

# SingleShot

## Installation and Operating Manual



### INTRODUCTION

The SingleShot is a water-resistant microprocessor controlled chemical injection device for accurate dose delivery upon demand. Features of the SingleShot include:

- Programmable Delay time from 0 to 20 minutes.
- Programmable Dose time from 0 to 20 minutes.
- Programmable Lockout time from 0 to 20 minutes.
- Recycle timer feature: Delay/dose/lockout cycle is performed indefinitely when turned on, instead of just once when the button is pushed.
- Easy triggering from the front panel via an optional remote switch or external closed-contact signal (using the opto-coupler).

The unique 5-button keypad and digital display screen on the front of this compact peristaltic pump adds to its versatility and ease of use.

The SingleShot can be triggered using the Dose button on the front panel. Additionally it can be triggered via the optional remote trigger button or from a dry contact closure for remote or automatic dosing applications.

The flexibility of the SingleShot allows its use in a variety of applications including over-the-sink pot and pan dosing and with top-load laundry machines.

The SingleShot is available for use with 115VAC or with a D-cell battery pack.

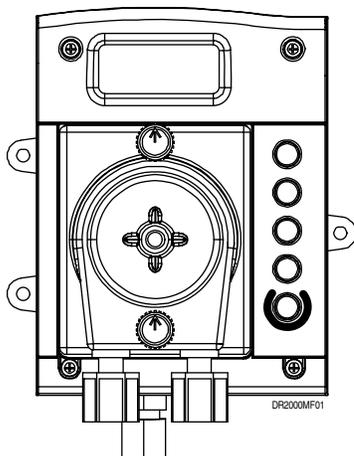


Figure 1a. SingleShot

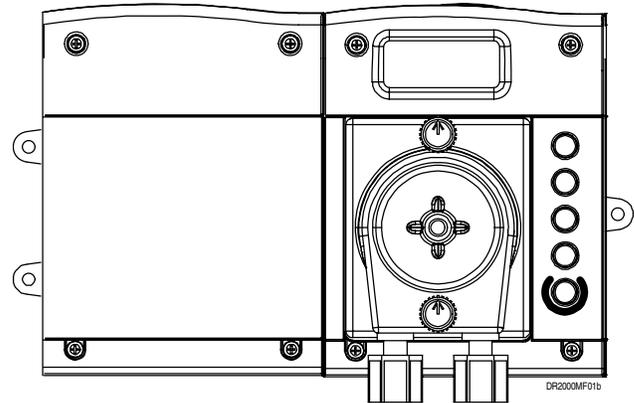


Figure 1b. SingleShot D-Cell Battery Unit

### PREFACE

This manual describes how to install, setup, operate and maintain the SingleShot. Material in this manual is subject to change without notice. Manual revisions will be made on an as needed basis. Special circumstances involving important design, operation or application information will be released via Equipment Technical Bulletins.

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### SAFETY

These symbols on the unit mean:



### SPECIFICATIONS

#### OPERATING CONDITIONS

Ambient Operating Temperature

35 to 104°F (5 to 40°C)

Electrical Power

Options available: 115VAC 50/60 Hz +/- 10%  
4 D-cell battery powered

Altitude

<2000 meters

Humidity

0 to 100% relative humidity (non-condensing) throughout temperature range.

Ratings

Pollution Degree: 2

Installation Category II  
Intended for indoor use only

## TIMING CAPABILITY

One Delay event, one Dose event and one Lockout event can be programmed, each with a duration of from 0 second to 19 minutes and 59 seconds. These events will occur in the order Delay, Dose, Lockout each time the dose button is triggered. If the dose button is triggered during a Delay or Dose event the Delay and Dose will be canceled and the SingleShot will go straight to the Lockout event. If the dose button is triggered during a Lockout event it will be ignored.

If the recycle timer feature is turned on, as long as the unit has power it will count down the delay time, pump for the programmed dose time, count down the lockout time, and then recycle or run the cycle again indefinitely, without the need for a trigger or push of the button.

## DIMENSIONS

115 VAC/230 VAC Version:

Size	Height	Width*	Depth**
Inches	5.6	4.6	4.8
Centimeters	14.2	11.6	12.2

D-Cell Battery Powered Version:

Size	Height	Width*	Depth**
Inches	5.6	8.4	4.8
Centimeters	14.2	21.3	12.2

\*Width includes feet.

\*\*Depth with SnapHead pump cartridge in place.

## Weight

115VAC version: 1.85 lbs/0.84 kg

D-Cell Battery Powered version: 1.57 lbs/0.72 kg\*

\*D-Cell Battery Powered version without batteries

## COMPONENTS

### Enclosure

Molded ABS plastic, water-resistant, flame-resistant

### Pump

Peristaltic, self-priming and self-checking,  
6 Volts DC

### Speed & Displacement

**Battery-Powered Units:** 5.5 oz per min (153 ml per min)\*

**Line-Powered Units:** 7.5 oz per min (222 ml per min)\*

\*With Silicone tubing. Results may vary depending on voltage, chemical viscosity, temperature and other factors. Always perform your own test with your unit to confirm actual pump speed.

### Maximum Duty Cycle

At temperatures up to 85°F/29°C: 4 hours of pump down-time required for every 20 minutes of continuous run.

At temperatures over 85°F/29°C: 12 hours down-time for every 20 minutes of continuous run time.

