VM-3382G

Installation, Operation and Maintenance Instructions

VIBRATORY FEEDER

MODELS - 85B, 98B & 105B

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 - MODELS 85B, 98B, 105B

Installation

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

Suspension Mounting (Fig. 1)
Suspend front and rear of feeder from cables or rods attached to the suspension bracket eyebolts. Such cables or rods should be equal in strength to 1/2" diameter (13 mm) dia. standard wire rope.

Refer to Eriez Vibratory Feeders Hopper Transition and Installation Guide (VM-3320R) 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 (Fig. 2)
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. 28)** should be bolted to the floor or other mounting surface, and the unit, with the floor mounting springs **(Parts No. 25 & No. 26)**, simply placed on the bases. (No fastening necessary).

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.

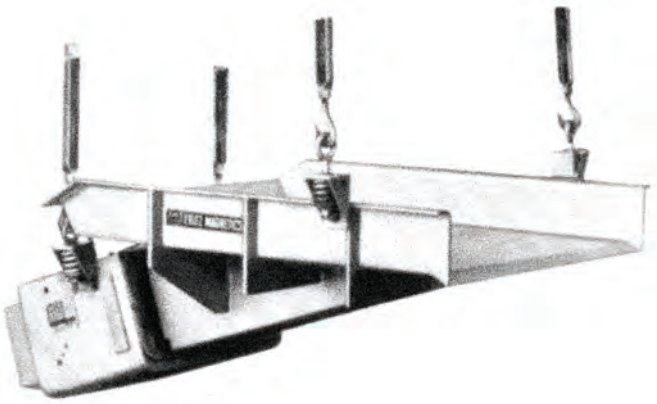

FIGURE 1

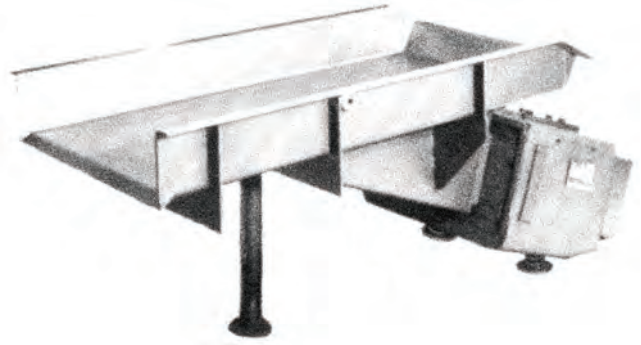

FIGURE 2

Electrical Connections (Fig. 3)

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 white wires in the feeder power cord to the terminal in the control box marked "Output".
3. Connect the green wire (ground) or 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). 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. 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.

YOU ARE NOW READY TO START YOUR VIBRATORY FEEDER.

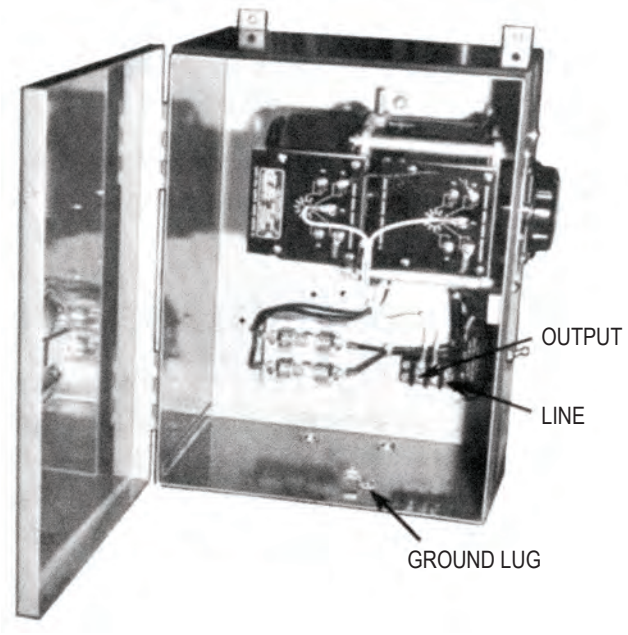

FIGURE 3

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. **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.

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 Eriez 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) (640 kg/m^3) or high (over 125 lb/cu ft) (2000 kg/m^3) 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 back 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 Fig. 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 .060" (1.5 mm) for the 85B, and .065" (1.65 mm) for the 98B and 105B. **It is recommended that the displacement be limited to .065" (1.65 mm) for the 85B, and .070" (1.80 mm) for the 98B and 105B with the machine fully warmed up.** Greater displacement may result in noisy operation or striking and may, if continued, cause damage to components.

