DOSAPRO MILTON ROY
Groupe Sundstrand

LMI ELECTRONIC DOSING PUMPS

Code : C7

Basic manual
Instruction supplement / Liquid End Sheet
Spare parts list for drive assembly
Declaration « CE » of conformity
List of « Technical assistance » and « spare parts » departments

DOSAPRO MILTON ROY
Groupe Sundstrand

INSTRUCTION MANUAL

FOR INSTALLATION,
OPERATING,
AND MAINTENANCE.

CE

LMI ELECTRONIC DOSING PUMPS
Diaphragm liquid end
Basic manual

This manual should be made available to the person responsible for installation, operating and maintenance.

Date : 10/98 **Ref : 160.0101.001 Rev. B**
Replaces Rev. 0 07/98

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PART I – DESCRIPTION

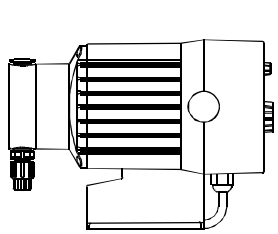
This manual addresses the installation, maintenance and troubleshooting procedures for electronic dosing pumps. An instruction supplement and a liquid end sheet complete this manual.

Please read them carefully before installing your pump.

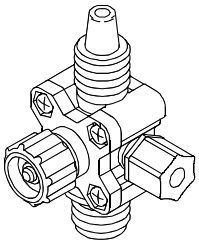
I – 1. UNPACKING

The packaging must be carefully examined on receipt in order to ensure that the contents have not sustained any obvious damage.

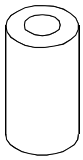
The carton contains the items necessary to a proper installation.



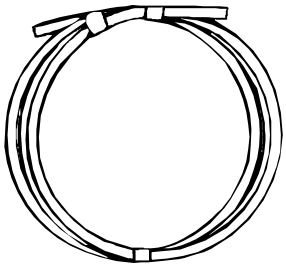
Dosing pump



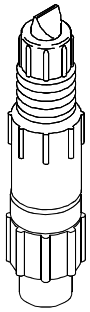
Function valve *



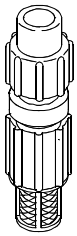
Ceramic weight*



Tubing



Injection check valve*



Foot valve*

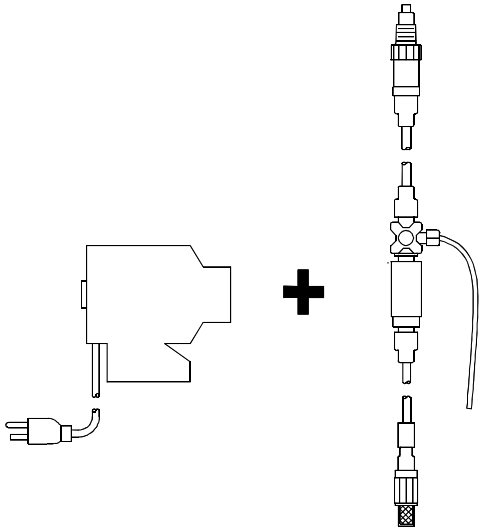
* depending on model

I - 2 - DESCRIPTION

Your pump consists of two parts :

1. The drive assembly
2. The liquid handling assembly

The pump code which appears on the packaging and on the identification plate consists of two codes according to drive assembly type and liquid handling assembly type.



DRIVE
A753

LIQUID HANDLING ASSY
352SM

LMI, Doseur à membrane, L001, Rev.B, 1098

Output adjustment controls

According to pump type, output adjustment controls are available :

- Stroke adjustment
  Each pump is equipped with a stroke adjustment. Stroke control provides adjustment of percent of maximum diaphragm travel.

Note : For B & C Series, stroke adjustment only when pump is running.

- Speed adjustment
  A1, A7, B1, B7, C1, C7, J5, P1 Series pumps are equipped with a speed adjustment. Speed control provides adjustment of the percent of maximum strokes per minute.
- Pressure control adjustment
  B7 and C7 Series Pumps are equipped with a pressure control adjustment. Pressure control provides the adjustment of the pump's pressure capability and power consumption, reducing heat, pipe shock and pulsation.

For more details, refer to Instruction supplement

I - 3. ACCESSORIES

4-Function valve

This accessory is supplied as standard equipment or as option. The functions are :

1. Anti-syphon (automatic)
   Prevents syphoning when pumping downhill or into a vacuum.
2. Back pressure (automatic)
   Supply approximately 1,7 bar back pressure to prevent over pumping when little or no system back pressure is present.
3. Priming (manual)
   Prime your pump while it is connected to a pressurized line.
4. Line depressurization (manual)
   By pulling both knobs (yellow and black) the discharge line will drain back to your supply tank.

3-Function valve

This accessory is supplied as standard equipment or as option (according to Series 300 models). The functions are :

1. Priming (manual)
   Prime your pump while it is connected to a pressurized line.
2. Pressure relief (automatic)
   Provides protection against excessive system pressure.
3. Line depressurization (manual)
   By opening the relief valve, the discharge line will depressurize without having loosen or disconnect discharge tubing.

Bleed/4-Function valve

This accessory is supplied as standard equipment or as option (according to Series 300 models). The functions are :

1. Anti-syphon (automatic)
   Prevents syphoning when pumping downhill or into a vacuum.
2. Back pressure (automatic)
   Supply approximately 1,7 bar back pressure to prevent over pumping when little or no system back pressure is present.
3. Continuous bleed (automatic)
   This valve is designed to permit an adjustable, continuous bleed or degasing or entrapped vapors. It is ideal for pumping small volumes of solutions having low vapor pressures.
4. Line depressurization (manual)
   By opening bleed port, the discharge lline will depressurize, without having to loosen tubing or fittings.

Foot valve

(Accessory available according to the model)

The foot valve makes easier priming and keep the pump primed in suction lift applications.

The strainer prevents sediment to pass through and valves to clog.

Injection check valveCanne d'injection

The injection check valve prevents backflow from a treated line.

I – 4. PRECAUTIONS

Always wear protective clothing, face shield, safety glasses and gloves when working on or near your metering pump.

All LMI pumps are shipped from factory with water in pump head to make easier priming.

If the pump head is empty, refill it with water or solution compatible with pumped solution before starting up the pump (see note on the Liquid End Sheet).

Solution compatibility

Verify that the liquid handling components are compatible with the pumped solution (refer to Liquid End Sheet).

Make certain that all tubing is securely attached to fittings prior to start-up.

Tubing supplied allows to match with pump maximum specifications.

All fittings should be hand tightened.Overtightening or use of a pipe wrench can cause damage to the fittings, causing the pump to lose prime or not function.

All LMI pumps have straight ¾"- 16N or 7/8 "- 14N or 1"- 12 N machine threads on the head and fittings.

The seal rings prevent leaks. Do not use Teflon tape between fittings and pump head.

PART II – INSTALLATION

II – 1. HYDRAULIC INSTALLATION

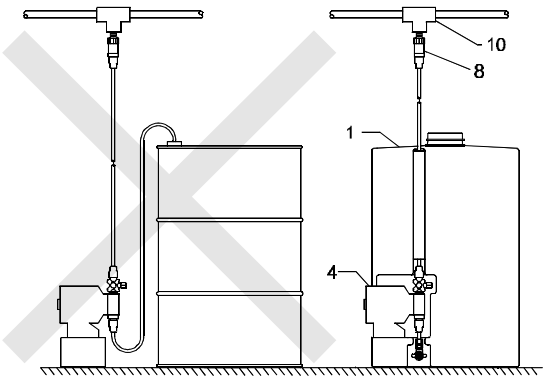
The pump can be mounted in one of two ways :

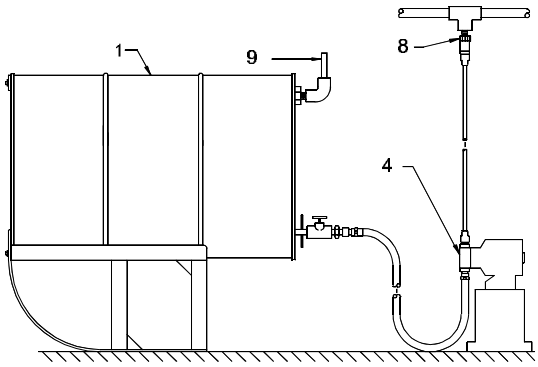
- Flooded suction (ideal installation).
- Suction lift – when suction lift is less than 1,5 m for solutions having a specific gravity of water. Your LMI metering pump must be mounted so that the suction and discharge valves are vertical.

Flooded suction

The pump is mounted at the base of the storage tank.

This installation is the most trouble-free, and is recommended for very low outputs, solutions that gasify, and high viscosity solutions. (Install shut off valve on the tank).





1	Solution tank	9	Vent
4	Pump	10	Tee
8	Injection check valve		

Fig. 2.1a : Flooded suction

Suction lift

- Wall bracket mount. The pump may be mounted directly above the solution tank. A pump mounted in this manner allows for easy changing of solution tank.

