VM-3660C

Installation, Operation and Maintenance Instructions

BRUTE FORCE FEEDER

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 INSPECTION APPLICATIONS

Introduction

This manual describes Eriez' Brute Force vibrating feeders.

The easy-to-clean, all metal pans provide low cost movement of a wide variety of materials. The pans can be supplied open or enclosed, with liners or screens, and with a variety of inlets and outlets.

A careful reading of these Installation, Operation and Maintenance Instructions will assure the most efficient and dependable performance of this equipment.

Please include the model and serial number found on the nameplate with any correspondence concerning your feeder.

CAUTION

Safety labels must be affixed to this product. Should the safety label(s) be damaged, dislodged or removed, contact Eriez for replacement.

Table of Contents

Brute Force Feeder

Installation

Damage in shipment

When you receive your feeder, examine it carefully for damage. If damage is found, report it immediately to Eriez Magnetics and the carrier.

Handling

It is important to handle this equipment carefully to avoid twisting or bending the pans. If lift lugs are provided, they must be used; otherwise, lift with slings.

A spreader board over the pan should be used to prevent your chain or cable from bending the pan while lifting.

Installation

Feeders are usually suspended from hooks on the pan with steel or rubber isolation springs. Base mounting is also available.

The isolation assemblies should be welded to suitable overhead structure or hopper (Fig. 1). wire rope and/or turbuckles may be used for greater suspension heights. For proper operation, all suspension points should have nearly equal tension.

When base mounting is used, attach the spring pads provided to floor or framework. Be sure that there is adequate clearance between any solid object and the pan or base.

For proper isolation at operating speed the static spring deflection should be 1/2" to 1" (12 to 25mm). This means that the feeder will pass briefly through a resonant mode with large deflections each time it is started and stopped. You may have to allow up to 2" (50mm) of clearance to prevent striking solid objects during this mode. Repeated impact with solid, stationary objects is almost certain to damage the feeder tray or drive motors, eventually.

Feeders are usually suspended with a downslope of up to 10 degrees. At this downslope, the Model BF feeders can attain velocities of up to 100 feet per minute, depending upon material characteristics.

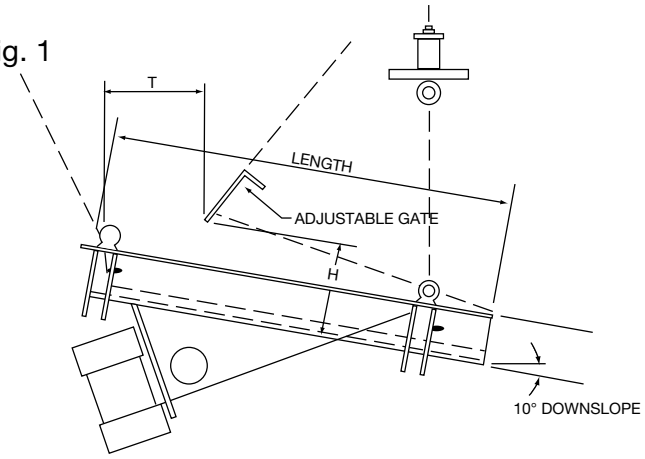
Hopper Design and Feeder Capacity

For vibratory feeders to perform at maximum capacities, it is important to have bins and hoppers designed to provide good material flow patterns. This is best achieved with the following guidelines.

The hopper throat opening T (see Fig. 1) should be a minimum of 2.5 times the largest particle size for random-sized material. For applicatioins with near-sized materials, T should be 5 times the particle size.

Best flow patterns result when the gate height H is at least twice the throat dimension T as shown in Fig. 2. Values of H equal to T are acceptable, but when H becomes less than T, material flow patterns are not uniform and usually result in dead zones where little or no flow occurs as shown in Fig. 3.

Fig. 1



T = HOPPER THROAT OPENING
H = GATE HEIGHT OPENING
d = MATERIAL DEPTH OF FLOW

The capacity of a vibratory feeder is given by:

$$Q = \frac{1}{4800} W \times d \times D \times v$$

where Q = capacity in tons per hour
W = tray width in inches
d = material depth in inches
D = density in poounds per cubic foot
V = material flow velocity in feet per minute

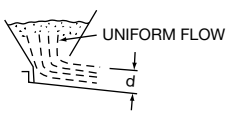


Fig. 2

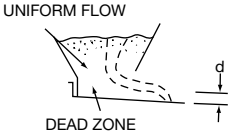


Fig. 3

Along with the hopper design, flow velocity v is dependent on material characteristics such as particle size, size distribution and moisture content.

