

SERIES B1 & D1 METERING PUMPS

INSTRUCTIONS MAINTENANCE SERVICE

For file reference, please record the following data:

Model No.: _____

Serial No.: _____

Installation Date: _____

Installation Location: _____

When ordering replacement parts for your LMI Metering Pump or accessory,
please include the complete model number and serial number of your unit.



LMI
LIQUID METRONICS DIVISION
MILTON ROY

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INSTALLATION

I. UNPACKING

A. Remove tubing, injection check and foot valve from the small cardboard carton included in the pump carton. Notify delivery carrier immediately if there are any signs of damage to the metering pump or parts.

II. LOCATION AND MOUNTING

CAUTION

When pumping chemicals make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective face shield and clothing when working on or near a chemical metering pump.

A. Locate the pump in an area that is convenient to both chemical injection point and electrical supply. LMI chemical metering pumps have corrosion resistant housings, but should not be subjected to continuous high temperature (over 122°F or 50°C).

B. Mount pump on a shelf directly above chemical tank. Secure pump by putting size no. 10 (3/16") or 5mm diameter screws through the four slots at the edge of the pump base.

C. Pump may also be mounted on top of molded chemical tank cover provided the cover has a recess for pump mounting to prevent pump from sliding. A molded cover for this purpose is included with LMI tank and cover assembly in 50 gallon size.

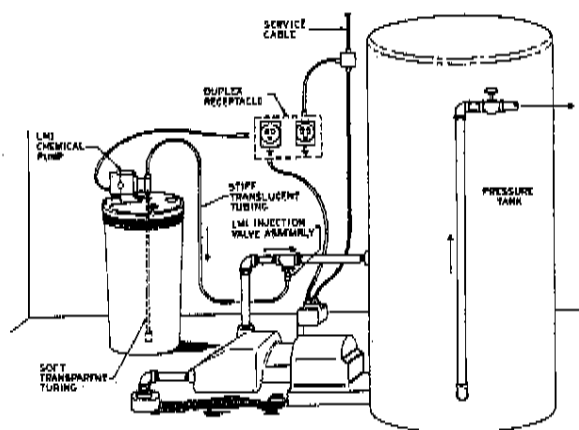
D. Diagrams (shown below and on the following page) show typical chemical pump installation methods. Note location of **Injection check valve** which is most important. Refer to separate **Liquid Handling Assembly Instructions** Section A regarding installation of injection check valve.

E. **BACK PRESSURE REQUIREMENTS**—All electronically controlled magnetically driven pumps maintain maximum velocity on the discharge portion of their stroke regardless of the stroke frequency setting. If there is little or no resistance (back pressure) the velocity of the pumped fluid will be so great as to cause **over-pumping**. Because of this characteristic, back pressure equal to approximately 25 psi must be supplied by an anti-syphon/back pressure valve if the system pressure at the injection point is not high enough to provide the needed back pressure.

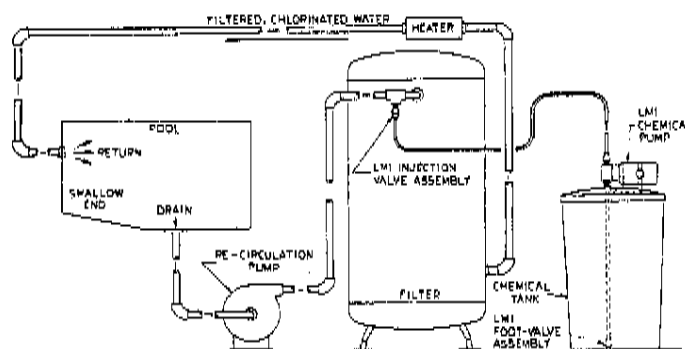
CAUTION

Be sure installation does not constitute a cross connection. Check local plumbing code.