## Hydraulic Performance

**Maximum Vacuum:** 8 in of mercury

**Maximum Pressure:** 20 psi

## Tubing Material

Silicone

## Coin Battery

3 Volt Lithium BR2032 or CR2032

## Regulatory

	CSA	CE
<b>SingleShot/115 VAC</b>	✓	✓
<b>SingleShot/6V Battery</b>	✓	✓

For confirmation of regulatory compliance, see rating label on your SingleShot.

## INSTALLATION



*Refer installation and service to qualified personnel only.*

*Installation must comply with all applicable plumbing and electrical codes.*

## MOUNTING

The SingleShot should be mounted horizontally with its back against the wall so the LCD screen can be viewed easily. It should be located close enough to both the injection point and liquid supply to ensure unobstructed delivery. It is recommended that the SingleShot be mounted in an area that is out of the way and partially protected from direct water spray and vapor.

1. Align the metal mounting bracket and mount on a smooth surface using screws. Use a level if necessary.
2. Place the SingleShot over the mounting bracket and slide it down tight.
3. If desired, a screw can be placed in one of the feet to hold the unit in place.



*The SingleShot can also be mounted using the three plastic feet. If mounting on an uneven surface, be careful not to over-tighten or snap the feet off.*



*Mounting the SingleShot horizontally with its back against the wall is important in assuring the water resistance of the unit. Mounting the unit face up may compromise this water resistance and for this reason is not recommended.*

## INSTALLING SUPPLY LINES

1. Cut the desired length of 1/4-inch (6mm) chemical feed line and attach it to the nut of the left side (suction side) of the pump squeeze tube.



Figure 3. Installing the Chemical Feed Line to the Squeeze Tube Fitting.

2. For the chemical uptake side, a standpipe is provided. Cut the bottom of the chemical feed line tubing at a 45-degree angle and press it into the standpipe. Insert the chemical feed line 0.5 inches (12 mm) above the bottom of the standpipe. Both the 45-degree cut and the 0.5-inch (12-mm) distance above the bottom of the standpipe will help avoid the formation of a seal with the bottom of the chemical drum and ensure an unobstructed chemical uptake.

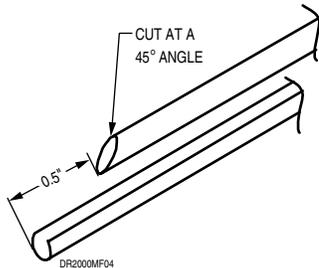


Figure 4. Cutting Chemical Feed Tubing, Inserting into Standpipe

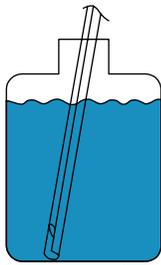


Figure 5. Chemical Feed Tubing (uptake side) with Standpipe in Chemical Drum

3. Cut and connect the desired length of chemical feed line for the chemical delivery to the right side of the pump squeeze tube. Run the delivery tube to the desired injection point. Avoid uphill runs greater than 10 feet (3 meters).

## POWER SUPPLY

### 115VAC Power Cord Version

This unit comes with a standard power cord. No ground connection is required.

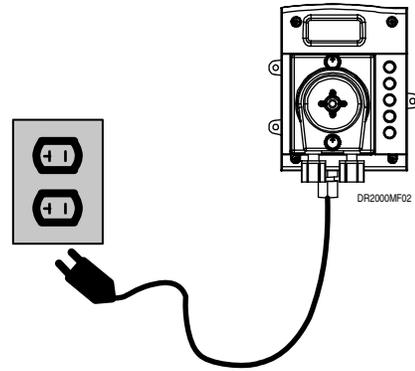


Figure 6. Plugging SingleShot into Outlet

### D-Cell Battery Powered Version

This unit comes with a battery pack for 4 D-Cell batteries (batteries not included). The D-Cell battery holder is housed in the battery compartment.

### Installing the Batteries

1. Remove the 4 screws holding the battery-housing top in place (the battery pack bezel).
2. Lift off the top and remove the battery holder, being careful not to damage the gasket.
3. Insert 4 D-cell batteries as indicated.
4. Replace the battery holder and battery-housing top.
5. Refit and tighten the 4 screws, being careful not to damage the gasket.

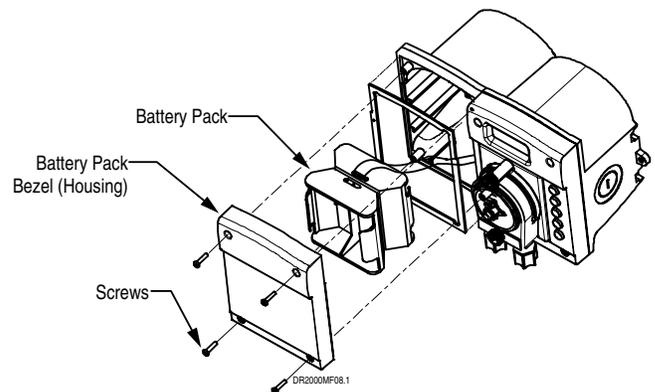


Figure 7. Inserting D-Cell Batteries

Ensure that the front plate is firmly in place and the screws properly tightened to prevent moisture from entering into the unit and to maintain the SingleShot water resistance.



*It is not necessary to remove the front of the pump control box. The batteries are in the battery compartment. They can be changed without opening the pump side of the SingleShot.*

### Battery Life

It is important to know that there is significant difference in quality between commercially available D-cell batteries.

