VM-3350D

Installation, Operation and Maintenance Instructions

VIBRATORY FEEDER

MODELS - 52A & 56A

ERIEZ MAGNETICS HEADQUARTERS: 2200 ASBURY ROAD, P.O. BOX 10608, ERIE, PA 16514–0608 U.S.A.
WORLD AUTHORITY IN ADVANCED TECHNOLOGY FOR MAGNETIC, VIBRATORY and METAL DETECTION APPLICATIONS

Introduction

This manual details the proper steps for installing, operating and maintaining the Eriez Vibratory Feeder.

Careful attention to these requirements will assure the most efficient and dependable performance of this equipment.

If there are any questions or comments about the manual, please call Eriez at 814/835-6000 for Vibratory Feeder assistance.

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ERIEZ VIBRATORY FEEDER - MODELS 52A AND 56A

Installation

MOUNTING

This Eriez heavy duty suspended type Feeder may be mounted in any of the following ways:

SUSPENSION MOUNTING

(See Figure 1)

Suspend front and rear of Feeder from cables attached to the suspension bracket eyebolts. Such cables should be 3/8" dia. (10 mm) standard wire rope. Never thread eyebolts directly into the bosses in the sides of the tray or into the threaded holes in the drive. Eyebolts loaded at right angles to the shank may fail unexpectedly causing damage to equipment or injury to personnel.

⚠ WARNING

Suspension mounting inherently involves risk of property damage or personal injury to equipment or personnel located under or near the machine, should a mounting cable fail. *Suspension component specifications given in this manual are suggestions only, and final selection of suspension method is entirely the responsibility of the user.* Select and use suspension cables with rated capacities (including reduction factors for clamps, etc.) that provide adequate safety factors when the weight of the equipment and all possible loading conditions and upsets are taken into account. Consult Eriez at 814-835-6000 if additional Eriez equipment information is needed to make this selection. As with all suspended equipment, access to the area under the machine should be restricted.

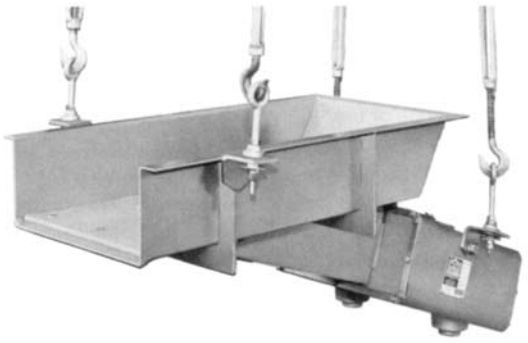

FIGURE 1

FLOOR MOUNTING

(See Figure 2)

Mount front and rear of Feeder on the floor mounting accessories provided as an alternate to the suspension accessories. The mounting bases (Part #23) should be bolted to the floor or other mounting surface, and the unit, with the floor mounting springs (Part #21), simply placed on the bases (no fastening necessary).

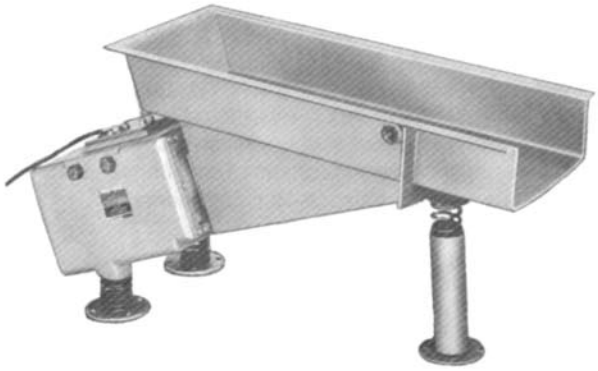

FIGURE 2

COMBINED SUSPENSION AND FLOOR MOUNTING

Any combination of suspension and floor mounting means may be utilized. The details of any such combination will, of course, be dictated by the particular application. The instructions and warning given in (A) and (B) above, should be followed.

Installation (cont.)

ELECTRICAL CONNECTIONS

(See Figure 3)

NOTE: The Eriez Vibratory Feeder is designed to be operated from an AC source. It cannot be operated from a DC source.