1	Solution tank
4	Pump
6	Pressure line
8	Injection check valve
10	Tee
A	50 mm space for sediment accumulation

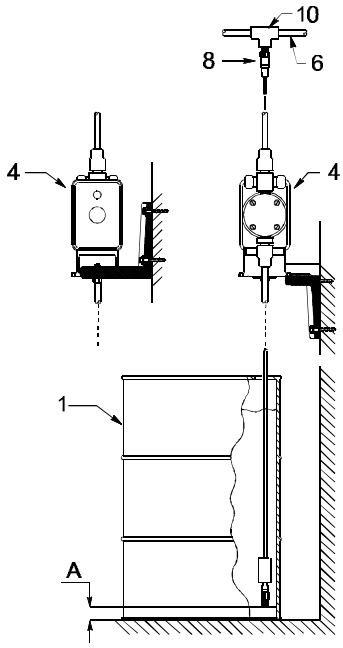


Fig. 2.1b : Suction lift

- Tank mount. The pump may be mounted on a molded tank. Tanks from 60 to 1000 liters are available for this utilisation.

1	Solution tank
2	Foot valve (equipped with strainer)
4	Pump
6	Flow
8	Injection check valve
10	Te
11	Ceramic weight
A	50 mm space for sediment accumulation

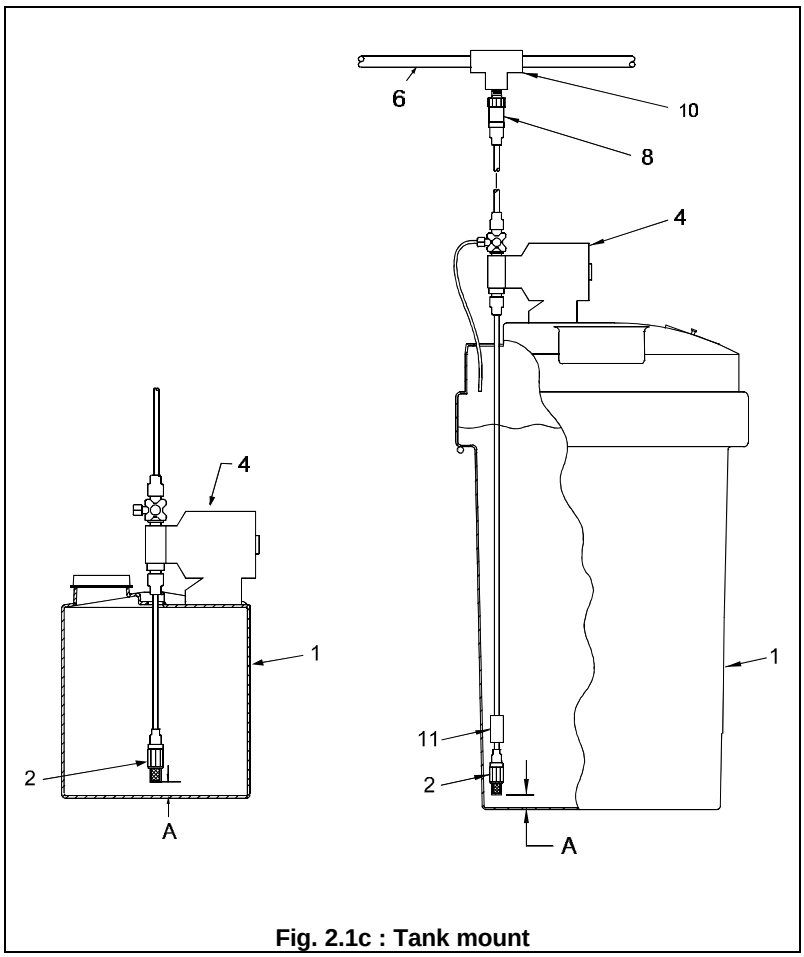


Fig. 2.1c : Tank mount

- Shelf mount (customer supplied). The pump may be mounted on a shelf. An LMI mounting kit is available for securing the pump to a shelf. (Series A , B, C).

1	Solution tank
2	Foot valve (equipped with strainer)
4	Pump
6	Flow
8	Injection check valve
10	Te
11	Ceramic weight
A	50 mm space for sediment accumulation

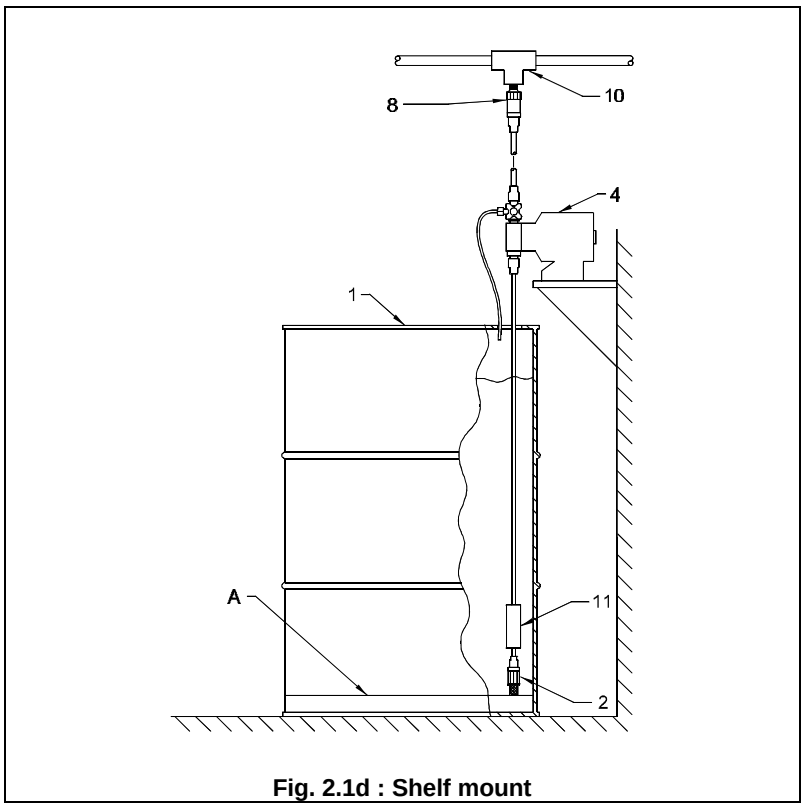


Fig. 2.1d : Shelf mount

Pump location

Locate pump in an area convenient to solution tank and electrical supply.

The pump should not be subjected to ambient temperatures above 50°C. Avoid exposing to direct sunlight the pump.

Tubing connections

- For installation and trouble-free running, use only recommended tubing size (refer to spare parts list).
- Do not use clear vinyl tubing on the discharge side of the pump. The pressure created by the pump can rupture the vinyl tubing.
- Before installation, all tubing must be cut with a clean square end.
- Remove the plugs which protect the head connections and valves.
- Do not use pliers or pipe wrench on coupling nuts or fittings.
- When tubing connection fits on a cone, dip end in hot water.

Refer also to the Liquid End Sheet.

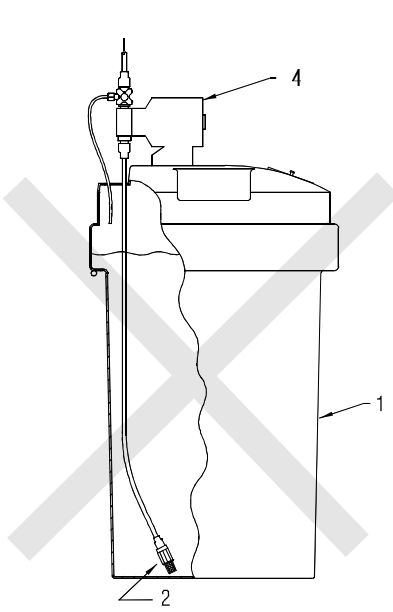
Foot valve/Ceramic weight

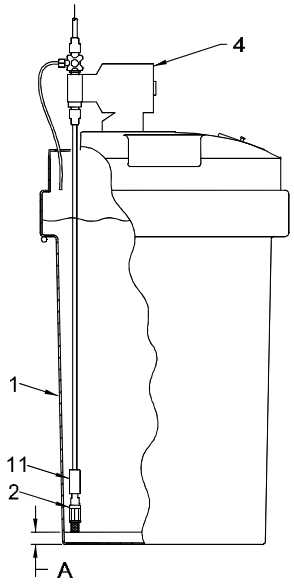
The foot valve must be sit in a vertical position at the bottom.

Position approximately 50 mm off the bottom if the tank or drum contains sediment.

The ceramic weight positions the foot valve in a vertical position.

Refer to the Liquid End Sheet for details of connections.





1	Solution tank	4	Pump
2	Foot valve	11	Ceramic weight

Fig. 2.2a : Foot valve/Ceramic weight

Injection check valveCanne d'injection

Connect the injection check valve to your discharge (outlet) line (refer to the Liquid End Sheet).

For in-line injection, use fitting or pipe tee with reducing bushing to ½'' (12x17).

Use Teflon tape or pipe dope to seal the pipe threads only.

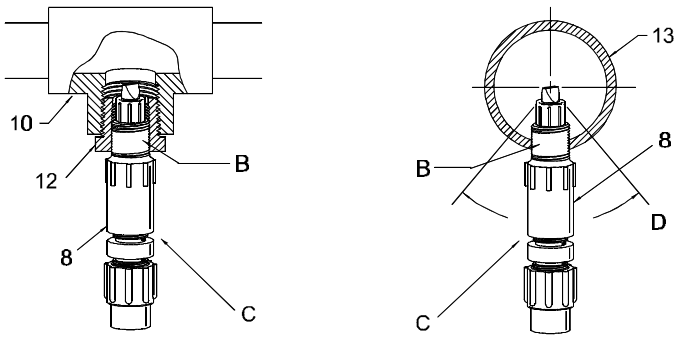
When installing the injection check valve, be sure to position it so that the valve enters the botton of your pipe in a vertical position (see fig. 2.2b).

