VM-3415B

Installation, Operation and Maintenance Instructions

VIBRATORY FEEDER

MODEL - 115B

ERIEZ MAGNETICS HEADQUARTERS: 2200 ASBURY ROAD, ERIE, PA 16506–1402 U.S.A.
WORLD AUTHORITY IN SEPARATION TECHNOLOGIES

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 115B

Installation

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

Suspension Mounting
Suspend front and rear of Feeder from cables attached to the suspension bracket eyebolts. Such cables should be equal in strength to 3/4" diameter (20 mm) standard wire rope. In some applications, the suspension brackets can be omitted and the unit suspended by means of wire rope slings attached to the suspension bolts.

Refer to Eriez Vibratory Feeders Hopper Transition and Installation Guide (VM-3320) for additional information.

Safety cables are recommended for suspension mounted feeders.

⚠ 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.

NOTE: Do not suspend from eyebolts threaded horizontally into the tray or drive housing. Eyebolts loaded at right angles to their shanks may fail unexpectedly causing damage to equipment or personal injury.

Floor Mounting
(See Figure 1)

Mount front and rear of Feeder on the floor mounting accessories provided as an alternate to the suspension accessories. The front and rear mounting base (Part No. 27) should be bolted to the floor or other mounting surface, and the unit, with the floor mounting springs (Parts No. 24 & No. 25), simply placed on the bases. (No fastening necessary).

FIGURE 1

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 given in (A) and (B) above should be followed.

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

⚠ WARNING
Electrical voltages present in this equipment and associated controls can cause serious personal injury or death. All wiring should be installed by qualified electricians, and should conform to all applicable electrical codes. Do not defeat electrical safety features incorporated into the equipment or controls.

1. Check the specifications of the power line to be certain that they are the same as those shown on the nameplate.
2. Connect the black and white wires in the Feeder power cords to the power source or to the proper terminals in the control box. Note that the 115B has two coils and each has a powercord. These powercords are to be connected in parallel.
3. Connect the green wires to the ground or to the lug provided in the control box.
4. If using a control box, make all connections as indicated on the control wiring diagram.
5. Connect the ground lug in the control box to a good earth ground (a cold water line is excellent).
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.

YOU ARE NOW READY TO START YOUR VIBRATORY FEEDER.

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.)

Operation *(cont.)*

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. 7) 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. 5) at the back of the unit (see Figure 2). 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 .070" (1.8 mm) for the 115B. It is recommended that the displacement be limited to .070" (1.8 mm) for the 115B, with the machine fully warmed up. Greater displacement may result in noisy operation or striking and may, if continued, cause damage to components.

CAUTION: NEVER OPERATE THE UNIT IN A STRIKING CONDITION

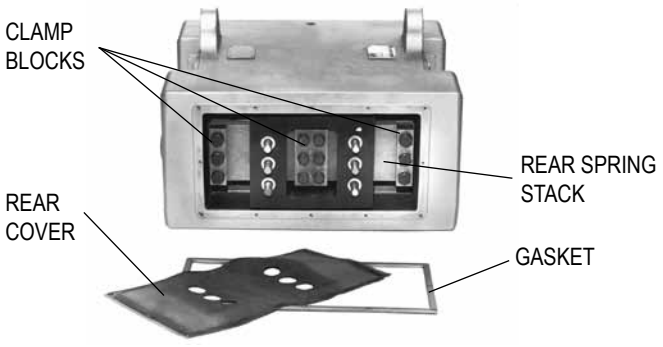


FIGURE 2

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 effect opposite of that noted in (1) or (2) above, 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.

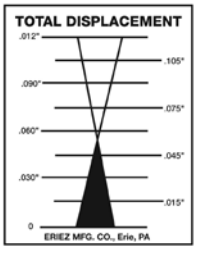
Example: To slightly decrease the deflection of a unit a 7/16" thick spring could be removed and replaced with two 5/16" thick springs. Or, to slightly increase the deflection of a unit with two 5/16" thick springs, one of these springs could be removed and replaced with a 7/16" thick spring.