1. Check the specifications of the power line to be certain that they are the same as those shown on the nameplate of the Feeder and Control.
2. Connect the black and the white wires in the Feeder power cord to the terminals in the control box marked “Output”.
3. Connect the green wire (ground) to the lug provided in the box.
4. Connect the power line to the terminals in the control box marked “Line”.
5. Connect the lug in the control box to a good earth ground (a cold water line is excellent).

YOU ARE NOW READY TO START YOUR VIBRATORY FEEDER

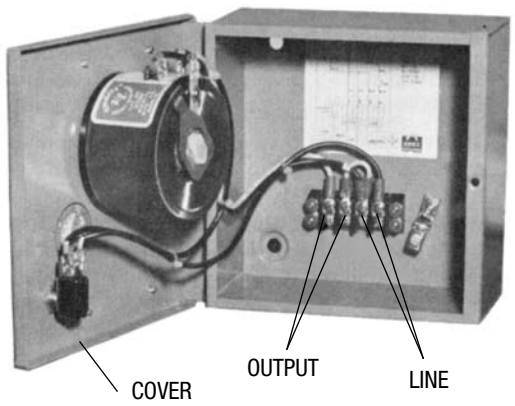

FIGURE 3

⚠ CAUTION NOTES:

OPERATION FROM PORTABLE ENGINE DRIVEN POWER PLANTS

Varying and unstable line frequency has a diverse effect on vibratory feeders because they are tuned mechanical devices, designed around either 50 or 60 cycle operating frequency. Shifts in the operating point due to changes in frequency cause higher than normal spring stress, striking and high line currents. When operating from portable engine-driven power plants, be certain that the engine is up to speed and all other loads are started and at running speed before starting the feeder.

The feeder should always be stopped first when the engine-driven power plant is shut down.

OPERATION OF MULTIPLE-DRIVE FEEDERS

On multiple-drive feeders (two or more drives on one tray) all drives should be wired electrically in phase. The black wires from each power cord should be connected together and the white wires connected together. The black wires should be connected to the positive side of the single phase input voltage and the white wires should be connected to the negative side.

Operation

To start the Vibratory Feeder after all connections have been made, switch on the power to the unit. If a control is furnished, adjust the feed rate by rotating the control knob or adjusting the control signal. Normally no warm-up period is required. **Do not operate the unit with any associated equipment touching any part of the unit.**

No routine maintenance or lubrication is required, except that any accumulation of foreign matter should be periodically removed from between the tray and the body to prevent restriction of movement of the vibratory elements.

IMPORTANT NOTE:
SPECIAL TRAYS AND ATTACHMENTS
Eriez engineering service should always be consulted before undertaking the design or construction of special trays. Neither standard or special trays as furnished by Eriez Magnetics should be modified or attachments made without first consulting us. (See Standard Tray Specifications.)

ADJUSTMENT (TUNING)

The adjusting means is solely for producing optimum performance of the unit where a specific material of low (under 40 lb/cu ft [.65 gm/cc]) or high (over 125 lb/cu ft [2.0 gm/cc]) density is to be handled continuously…also where off-standard sizes and shapes of trays are required.

The unit is adjusted by changing the stiffness of the springing system. Spring stiffness adjustment consists of varying the number of springs (Part No. 5) at the beck of the unit or the thickness of individual springs. Access to the rear springs is gained by removing the cover (Part No. 4) at the back of the unit (see Figure 4). In tuning, the front spring need not be disturbed. In NORMAL OPERATION at full voltage the total displacement of the tray, measured at the back of the tray or the tray mounting brace, is .050" (1.25 mm). Displacements in excess of .060" (1.50 mm) will result in noisy operation of the unit and may, if continued, cause damage to components.

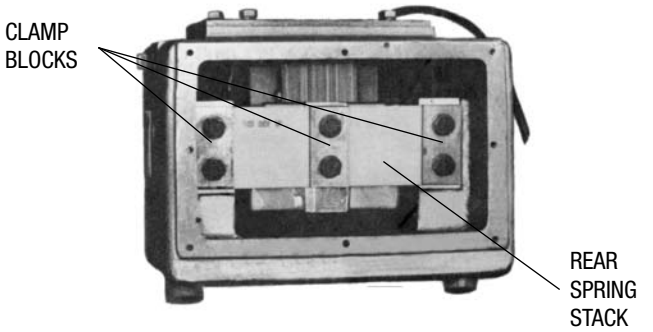

FIGURE 4

⚠ CAUTION

Never operate the unit in a striking condition.

