Installation, Operation and Maintenance

6C
VIBRATORY FEEDERS

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Introduction

This manual describes Eriez' 6C Drive vibrating feeders. These modern feeders are engineered and manufactured to provide reliable, low cost movement of a wide variety of materials on wide, short trays.

Operating and maintenance requirements may differ from the requirements for other feeders you have used. To assure optimum operation of your Inertial Drive feeder, please read this manual carefully and completely, before installing the equipment.

Contents

INSTALLATION

SHIPPING DAMAGE

Eriez carefully packs all equipment for shipment from the factory. When you receive your feeder, examine it carefully. If you find damage, report it immediately to the carrier and to Eriez Magnetics.

HANDLING

The equipment is of rugged design and construction. However, because proper balance and alignment are necessary for proper operation, it is important to handle the equipment carefully. Avoid twisting or bending the feeder pan. Use any lift lugs provided; typically, these will be in the form of brackets attached to the pan bracing. For floor-mounted units that may not incorporate lift lugs, lift only with slings. Use a spreader bar over the pan to prevent your chain or cable from bending the pan while lifting.

INSTALLATION

MOUNTING

O6C mounted on a flat, stable surface in one of the two ways:

POSITIONED AND FASTENED

Fasten the unit to the desired surface with bolts or screws of the proper size through the standard rubber isolators on the base. Use flat washers under the bolt heads.

POSITIONED BUT NOT FASTENED

Install headlines stud pins of proper size into the rubber isolators. Set the base (with the standard rubber isolators) into holes in a base plate.

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 unit is 3 pound (1.36 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 should be as close as possible to the drive unit's drive line (see Figure 1).

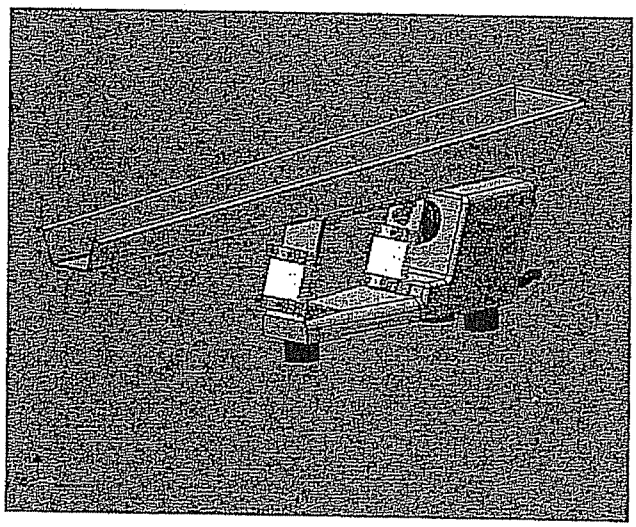

FIGURE 1

ELECTRICAL CONNECTIONS

NOTE: The Eriez Vibratory Feeder is designed to be operated from an AC source. It cannot be operated from a DC source. All wiring should conform to all application electrical codes.

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 cord to the power source or to the terminals in the control box marked "Output".
3. Connect the ground lug in the lug provided in the control box.
4. Connect the power line to the terminals in the control box marked " Line".
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. The black wires from each power cord should be connected together.

YOU ARE NOW READY TO START YOUR VIBRATORY FEEDER.

OPERATION

PRINCIPLE OF OPERATION

Do not operate the unit with associated equipment touching any part of the unit.

To start the feeder after all connections have been made, apply power to the line connected to the feeder. If a controller is used, operate the switch on the controller and adjust the output voltage to maximum by rotating the control knob to the full clockwise position. Usually (at ordinary room temperatures) the unit will take about two minutes to reach full steady state displacement.

After full steady-state displacement has been attained, use the controller to adjust the unit to the desired rate.

No routine maintenance or lubrication is required except that any accumulation of foreign matter should be periodically removed from between the tray-tie-bar assembly and the body, and from between the body and the mounting surface, to prevent restriction of movement of the vibratory elements.

CONTROL

The 06C feeder is best suited for essentially continuous steady-state operation. Simple variable transformer controls can be used to regulate performance by varying applied voltage. Variable frequency controls are *not* appropriate because the drive is internally tuned to operate at essentially line frequency (50 or 60Hz).