Installation (cont.)

Wiring

Wiring to the motors should enter from a flexible conduit. Use of a motor starter and circuit protection in recommended. Wiring must be properly sized to prevent line voltage drop.

Motors commonly supplied are 1200 rpm, dual voltage polyphase. Connect wiring according to the manufacturer's instructions, usually located on the nameplate or in the conduit box cover.

Motors must be wired so that they rotate in opposite directions, see principle of operation on next page.

When controller is supplied, connect according to instructions enclose with this equipment.

Special Troughs and Attachments

Eriez Engineering Service Departments should always be consulted before undertaking the design or construction of special troughs. The troughs furnished by Eriez **should not** be modified or attachments added without first consulting Eriez.

Weight adjustment inscribed on fixed cast weight

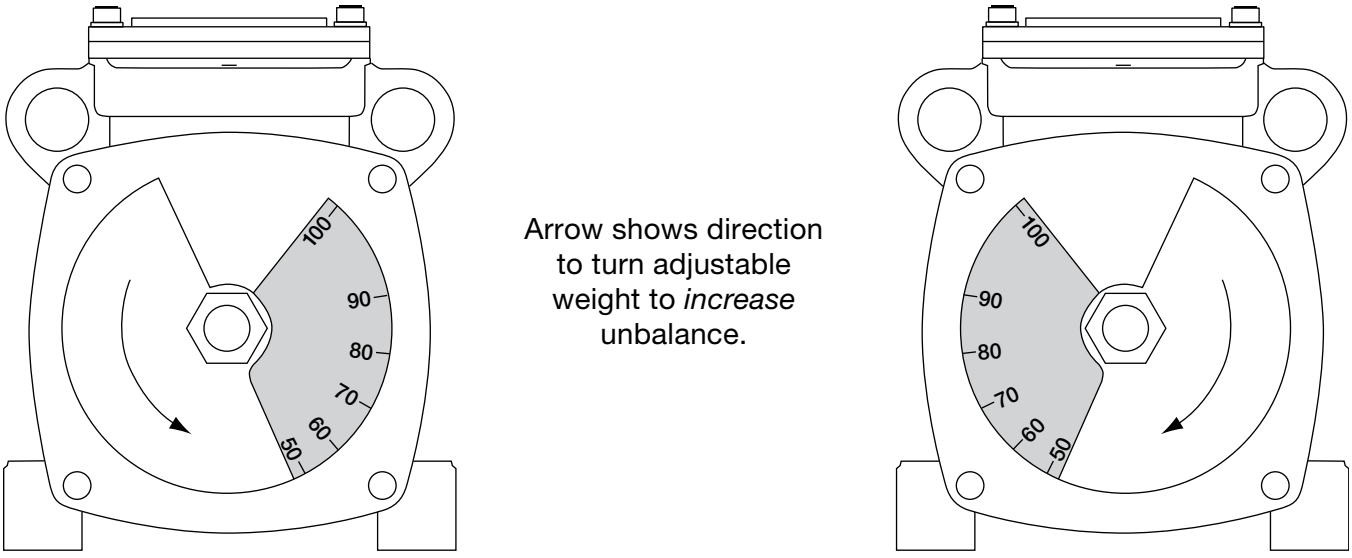


Figure X. Adjustable Weights Set at 50% (fixed weight shaded)

Operation

Principle of Operation

Feeder tray motion is provided by eccentric weights mounted on synchronized, counter-rotating, twin motors. The motors are in balance with one another to eliminate the isolation problems associated with single eccentric drive systems. Feed rate can be varied by adjusting the weights. the twin motor drives operate on standard AC power.

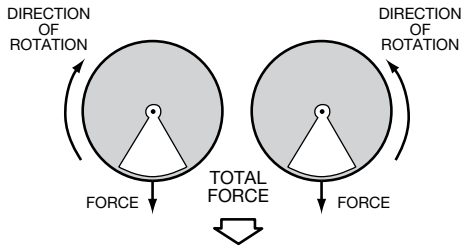


Fig. 1

Both eccentrics in down position.
Resultant force is downward.

