

Installation, Operation and Maintenance Instructions



**VIBRATORY
FEEDER**

MODEL – HSB-4

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.

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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Installation

Mounting

This Hi-Vi model should be mounted on a flat, stable surface. Spring seats 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 tray mounting plate supplied with the drive unit. Maximum tray weight for each drive is 4 pounds (1.58 kg). 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).

Electric Connections

The HSB-4 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 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.**

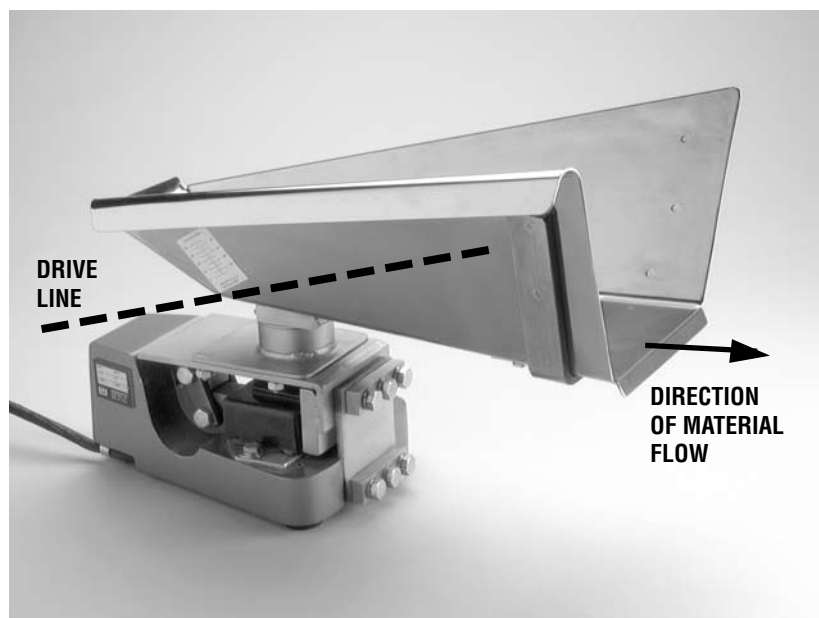


FIGURE 1

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.” Initial striking at start-up is permissible, but 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 periodically removed to prevent restriction of movement of the vibratory elements.

Setting Gap

Using a 0.160” (4mm) thick gap bar, position the gap bar between the attraction bar and the coil face. 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).

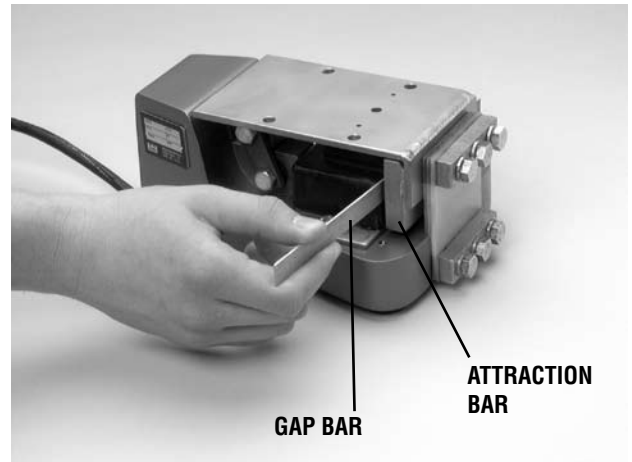


FIGURE 2

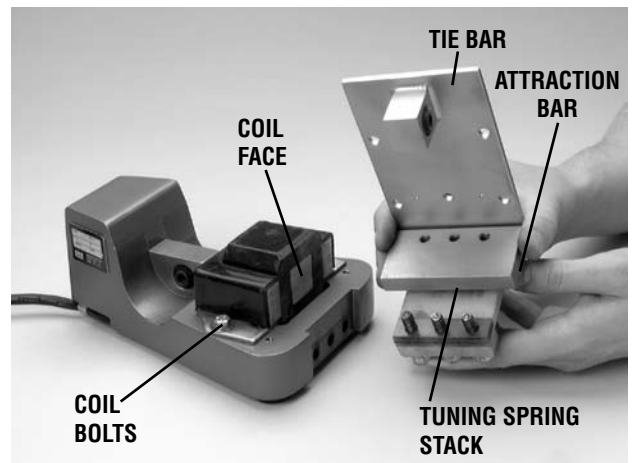


FIGURE 3

Operation and Adjustment *continued*

Tuning Procedure

HSB-4 drive units supplied without a tray are tuned by Eriez for use with a three-pound (1.4kg) 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 of a system 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 unite operating, observe where the fine gray lines of the deflection sticker meet.
3. At the point where lines meet, read the deflection.

