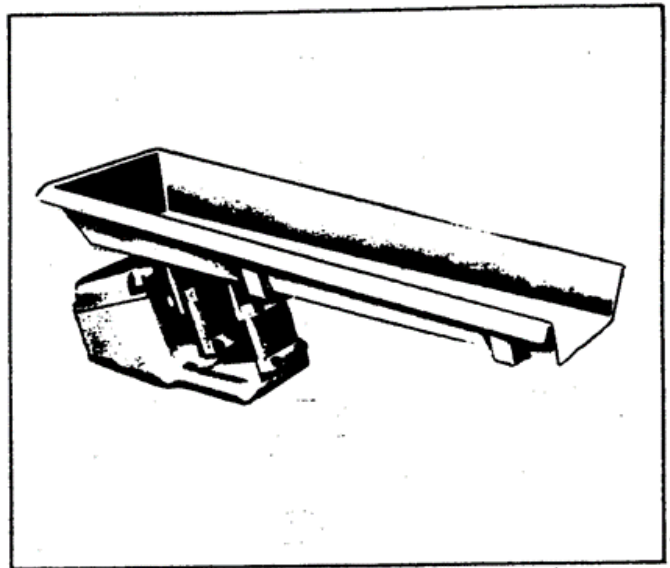


Service Instructions

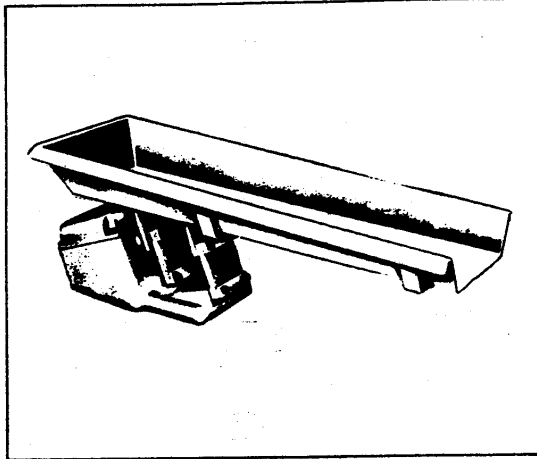
Syntron®
Vibrating Feeder
Model: F-010-BM



SERVICE INSTRUCTIONS

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Model: F-010-BM



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Safety Instructions: Product Safety Labels must remain highly visible on the equipment. Establish a regular schedule to check visibility. Should safety labels require replacement, contact Syntron Material Handling Material Handling Solutions for an additional supply free of charge.

The instructions and data herein are vital to the proper installation and operation of this equipment. In order to avoid delays due to faulty installation or operation, please see that these instructions are read by the persons who will install, operate and maintain this equipment. Supporting information, such as drawings, may be attached to this manual. The information contained there in takes precedence over corresponding information printed in this manual.

INTRODUCTION

The F-010-BM Feeder assembly is an electromagnetic unit, consisting of a dynamically balanced, two-mass vibrating system. This system consists of a trough and trough-connecting bracket coupled to an electromagnetic drive by means of leaf springs.

NOTE: When supplied without a trough assembly, the drive unit (F-010-BM Vibra-Drive) can be used with chutes, tracks, etc. (supplied by customer).

The electromagnetic drive (a magnet and armature) is located within the base housing. The magnet assembly is connected directly to the housing. An armature, also part of the drive unit, is located opposite the magnet and is connected directly to the trough mounting bracket.

Leaf springs are located at the front of the drive unit housing. These springs are clamped at the bottom of the drive unit housing, and at the top, to the trough mounting bracket. The trough, through mounting bracket and armature become an assembly, joined to the drive unit through the springs.

THEORY OF OPERATION

Model F-010-BM Feeder operation produces a vibrating stroke on the surface of the feeder trough. The stroke is obtained by the electromagnet pulling the trough sharply down and back and then allowing it to spring up and forward. Repeated at high speeds (3000 v.p.m. at 50-cycle power supply), this action produces a definite vibrating movement on the trough surface.

The F-010-BM Feeder requires the use of a separate controller which contains a rectifier, used to convert alternating current into rectified current.