Variations left and right within 30° are acceptable.

For low pressure (under 1,7 bar) or open tank use, the injection nozzle prevents siphoning but not flow increase.

In this case,we recommend the use of a 4-Function valve.

Refer to the Liquid End Sheet for details of connections.



8	Injection check valve	B	Use Teflon tape
10	Tee	C	Do not use Teflon tape
12	Reducing bushing ½ ''	D	± 30° variation acceptable
13	Pipe cross section		

Fig. 2.2b : Injection check valve

II – 2. ELECTRICAL INSTALLATION

Check the specifications of the pump and compare them with the voltage available on your installation before making connections.

WARNING :

To reduce the risk of electrical shock, the metering pump must be plugged into a fused grounded outlet with ratings conforming to the pump specification chart (see Technical characteristics : refer to peak power to determine the appropriate fuse size).

DO NOT USE ADAPTERS.

All wiring must be conform to local electrical codes.

OVER-VOLTAGE

LMI pumps include a Varistor vonnected on the supply voltage terminals.

This device is an over-voltage protection. It will burn if the supply voltage exceeds 150 V for 115 V rated pumps or 275 V for 230 V rated pumps to protect the pulser.

As soon as it happends, it means the pump got a too high voltage peak. After supply voltage control, replace the Varistor and the pump will run again.

PART III – START UP

Pumps are shipped from the factory with water in the pump head to aid in priming. After a long storage, refill the pump head with water or solution compatible with pumped solution (see note on the Liquid End Sheet).

III – 1. PRIMING

After connecting the pump, plug in or switch the pump on. While the pump is running, set the speed knob at 80% and the stroke knob at 100%. If the pump is equipped with a pressure control knob (B7, C7), set the switch on « INTERNAL » and turn the pressure control knob fully clockwise.

III – 2. OUTPUT ADJUSTMENT CONTROLS

Once the pump has been primed, an appropriate output adjustment must be made.

The identification plate indicates the output at max. stroke and max. speed (100%) and max. pressure. The graduations of stroke knob and speed knob correspond to percentage of this max. output.

Note : P0 pumps have no stroke adjustment.

Example :

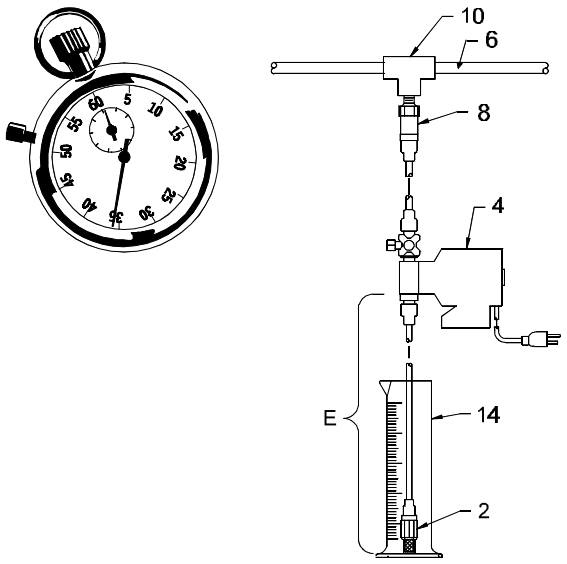
Use max. output = 2,3 L/H. If the pump is set at 40% speed and 60% stroke lenght, the appropriate pump out put is 2,3 L/H x 0.40 x 0.60 = 0,55 L/H.

Note : Remember that 6x8 tubing is 0,22 ml/cm which is 0,8 % wrong for 1 l measuring pot.

III – 3. CALIBRATION

Once installation is complete and the approximate output has been determined, the pump should be calibrated to adjust speed and stroke for your actual desired output.

1. If equipped (B7 – C7 series), make certain Pressure control knob is turned fully clockwise.
2. Be sure the pump is in normal service (i.e. including factors such as injection pressure, fluid viscosity, suction lift …).
3. Place the foot valve in a graduated container.
4. Start the pump at maximum frequency and let it run to remove air trapped in suction line (bleed valve open when using a 4FV). Close bleed after priming.
5. Turn the pump off. Refill graduated container to a level strarting point.
6. Using a stopwatch or timer, turn the pump on for a measured amount of time (50 pump strokes minimum). The longer the time period, the more confident you can be of the results.
7. The volume and the time unit are known. Calculate the output. If the output is too low or too great, adjust speed and or stroke, estimating required correction.
8. Adjust stroke length knob to desired value refering to calibration.



2	Foot valve	10	Tee
4	Pump	14	Graduate container (1 l min.)
6	Pressure line	E	Suction lift
8	Inj. check valve		

Fig. 3.2a : Calibration

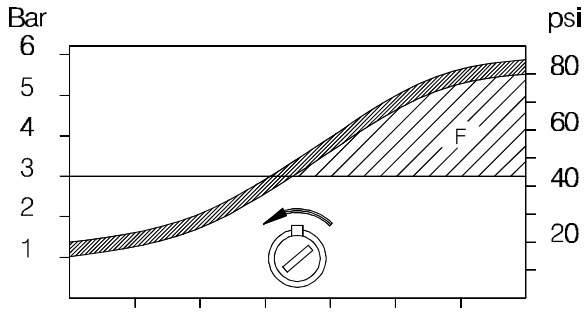
III – 4. VOLUMETRIC CALIBRATION IN EXTERNAL MODE

1. Since pump output is governed by an external device such as Flowmeter-pulser, Liquitron™ Current-to-frequency converter or 4-20 mA DC signal from an instrument with an LMI Analog-to-digital converter, only the ouptut per stroke may be calibrated.
2. With pump primed and discharge tubin connected to the injection point as it would be in normal service, place foot valve in a graduated container.
3. Swtch pump to Internal mode with speed knob set at 100 until air is exhausted from suction line and pump head.
4. Adjust control pressure (B7 – C7 series).
5. Turn the pump off. Refill graduated container to a level strarting point.
6. Switch pump on and count the number of strokes. For a good accuracy, count at least 100 strokes. Switch pump off.
7. Note the volume pumped during the calibration period and the number of strokes. Divide into the volume the number of strokes to determine the volume of solution pumped per stroke.
8. Adjust stroke length knob to desired value refering to calibration.

III – 5. PRESSURE CONTROL

Adjust pressure control (B7 - C7 series) : while unit is running, turn pressure control knob fully clockwise then turn slowly counter-clockwise until unit just begins to stall. This is the optimmum pressure control setting for your installation. Adjust pressure control to prolong pump life.

Increase setting if back pressure is increased.



F : Excess pressure

Fig. 3.3a : Control pressure

Note : On series A9, B9, C9, this setting is in the main menu.

PART IV – MAINTENANCE

IV – 1. SPARE PARTS REPLACEMENTS

WARNING : Always wera protective clothing, face shield, safety glasses and gloves when performing any maintenance or replacement on your pump.

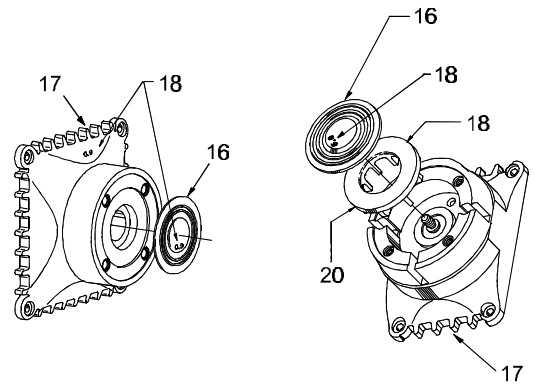
LMI metering pumps are designed for trouble-free operation, yet routine maintenance of elastomeric parts is essential for optimmum performance.

Refer to the spare parts list.

Replacements frequency will depend on your particular application. We recommend replacing these parts at least one a year.

