VM-3015F

Installation, Operation and Maintenance Instructions

VIBRATORY FEEDER
MODEL – 15A

ERIEZ MAGNETICS HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1402 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 Manufacturing 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 15A

Installation

MOUNTING

This Hi–Vi model should be mounted on a flat surface in one of the following ways:

Positioned and fastened using rubber isolation mounts. Fastened to desired surface with bolts of proper size up through the isolation mounts.

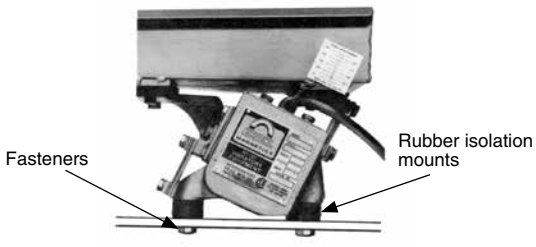

FIGURE 1

Positioned but not fastened using steel isolation coil spring. Fixed headless stud pins of proper size and spacing. Set the base (with optional coil mounting springs) over the pins.

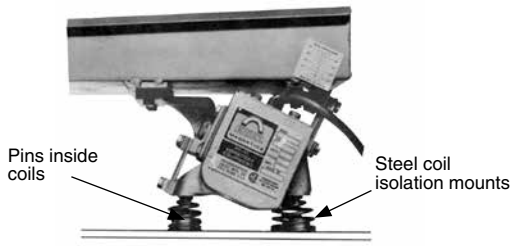

FIGURE 2

Positioned and fastened using rubber isolation mounts and optional extended base. Fastened to desired surface with bolts of proper size up through the isolation mounts.

FIGURE 3

ELECTRICAL CONNECTIONS

1. Check the supply voltage and frequency and make certain that they are the same as those shown on the nameplate of the Feeder and Control (See Figure 4).

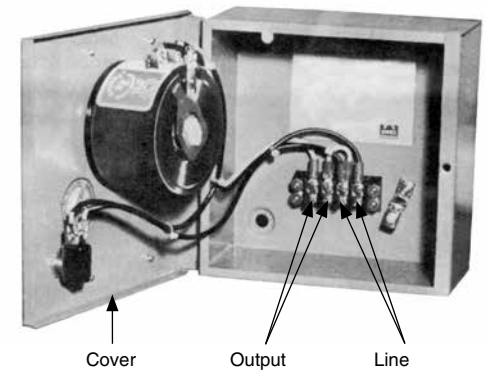

FIGURE 4

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 copper cold water line is excellent). If a well-grounded metallic conduit system is used, the latter connection may be dispensed with.
6. On multiple drive feeders (two or more drives on one tray) all drives should be wired electrically in phase and in parallel. 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 line side of the input voltage and the white wires should be connected to the neutral side.

NOTE: The Eriez Vibratory Feeder cannot be operated from a DC source.

YOU ARE NOW READY TO START YOUR VIBRATORY FEEDER.

Operation

To start the Vibratory Feeder after all connections have been made, turn the switch on the control to the "ON" position and adjust the feed rate by rotating the control knob. 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. To do so will void the warranty. (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 lbs/cu ft [.6 gm/cm^3]) or high (over 150 lbs/cu ft [2.4 gm/cm3]) density is to be handled continuously…also where off-standard sizes and shapes of trays are required.

This unit is tuned by changing the stiffness of the tuning spring (See Figure 5) or springs. This adjustment consists of varying the number of springs, or the number of fiberglass plies in individual springs.

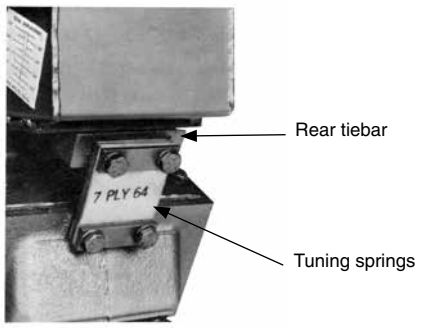

FIGURE 5

In NORMAL OPERATION at full voltage the total displacement measured at the back of the tiebar (or the back of the tray if a displacement sticker is used) is .045" (1.1 mm). In general this displacement should not be exceeded by more than .005 (.1 mm).

