

# Model L3P

## Sonic Sifter Separator

### Operation Manual



Model L3P  
Model L3P-15  
Model L3P-25  
Model L3P-26

## **Advantech Mfg**

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## **Specifications for the Advantech Model L3P Sonic Sifter Separator**

### Power Requirements

Model L3P.....	120 volts, 60 Cycles
Model L3P-15.....	120 volts, 50 Cycles
Model L3P-25.....	240 volts, 50 Cycles
Model L3P-26.....	240 volts, 60 Cycles

### **Materials of Construction**

Stainless Steel Test Table  
Steel Cabinet and Frame  
Baked Powder Finish Throughout  
Acrylic Sieve Frames, Spacers, and Top Cone  
Metal Column Lock  
Aluminum Fines Collector Holder

### Physical Dimensions

Weight.....	43 lb (20 kg)
Cabinet Dimensions.....	23"h x 10"w x 12"d
.....	61 cm x 25 cm x 31 cm

### **Operating Conditions**

This device will function properly at any non-condensing humidity level within the temperature limits of 0° to 120°F (18° to 49°C). However, for test repeatability, it is recommended that the ambient temperature and humidity be controlled. The sieves and accessories used with this device should never be subjected to temperatures above +125°F (52°C) or below -45°F (-43°C).

External vibrations of a low energy level will have little effect upon the accuracy of the test results. For optimum results, the device should be operated on a stable, level surface. This practice will help ensure an even layer of particles on each sieve.

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# **Model L3P Sonic Sifter Separator Operating Instructions**

## **Installation**

Place the Model L3P Sonic Sifter Separator on a level surface for operation. Observe the ambient temperature and humidity guidelines outlined in the specification section.

## **Electrical Connection**

Plug the power cord into the socket in the rear of the unit and then into the appropriate power source as outlined in the specification section.

## **Control Panel Components**

On the control panel, locate the Sift/Pulse Switch; the Amplitude Control; and the Timer. The components and their operations are described in the following pages.

Model L3P Sonic Sifter Separator Control Panel

## **Sift/Pulse Switch**

The Sift/Pulse Switch consists of three possible settings (Off, Sift, and Sift/Pulse) and serves two main functions. First, it is the main power switch to the unit itself. When rotated counterclockwise to the OFF position, all power is shut off to the L3P circuitry. Rotating the switch clockwise to the SIFT position enables only the sifting portion of the unit to operate. Rotating the switch clockwise to the SIFT/PULSE position energizes not only the sifting portion of the unit, but also the pulse portion. The pulse is supplied by a vertical-firing electromagnetic solenoid located beneath the table in the test chamber. Every four seconds, a vertical pulse or shock wave is

imparted to the sieve stack to reorient the particles in the stack and break down softly clinging or agglomerated particles. Virtually every test procedure benefits from the use of the pulse circuitry.