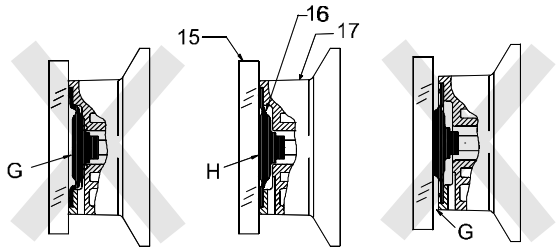
Diaphragm replacement

1. Depressurize the pump (see Liquid End Sheet).
2. Place the foot valve into a container of water or other neutralizing solution.
   Turn the pump on to flush the head assembly. Lift the foot valve out of the solution and continue to pump air into the pump head until the pump head is purged of water or neutralizing solution. If the liquid cannot be pumped due to diaphragm rupture, using protective gloves, carefully disconnect the suction and discharge tubing. Remove the screws to the head and immerse the head in water or other neutralizing solution.
3. While running, set the stroke knob to zero and turn the pump off.
4. Dismantle the liquid end. Unscrew the diaphragm. Clean the diaphragm recess and the disk. Check the size of replacement diaphragm, the code (0,5 - 0,9 - 1,8 - 3,0- 6,0) is indicated on the diaphragm and the disk or spacer (see fig. 4.1a).
5. Reinstall the disk (A, J, P series).
6. Start the pump and turn the stroke knob to the setting indicated on stroke setting chart which matches the pump model number located on the pump dataplate. Stop the pump.
7. Grasp the outer edge of the diaphragm and adjust by screwing it in or out so that the center of the diaphragm is flush with the outside of the spacer edge (see fig. 4.1b). Once the diaphragm is properly positionned, remount the pump head to the spacer using the screws. Tighten in a crisscross pattern. **AFTER ONE WEEK OF OPERATION, RECHECK THE SCREWS AND TIGHTEN IF NECESSARY.**



16	Diaphragm	18	Code
17	Spacer		

Fig. 4.1a : Diaphragm identification



15	Straight edge	G	Gap
16	Diaphragm	H	No gap
17	Spacer		

Fig. 4.1b : Diaphragm fitting

Pump series	**Stroke knob setting**
A – B – J – P (all series) Cx0 – Cx1 – Cx2 Ex0 – Ex1 – Ex2	90 %
Cx3 – Cx4 – Cx5 Ex3 – Ex4	70 %

Ball, seal ring and injection check valve spring replacement or set of cartridges replacement (depending on model)

Refer to the spare parts list for the proper sparte parts kit number.

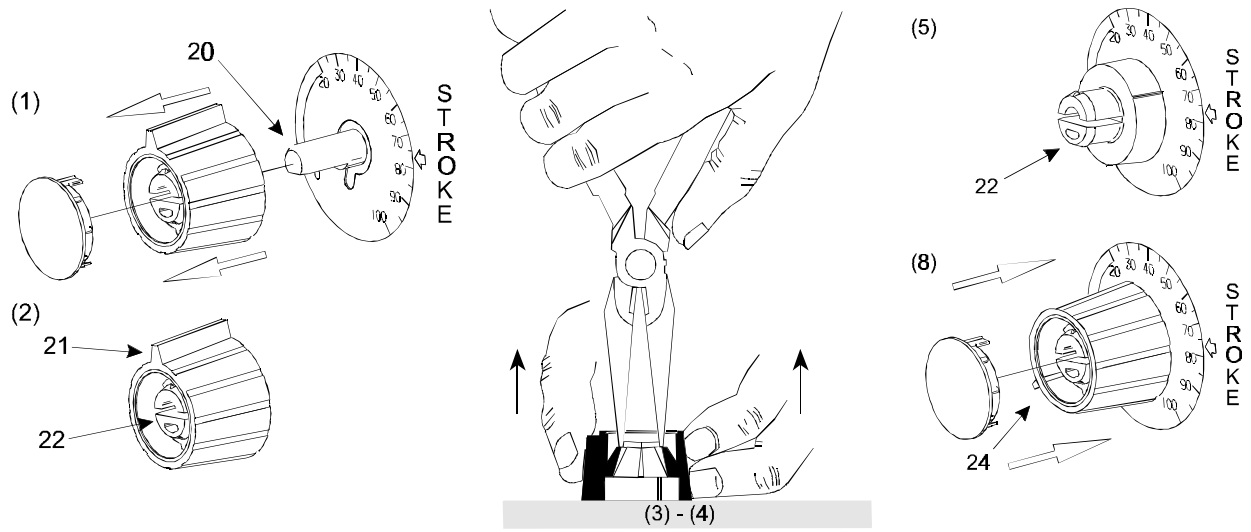
1. Depressurize the pump (see Liquid End Sheet).
2. Flush and purg the pump head before dismantling (see above).
3. During dismantling, note the orientation of each item.
4. Dismantling the injection check valve. Unscrew the valve body and replace the spring, the ball and the seal ring. Refer to the spare parts list drawing.
5. Replace the seal rings and balls in the pump head and the foot valve. Order of assembly changes depending on valve location.
6. In case of cartridge liquid end, see spare parts list drawing to identify the orientation of each item.

IV – 2. CHECKING PUMP FOR PROPER ZEROING (STROKE KNOB)

1. With pump running, turn stroke knob counter-clockwise toward zero or end of black or red band.
2. Listen to the clicking as the pump is running. The pump shoukd operate quietly at the zero position (no clicking). If the pump continues to click at zero or stops clicking before zero is reached, the pump zero must be reset.

Push on knob

1. Remove stroke knob from the pump by grasping the knob firmly and pulling it toward you.
2. Pry off the yellow cap.
3. Place the knob on a flat surface.
4. Using needle nose pliers, squeeze the inner section together while lifting the outer section up.
5. Push the inner section back onto the « D » shaped stroke shaft.
6. With the pump running, zero the pump by turning the inner sectionof the knob counter-clockwise until the pump stops clicking.
7. Position the outer section of the knob so that the pointer aligns with zero on the nameplate or end of the black or red band.
8. Push down on the outer section (a snap sound indicates parts are locked together).
9. Replace the yellow cap over the outer section of the knob, aligning the tabs on the cap with the slots inside the knob.



20	Shaft	22	Knob base
21	Knob pointer	24	Knob pointer

Fig. 4.2a : Push on knob

IV – 3. TROUBLESHOOTING

Pump will not prime

- Pump not turned on or plugged in.
  Turn on pump/plug in pump.
- Output dials not set properly.
  Always prime pump with speed at 80 % and stroke at 100 %.
- Foot valve not in vertical position on bottom of tank.
  See Chapter II – 1. Section Foot valve/ceramic weight.
- Pump suction lift too high.
  Maximum suction lift is 1,5 m. Pump with High viscosity liquid handling assemblies require flooded suction.
- Suction tubing is curved or coiled in tank.
  Suction tubing must be vertical. Use ceramic weight supplied with pump. (see Chapter II – 1. Section Foot valve/ceramic weight).
- Fittings are over tightened.
  Do not overtighten fittings. This causes seal rings to distort and not seat propertly which causes pump to leak back or lose prime.
- Air trap in suction valve tubing.
  Suction tubing should be as vertical as possible. AVOID FALSE FLOODED SUCTION (see Chapter II – 1. Section Flooded suction).
- Too much pressure at discharge (pump without 4-function valve).
  Shut off valves in pressurized line. Disconnect tubing at injection check valve (see Chapter III – 1. Priming). When pump is primed, reconnect discharge tubing.

Pump loses prime

- Solution container ran dry.
  Refill container with solution and reprime (see Part III).
- Foot valve not in vertical position on bottom of tank.
  See Chapter II – 1. Section Foot valve/ceramic weight.
- Pump suction lift too high.
  Maximum suction lift is 1,5 m. Pump with High viscosity liquid handling assemblies require flooded suction.
- Suction tubing is curved or coiled in tank.
  Suction tubing must be vertical. Use ceramic weight supplied with pump. (see Chapter II – 1. Section Foot valve/ceramic weight).
- Fittings are over tightened.
  Do not overtighten fittings. This causes seal rings to distort and not seat propertly which causes pump to leak back or lose prime.
- Air trap in suction valve tubing.
  Suction tubing should be as vertical as possible. AVOID FALSE FLOODED SUCTION (see Chapter II – 1. Section Flooded suction).
- Air leak on suction side.
  Check for pinholes, cracks. Replace if necessary.

Leakage at tubing

- Worn tubing ends.
  Cut tubing about 25 mm (1'') off tubing and then replace as before.
- Loose or crack fitting.
  Replace fitting if cracked. Carefully hand tighten fittings. Do not use pipe wrench. Once fitting comes into contact with seal ring, tighten an additional 1/8 or ¼ turn.
- Worn seal rings.
  Replace balls and seal rings (see part IV).
- Solution attacking Liquid handling assembly material.
  Consult Technical Assistance Department for alternate materials compatible with the pumped solution.

Low output or failure to pump against pressure

- Pump's maximum pressure rating is exceeded by injection pressure.
  Injection pressure cannot exceed pump's maximum pressure. See pump data plate.
- Worn seal rings.
  Replace them : see Chapter IV –1.
- Ruptured diaphragm.
  Replace diaphragm : see Chapter IV –1. Section Diaphragm replacement.
- Incorrect stroke length.
  Check zero on pump/Re-zero pump (See Chapter IV – 2.).
- Tubing run on discharge may be too long.
  Longer tubing runs may create frictional losses sufficient to reduce pump's pressure rating.
- Clogged foot valve strainer.
  Remove foot valve strainer when pumping slurries or when solution particles cause strainer to clog.

Failure to run

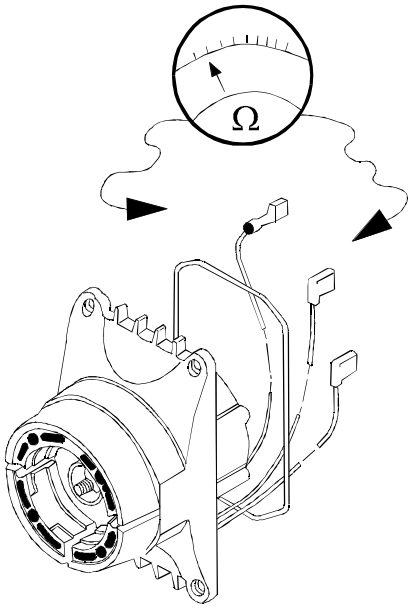
- Pump not turned on or plugged in.
  Turn on or plug in pump. Check also programming (A9, B9, C9 Series).
- EPU failure.
  Disassemble pump and measure the resistance of the EPU across the EPU wires. Resistance reading should be in accordance to the table (see Chapter IV – 4.). Also check EPU leads to ground.
- Pulser failure.
  The pulser should be replaced if EPU checks out OK.

