

Service Instructions

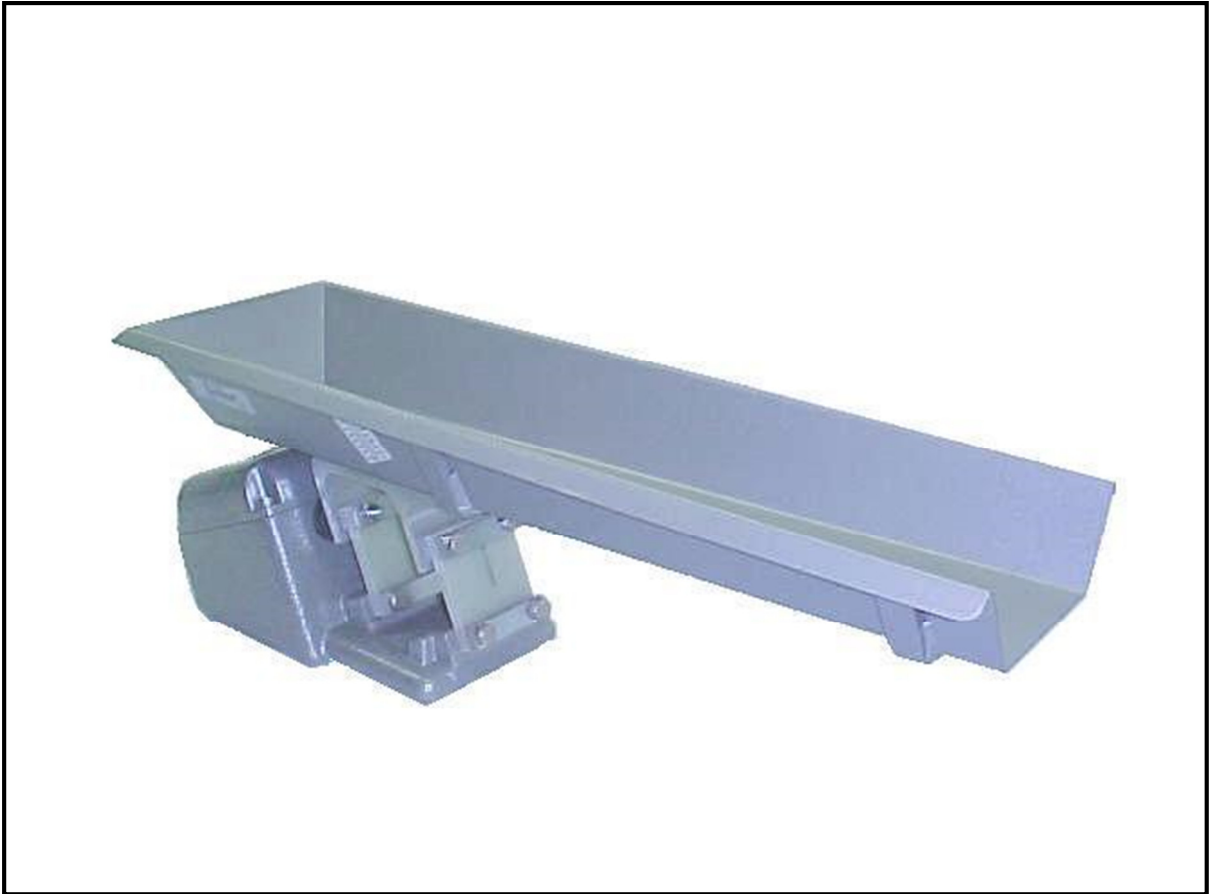
Syntron®
Electromagnetic
Feeder
Model: F-010-B
DF-010-B



Service Manual

Syntron® Electromagnetic Feeder

Models: F-010-B and DF-010-B



■ Installation ■ Operation ■ Maintenance

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SAFETY INSTRUCTIONS

The purpose of safety symbols is to attract your attention to possible danger. Safety symbols, and their explanations, deserve careful attention and understanding. The Safety warnings do not by themselves eliminate any danger. The instructions or warnings they give are not substitutes for proper safety procedures.

SYMBOL	MEANING
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	Safety Alert Symbol: Indicates DANGER, WARNING, OR CAUTION. Attention is required in order to avoid serious personal injury. This symbol may also be used in conjunction with other symbols or pictographs.
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NOTE	Notes advise you of information or instructions vital to the operation or maintenance of the equipment.
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IMPORTANT SAFETY INFORMATION

READ ALL INSTRUCTIONS BEFORE OPERATING

- Upon receipt, unpack and inspect the unit for damages that may have occurred during shipment. If damage is found, contact the shipping carrier and SMH Corporation immediately.
- Read instructions carefully. Be familiar with the controls and proper use of the unit.
- Do not operate the unit when tired, ill, or under the influence of alcohol, drugs or medication.