“Heavy-duty” and “Copper Top” brand batteries tend to last the shortest length of time, while the Duracell Ultra M3 and Energizer Max batteries can last up to ten times longer. We recommend that you ONLY use these high-quality alkaline batteries. All performance data described in this manual for the battery powered SingleShot assumes high-quality batteries are being use.

When putting in batteries for the first time or changing out old batteries the SingleShot will not immediately recognize the charge of the new batteries. The three bars on the screen will blink alternately to indicate that the SingleShot is unsure of the charge the batteries hold. The battery indicator will return to normal after the first pumping event or when the pump is primed for more than 3 seconds.



*There is a 3-volt lithium battery on the main PCB that serves as an emergency backup power supply. This battery provides backup power to retain the settings during power loss. It provides enough power to retain event data but will not run the pump. The life of this battery will depend on the amount of time that power is lost during the lifetime of the pump and the average ambient temperature. Because of the extremely low power demands of the SingleShot it may never be necessary to change this battery. If this battery does go dead all programmed events will be erased after a power loss. A replacement battery can be purchased commercially. See the Periodic Maintenance section for more information.*

## SETUP & PROGRAMMING

During normal operation, the SingleShot is in Run Mode. In Run Mode, the screen will display “---”. For battery powered units without batteries only one bar will be lit.

The SingleShot is programmed using the 5-button keypad and display screen in the front of the unit.

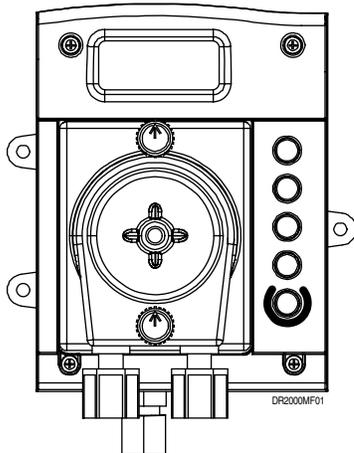


Figure 8. SingleShot, Front Plate

## ENTERING PROGRAM MODE

To begin programming, you must first enter into Program Mode. To do this, hold down the Program button for 8 seconds.

A “P” will appear to indicate that you have successfully entered Program Mode. The screen displays a “1” in the upper left to indicate that you are in the Delay Time menu. The screen will display the current Delay Time setting in minutes and seconds and “MIN: SEC” will appear in the lower right of the screen.

## DELAY TIME

Use the Minutes and Seconds buttons to change the length of the Delay event. The Delay Time can be set for up to 19 minutes and 59 seconds. Setting the Delay Time to 0:00 assures that there will be no delay and when activated the pump will go directly to the Dose event.

Example:



The screen above indicates that you are in program mode, in the Delay Time Menu and have a Delay Time set for 1 minute and 15 seconds.

## DOSE RUN TIME

When you have finished programming the Delay Time press the event button; a 2 will appear to indicate that you are in the Dose Time menu. The current Dose Run Time will be displayed in minutes and seconds. Use the Minutes and Seconds buttons to set the Dose Run Time. This can be set for up to 19 minutes and 59 seconds.

While programming the Dose Run Time, once you have entered a run time you can activate the dose event from this menu. This will allow you to confirm the correct chemical delivery and adjust the Dose Run Time as needed. To activate the dose event simply push the Dose button from this menu. The display will count up the event and the pump will run for the programmed Dose Run Time.

Example:



The screen above indicates that you are in program mode, in the Dose Run Time Menu, and have a Dose Run Time set for 4 minute and 45 seconds.



*The duty cycle for SingleShot should be no more than 20 minutes on/20 minutes off.*

## VOLUMETRIC DOSE RUN TIME SETTING

If desired, you can also set the Dose Run Time volumetrically. In order to do so you must first program a run time for the dose from the Dose Run Time menu. Choose a run time that you expect to be more than the run time you will need.

In program mode, from the Dose Run Time menu, press the Dose button to begin the dose. Measure the chemical delivered. When the desired volume of chemical has been delivered press the dose button again to stop the pump. The time the pump ran will now replace the programmed Dose Run Time.

**Example:** You want to program a dose of 100 ml. You expect that the pump will need to run for somewhere between 30 seconds and 1 minute in order to pump 100 mls. Remember the flow rate for a line-powered SingleShot with Silicon squeeze tube should be around 150 mls per minute but this may vary depending on chemical viscosity, temperature etc. (the flow rate for a battery-powered SingleShot will be less).

From the Dose Run Time menu in program mode, set a Dose Run Time of 1 minute (more time than you expect you will need). Without leaving this menu, press the Dose button. Catch the chemical pumped by the SingleShot in a graduated cylinder. When the quantity of 100 mls has been delivered press the Dose button again to stop the pump. The programmed Dose Run Time will be replaced with this new value, the actual time it took to deliver 100 mls of chemical (the time between the first time you pressed the Dose button and the second time you pressed it).



*When D-cell batteries power the SingleShot the speed the pump spins will decrease as the batteries age. Thus the delivered dose may be less as the batteries approach the end of their useful lives and it may be necessary to reprogram longer events in order to deliver the same chemical volume*

## LOCKOUT TIME

When you have finished with the Dose Run Time press the event button again, a 3 will appear to indicate that you are now in the Lockout Time menu. The current Lockout Time will be displayed in minutes and seconds. Use the Minutes and Seconds buttons to set the desired Lockout Time. This can be set for up to 19 minutes and 59 seconds. A setting of 0:00 will assure that there is no Lockout event.

