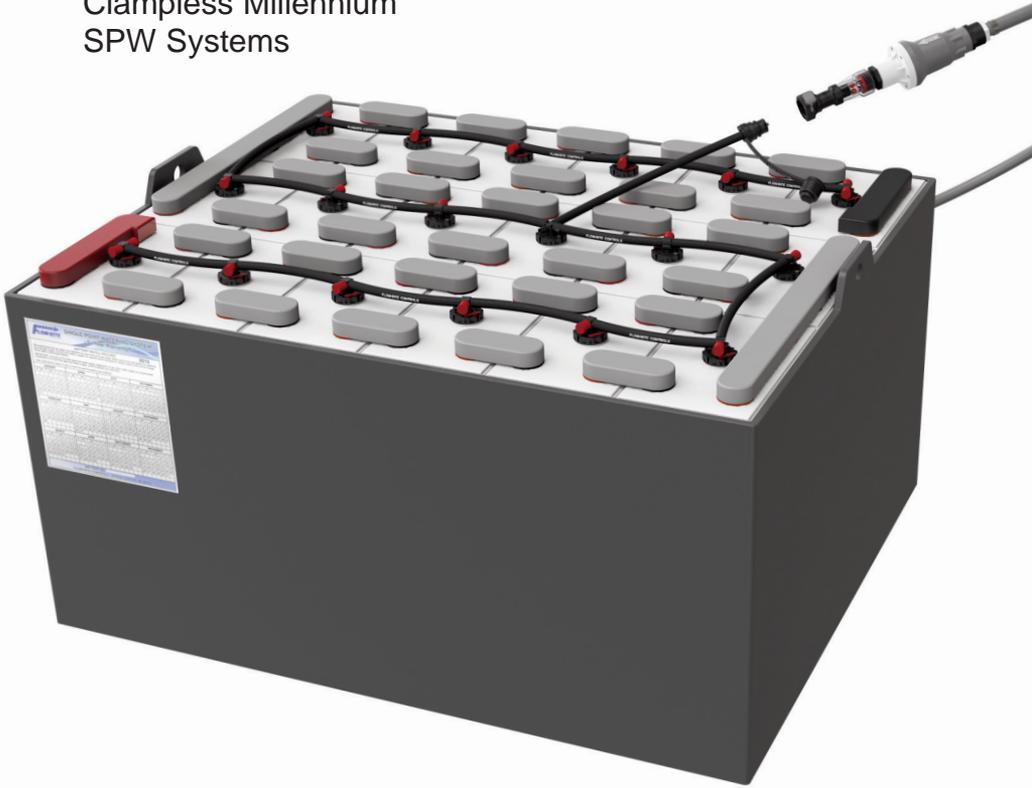




Installation, Operation & Maintenance Manual

For Model:
Clampless Millennium
SPW Systems



General Information & Precautions

This publication provides detailed instructions for installing the single point watering system kit. Thoroughly review this document before any installation procedures are performed.



The following safety statements relate to specific safety issues and must be read, understood, and heeded before a kit is installed. Failure to do so could result in personal injury and/or property damage.

DANGER

- Battery – Explosive gases! Do not smoke. Keep sparks and flames away from the vehicle and service area. Ventilate when charging or operating vehicle in an enclosed space. Wear a full face shield and rubber gloves when working on or near batteries.
- Battery – Poison! Contains acid! Causes severe burns. Avoid contact with skin, eyes, or clothing.
Antidotes:
 - External: Flush with water. Call a physician immediately.
 - Internal: Drink large quantities of milk or water. Follow with milk of magnesia or vegetable oil. Call a physician immediately.
 - Eyes: Flush with water for 15 minutes. Call a physician immediately.

WARNING

- Follow the procedures exactly as stated in this instruction, and heed all DANGER, WARNING, and CAUTION statements in this instruction as well as those on the vehicle and battery charger.
- Only trained technicians should service or repair the single point watering system. Anyone doing even simple repairs or service should have knowledge and experience in plumbing, electrical, and mechanical repair. The appropriate instructions must be used when performing maintenance, service, or accessory installation.
- Prior to servicing the vehicle or leaving the vehicle unattended, turn the key switch OFF, remove the key, and chock the wheels.
- Wear safety glasses or approved eye protection when servicing any part of the watering system. Wear a full face shield and rubber gloves when working on or near batteries.
- Do not wear loose clothing or jewelry such as rings, watches, chains, etc., when servicing the vehicle or battery charger.
- Moving parts! Do not attempt to service the vehicle while it is running.
- Use insulated tools when working near batteries or electrical connections. Use extreme caution to avoid shorting of components or wiring.
- If wires are removed or replaced, make sure wiring and wire harness are properly routed and secured. Failure to properly route and secure wiring could result in vehicle malfunction, property damage, personal injury, or death.