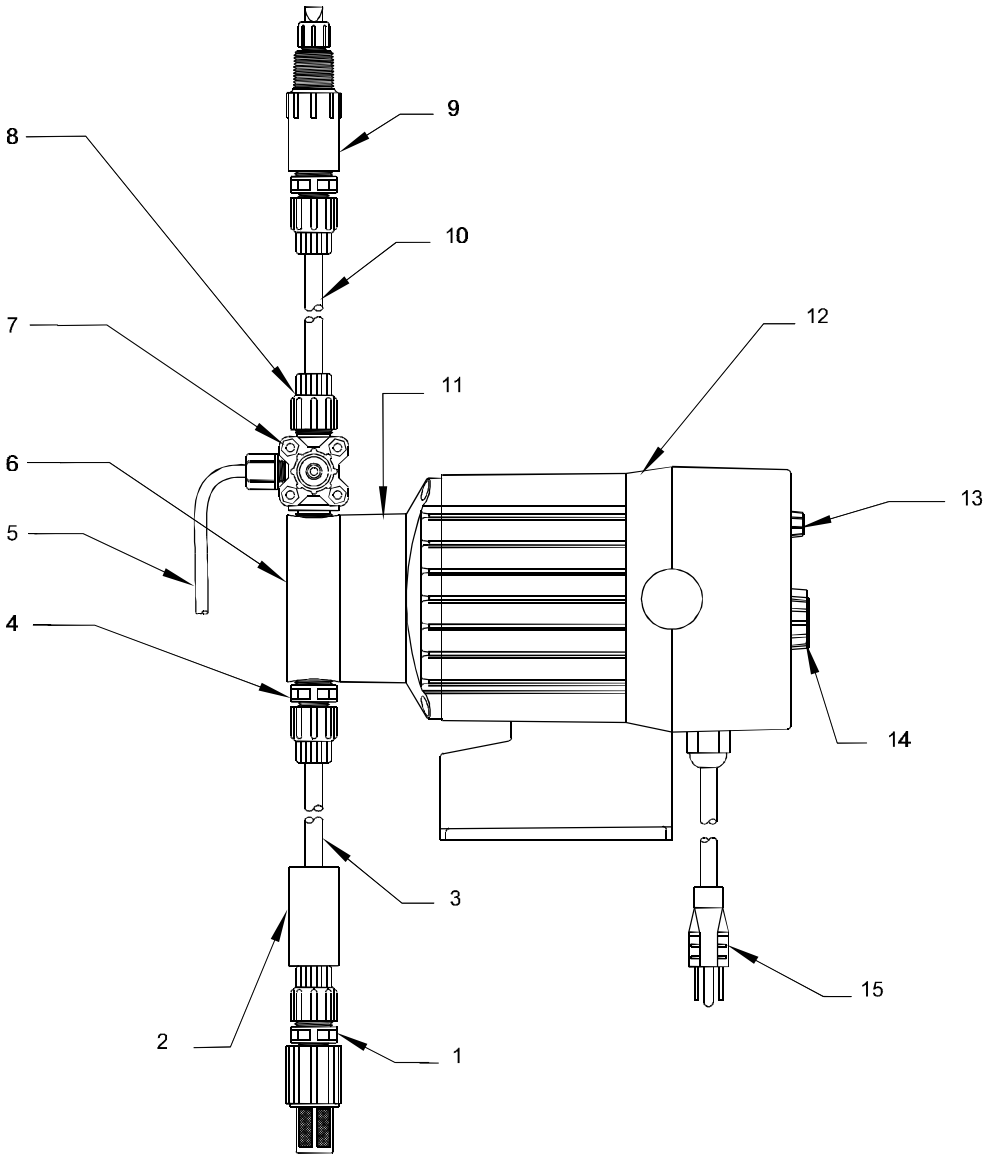
Excessive pump output

- Syphoning. Pumping downhill without a 4-FV. Move injection point to a pressurized location or install an 4-FV.
- Little or no pressure at injection point. If pressure at injection point is less than 1,5 bar (25 psi), an 4-FV should be installed.
- Excessive strokes per minute. Replace pulser or control panel.

IV – 4. EPU RESISTANCE CHART

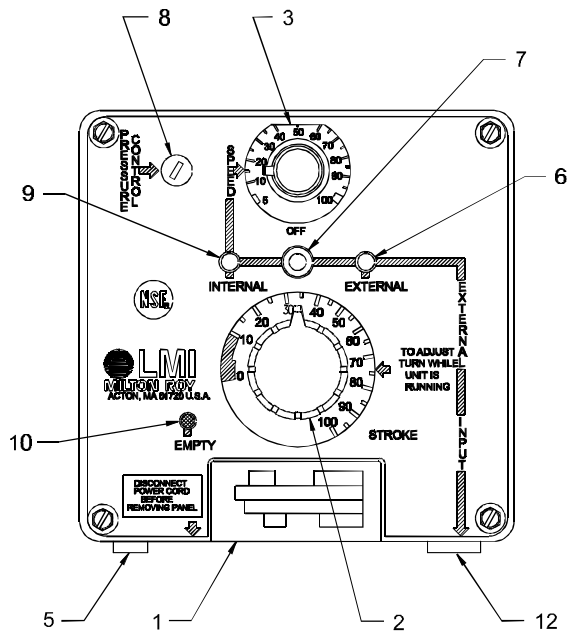
Pump series	**Voltage**	**Coil resistance (ohms) 20° C (68°F)**
Ax4, Ax5, Ax6	115 V	76 – 87
Px4, Px5, Px6, Px8 H9	230 V	307 – 353
Ax7, Ax8	115 V	152 – 176
Px2, Px3	230 V	583 – 671
Bx1, Bx2, Bx3, Bx4	115 V	43 –49
	230 V	167 – 193
Cx0, Cx1, Cx2, Cx3, Cx4, Cx5	115 V	22.8 – 26,2
E70, E71, E72, E73, E74	230 V	91 – 105
J54D, J55D, J56D	12VDC	1.1 – 1.3





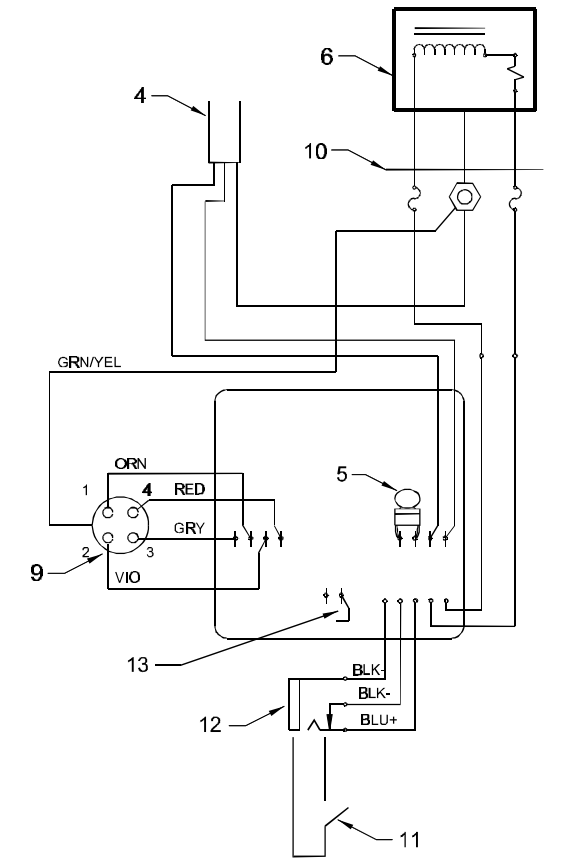
1	Foot valve	9	Injection check valve
2	Ceramic weight	10	Discharge tubing
3	Suction tubing	11	Spacer E.P.U.
4	Suction fitting	12	Metering pump housing
5	Return line (pressure relief)	13	Speed knob
6	Pump head	14	Stroke knob
7	4-Function valve (option)	15	Power cord
8	Coupling nut		