Figure 1 illustrates a typical AC sine wave and a typical RC sine wave (the type of pulsating current which is being fed to the feeder coil). The coil is energized only by the portion of the sine wave shown as a heavy solid line of the RC sine wave. The broken line represents the portion of the sine wave which is blocked by the rectifier. The blocked portion does not reach the feeder coil, and during this time the feeder coil is de-energized.

When the coil is energized, the core becomes magnetized and attracts the armature assembly. This pulls the armature, trough mounting bracket and trough down and back toward the core. This pull is against the mid-point of the leaf spring stack, flexing the springs.

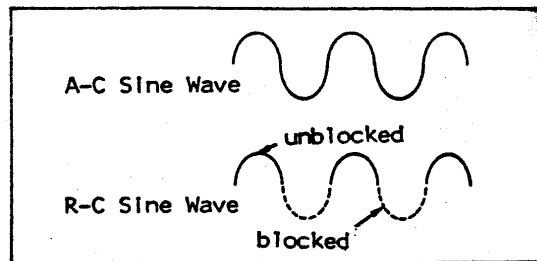


FIGURE 1 - THE RECTIFIED SINE WAVE

The unit is mechanically adjusted to limit the travel of the armature so it does not strike against the face of the core. The space between the armature and core is called the “air gap”, and its setting is critical to good feeder operation. Instructions concerning the air gap are on page 7.

The magnetic pull between the armature and core exists during the time a current is passing through the unblocked, or power, half cycle.

Each power half cycle is followed by a half cycle of blocked current flow. During this half cycle, power is not available to the coil and the coil becomes de-energized. With the coil de-energized, the magnetic pull between core and armature is released, and the leaf spring system is permitted to spring back to (and slightly trough) its normal position. This pulls the trough, bracket and armature assembly up and forward.

On the next power half cycle, the trough, bracket and armature assembly are again pulled down and back. On the next no-power half cycle, the trough, bracket and armature assembly are again pulled forward. Thus, during operation, the trough is continually vibrating along a straight line path.

The following explanation will provide a general description of material flow and how it is achieved by the vibrating stroke of the trough.

Figure 2 illustrates the action of a single particle of material moving along the trough surface. During a vibration cycle, the trough surface travels between its lowest point (A) to its highest limit (C). The trough travels at its greatest velocity between (A) and (B), although still traveling up and forward, the trough decelerates between (B) and (C). On the upward stroke, the particle of material is in contact with the trough from (A) to (B). At point (B), the velocity of the particle becomes greater than the trough, and the particle leaves the trough surface on a free-flight trajectory from (B) to (D). The particle lands back on the trough surface at a position further forward (D). This completes one cycle. Each cycle imparts a forward and upward motion of the material, and it lands further along the trough toward the discharge.

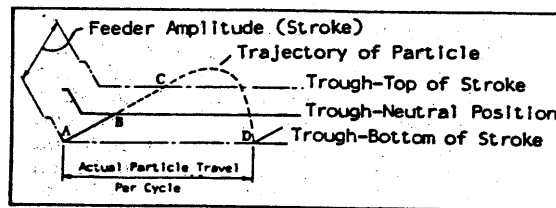


FIGURE 2 - MATERIAL FLOW ON TROUGH

The rate of feed is controlled by the intensity of the magnetic pull which is varied by the controller.

LONG-TERM STORAGE

When received, the equipment should be carefully uncrated.

Give the equipment a thorough visual inspection to reveal any damage that may have occurred during shipment. If damage is found, contact Syntron Material Handling and the shipping carrier at once.

If feeder is placed in storage, prior to installation, store the feeder in the shipping carton.



CAUTION: Do not support the weight of the unit by the trough assembly. This will distort and damage the springs.

When storing the controller, plug all openings in the control box to prevent dirt, rodents and insects from entering. Syntron Material Handling advises placing a corrosion preventive inside the control box. Cover the controller and place in an area protected from extreme heat. Do not drop the controller. The force of the impact may damage the components.

INSTALLATION



CAUTION: Do not lift the unit by the trough.