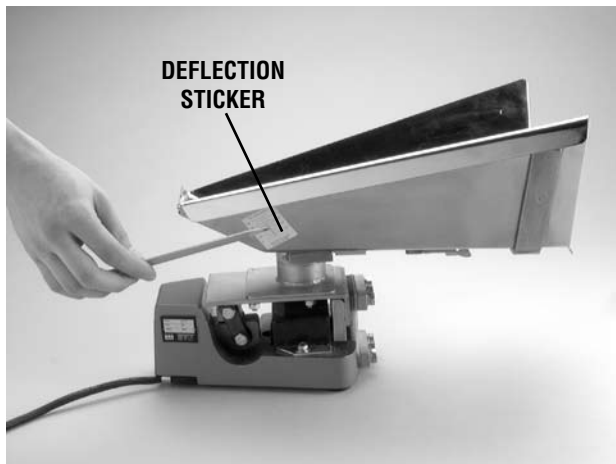


FIGURE 4

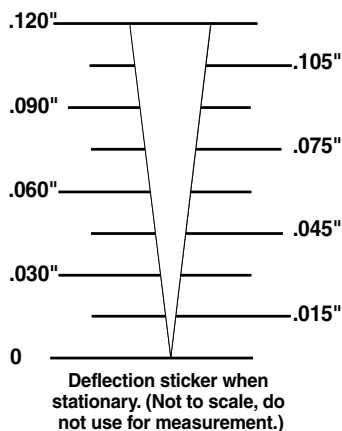
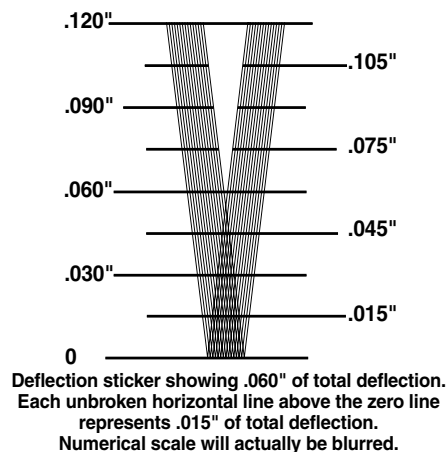


FIGURE 5



Tuning By Replacing Springs

To obtain the maximum desirable deflection of 0.110" to 0.120" (2.8 mm to 3.0 mm), 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 HSB-4 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 stack.
2. To INCREASE the tray displacement, INCREASE the stiffness of the tuning spring stack.

If decreasing or increasing the tuning stiffness has an opposite effect, it means that the spring stack 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.

As a guide to the stiffness of individual tuning springs, each spring is marked with a code number such as 5-27. The first number (5) is the number of fiberglass plies in the spring. The following number (27) indicates the relative stiffness of the spring: the higher this number, the stiffer the spring.

The total stiffness of the tuning spring stack is the sum of the relative stiffness numbers. By varying combinations of different ply springs having different relative stiffnesses, practically any desired total stiffness can be obtained.

Repairs

Spring Change or Replacement

Although the non-metallic springs used in the HSB-4 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.

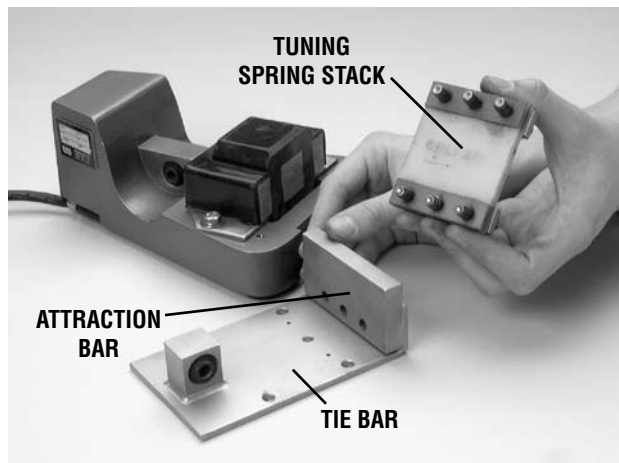


FIGURE 6

Elastomer Spring Replacement

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

1. Remove the spring lever arms and hardware from each side of the unit.

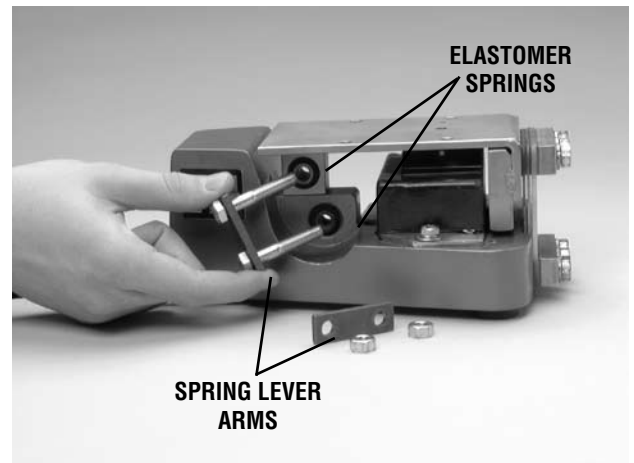


FIGURE 7

2. Lay the unit on its side and use a small hammer and flat-ended round bar or dowel to tap the elastomer spring out of the body housing (see Figure 8). Next, support the tie bar (shown in Figure 6) with a small block between the tie bar and work surface, and tap the spring out of the tie bar.

