CONTROL, FEEDER OR POWER LINE PROBLEM?

Problems with vibratory feed systems generally fall into three categories: mechanical feeder, power line fluctuations and control problems. To complicate things, any of the three problems can make a feeder vary its parts rate or slow down; therefore, careful attention needs to be given to find the root cause of the problem. Let's determine if the problem is with the control, with the feeder's mechanical tuning or with power line fluctuations.

TEST SET UP FOR TROUBLESHOOTING

The control must be in the "run" mode in order to test the output.

Important: When checking the output voltage of a feeder control with a volt meter, always have a known good load connected to the output so that the meter does not give false readings due to TRIAC leakage current.

Connect a voltmeter to the output of the feeder control. On some models this can be accomplished by backing the plug out of the outlet just a little so that the voltmeter leads can touch the flat blades of the plug. Always leave the load connected; otherwise, the meter readings will be incorrect.

HOW TO USE THIS GUIDE

The typical symptoms for an existing feed system are no vibration, low vibration, gradually decreasing feed rate, fluctuating feed rate and too much vibration with no control. To use this guide, match the vibratory feeder's symptom to the corresponding problem listed in bold letters.

No vibration: Connect a volt meter to the output of the control and monitor the meter while adjusting the main control pot up and down. If there is no voltage present, follow the recommendation given in the troubleshooting guide for your control model. If there is a voltage output, follow the procedure below.

Not enough vibration and gradually reduced vibration: Connect a volt meter to the output of your control and monitor the meter while turning the main control pot clockwise. For controls set to 120 Pulse, the output should increase to within 2VAC of the incoming power. For controls set to 60 Pulse, the voltage measured depends on the inductance of the feeder coils. The output voltage should increase to 80 - 110 volts with a 120VAC supply line or 160 - 220 volts with a 240VAC utility. If these values are not obtained, see the application note for setting the Max pot (where applicable). If the control is set up properly and it will not supply the correct output voltage, then the control is malfunctioning. Follow the troubleshooting guide's recommendations.

If full output voltage is achieved and there is not enough vibration, check the 60/120 pulse switch set up. The control's 60/120 pulse switch may be in the wrong position. If the feeder only hums and does not feed

parts, turn the power off, and flip the 60/120 switch on the circuit card. If it still does not feed parts, turn the power off, and flip the 60/120 switch on the circuit card back to the original position.

For no vibration or low vibration at full output voltage, check the following: In rare cases a bad coil or a bad connection can cause the vibratory feeder to stop vibrating, even though the output of the feeder control is at full voltage. To test for this condition, disconnect the wires going to the vibratory feeder, and use an ohmmeter to measure their resistance. Use the lowest Ohms scale on the meter.

The wiring and feeder coil resistance should measure well below 200 Ohms. If the resistance is greater than 200 Ohms, check for bad connections. Then check with the manufacturer, or replace open (bad) coils.

If the coils check good, the TRIAC may be short circuited. Follow the recommendation given in the troubleshooting guide for your model. A shorted TRIAC provides full power in the 120 pulse mode. If the vibratory feeder is tuned for 60 pulse, it will not vibrate.

If there is still not enough vibration and the 60/120 pulse switch and Max pot are set correctly, the problem may be a mechanical tuning problem. Contact the manufacturer of the vibratory feeder for assistance with solving mechanical problems.

The following is a list of some common electromechanical tuning problems:
1) Loose bolts, loose toe clamps, a missing bolt at the center of the feeder bowl, etc. will cause a loss in vibration. When tightening the bolts on the springs and large toe clamps, use a three-foot-long cheater bar over the Allen wrench.

2) Cracked or broken springs will cause a loss of vibration. To check for a bad spring while the feeder is operating, lightly grasp a spring holding the outside edges of the spring between your thumb and fingers. A bad spring will move from side to side and feel different than a good spring. Repeat this for every spring. Another test for a cracked or broken spring is to remove the springs from the feeder. Lightly grasp a spring holding the outside edges of the spring between your thumb and fingers. Tap each end of the spring with a hammer. A good spring will ring like a bell. A bad spring will not ring.

3) Spring fatigue is a gradual degradation in spring performance that happens over a period of months or years. Spring fatigue will cause the operator to turn the control up gradually over a long period of time until there is no more power available from
the control.

4) A broken weld on the vibratory feeder or drive base will cause a loss in vibration. Visually inspect and touch each welded joint. The vibration on both sides of the joint should feel the same. If it feels different, the weld may be cracked.

5) The feeder/machine must be securely fastened to the floor to avoid any movement of the drive base.

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6) A bad coil(s) can reduce the vibration to a hum. Check for magnetism at the air gap along side of each coil and its pole face. Use the metal shaft of a screwdriver to feel the magnetic pull. Alternately, a clamp-on Amp meter can read the current for each coil. If a coil has no pull or current flowing through it, it may have a bad connection, or it may be damaged internally.

7) If the vibratory feeder is being set up after importation from a foreign country, it may be tuned for the wrong power line frequency.

Too much vibration, with no control: The TRIAC has probably short circuited causing the vibratory feeder to operate only at full power, regardless of the Main Pot setting. Please refer to the TRIAC troubleshooting guide and the troubleshooting guide for your control.

Feed rate fluctuations: The feed rate of a vibratory feeder can fluctuate due to one of several possible causes. The common causes are listed here: Loose or broken springs, a bad potentiometer, fluctuating weight of the parts in the feeder bowl and fluctuations in the power line voltage. Also, electricity produced by a motor–generator can produce variations in voltage and frequency.

Power Line problem test: When the output voltage changes by a few volts, the feed rate of the vibratory feeder will also change. To test for power line problems, connect a voltmeter to the output of the feeder control. First, monitor the meter while the vibratory feeder is operating ("run" mode). Record the output voltage readings when the bowl
is running its fastest and slowest. Also, record what time the readings were taken. Find the difference (in volts) between the readings by subtracting the low voltage reading from the high voltage reading.

Secondly, monitor the incoming line voltage to the control where the feeder control power cord is connected to the power line. Record the voltage reading when the bowl is running the fastest and the slowest, also record what time the readings were taken. Find the difference (in volts) between the readings by subtracting the low-voltage reading from the high voltage reading.

Next compare the voltage difference values from step 1 and step 2. If they are about the same, then the problem is with the incoming power line. If the incoming power line voltage does not fluctuate, but the output voltage does, then the problem is in the control. If neither input nor output fluctuates, but the feed rate fluctuates, then there is a mechanical problem in the vibratory feeder system. See the list of electromechanical tuning problems on the previous page.

Power line fluctuations can be caused by many different factors such as too many loads being connected to a power panel branch circuit; a heavy momentary load like a machine nearby starting up; too many loads (including the feeder control) are supplied by a long extension cord; the utility supplied voltage to the plant varies at different times of the day; a bad or loose fitting power outlet or connection.

Line Voltage fluctuations can be overcome by using a control that has a line-voltage compensation feature. The 6800 series controls adjust the control's output voltage to compensate for power line fluctuations.

No Voltmeter Available? If there is no voltmeter available, a quick function check of the feeder control can be made with a light bulb (incandescent) such as a garage trouble light. Substitute the light bulb for the vibratory feeder. A good control will act like a light dimmer. A bad control will not be adjustable, or it will not light the light bulb when it is supposed to. For a bad control, follow the recommendation given in the troubleshooting guide for the control model.

Troubleshooting guides & Application Notes
There are other troubleshooting guides available at www.autodev.com, or call for technical support at 1-814-474-5561.

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