The feeder has been factory tuned for your specific application. Handling by the trough could cause damage to the feeder.

When received, the feeder and controller should be carefully uncrated. All packing bands, paper, etc., must be removed. Check the controller components for protective shipping blocks, tape, etc.

Inspect all the equipment received and report any damage which may have occurred during shipment. If damage is found, notify the shipping carrier and Syntron Material Handling.

NOTE: When installing the feeder, consideration must be given to the area of support. Some of the heavier Model F-010-BM Feeders can weigh over 45 pounds (20 kg), and a support must be selected that will safely carry the full weight of the unit under load conditions.

Most Model F-010-BM Feeders can be furnished with a choice of mounting feet:

- (1) Standard rubber
- *(2) Rubber foot, double stud, with M6 x 18 mounting stud
- *(3) Rubber foot, sandwich type, with M6 tapped hole

*These mounting feet are designed for bolting the unit directly to the mounting structure.



CAUTION: Feeder must not come in contact with any rigid object or adjacent surface that could hamper its vibrating action; a 1" (25.4 mm) clearance must be maintained. Any connections (such as dust seals) between the trough and adjacent objects must be flexible, preferably cloth or rubber.

The separate control assembly should be installed as close to the feeder as possible. Installation on a wall in a clean, dry location, free from excessive vibration is recommended.



WARNING: Electrical power supply connection to the SMH-Technologies supplied controller must be made through a customer-supplied safety disconnect switch which must be mounted next to the controller.

If possible, install the controller at a location where it will receive adequate ventilation. This will ensure prolonged component life.



CAUTION: The conductor between the feeder and controller must be of a size sufficient to carry the current and voltage as stamped on the equipment nameplate.



WARNING: Be certain the equipment is properly grounded!!

With the feeder and controller properly installed and all wiring completed, the equipment is now ready for operation.

OPERATION



CAUTION: Unauthorized modification of feeder or the use of unauthorized replacement parts may damage the feeder.

Syntron Material Handling will not assume responsibility for feeder performance as a result of any unauthorized alterations to the equipment. Consult Syntron Material Handling before modifying or repairing your feeder.



WARNING: Before operating feeder, make sure controller is closed and secured.

Before starting the equipment, rotate the control knob on the controller to a low counterclockwise position. Turn the switch to its "ON" position, and the feeder will begin operating at a low rate of feed. While the feeder is running at this reduced rate, check all external bolts on the feeder assembly for tightness.



CAUTION: When operating normally, the feeder should perform with a smooth, even stroke. If a loud striking noise occurs, immediately turn off the unit.

Striking is the result of the armature and core making contact. Continued striking can result in serious damage to the unit. Refer to the Air Gap section on page 7 for the procedure to correct a striking condition.

With the feeder operating satisfactorily, load the trough with the materials to be conveyed and adjust the control knob to the desired output. Clockwise rotation will increase feed rate. The material will flow along the trough surface in a smooth, controlled rate of flow toward the discharge end of the trough.

MAINTENANCE



WARNING: Before performing any maintenance work, the electrical power supply must be disconnected at the safety disconnect switch.

Some materials, due to their nature, adhere to the trough surfaces. These deposits increase the dead weight of the feeder pan and, if permitted to build up excessively, will alter the natural frequency (tuning) of the feeder. Material build-up on the trough should be removed as a daily practice. Look for material build-up at the rear of the feeder trough, particularly around and under hopper openings.

A clean, dry compressed air supply is recommended for general cleaning of these units. Water is not recommended.



WARNING: Never oil the spring assembly. This destroys the clamping effect of the spring pads against one another.

In the event repairs are necessary, take immediate action to avoid possible injury to personnel and damage to feeder parts from faulty operation. When ordering replacement parts, include all information given on the nameplate.



CAUTION: Any signs of excessive heat or burned components are an indication of trouble. At first notice of an overheating condition, immediately investigate and correct the cause. This could eliminate a potential major component failure. Feeder coils, under normal operating conditions, run warm but never too hot to touch.