Package Contents



Millennium Valve



Male coupler



Tubing



Red End Caps



Instruction Manual



Battery Refill Record



Spanner Tool

	6 Cell Kit	12 Cell Kit	18 Cell Kit	24 Cell Kit	36 Cell Kit	40 Cell Kit	Master Pack
Millennium Valves	6	12	18	24	36	40	60
Clampless Tubing (in feet)	4.8	9.6	13.5	17.25	25	29	40
Red End Caps	9	18	27	36	54	54	70
Coupler	1	1	1	1	1	1	0
Spanner Tool	1	1	1	1	1	1	0
Battery Refill Record	1	1	1	1	1	1	0
Large Battery Manifold	0	0	0	0	1	1	0
Instruction Manual	1	1	1	1	1	1	1

Installation

Step 1 - Clean Battery & Remove Vent Caps

Wipe down battery top and remove any loose debris. Remove existing vent caps from battery.

Step 2 - Install Valves

Insert and secure Millennium™ valve into each battery cell by turning valve in a clockwise direction. Use the spanner tool to tighten. To secure the 35 mm DIN style cap, simply push in by hand.



Step 3 - Determine Tube Routing

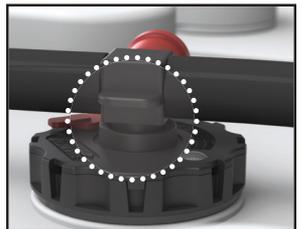
Choose the proper tube routing for your battery. In general, we recommend the tubing follow the electrical path. Batteries larger than 24 cells require a large battery manifold. For specific layouts please refer to SPW system installation diagrams on pages 6-7.

Step 4 - Install Tubing Segments (Pre-Assembled kits only)

- If your kit does not include pre-assembled hose sections you can proceed to step 5. Snap each swivel into the top of your Millennium SPW™ valves. Press firmly until you hear the audible click. When installed correctly the swivel will set flush with the port on the top of the valve as shown.



Correct



Incorrect

Installation Continued

Step 5 - Install Tubing Segments

Push one end of a tube segment onto a swivel connector. Tubing should be pushed up fully to the stop.

If needed, trim the tube with a sharp pair of scissors or Flow-Rite tube cutter and then connect to the adjacent valve. When trimming, cut tube squarely and leave a slight curve in the tube to prevent stretching or kinking.

Repeat until all valves are connected with tubing.



Note: We have included extra tubing attached to the feed tube to connect the cell rows (in battery width direction).

Step 6 - Connect Feed Tube

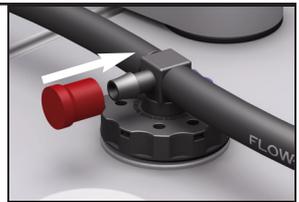
Locate tube near the center of the battery ensuring that the water supply can be connected without kinking the tubing. Cut to the desired length and connect to a swivel connector. Connect the quick coupler if applicable.

Note: Coupler should rest on top of the battery and not hang over the side.



Step 7 - Install Red End Caps

Press red caps onto all the unused swivel connector ports.



Step 8 - Dust Cover

Slide the dust cover over the quick coupler.

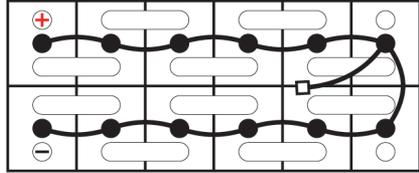


Installation Diagrams

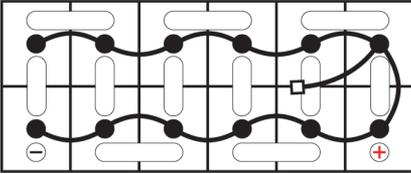
6-cell, 2 post



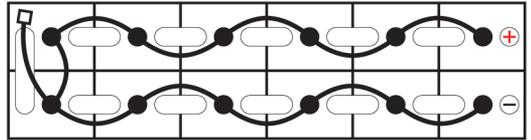
12-cell, 2 post (A)