These combinations must be determined by the existing springs on the rear spring stack.

Always tune with the tray empty and clean of any material buildup.

How To Measure Displacement

With the 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 (see Figure 3). Deflection sticker is placed at the rear of the tray at an angle that is in line with the drive unit.



Stroke gauge under vibration (shown at .055" displacement)

FIGURE 3

Adjustment For Non-Standard Trays

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

1. Attach the tray (PART NO. 11) and draw all bolts tight. Check air gap (see Items 10 and 11 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 striking or 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 spring of greater thickness for one or more of the rear springs, or by adding additional springs until the displacement is approximately .070" (1.8 mm). Additional springs may be purchased from Eriez Magnetics (see Parts List). 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 .070" (1.8 mm), decrease the spring stiffness by substituting springs of lesser thickness. If the displacement is much more than .070" (1.8 mm), increase the spring stiffness by substituting springs of greater thickness.

In changing tuning springs, put the clamp blocks (Part No. 8 & 9) back on the same way they came off (see Figure 3) to insure smooth clamping surfaces against the spring. All clamping bolts (Part No. 19) should 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). If "bottoming" of bolts should occur, washers of sufficient thickness to prevent such ‘'bottoming" should be used under the bolt heads.

IMPORTANT NOTE: SPRING BOLT TORQUE

When tightening Spring Bolts: The 7/8" - 9 bolts on the 115B should be tightened to a torque of 400 ft lbs. The 1" - 8 bolts should be tightened to a torque of 500 ft lbs. The tapped threads in the castings should be cleaned and lightly coated with a good molybdenum disulfide anti-seize compound (such as "Molykote" by Alpha-Molykote Corp.) to insure proper clamping pressure.

When attaching the drive unit to the tray, the 1" -8 nut should be torqued to 500 ft lbs because of space restrictions. A special adapter is needed for the torque wrench in this area. Snap-On Tool supplies the adapter and the part numbers are 41XH152B (1-5/8"), XH524 (3/4") and 13B.

KEEP COMPOUND AWAY FROM SPRING CLAMPING SURFACES.

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 units are adjusted with the tray empty to a displacement of .070" (1.8 mm) (all standard tray units are so adjusted at factory), they are set for optimum performance on a material with a density up to 100 lb/cu ft (1.6 gm/cc). For denser materials optimum performance may occur with displacement less than .070" (1.8 mm).

The characteristics of these units are such that the volume output is virtually constant for materials from 40 lb/cu ft (.65 gm/cc) to 125 lb/cu ft (2.0 gm/cc) when units are equipped with standard trays. When non-standard trays are used (particularly large trays), a tuning change may be necessary to provide optimum performance for a specific material.

Repairs

Coil or Armature Replacement

The electrical assemblies (Part No. 4) in a vibratory feeder may require replacement due to operation at overvoltage, or normal aging of the unit. Reassembly 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 4 and 5):

1. Remove the bolts securing the electrical assembly plate to the sides of body casting.
2. Back off the adjusting screws that position the electrical assembly plate.
3. Lift the electrical assembly out through the side of the body casting (see Figure 5).
4. (a) Replace defective electrical assemblies (order from Eriez Parts List), or
   (b) Remove and replace defective armatures.
5. In replacing the electrical assembly, insert it into its original position in the body casting. DO NOT FORCE THE ASSEMBLY INTO PLACE. When properly aligned, the assembly will go in easily, 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 inward pressure to the top of the plate.
6. Start the electrical assembly plate bolts into the body casting, but do not tighten completely.
7. Feed electrical assembly lead wires back through conduit.
8. Tighten the adjusting screws that position the electrical assembly plate, then back off 1/2 turn.
9. Remove the nameplate from the top of the body casting to gain access to airgap (see Figure 6).

