

SpectraPure

LiterMeter™



Precision Dosing System

OPERATIONS MANUAL

TM0110-010

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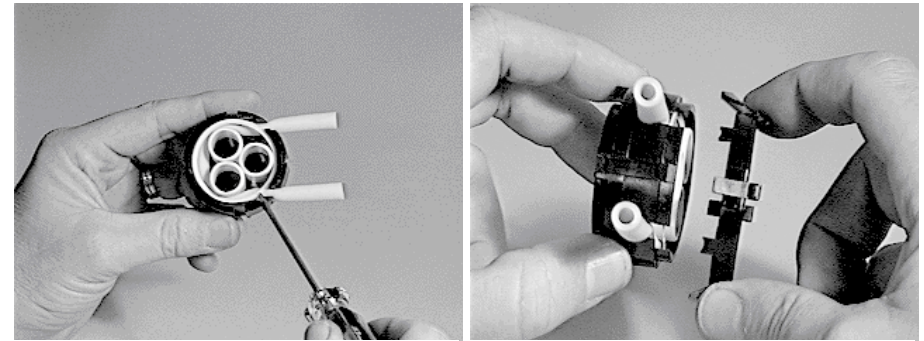


Figure 5

Figure 6

- Step 12: Replace the Teflon ring over and around the three rollers.
You may have to push the third roller inward to position the ring properly. See Fig. 5.
- Step 13: Carefully align the pump body with the lid and press together. See Fig. 6. Make sure the two release tabs (referred to in Step 3) click and lock in place. Press the pump head assembly onto the motor shaft and click in place.
- Step 14: Reinstall the supply and delivery hoses. Use the extra cable ties provided to secure the tubing.
- Step 15: Before you re-calibrate your LiterMeter, a short break-in period is needed to assure an accurate calibration. Run it dry for one hour with *Milliliters/minute* set to 138 and *Liters/day* set to 99.99. Next, follow the calibration procedure outlined earlier in this manual.

REPLACEMENT & OPTIONAL PARTS:

No.	Catalog No.	Optional Part
1.	KT2720-005	Tubing Replacement Kit
2.	179020-010	120VAC Power Supply
3.	179020-012	230VAC Power Supply

Step 5: Pull the two halves apart and set the lid and Teflon® ring aside.

Step 6: Remove the three white rollers and tubing from the body.

Step 7: Clean the three white rollers, lid and body with a cloth soaked in De-Solv-it® (available in most grocery stores), acetone, or petroleum spirits. Make sure you remove any gummy deposits then rinse parts with water and dry. Next, wipe the motor shaft clean. If you use acetone, be careful not to spill on the plastic case or it will mar the finish.

Step 8: Inspect the tubing for cracks and/or excessive wear. Replace when necessary.

Step 9: Reinstall the tubing by pinching it one inch from an end and inserting it into the outlet port of the pump body. Position the tubing so that an un-worn side will be against the rollers. See Fig. 2.

Step 10: Pinch the other end of the tubing and insert it into the inlet port of the pump body. Manipulate the tubing so that it conforms to the inside diameter of the pump body and **is resting on the bottom step of the pump body**. Be sure that the tubing is completely pushed down into the ports. See Fig. 3.

Step 11: Place two of the three rollers into the pump body, pushing them against the tubing. Hold them in position with your left thumb and push the third roller into place. See Fig. 4.