NEVER OPERATE THE UNIT IN A STRIKING CONDITION!

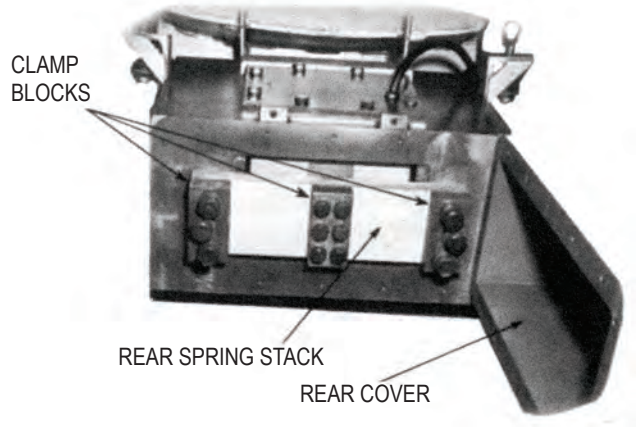

FIGURE 4

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.

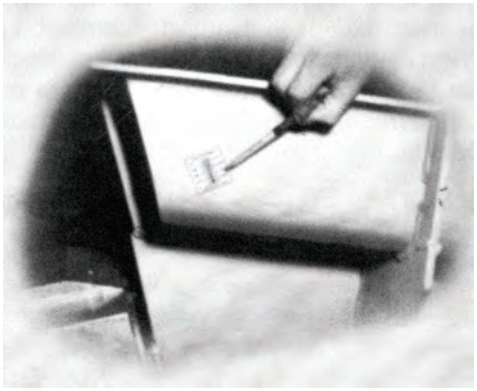

FIGURE 5

Adjustment (Tuning) 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 1/4" (6.3 mm) thick spring could be removed and replaced with two 3/16" (4.8 mm) thick springs. Or, to slightly decrease the deflection of a unit with two 1/4" (6.3 mm) thick springs could be removed and replaced with a 5/16" (7.9 mm) thick spring.

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

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 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 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 .060" (1.5 mm) .065" (1.65 mm) for 98B and 105B. Additional springs may be purchased from Eriez Magnetics (See Parts List **Part No. 7**). 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 .060" (1.5 mm) .065" (1.65 mm) for 98B and 105B, decrease the stiffness by substituting springs of lesser thickness. If the displacement is much more than .060" (1.5 mm) .065" (1.65 mm) for the 105B, increase the spring stiffness by substituting springs of greater thickness.

In changing tuning springs, put the clamp blocks **(Part No. 8)** back on the same way they came off (See Fig. 4) to insure smooth clamping surfaces against the spring. All clamping bolts **(Part No. 20)** 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). If "bottoming" of bolts should occur, washers of sufficient thickness to prevent such ''bottoming" should be used under the bolt heads.

SPRING BOLT TORQUE

When tightening Spring Bolts:

The 3/4" - 10 Bolts on the 85B should be tightened to a torque of 300 lb.-ft. (4.0 Nm). The 1" - 8 Bolts on the 98B and 105B should be tightened to a torque of 500 lb.-ft. (678 Nm). The tapped threads in the castings should be cleaned and lightly coated with a good molybdenum disulfide anti-seize compound to insure proper clamping pressure.

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 .060" (1.5 mm) .065" (1.65mm) for the 98B and 105B (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 (1600 kg/m^3). For lighter materials, optimum performance occurs with displacement above this value (up to .065" (1.65mm)). For denser materials optimum performance occurs with displacement less than .060" (1.5 mm) .065" (1.65mm) for the 98B and 105B.

The characteristics of these units are such that the volume output is virtually constant for materials from 40 lb. cu ft (640 kg/m^3) to 125 lb/cu ft (2000 kg/m^3) 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.

Repairs

Coil or Armature Replacement

The electrical assembly **(Part No. 4)** in a vibratory feeder may require replacement due to operation at overvoltage, 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 Fig. 6 and 7):

1. Remove the bolts securing the electrical assembly plate to the body casting.
2. Back off the adjusting screws that position the electrical assembly plate.
3. Lift the electrical assembly from the body casting, using a sling passed thru eye bolts threaded into the electrical assembly plate. (See Fig. 7).
4. (a) Replace defective electrical assembly (order from Eriez Parts List), or
   (b) Remove and replace defective armature.
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. Tighten the adjusting screws that position the electrical assembly plate.
8. Remove the nameplate from the side of the body casting to gain access to gain access to airgap. (See Fig. 8).