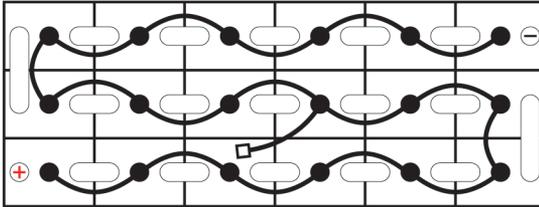
12-cell, 2 post (B)



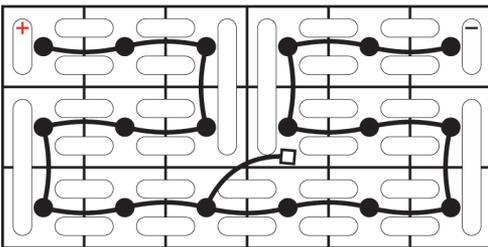
12-cell, 2 post (C)



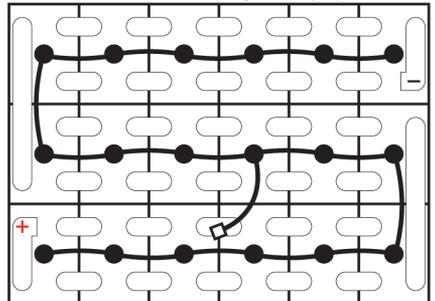
18-cell, 2 post



18-cell, 4 post (A)

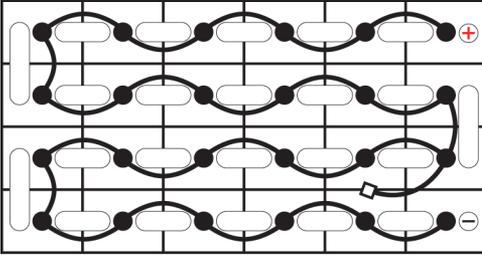


18-cell, 4 post (B)

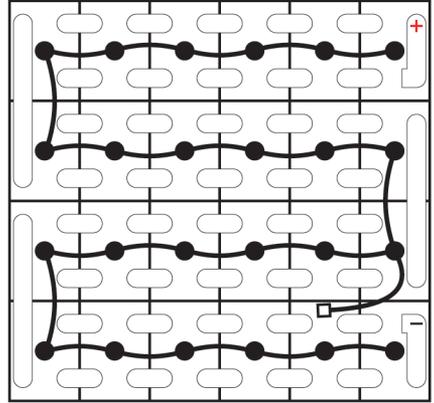


Installation Diagrams

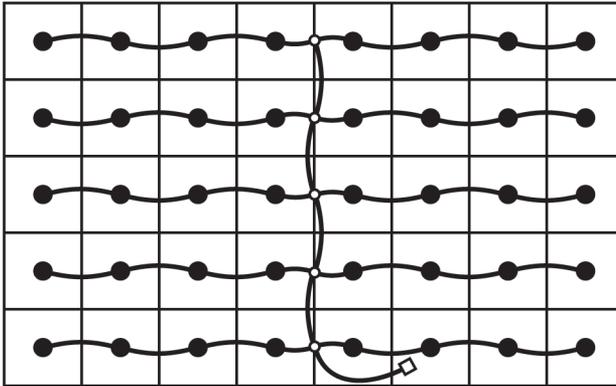
24-cell, 2 post



24-cell, 4 post



40-cell, 2 post



Note: Batteries larger than 24 Cell / 48 Volt require the use of a large battery manifold kit (p/n: BA-017). A manifold kit is included with pre-cut Millennium kits when applicable. Please refer to the instructions included with this kit for proper tubing layout. Large Battery Manifold Kits are not included with Master Packs and must be purchased separately if needed.

Watering Procedures

1. Water After Charge

Electrolyte levels drop during discharge and rise during charge. In addition, charging generates heat, fluid expansion, and explosive gases. Watering a battery before charge (or with a low charge level) can lead to boil over, resulting in potential damage to the watering system, battery, and vehicle.

When needed, water must only be added to fully charged battery. If the battery has been neglected and water levels have fallen below the plates, water should be manually added to just cover the plates. After the battery has been charged you can finish topping up with the watering system.

2. Watering Intervals

Watering intervals are dependent on the local climate, charging methods, application, and age of batteries. Flow-Rite recommends checking consumption rates manually or with the optical indicator (when equipped). New batteries should be checked once a month and older batteries weekly until water consumption rates are known.