HYDROPNEUMATIC SYSTEMS

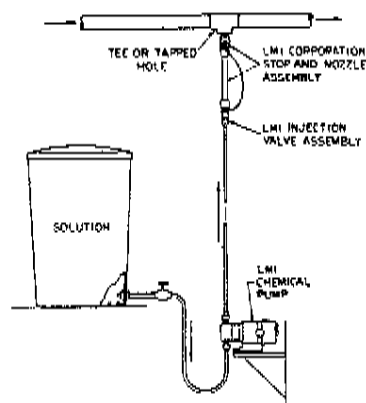


TREATMENT OF SWIMMING POOLS

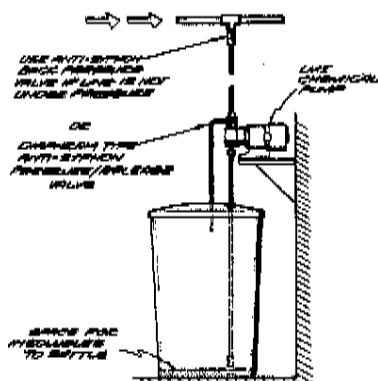


FLOODED SUCTION INSTALLATION

helpful when pumping at very low rate

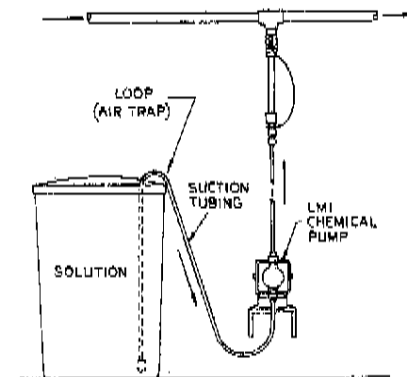


SUCTION LIFT INSTALLATION



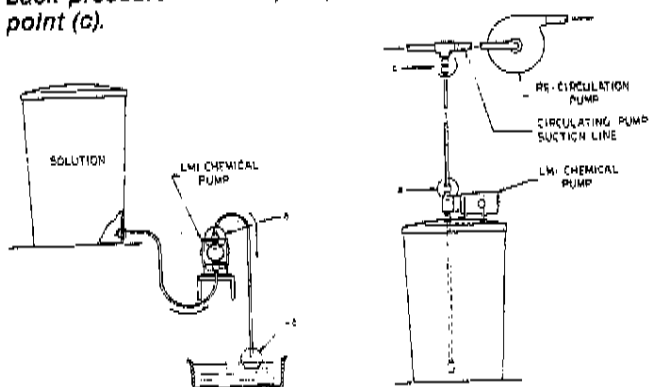
AVOID THIS TYPE OF "FALSE" FLOODED SUCTION INSTALLATION

The loop at the top of the tank forms a neat air trap. In time, air and gases can bubble out, accumulate, and cause loss of prime.



PREVENT SYPHONING WHEN PUMPING

"Downhill" or into pump suction. Always use anti-syphon/ back pressure valve at pump discharge (a) or at injection point (c).

**III. ELECTRICAL**

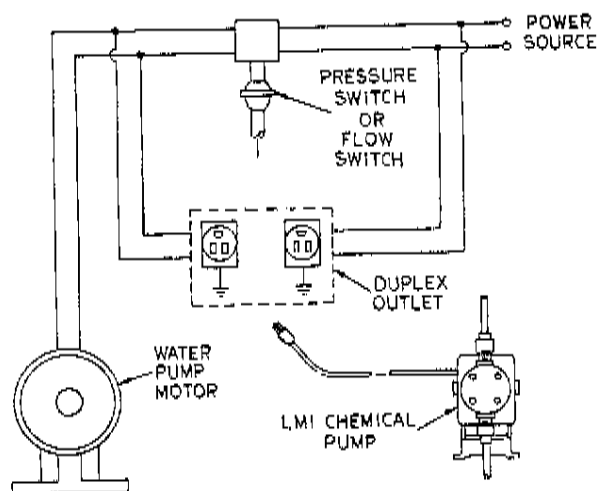
A. Chemical metering pump should be plugged into a 3-prong grounded electrical outlet with ratings conforming to data on the pump control panel.

NOTE: All wiring must be approved under local electrical code.

B. It is extremely important that ground prong of the 3-prong plug is connected to a good ground. Do NOT use adapters.

C. Diagram (below) is an example of wiring schemes commonly used.

**WIRING DIAGRAM
PRESSURE OR FLOW SWITCH SYSTEM**

**OUTPUT ADJUSTMENT****I. INITIAL APPROXIMATION**

A. Stroke frequency adjustment knob is the uppermost of the two knobs on the control panel. Speed control dial is graduated in approximate strokes per minute. Turning this knob clockwise increases pumping frequency. This knob also acts as an on/off switch. The pump may be shut off by turning this knob fully counterclockwise until it clicks into the off position.

Output Estimate—Total output of pump may be estimated by multiplying stroke frequency (percent of maximum) by stroke length setting (percent of maximum).

For example, if the stroke length knob is set at 100% of maximum and the stroke frequency is 20% of maximum, total pump output will be approximately 20%; if the stroke length knob is set at 30% of maximum and stroke frequency is 20% of maximum, total output will be approximately 6% of the pump's maximum rating. That is, $.2 \times .3 = .06$ or 6%.

B. To determine exact frequency in strokes per minute at any speed knob setting, count number of flashes of stroke frequency pilot light for one minute.

C. Stroke length adjustment knob is the lower of two control panel knobs. Adjust by rotating to desired setting, while pump is stroking.

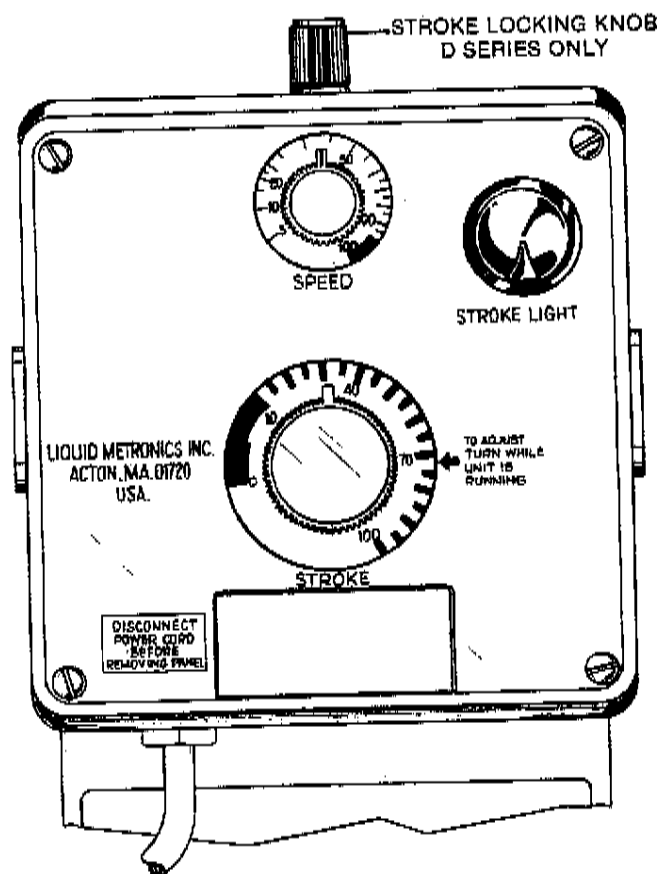
NOTE: For "D" Series pumps, unlock stroke locking knob to turn stroke adjustment. Lock after setting to prevent stroke adjustment knob from turning during operation.