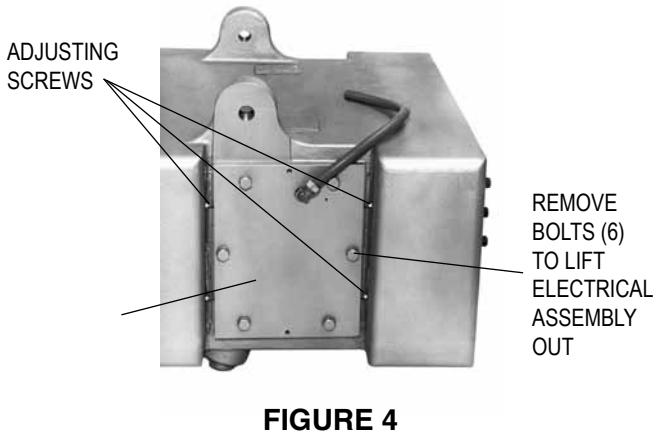


FIGURE 4

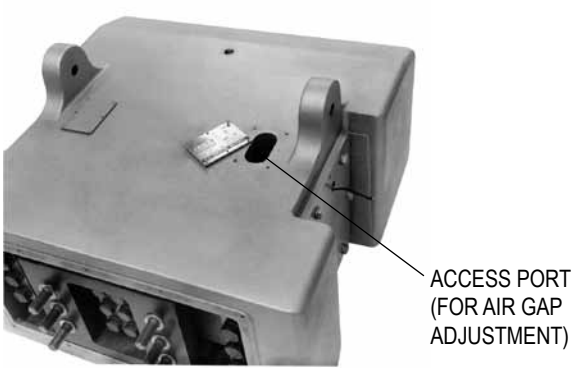


FIGURE 6

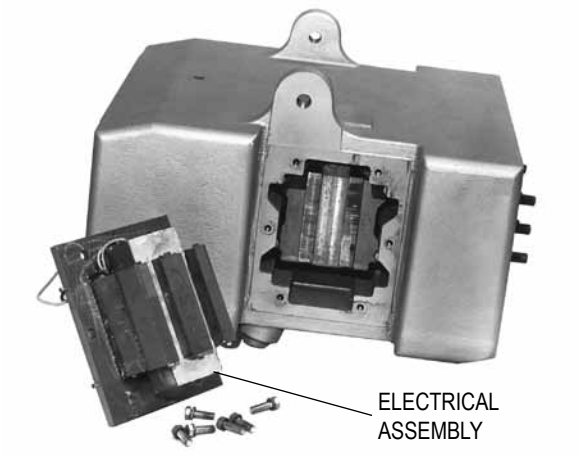


FIGURE 5

10. Work through the port in the top of the body casting (see Figure 6) and using a non-magnetic feeler gauge approximately .072" (1.8 mm) thick (furnished with each unit), check the air gaps between the E-Frame legs and the armature pole pieces (see Figure 7). 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 with the front or rear adjustment screws. In checking the gaps, the internal parts will be easier to see if the rear cover and the opposite port covers are removed.

11. Tighten the electrical assembly plate bolts and replace the covers.

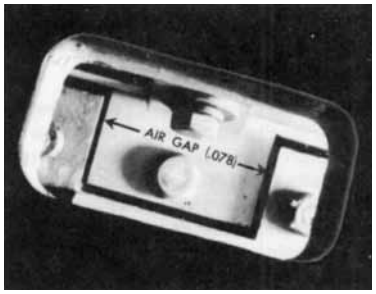


FIGURE 7

Spring Change or Replacement

Although the 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, and (3) greatly increased and perhaps uncontrollable displacement (4) Increased amperage over nameplate rating. If spring failure is suspected, the front and rear spring stacks should be removed, checked, and replaced one stack at a time. Replace broken or cracked springs with springs of equal thickness.

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 flexible diaphragm and the tray, after which the springs can be removed, one leaf at a time, through the spring ports (see Figure 8). Before either spring stack is removed the piston casting at that end of the unit should be blocked up (see Figure 9) to hold its position relative to the body casting, and the blocks left in place until the spring stack is replaced.

When assembling and installing spring stacks, keep the metal spacer and the clamping surfaces absolutely dry and free from grease, oil or any other material which may act as a lubricant. (Such lubrication 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.