INITIAL OPERATION

When all connections have been made, apply power to the line connected to the feeder. If a controller is used, operate the switch on the controller and adjust the output voltage to maximum by rotating the control knob to the full clockwise position. At ordinary room temperature it may take up to two minutes for the feeder initially to reach full steady-state displacement. After full steady state displacement has been reached, use the controller to adjust the feeder to the desired feed rate. Measure the deflection of the feeder tray upon initial operation of the unit (see procedure under 'Deflection', below). Unless the feeder was specified otherwise, with normal material flow, at maximum voltage the deflection should be close to .060" (1.1mm) for the 6C6. Record this reading for future reference here. If the deflection differs significantly from the expected value, contact Eriez.

Machine serial number: _____

Feeder tray deflection normal load: _____

Date: _____

DEFLECTION

06C drive is normally set at approximately. 0.055 (1.1mm) tray deflection under expected normal operating conditions. This can be checked with an Eriez deflection (displacement) sticker. Attach the sticker to a side-plate of the feeder pan. The vertical centerline of the sticker should be approximately perpendicular to the expected tray motion. Read the sticker while the feeder is operating at full voltage and normal load by observing the optical illusion in which the legs of the printed "V" appear to merge. The printed tray displacement will be next to the point of the 'merged V'. This Blurred Image shows how the sticker would look for a deflection of approximately 0.045"

Notes:

1. Obtain the actual Displacement Sticker from Eriez.
2. Deflection will change under extreme head-load. Measured only under normal operating conditions.

SPECIAL PANS AND ATTACHMENTS

Consult Eriez before undertaking the design or fabrication of special pans or attachments for this equipment. Such modifications may adversely affect the performance of the feeder, and may impose abnormal structural loads on the existing components, causing premature failure. Modifications or attachments that have not been pre-approved by Eriez will void the equipment warranty.

CAUTION: Operation from portable engine driven power plants.

Varying and unstable line frequency has an adverse effect on vibratory feeder 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 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 plant is shut down.

MAINTENANCE

TUNING GUIDE

The 6C Drive feeder is factory-tuned. The deflection is intended to be user-adjustable only under special circumstances. The tuning adjustments are provided solely for tuning the drive mechanically to the desired vibratory displacement at full voltage.

Tunis is accomplished by changing the stiffness of the tuning spring stacks of the feeder (see Figure 2). Variations in stiffness are obtained by changing the number of springs in the stacks and/or by changing the thickness of the individual fiberglass springs.

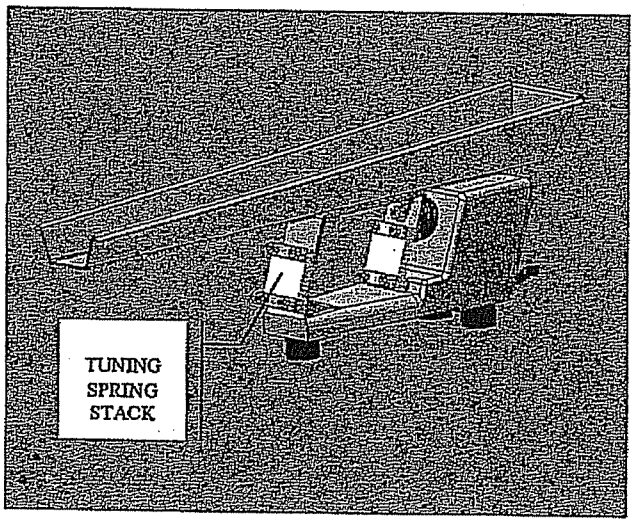

Figure 2

The following general rules apply to a feeder operating on the "normal side" of its "tuning curve". Keep them in mind when attempting tuning adjustments:

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

If a change in tuning spring stiffness has an effect opposite to that expected, it means that the spring stiffness is not great enough, and the feeder is operating on the "opposite side" of its tuning curve. In such a situation, increase the spring stiffness until further increases result in a decrease in tray displacement, in accordance with the above two rules. You will then be able to tune the feeder properly to the desired displacement.

Each tuning spring is marked with a code number, for example: 3. The first number (3) is the number of fiberglass plies in the spring. The higher this number the stiffer the spring.

The total stiffness of the spring stack is the sum of the relative stiffness numbers. Practically any desired total stiffness can be obtained by combining springs with different ply and stiffness numbers.

'Striking' is a vibratory drive behavior characterized by a hammering noise. It may occur during warm-up or when the drive is turned off and on quickly. This noise indicates that the drive is tuned for an excessive displacement, and the tuning should be adjusted until normal behavior is obtained. A small amount of striking is allowable during tuning, but must not be allowed during normal operation because it can result in damage to the feeder drive.

TUNING ADJUSTMENT AND SPRING REPLACEMENT

Although the non-metallic springs used in the Inertial Drive feeder 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 feeder.
2. Greatly reduced displacement.
3. Low product output.