TROUBLESHOOTING

PROBLEM	CAUSE	CORRECTION
Feeder operates too slow	<p>Line voltage below designated current rating</p> <p>Unit in contact with rigid object or surface</p> <p>Spring action may be hampered</p> <p>Defective leaf springs</p> <p>Worn or cracked trough</p>	<p>Increase line voltage to that designated on nameplate.</p> <p>Isolate unit</p> <p>Remove and clean spring assemblies; see separate instructions</p> <p>*Replace</p> <p>*Replace</p>
Feeder operates too fast	Line voltage above designated current rating. High voltage will cause a "striking" condition.	Reduce line voltage to that as designated on nameplate
Unit hums – will not vibrate	Defective SCR within controller (Refer to controller instructions)	*Replace
Unit fails to operate	<p>No power to controller</p> <p>Defective switch or fuse</p> <p>Defective SCR within controller (Refer to controller instructions)</p> <p>Feeder coil may be burned out or grounded</p> <p>Short circuit in wiring</p> <p>Open winding on rheostat</p>	<p>Check for broken or grounded lines</p> <p>*Replace</p> <p>*Replace</p> <p>*Replace burned-out coil, repair grounded coil</p> <p>Repair</p> <p>*Replace</p>

*Replace only with parts supplied, or recommended by Syntron Material Handling.

SPRING REPLACEMENT



WARNING: Before performing any maintenance work, the electrical power supply must be disconnected at the safety disconnect switch.

Replacement springs must be of the same size and thickness as those removed. Syntron Material Handling recommends replacing all springs rather than just one.

Work on one spring assembly at a time (first the rear spring stack). Make a note of the location and arrangement of each spring, spacer and clamp. Remove the bolts which secure the leaf springs to the base, then the bolts which hold the springs to the trough mounting bracket.

The number and thickness of springs will vary according to trough size, power supply voltage and operating frequency. It is important that proper replacement springs be used. Carefully examine all springs and replace cracked or broken springs. Rather than replacing only defective springs, it is recommended that all springs in a stack be replaced.

Install the new spring assembly in reverse order of that removed. Replace cap screws and torque as specified on page 11.

When springs are properly assembled, there should be no tension or distortion on the springs.

After replacing springs or rebuilding spring stacks, it may be necessary to adjust the air gap.

The unit is now ready for operation.

Check the torque of the spring clamping hardware after several hours of operation. Settling of spring stacks could relieve compression in the spring assemblies. This will alter the feeder operation.

AIR GAP

The air gap is the spacing that exists between the face of the armature and the face of the core assembly. Proper adjustment of this space is extremely important for good feeder operation.

If the air gap is adjusted so the armature and core are too close, the faces of these items will make contact during feeder operation. This is called “striking”.



CAUTION: If a loud striking noise occurs, immediately turn off the unit. When operating normally, the feeder should perform with a smooth, even stroke.

If the air gap is adjusted so that armature and core are too far apart, the feeder current may climb to a dangerous level. A high current condition will result in coil burn-out, failure of control components, or reduced material feed.

The air gap is properly set at the factory; readjustment should rarely be required. However, if high voltage is applied to the feeder, or if the air gap has been moved due to the improper handling during shipment or installation, an adjustment may be in order.

(Refer to the illustration on page 10)

Remove cover (Y) by removing cap screws (Z). Loosen cap screws (X) and adjust the position of the magnet assembly. Moving the magnet forward will lessen the air gap, resulting in a smaller feeder stroke. Moving the magnet toward the rear of the feeder will widen the air gap resulting in a longer feeder stroke and a higher current draw. The proper air gap is reached when the air gap is as narrow as possible without a striking condition. The designated current rating must not be exceeded. (If a clamp-on meter is used, multiply reading by 1.7) When the proper air gap has been obtained, lock the core in place by tightening the cap screws (X). F-010-BM units operate with the trough stroke between .045" to .050" (1.1 mm to 1.2 mm). This is checked by applying a stroke gauge to the trough assembly.

NOTE: The air gap adjustment is a very delicate procedure and may require a little time to properly obtain the desired setting. The correct air gap spacing will be obtained when the armature and core faces are as close as possible without "striking" when maximum current is applied to the feeder magnet.