Product safety labels must remain highly visible on the equipment. Establish a regular schedule to check visibility. If you need to replace safety labels, contact Syntron Material Handling, Material Handling Solutions for an additional supply free of charge.

The instructions and data in this manual are vital to the proper installation and operation of this equipment. In order to avoid delays due to faulty installation and operation of this equipment. In order to avoid faulty installation and operation, please see that these instructions are read by the persons who will install, operate and maintain this equipment.

NOTE: Supporting information, such as drawings, may be attached to the manual. The information contained therein takes precedence over corresponding information printed in this manual.

INTRODUCTION

The Syntron® “F-010-B” and “DF-010-B” Electromagnetic Vibrating Feeders are dynamically balanced, two-mass vibrating systems that consists of a trough and trough connecting bracket coupled to an electromagnetic drive by means of leaf springs.

NOTE: When the drive assembly is supplied without a trough, it can be used with chutes, tracks, etc. (supplied by the customer).

The drive assembly (magnet and armature) is located in the base housing. The magnet assembly is connected directly to the housing. The armature is located opposite the magnet and is connected directly to the trough connecting bracket.

The springs are clamped to the drive unit housing at the bottom, and to the trough connecting bracket at the top.. The trough, trough connecting bracket and armature are joined to the drive unit through the spring assemblies.

INSPECTION

Upon receipt, carefully unpack the feeder. Remove all packing bands, paper, tape, etc. Thoroughly inspect the feeder for any damage that may have occurred during shipment. If damage is found, contact the shipping carrier and Syntron Material Handling immediately.

THEORY OF OPERATION

The “F-010-B” and “DF-010-B” Feeder operation produces a vibrating stroke on the surface of the feeder trough. The stroke results from the action of the electromagnet as it pulls the trough sharply down and backward and then allows it to spring up and forward. Repetition of this action at high speeds (3600 vibrations per minute at 60 cycle power) produces a definite vibrating movement on the trough surface.

The “F-010-B” and “DF-010-B” Feeder requires the use of separate control which contains a rectifier. The rectifier converts alternating current into rectified current.

Figure 1 illustrates a typical a-c sine wave and a typical r-c sine wave (the type of pulsating current which is required to operate the feeder). The feeder coil is energized only by the portion of the sine wave shown as a heavy solid line of the r-c 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 towards the core.

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 the core and armature is released and the leaf spring system is permitted to spring back

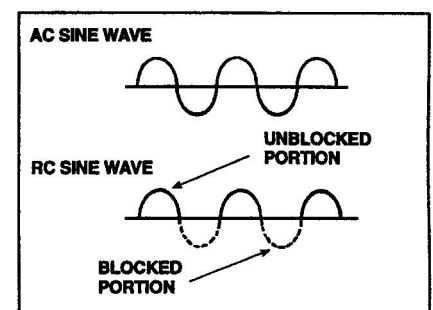


FIGURE 1: RECTIFIED SINE WAVE

to (and slightly through) its normal position. This pulls the trough, bracket and armature assembly up and forward.

INSTALLATION



CAUTION: Never 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.

NOTE: When installing the feeder, the support area must be considered. F-010-B and DF-010-B Feeders can weigh in excess of 41 pounds, and it is important to select a support that will safely carry the full weight of the unit under loaded operating conditions.

The unit must not be installed where the trough could come in contact with any rigid object or adjacent surface. A one-inch clearance must be maintained. Any connections 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, where it is easily seen by and accessible to the operator. Installation on a wall, in a clean, dry, vibration-free location is recommended. If possible, install the control at a location where it will receive adequate ventilation. This will ensure prolonged component life.

NOTE: The voltage and frequency of the power supply must match that designated on the nameplate. The line conductor and the conductor between the feeder and separate control must be of sufficient size to carry the required current and voltage (as stamped on the nameplate). The wiring connections between the feeder, control, and power supply must be secure and in accordance with the wiring diagram supplied with the control.



WARNING: The equipment must be properly grounded at installation.

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

OPERATION



WARNING: Unauthorized modification of the feeder or use of unauthorized 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, Material Handling Solutions before modifying your equipment.

OPERATION (cont'd.)



WARNING: The control door must be kept closed and secured while the equipment is in operation.

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 low rate, check all external bolts on the feeder assembly for tightness. Check the feeder support, making sure it is substantial and the feeder is not touching any rigid objects or an adjacent structure.



CAUTION: During normal operation, the feeder should perform with a smooth, even stroke. If a loud “striking” noise occurs, immediately turn off unit.

Striking is the result of the faces of the armature and core making contact. Striking can result in serious damage to the unit! Refer to the Air Gap, page 8, for instructions on adjusting the air gap. Refer to Troubleshooting, page 10, for instructions on correcting a striking condition.