Metering pump component diagram



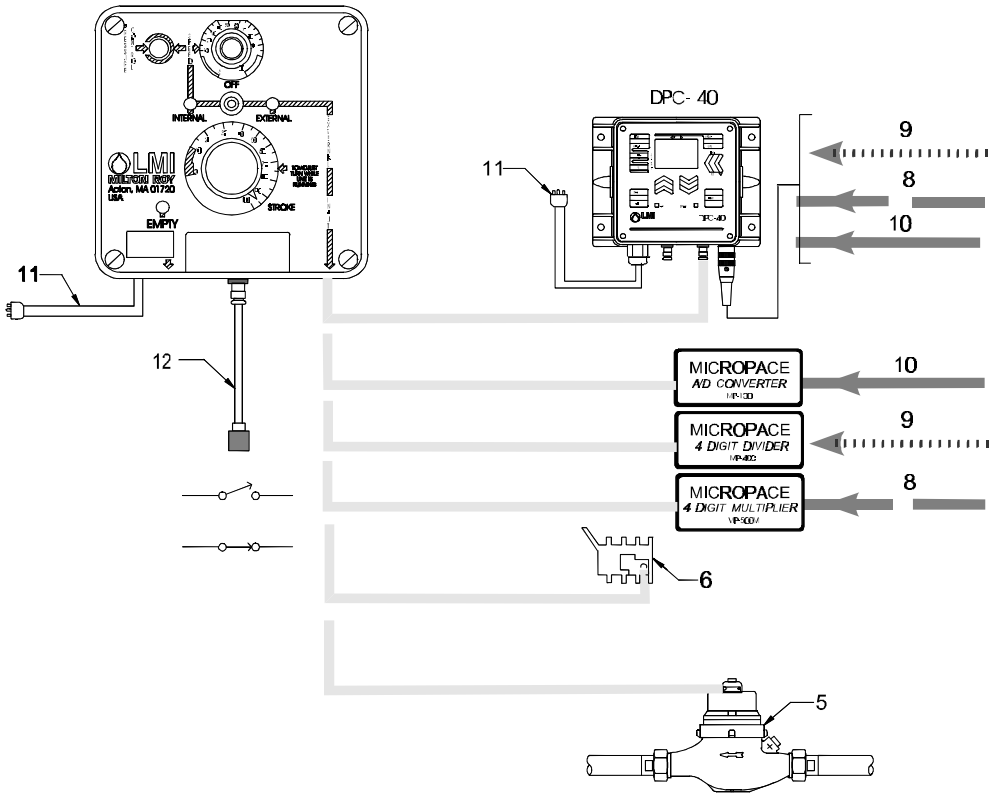
Control panel detail

1	Identification plate
2	Stroke knob
3	Speed knob
5	Low level jack
6	External light
7	Selector switch
8	Pressure control (shown with cap removed)
9	Internal light
10	Empty light
12	External input jack



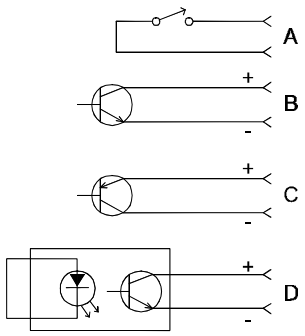
Wiring diagram

4	Power cord
5	Mov/cap assembly
6	EPU assembly
9	External input jack
10	Housing wall
11	Optional low level switch
12	Low level socket
13	Voltage selection
BLK	Black
BLU	Blue
GRN/YEL	Green/yellow
GRY	Grey
ORN	Orange
RED	Red
VIO	Violet



5	Flowmeter/contactor	10	4-20 mA DC
6	Pulse transmitter	11	115 V or 230 V ; 50-60 Hz
8	Lower frequency pulses	12	Low lever sensor (option)
9	Higher frequency pulses		

Methods of externally triggering or pacing



Methods of triggering

A	Switch closure Switch closing trigggers pump
B	NPN transistor Base goes high to trigger pump
C	PNP transistor Base goes low to trigger pump
D	Opto isolator
+ -	White Black

Note :
Switch or transistors must be capable of switching 15 VDC at 2 mA.
Minimum time in low impedance state (on) is 50 ms.
Minimum time in high impedance state (off) is 100 ms.

TECHNICAL CHARACTERISTICS

	C70x	C71x	C72x	C73x	C74x
Output					
- max. (l/h)	4.9	9.5	15	30.4	76
- min (ml/h)	24.5	47.5	75	152	380
Max. pressure (bar)	20.7	10.3	6.9	4.1	1.7
Stroke capacity (ml)					
- min.	0.08	0.16	0.25	0.51	1.26
- max.	0.81	1.58	2.52	5.05	12.60
Stroke frequency (cps/mn)					
- min.	5	5	5	5	5
- max.	100	100	100	100	100
Diaphragm size (in^2)	0.9	1.8	1.8	3.0	6.0
Min. recommanded stroke lenght (%)	10	10	10	10	10
Peak power (W)	420	420	420	420	420
Average power (Wh)	56	56	56	56	56

Note :

The « x » which appears in the code designates both voltage and power cord/plug type.

DOSAPRO MILTON ROY

Liquid End Sheet

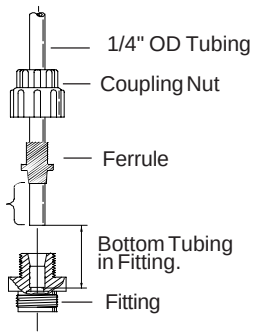
When pumping solutions, make certain that all tubing is securely attached to the fittings. It is recommended that tubing or pipe lines be shielded to prevent possible injury in case of rupture or accidental damage. Always wear protective clothing and face shield when working on or near your metering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

Tubing Connections

Your pump will be supplied with one of the following tubing connections. Before installation, all tubing must be cutted with a clean square end. Valve and head connections from the factory may be capped. Remove and discard these caps before connecting the tubing.

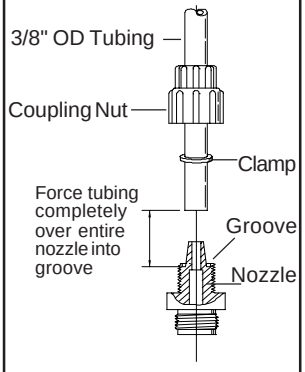
DO NOT USE CLEAR VINYL TUBING ON THE DISCHARGE SIDE OF THE PUMP.
(Pressure can rupture tubing.)
DO NOT USE PLIERS OR PIPE WRENCH ON COUPLING NUTS OR FITTINGS.

Tubing Connection
1/4" O.D. (.250" Tubing)



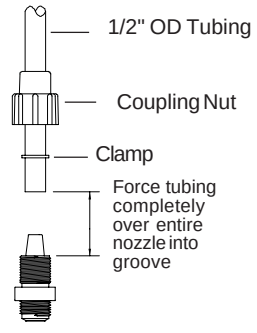
Push and hold tubing down while tightening coupling nut.

Tubing Connection
3/8" O.D. (.375" Tubing)



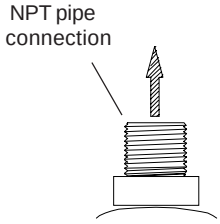
Push and hold tubing down while tightening coupling nut.

Tubing Connection
1/2" O.D. (.50" Tubing)



Push and hold tubing down while tightening coupling nut.

Pipe Thread Connection
1/4" or 1/2" NPT



Apply Teflon© tape.
(Customer supplied pipe connections)

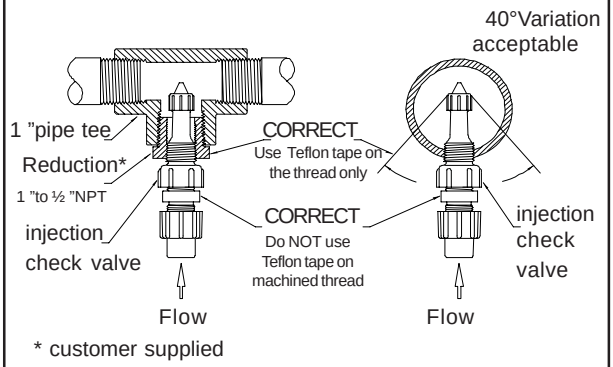
Injection Check Valve and Discharge Tubing Installation

The Injection Check Valve prevents backflow from a treated line. Connect the Injection Check Valve to your "DISCHARGE" (outlet) line. An NPTF fitting or pipe tee with a reducing bushing to 1/2" NPTF will accept the injectioncheck valve. Use Teflon® tape or pipe dope to seal the pipe threads *only.*

When installing the Injection Check Valve, be sure to position it so that the valve enters the bottom of your pipe in a vertical position. Variations left and right within 40° are acceptable (see illustration below).

After cutting an appropriate length of discharge tubing, connect tubing to the injection check valve then back discharge

Make sure it does not crimp or come into contact with hot or sharp surface (see Tubing Connections).



Typical injection check valve installation

date : 05/99	**LMI PUMP**	*Ref : 1907.001*

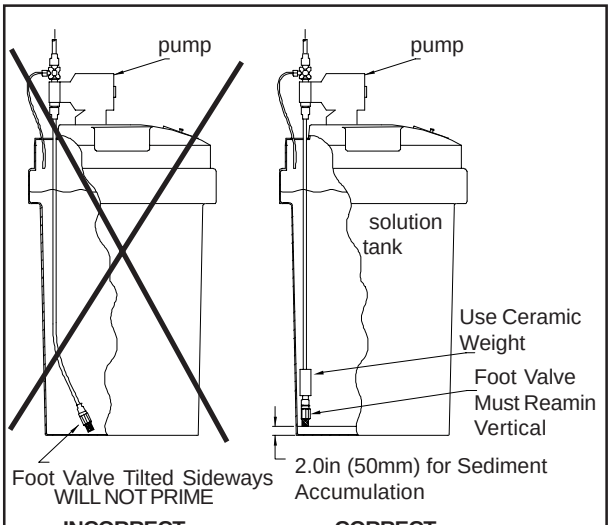
Foot Valve/Suction Tubing Installation

The Foot Valve acts as a check valve to keep the pump primed in suction lift applications.