⚠ CAUTION
Never operate the unit in a striking condition.

HOW TO MEASURE DISPLACEMENT

With unit operating observe where the fine gray lines on the displacement sticker meet (See Figure 6). 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 of the tiebar.

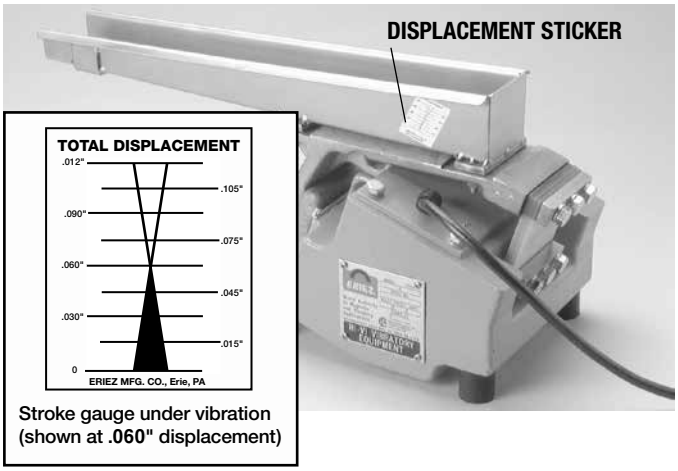

FIGURE 6

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 the 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.

Operation *(cont.)*

To serve as a guide to the stiffness of the tuning springs, each spring is marked with a code number. Example: 7-27. The first digit indicates the number of plies 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.

ADJUSTMENT FOR NON-STANDARD TRAYS

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

1. Attach the tray (see Tray Installation Procedure). Be sure that all bolts are tight.
2. Energize the unit at the nameplate voltage and frequency.
3. A. If a control box is used, turn the control slowly toward the full “ON” position and observe the unit in operation. If a control box is not used, turn the unit on and off quickly and note its performance during the “ON” period.

   B. If a hammering noise is heard, the tray displacement is excessive. To produce normal quiet operation at full voltage, increase the stiffness of the tuning spring stack by substituting a leaf or leaves with more plies for one or more of the tuning spring leaves, or by adding additional leaf or leaves, until approximately normal total displacement is obtained. Under normal operating conditions, the unit may be turned on or off without any momentary or prolonged striking noise.

   C. If the displacement at full voltage is considerably less than normal, decrease the tuning spring stiffness by substituting leaves with fewer plies.

When installing tuning springs, be sure that all spring clamping bolts are torqued to 10 ft-lbs. Additional springs may be purchased from Eriez Magnetics.

ADJUSTING OR TUNING FOR VARIOUS DENSITIES OF MATERIALS

The unit may be adjusted to provide optimum performance for a specific density of material in the same manner as described for non-standard trays. When a unit is adjusted, with the tray empty, to the normal total displacement for that unit (given above), it is set for optimum performance on a material having a density of 100 lbs/cu ft (1.6 g/cm^3). All standard units are so adjusted at the factory. For very light materials, optimum performance occurs with displacements above the normal value, but not to exceed .005" (.1 mm) above the normal value. For denser materials, optimum performance occurs with displacements below the normal value.

The basic characteristic of these units is such that the volume output is virtually constant for materials from 40 lbs/cu ft to 150 lbs/cu ft (.6 gm/cm^3 to 2.4 gm/cm^3) when units are equipped with standard trays. When nonstandard trays are used (particularly large trays), a tuning change is often necessary to provide optimum performance for a specific material. A tuning change may also be required to accommodate appreciable “dead” weight of material on the tray.

Repairs

COIL REPLACEMENT (PART 4)

The coil in a vibratory Feeder may require replacement due to operation at over-voltage, or normal “aging” of the unit. Re-assembly after a coil change will require checking and possible re-centering of the air gap between the E-Frame and the permanent magnet elements. In the Model 15A the air gap is directly accessible from the outside of the unit as described in the following.