Example:



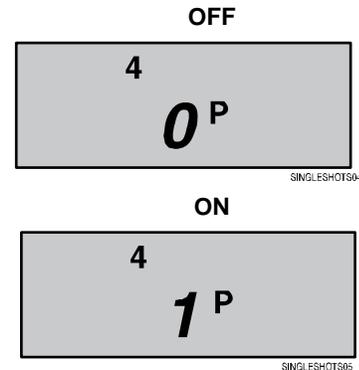
The screen above indicates that you are in program mode, in the Lockout Time Menu and have a Lockout Time of 10 minutes and 30 seconds.

## RECYCLE TIMER FEATURE

The continuous cycle feature is by default off, with a setting of 0. Press either the minute or second button once to change the 0

to a 1, which turns this feature on, such that the pump will continuously run through the delay/run/lockout cycle sequence. Pressing either key again will change the setting back to 0 to turn it off.

Example:



## RETURNING TO RUN MODE

When you have finished programming, you can return to Run Mode by pressing the Program button once. The “---” will appear and the “P” will no longer be illuminated. If you leave the SingleShot in Program Mode and unattended for 2 1/2 minutes, it will switch back into Run Mode automatically.

You can be sure you are in Run Mode by pressing the Prime button and priming the pump. The Prime button will not prime the pump if you are not in Run Mode.

If in Relay Mode, the unit will immediately begin the cycle.



*The duty cycle for SingleShot should be 50% or less, i.e. it shouldn't run more than 50% of the time, to prevent heat build up in the enclosure.*

## PRIMING

1. Ensure that you are in Run Mode.
2. Press the Prime button to operate the pump.

## Activating a Dose

Once the SingleShot is programmed and in Run Mode it is ready to use. To activate a dose the pump must receive a signal. This signal can come by pressing the Dose button, pressing the remote switch (if present), or by an electric signal sent from the washer through the opto-coupler (if present).

## INSTALLING THE OPTIONAL REMOTE SWITCH OR OPTO-COUPLER

The remote switch (#069484) or opto-coupler (#067480) must be installed and wired into the PCB as described below. A strain relief should be used and can be obtained commercially or purchased from Beta (#032121).

Break out the bottom knockout, mount the strain relief and wire in as described below.

## Removing the Knockout

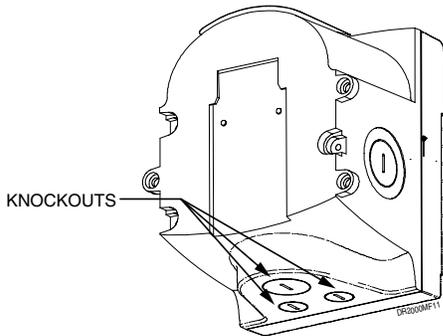


Figure 8a. Bottom of Unit, Knockouts

1. Remove the front plate.
2. Remove the wires from the motor terminals.
3. Remove the motor gearbox from the front plate.
4. Re-mount the front plate without the motor gearbox to add stability to the pump housing while removing the knockout.
5. Insert a screwdriver into the groove in the middle of the “knockout” you have selected. Either the small left or right knockout may be used.
6. Rock the screwdriver back and forth while applying pressure. Work the screwdriver through the plastic.
7. Insert the screwdriver and gently pry up, being careful not to damage the pump housing.
8. Work from the center of the knockout toward one side and then around, gently prying the knockout plastic free.
9. Clear any plastic burrs that remain.
10. Remove the front plate, re-mount the motor gearbox and reconnect wire leads to motor terminals (black wire to terminal with red dot).

## Mounting the Strain Relief

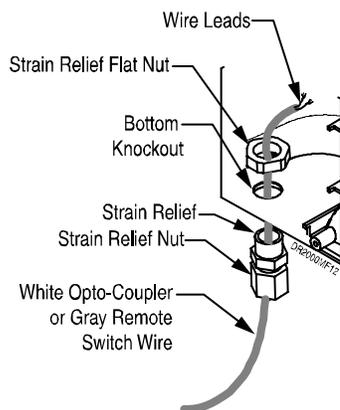


Figure 8b. Mounting Strain Relief

1. Remove flat nut from strain relief.
2. Feed the white opto-coupler wire or gray remote switch wire through the strain relief nut and through the strain

relief so that about 2” (5 cm) of the wire stick out from the top of the strain relief.

3. Insert wire and strain relief into the pump enclosure through the bottom knockout as shown in Figure 8b and tighten the strain relief nut.
4. From inside the pump enclosure, feed the end of the wire through the strain relief flat nut.
5. Tighten the flat nut onto the strain relief to hold wire in place and ensure the pump’s water resistance.

## Connecting the Wires to the PCB

### Remote Switch

When connecting the wire leads from the remote switch the orientation does not matter. Connect the wire leads to the terminal block marked “Dep Input” (J3) on the main circuit board (see Figure 8c).

### Opto-Coupler

1. When installing the opto-coupler the white wire goes to the SingleShot and the black lead goes to the washer trigger source.
2. Connect the leads of the white wire (blue and brown on Opto-coupler #067480) as indicated in the drawing. **The orientation is important.** The blue lead connects to the position closest to the coin cell battery (top) and the brown lead goes to the position closest to J3 (bottom). If these leads are reversed, the opto-coupler will not work and can be damaged. See Figure 8c.



Ensure that the trigger wire voltage and temperature rating are suitable for the application.



Opto-coupler #067480 will trigger with low voltage (such as 3-14V). If you have a trigger with electrical noise over 3V, you should use a different opto-coupler.

3. Connect the black leads to the trigger source at the washer. Triggers signals of from 24 to 240 V 50 -60 Hz are acceptable.