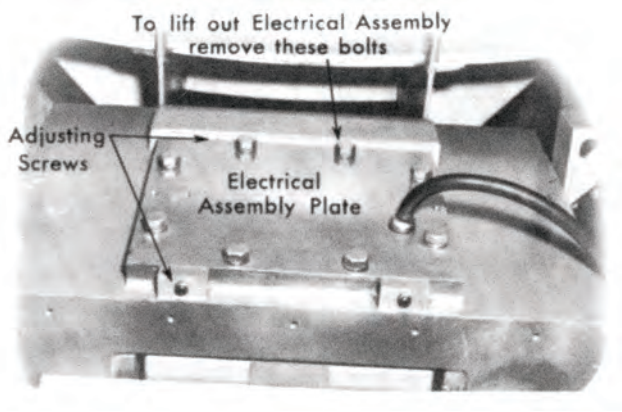

FIGURE 6

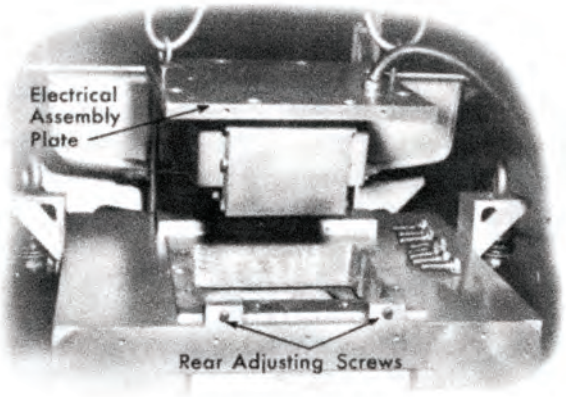

FIGURE 7

FIGURE 8

9. Work through the port in the side of the body casting (Fig. 8) 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. 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.

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

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.** 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 Fig. 9). Before either spring stack is removed the piston casting at that end of the unit should be blocked up (Fig. 10) 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.

To hold the front springs and spacers in alignment while installing the springs through the side port it is recommended that 3/4 — 10 x 3" long socket set screws (or slotted head) be used on the 85B (1 — 8 x 3" long for 98B and 105B) 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.

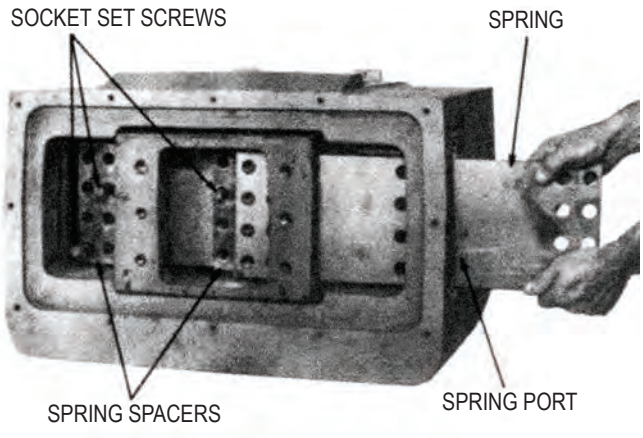

FIGURE 9

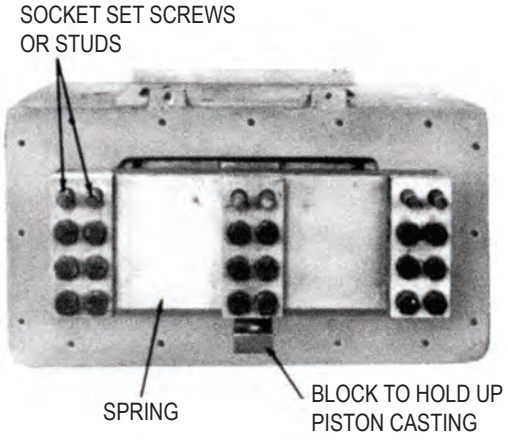

FIGURE 10

To hold the rear springs and spacers in alignment either the 3/4" — 10 x 3" socket set screws or approximately 6" long studs are recommended for the 85B (1 — 8 x 6" long for 98B and 105B), 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.

CAUTION NOTE:

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 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.

Storage of Equipment

Prior to storage, equipment should be carefully inspected for shipping damage. Should damage have occurred, immediately contact freight carrier and Eriez Magnetics. 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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