ADJUSTING GUIDE

The following general rules should be borne in mind when making adjustments:

1. To increase the tray displacement, decrease the stiffness of the spring system.
2. To decrease the tray displacement, increase the stiffness of the spring system.

The above rules are true where the unit is operating on the normal side of its tuning curve. If increasing or decreasing the spring stiffness has an opposite effect, it means that the mass of the tray and/or load has been great enough to throw the operating point to the reverse side of the curve, which is undesirable. In this event, the stiffness should be increased (or the tray-load mass reduced) until the behavior is in accordance with rules (1) and (2) above. The unit can then be properly tuned.

To serve as a guide to the stiffness of the various springs, each spring is marked with a code number. Example: 25-237. The first two digits indicate the number of plys in the spring. The following numbers indicate the relative spring stiffness. The higher this number, the stiffer the spring.

The total stiffness of the spring system is the sum of the relative stiffness numbers. By combinations of standard stiffness springs, virtually any desired stiffness can be obtained.

Operation (cont.)

HOW TO MEASURE DISPLACEMENT

With unit operating observe where the fine gray lines on the displacement sticker meet. This point will be higher or lower as the displacement changes. Opposite the point where they meet, read amount of displacement. If a rule is used, the displacement can readily be measured as a “blurred bar” at the back edge of the tray.

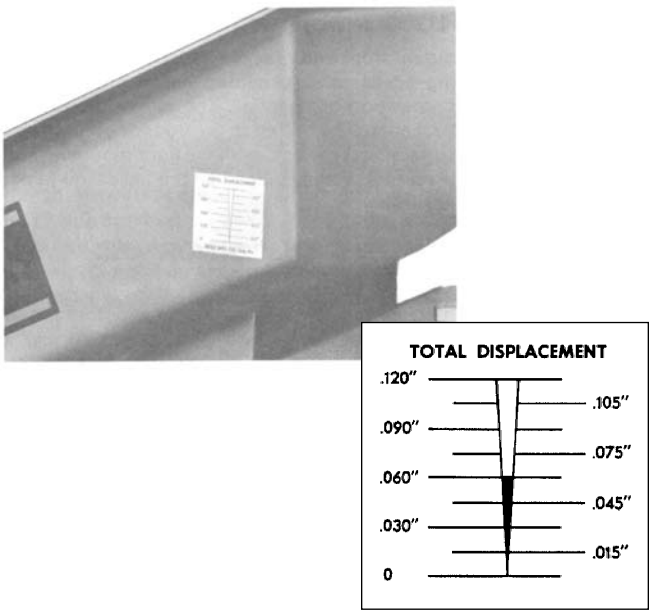

FIGURE 5

ADJUSTMENT FOR NON-STANDARD TRAYS

In the adjustment of the unit, the following steps should be followed:

1. Attach the tray (PART NO. 19) and draw all bolts tight. Check air gap (see Items 8 and 9 under Coil Replacement).
2. Energize the unit at the voltage and frequency shown on nameplate.
3. If a control box is used, turn control slowly to the full “ON” spot and observe the unit in operation.

(a) If a hammering noise is in evidence, the tray displacement is excessive. To produce normal quiet operation, increase the stiffness of the rear spring stack by substituting a leaf or leaves of greater ply for one or more of the rear spring leaves, or by adding additional spring leaves, until the displacement is approximately .050" (1.25 mm). Additional springs may be purchased from the Eriez Manufacturing Co. (See Parts List Part #5). Under normal operating conditions, the unit may be turned “ON” or “OFF” quickly without any momentary or prolonged striking noise.

(b) If the displacement so measured is considerably less than .050" (1.25 mm), decrease the spring stiffness by substituting leaves of lesser ply. If the displacement is much more than .050" (1.25 mm), increase the spring stiffness by substituting leaves of greater ply.

In changing tuning springs, put the clamp blocks (Part #7) and spacers (Part #6) back on the same way they came off (See Fig. 4.) to insure smooth clamping surfaces against the springs. All clamping bolts (Parts #8 and 9), shall have a thread engagement of not less than one and one-half times the bolt diameter and should be drawn very tight (see Bolt Torque information below.)