D. **SETTING**—Maximum output of the pump is obtained with stroke frequency knob set at maximum and stroke length knob set at maximum.

If pump is to be used at less than maximum output, best volumetric efficiency will be achieved if stroke length knob is left at maximum, and stroke frequency knob rotated counter-clockwise to reduce pump output. If more output reduction is required than can be achieved by reducing stroke frequency, reduce output by turning the stroke length knob counter-clockwise.

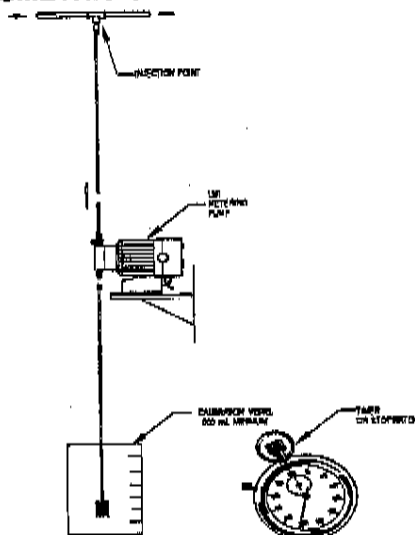
E. After installation is complete and an initial approximation setting has been made, the pump should be calibrated and the stroke frequency and/or stroke length settings adjusted.

F. Nominal output and pressure ratings at 100% settings of stroke frequency and stroke length:



Series	Max Pressure Rating		Max Output Rating	
	PSI	BAR	gph	lph
B11	150	10.3	1.6	6
B12	100	6.9	2.5	9.5
B13	50	3.5	4.5	17
D10	300	20.7	1.3	4.9
D11	150	10.3	2.5	9.5
D12	100	6.9	4	15.2
D13	60	4.1	8	30.3
D14	20	1.4	20	76

II. CALIBRATION PROCEDURE - ON-SITE VOLUMETRIC CALIBRATION



A. With pump primed and discharge tubing connected to the injection point as it would be in normal service, place foot valve and strainer assembly in a graduated container with a volume of 500 ml or more (so that the volume displaced by tubing and foot valve assembly is minimal in relation to volume of the solution in the container).

B. Switch pump on, and pump until air is exhausted from the suction line and pump head.

C. Switch pump off, note the solution level in the graduate. Refill graduate if necessary.

D. Switch pump on, and permit it to pump for a measured time. Be sure time is long enough to accumulate an adequate number (minimum 50) pump strokes. In general, the longer the calibration period, the more confidence you can have in accuracy of results.

E. Switch off pump at the end of the calibration period, note volume pumped during the calibration period, and calculate volume of chemical pumped in time unit you choose (minute, hour, day, etc.).

F. Adjust stroke frequency and/or stroke length knobs to your best estimate of required correction, and repeat calibration measurements as a check.

You may elect for safety and convenience to do the first calibration or operating test with water or other non-hazardous solution. If so, make certain the water or test fluid is removed from the Liquid End before pumping chemicals that may react with the test fluid or be exothermic, such as sulfuric acid.

The final calibration adjustment should be made with pumping conditions identical to conditions of normal pumping service. This means that factors such as injection pressure, fluid viscosity, suction lift and others will automatically be accounted for in making the final adjustment of the pump.

TROUBLESHOOTING - LIQUID END

I. LOW PUMP OUTPUT:

Low pump output can be caused by many things. Some of the more common ones are:

- Very low stroke setting, i.e. red zone setting of knob
- Trapped air in pump head (trapped air in discharge tubing has no effect)
- Air leak through valve seal rings
- Ruptured pumping Liquifram™ (diaphragm)
- Clogged Liquid End, or injection point connection
- Injection into pressure within 25" psi of pump's maximum pressure rating with anti-syphon spring in place (if so supplied)
- Injection into pressure in excess of pump rating
- see chart on page 5

A. Very low stroke setting - Check position of stroke length knob (lower knob) by rotating it counter-clockwise until Liquifram™ (diaphragm) stops moving with the pump operating. The Liquifram™ should not stop reciprocating (moving or clicking) until the knob points to zero. If it stops before zero, reset knob by grasping the knob and pulling it towards you. Pry the yellow cap off of the knob. Place the knob on a flat surface. Using needle nose pliers, squeeze the inner section together while lifting the outer section up (see figure below). Push the inner section back onto the "D" shaped stroke shaft. With the pump running, zero the pump by turning the inner section of the knob counter clockwise. Position the outer section of the knob so that the pointer aligns with zero on the nameplate. Push down on the outer section of the knob (a snap sound will indicate that parts are locked together). Replace the yellow cap over the outer section of the knob, aligning the tabs on the cap with the slots on the knob.