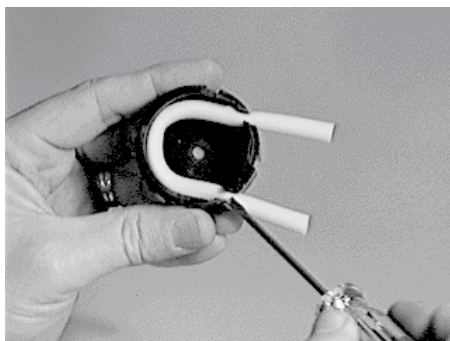


Figure 3

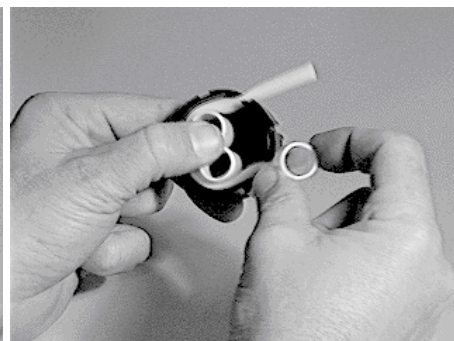


Figure 4

ONE YEAR LIMITED WARRANTY

SpectraPure, Inc. warrants each new LiterMeter Precision Dosing System to the original owner only to be free of defects in material and workmanship for a period of 1 year from the date of receipt. SpectraPure's liability under this warranty shall be limited to repairing or replacing on SpectraPure's option, without charge, F. O.B. SpectraPure's factory, any product of SpectraPure's manufacture. SpectraPure will not be liable for any cost of removal, installation, transportation, or any other charges which may arise in connection with a warranty claim. Products which are sold but not manufactured by SpectraPure are subject to warranty provided by the manufacturer of said products and not by SpectraPure's warranty. SpectraPure will not be liable for damage or wear to products caused by abnormal operating conditions, accident, abuse, misuse, unauthorized alteration, or repair, or if the product was not installed in accordance with SpectraPure's printed installation and operating conditions or damage caused by power failures, freezing, flood, fire, or acts of God.

TERMS AND CONDITIONS OF SALE

To obtain service under this warranty, the defective system or components must be returned to SpectraPure with proof of purchase, installation date and failure date. Any defective product to be returned to the factory must be sent freight prepaid; documentation supporting the warranty claim and/or a Return Goods Authorization must be included, if so instructed.

SpectraPure will not be liable for any incidental or consequential damages, losses, or expenses arising from installation, use, or any other causes. There are no expressed or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limitations on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary jurisdiction to jurisdiction. SpectraPure, Inc. reserves the right to change prices without notice when necessary.

SYSTEM DESCRIPTION:

Calcium maintenance and alkalinity control are essential for a healthy reef tank. The LiterMeter eliminates the manual drudgery of dosing Kalkwasser, trace elements, or topping off evaporated water. Kalkwasser replenishment, to be most effective, should be added to your aquarium slowly and consistently to avoid precipitation of calcium carbonate. The LiterMeter automatically and reliably performs this task for you. The LiterMeter offers features found only on expensive laboratory pumps, such as microprocessor control and digital thumbwheel switches. These calibration features eliminate the guesswork of uncalibrated competitive units. Unlike noisy industrial metering pumps sold to the aquarium trades, the LiterMeter was specially designed for critical aquarium dosing and is so quiet you can use it in your living room. Superior three-roller direct-motor drive eliminates noisy gears and improves flow accuracy and tubing life. It can be run dry without damage, and pumps from a draw height of 10 feet to a delivery height of 16 feet.

SYSTEM SPECIFICATIONS:

- **Pump Flow Rate:** approx. 250 ml/min. (8.45 oz./min.)
- **Dimensions:** 8.0" x 5.5" x 2.4" (20 cm. x 14 cm. 6 cm.)
- **Minimum Daily Total:** 50 milliliters (1.7 oz.)
- **Maximum Daily Total:** 99 liters (26 gals.)
- **Draw height:** at least 10 feet (3 meters)
- **Delivery Height:** at least 16 feet (4.9 meters)
- Doses equal amounts 150 times per day
- 120VAC (60Hz)/12VDC wall-mounted power supply
- International power supply available: 230VAC (50Hz)
- Uses less than 6 Watts of power when operating, can be powered directly from a 12VDC battery
- Includes high limit level control for fail-safe operation

OTHER APPLICATIONS:

- Automatic Invertebrate Feeding
- Hydroponics
- Bio-Remediation
- Methanol Dosing for Bio-Reactors

MAINTENANCE:

It is recommended that, according to the chart below, the pump head be inspected and cleaned per the following procedure.

Liters / Day	Maintenance Period
up to 6 L.	9 months
7 L. to 12 L.	6 months
13 L. to 18 L.	4 months
19 L. to 24 L.	3 months
over 25 L.	2 months

Step 1: Remove the pump head by gently depressing the two opposing release clips and lifting the pump head from the motor shaft.

Step 2: Clip the cable ties, being careful not to cut the pump tubing.

Step 3: Disconnect the supply and delivery hoses from the pump tubing, taking care not to splash or spill any liquid in the tubing.

Step 4: Gently depress the release tab (located between the inlet and outlet tubing ports) with your left thumb and insert a small flat screwdriver into the gap between the pump lid and body. Rotate the screwdriver 90 degrees to separate the lid from the body. Repeat on the opposite side. See Fig. 1.