The foot valve is designed to be submersed in the solution tank or drum and must sit in a vertical position at the bottom. Position approximately 2 inches (50mm) off the bottom if the tank or drum contains sediment. The ceramic weight, when installed, positions the foot valve in a vertical position.

NOTE: *Pump models equipped with high-viscosity liquid end s are not equipped with foot valves. Flooded suction is recommended A 1/2" NPT connector is included for flooded suction installations.*

1. Cut a piece of suction tubing to a length so that the foot valve hangs just above the bottom of the solution container. Maximum recommended vertical suction lift is 5 feet (1.5 m).
2. Attach the foot valve to one end of the suction tubing.
3. Slide the ceramic weight over the tubing end until it contacts the top of the foot valve coupling nut.
4. Place foot valve and tubing into the solution tank. Check that the foot valve is vertical and approximately 2 inches (50 mm) from the bottom of the tank or drum(see ullustration). Connect the Connect the other end of the tubing to the suction side (bottom side) of the pump head (see Tubing Connections).



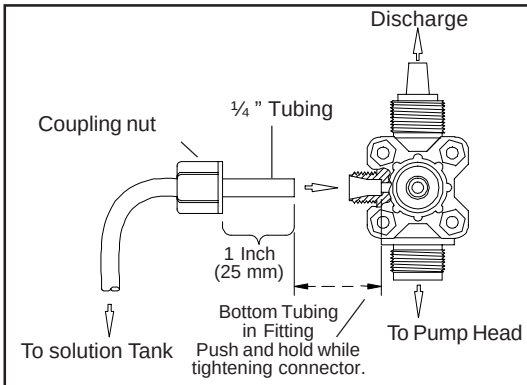
Foot Valve Tubing Connection

Multi-Function Valve Installation

To install the multi-function valve, remove the yellow screw cap on the top of the pump head and screw in the valve so that it contacts the seal ring. An additional 1/8 – 1/4 turn may be necessary to prevent leakage.

1/4" O.D. tubing connects to the side of the valve and acts as a return line to the solution tank. To ensure priming, this tubing must NOT be submerged in the solution.

This return line tubing must be secured to ensure pumped solution will safely return to supply tank.



Multi-Function Valve Tubing Connection

Depressurizing Discharge Line

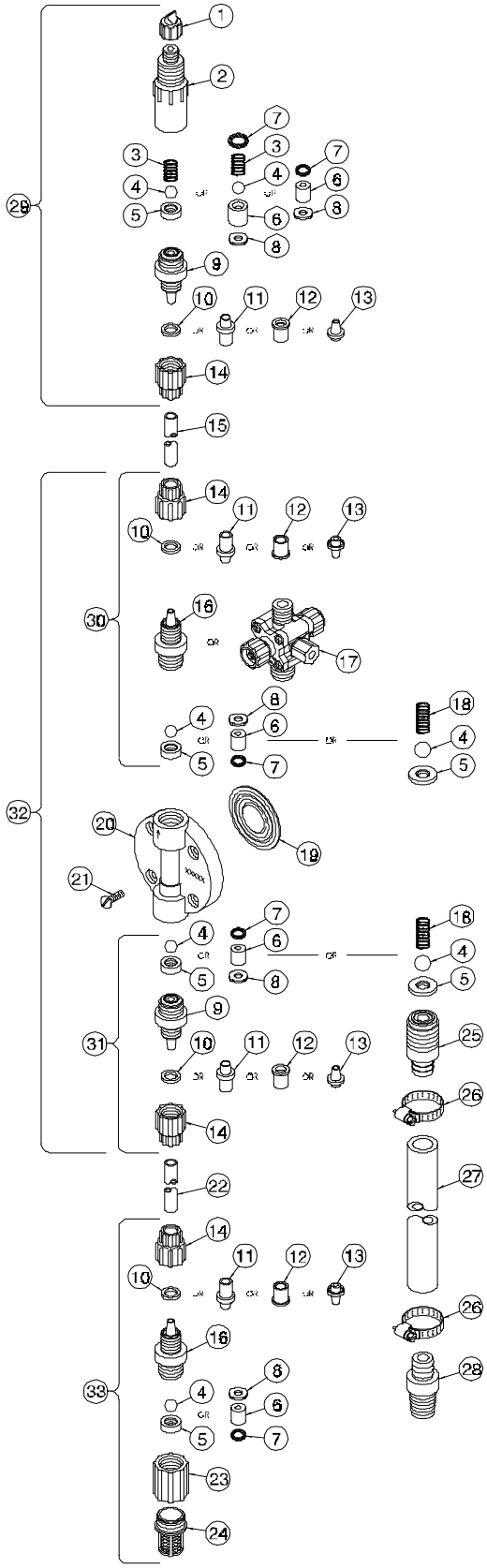
(pumps equipped with multi-function valves)

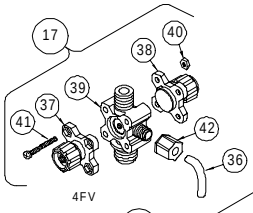
It is possible to depressurize the discharge line and pump head without removal of tubing or loosening of fittings.

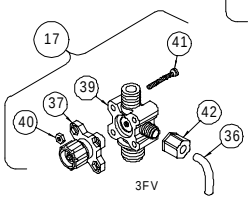
1. Be sure injection check valve is properly installed and is operating. If a gate valve or globe valve has been installed downstream of injection check valve, it should be closed. Be certain relief tubing from the multi-function valve is connected and run to solution reservoir.
2. Turn Pressure Relief knob 1/4 turn.
3. Open the anti-syphon valve, if equipped
4. The discharge line is now depressurized.
5. If injection check valve is of higher elevation than pump head, disconnecting tubing at the injection check valve end will allow air to enter and cause solution to drain back to tank.

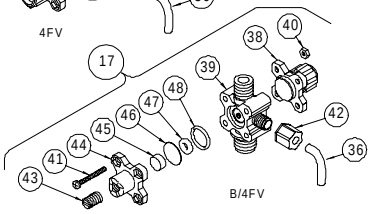
Liquid End Parts List

1 Flapper valve
2 Injection check valve body
3 Injection check valve spring
4 Check valve ball
5 Seal ring
6 Cartridge valve
7 Cartridge valve o-ring
8 Cartridge valve washer
9 Valve seat
10 Clamp ring
11 Ferrule
12 Clamp sleeve
13 Tubing adapter
14 Coupling nut
15 Discharge tubing
16 Valve housing
17 Multi-function valve
18 High-viscosity spring
19 Liquifram
20 Pump head
21 Pump head screw
22 Suction tubing
23 Foot valve seat
24 Foot valve screen
25 High-viscosity valve seat
26 H.V. tubing clamp
27 H.V. suction tubing
28 H.V. Tubing x 1/2 NPT connector
29 Injection check valve assembly
30 Discharge valve assembly
31 Suction valve assembly
32 Pump head assembly
33 Foot valve assembly
34 Injection Seat PTFE
35 Ceramic Weight
36 Return Line
37 Cap ASM (Black Knob)
38 Cap ASM (Yellow Knob)
39 Multi-Function Valve Body
40 Nut Multi-Function Valve
41 Screw Multi-Function Valve
42 Return Line Coupling Nut
43 Adjustment Screw B/4-FV
44 Cap B/4-FV
45 Plug B/4-FV
46 Gasket B/4-FV
47 Small O-Ring B/4-FV
48 Large O-Ring B/4-FV









NOTE: This illustration is a visual representation of all LE components. Liquid ends will not include all parts shown.

Start-Up/Priming for Pump Supplied with Multi-Function Valve

Read this entire section completely before proceeding.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now start priming the pump.

1. Plug in or switch the pump on.

2. While the pump is running, set the speed knob at 80 %and the stroke knob at 100%.

If the pump is equipped with pressure control, turn fully clockwise.

3. 1/4 turn open the relief side (black knob) of the multi-function valve.

3A. (Bleed 4FV only) With screwdriver rotate bleed adjustement screw counter-clockwise 2 full turns. When solution begins to flow through translucent bleed return tubing, the pump is primed. Stop pump.

4. The suction tubing should begin to fill with solution from the tank.

5. A small amount of solution will begin to discharge out the return line of the multi-function valve. Once this happens,1/4 turn or release the knob and **SHUT THE PUMP OFF.** (If pump is not equipped with an on/off switch, or disconnect the power cord.)

