VM-3002

Installation, Operation and Maintenance Instructions

VIBRATORY FEEDER
MODEL HS-8

ERIEZ MAGNETICS HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1440 U.S.A.
WORLD AUTHORITY IN ADVANCED TECHNOLOGY FOR MAGNETIC, VIBRATORY and INSPECTION 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.

⚠ CAUTION: Safety labels must be affixed to this product. Should the safety label(s) be damaged, dislodged or removed, contact Eriez for replacement.

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ERIEZ VIBRATORY FEEDER MODEL HS-8

Installation

MOUNTING
This Hi-Vi model HS-8 should be mounted on a flat, stable surface. Anchor bolts (1/4-20 threads) in the rubber shock mounts must be used to prevent the unit from “walking” during operation.

IMPORTANT NOTE:
DRIVES WITHOUT TRAYS
Drive units are often supplied without trays for use with trays, chutes or tracks supplied by others. In this case the chute, track, tray or other equipment is bolted to the tie bar supplied with the drive unit. The unit can drive a tray 18" long, up to 8 LBS (total weight including clamps, elevation towers, etc.) with tray heights of 3.5" maximum above the tie bar using a tower. Heavier weights, longer trays, and taller towers may be accommodated but Eriez must be consulted. Make sure the drive unit is installed so the end containing the leaf springs is facing the direction of material flow (see Figure 1). The center of gravity of any components attached to the drive unit should be as close as possible to the drive unit’s drive line (see Figure 1).

ELECTRICAL CONNECTIONS
The HS-8 is operated from single-phase full wave **alternating current**.

To connect the unit:

1. Check the voltage of the power source to be certain that it is the same as that shown on the nameplate of the control box.
2. Connect the black and white wires of 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 incoming 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) or a well-grounded metallic conduit system.
6. 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.

YOU ARE NOW READY TO START YOUR VIBRATORY FEEDER.

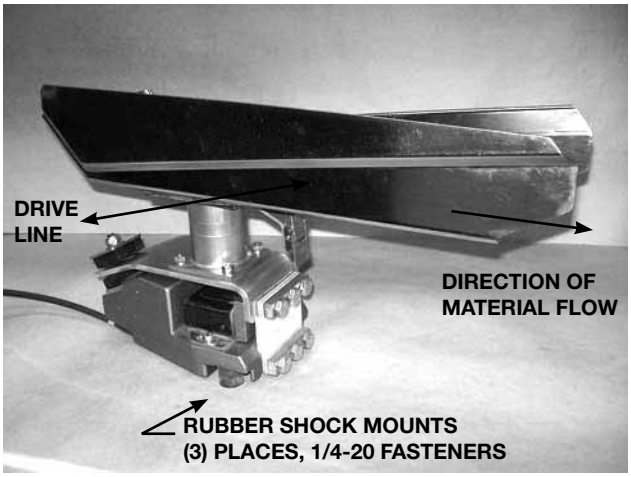


FIGURE 1

Operation and Adjustment

GENERAL CAUTIONS FOR SUCCESSFUL OPERATION

1. Never add extensions or accessories to the tray supplied by Eriez.
2. Always insure that the unit is operating without contacting obstructions or adjoining equipment.

CAUTION: A loud rapping noise in the drive unit indicates that the coil and the attraction bar are contacting each other. This is known as "gap striking." Striking must not be allowed during regular operation since damage to the feeder can result.

To start the feeder after all connections have been made, operate the control box switch and adjust the output voltage to maximum by rotating the control knob to the full clockwise position.

Use the controller to adjust the unit to the desired feed rate.

No routine maintenance or lubrication is required except that any accumulation of foreign matter should be removed to prevent restriction of movement of the vibratory elements.

SETTING GAP

Using a 0.125" (3.18 mm) thick gap bar, position the gap bar between the attraction bar and the coil face. This is a good starting gap, however, this gap can be modified to enhance performance or avoid "gap striking". Keep in mind that increasing the gap increases the current draw of the unit and decreasing the gap decreases the current draw. Obtain a snug fit of the gap bar between these two components by loosening coil mounting bolts and moving the coil in either direction (see Figures 2 and 3). Retorque bolts per torque given in the spare parts list.

