

**RODIX, INC.**  
**FC-200 Series Troubleshooting Guide**  
for circuit board P/Ns 24-200 and 24-201

**Control must be connected to a known GOOD LOAD prior to testing**

| <b><u>Problem:</u></b>   | <b><u>Possible Cause:</u></b>  | <b><u>Solution:</u></b>  |
|--|--|--|
| <b>No output from the control</b>  | No AC line voltage   | Plug in control.   |
|  | No AC voltage on circuit board at terminal block TB1: 1, 2 & 3 are HOT<br>5, 6, 7 & 8 are COM  | Check / Replace Fuse<br>Check / Replace Control Switch   |
|  | Run Jumper is missing from TB2-8 & 9 or Run Contacts are not closed.                           | Install Run Jumper or close Run Contacts.<br>Run LED is lit when the Run circuit is made.  |
|  | 60/120 Pulse selection is set wrong for the feeder. (It looks like no output)                  | Change pulse setting (If this does not work, reset the pulse setting to its original value).<br>Measure output voltage with load connected |
|  | **Bad parts sensor or incorrect parts sensor setup   | Test: Decrease ON delay to zero. Then, change the "Sensor Logic" Function Setting, if the control runs, sensor setup is incorrect.         |
|  | <b>Max Pwr</b> selection is adjusted too low.  | Adjust <b>Max Pwr</b> selection in the Function Settings menu per the application note.  |
|  | Read message in status window<br>***Bad control board  | See application note for status message.<br>Replace control board  |
| <b>Feeder only hums or moves parts slowly</b>  | 60/120 pulse selection is wrong for the feeder.  | Change pulse setting (If this does not work, reset the pulse setting to its original value)  |
|  | <b>Max Pwr</b> selection is adjusted too low.  | Adjust <b>Max Pwr</b> selection in the Function Settings menu per the application note.  |
|  | Potential Feeder problem   | Download Rodix Solution "Control or Feeder Problem?"   |
|  | Electrical noise has disrupted the unit  | Download Rodix Solution "Good Wiring Practices"  |
|  | Electrical noise has disrupted the sensor/control signal                                       | Turn the power to the control OFF for one second and then reapply power. Also, download Rodix Solution "Good Wiring Practices"             |
|  | *** Bad control board  | Replace control board  |
| <b>Full output with no change in the output when the Power Setting is adjusted</b>         | Control is not connected to a known good load  | Connect a load to the unit   |
|  | ****The TRIAC on the unit is shorted   | Replace TRIAC (P/N 115-32)   |
|  | <b>MAX Pwr</b> selection is set incorrectly, or <b>MIN Pwr</b> selection is set incorrectly    | Adjust Maximum and Minimum output levels per the control's application note  |
|  | CFR Sensor detached from feeder  | Re-attach the sensor to the feeder.<br>Additional tape is available from Rodix   |
|  | ***Bad control board   | Replace control board  |
| <b>The output power is reduced automatically after the Amplitude setting is increased.</b> | The feeder vibration is near 25g of acceleration, and it is exceeding the range of the sensor. | Rotate the CFR sensor about 15 degrees so that its sensitive axis gets less vibration. (see unit's application note)                       |