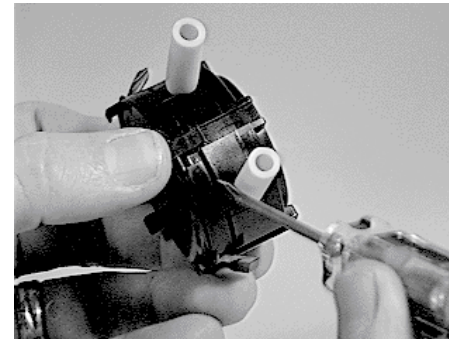


Figure 1

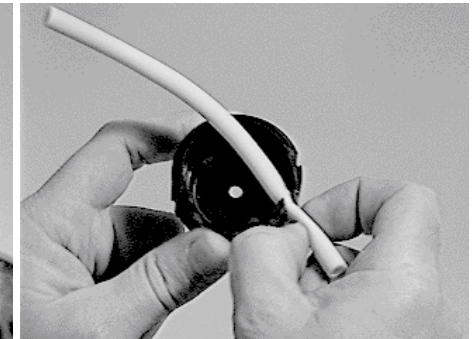


Figure 2

PROGRAMMING THE LiterMeter:

You may wish to dispense a known constant amount on a daily basis from a reservoir containing many days' worth. Set the DAILY TOTAL switches for the amount in liters you wish to dispense each day. **Note:** the decimal point, located between the second and third digits, allows the system to display and dispense up to 99.99 Liters per Day. Example: if your goal was to add one gallon of water to your aquarium per day and your decimal minutes just happened to be 1.67 as noted above, you would set your CALIBRATION switches to read **299** (500/1.67) milliliters/min. Then you would set the DAILY TOTAL switches to read **03.78** (1 U.S. Gallon = 3.785 Liters). Locate the provided clear protective strip, remove the paper backing and place it over the thumbwheel switches. Flip the RUN-STOP switch from STOP to RUN and the pump will operate just long enough 150 times a day to deliver a daily total of one gallon. This would equate to about 25 milliliters per pump operation.

OPERATING THE LiterMeter:

Every time the RUN-STOP switch is changed from RUN to STOP, the pump is disabled and the internal control is put into a reset state. Set to RUN, the pump will begin to operate using the current switch settings. **Note:** if the requested DAILY TOTAL is very small, the pump may not immediately activate during the initial dosing cycle.

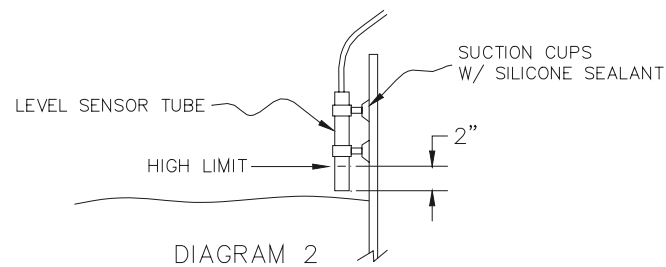
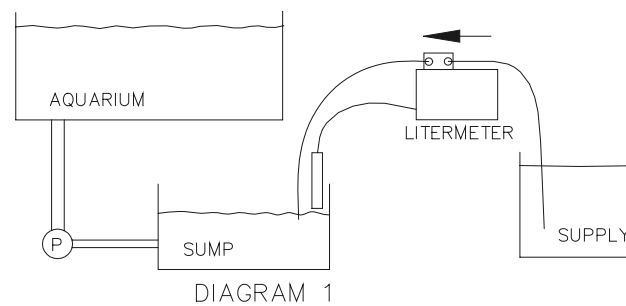
HIGH LIMIT LEVEL CONTROL:

The provided high limit level sensor should be used to provide an extra degree of fail-safe protection. Connected to the 1/8" FLOAT SWITCH nipple, it also allows the LiterMeter to operate as a dosing system with "top-off" limiting. You can set the DAILY TOTAL for more than you know you will need and let the level sensor control the top-off level. When the liquid level rises 2" above the open end of the sensor tube, the pump will shut-off. The pump will turn-on when the level drops to 1" above the end of the tube. The small and evenly-spaced mini-doses will be dispensed whenever the level control permits. **Note:** The LiterMeter will operate properly without the level sensor connected, but it is not recommended.

SYSTEM FEATURES:

- Quietest Pump on the Market
- Highest Quality and Accuracy
- Fully automatic operation - Set it and forget it
- Calibration feature eliminates guesswork
- Virtually maintenance free
- No check valves to clog or seals to leak
- Self-priming and Anti-siphoning
- High limit level control for fail-safe operation
- Compact Size and Cool Operation
- Kalkwasser safe, Self-priming pumping system
- Can run dry without damage to the unit
- Quiet operation and low power, consumes less than 6 W.