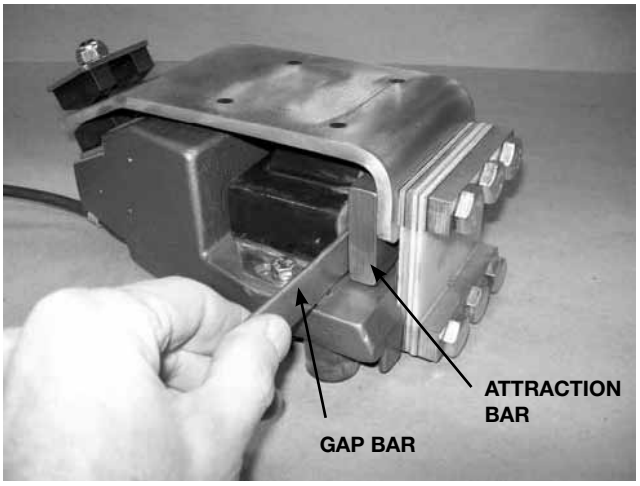


FIGURE 2

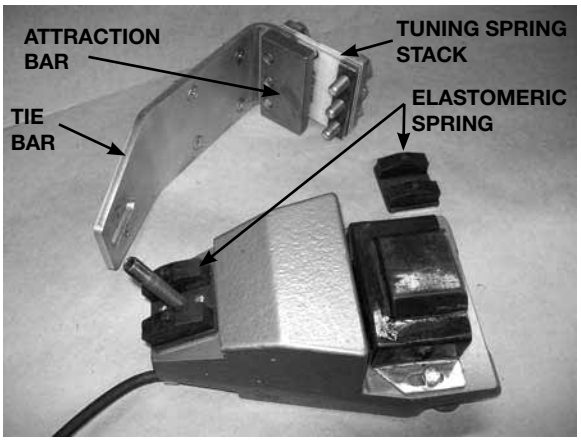


FIGURE 3

Operation and Adjustment (cont.)

TUNING PROCEDURE

HS-8 drive units supplied without a tray are tuned by Eriez for use with a seven-pound (3.18 kg) weight. If supplied with a tray, they are tuned for that specific tray and should require no further adjustment. However, if different trays or other components are used, or if a striking condition occurs, re-tuning may be required.

CHECK DEFLECTION

1. Place an Eriez deflection sticker on the side of the tray near the rear and parallel with the drive line (see Figure 4),or approximate this position if other attachments are being used on the drive unit.
2. With the unit operating, observe where the fine gray lines of the deflection sticker meet.
3. At the point where lines meet, read the deflection. See Figure 5.

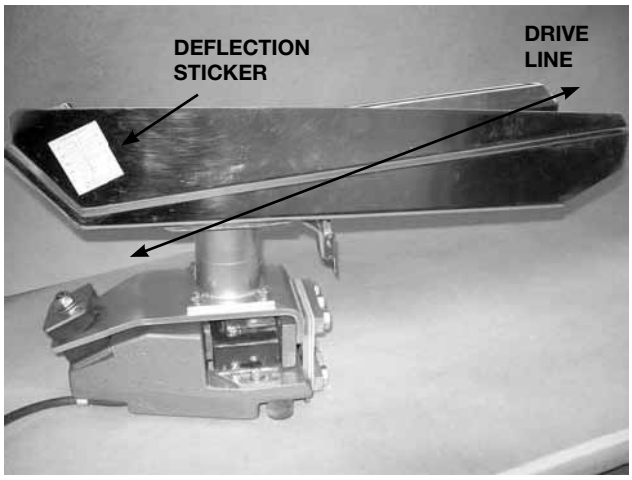


FIGURE 4

TUNING BY REPLACING SPRINGS

To obtain the maximum desirable deflection it may be necessary to add, subtract or substitute tuning spring leaves in the tuning spring stack (see Figures 6 and 7) at the front of the unit.