B. Trapped air in pump head - May be caused by leaks in the suction line, where the suction line joins the suction fitting, or at the seal ring between suction fitting and pump head. It may also be caused by air or gases coming out of the solution. Trapped air or bubbles in the discharge line have no effect on the pump's operation. They may be ignored.

To remove trapped air from the pump head, operate the pump with power control knob, stroke frequency knob and stroke length knob set at 100.

It may be necessary to disconnect the discharge tubing from the injection point temporarily in order to relieve the pressure on the pump discharge or pull on both knobs of "Anti-Syphon/Pressure Release Assembly" if so equipped. Follow "Priming" instructions in the Liquid Handling Assembly sheet inserted in this instruction book and operate the pump for a few minutes to purge the head and valves of air or gas.

C. Air leak through valve seal rings - Usually caused by worn or damaged seal rings or loose fittings. Tighten fittings by hand until they are very snug. If there is no improvement, replace both seal rings in pump head. See enclosed Liquid Handling Assembly sheet.

D. Ruptured pumping diaphragm - If rupture is severe, and pump is injecting into pressure, chemical leak will be obvious. Replacement of Liquifram™ (diaphragm) will be necessary.

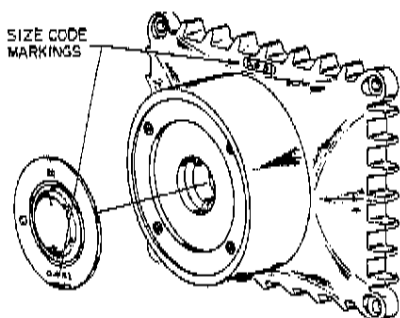
E. Clogged Liquid End - Will cause low pump output. Disassemble Liquid End. Clean individual parts with water and detergent or appropriate cleaning solution.

F. Injection into excessive pressure - If discharge pressure is within 25 psi of maximum pump rating, remove spring in injection check valve, if so supplied.

III. CHANGING PUMPING LIQUIFRAM™ (DIAPHRAGM):

A. Make sure size code markings (1.8 S.I. or 3.0 S.I.) on spacer and Liquifram™ (diaphragm) are the same. Liquifram™ and spacer size code must match for the pump to function. On D14, Liquifram™ is size code 6.0 S.I., (spacer is 3.0 S.I., but there is a large black spacer adapter).

Always wear protective clothing, gloves and face shield when working on or near chemical metering pumps.



LIQUIFRAM™ (DIAPHRAGM) REMOVAL

A. Depressurize discharge line following steps outlined in the supplement "Liquid Handling Assembly" Instructions. Lift foot valve from chemical and let pump run pumping air for a few minutes. Then remove pump head.

C. Set stroke length knob (lower knob) to zero by pushing and rotating it counter-clockwise with the pump switched on, then stop the pump by turning selector switch to "off".

D. 0.9, 1.8 and 6.0 Size Code: Lift edge of Liquifram™ and rotate it counter-clockwise to unscrew or, if Liquifram™ is not to be used again, pierce it with a pointed tool and rotate it counter-clockwise to unscrew it.

3.0 Size Code: Insert one of the 10-24 screws or a screwdriver in one of the Liquifram™ holes and rotate it counter-clockwise to unscrew it.

LIQUIFRAM™ (DIAPHRAGM) INSTALLATION

0.9 and 1.8 Size Codes

A. Before installing new pumping Liquifram™ switch pump on and rotate stroke length control knob (lower knob) to 90. With pump

stroking, screw on new pumping Liquifram™ until the center part begins to buckle inwards during the latter half of the stroke. Switch pump off and check Liquifram™ position with a straight edge according to the illustration.

If Liquifram™ setting is not correct, restart pump, then screw the Liquifram™ in or out. Repeat procedure if necessary.

After Liquifram™ is set properly, turn stroke knob to 100%.

B. Reinstall pump head and tighten head mounting screw in criss-cross pattern.

LIQUIFRAM™ (DIAPHRAGM) INSTALLATION

3.0 and 6.0 Size Codes

A. Before installing new pumping Liquifram™ switch pump on and rotate stroke length control knob (lower knob) to 70 for D13 or 50 for D14. With pump stroking, screw on new pumping Liquifram™ until the center part begins to buckle inwards during the latter half of the stroke. Switch pump off and check Liquifram™ position with a straight edge according to the illustration.

If Liquifram™ setting is not correct, restart pump, then screw the Liquifram™ in or out. Repeat procedure if necessary.

After Liquifram™ is set properly, turn stroke knob to 100%.

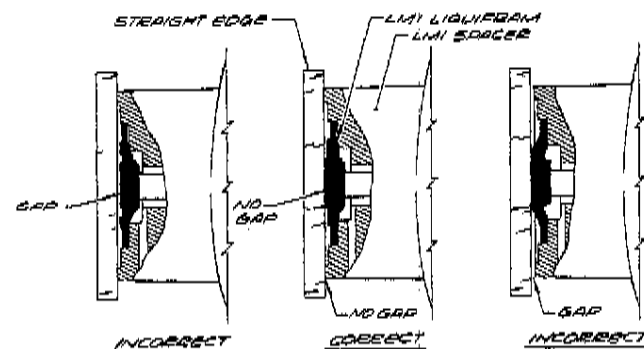
B. Reinstall pump head and tighten head mounting screw in criss-cross pattern.

