

DR-1000

Installation and Operating Manual



PREFACE

This manual describes how to install, setup, operate and maintain the DR-1000. 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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SPECIFICATIONS

TIMING CAPABILITY

Up to 24 different times. Daily, weekly, or mixed schedule: run time 1 second to 19 minutes 59 seconds.

DIMENSIONS

Size	Height	Width	Depth
	4.0	5.5	5.5 Inches
	10.2	14	14 Cm

Weight

- 2.1 lbs (.95 Kg)
- 3.4 lbs (1.5 Kg) with battery

OPERATING CONDITIONS

Ambient Operating Temperature

- +36° to +120° F
- +2° to +49° C

Electrical Power

Options available: 120 Volts AC 50/60 Hz, 240 Volts AC 50/60 Hz, or 6 Volt lantern battery.

COMPONENTS

Pump/Motor

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

Tubing Material

3/16 in ID silicon

Speed & Displacement

100 rpm, 5 oz per min (148 ml per min)

Hydraulic Performance

Maximum Vacuum: 8 in of mercury
Maximum Pressure: 20 psi

INSTALLATION

MOUNTING

Using the two keyhole slots at the back of the enclosure, mount the DR-1000 to a vertical surface. Because programming is from the main PCB, the DR-1000 should be at eye level so the LCD screen can be easily viewed. In addition, it should be located close enough to both the injection point and liquid supply to ensure unobstructed delivery.

INSTALLING SUPPLY LINES

Connect the $\frac{1}{4}$ inch (6mm) polyflow line to the polyflow nut on the left (suction) side of the pump squeeze tube. Install a snap-in standpipe on the supply end of the polyflow line. Cut the polyflow tube at a 45° angle and press into the standpipe so that it is slightly lower than the inlet of the polyflow line.

Connect the $\frac{1}{4}$ inch (6mm) polyflow line to the polyflow nut on the right (delivery) side of the pump tube. Run the feed tube to the injection point, avoiding uphill runs if possible (must be no more than ten feet in height).

POWER SUPPLY CHOICES

Power Transformer

120 Volt or 240 Volt AC power supply DR-100's come with a transformer that plugs into a standard power outlet. To install the transformer, insert the connection end to the power terminal on the PCB and plug the transformer end into the outlet.

Battery Harness

Battery-power DR-1000's come with a lantern battery connector or a four-D-cell battery holder, depending on which unit is ordered. Both of these parts are available as spares for retrofitting line-power units, though neither part includes batteries.

Plug the connector end of the harness into the power outlet of the DR-1000. The other two ends connect to the battery (the solid black wire to positive and the white stripe to negative).

3 Volt Lithium Battery (on PCB)

A 3 Volt battery is located on the PCB and provides backup power for retaining time data during power loss. It provides enough power to retain time data, but will not operate the pump. This battery is factory installed and shipped with a strip of packing material that prevents it from being drained during shipment and storage. When installing the DR-1000, ensure this material is removed from the 3 Volt battery and the battery contact.



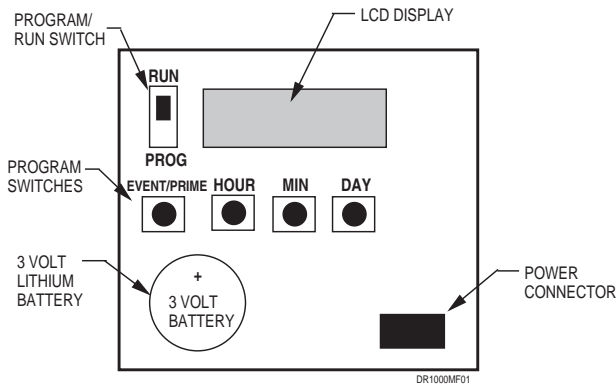
In normal operation, this 3 Volt battery supplies power only when the system's main power supply is off. When storing or shipping the DR-1000, reinstall the packing strip to prevent it from being unnecessarily drained. The battery will operate for approximately a half year when operated constantly.

Optional Low Level Sensor

An optional low level sensor is available. Install the sensor wire connector at J2 on the PCB. The sensor is inserted in the product drum and issues an alarm when chemical is low. A PCB that includes an audible alarm must be ordered specifically (see spare parts list).