IMPORTANT NOTE:
SPRING BOLT TORQUE

When Tightening Spring Bolts:

1/2"-13 Bolts should be tightened to a Torque of 55 lb-ft. (75 Nm)

3/8"-16 Bolts should be tightened to a Torque of 30 lb-ft. (41 Nm) To insure proper clamping pressure, threads should be lightly coated with a good molybdenum disulfide anti-sieze compound such as “Molykote” by Alpha-Molykote Corp.

KEEP COMPOUND AWAY FROM SPRING CLAMPING SURFACES.

Operation (cont.)

ADJUSTING OR TUNING FOR VARIOUS DENSITIES OF MATERIALS

The unit can be adjusted to provide optimum perfor mance for a specific density of material in the same manner as described for non-standard trays. When units are adjusted with the tray empty to a displacement of .050" (1.25 mm) (all standard tray units are so adjusted at factory), they are set for optimum performance on a material with a density of 100 lb/cu ft. (1.6g/cm3). For very light materials, optimum perfor mance occurs with displacements above this value (up to .060" (1.50 mm)). For denser materials optimum performance occurs with displacements less than .050" (1.25 mm).

The basic characteristic of these units is such that the volume output is virtually constant for materials from 40 lb/cu ft. (.65 g/cm3) to 125 lb/cu ft. (2 g/cm3) when units are equipped with standard trays. When non-standard trays are used (particularly large trays), a tuning change is often necessary to provide optimum performance for a specific material; also, since the actual “dead” weight of material on the tray may be appreciable.

Repairs

COIL REPLACEMENT

The electrical assembly in a vibratory feeder may require replacement due to operation at over-voltage or normal aging of the unit. Re-assembly will require checking and possible re-centering of the air gap between the E-Frame and the permanent magnet elements. The air gap is directly accessible from the outside of the unit as described below.

The following procedure should be followed in removing and replacing the electrical assembly (See Figures 6, 7 and 8).

1. Remove the bolts securing the electrical assembly plate to the body casting.
2. Pry and lift the electrical assembly from the body casting, using a sling or some other safe method of lifting. (See Figure 7).
3. Replace defective electrical assembly (order from Eriez Parts List).
4. In replacing the electrical assembly, insert it

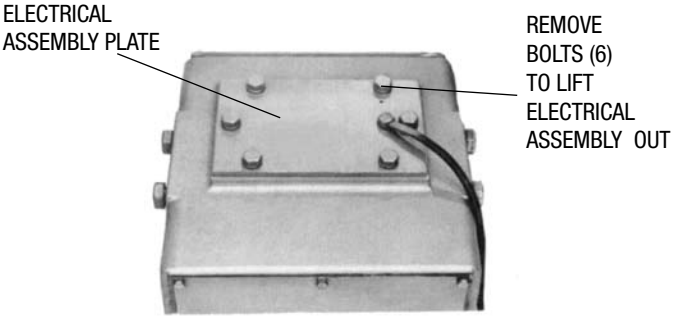

FIGURE 6

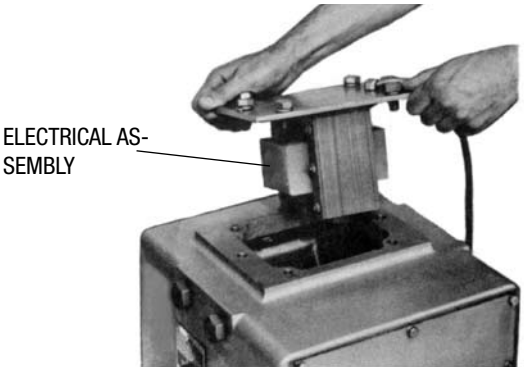

FIGURE 7

Repairs (cont.)

into its original position in the body casting. DO NOT FORCE THE ASSEMBLY INTO PLACE. When properly aligned, the assembly will go in readily, although there will be a distinct pull exerted by the permanent magnets in the armature. To overcome this pull, it may be necessary to guide the plate with a heavy screwdriver, meanwhile applying pressure to the top of the plate.

Start the electrical assembly plate bolts into the body casting, but do not tighten completely. Remove the nameplate from the side of the body casting to gain access to the air gap. (See Figure 8).

5. Working through the opening in the side of the body casting (see Figure 8) and using a non-magnetic feeler gauge approximately .066" (1.7 mm) thick (furnished with each unit), check the air gaps between the E-Frame legs and the armature pole pieces. These gaps should be uniform in width, parallel, and as nearly alike as possible; if they are not, they should be adjusted by shifting the electrical assembly plate.

