

# Automation Devices, Inc.

IE02.01

## XL SERIES VIBRATORY PARTS FEEDER INSTALLATION & OPERATING INSTRUCTIONS

### INSTALLATION

Base Units are shipped ready for installation after removal from the shipping container. Check the unit to make sure the four rubber feet (Part #2008) are securely attached to the base of the unit. It is essential that these feet are in good condition and securely attached to the base. Install the unit on a sturdy vibration-free stand. The rubber mounting feet will isolate the slight vibrations of the drive unit from the mounting structure. To restrain the drive unit from moving, four foot locators (Part #7951) may be purchased from ADI.

Secure the feeder bowl to the top plate of the drive unit with the screws provided. Erratic parts feeding will occur if the bowl mounting screws are not drawn down tightly or if the screws become loose. Mount the Model 6000 Series controller in a convenient location, free from vibration, and run a three-wire cable from the feeder solenoids to the controller per instructions and schematic. Plug the line cord into any 120 Volt AC source (or 240 Volt AC, if appropriate). The feeder is now ready to operate.

### INITIAL OPERATION

Start the feeder by moving the toggle switch on the controller to the ON position. Rotate the power control knob in a clockwise direction until a satisfactory feed rate is obtained. Do not mount external tracks or extensions to the feeder bowl without the manufacturer's approval. Such additions may create dead spots in the feeder bowl, harm the power unit or decrease the feed rate. *Always* maintain a gap between the feeder bowl discharge and the track.

### ADJUSTMENT OF COIL GAP

The XL Series drive units are equipped with two adjustable coils mounted on the base casting and two fixed armatures mounted on the top plate. The air gap between each armature and coil is adjusted at the factory and under normal operation should not require any further adjustment. Should a continuous metallic rapping sound develop during feeder operation or when the power control knob is turned to maximum, it will indicate that the armature is striking the coil and damage to the feeder unit will occur if not corrected.

To adjust the coil for a larger air gap, first back off the two  $\frac{1}{2}$ " socket head cap screws whose centers form a vertical line in the four screw pattern, approximately  $\frac{1}{8}$  of a turn. Then tighten the two  $\frac{1}{2}$ " socket head cap screws whose centers form a horizontal line in the four screw pattern, approximately  $\frac{1}{8}$  of a turn. This will draw the coil back away from the armature about an additional .009" and should eliminate the metallic rapping sound. Care should be taken to loosen both vertical screws the same amount and tighten the two horizontal screws the same amount so that the surface of the coil remains parallel to the surface of the armature. *Normal* air gaps run from .025" to .040". Some units could have as little as .015" gap or as much as .075" gap. To adjust the coil for less air gap, back off the two horizontal screws and tighten the two vertical screws, the same amount each. Make sure all four screws are tight after making the adjustment.

### SPRINGING (TUNING)

The XL Series drive units employ four spring banks for tuning the drive unit. These spring banks usually contain the same number and thickness of springs; however, sometimes due to bowl construction or bowl tooling, it is necessary to vary the number and thickness of the springs in each bank. When springs of different thickness are used in a spring bank, the thickest spring should always be placed so that it is next to the base and top plate castings and the thinner springs toward the screw heads. A smaller diameter and lighter weight bowl will require less or thinner springs than a larger diameter and heavier bowl.

The XL Series drive units are powered by alternating (unrectified) 60 cycle current which energizes the coil at a rate of 120 pulses per second. These pulses cause the coils to magnetize and draw the armature toward them, thereby flexing the springs. The combined spring force must be sufficient to return the armatures to their original or neutral position at the same rate of 120 reactions per second. When this happens, the unit is properly tuned for 60 cycle current. If the power source is 50 cycle, such as used in some European countries, the drive unit must be retuned by reducing the number or thickness of springs. If the power source is other than 110/120 Volt, then different coils must be used (240 volt AC coils are available from stock).

### ERRATIC FEED

When erratic feeding is observed, first check to see that the feeder bowl is securely mounted on the drive unit. All mounting screws must be tight. Check the bowl track to be sure there are no physical obstructions causing interruptions in the feed such as parts stuck under wipers or parts wedged together and jammed between tracks. Check also to see if coatings on the parts, such as mold release compound, oil, dirt or some other foreign matter, may have made the track slippery or sticky, thus preventing the parts from properly driving up the track.

A broken spring in any of the spring banks will cause the feed rate to diminish or stop. A broken spring screw will have the same effect. Removal and reassembly of each spring bank, *one at a time*, will permit examination of springs – a cracked spring will make a dead sound when struck against a hard surface. A broken screw will be self-evident. All drive units are tuned before shipping. Tuning is accomplished by adding springs to the unit until a resonance is established between the driving coils and the mass being driven. A broken spring, or a broken or loose spring screw, destroys this resonance and the feeding ability diminishes or stops.