## Reassembling the Pump

Re-mount the pump front plate with the motor gearbox. Be sure that the wire leads are connected to the motor terminal (black wire to terminal with red dot).

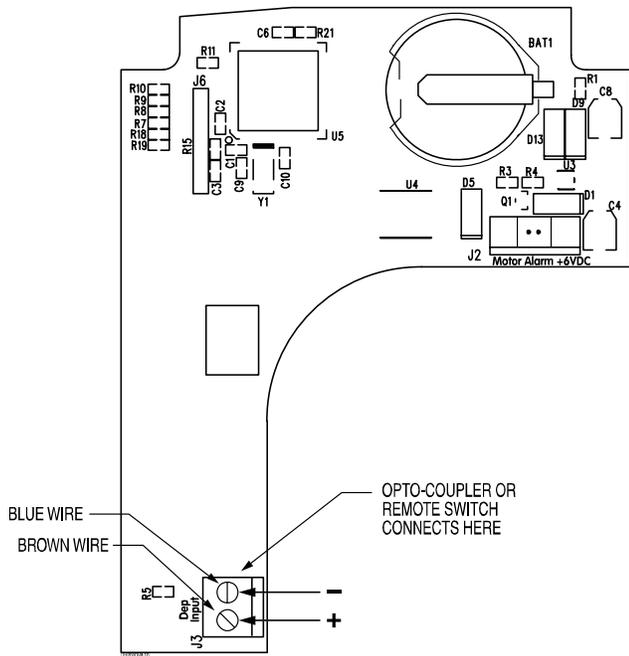


Figure 8c. Connecting Remote Switch or Opto-Couple (#067480)

## USING THE SINGLESHOT

When the SingleShot receives a signal from pressing the Dose button, remote switch or closed-contact signal (opto-coupler), it will activate a dose event.

The Screen will display a 1 to indicate that it is in a Delay event, and countdown the Delay Time. When the Delay event ends the screen will display a 2 to indicate that it is in a Dose event, the Dose Run Time will begin counting down and the pump will activate. When the Dose ends the screen will change to display a 3 to indicate that it is in a Lockout event and the screen will count down the Lockout Time. When the Lockout ends the pump will return to ready mode and “---” will be displayed.

If no delay is programmed, when the dose button is pressed the pump will go straight to the Dose Event. If no Lockout is programmed when the Dose Event ends the pump will go straight to ready mode.

If a signal is received and a dose is activated by mistake, pressing the Dose button or sending a second signal (via remote switch or opto-coupler) will cancel the event and take the SingleShot directly to the Lockout Event. *This means that if the SingleShot receives a signal during a dose event, the dose event will be cancelled before it is completed.*

## LOW BATTERY MONITOR

The battery powered SingleShot has a low battery monitoring capability. When in Run Mode the “---” that appear on the screen indicate that the batteries are fully charged. As the batteries pass about 1/3 of their useful life only 2 bars will be lit, the screen will display “-”. As the batteries continue to age only one bar will be lit, and the screen will display “-” indicating that it is time to change batteries.

## MAINTENANCE



Safety glasses and protective clothing should be worn while servicing the SingleShot.



Refer installation and service to qualified personnel only.

## PERIODIC MAINTENANCE

### Pump & Squeeze Tube Replacement Schedule

Since every installation is different (chemicals, tube runs, operating frequency, and so on), an exact tube replacement schedule cannot be specified. With use, the tube slowly evolves from round to oval and the amount of chemical pumped decreases. By regularly checking the amount of chemical pumped, you can determine general tube life. It is recommended that you closely monitor the time it takes the original tube to reach the end of its flex life, and then establish a replacement schedule. Replacing tubes at regularly scheduled intervals ensures more accurate product use and reduces service calls. In general, short feed lines of a large diameter will improve pump tube life.

## REPLACING PUMP CARTRIDGES

### To Remove

1. Turn off power to the unit to ensure that the pump does not run during maintenance.

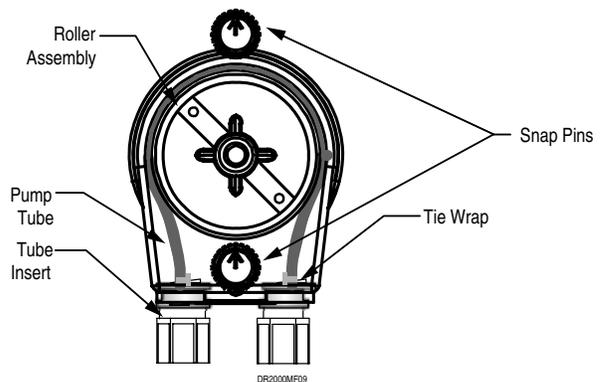


Figure 9. SnapHead Pump Cartridge

2. Turn the SnapHead pins to the left or right to remove the pump head.
3. Remove the supply and feed lines from the old pump squeeze tubing and connect them to the new pump squeeze tubing.

### To Install

1. Align and engage the pump drive spline with the motor gear by rotating the roller assembly.
2. Turn the snap pins so that the arrow is pointed either straight up or down. Then push in until you hear a distinct click.