Typically for a heavy use application, watering a maximum of once per week is recommended, and for light use applications once per month. Do not water a battery that has been sitting for an extended period of time with no activity (non-use or not on charge) such as a battery that has sat idle over the weekend. It is best to water a warm battery that has just been fully charged.

Important: Water quality is important to maintain the life of your battery and watering system. Always use water that meets the quality requirements of your battery's manufacturer.

Operation

For successful operation of your Single Point Watering system always:

1. Only use Flow-Rite approved equipment.

Warning! Use of unapproved equipment or modification of approved equipment can lead to system failure and will void your warranty.

2. Always follow Flow-Rite's required watering procedures.
3. Perform regular scheduled maintenance!

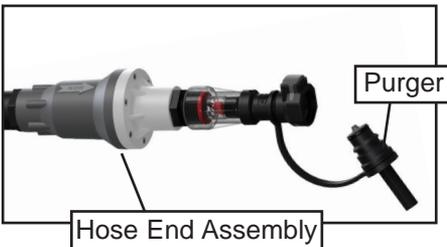
Warning! Only fill batteries after they have been fully charged and require water.

Important: If you are using a hand pump, cart, or gravity feed water supply to fill your Millennium SPW™ system, please refer to their instructions for proper operation!

Step 1 - Qualify Water Supply

- Check flow rate through included purger by mating purger with hose end assembly. Verify that a minimum of 2 GPM (gallons per minute) is achieved. This can be measured with a bucket and a stop watch or a watch with a second hand.

Note: Should a 2 GPM flow rate not be produced refer to the troubleshooting guide in your water supply's instruction booklet.



Step 2 - Remove Dust Cover



Operation Continued

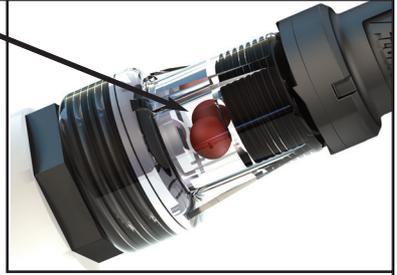
Step 3 - Mate Couplers

- Insert the male coupler on the SPW system into the female coupler on the end of the water supply.



Step 4 - Observe Flow Indicator

- The red balls inside the flow indicator will begin to spin indicating that water is flowing into the battery. As the cells fill and the valves shut off, the balls will begin to spin slower until they come to a stop. This indicates that all valves have shut off and filling is complete.



Step 5 - Disconnect

- When the balls stop spinning, and not before, immediately disconnect the couplers by depressing the push button on the female coupler.

Warning! If the water supply is left connected after the filling process is finished, it could lead to an overflow.

Disconnecting before the balls come to a complete stop will lead to underfilled cells.

CAUTION: If at any time during the filling process you have a valve failure, disconnect immediately and refer to the troubleshooting section.



Step 6 - Replace Dust Cover

- Place dust cover back over the male coupler.



Regular Maintenance

Your single point watering system requires regular preventative maintenance on at least a quarterly basis.

1. Check all screens and/or filters on water supplies.

Clean or replace all filters & line strainers as necessary. Failure to do so can cause a reduction in the water pressure and flow rates needed to operate the system properly. A filter screen can be found on the inlet of all regulators, and a line strainer on all supply hoses. Pump powered water supplies include a strainer on all suction hoses. For deionizers, be sure to replace the filter cartridges as indicated by the water quality light. Consult your water supply's manual for detailed instructions.

2. Inspect the condition of all tubing, connections, and couplers.

Make sure that all parts are in good working condition, secure, leak free, and properly connected. The coupler must have an O-ring and the dust cover properly attached.

3. Clean optical indicators.

If the optical indicators are dirty they should be cleaned by wiping down with a cloth.

4. Check electrolyte levels.

Flow-Rite recommends checking the electrolyte level in each cell for accuracy after the system has been installed and operational for three months. This can be done using the by looking in the cell during PM's or by using the built in optical level indicators. The indicators will appear black in color if the cell is full and white in color if they are low. In poorly lit areas we recommend using a flashlight for best results.

Seasonal Maintenance

Water Supplies

Water supplies must be drained and stored in an empty state if they will be exposed to freezing temperatures. Failure to do so can cause permanent damage.

Watering Systems

If you have vehicles that are taken out of service or put into storage for a period of 6 weeks or longer, your single point watering system will require seasonal maintenance. To prepare the SPW system, ensure the feed tube and coupler are on top of battery. Additionally, the following steps need to be followed when bringing your vehicle back into service.