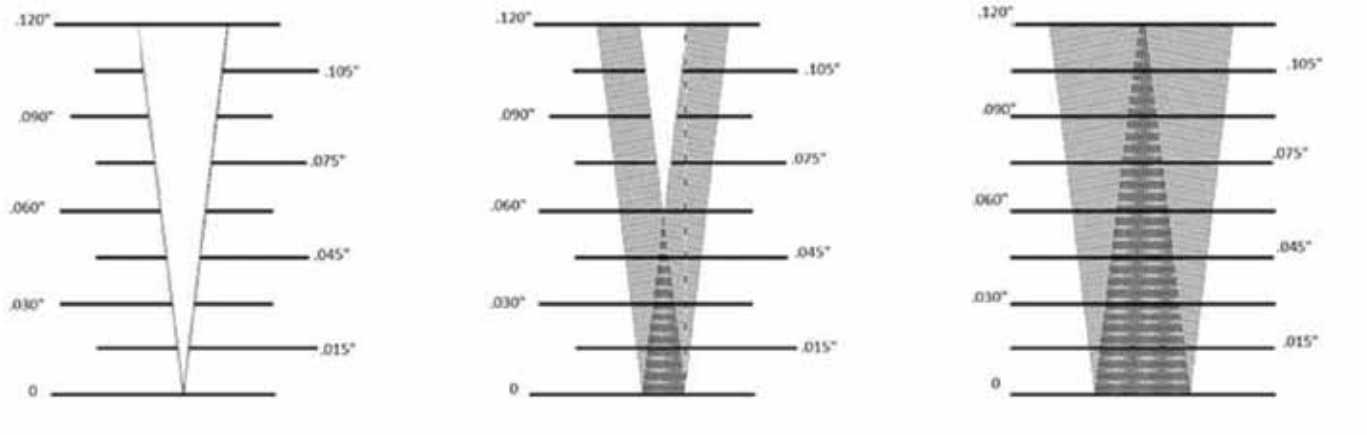
The following general rules, which apply to the cold HS-8 feeder operating ideally on the normal side of its tuning curve, should be borne in mind when making tuning adjustments to increase or decrease the displacement:

1. To DECREASE the tray displacement, DECREASE the stiffness of the tuning spring system.
2. To INCREASE the tray displacement, INCREASE the stiffness of the tuning spring system.

If decreasing or increasing the tuning stiffness has an opposite effect, it means that the spring system stiffness is too great and the unit will no longer behave predictably. The spring stiffness should be reduced until the behavior is in accordance with rules 1 and 2. The unit can then be properly tuned to the desired displacement.

Maximum allowable tray amplitude will vary depending upon tray weight and tower height. Table 1 is a reference to be used to tune a typical feeder tray and a 3" tall tower. Lighter trays will allow higher amplitudes and as the tray weight increases the allowable tray amplitude decreases. The tray amplitude can range from 0.120" stroke for a 3.5 LB tray to 0.090" stroke on an 8 LB tray depending on tower height and tray structure.

To select the proper leaf springs, obtain the weights of any items being bolted to the tie bar (tray, tower, etc). Once the total weight is known, refer to table 1. Find the closest weight in column one of the table to the tray and accessories that are to be installed. When between two weights round to the nearest half pound (for example a 7.3 LB weight would round to 7.5 LB). Read the row from left to right to obtain the proper number of 9, 7, and 5 ply leaf springs to be installed in front of the feeder. This will provide the course tuning of the feeder.



Deflection sticker when stationary. (Not to scale, do not use for measurement.)

Deflection sticker showing .060" of total deflection. Each unbroken horizontal line above that zero line represents .015" of total deflection. Numerical scale will actually be blurred.

Deflection sticker showing .120" of total deflection.