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

1. Remove the bolts securing the lower end of the tuning spring and those securing the tray to the front section of the tiebar. Remove the tray, the rear section of the tiebar and the tuning springs in one piece. (See Figure 7).
2. Remove the bolts securing the electrical assembly plate to the body casting and lift the entire electrical assembly out of the body cavity. (See Figure 8).
3. Remove defective coil or E-Frame assembly and install new coil or E-Frame assembly (Order from Eriez parts list.)

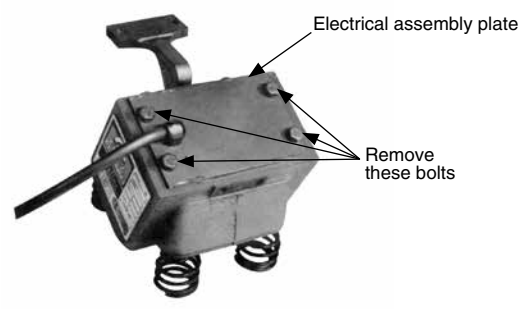

FIGURE 7

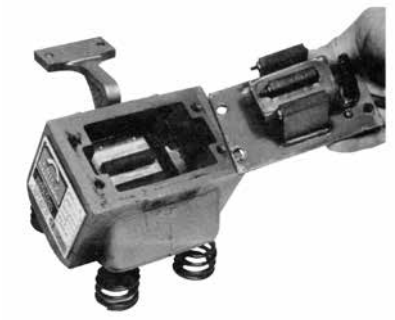

FIGURE 8

4. In replacing the electrical assembly, insert it into 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 magnet in the armature. To overcome this pull, it may be necessary to guide the plate with a screwdriver, meanwhile applying pressure to the top of the plate.
5. Start the electrical assembly plate bolts into the casting, but do not tighten completely.
6. A. Remove the cover nameplate from the left side of the body casting (see Figure 9).

FIGURE 9

B. Working through the gap access port in the side of the body casting, and using a non-magnetic feeler gauge approximately .056" (1.4 mm) thick (furnished with each unit), check the air gaps between the E-Frame legs and the armature pole pieces (See Figure 10). These gaps should be uniform in width and parallel and as nearly alike as possible. If they are not, they should be adjusted by shifting the electrical assembly plate.

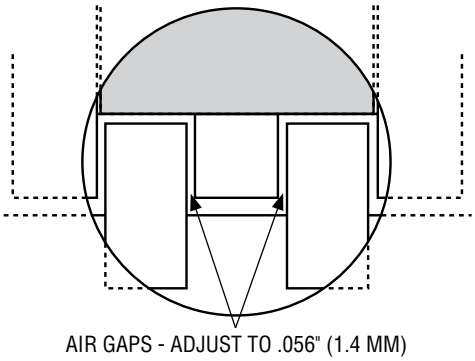

FIGURE 10

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

Repairs *(cont.)*

TRAY INSTALLATION PROCEDURE
USE OF THE ALIGNMENT PLATE

The alignment plate furnished should be used to insure proper alignment of the tray, tiebar and tuning springs whenever a new tray is installed, or an old one reinstalled after repair work. The following instructions should be followed:

1. Attach the rear section of the tiebar to the body casting, using the alignment plate in place of the tuning springs. This puts the two sections of the tiebar into proper dimensional relationship (See Figure 11).
2. Attach the tray and fasten the bolts securely (See Figure 12).

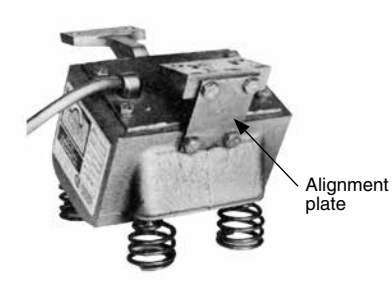

FIGURE 11

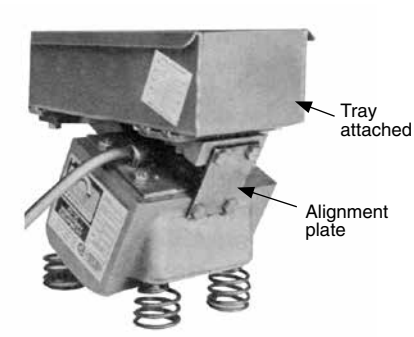

FIGURE 12

3. Remove the alignment plate and install tuning springs in the proper number and ply to give the desired displacement (See Figure 13). See tuning instructions.