II. EXCESSIVE PUMP OUTPUT:

A. Syphoning - If your D Series pump has a Liquid End in the 70, 80 or 90 group, its injection check valve assembly has a chemically resistant anti-syphon spring. Disassemble the injection check valve and check to be sure this spring is in place and undamaged. replace if necessary. Note that the anti-syphon spring must be removed if injection is into a pressure within 25 psi of pump's maximum pressure rating. Liquid Ends with a suffix "S" have, in addition, a diaphragm type anti-syphon valve, which prevents syphoning and over pumping.

B. Incorrect knob settings - Check stroke length knob (lower knob) by rotating it counter-clockwise to zero position. The Liquifram™ (pumping diaphragm) should stop reciprocating. If it does not, reset knob by grasping the knob and pulling it towards you. Pry the yellow cap off of the knob. Places the knob on a flat surface. Using needle nose pliers, squeeze the inner section together while lifting the outer section up (see figure below). Push the inner section back onto the "D" shaped stroke shaft. With the pump running, zero the pump by turning the inner section of the knob counter clockwise. Position the outer section of the knob so that the pointer aligns with zero on the nameplate. Push down on the outer section of the knob (a snap sound will indicate that parts are locked together). Replace the yellow cap over the outer section of the knob, aligning the tabs on the cap with the slots on the knob.

NOTE: This illustration For All Pumps



TROUBLE SHOOTING ELECTRICAL—B1 & D1 SERIES

NOTE: All tests should be conducted with the pump head and **Liquifram™** (diaphragm) installed. If pump head is removed it is common for **Liquifram™** shaft to hang forward and not stroke.

I. Plug power cord into appropriate outlet.

A. Set speed knob (upper knob) to 100.

B. Set stroke knob (lower knob) to 100.

II. Listen for stroking action.

A. If pump strokes 95 to 110 times per minute for B1 Series or 71 to 82 times per minute for D1 Series, the electronic pulser module is working correctly.

B. If stroke light stays on, go to step III.

C. If stroke light stays off, go to step IV.

D. If pump strokes faster than 110 times per minute for B1 Series or 82 times per minute for D1 Series, pulser module is defective and should be replaced.

E. If pump strokes slower than 95 times per minute for B1 Series or 71 times per minute for D1 Series, go to step V.

III. Unplug power cord and remove control panel from housing. The control panel is secured by a 10-24 screw in each corner. In addition the stroke length knob must be removed by loosening the hex nut with 8mm (or 5/16") nut driver. Check for blown fuses (located in pump housing). Replace if necessary. Check that all electrical connections are tight and correspond to the wiring diagram. Also check that no corrosion has formed around the connections. If there is an open circuit the light will stay on and not blink. If the wiring is all OK, proceed as follows:

A. Disconnect yellow EPU* wires from pulser terminal 3 (YEL EPU + Light) and pulser terminal 5 (YEL EPU - Light).

B. Measure the resistance across the EPU wires. Cold coil (18°C-22°C or 64°F-72°F) resistance readings should be:

Pump Series	EPU Resistance
B1, 115 Volts	42 to 50 Ohms
B1, 220-240 Volts	167 to 193 Ohms
D1, 115 Volts	25 to 30 Ohms
D1, 220-240 Volts	97 to 113 Ohms

C. Coil resistance readings other than those above indicate that the EPU is defective and should be replaced. Too low a resistance indicates a partial short within the EPU and while pump may operate for awhile, either thermostat will open or fuse will blow.

D. Using an ohmmeter set for high resistance range, measure the resistance between either EPU lead and the green EPU ground lead. Resistance should be infinity.

IV. Check line voltage at outlet. 115 to 105 VAC or 220 to 240 VAC is normal (depending upon model). If line voltage is OK proceed as follows:

A. Remove control panel and check wiring as in III above.

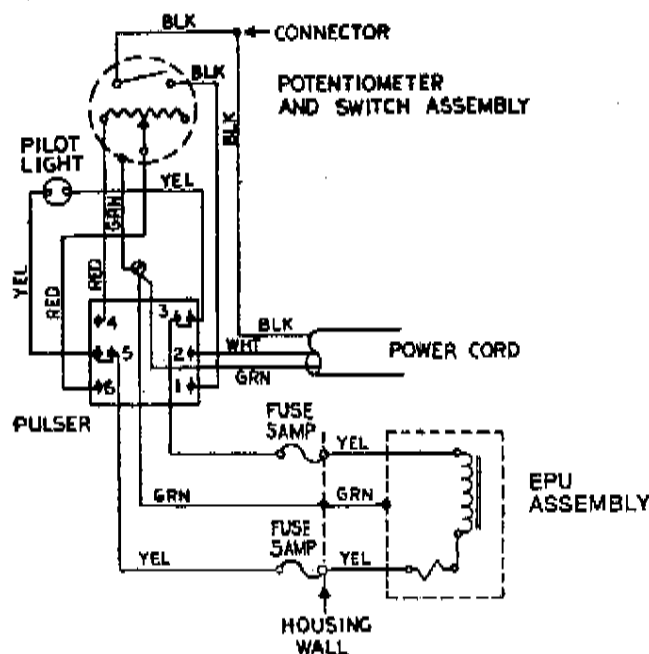
B. If wiring is OK, carefully plug power cord into outlet. **USING EXTREME CAUTION** measure voltage between pulser terminal 1 (BLK) and pulser terminal 2 (WHT). If it reads zero Volts the switch is defective.