## Replacing Pump Squeeze Tubing



*Splash danger! Because the squeeze tube contains chemical product and is flexible, extra caution should be taken while changing the squeeze tube to insure that the chemical does not splash in the eyes or on the hands or clothing of the service person.*



*Always wear protective eyewear, gloves and protective clothing when changing the squeeze tube.*

1. Remove the cartridge as described above.
2. Loosen but do not remove the small screw at the bottom of the rear cover and lift the cover from the cartridge.
3. Pull the roller assembly out of the pump cartridge to release the pump squeeze tubing.
4. Pull the tube inserts out of the pump cartridge.
5. Remove the squeeze tube.
6. Replace it with a new squeeze tube.
7. When using Viton or Silicone, always coat the inside of the cartridge with a liberal amount of Vaseline (petroleum jelly) lubricant. Never use Dow Corning lubricant with a Silicone tube, as it will make it fail prematurely. Press the two tube inserts into the cartridge so that the tie wrap "buckles" face toward the center of the pump. Remember, the tube must not be twisted during the assembly.
8. Replace the roller assembly.
9. Replace the rear cover.
10. Push the black SnapHead pins back into position, with the arrow pointing up or down. Re-tighten the screw.

## How to Replace the Main PCB

1. Disconnect power to the unit.
2. Remove the 4 screws holding the front plate of the SingleShot control box in place. Remove the front plate (bezel), being careful not to damage the gasket.
3. Detach the power wire connection coming from the power PCB to the main PCB.
4. Detach the motor supply wires from the PCB.
5. Place the bezel face down on the work surface.
6. Remove the 4 screws holding the main PCB to the bezel.
7. Gently lift the main PCB out of the bezel.
8. If the zebra strips and display screen stick to the old PCB, remove them and place them in the bezel, being careful to keep their orientation.
9. Align the new PCB over the zebra strips and replace the 4 screws. Be sure to tighten the screws into position. The pressure these screws exert on the PCB is important for maintaining water resistance and holding the display in place.
10. Reattach the motor supply wires to the main PCB at the terminal marked "motor".

11. Reattach the power supply to the terminal marked "+6VDC".
12. Remount the front plate (bezel) and retighten the screws, being careful not to damage the gasket.



*Between the main PCB and the front plate (bezel) are the buttons, screen and zebra strips. It is important that these items are properly aligned and that the screws holding the PCB in place be properly tightened. If these items are not properly aligned and held in place by pressure from the 4 screws, water resistance may be lost around the buttons or the screen may not display properly.*

## How to Replace the Power PCB

1. Disconnect power to the unit.
2. Remove the 4 screws holding the front plate of the SingleShot control box in place. Remove the front plate (bezel), being careful not to damage the gasket.
3. Detach the power wire connection from the main PCB.
4. Detach the power cord.
5. Remove the screws holding the power PCB in place.
6. Gently lift out the power PCB.
7. Align the new power PCB and replace the screws. Be sure to tighten the screws into position.
8. Reattach the power cord to the terminal block.
9. Reattach the power wire connection from the main PCB.
10. Remount the front plate (bezel) and retighten the screws, being careful not to damage the gasket.

## How to Replace Coin Battery

1. Ensure that power is off.
2. Remove the 4 screws holding the front plate of the SingleShot control box in place. Remove the front plate (bezel), being careful not to damage the gasket.
3. Locate the coin battery on the PCB.
4. Slip the coin battery out and replace it with a new one (3 Volt lithium BR2032 or CR2032).
5. Remount the front plate (bezel) and retighten the screws, being careful not to damage the gasket.



*When the lithium backup battery is removed, all programmed events will be erased and will need to be reprogrammed.*

## Cleaning the Unit

Wipe pump housing clean with a dry rag.

## TROUBLESHOOTING

### Pump Runs Continuously

1. Check programming. If Menu 4 is set to "1", and neither a delay nor lockout is set, pump will run continuously.
2. If programming is correct, replace the Coin Cell Battery. If the pump continues to run replace the PCB.

### Pump Runs Too Slowly

1. Check that the squeeze tube or pump cartridge is not jammed.
2. Check the chemical uptake line for kinks.
3. Verify that the chemical uptake line is not forming a seal against the side or bottom of the chemical drum (See: **INSTALLING SUPPLY LINES** in **INSTALLATION** section).
4. If the liquid being pumped is very viscous the pump may labor in order to move it. Using a less viscous chemical, pumping shorter distances, setting longer run times, and assuring that the squeeze tube is in good condition will help address this issue.

#### For 115 VAC version:

1. Verify that the correct line power is installed and adequate power is arriving to the unit.
2. Check for 6.0 volts DC or greater at the motor connection wires with the motor disconnected and the pump prime button activated. If this voltage is present, replace the motor gearbox. If the problem persists after the motor gearbox has been replaced, replace the power PCB. If the voltage is absent replace the main PCB.

#### For D-cell Battery Power Version

1. Check for 6.0 volts DC or greater coming from the battery holder. If voltage is absent replace the batteries. If voltage is present, proceed with step 2.
2. Check for 4.5 volts DC or greater at the motor connection wires with the motor disconnected and the pump prime button activated. If this voltage is present replace the motor gearbox. If the voltage is absent replace the main PCB.

### Pump Will Not Run

1. Check that the squeeze tube or pump cartridge is not jammed.
2. Check the chemical uptake line for kinks.
3. Verify that the chemical uptake line is not forming a seal against the side or bottom of the chemical drum (See: **INSTALLING SUPPLY LINES** in **INSTALLATION** section).
4. Check to see that the motor connection wires are properly connected from the main PCB to the motor gearbox.
5. Check that "--" is displayed. This insures that you are in Run Mode. If less than 3 bars are present in a battery - powered unit, replace the batteries.