SETUP & PROGRAMMING

The DR-1000's PCB includes an LCD screen, a Run/Program toggle switch, and four programming switches for setting time and day. The figure below shows the component locations on the PCB.



SETTING THE CURRENT TIME & DAY

1. Set the RUN/PROG switch to PROG.
2. Set the time using the HOUR and MIN switches. Note that when programming a time in PM, a 'P' should be present.



3. Set the correct day of the week by pressing the DAY switch until the number appears. Normally, Monday is assigned as day 1.

PROGRAMMING EVENTS

An event refers to a programmed interval for a specific day, or series of days, each week. Each event includes a time when the pump will turn on, the amount of time in minutes and seconds the pump will run, and the days the operation will occur. You can program up to 24 different events. To program an event:

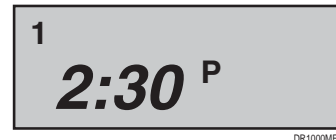
1. Ensure the RUN/PROG switch is set to PROG.
2. Press the EVENT/PRIME switch until 'E:01' appears.



3. Press EVENT/PRIME again to display the start time and day(s).



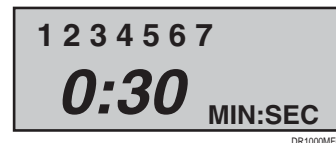
4. Set the event start time by pressing the HOUR and MIN switches.



5. Set the event day, or days, by pressing the DAY switch. The DR-1000 cycles through each day separately (1 to 7) and then through three multiple day groups as shown below. Set one of these.

- Select all days 1 2 3 4 5 6 7
- Select the first five days 1 2 3 4 5
- Select the last two days 6 7

6. Press EVENT/PRIME again to set the pump time interval. Press the MIN switch to set the number of seconds and the HOUR switch to set the number of minutes.



7. Press EVENT/PRIME to move to event #2.
8. When all events have been programmed, set the RUN/PROG switch to RUN. The LCD should display the current time and day.

CLEARING PRIOR EVENTS



In situations where two events have been programmed for the same time and day, the highest event number will be the one the DR-1000 accepts. For example, if event #1 is set for 30 seconds at 2:00 on day 1 and event #4 is set for 10 seconds at 2:00 on day 1, the time interval will be 10 seconds.

As a rule it is a good idea to clear all events prior to programming events for a new account. To clear all event data:



1. Ensure the RUN/PROG switch is set to PROG.
2. Press the EVENT/PRIME switch until 'E:01' appears.
3. First press the DAY and MIN switches down and hold. While holding, push the EVENT/PRIME switch, and while holding all three, the LCD will begin to cycle through the events (1 to 24). When complete, the LCD will stop at 'E:01'.

If you want to clear data from a later event, start from the last event programmed and follow the same procedures.

PRIMING

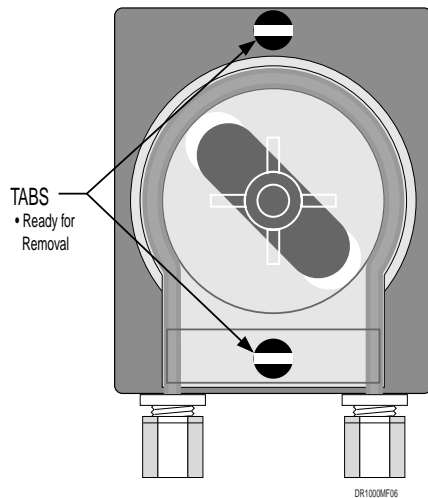
1. Ensure the RUN/PROG switch is set to RUN
2. Press the EVENT/PRIME switch to operate the pump.

MAINTENANCE & TROUBLESHOOTING

Replacing Pump Cartridges

To Remove

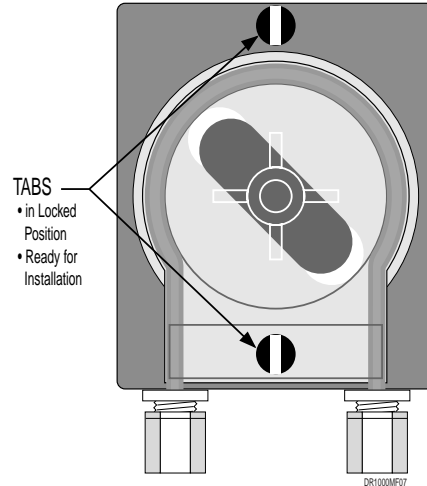
1. Remove the pump from the motor housing by twisting the two quarter turn pins at top and bottom, and slide pump forward (rotate the tabs as shown).