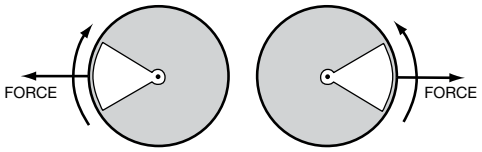


Fig. 2

Both eccentrics outward and opposed, 180° apart.
Resultant force is zero due to cancellation effect.

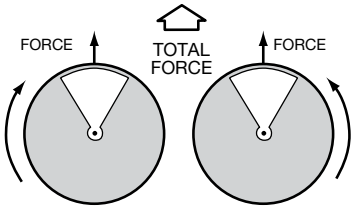


Fig. 3

Both eccentrics in up position.
Resultant force is upward.

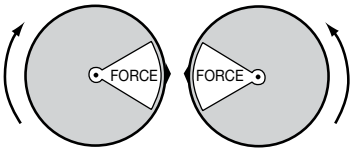
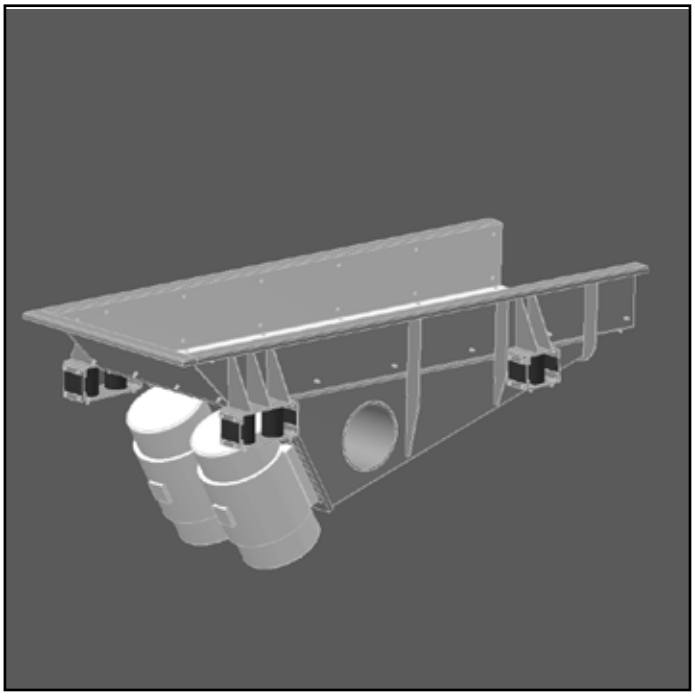


Fig. 4

Both eccentrics inward and opposed, 180° apart.
Resultant force is zero due to cancellation effect.

Rotation direction is not critical providing rotation is in the opposite direction.

Dust-tight construction and splash-proof design make the motors suitable for dusty, dirty environments, as well as outdoors in rain or snow. heavy-duty construction and long-life bearings ensure peak, long-term performance.

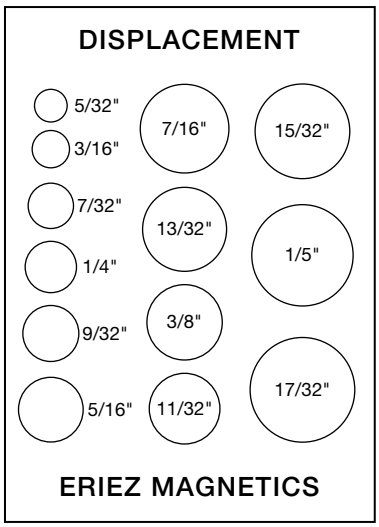


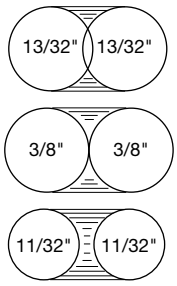
Deflection

Eriez mechanical conveyors and feeders are normally set at approximately 1/2 inch pan deflection. This can be checked with an Eriez deflection sticker. The sticker is read while the equipment is operating by looking at the optical illustion in which the printed circles appear as double. Read the deflection where a pair of circles just touch together. A deflection sticker is shown actual size in Fig. 4.

Note: Deflection will decrease under headload. It should be read under normal operating conditions to determine output.

Operation (cont.)





This is how the circles would look if the pan deflection is 3/8".