CHECKING FEEDER CURRENT

When checking feeder current with a tong meter, the meter reading must always be multiplied by a value of 1.7. A tong meter does not reveal the same current as designated on the equipment nameplate, due to the waveform characteristics of the feeder, when operating. Therefore, the 1.7 multiplier must be used.

STROKE GAUGE

Feeder stroke is the distance the trough travels in one complete cycle of vibration. This is measured from the forward upward limit of the vibrating stroke to the downward backward limit of the vibrating stroke.

This stroke can be read from the stroke gauge on the feeder trough. Under vibration, a black "V" will appear on the gauge. The stroke of the unit can be read at the apex of this black "V". The lines should appear solid black. (Refer to Figure 3)

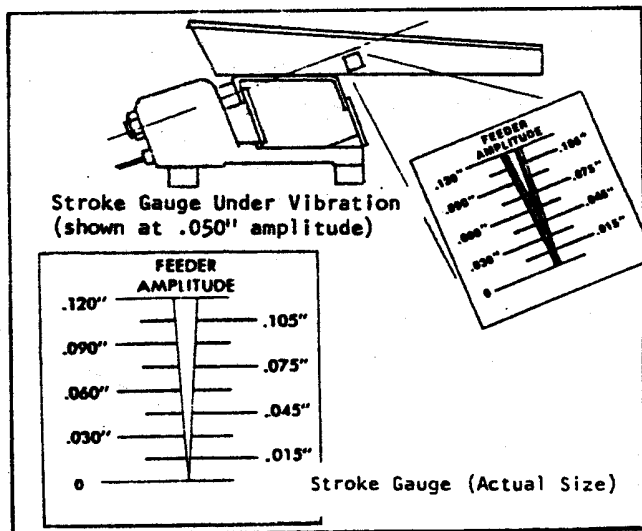


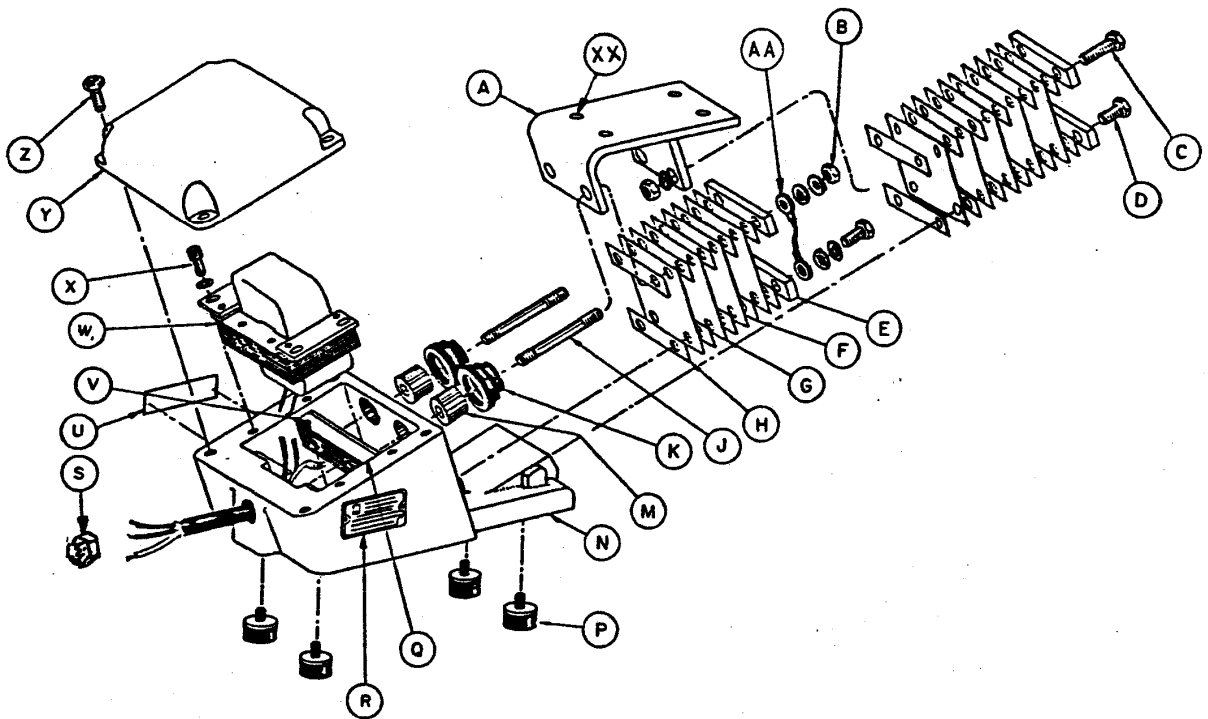
Figure 3.