1. After the batteries have been fully charged/equalized, connect the system to its water supply for 3-5 seconds then disconnect, regardless of whether or not the batteries are completely full.
2. Return the vehicle back to normal operation.
3. Place the vehicle back into its regular watering schedule (waiting at least one week until next watering).

Operating Specifications

Operating Requirement of SPW system

Flow-Rate:	2.0-5.0 gallons per minute* 7.6-19.0 Litres per minute
Pressure Range:	3.0 - 35.0 PSI (no flow, static) 0.21-2.4 bar
Temp. Range:	Freezing - 150 ^o F Freezing - 65.5 ^o C

Water Supply Operating Requirements

Inlet Pressure Range	40-100 PSI (no flow, static)
Temp. Range	33 - 150 ^o F 1 - 65.5 ^o C

All product specifications and requirements should be met for proper operation of your Flow-Rite SPW system. Contact your battery supplier or Flow-Rite Controls if you have any questions regarding product specifications or how to verify a water supply.

*Flow rate should be measured at the end of a purger (female / male coupler combination).

Troubleshooting

If you notice reduced run time on your vehicle, check to see that each cell is filled to the proper level. In the event that a cell is not showing water, connect system to its water supply. Recheck the level of low cells. If they are still low, call for service.

In the event that a valve does not shut off, qualify water supply to ensure that it is producing 2GPM (measured through the purger). If the water supply qualifies, call for service. If it does not qualify, perform Maintenance procedures and requalify. If it does not qualify after performing Maintenance, call for service.

Warranty

5 Year Limited Warranty for Millennium SPW

Flow-Rite Controls Warranty Policy for Millennium SPW Systems as used on flooded lead acid batteries

Flow-Rite Controls warrants to Purchaser that its product, the Millennium Single Point Watering (SPW) kit, will be free of all defects in material and workmanship for five (5) years after the date of purchase. If within five years of the date of purchase, the Millennium SPW kit, fails to perform due to a manufacturing defect, Flow-Rite Controls will repair or replace the Millennium SPW kit free of charge.

A Return Goods Authorization Number (RGA) must be obtained from Flow-Rite Controls (through your Millennium SPW supplier) prior to returning product for warranty consideration. Purchaser must send any product covered under this warranty, along with a copy of supplier's invoice and description of the problem to: Flow-Rite Controls, 960 74th St SW, Byron Center, MI 49315.

Flow-Rite Controls Replacement Plus +

Flow-Rite wants to ensure that your Millennium SPW watering system is always functioning properly. If a swivel tee, gasket or o-ring is ever damaged or broken during regular battery use, we will replace the parts at no charge. Please follow the normal return authorization process.

In addition, if the Millennium SPW kit is installed by an authorized representative in accordance with our installation instructions and a defect in this Millennium SPW system is the cause of a dry cell(s) resulting in permanent failure (unable to deliver 80% of rated capacity), Flow-Rite Controls will repair or replace the cell or battery at its option and at its expense.*

*Limited to cost of repair, **does not include travel or transportation.** Covered costs are subject to Flow-Rite Controls warranty cost schedule.

Warranty

*This warranty is subject to the following terms and limitations:

- The SPW system must be installed in agreement with Flow-Rite's current installation and operation instructions.
- The user must follow the recommended watering and maintenance procedures as directed by the Flow-Rite Controls and battery manufacturer's operation and maintenance manuals.
- The user must only fill the Millennium SPW system from Flow-Rite Controls authorized or approved water supplies.
- The warranty is void if the product is subject to misuse, abuse, inadequate maintenance or physical damage other than normal wear and tear.
- The warranty applies to the original user of the product and is not transferable. It applies only to product located in North America.

Flow-Rite Controls, at its option may require the following: documentation of who installed the SPW system, serial number of the battery, watering logs, photographs of installation or proof of purchase (copy of original invoice). Warranty claims must be submitted through your Millennium SPW supplier. Flow-Rite Controls, at its option, has the right to inspect the warranty claimant's facility for proper installation, operation and maintenance procedures of the battery watering system.

Disclaimer of Warranties: It is expressly understood and agreed that Flow-Rite Controls shall not be liable for damages or injuries to persons or property. Failure to promptly report a malfunction in your system may limit your coverage. This limited warranty expressly excludes any incidental or consequential damages. Because Flow-Rite's warranty excludes any incidental or consequential damages, Flow Rite recommends for the first three months checking electrolyte levels once a month. Thereafter, check electrolyte level once per quarter.



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