### TROUBLESHOOTING

Should your XL Series feeder stop completely (i.e., no vibration or humming sound at all), the reason will be an *electrical* failure. Carefully check the following to be certain that:

1. The power cord is plugged into a live outlet.
2. The controller ON/OFF switch is in the ON position.

3. Amplitude control knob is set to the #10 position (for troubleshooting purposes).

### **UNPLUG THE POWER DURING REMAINING ELECTRICAL CHECKS.**

4. The fuse on the controller is good.
5. The auxiliary contacts inside the controller are properly shorted or jumpered together. Consult the Model 6000 Series operating instructions and schematic.
6. The input and output power connections inside the controller are good and sound.
7. The coil wires are properly connected to the controller output wires.
8. The coils themselves show continuity with the controller disconnected.

If there is still no output, then the controller should be returned to Automation Devices, Inc. If the failure is not our responsibility, ADI will advise you of repair costs.

If your XL Series feeder stops feeding completely, or starts feeding slowly or erratically (i.e., fast then slow), and you can hear the unit humming, then the problem is *mechanical*. Carefully check the following to be certain that:

1. Parts are not jammed under track wipers or wedged between tracks.
2. The feeder bowl mounting screws are tight.
3. The rubber mounting feet are not cut and are securely tightened to the feeder base.
4. The rubber mounting feet are not tight in the foot locators (if used).
5. The armatures and coils have an air gap between them.
6. There is no loose tooling in the feeder bowl.
7. Parts are not slipping or sticking on the track due to oily air contamination, mold release compound from parts, etc.
8. There are no broken welds, especially track welds, on the fabricated bowls; a broken track weld could cause a dead spot, erratic feeding or a metallic rattle.
9. Other equipment is not restricting the bowl from vibrating freely.
10. There are no cracked or broken springs in any of the spring banks.
11. There are no broken spring mounting screws.

### **DEAD SPOTS**

Dead spots may occur in either the fabricated or cast bowls and are usually the result of an unequal distribution of mass in the bowl construction caused by tooling. They may also occur when one section of the bowl is not securely fastened to the drive unit, when a weld has broken, or when part of the bowl track has loosened. This may be determined by removing the bowl from the drive unit and rotating it 90° from its original position. If the dead spot remains at the same point in the bowl, it can be assumed that the problem is in the bowl. Dead spots, caused by an unequal mass distribution in the bowl, are generally corrected by adding weight to a selected spot or spots on the outer periphery of the bowl, usually 180° from the dead spot.

If, after checking all of the above, the feeder still does not feed properly, then get a  $1\frac{3}{16}$ " box wrench and check both the upper and the lower spring mounting screws for tightness. If the screws seem excessively tight, try loosening each set of four screws about  $\frac{1}{8}$  turn each. (The amplitude control knob should be set at the maximum feed position while doing this.) If the screws are loose, the feed rate will slow down to a point where feeding will stop entirely. Progressively tighten the four upper spring screws, and then tighten the four lower screws. As you tighten the screws, the feed rate should immediately pick up. You will know by the sound of the feeder when you have attained the proper torque on the screws. Attempt to tighten all screws to the same torque.

## **REPAIR PARTS**

When ordering repair parts, consult the attached parts list and assembly drawing. Make sure the serial number shown on the nameplate is supplied so that ADI can identify your machine for its exact characteristics.

## **18XL SPECIFICATIONS**

### **Performance Data**

Part movement approaching 100 feet/minute is obtainable.

### **Overall Dimensions**

8  $\frac{3}{4}$  inches high, 16  $\frac{1}{2}$  inch square base, 17  $\frac{3}{4}$  inch diameter bowl mounting surface (see "Bowl Mounting").

### **Weight**

222 pounds (drive unit less bowl).

### **Power Required**

3.5 Amps maximum ampere draw @ 120 Volt AC, also available 240 Volt.

### **Springing**

4 spring banks 90° apart, 15° spring angle.

### **Rotation**

Clockwise or counterclockwise (factory assembled).

### **Bowl Mounting**

4 hole, top or bottom mount, bolt circles up to 16  $\frac{1}{2}$  inches; 4 hole, 17  $\frac{3}{4}$  inch diameter rim mount.

### **Bowl Size**

Up to 30 inch stainless steel fabricated or cast aluminum.

### **Operating Mode**

7200 cycles per minute @ 60 Hz; 50 Hz tuning available.

### **Coils**

2 mounted for horizontal pull, 180° apart, "E" frame construction with encapsulated windings.

### **Control**

Model 6000 Series for 120 or 240 Volt, 50 or 60 Hz operation, minimum setting trim pot, includes terminals for low current "off/on" switching.

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