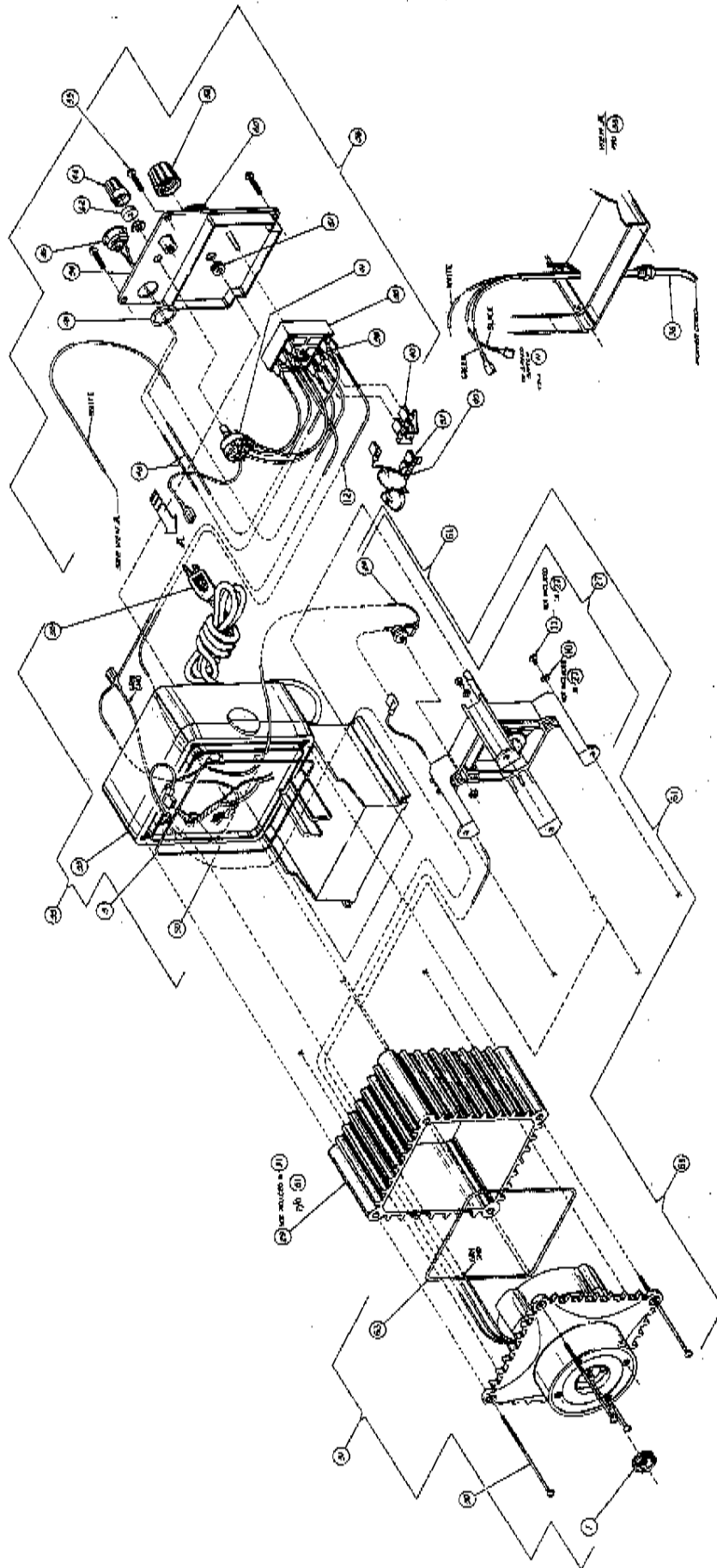
*EPU = Electromagnetic Power Unit

C. If terminals 1 and 2 (BLK and WHT) of pulser are getting proper voltage and EPU is stroking, stroke light is defective and should be replaced.

D. If EPU does not stroke with power applied, unplug power cord. Remove red wire from pulser terminal 6 (RED POT) and red wire from pulser terminal 4 (RED POT). Measure resistance across these two wires making sure speed knob (upper knob) is set fully clockwise. Resistance should be less than 100 Ohms. Turn speed knob (upper knob) fully counter-clockwise and the resistance should read 1,000,000 Ohms (1 Megohm $\pm 20\%$). If the resistance is not correct, replace the potentiometer. If the resistance checks out OK, the pulser is defective and should be replaced.