   In checking the gaps, the internal parts will be easier to see if the rear cover (Part #4) is removed.

6. Tighten the electrical assembly plate bolts and replace the cover nameplate.

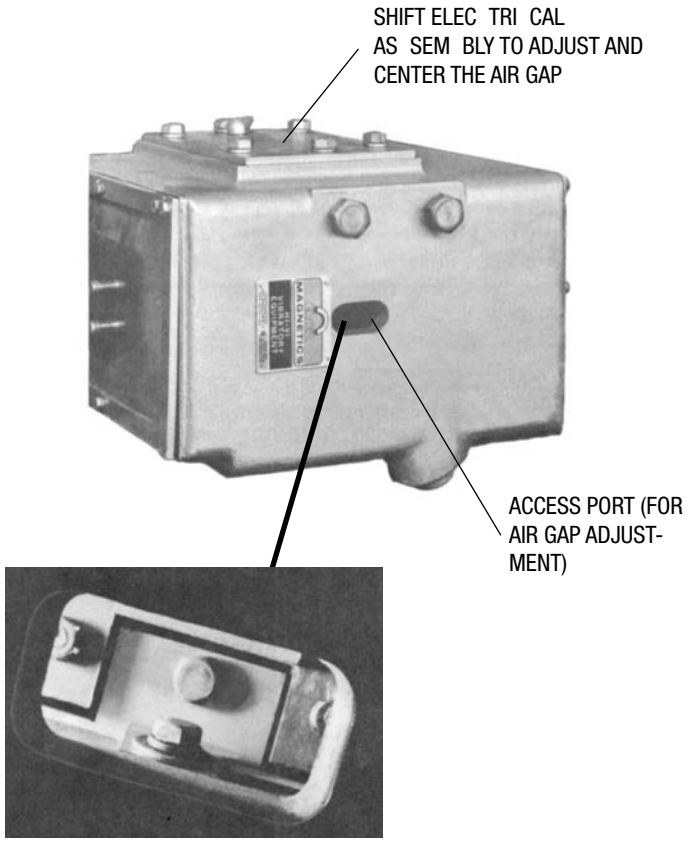

FIGURE 8

Repairs (cont.)

SPRING CHANGE OR REPLACEMENT

Although the non-metallic leaf springs have outstanding life characteristics, failure may eventually occur, especially if the displacement is greater than normal. The symptoms of such failure are: (1) erratic behavior of the unit, (2) greatly reduced displacement or (3) greatly increased and perhaps uncontrollable displacement. If spring failure is suspected, the front and rear spring stacks should be removed, checked and replaced one stack at a time. Access to the rear spring stack is gained by removing the rear cover of the unit, while the front stack can be reached by first removing the tray and the flexible diaphragm (see Figure 9). Before either spring stack is removed the armature at that end of the unit should be blocked up (see Figure 10) to hold its position relative to the body casting, and the blocks left in place until the spring stack is replaced.

A failed spring leaf can be recognized by the appearance of the surfaces adjacent to the inside edge of the phenolic spacers. If these surfaces have a discolored or whitish appearance accompanied by a bulged or irregular appearance of the surface, the spring is defective and should be replaced. When assembling and installing spring stacks, keep the phenolic spacers and the clamping surfaces absolutely dry and free from grease, oil or any other material which may act as a lubricant. (Such lubricant can cause internal heating which could seriously damage the springs.) Clamp Blocks should be put back on the same way they came off, to insure smooth clamping surfaces and maximum clamping area.