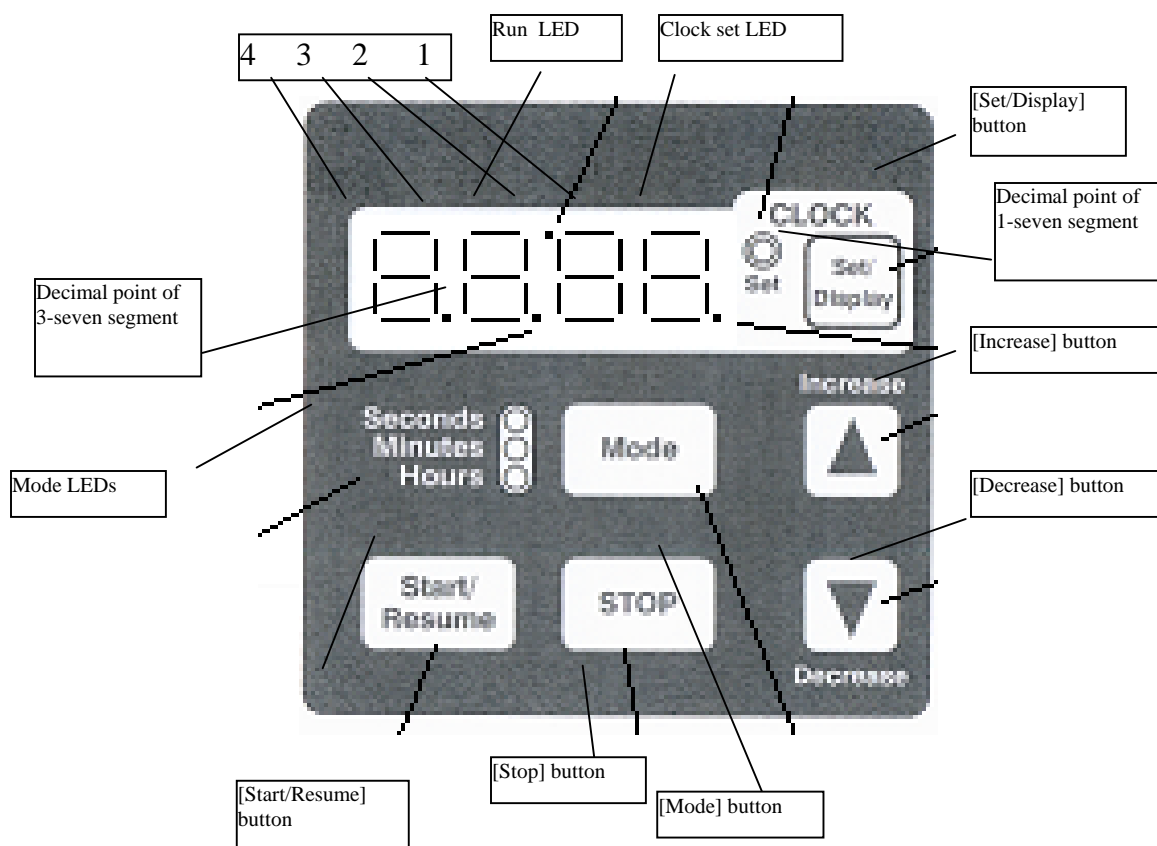
## Amplitude Control

The Amplitude Control adjusts the amount of “lift” applied to the powder in the sieve stack. The density of the particles, the presence of electrostatic or other physical bonds, and the percentage of fine material in the sample determine the amount of lift required.

## Digital Timer/Clock

The timer controls the cycle time of the sieving operation, as well as functioning as a 24-hour clock.

Minimum operating time is 2 seconds, maximum 99 minutes 59 seconds.



1. After applying an appropriate AC to the power input terminals, the display will be blank and the beeper will beep for ¼ second giving the user notification that the timer is now activated. The units' default is in Minute [Mode].
2. **Setting Time of Day** - Push and hold the button [SET/DISPLAY] for 1 second, the unit will default the time to 12:00am and enter the 'Clock Set' mode. While in this mode, buttons [MODE], [STOP] & [START/RESUME] are disabled and the clock set LED will be turned ON. The user now can set the time by pressing and holding either [INCREASE] or [DECREASE] button until the desired time is achieved. If you do not wish to set the time of day, skip step number 3.

The clock mode is a 12-hour with an am/pm display element. When the clock is being displayed and the clock is in the pm time frame, the decimal point of number 1-seven segment will be ON. Once the user has achieved the proper clock value, they need to exit the clock set mode by pressing and holding the button [SET/DISPLAY] for 1 second. After the 1 second, the beeper will beep for 1 second giving the user notification that the mode is now exited. Once the clock is set, the display will go blank and the clock set LED will turn OFF.

If the clock has been set and the user presses the button [SET/DISPLAY] for less than 1 second, the display will show the current time for a 5 second period and revert back to what was previously on the display.

3. **Setting Interval Timer** - In modes 1 – 3, the device functions as a simple countdown timer. When you set the value, press the button [START/RESUME]. When the value reaches 0, the relay is turned OFF and the beeper beeps 6 sets of 2 (250ms) beeps.

Repeat Feature- the timer will remember the last time set. If you desire to change the setting from the original setting, press start switch to recall previous setting then input new setting.

To enter one of the 3 countdown modes, press and hold the button [MODE] for 1 second. Holding down this button the mode will switch every 2 seconds. Each time the mode switches, the appropriate LED of mode LEDs will be turned ON and the value displayed will change to the modes default value. An audible ¼ beep will also be heard.