Repairs *continued*

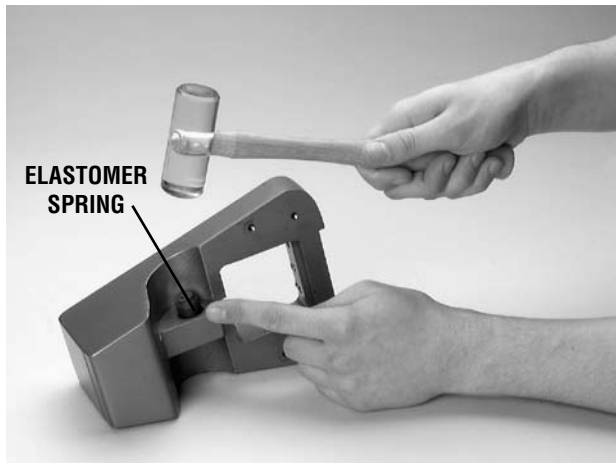


FIGURE 8

3. Carefully examine both springs for signs of failure and replace if such signs are found. A failed spring will exhibit one or more of the following characteristics:
 - a) Looseness of the spring combined with signs of rubbing or abrasion at the outer surface of the cylinder. Looseness of the metal sleeve.
 - b) Small crack in the elastomer around the end of the metal sleeve, possibly with small abraded particles of the elastomer present.
 - c) Tackiness of the elastomer around the metal sleeve and at the outer surface of the cylinder, possibly with some outward bulging of the elastomer.
4. In replacing the elastomer springs, lay the unit on its side so that the chamfered ends of the spring holes are up. After making sure that the holes and their chamfered ends are clean and free from obstructions, lubricate the springs with a little water (*CAUTION: do not use a petroleum product for lubrication*) and press them partly into place with the thumbs. Then tap the springs back into place, again using the small supporting block between tie bar and work surface. Make sure that the springs go in straight and that the steel inner sleeves protrude equally at both ends of both spring holes.

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 two hex bolts that fasten the electrical assembly to the body.
2. Lift out the electrical assembly (see Figure 9) and replace it with a new assembly.
3. Replace the two bolts in the side plates, tune the feeder as described in Tuning Procedure and tighten down hex bolts.

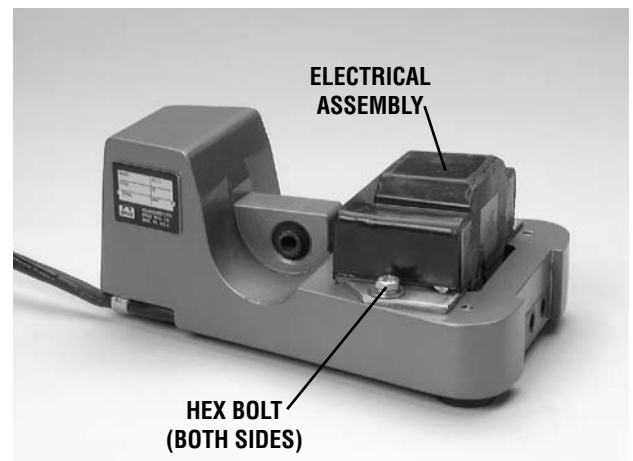


FIGURE 9

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.

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 and 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	Shockmount Deterioration	Corrosive or Abrasive Material	Product Variation
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Initial Installation	Reduced or Low Output	1	2			5	6	7	8	9				13	14		16			19
	Noisy, but Output Okay		2	3					8	9	10	11	12	13						
	Noisy Certain Periods Only													13	14					
Develops After Satisfactory Initial Operation	Completely Inoperative		2		4	5		7						13		15	16			
	Operating, but Reduced Output		2	3		5	6	7	8	9	10		12	13	14		16	17		19
	Output Okay Too Much Noise		2					7	8	9	10		12	13	14					
	Gradual Fading					5		7	8	9	10			13						19
	Excessive Tray Wear																		18	
	Turbulent Flow										10								17	
	Inconsistent Output		2	3		5	6	7		9	10		12	13	14		16	17		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.

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 *continued*

7. Spring Failure

See maintenance instructions. Disassemble for examination. Tuning spring failure will show up as white areas. Order new parts from factory 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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