FIGURE 5

TABLE 1			
Tray/Tower Weight (lbs)	**Required Tuning Springs**		
	9 Ply	**7 Ply**	**5 Ply**
9.5	3	0	1
9.0	2	0	3
8.5	2	2	0
8.0	2	1	1
7.5	2	0	2
7.0	1	2	1
6.5	2	1	0
6.0	2	0	1
5.5	1	0	3
5.0	1	2	0
4.5	1	1	1
4.0	0	1	3
3.5	0	0	4

To remove the spring stack, remove the 6 bolts that attach it to the body and the tie bar/attraction bar. Add/remove/replace the required springs in the stack making sure that a spacer separates each spring and also between the spring stack and the body/tie bar and also between the springs and the spring clamps. Torque each bolt according to the torque given in the spare parts list.

The fine tuning is obtained by adjusting the compression on the elastomeric springs in the rear of the feeder. Two turns of the compression nut will result in an approximate increase of 0.045" of deflection. Using a 17 mm wrench apply one full turn of compression to the elastomeric springs. This is the minimum displacement for this tuning arrangement.

NOTE: Never attempt to operate the feeder with less than one turn (0.059") compression on the elastomeric springs! Premature wear, erratic operation and elastomeric spring failure will result. If this displacement is too high, drop down to the next lighter leaf spring stack. A maximum displacement with this tuning arrangement should be obtained within 4 turns of the compression nut.

NOTE: Never attempt to operate the feeder with more than 4 turns (0.236") of compression on the elastomeric springs. Damage to the elastomeric spring will result.

Repairs

SPRING CHANGE OR REPLACEMENT

Although the non-metallic springs used in the HS-8 feeders have outstanding life characteristics, failure may eventually occur, especially if the displacement is greater than normal. The symptoms of such failure will be:

1. Erratic behavior of the unit or,
2. Greatly reduced displacement

If spring failure is suspected, the tuning spring stack should be removed by removing the six bolts attaching it to the body and the tie bar/attraction bar (see Figure 6).

Carefully examine each tuning spring for signs of delamination or breakage. A failed spring can be recognized by the appearance of the spring surface. If this surface is discolored or has a patchy whitish appearance, perhaps accompanied by surface bulging or other irregularity, the spring is defective and should be replaced with a new spring ordered from the parts list.

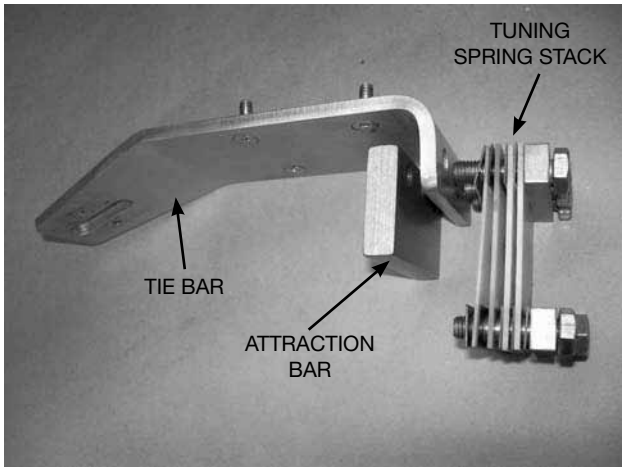


FIGURE 6

ELASTOMERIC SPRING REPLACEMENT

If the feeder still exhibits signs of spring malfunction after the tuning spring has been checked and replaced, check the two elastomeric springs in the rear of the feeder (see Figure 7).