**PARTS LIST – VIBRATORY FEEDER
MODELS: F-010-BM**

<u>Item No.</u>	<u>Description</u>	<u>Quantity</u>	<u>Part No.</u>
A	Armature Mounting Bracket Assy	1	C-222284-B
B	Hex Nut NIPI, M10	4	BN115M10NI
C	Cap Screw, Hex Hd., M10 x 40	2	BN54M10X40NI
	Lockwasher, M10	4	BN76M10NI
D	Cap Screw, Hex Hd., M10X35	4	BN54M10X35NI
	Lockwasher, M10	4	BN761M10NI
E	Spring Clamp Bar	4	A-222292-B
F	Leaf Spring Spacer (Fiber)	14	A-222293-001
G	Leaf Spring (.050" Tk.)	If Req'd	A-222291-A
	Leaf Spring (.070" Tk.)	1	A-222291-C
	Leaf Spring (.090" Tk.)	4	A-222291-C
H	Leaf Spring Seat	2	A-222353-002
J	Armature Stud	2	A-59185
K	Dust Seal	2	A-59185
M	Armature Spacer	2	A-59179
N	Base Casting	1	D-222367-004
P	Rubber Isolator – No. 1 Standard (Shown)	4	A-222439-001
	Rubber Isolator – No. 3 Double Stud	4	A-222440-002
	Rubber Isolator – No. 2 Sandwich	4	A-222441-002
Q	Armature Assembly	1	B-222453
R	Nameplate	1	A-62245
S	Cable Grip	1	0102 X 079
U	Label	1	A-125694
V	Mach. Screw Br., Sl. Pan Hd., M4X10	1	BN140M4X10
	Lockwasher, M4	1	BN761M4MI
W	Magnet Assembly, 240/50	1	B-126210-N
X	Cap Screw, Soc. Hd., M6X20	4	BN7M6X20NI
	Plainwasher, M6	4	BN342M6NI
Y	Cover Casting	1	C-222434-002
Z	Cap Screw, Hex Hd., M6X12	4	BN54M6X12NI
AA	Ground Strap	1	B-222368-B
	Flat washer, M10	2	BN342M10NI
XX	Trough Mounting Fastener – M8	4	-----

Do not remove or paint safety labels. Should safety labels require replacement, contact Syntrol Material Handling for an additional supply free of charge.

Replace parts only with those supplied or recommended by Syntrol Material Handling.



TORQUE SPECIFICATIONS		
TORQUE VALUES: IN-LBS, Nm		
ITEM	DRY* FASTENERS	LUBRICATED FASTENERS
B, C, D	350 IN-LBS, 40 Nm	260 IN-LBS, 30 Nm
X	144 IN-LBS, 17 Nm	108 IN-LBS, 13 Nm
XX	132 IN-LBS, 15 Nm	96 IN-LBS, 11 Nm

OPERATING SPECIFICATIONS

Maximum trough weight: 13 lbs (5.85 Kg)
 Trough stroke range: .045" to .050" (1.1 mm to 1.2 mm)
 Operating voltage: 240 V. 50 HZ
 Natural frequency: 3330 VPM
 Maximum current rating: 1.0 amps
 (nameplate)
 Expected current: .9 amps

Important

Syntron Material Handling reserves the right to alter at any time, without notice and without liability or other obligations on its part, materials, equipment specifications, and models. Syntron Material Handling also reserves the right to discontinue the manufacture of models, parts, and components thereof.

Your satisfaction is very important to us. Please direct any comments, questions, or concerns to our Marketing Communications Department.

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