2. Remove the supply and feed lines from the old pump and connect them to the new pump.

To Install

1. Align and engage the pump drive spline with the motor gear by rotating the pump.

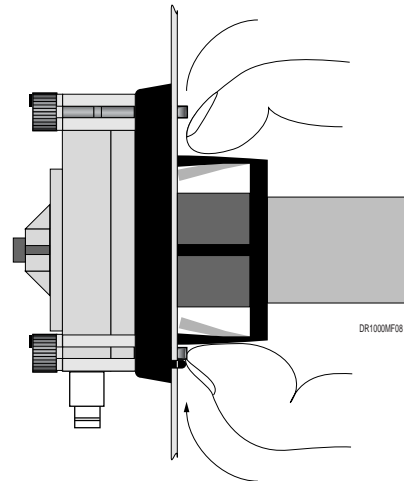


2. Turn the pin tabs to vertical.
3. Hold pump vertically and press the pin tabs into the motor housing until you hear a distinct click.

Replacing the Pump Motor

To Remove

1. Remove the pump cartridge from the motor assembly, leaving the chemical lines attached.



2. Remove the electrical connections at the back of the motor.
3. To remove the pump motor, compress the two flex ears sufficiently to allow it to slide out through the hole in the cabinet.

To Replace

1. Locate the alignment tip of the pump motor housing so it is in the down position.
2. Slide the pump motor housing into the cabinet hole. The holding ears will expand to hold the pump motor in place.
3. Reinstall the electrical connections at the back of the motor.
4. Install the pump cartridge.
5. Prime the pump to verify the proper pump rotation (clockwise). Reposition the motor wires if necessary to change direction.

TROUBLESHOOTING

Pump Runs Continuously

If the pump runs without being activated, replace the circuit board.

Pump is Running Backwards

1. If using a battery, check the polarity of the harness connectors. The white stripe should be to negative and the black wire to positive.
2. If not using a battery, or the problem continues after checking polarity, replace the PCB.

Pump Runs Too Slowly

1. Check the battery.
2. If the liquid being pumped is too viscous, it may be necessary to increase the pump time and/or replace the pump tube.
3. Check the supply line for kinks or bends.
4. Check that 6 volts DC is measured at the circuit board motor terminals with the motor disconnected. If so, try another motor. If not, replace the circuit board.

Pump Will Not Run

1. Press the prime button to see if the pump runs.
2. Check if the squeeze tube is jammed.
3. With the two motor wires unplugged from the circuit board, check for 4.5 to 6 volts DC at the wire tab connectors when pressing the prime switch. If not, replace the battery or power source. If the problem continues, replace the pump motor.

Pump Will Not Operate When Programmed Interval Occurs

Check event programming. If setup is correct, and the prime switch activates the pump, replace the PCB.

Pump Will Not Pull Liquid from the Supply Container

1. If there is too much vacuum created, easily recognized when the squeeze tubing collapses, check:
 - a) That the supply line is away from the bottom of the drum.
 - b) There are no crimps in the intake supply line.
 - c) A viscous and/or heavy product is too far from the chemical drum.
2. An air leak somewhere along the input supply run is caused by inadequate sealing of the supply line to the pump.
3. Squeeze tube flex life has ended and the rollers can no longer squeeze the tube properly.

RECOMMENDED SPARE PARTS & ACCESSORIES

Part	Item#
PCB Without Alarm	090896
PCB With Alarm	090897
Silicon Tubing (with Fittings)	058209
Norprene Tubing (with Fittings)	039553
Tube Insert	036969
Tube Fitting, Nut	043823
Lantern Battery Connector	059510
External Transformer (115 Volt)	058824
External Transformer (220 Volt)	057662
Low Level Sensor	091518
D-Cell Battery Holder	1200356

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.



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