V. Unplug power cord, remove control panel and check wiring as in step III. If wiring is OK, go to step IV.



B1 SERIES DRIVE ASSEMBLY PARTS LIST

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Key No.	Model Series	Part No.	Description	Quantity
1	B1	10973	Seal	1
3	B1	10366	O-Ring	1
10	B1	10415	Washer, Fan Disk	4
11	B1	10598	Screw	4
12	B1	26298	Wire Assembly	2
24	B1	29410	Wire Assembly	1
27	B1	26628	Stroke Adjustment Assembly	1
29	B1	25058	Sleeve, EPU	1
30	B1	25127	Screw, RH S.S.	4
31	B111, B121	26893	EPU and Spacer Assembly, 120 V	1
31	B131	26897	EPU and Spacer Assembly, 120 V	1
31	B141	29618	EPU and Spacer Assembly	1
31	B112, B122	26894	EPU and Spacer Assembly, 240 V	1
	B113, B123			
	B115, B125			
	B116, B126			
31	B132, B133	26898	EPU and Spacer Assembly, 240 V	1
31	B135, B136, B137	29619	EPU and Spacer Assembly, 240 V	1
	B142, B143			
33	B145, B146, B147	29256	Housing	1
	B1			
35	B111, B121, B131, B141	26087	Housing Assembly, 120 V	1
35	B112, B122, B132, B142	26088	Housing Assembly, 240 V	1
35	B113, B123, B133, B143	26089	Housing Assembly, 200-240 V	1
35	B115, B125, B135, B145	26819	Housing Assembly, 200-240 V	1
35	B116, B126, B136, B146	26820	Housing Assembly, 200-240 V	1
35	B117, B127, B137, B147	28256	Housing Assembly, 200-240 V	1
36	B111, B121, B131, B141	26293	Power Cord, 120 V	1
36	B112, B122, B132, B142	26296	Power Cord, 240 V	1
36	B113, B123, B133, B143	26297	Power Cord, 200-240 V, DIN	1
36	B115, B125, B135, B145	26817	Power Cord, 200-240 V, U.K.	1
36	B116, B126, B136, B146	26818	Power Cord, 200-240 V, Aust.	1
36	B117, B127, B137, B147	27701	Power Cord, 200-240 V, Swiss	1
38	B111, B121, B131, B141	25051	Pulser, 120 V	1
38	B112, B122, B132, B142			
	B113, B123, B133, B143			
	B115, B125, B135, B145			
	B116, B126, B136, B146			
39	B117, B127, B137, B147	10422	Retaining Ring	1
39	B1			
	B111, B121, B131, B141			
	B112, B122, B132, B142			
	B113, B123, B133, B143			
40	B115, B125, B135, B145	10627	Varistor Assembly, 200-240 V	1
	B116, B126, B136, B146			
	B117, B127, B137, B147			
	B1			
41	B1	30830	Pot Assembly	1
44	B1	30709	Knob	1
46	B111, B121, B131, B141	26052	Pilot Light, 120 V	1
46	B112, B122, B132, B142			
	B113, B123, B133, B143			
	B115, B125, B135, B145			
	B116, B126, B136, B146			
46	B117, B127, B137, B147	26053	Pilot Light, 200-240 V	1
46	B111, B121, B131, B141			
	B112, B122, B132, B142			
	B113, B123, B133, B143			
	B115, B125, B135, B145			
46	B116, B126, B136, B146			
46	B117, B127, B137, B147			

B1 SERIES DRIVE ASSEMBLY PARTS LIST

Key No.	Model Series	Part No.	Description	Quantity
50	B1	26073	Fuse, 5A	2
51	B1	10465	Grommet	1
52	B1	31891	Knob	1
54	B1	26075	Panel with Nameplate	1
55	B1	30306	Screw	4
56	B111	26069	Control Panel Assembly, 120 V	1
56	B112	26070	Control Panel Assembly, 240 V	1
56	B113, B115, B116, B117	26076	Control Panel Assembly, 240 V	1
56	B121, B131	26071	Control Panel Assembly, 120 V	1
56	B141	26071	Control Panel Assembly, 120 V	1
56	B122, B132	26072	Control Panel Assembly, 240 V	1
	B123, B133			
	B125, B135			
56	B126, B136	26077	Control Panel Assembly, 240 V	1
	B127, B137			
56	B142, B143	26072	Control Panel Assembly, 240 V	1
	B145, B146, B147			
57	B112, B122, B132, B142	25268	MOV Assembly, 240 V	1
60	B111, B112	25882	Stroke Length Dial	1
	B113, B115, B116			
61	B111, B121	31927	EPU and Spacer Assembly w/Stroke Adjustment, 120 V	1
61	B131	31929	EPU and Spacer Assembly w/Stroke Adjustment, 120 V	1
61	B141	31931	EPU and Spacer Assembly w/Stroke Adjustment, 120 V	1
	B112, B122			
	B113, B123			
61	B115, B125	31928	EPU and Spacer Assembly w/Stroke Adjustment, 240 V	1
	B116, B126			
	B117, B127			
61	B132, B133	31930	EPU and Spacer Assembly w/Stroke Adjustment, 240 V	1
	B135, B136, B137			
61	B142, B143	31932	EPU and Spacer Assembly w/Stroke Adjustment, 240 V	1
	B145, B146, B147			
62	B11, B12, B13, B14	30803	Gasket	1
63	B1	31103	Seal	1