## FC-200 Series Control Troubleshooting Guide - *Continued*

| <u><b>Problem:</b></u>   | <u><b>Possible Cause:</b></u>  | <u><b>Solution:</b></u>   |
|--|--|---|
| <b>Erratic output when adjusting power setting</b>                       | *Damaged keypad<br>*** Bad control board   | Send in for keypad replacement<br>Replace control board   |
| <b>Erratic output when making no adjustment to the control.</b>          | Potential Feeder problem<br><br>Electrical noise has disrupted the unit<br><br>50Hz generator produces electrical noise transients (where used)  | Download Rodix Solution "Control or Feeder Problem?"<br><br>Download Rodix Solution "Good Wiring Practices"<br><br>Use utility power when available   |
| <b>Output is not turning ON and OFF properly</b>                         | Delay timers set wrong or the "Sensor Logic" selection is set wrong or both the delay timers and "Sensor Logic" are set wrong<br><br>Sensor has a pull-up/pull-down resistor on its output<br><br>**Bad sensor<br><br>***Bad board   | Turn the delay settings down and change "Sens Log" setting (If changing the setting does not work, change the parameter back to its original setting). The sensor status can be monitored with the NPN and PNP LEDs on the PWB.<br><br>Select the correct "Sensor Logic", NPN or PNP according to the sensor type.<br><br>Replace sensor<br><br>Replace control board |
| <b>Interlocked board does not turn off with the FC-200 board</b>         | Run jumper or paddle switch may not be across interlock terminals (where used)   | See control's application note for to determine proper interlock connections  |
| <b>The CFR sensor is not regulating the feeder speed</b>                 | The "Ext Sig" is not configured to CFR<br>Broken or detached CFR sensor cable.<br>CFR Sensor is no longer attached to the vibratory feeder.<br>Power Setting is set to "100.0".<br><br>CFR control settings were changed (Max Pwr, 60/120 pulse, NORM/INV). Or the Power Setting was changed while the control was idle. | Set external signal source to CFR<br>Reconnect CFR sensor cable.<br>Re-attach the sensor to the feeder. Additional tape is available from Rodix.<br>Adjust <b>Max Power</b> Output setting per the control's application note.<br><br>Readjust the Power Setting to the desired feed rate.  |
| <b>The Vibratory feeder oscillates by itself</b>                         | The CFR control is overcompensating for changes in vibration. A small amount of oscillation shows that the feedback from the sensor is working.  | Rotate the CFR sensor about 15 degrees so that its sensitive axis gets less vibration. (see unit's application note) If the part feed rate is acceptable and no part jams occur, a small amount of oscillation is acceptable.   |
| <b>Control settings are wrong and do not match the programming sheet</b> | The control's memory settings have become corrupted.   | Restore good memory settings from either "User Restore" or "Factory Restore" memory. Adjust the control settings as needed afterwards.  |
| <b>The keypad will not do certain functions</b>                          | The Keypad or keypad cable may have been damaged.  | Send in for keypad replacement  |

## FC-200 Series Control Troubleshooting Guide - *Continued*

**Problem:**

**Display LCD does not work, but the control works**

**Possible Cause:**

The LCD's board connector may be unplugged  
LCD contrast pot has been changed  
Electrical noise has disrupted the unit  
  
\*\*\* Bad control board

**Solution:**

Push the center of the connector to re-install it on the board.  
Re-adjust LCD contrast pot  
Download Rodix Solution "Control or Feeder Problem?"  
Replace control board

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\*\*\* To determine if the problem is in the feeder or control: down load Rodix Solution "Control, Feeder or Power Line Solution."

Please send in the product to Rodix Inc., 2316 23<sup>rd</sup> Avenue, Rockford IL 61104, Attention Repair Department. Please include your address, telephone number, name of person to contact and a description of the symptoms of the control problem. For further assistance visit [www.rodix.com](http://www.rodix.com) or call us at 800-562-1868 extension 22.

# RODIX, INC.

## TRIAC Troubleshooting Guide

Use an Ohmmeter to test the TRIAC across the terminals described below (see the TRIAC Reference Guide below for terminal locations).

Set the Ohmmeter to the highest Meg. Ohm scale for the following resistance measurements. The resistance noted below is generally greater than 1Meg. Ohm. A good TRIAC will match the conditions shown in the chart below.

| Red Meter Lead | Black Meter Lead | Correct Result                     |
|----------------|------------------|------------------------------------|
| Anode 1        | Anode 2          | High resistance in both directions |
| Anode 2        | Anode 1          |                                    |

Measure the resistance between the terminals indicated by the following chart. The resistance noted below is generally greater than 1Meg. Ohm. A good TRIAC will match the conditions shown in the chart below.

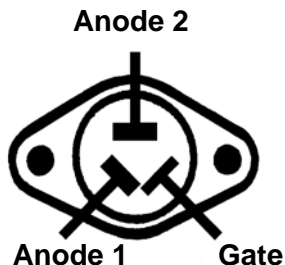
| Red Meter Lead | Black Meter Lead | Correct Result                     |
|----------------|------------------|------------------------------------|
| Gate           | Anode 2          | High resistance in both directions |
| Anode 2        | Gate             |                                    |

Set the Ohm meter to the 1K Ohm resistance scale. Measure the resistance between the terminals indicated by the following chart. The resistance noted below is generally 1K Ohm or less. A good TRIAC will match the conditions shown in the chart below.

| Red Meter Lead | Black Meter Lead | Correct Result                    |
|----------------|------------------|-----------------------------------|
| Gate           | Anode 1          | Low resistance in both directions |
| Anode 1        | Gate             |                                   |

If the resistance measurements match all of the above conditions, then the TRIAC is good. If any measurements do not match all of the above conditions, replace the TRIAC.

### TRIAC Reference Guide



### RODIX, INC.

2316 23<sup>rd</sup> Avenue, Rockford, IL 61104  
 Toll Free (800) 562-1868, FAX (815) 316-4701  
 E-mail [custserve@rodix.com](mailto:custserve@rodix.com)  
[www.rodix.com](http://www.rodix.com)

# RODIX, INC.

## Troubleshooting Guide for Three-Wire DC sensors

### Control must be connected to a known GOOD LOAD prior to testing

\*NOTE: RODIX FC-200 Series controls work with three-wire DC sensors with NPN or PNP outputs.