6. The pump is now primed.

6A. (Bleed 4FV only)

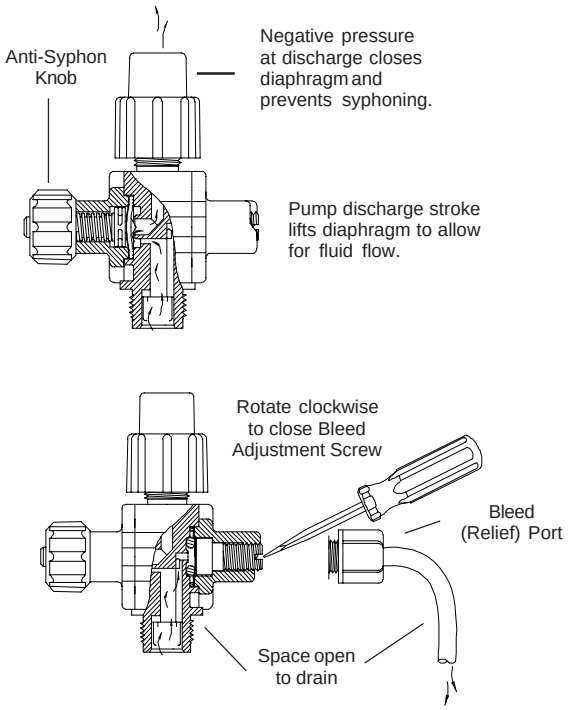
a. Start pump and let pump inject solution into the discharge line.

b. Close the bleed adjustment screw by rotating it clock-wise with a screwdriver.

c. Now adjust the pump stroke length and/or speed (frequency) to a range approximately 25% higher than you would normally want for the process.

d. Slowly rotate bleed adjustment screw counter-clockwise until just a small amount of solution begins to trickle down inside the bleed return tubing. A small amount of solution pumped back to the tank with each stroke of the pump will allow gas and air to escape without air or gas locking in the pump head.

NOTE: *If the pump does not self-prime, remove the multi-function valve on the discharge side of the pump head. Remove the check valve and pour water or solution into the port until the head is filled. Replace valve, then follow start-up/priming steps.*



Bleed 4-FV

Start-Up/Priming without Multi-Function Valve

Read this entire section completely before proceeding.

When all precautionary steps have been taken, the pump is mounted, and the tubing is securely attached, you may now prime the pump.

1. Plug in or switch on the pump.

2. While the pump is running, set the speed knob at 80% and the stroke knob at 100%.

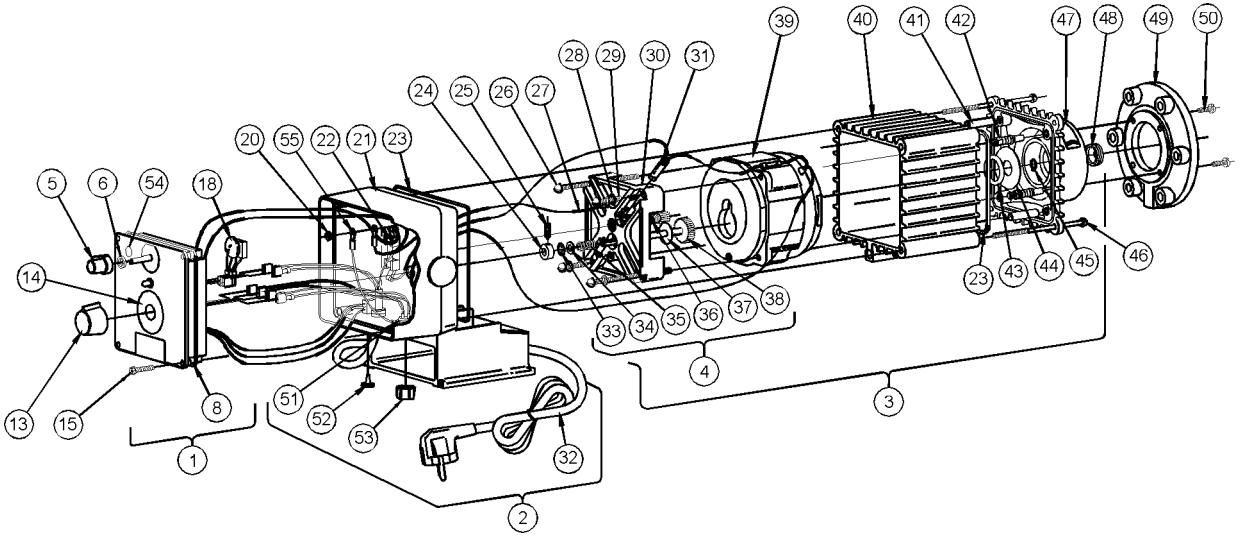
If the pump is equipped with pressure control, turn fully clockwise.

3. The suction tubing should begin to fill with solution from the tank.

4. Once the solution begins to exit the pump head on the dis-charge side, **SHUT THE PUMP OFF.** (If pump is not equipped with an on/off switch, disconnect the power cord).

5. The pump is now primed.

NOTE: *If the pump does not self-prime, remove the fitting on the discharge side of the pump head. Remove the ball and pour water or solution into the port until the head is filled. Replace valve, then follow start-up/priming steps.*



PREVENTIVE MAINTENANCE

Rep.	Qt	Désignation / *Description*
48	1	Joint de coulisseau (inclus dans le lot entretien du doseur) Seal (is included in liquid end maintenance kit)

C7xx	
10973	48

CORRECTIVE MAINTENANCE

Rep.	Qt	Désignation / *Description*
1	**1**	**Ens. panneau de commande / *Control panel assembly***
3	**1**	**Ens. EPU/Réglage de course / *EPU w/stroke adjustment***
4	**1**	**Ens. réglage de course / *Stroke adjustment assembly***
5	1	Bouton de cadence / *Speed knob*
13	1	Bouton de course / *Stroke knob*
18	**1**	**Ens. Condensateur – Varistor / *MOV/Cap assembly***
22	2	Fusible / *Fuse*, 5 A
39	**1**	**EPU**

C701	C703 C705 C707	C711	C713 C715 C717	C721	C723 C725 C727	C731	C733 C735 C737	C741	C743 C745 C747	
33814CE	33815CE	33814CE	33815CE	33816CE	33817CE	33818CE	33819CE	33820CE	33821CE	**1**
32532CE	32533CE	32534CE	32535CE	32534CE	32535CE	32536CE	32537CE	32536CE	32537CE	**3**
32251CE	32251CE	32251CE	32251CE	32251CE	32251CE	32251CE	32251CE	32251CE	32251CE	**4**
30709	30709	30709	30709	30709	30709	30709	30709	30709	30709	5
31891	31891	31891	31891	31891	31891	31891	31891	31981	31981	13
35243	35237	35243	35237	35243	35237	35243	35237	35243	35237	**18**
26073	26073	26073	26073	26073	26073	26073	26073	26073	26073	22
32158CE	32159CE	32158CE	32159CE	32158CE	32159CE	32158CE	32159CE	32158CE	32159CE	**39**

Rep.	Qt	Désignation / *Description*
2	**1**	**Ensemble carter / *Housing assembly***
32	**1**	**Cable dàlimentation / *Power cord assembly***

C7x1	C7x3	C7x5	C7x7	
32401CE	32403CE	32404CE	32406CE	**2**
29033CE	29042CE	29044CE	29048CE	**32**

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F

DECLARATION "CE" DE CONFORMITE

Nous, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANCE
déclarons que le matériel désigné ci-après a été conçu et fabriqué suivant les directives et spécifications suivantes :

Directive basse tension 73/23/EEC	Norme EN61010-1
Directive CEM 89/336/EEC	Norme EN50081-1
	Norme EN50082-1

GB

"EC" DECLARATION OF CONFORMITY

We, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANCE
certify that the equipment designated below has been designed and manufactured in accordance with the specifications of the following :

Low voltage Directive 73/23/EEC	Standard EN61010-1
EMC Directive 89/336/EEC	Standard EN50081-1
	Standard EN50082-1

D

EG-KONFORMITÄTSERKLÄRUNG

Wir, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANKREICH
erklären, daß die nachgestehend bezeichneten Gerätschaften im Einklang mit folgenden Richtlinien und Spezifikationen geplant und hergestellt wurden :

EG-Richtlinie 73/23 für Niederspannung	Norm EN61010-1
EG-Richtlinie 89/336 zur elektromagnetischen Verträglichkeit	Norm EN50081-1
	Norm EN50082-1

NL

EG FABRIKANTENCONFORMVERKLARING

De ondergetekenden, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANKRIJK
verklaren geheel onder eigen verantwoordelijkheid dat het produkt waarop deze verklaring betrekking heeft in overeenstemming is met:

Richtlijn 73/23/EEG inzake elektrisch materiaal	Norm EN61010-1
bestemd voor gebruik binnen bepaalde spanningsgrenzen;	Norm EN50081-1
Richtlijn 89/336/EEG inzake elektromagnetische compatibiliteit.	Norm EN50082-1

I

DICHIARAZIONE DI CONFORMITA' "CE"

La società DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANCIA
Dichiara che il materiale sotto specificato è stato progettato e realizzato in conformità con le seguenti direttive e specifiche:

Direttiva bassa tensione 73/23/EEC	Norma EN61010-1
Direttiva CEM 89/336/EEC	Norma EN50081-1
	Norma EN50082-1

E

DECLARACION "CE" DE CONFORMIDAD

Nosotros, DOSAPRO MILTON ROY 27360 PONT SAINT PIERRE FRANCIA
Declaramos que el material detallado a continuación está diseñado y fabricado de acuerdo a la signientes directivas y normas :

Directiva basa tension 72/23/CEE	Norma EN61010-1
Directiva EMC 89/336/CEE	Norma EN50081-1
	Norma EN50082-1

TYPE / TYP / TIPO

A1.. / A7.. / A9.. / B1.. / B7.. / B9.. / C1.. / C7.. / C9.. / H9.. / J5.. / P0.. / P1.. / P5..

Directeur Commercial / Marketing Manager

DOSAPRO MILTON ROY

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