6. Push the Prime button and try to prime the pump. If the pump does prime, check that events are properly programmed.

#### For 115 VAC

1. Verify that the power is connected.
2. Check for 6 to 11 volts in the wire harness from the power PCB to the main PCB. If the voltage is absent replace the power PCB.
3. Check for 6 volts DC or greater at the motor connection wires with the motor disconnected and the pump prime button activated. If this voltage is present, replace the motor gearbox. If the voltage is absent, replace the main PCB.

#### For D-cell Battery Power Version

1. Make sure that the batteries are properly aligned.
2. Make sure that the polarity of the wires running from battery pack to the main PCB is correct.
3. Check for 4.5 volts DC or greater coming from the battery holder. If voltage is absent, replace the batteries. If voltage is present, proceed with step 2.
4. Check for 4.5 volts DC or greater at the motor connection wires with the motor disconnected and the pump Prime button activated. If this voltage is present, replace the motor gearbox. If the voltage is absent, replace the main PCB.

### Events are Erased When Unplugged or Power is Lost

Replace backup battery on the main PCB (see **HOW TO REPLACE THE COIN BATTERY** in the **MAINTENANCE** section of this manual).

### Pump Will Not Operate When Dose Button is Pushed

If a remote trigger is being used be sure that it is not shorted in the on position. Check event programming. If setup is correct the dose button has no effect, but the prime switch does activate the pump, replace the main PCB.

### Pump Will Not Pull Liquid from the Supply Container

1. If there is too much vacuum created, the pump will not be able to move the chemical. This is easily recognized when the squeeze tubing collapses. If this happens:
  - a) Check that the squeeze tube or pump cartridge is not jammed.
  - b) Check the chemical uptake lines for kinks.
  - c) Ensure that the chemical uptake line is not forming a seal against the side or bottom of the chemical drum (See **INSTALLING SUPPLY LINES** in **INSTALLATION** section).

- d) Using a less viscous chemical, pumping shorter distances, setting longer run times and ensuring that the squeeze tube is in good condition will help address the issue.
2. Check to see that there is not an air leak somewhere along the chemical supply line.

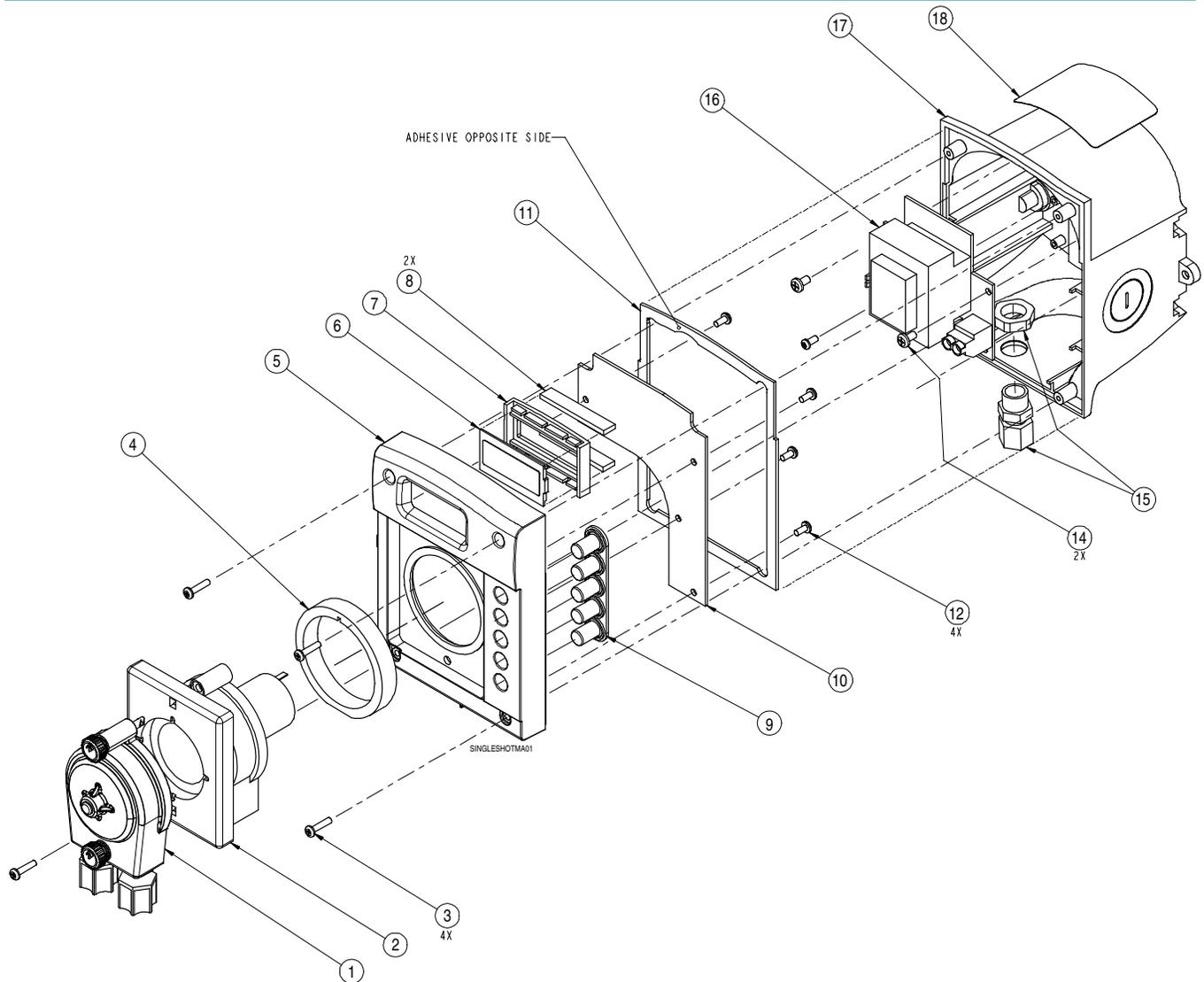
### Intermittent dosing with opto-coupler

Opto-coupler #067480 will trigger at low voltages (of 3-14V). If intermittent triggering occurs, switch trigger source or use with higher-voltage opto-coupler.