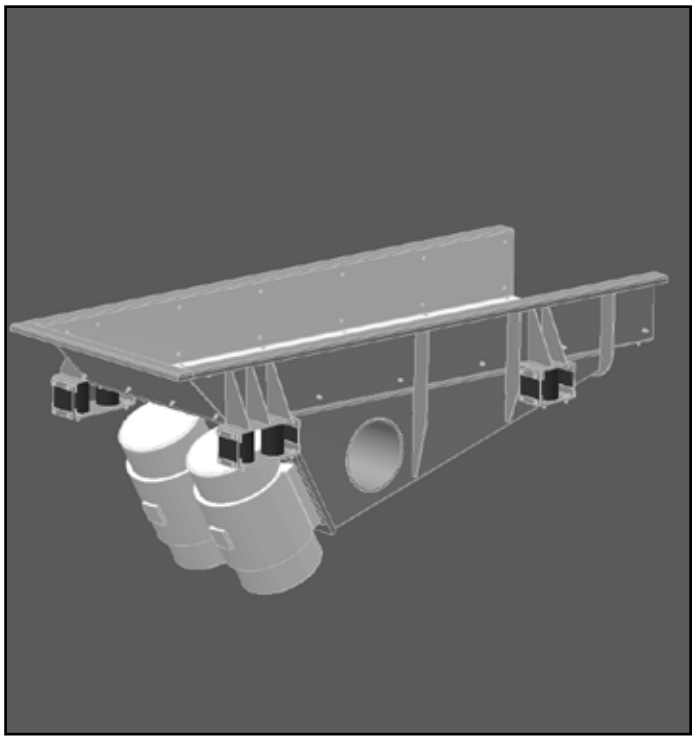
Adjustment of force output

To decrease the centrifugal force output, a quick and easy adjustment can be made to the eccentric weight position, at each of the motors.

1. Disconnect all power to the unit.
2. Remove both end covers, exposing the eccentric weights. Each end of the shaft has a percentage calibration from zero to 100%. See photo illustration.
3. Loosen only the outer eccentric weight at each end of the motor (use a metric wrench). Rotate the dot (punch mark or similar indicator) to the desired force output percentage position. Do the same at both ends of the motor.
4. Be certain weights have been retightened securely and replace motor and end covers back to their proper position.

Motor vibrators are easily adjusted by setting the indicator on the eccentric weight to the proper (% of maximum force) output.

IMPORTANT: Both ends of the motor must be adjusted to the same setting.



IMPORTANT

1. Never loosen the inside eccentric weights closest to the motor.
2. Never operate the motor vibrator while the weights at opposite ends set at different settings.
3. Be certain eccentric weights are retightened securely.

Maintenance

Maintenance must be performed by a qualified technician. Disconnect the power supply and allow the vibrator to cool to a temperature below 104°F (40°C) before servicing the vibrator.

Lubrication

Use on the prescribed grease in the vibrator. If a different grease is used, the warranty will be void. Too much grease will cause bearings to overheat and result in premature bearing failure. Eriez recommends the use of SKF LGHP2 lubricant in Eriez ERV vibrators. For conveyors equipped with a Martin CD9 or CD 12 vibrator lubricant with Kluber Staburags NBU 8EP grease. Refer to the Maintenance Table for lubrication schedule and quantity required for your vibrator.

Replacement

Martin CD Series

Do NOT attempt to replace bearings on a Martin vibrator. In the event of a failure contact Martin Engineering at 800-544-2947.

OR

Eriez ERV

Bearing must be replaced exclusively on the work bench by qualified personnel with the power supply deactivated.

- Disconnect the power supply to the electric vibrator
- Dismantle the electric vibrator and place it on the bench
- Remove the side covers
- Remove the eccentric weights
- Remove the bearing holder flanges through the threaded extraction holes
- Remove the bearing using the special extractor
- Fit a new bearing
- Reassemble the electric vibrator

During reassembly, keep all parts perfectly square to avoid misalignment as this can damage the bearings and bearing holders permanently. Check all screws, washers and gaskets to make sure there is no damage. Replace bearings if necessary.

Maintenance (cont.)

