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The LO-Pulse pulse detector reduces pulsations by compressing a fluid held within the bottom cavity of the unit. This fluid is isolated from the mobile phase by a durable but flexible inert diaphragm. As the HPLC system pressure increases, the fluid in the bottom chamber is compressed. When the LC pump piston is retracting, the compressed fluid expands, maintaining system pressure, and, more importantly, keeping the mobile phase flowing at a constant rate. When the system reaches its maximum allowable pressure, the volume of the mobile phase in the LO-Pulse pulse damper is only 0.9 mL.

The geometry employed assures a completely swept flow path so that solvent "memory effects" are virtually nonexistent when changing mobile phases.

### WARNING – READ THESE INSTRUCTIONS

The shipping screw on the LO-Pulse pulse damper must be tightened before operating or damage to the unit will result

### DESCRIPTION

The Model LP-21 LO-Pulse pulse damper is a patented wide dynamic range pulse damper designed for use with single-piston reciprocating HPLC pumps.

The noise level in the detector resulting from pump pulsations can significantly affect precision in quantitation and the detection limit of trace components. The LO-Pulse pulse damper smoothes pump pulsations and flow in flow-sensitive (e.g., refractive index, conductivity, and electrochemical) detectors.

Altex 110A with Refractive Index Detector  
Flow: 1 mL/min Range:  $2 \times 10^{-6}$  RI units FS  
Chart: 1 cm/min Pressure: 1000 psi



WITH LO-PULSE



WITHOUT LO-PULSE

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### INSTALLATION

#### WARNING

The shipping screw on the LO-Pulse pulse damper must be tightened before operating or damage to the unit will result.

The LO-Pulse pulse damper is shipped with the shipping screw in the full out (counterclockwise) position to provide additional space for the compressible fluid to expand during the temperature extremes of transit. Failure to tighten the shipping screw can result in the loss of compressible fluid and subsequent damage to the diaphragm.

#### Before Operating

1. Carefully pry the hole plug from the front of the case with a screwdriver or similar tool to gain access to the shipping screw.
2. Using a 1/4" hex wrench, turn the shipping screw fully clockwise and tighten to 120 inch-pounds or **as tight as possible by hand**.
3. After the shipping screw has been properly tightened, insert the hole plug in the pulse damper cabinet.

**NOTE:** If the temperature in the LO-Pulse environment exceeds 35°C during storage or shipping, the shipping screw must be turned counterclockwise only until the screw lightly contacts the stop. To operate, the screw must again be tightened as described above.

### Fluid Connections

Because the flow geometry through the LO-Pulse pulse damper is symmetrical, the most convenient connection can be chosen for the inlet from the pump and the outlet to the injection valve.

### Connection Procedures

Connecting the stainless steel pulse damper is a simple matter of making up the fittings to connect the ports on the front of the cabinet to the pump outlet and injection valve inlet.

### Fitting Makeup

Clean, deburred tubing is essential to proper make-up of a fitting. The SSI Tube Cut-Off Machine with deburring tool has been designed for this purpose.

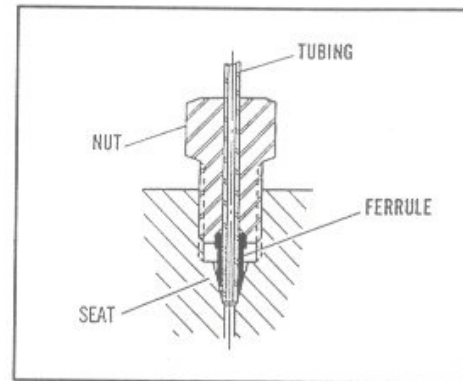
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To safeguard the integrity of the connection and to increase the useful life of the fitting, keep the following points in mind during make-up.

1. Always be sure the tube and fitting are aligned. In order for the tube end to enter into the fitting in proper alignment, tube line fabrication (bend angles and measured lengths) must be accurate. An improperly fitted tube line should not be forced into the fittings.
2. Always be sure the tube end is bottomed against the shoulder in the fitting body. This prevents movement of the tube while the nut forces the ferrule to grip the tube and seal through any imperfections that may exist on the outside surface.
3. Always use two wrenches to prevent rotation of the fitting body during tube end make-up. Assemble port connectors to components first and hold with a wrench while making the tube joint. Union bodies of all types must be held while each of the tube ends is made up.
4. Never use torque or "feel" to make up; always turn the nut the prescribed amount regardless of torque required. All instrumentation fittings are designed so that the ferrule(s) must move a prescribed distance in relation to the tube to effectively grip and seal. The force needed to accomplish this can vary a great deal with size, tube wall thickness, and normal manufacturing variables of tube and fittings. When "made-up" fittings have been loosened or disconnected, they should only be tightened appropriately one wrench-flat (1/6 turn) past finger-tight to achieve a pressure-tight connection. Tightening further will shorten the useful life of the fitting.

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1. Insert the tube until the tube bottoms against the shoulder in the fitting body. Make sure the tube is in proper alignment with the fitting body.
2. Tighten the nut finger tight. Then, using two wrenches, one on the nut and the other on the fitting body, turn 1/16" to 1/8" nuts an additional 3/4 turn and 1/4" to 1" nuts 1-1/4 turns. Marking the nut is helpful in counting the number of turns.



3. Insert the other end of the tubing into the pump outlet. Tighten the fitting as described above.
4. Insert one end of the injection valve tubing into the other port on the pulse damper. Tighten the fitting as described above.
5. Insert the other end of the tubing into the inlet port of the injection valve. Tighten the fitting as described above.

### OPERATION

Operation of the LO-Pulse pulse damper is automatic; however, the pulse damper works best if the pressure is at least 500 psi and preferably 1000 psi or more. It may be desirable to install a length of small bore "resistor" tubing to the pulse damper outlet to enhance unit performance.

### WARNING

ALWAYS RELEASE PRESSURE FROM THE SYSTEM SLOWLY. A RAPID PRESSURE RELEASE COULD CAUSE THE LO-PULSE DIAPHRAGM TO RUPTURE.

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**SPECIFICATIONS**

Operating Pressure ..... 500 to 6000 psi  
Internal Volume ..... 0.9 mL max at 6000 psi  
Materials in Flow Path  
Stainless Steel ..... Teflon and #316 stainless steel  
Connections  
Stainless Steel ..... 1/16" SSI  
Compressible Fluid ..... Isopropanol with non-toxic blue dye  
Operating Temperature ..... +15 to 35°C  
Shipping Temperature ..... -10 to +55°C

LO-Pulse is a registered trademark of Scientific Systems, Inc.

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<b>CATALOG NO.</b>	<b>DESCRIPTION</b>
20-0218	Model LP-21 LO-Pulse, 316 SS
12-0139	Refurbishing Kit – includes diaphragm, seal removal tool, 3 seals, 2 hex keys
01-0142	1/16" SSI Ferrules, (pack of 10)
01-0140	1/16" SSI Gland Nuts (pack of 10)
01-1274	1/16" x 0.010 ID, 316 SS Tubing, 3 ft

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