



# Portable Watering Cart - Operation & Maintenance Manual

For Model:  
BA-MS-110



BL-036  
02/17/2015

# 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.

# 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 of the watering system, battery and vehicle.

Water, when needed, must be added to a fully charged battery. Prior to charging, there must be sufficient water to cover the plates. If the battery has been discharged (partially or fully), the water level should still be above the plates.

## 2. Watering Intervals

- Watering intervals are dependent on the local climate, charging methods, application, and age of batteries. Flow-Rite recommends that new batteries be checked once a month and older batteries be checked weekly until you get a feel for your water consumption rate.

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.

## Step 1 - Fill Tank

- Ensure the water supply has ample water to fill battery. If necessary, remove lid and fill cart with water. All carts are compatible with deionized water.

## Step 2 - Power Up Cart

- Turn on the cart by pushing the on/off button. Check the LED power lights to verify the battery is charged. The status is as follows:

Green - Ready to go, battery charged

Yellow - Battery is low, charge soon

Red - Battery is below 12 volts, cart must be plugged in to continue watering.

Blinking Yellow - Battery is charging, but can be run while plugged in

**Recharging Battery:** Plug in battery charger to a GFCI outlet when cart is not in use to ensure the battery is fully charged. The on-board charger will maintain charge levels as necessary. See page 3 for power requirements.

NOTE: Once the water supply has been powered on, the pump will turn on briefly to develop pressure in the supply hose and then will turn off. The power switch can be left on in between refilling batteries. The pumps will turn on occasionally to maintain pressure in supply hose. This occasional cycling will not damage the water supply. If the battery falls below 12 volts the cart will automatically shut down until recharged or plugged in.

## Step 3 - Remove Dust Cover



# Operation Continued

## Step 4 - Mate Couplers

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



## Step 5 - 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. Note: the pump may cycle on and off during the filling process to maintain an even fill pressure. Do not disconnect until the red balls have stopped rotating.



## Step 6 - 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 7 - Replace Dust Cover

- Place dust cover back over the male coupler.

NOTE: Cart will automatically turn off after 5 minutes of inactivity.



# Regular Maintenance

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

## 1. Check all screens

Clean or replace all strainers as necessary. Failure to do so can cause a reduction in the water pressure and flow rates needed to operate the system properly.



Regulator Filter Screen (A)



Line Strainer (B)



**Note:** Pictures may differ slightly from your specific application.

## 2. Inspect the condition of all tubing connections, red end caps, swivel T's, and couplers.

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

## 3. 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.

# 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. Check you system instructions for details.

# 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 <sup>o</sup> F Freezing - 65.5 <sup>o</sup> C

## Water Supply Operating Requirements

Power requirements	100 - 240VAC, 50/60Hz
Temp. Range	33 - 150 <sup>o</sup> F 1 - 65.5 <sup>o</sup> 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).



Visit [www.flow-rite.com](http://www.flow-rite.com) for details



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