D1 SERIES DRIVE ASSEMBLY PARTS LIST

Key No.	Model Series	Part No.	Description	Quantity
16	D112, D122	31924	EPU and Spacer Assembly w/Stroke Adjustment, 240 V	1
	D113, D123			
	D115, D125			
	D116, D126			
	D117, D127			
16	D132, D142	31926	EPU and Spacer Assembly w/Stroke Adjustment, 240 V	1
	D133, D143			
	D135, D145			
	D136, D146			
	D137, D147			
17	D1	25068	Sleeve, EPU	1
18	D1	25127	Screw	4
19	D14	25897	Adapter	1
20	D14	10588	Screw	4
23	D1	31891	Knob	1
24	D1	25816	Bushing	1
25	D1	25813	Label	1
27	D1	25963	Washer	1
28	D1	25822	Shaft	1
29	D1	25814-1	Collar	1
30	D1	25815	Set Screw	1
31	D1	25424	Collar	1
32	D1	10462	Retaining Ring	1
33	D1	29257	Housing, Bare	1
36	D1	28856	Wire Assembly (yellow)	2
38	D101, D111, D121, D131, D141	27624*	Housing Assembly	1
38	D102, D112, D122, D132, D142	27625*	Housing Assembly	1
38	D103, D113, D123, D133, D143	27626*	Housing Assembly	1
38	D105, D115, D125, D135, D145	27627*	Housing Assembly	1
38	D106, D116, D126, D136, D146	27628*	Housing Assembly	1
39	D101, D111, D121, D131, D141	26293	Power Cord Assembly, 120 V	1
39	D102, D112, D122, D132, D142	26296	Power Cord Assembly, 240 V	1
39	D103, D113, D123, D133, D143	26297	Power Cord Assembly, 200-240 V, DIN	1
39	D105, D115, D125, D135, D145	26817	Power Cord Assembly, 200-240 V, U.K.	1
39	D106, D116, D126, D136, D146	26818	Power Cord Assembly, 200-240 V, Aust.	1
39	D107, D117, D127, D137, D147	27701	Power Cord Assembly, 200-240 V, Swiss	1
41	D101, D111, D121, D131, D141	25559-1	Pulser, 120 V	1
41	D102, D112, D122, D132, D142	25560-1	Pulser, 240 V	1
	D103, D113, D123, D133, D143			
	D105, D115, D125, D135, D145			
	D106, D116, D126, D136, D146			
42	D1	10422	Retaining Ring	1
43	D101, D111, D121, D131, D141	10626	Varistor, 120 V	1
43	D102, D112, D122, D132, D142	10627	Varistor, 240 V	1
	D103, D113, D123, D133, D143			
	D105, D115, D125, D135, D145			
	D106, D116, D126, D136, D146			
	D107, D117, D127, D137, D147			
45	D1	30830	Potentiometer Assembly	1
47	D1	30708	Knob	1
48	D101, D111, D121, D131, D141	26052	Pilot Light, 120 V	1
48	D102, D112, D122, D132, D142	26053	Pilot Light, 240V	1
	D103, D113, D123, D133, D143			
	D105, D115, D125, D135, D145			
	D106, D116, D126, D136, D146			
	D107, D117, D127, D137, D147			

*Note: Housing Assembly DOES NOT INCLUDE the following: 25899 Knob, 25816 Bushing, 25814-1 Collar, 25815 Set Screw, 25822 Shaft, 25424-1 Collar, 25963 Washer, 25813 Label.

D1 SERIES DRIVE ASSEMBLY PARTS LIST

Key No.	Model Series	Part No.	Description	Quantity
50	D1	26073	Fuse, 5A	2
51	D1	10465	Grommet	1
52	D1	25891	Knob	1
54	D1	26075	Panel with Nameplate	1
55	D1	30306	Screw	4
56	D101, D111	27562	Control Panel Assembly, 120 V	1
56	D103, D113	27564	Control Panel Assembly, 240 V	1
	D105, D115			
	D106, D116			
56	D121	27566	Control Panel Assembly, 120 V	1
56	D122	27567	Control Panel Assembly, 240 V	1
56	D123, D125, D126	27568	Control Panel Assembly, 240 V	1
56	D131	27645	Control Panel Assembly, 120 V	1
56	D132	27646	Control Panel Assembly, 240 V	1
56	D133, D135, D136	27647	Control Panel Assembly, 240 V	1
56	D141	27569	Control Panel Assembly, 120 V	1
56	D142	27570	Control Panel Assembly, 240 V	1
56	D143, D145, D146	27571	Control Panel Assembly, 240 V	1
57	D102, D112, D122, D132, D142	25268	MOV Assembly, 240 V	1
60	D101, D111	27263	Stroke Length Dial	1
	D102, D112			
	D103, D113			
	D105, D115			
60	D106, D116	27096	Stroke Length Dial	1
	D121, D122,			
	D123, D125, D126, D127			
60	D131, D132, D133, D135, D136	27767	Stroke Length Dial	1
60	D141, D142,	27097	Stroke Length Dial	1
	D143, D145, D146, D147			
63	D1	26983	O-Ring	1
64	D1	28912	Stroke Bracket Assembly	1
65	D1	26989	Shaft Assembly	1
67	D1	27552	Screw	2
68	D1	27551	Screw	2
69	D1	12064	Bracket, Bare	1
70	D1	25121	Gasket	1
71	D1	25414	Spring	1
72	D1	25423	Set Screw	1
74	D1	27187	Spacing Stud	2
75	D11, D12, D13, D14	30803	Gasket	1
76	D1	31941	Washer	1
77	D1	31103	Seal	1