Mode 1	0 – 99 second:	DEFAULT DISPLAY = 01
Mode 2	0 – 99 minute:	DEFAULT DISPLAY = 00.00
Mode 3	0 – 99 hour:	DEFAULT DISPLAY = 00.00

Once the countdown value has been set, you can now start the timer by pressing the button [START/RESUME]. The relay is turned ON. While the timer is counting down the user can stop the event by pressing the button [STOP]. The current countdown value will remain on the display. If you want to resume the session you just need to press the start button again.

Counting will proceed from the point where stopped. During this operation, the run LED is blinked at once a second.

Once the timer has counted down to 0 and stopped, you can execute the same session (time value) by pressing the [START/RESUME] button again. This will recall the timer value and display it. At this point, you have two options. The first being the ability to change the value by using the [INCREASE] or [DECREASE] buttons and the second being the ability to use the same value and starting the event again by pressing the [START/RESUME] button.

### **Using the SIFT/PULSE Switch**

Rotate the Sift/Pulse Switch to either the SIFT or the SIFT/PULSE position. The light at the rear of the test chamber will become illuminated.

### **Removing the Stack Assembly**

The stack assembly can be removed from the test chamber by grasping the locking arms on the column lock assembly and pulling straight down. The stack assembly will lock and the stack can be slid straight out of the test chamber.

### **Disassembling the Stack Assembly**

Sliding a thumb and forefinger into the openings between the lowest sieve or spacer and the column locking arms can disassemble the stack assembly. While steadying the stack with one hand, spread the column locking arms with the other hand. The spring-loaded column lock will release. It can then be carefully removed and access gained to the rest of the stack components.

### **Selecting the Sieves for Analysis**

Select the sieves required for analysis. The height of the testing stack used within the L3P is a fixed height.

#### **U.S. Standard Sieve Series – 5/8" overall height**

A maximum of six U.S. standard series sieves (sieve sizes #3.5 through #635) may be used at one time. Any combination of

sieves, accessories, or spacers making up the standard stack height of six standard sieve units may be used.

**Precision Electroformed Sieve Series** – 1-1/4" overall height  
A maximum of three precision electroformed sieves may be used at one time. Any combination of sieves, accessories, or spacers making up the standard stack height equivalent to three precision electroformed sieves may be used.

### **Accessory Usage**

When sifting powders 45µm and finer, or with powders of any distribution showing high electrostatic charges, the use of the **Advantech L3-N8 Horizontal Pulse Accessory** is recommended. It takes the place of one standard series sieve (5/8" height). The operating principle is the introduction of a high-speed shock wave sent across the sieving medium. The net result is a further reorientation of particles, a shearing action on agglomerated particles, and a reduction of screen blinding (plugged openings).

For more information on specific applications, contact your Advantech Manufacturing representative.

### **Preparation for the Analysis**

To prepare for the analysis of a powder sample for the first time, it will be necessary to perform a few simple tasks:

#### **Gather the Ancillary Equipment Needed:**

- Weighing device (balance or scale with resolution in grams suitable for your application; generally, 0.1g or 1.01g are sufficient) 100g capacity is suitable.
- Camel hair paint brush for brushing fine particles from the standard sieves or precision mesh frames. (NOTE: Brush sieves from the underside ONLY! Never force material through a sieve opening.)
- Means of recording and calculating tare weights, sample weights, percentages, etc.

**Note:** In addition, prior to performing the first test, all sieve, standard spacers, and the top cone should be washed according to the care section that follows. This step will reduce the chance of sample contamination from any residues left over from the manufacturing process.

## Performing the Analysis

The following steps constitute a typical analysis with the L3P Sonic Sifter Separator:

## Weighing the Parts

Weigh and record the tare weights of the diaphragm, top cone, spacers, sieves, and fines collector.

## Installing the Fines Collector

Install the fines collector in the fines collector holder. Fasten the round metal plate at the bottom of the fines collector to the fines collector holder by sliding the keyhole slot in the fines collector over the fastener mounted in the fines collector holder base.

## Assembling the Sieve Stack

Assemble the sieve stack with the coarsest sieve on the top of the stack and finest sieve at the bottom. If fewer than six (6) standard series or three (3) precision electroformed sieves are used, add spacers as necessary to fill out the proper stack height as described in the *Selecting the Sieves for Analysis* section above. If spacers are necessary for operation, they should be placed at the top of the stack.