The procedure for spring inspection and replacement is essentially the same as that for re-tuning the unit. Refer to the Parts List illustration and to Figure 5.

1. Carefully inspect the two tuning spring stacks for signs of delamination or breakage, especially in the area near the spring shims. A failed spring will typically exhibit discoloration or a patchy whitish appearance, and the surface may be burred or otherwise irregular. A spring with these symptoms should be replaced.
2. *Before removing any of the fasteners on the spring stacks*, insert the two gap spacers (supplied with the feeder) between the center leg of the E-frame and the two pole pieces (Figure 5). The purpose of these spacers is to hold the tray and weight assemblies in the correct relation to each other when the springs are removed. For added support and security you may find it advisable to shim under the weight, but be sure the gap spacers remain in place if you do this.
3. To minimize the chance of accidentally changing the gap setting, remove the bolts from one spring stack at a time to replace a failed spring or to adjust tuning. However, remember that *spring*

changes or replacements must be made in pairs; any change made to one stack must be duplicated in the other stack.

4. If springs have failed, replace them with springs of the same rating.
5. If the tuning needs to be adjusted, note the ratings stamped on the existing springs. Following the tuning guidelines given above, plan an incremental strategy of increasing or decreasing stiffness. Make small changes, reassemble the unit, and check operation. Always match a change in one spring stack with the same change in the other stack.
6. After replacing springs in both stacks and properly tightening the spring bolts, remove the gap spacers and verify that the gap has not changed. If it has, loosen the electrical assembly bolts slightly and position the E-frame center leg between the two pole pieces of the armature. Insert the gap spacers, and adjust the electrical assembly position until both spacers move freely in the gaps. Tighten the electrical assembly bolts and remove the gap spacers.

TUNING BY PLUNGER ADJUSTMENT

1. With the tray mounted, loosen or remove the hex nut at the back of the unit.
2. Insert a screwdriver into the slot of the plunger (Figure 3) and turn it clockwise until the plunger hits the armature.
3. Back out the plunger by turning it counterclockwise three full turns.
4. Replace and tighten the hex nut.
5. Check the deflection.

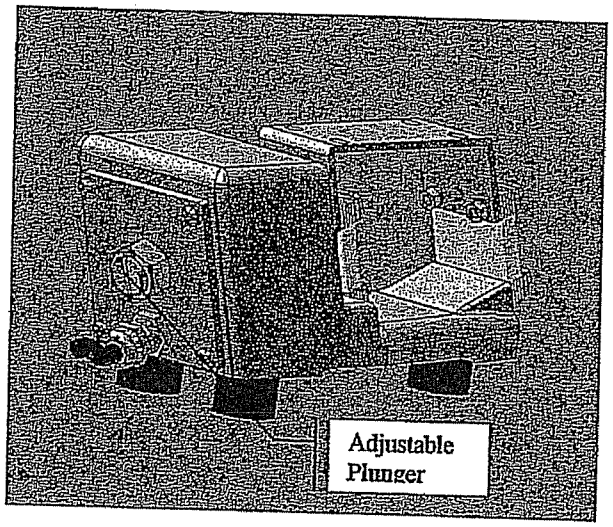

Figure 3

TUNING FOR NON-STANDARD TRAYS

If it is necessary to tune the unit to an off-size or non-standard tray, follow this procedure:

1. Attach the tray, making sure that all lockwashers are in place and the fasteners tight.
2. Energize the unit at the nameplate voltage and frequency.
3. (a) During tuning if a hammering of striking noise occurs when the unit is turned off and on quickly, the displacement is well in excess of normal. Whether striking or not, if the displacement exceeds the normal range for that particular size of tray, it must be reduced by substituting a tuning spring leaf of leaves of displacement and feed rate.

   (b) During tuning if the displacement at full voltage is below the nominal range for that particular size tray, and greater displacement is desired, increase the tuning spring stiffness by substituting leaves of greater stiffness or adding more leaves.

TUNING FOR DIFFERENT CONDITIONS OF TRAY LOADING

Units with Eriez- built trays are factory tuned for normal displacement .055" with light loading (light head load, light materials, limited depth of flow of heavier materials). Ordinarily this tuning will not need to be changed. In no case, however, should the unit be permitted to deflect more than .120" without load.

Caution: A small amount of striking during tuning is permissible, but must not be allowed during regular operation since damage to the feeder can result.

Lubrication

No lubrication of the feeder mechanism is needed or recommended.

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