CONNECTION DIAGRAMS:



SYSTEM SET-UP:

1. To assure secure connections, it is recommended that the ends of the white polyethylene tubing be heat-formed into “hose barbs” by briefly melting the ends with an open flame.
2. Press-fit the barbed-end of a piece of ¼” polyethylene tubing into the rubber outlet hose (arrow pointing away from the pump) at least ½”.
3. Although a peristaltic pump inherently prevents back-flow conditions, it is always good practice to locate the LiterMeter above and to the side of the supply vessel and aquarium (or sump). Providing an air-gap between the hose end and the top-most water level in the aquarium is also accepted practice. **Note:** when metering Kalkwasser, the end of the tubing will eventually become calcified and interfere with the flow. To prevent this, it is suggested that the end of the dispensing tubing be slightly immersed in the aquarium (or sump). See Diagram 1.
4. Press-fit the barbed-end of another piece of ¼” polyethylene tubing into the rubber inlet hose (arrow pointing toward the pump) at least ½”. Secure with a provided cable tie. This is connected to the supply reservoir.
5. The supply tank can be any size and located as much as 10 feet below the LiterMeter. If the LiterMeter is located at the same level as the supply tank, delivery to a height of 16 feet above the LiterMeter is possible.
6. Locate the level sensor tube with clear air line tubing attached to it and connect the loose end of the tubing to the 1/8” nipple on the side of the LiterMeter. See Diagram 2. **Note: Airline tubing MUST be connected to the 1/8” nipple on the side of the LiterMeter BEFORE immersing the level sensor tube in water.**
7. Mount the level sensor tube with the suction cups provided by whatever means you prefer. Water will cover approximately 2” of the sensor tube when over-ride shut-off occurs. **Note: A small dab of aquarium silicone sealant on each suction cup will prevent them from detaching.**
8. The 12VDC, 500 mA wall-mounted power supply can now be connected to the power jack on the side of the LiterMeter, and then connected to any proper 120VAC source (230VAC power supply available).

CONTROL FUNCTIONS:

1. CALIBRATION - three “thumbwheel” type switches, indicating **Milliliters per Minute.**
2. DAILY TOTAL - four “thumbwheel” type switches, indicating **Liters per Day.**
3. RUN-STOP - an “on-off” toggle switch, controls the operation of the dosing system.

4. GREEN PUMP Light - indicates power is applied to the pump.
5. AMBER SYSTEM Light - indicates proper operation of the system.
6. FLOAT SWITCH 1/8” nipple - attached to the clear air line of the external level sensor for fail-safe operation.

THE LIGHTS:

The LiterMeter has two LEDs: the GREEN PUMP LED indicates that power is getting to the pump motor. If this light is on, but the pump does not run, then there may be a problem with the pump motor. If you are using the highlimit level control, make sure the sensor tube is not submerged, and then re-test. The AMBER SYSTEM LED serves several functions:

1. After being switched to RUN, an initial blink of the SYSTEM light indicates the internal computer is performing diagnostics and reading the switches before beginning actual pump operation.
2. The SYSTEM light normally blinks briefly at a one second rate, indicating that proper operation and time-keeping are proceeding.
3. If you ask for a greater DAILY TOTAL than the pump is capable of delivering, the SYSTEM light will continue to blink at the one second rate, but it will be ‘on’ more than it is ‘off’, indicating this over-limit condition. The pump will run constantly until stopped.

CALIBRATING THE LiterMeter:

Variations in pumping height will affect the flow rate of the pump. You must calibrate the Liter Meter before use with the following procedure:

1. Set the CALIBRATION switches to **011** and the DAILY TOTAL switches to **9999**. Flip the RUN-STOP switch from RUN to STOP and back to RUN.
2. While the pump is running, measure in minutes and seconds how long it takes to fill a kitchen measuring cup to 500 milliliters. Shut the pump off and convert to decimal minutes. Example: If it took 1:40 (one minute and forty seconds) to acquire the 500 milliliters, this time equates to 1+(40/60) or 1.67 minutes.
3. Divide 500 milliliters by the decimal minutes. The resultant (299) is the pump flow rate in **Milliliters per Minute**. Set the CALIBRATION switches to that value. This is required to calibrate the pump’s delivery flow rate according to the height and/or placement of your particular unit.
4. As with any user-calibrated device, a periodic re-calibration should be performed to maintain original specifications.