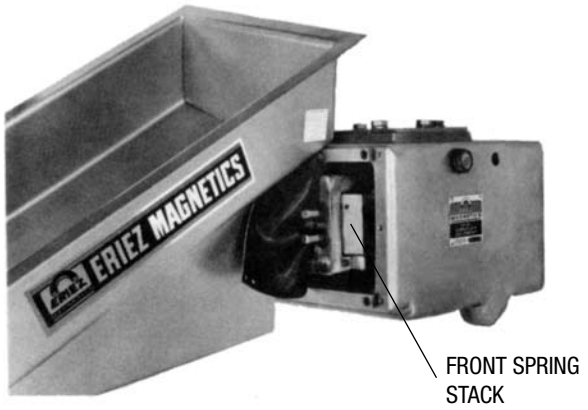

FIGURE 9

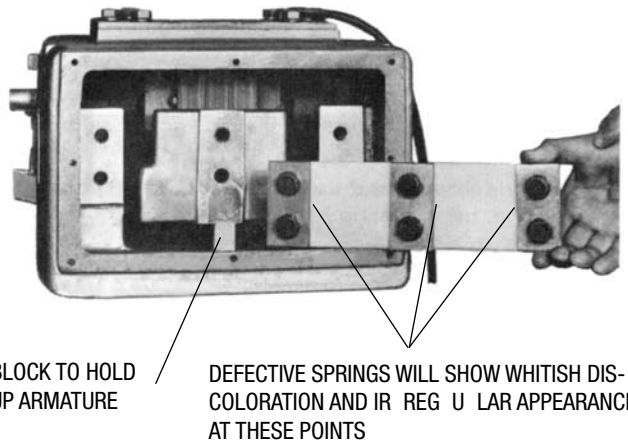

FIGURE 10

Troubleshooting

TABLE 2. SERVICE CHART

NATURE OF PROBLEM		Misapplication	Tampering or Changing of Base or Tray	Loose Spring Clamp or Tray Mounting Bolts	Coil Failure	Control Failure	Incorrect Voltage	Spring Failure Foreign Material Between Tray & Reaction Mass	Incorrect Tuning Poor or Broken Weld on Tray	Incorrect Factory Adjustment	Sympathetic Vibration in Other Equipment In Contact with Other Equipment	Line Voltage Variation	Blown Fuse or Circuit Breaker	Other Electrical Connections	Coil Spring Failure	Corrosive or Abrasive Material	Product Variation
Initial Installation	Reduced or Low Output	1				5	6	7	8	9					14		
	Noisy but Output Okay			3					8	9	10	11	12	13			
	Noisy Certain Periods Only														14		
Develop After Satisfactory Initial Operation	Completely Inoperative				4	5		7								15	16
	Operating But Reduced Output		2	3		5	6	7	8								16
	Output Okay Too Much Noise							7	8	9	10				14		
	Gradual Fading					5		7									
	Excessive Tray Wear															18	
	Turbulent Flow										10						17
	Inconsistent Output					5									14		19

1. Misapplication
Feeder too small. Product difficult or impossible to handle. Impossible temperatures or atmospheres. Impossible dimensional requirements. Feeding requirements too precise or excessive. Consult Eriez.

2. Tampering or Changing of Base or Tray
Improper disassembly, extensions, covers, weights, screens or other modifications or attachments may have affected performance. Reassemble in accordance with printed instructions or consult Eriez.

3. Loose Spring Clamp or Tray Mounting Bolts
Tighten all bolts. (See Spring Bolt Torque Specifications).

4. Coil Failure
Replace coil or coil and E-frame assembly. Order from Eriez parts lists. Follow maintenance instructions carefully.

5. Control Failure
Check for burned out powerstat or rheostat, defective capacitor, defective switch, loose wiring, defective transformer (if used). Order new parts from Eriez. Possibility special control needed. Consult Engineering.

6. Incorrect voltage
Check nameplate specifications and line voltage.

Troubleshooting (cont.)

7. **Spring Failure**
   See maintenance instructions. Disassemble for examination. Tuning spring failure will draw high amps, blow fuses, and cause loss of production.

8. **Foreign Material**
   Examine and remove foreign material.

9. **Incorrect Tuning**
   See maintenance instructions. To increase displacement and output, use fewer or thinner tuning springs. To decrease displacement and eliminate striking, use more or thicker tuning springs.

10. **Poor or Broken Weld on Tray**
    Check and correct.

11. **Incorrect Factory Adjustment**
    See maintenance instructions (Gap adjustments.)

12. **Sympathetic Vibration in Other Equipment**
    Check and correct.

13. **Contact with Other Equipment**
    Check and correct.

14. **Line Voltage Variation**
    Check and install voltage regulator if necessary.

15. **Blown Fuse or Circuit Breaker**
    Check for short circuits and correct.

16. **Other Electrical Connections**
    Check all connections and correct.

17. **Coil Spring Failure**
    Replace if collapsed or broken. (Suspended or floor mounted units).

18. **Corrosive or Abrasive Material**
    May require special tray. Consult Eriez.

19. **Product Variation**
    If product density, moisture content or other characteristics vary, customer should take own corrective measures.

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