Always check for proper wiring of the sensor to the Rodix control. Check the sensor's application note and the Rodix control's application note to determine what the correct sensor wiring should be. (Do not use a two-wire DC sensor)

Most proximity switches and fiber-optic sensors have a red LED mounted in the back of the sensor which lights up whenever it is sensing. If this is operational then the sensor is typically good. Occasionally the vibration movement of a track can interrupt the beam of an optic sensor causing ON/OFF delay problems.

Most fiber-optic sensors, such as the Banner sensors, have a Light/Dark operate switch and a sensing-distance (gain) adjustment in the rear of the sensor. Turn the gain Pot fully clockwise for maximum sensing distance. If the sensor is turning On and Off at the desired sensing distance, but not in the correct sequence (OFF when supposed to be ON, ect.), then change the "Sensor Logic" in the Function Setting menu of the Rodix control.

The Sensor type (in the Function Menu) needs to be set to **NPN** or **PNP** for a parts sensor with an internal pull-up resistor on its output. Symptoms: The control will run (or not run) no matter what LED status is on the parts sensor. The PWB has a NPN and a PNP LED, the LED's alternately turn ON when the part sensor has an internal pull-up resistor.

| <b><u>Problem:</u></b>    | <b><u>Possible Cause:</u></b>                                  | <b><u>Solution:</u></b>  |
|---------------------------|--|--|
| <b>LED will not light</b> | End of cables covered with dirt, grease or oil                 | Clean cable ends<br>Increase Gain adjustment<br>Clean sensor head with cotton swab   |
|                           | Cracked or broken cables                                       | Increase Gain adjustment<br>Replace broken cables<br><br><u>Test each cable:</u> Plug both ends of one cable into sensor, LED should light when cable is good. |
|                           | Poor alignment of cable ends across the track                  | Correct alignment: use a drill rod to verify correct alignment   |
|                           | Incorrect sensor wiring  | Correct the wiring: see the application notes for the control and the sensor   |
|                           | Optic cables not fully inserted into sensor                    | Insert cables fully into sensor  |
| -----                     |  |  |
| <b>LED is always ON</b>   | Sensor bad   | Replace sensor   |
|                           | Light is bouncing around the parts                             | Decrease the Gain adjustment.<br>Mount the optics at a 45° angle to the track and not a 90° angle. This way the beam gets blocked by 2-3 parts.                |
|                           | Cable not fully seated in the sensor head of the Banner sensor | Loosen screw and push cable ends further in.   |

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2316 23<sup>rd</sup> Avenue, Rockford, IL 61104  
Toll Free (800) 562-1868, FAX (815) 316-4701  
E-mail [custserve@rodix.com](mailto:custserve@rodix.com)  
[www.rodix.com](http://www.rodix.com)



## 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. If additional information is needed, the application note and troubleshooting guide for your control is available from our web site.

**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 an explanation of 60/120 pulse selection, download the Rodix Solution "60/120 Pulses Output Selection." Note: the line frequency must be correct for the feeder used, see electro-mechanical tuning problems part 7.

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 list of some common electro-mechanical 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.

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, bad DIAC for controls models FC-30 through FC-90 Series (excluding *Plus* series controls) 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 electro-mechanical 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.

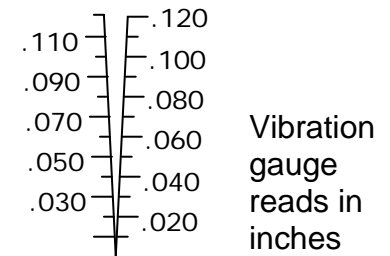
Line Voltage fluctuations can be overcome by using a control that has a line-voltage-compensation feature. The FC-40-PLC Plus, FC-90 Plus, CFR-90 Plus series, and VF-9 controls adjust the control's output voltage to compensate for power line fluctuations. In addition the CFR-90 Plus series and VF-9 controls use a sensor that attaches to the feeder to maintain a constant vibration level providing a Constant Feed Rate to the machine process.

### 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

Rodix has troubleshooting guides available at [www.rodix.com](http://www.rodix.com), or call for technical support at 1-800-562-1868 extension 22.



Place the vibration gauge on feeder to measure the stroke. The top of the line appearing in the center indicates the stroke distance.

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2316 23<sup>rd</sup> Ave, Rockford, IL 61104  
Toll Free (800) 562-1868, FAX (815) 316-4701  
E-mail [custserve@rodix.com](mailto:custserve@rodix.com)  
[www.rodix.com](http://www.rodix.com)