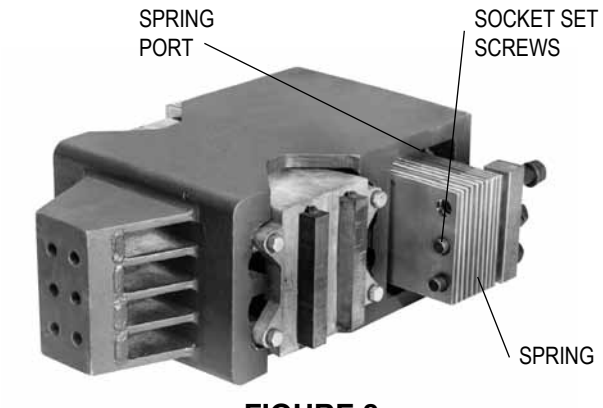


FIGURE 8

To hold the front springs and spacers in alignment while installing the springs through the side port it is recommended that 7/8"—9 x 4" and 1"—8 x 4" long socket set screws (or slotted head) be used as shown in Figure 9. After all springs and spacers are in place the clamp blocks can be installed over the studs. These set screws can be removed after fasteners are inserted in the remaining holes.

To hold the rear springs and spacers in alignment use 7/8"—9 and 1"—8 socket set screws or approximately 6" long studs, using the same installation procedure as for the front springs. Tighten all spring bolts to the specified bolt torque as shown in the bolt torque chart.

NOTE: Operation from portable engine driven power plants

Varying and unstable line frequency has a adverse effect on vibratory feeders because they are tuned mechanical devices, designed around either 50 or 60 Hz operating frequency. Shifts in the operating point due to changes in frequency causes 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 electromagnetic feeder.

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

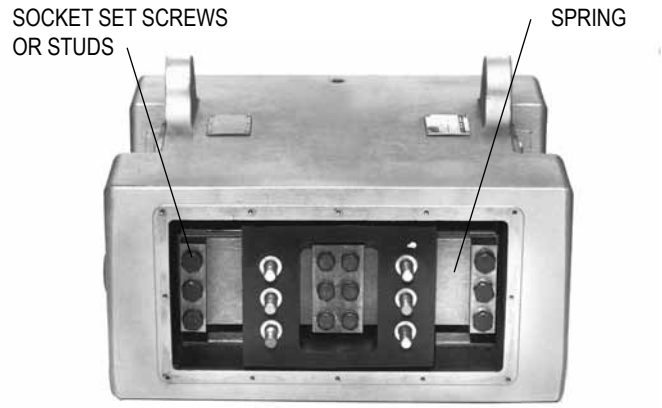


FIGURE 9

Preventive Maintenance

1. Check suspension and keep feeder clear of hopper and all other objects.
2. Check for buildup in tray.
3. Check amplitude.
4. Check current (loaded). Should be within name plate rating.
5. Check liners for wear and loose bolts. If liner is replaced, use same thickness liner.

Troubleshooting

1. **If feeder will not run at all:**
   a. Check fuses.
   b. Check input voltage.
   c. Check output voltage and current (amps).
   d. If voltage is going to feeder coil, check coil for open or ground.

2. **If feeder is slow in output:**
   a. Check current on feeder at 100% voltage with the tray empty. If current is higher than nameplate reading, check for broken tuning springs.
   b. Check for cracks in the tray.
   c. Check for broken tray mounting studs.
   d. Check for broken piston casting, or broken armature bolts.

2. **If feeder is noisy or striking in gap:**
   a. Check for broken suspension hangers or tray rubbing hopper or anything else.
   b. If striking, check if air gap is ok then check current at 100% voltage with the tray empty. If current is higher than name plate reading, check for broken turning springs.

Storage of Equipment

Prior to storage, equipment should be carefully inspected for shipping damage. Should damage have occurred, immediately contact freight carrier and Eriez Manufacturing. Equipment should remain in its original shipping crate or packaging and be placed in a clean, dry area.

For electronic controllers, in addition to the above, a rust inhibitor should be placed inside the control enclosure. Desiccant must be removed from control enclosure prior to wiring control. Controls should not be stored in temperatures above 110°F (43°C).

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