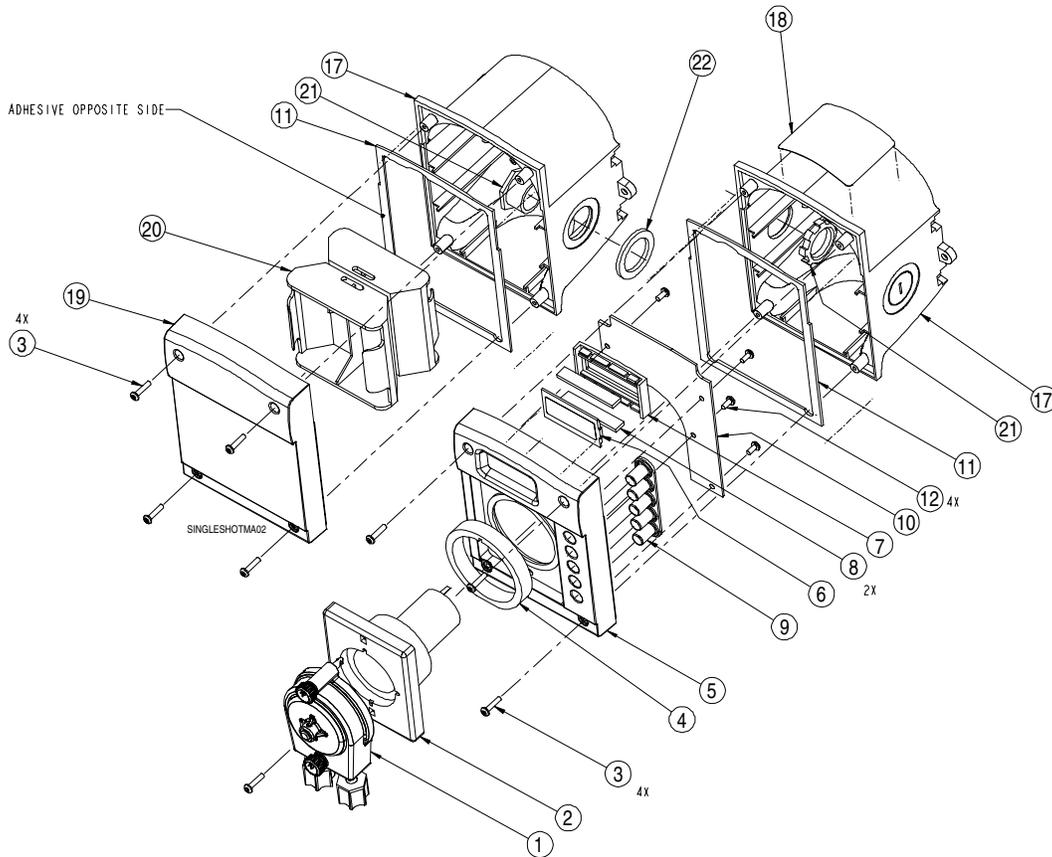
## PRODUCT REPAIR

If an item is in need of repair, please call or write to obtain a Return Authorization (RA) number. When calling, ask for the Repair Department. They provide RA numbers. Then, please write the number on the outside of the box before sending. It is very helpful to our Repair Department to include a note explaining the nature of the problem. Failure to obtain an authorization number before returning an item may delay repair of the equipment.

# APPENDIX/DRAWING LIBRARY



Seq#	Description	Code #	Seq#	Description	Code #
1	SnapHead Pump Cartridge w/Silicone Tube	058210	8	Zebra Strips	N/A
2	Pump Motor Gearbox 6 VDC	1207594	9	Buttons	N/A
3	M3 x 12 mm Panhead Bezel Screws	N/A	10	Main PCB	1203122
4	Pump Gasket	099705	11	Bezel Gasket	1202615
5	Main Bezel	N/A	12	Main PCB Screws	N/A
6	LCD	N/A	14	Power PCB Screws	N/A
7	Bracket	N/A	15	Strain Relief	N/A
			16	Power PCB 115 VAC	1202396
				Power PCB 230 VAC	1202678
			17	Bucket	N/A
			18	Serial Label	N/A



Seq#	Description	Code #	Seq#	Description	Code #
1	SnapHead Pump Cartridge w/Silicone Tube	058210	9	Buttons	N/A
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3	M3 x 12 mm Panhead Bezel Screws	N/A	11	Bezel Gasket	1202615
4	Pump Gasket	099705	12	Main PCB Screws	N/A
5	Main Bezel	N/A	17	Bucket	N/A
6	LCD	N/A	18	Serial Label	N/A
7	Bracket	N/A	19	Battery Pack Bezel	N/A
8	Zebra Strips	N/A	20	D-Cell Battery Holder	1202596
			21	Conduit Fitting	N/A
			22	Circular Gasket	N/A



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