MARTIN CD SERIES- 900 RPM UNITS		
Motor	Maintenance	
Power Output [Hp]	Amount of Grease Per Bearing [grams]	Operating Time Between Regreasing [hours]
0.17*	-	-
0.28*	-	-
0.2	7	2000
0.35	9	2000
0.4	16	2000
1.1	14	2000
1.2	14	2000
1.8	18	2000
2	30	2000
2.9	30	2000
3.2	50	2000
4.3	60	2000
5.8	80	2000
5.8	80	2000
6	90	1000
8.5	90	1000
8.7	130	1000
10.9	150	1000
12.7	180	1000
17.4	220	1000

* No maintenance required replace bearing if failure occurs

ERIEZ ERV- 900 RPM UNITS		
Motor	Maintenance	
Power Output [Hp]	Amount of Grease Per Bearing [grams]	Operating Time Between Regreasing [hours]
0.31*	-	-
0.47*	-	-
0.47*	-	-
0.67	15	1000
0.87	15	1000
1.34	18	1000
2.01	26	1000
2.68	70	1000
3.35	70	1000
3.89	70	1000
5.36	70	1000
6.71	70	1000
9.12	90	1000

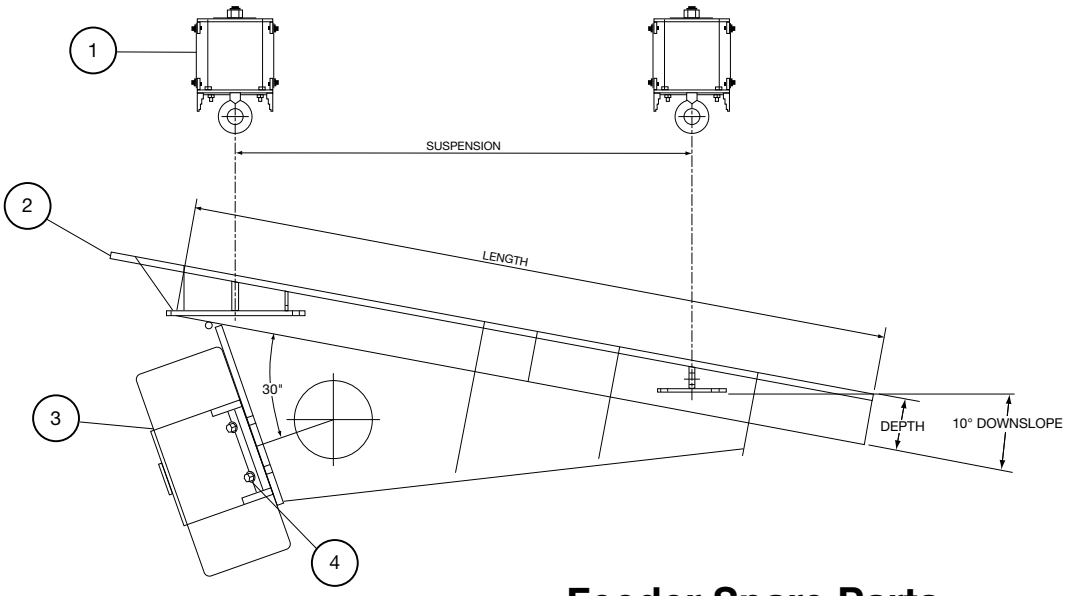
* No maintenance required replace bearing if failure occurs

Maintenance (cont.)

MOTOR CHARACTERISTICS				
Three Phase (900 RPM)				
Motor Power [Hp]	Maximum Force		Amp Draw	
	lbs	N	230V	460V
0.17	328	1459	0.4	0.8
0.28	573	2549	0.6	1.1
0.2	913	4061	0.4	0.7
0.35	1444	6423	0.6	1.2
0.4	2019	8981	0.7	1.3
1.1	2923	13002	1.1	2.2
1.2	3841	17086	1.3	2.6
1.8	4643	20653	2.1	4.2
2	6832	30390	2.6	5.2
2.9	8380	37276	3.0	6.0
3.2	9343	41560	3.3	6.5
4.3	11656	51848	4.0	7.9
5.8	14368	63912	4.8	9.5
5.8	15498	68939	4.8	9.5
6	14657	65198	5.0	10.0
8.5	21905	97438	6.0	12.0
8.7	24767	110169	6.8	13.5
10.9	30942	137637	9.8	19.5
12.7	38056	169282	10.0	20.0
17.4	48923	217620	12.0	24.0

Typical Eriez Brute Force Feeder

Spare Parts



Feeder Spare Parts

1. Isolation Assembly . . . . . (4)
2. Tray. . . . . (1)
3. Vibrator Motor. . . . . (2)
4. Motor Mounting Bolt Nut & Washer . . (8)

Specify Serial No., Motor HP, and Tray Size

NOTE: Some safety warning labels or guarding may have been removed before photographing equipment.

World Authority in Advanced Technology for Magnetic, Vibratory and Inspection Applications

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