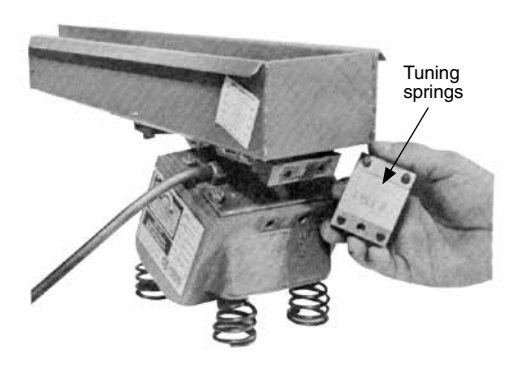

FIGURE 13

SPRING REPLACEMENT (PART 11)

Although the non-metallic springs used in the 15A Feeders 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, simply remove and replace one spring stack at a time with new springs of identical number and ply count. (See Figures 14 & 15).

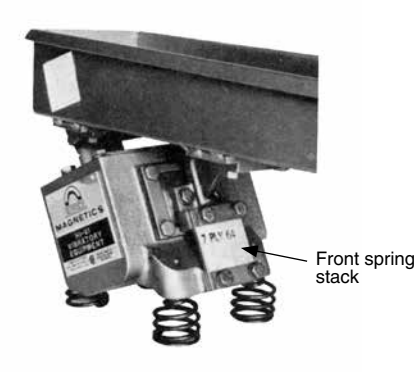

FIGURE 14

FIGURE 15

ARMATURE REPLACEMENT (PART 3)

The armature in a vibratory feeder may require replacement due to operation in a striking condition. If this becomes necessary, remove the tray as previously detailed under Coil Replacement. Remove electrical assembly. Remove the two hex head bolts fastening the armature to the front Tie Bar Section, through the front diaphragm. The armature can now be lifted up through the body casting (See Figure 16). Replace with new armature insuring that it is seated correctly in the diaphragm opening. (If the diaphragm is completely disassembled it must be replaced identically as removed, as the center opening is offset). Replace electrical assembly per coil replacement and tray per Tray Installation procedure. Recheck and adjust air gap if required.

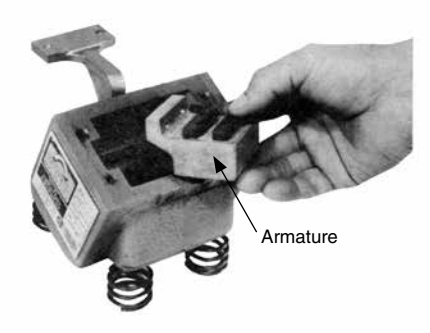

FIGURE 16

CAUTION NOTE: OPERATION FROM PORTABLE ENGINE-DRIVEN POWER PLANTS

Varying and unstable line frequency has an adverse 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 (+ or -1 cycle) can cause higher than normal spring stress, striking and high line currents which can cause drive and tray failure. 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.

Troubleshooting

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

Table 1
Service Chart

REFER TO TABLE 1. SERVICE CHART

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 Engineering.
2. **Tampering or Changing of Base or Tray**
   Extensions, covers, weights, screens or other modifications or attachments that may have affected performance. Disassembly or other modifications without either carefully following printed instructions or consulting Eriez Manufacturing Company.
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.
7. **Spring Failure**
   See maintenance instructions. Disassemble for examination. Tuning spring failure will also 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 increase displacement and output, use fewer or lesser ply tuning springs. To decrease displacement and eliminate striking, use more or greater ply tuning springs. (Note: Opposite on HS Feeder only.)
10. **Poor or Broken Weld on Tray or Crack 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 or Hz Variation**
    Check and install voltage regulator if necessary. Check and install Hz regulator.
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 Manufacturing Company.
19. **Product Variation**
    If product density, moisture content or other characteristics vary, customer should take own corrective measures.

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