1. Remove the elastomeric spring compression nut, and lift the top set of elastomeric springs from the unit.

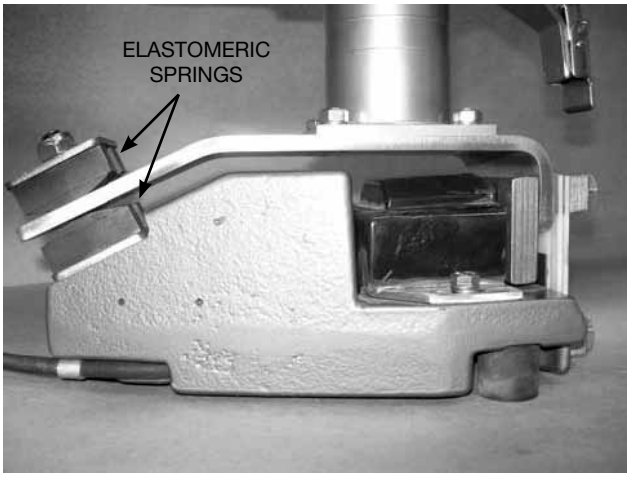


FIGURE 7

2. Remove the leaf spring stack on the front of the unit by removing the 6 bolts that attach it to the body and the tie bar/attraction bar.
3. Remove the 2 screws that attach the bottom elastomeric springs to the body, lift the spring from the unit.
4. Carefully examine both sets of springs for signs of failure and replace if such signs are found. A failed elastomeric spring will exhibit one or more of the following characteristics:

   a) Signs of rubbing or abrasion of the rubber surface that is in contact with the tie bar. Small abraded particles of the elastomer may be present.

   b) Tackiness of the elastomer where it is in contact with the tiebar.

5. In replacing the elastomeric springs, make sure that the springs and tie bar are free of dirt, oil or any other contaminant that would allow the springs to slip on the tie bar and lead to premature failure.
6. Place the new elastomeric spring over the rear stud and reinstall the 2 screws that attach the spring to the body.
7. Install the front spring stack and tie bar making sure the nubs on the elastomeric springs engage the holes in the tie bar. Install and retorque the 6 bolts that hold on the spring stack per torque given is spare parts list.
8. Slide the top elastomeric spring over the stud making sure that the nubs on the elastomeric spring engage the holes in the tie bar. Install the spring compression nut and reapply the compression load.
9. Check the motor gap and adjust if necessary.

COIL REPLACEMENT

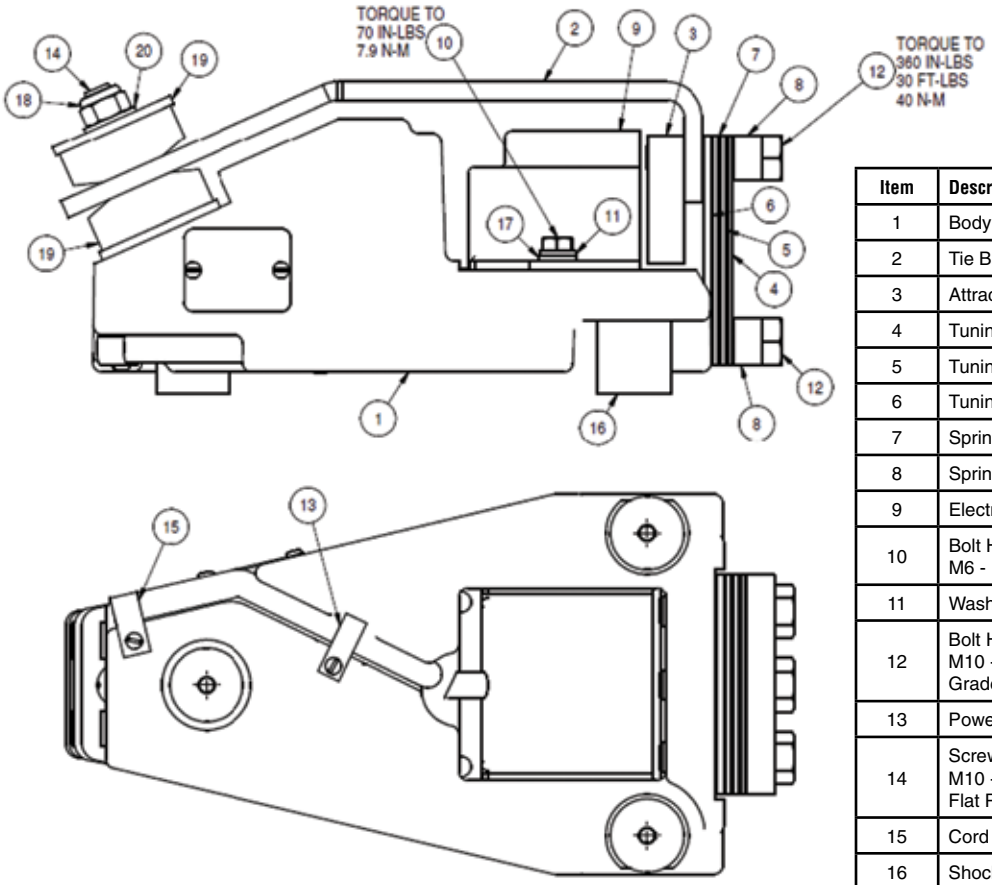
The electrical assembly in a Vibratory Feeder may eventually fail due to over-voltage or normal aging. The following procedure will explain how to remove and replace the electrical assembly, which includes the coil:

1. Remove the elastomeric spring compression nut and lift off the top spring.
2. Remove the 6 bolts that hold on the front leaf spring stack, remove leaf springs and tie bar.
3. Remove the 2 screw clips that hold the power cord under the body.
4. Remove the 2 bolts that hold the electrical assembly in place.
5. Lift out the electrical assembly and replace with a new assembly.
6. Install the 2 bolts and washers that hold the electrical assembly in place, but do not tighten.
7. Install the 2 cord screw clips under the body.
8. Install the tie bar, leaf spring stack and 6 bolts. Make sure the rubber nubs on the elastomeric springs engage the holes in the tie bar. Retorque spring bolts per torque in spare parts list.
9. Install the upper elastomeric spring and compression nut. Make sure the nubs on the elastomeric spring engage the holes in the tie bar. Reapply the proper compression.
10. Using a gap bar, set the gap between the attraction bar and the electrical assembly. Tighten electrical assembly bolts per torque in spare parts list

⚠ CAUTION

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

Spare Parts List



HS-8 Spare Parts List

Item	Description	Part Number	Quantity
1	Body	135750	1
2	Tie Bar	135767	1
3	Attraction Bar	135751	1
4	Tuning Spring 5 Ply	135753	1
5	Tuning Spring 7 Ply	135754	1
6	Tuning Spring 9 Ply	135756	1
7	Spring Spacer	449432	10
8	Spring Clamp	135765	2
9	Electrical Assembly 115/60	132420	1
10	Bolt Hex HD SS M6 - 1 x 12MM	425123	2
11	Washer Lock SS M6	425013	2
12	Bolt Hex HD M10 - 1.5 x 40MM Grade 8.8 Plated	453200	6
13	Powercord Clip	1N-9603710	1
14	Screw Soc Set M10 - 1.5 x 75MM Flat Point	225887	1
15	Cord Clamp	208050	1
16	Shockmount	189018	3
17	Washer Flat SS M6	425012	2
18	Nut Hex SS M10 - 1.5 Nylok	225711	1
19	Elastomeric Spring Assembly	457733	2
20	Washer Seal 3/8 ID SS W/Neoprene Backing	435843	1

Optional Stainless Steel Parts

12	Bolt Hex HD Stainless Steel M10 - 1.5 x 40MM	225952	6
14	Screw Soc Set Stainless Steel M10 - 1.5 x 75MM Flat Point	225248	1

Troubleshooting

TABLE 1. 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 or Hz Variation
Initial Installation	Reduced or Low Output	1	2			5	6	7	8	9				13	14
	Noisy but Output Okay		2	3					8	9	10	11	12	13	
	Noisy Certain Periods Only													13	14
Develop After Satisfactory Initial Operation	Completely Inoperative		2		4	5		7						13	
	Operating but Reduced Output		2	3		5	6	7	8	9	10		12	13	14
	Output Okay Too Much Noise		2					7	8	9	10		12	13	14
	Gradual Fading					5		7	8	9	10			13	
	Excessive Tray Wear														
	Turbulent Flow										10				
	Inconsistent Output		2	3		5	6	7		9	10		12	13	14

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.

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. Possible 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 show up as white areas. Order new parts from Eriez and replace per instructions.

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

9. **Incorrect Tuning**
   See maintenance instructions. To decrease displacement and output, use fewer or thinner tuning springs. To increase 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. **Shockmount Deterioration**
    Check and correct.

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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