## Introducing the Powder

Discussion of the proper methods of extracting gross samples and preparing test samples for analysis is far too complex to be dealt with here. For more information on sample extraction and preparation, contact your Advantech Manufacturing representative for the publication, *Test Sieving: Principles and Procedures*.

A good rule of thumb is to use the smallest sample size possible that is still representative of the lot from which it was extracted. Sample sizes of 1 gram are a good starting point for Sonic Sifter Separator determinations. The sample size can be increased until the optimal combination of sample size, time, and sift amplitude are determined. Our Customer Service Laboratory can be consulted at no charge for suggestions on test parameters for powder samples.

Select a proper mass of powder to be tested. When sieving materials larger than 38  $\mu\text{m}$ , do not exceed 20g. When sieving materials smaller than 38 $\mu\text{m}$ , do not exceed 10g. Weigh and record the mass of the powder sample. Place the powder sample on the top sieve in the stack.

### **Installing the Diaphragm**

The diaphragm is placed on top of the top cone with the metal ring protruding downward. The proper orientation of the diaphragm can be determined by the word "TOP" stamped on the latex material.

### **Replacing the Column Lock**

Place the column lock onto the sieve stack and press straight down until the locking arms snap onto the fines collector holder.

### **Check the Control Panel**

As a safeguard, make sure the amplitude control is set at "0" and the timer is in the "CLOCK" mode or the display is blank before placing the stack assembly into the test chamber. This is necessary to prevent damage to the sieves and the integrity of the test sample in the chamber. If the amplitude had been inadvertently set to the maximum setting or the timer interrupted mid-cycle, for example, the sudden impact of the signal from the loudspeaker could damage the sieves or compromise your test sample.

### **Inserting the Stack Assembly**

Slide the stack assembly into the test chamber with the column arms locked. The stack assembly is stopped at the top by two tabs

on the driver support plate. On the test chamber table, you will notice two rivets that will limit how far the stack can be placed inside the chamber. Also on the floor of the test chamber is the table switch, a safety interlock device that prevents the unit from operating if the stack moves forward out of position. This switch will be properly deployed and the circuit activated if the stack is inserted correctly.

Once the stack assembly is in position, the column lock can be released by sliding a thumb and forefinger into the openings between the lowest sieve or spacer and the column locking arms. Spread the column locking arms. The spring-loaded column lock will release and expand to lock the column into the test chamber, forming an airtight seal. Close the sliding door to the test chamber.

## Beginning the Test

Rotate the SIFT/PULSE switch to the PULSE setting. While virtually all test procedures benefit from the use of the PULSE circuitry, some may not. Use the setting appropriate to your samples.

## Setting the Amplitude

Note: The amplitude is the “lift” particles see as the oscillating air column is set in motion. The higher the amplitude setting, the more lift on particles. Moving the particles more vigorously than necessary **DOES NOT** increase the speed or precision of the separation. In fact, excessive amplitude settings may increase electrostatic problems, sample loss, and equipment wear.

**WARNING:** *Due to the extremely fragile nature of the Precision Electroformed Series sieves, excessive amplitude, especially over extended periods of time can cause immediate or premature sieve failure.*

After starting the timer, increase the amplitude SLOWLY until the largest of the particles begins rolling on the top sieve. The entire operation can be viewed through the sidewalls of the sieves. The finer material should begin flowing through the sieves within seconds. Each particle is being lifted off of the screening surface and set back down on the sieve openings 60 times per second

when using 60 Hz current (50 times per second when using 50 Hz current).

## Completing the Test

**For an initial test run:** When no more material can be seen falling through the sieves, note time elapsed. This value should be used for subsequent testing of the same material to assure repeatable results.

**For a routine test run:** When the timer counts down to "0", open the door and follow the procedures listed for 'Removing the Stack Assembly'. Caution should be exercised when dismantling the stack assembly to avoid any loss of sample retained on the sieves or fines collector.

The parts can be weighed directly on the weighing device, removing the need to transfer the powder to a weighing dish (thus reducing potential sample loss). Don't forget to weigh the fines collector as well. Record the weights on the worksheet used to record the tare weights. Subtracting the tare weight from the post-test weight yields the mass of the sample retained on the part. The percentage retained at each sieve size can be calculated simply by comparing the weight on each part with the starting sample weight.

## CARE OF ADVANTECH MODEL L3P SONIC SIFTER SEPARATOR AND ACCESSORIES

The Advantech Model L3P Sonic Sifter Separator and Accessories will perform satisfactorily for many years if the following basic care instructions are observed:

### Cleaning the Sieves and Stack Assembly Parts

For best results, stack assembly components and sieves should be cleaned in an ultrasonic cleaner of 150 watts or less. General cleaning is best accomplished in a mild solution of dishwashing detergent and water maintained at 75-80°F (24-27° Celsius). Ultrasonic cleaning has proven to be the most effective method of removing particles plugging sieve openings. Regular ultrasonic cleaning will help prevent particle buildup in the sieve openings, thus reducing the amount of time each sieve must be exposed to

ultrasonic vibrations. Care must be taken in how long the sieves are exposed to the ultrasonic vibrations, as damage can result from overexposure.

After washing, rinse the parts with tap water, and allow to air dry. DO NOT expose the sieves, spacers, or top cone to heat sources of any kind. Heat sources will cause warping and/or cracking of the parts which will compromise the airtight seal between the stack assembly parts during use. If an ultrasonic cleaner is not available, immerse items to be cleaned in the same mild detergent solution, rinse and allow to air dry as directed.

## CAUTIONS

**U.S. Standard Sieve Series:** Improper handling can cause serious damage to the sieve openings and accelerate sieve failure.

- **DO NOT** remove particles clogging sieve openings with a needle or other sharp object.
- **DO NOT** use compressed air to clean the sieves or dislodge trapped particles.

**Precision Electroformed Sieve Series:** Store the precision electroformed sieves in the protective plastic storage box provided.

- **DO NOT** remove particles clogging sieve openings with a needle or other sharp object.
- **DO NOT** brush the electroformed media.
- **DO NOT** touch the electroformed media with your fingers. The natural acids and oils in the skin will attack and discolor the fragile electroformed mesh and cause permanent failure.

## Cleaning the Fines Collector and Diaphragm

The fines collector and diaphragm are made of durable latex material. With regular care, these parts can withstand a considerable number of duty cycles. Both parts can be cleaned in a

mild detergent and water solution and rinsed with water. The parts should be allowed to air dry, avoiding heat and sunlight.

After drying, both parts should be dusted lightly with talcum powder (NYTAL 200 or any commercial unscented talcum powder). The excess talcum powder can be blown off with low-pressure compressed air. Return the parts to their protective foil envelopes for storage, as light and some chemicals in the air can be harmful to the latex, causing holes and cracks to appear prematurely.

**Users' Tip:** For longer life of the fines collectors, rotate the use of several collectors over time. For example, use fines collector #1 on Monday, wash and store the collector at the end of the day and use collector #2 on Tuesday, etc. Set up a regimen to rotate 3-5 collectors over the course of a week, or whatever your usage requires. Allowing the latex to 'rest' before it is put back into regular service can significantly extend the life of the individual collector.

### **Cleaning and Care of the L3P Sonic Sifter Separator Unit**

The Sonic Sifter Separator cabinet, test chamber and aluminum stack assembly parts should be wiped off periodically with a soft, damp cloth.

### **Servicing the L3P Sonic Sifter Separator Unit**

Only personnel qualified by Advantech Mfg. should service the Sonic Sifter Separator. If any performance or operational problems arise, please contact Advantech Mfg. directly.

## **ADVANTECH MODEL L3P SONIC SIFTER SEPARATOR LIMITED WARRANTY**

Advantech Mfg. guarantees all its apparatus against defective material and workmanship for a period of one year from the date of delivery. This guarantee is limited to repair or replacement of the defective apparatus in our factory in New Berlin, Wisconsin. Advantech Mfg. does not assume responsibility or accept invoices for unauthorized repairs to its apparatus. Under no circumstances shall Advantech Mfg. be liable for loss of profits or other damages.

Advantech Mfg. is not responsible for damage to apparatus due to improper installation or operation beyond its rated capacity (intentional or otherwise). It is distinctly understood that the above covers all conditions under which Advantech Mfg. apparatus are sold.

For warranty claims or other service requests, please obtain return authorization prior to shipment by contacting:

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