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

OPERATING SPECIFICATIONS	
Maximum Trough Weight:	13 lb
Trough Stroke Range:	.045 in to .050 in
Minimum Natural Frequency:	3330 vpm (50 Hz); 4000 vpm (60 Hz)
Maximum Current Rating:	2.0 amps 115V/50-60 Hz
(nameplate)	1.0 amps 230V/50-60 Hz

MAINTENANCE



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

Due to their nature, some materials adhere to the trough surfaces. Trough buildup increases the dead weight to 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.

Clean, dry, compressed air is recommended for general cleaning. Water is not recommended.



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



CAUTION: Any sign of excessive heat or burned components is an indication of trouble.

Under normal operating conditions, feeder coils run warm, but never too hot to touch. At first notice of an overheating condition, immediately investigate and correct the cause. This could eliminate a potentially major component failure.

AIR GAP

The air gap is the spacing that exists between the armature (Q) and magnet assembly (W) Proper adjustment of the air gap is extremely important for good feeder operation.

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

If the air gap is adjusted so the armature and magnet assembly 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 a reduced material feed.



CAUTION: Do not operate the feeder when either of the above conditions exist.

The air gap is properly set at the factory. Adjustment is rarely required. However, if high voltage is applied to the feeder, or if the air gap has been altered due to improper handling, an adjustment may be in order.

ADJUSTING THE AIR GAP

To adjust the air gap, perform the following steps. Refer to the illustration on page 11.

1. Remove the cover (Y) by removing the cap screws (Z).
2. Loosen the cap screws (X) and adjust the position of the magnet assembly. Moving the magnet forward will decrease the air gap, resulting in a greater feeder stroke. Moving the magnet toward the rear of the feeder will increase the air gap, resulting in a shorter feeder stroke and higher current draw. The proper air gap is reached when the air gap is as narrow as possible without a striking condition and the trough amplitude is between .045 and .050 inches. The designated current rating must not be exceeded. (If a clamp-on meter is used, multiply the reading by 1.7).
3. When the proper air gap has been obtained, lock the magnet assembly in place by tightening the cap screws (X).

NOTE: The air gap adjustment is a very delicate procedure, and it may require some time to properly obtain the desired setting.

F-010-B and DF-010-B feeders operate with a trough stroke range of .045 inches to .050 inches. The stroke is checked through use of a stroke gauge applied to the trough assembly. Refer to the directions below on reading the stroke gauge.

FEEDER STROKE

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.

The stroke can be read by applying a stroke gauge sticker to the feeder trough. Be certain that the graduated lines on the gauge are parallel with the line of drive. The gauge can be applied at any point on the side of the trough, as close to the center line of the drive as possible.

Under vibration, a black "V" will appear on the gauge. The stroke of the unit can be read at the apex of the black "V". The lines should appear solid black. If the lines are fuzzy and gray, the graduated lines of the gauge are not parallel to the line of the drive.

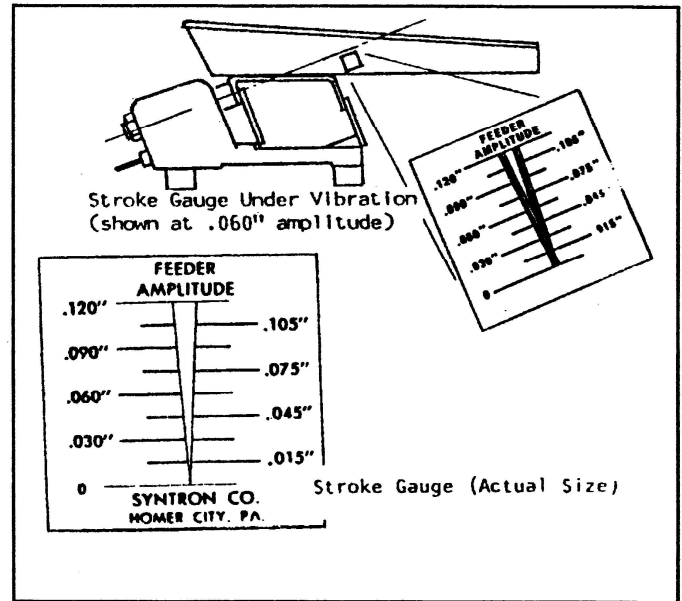


FIGURE 2: STROKE GAUGE

SPRING REPLACEMENT

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



WARNING: Disconnect the feeder from the power supply before replacing springs.

Work on one spring assembly at a time (beginning with the rear spring stack).

Make a note of the location and arrangement of each spring, spacer and clamp. Remove the bolts which secures the leaf springs to the base, then the bolts which hold the springs to the trough mounting bracket.

Reassemble the spring arrangement in the reverse order of which it was removed. Replace the cap screws and torque as specified in Torque Values, page 10.

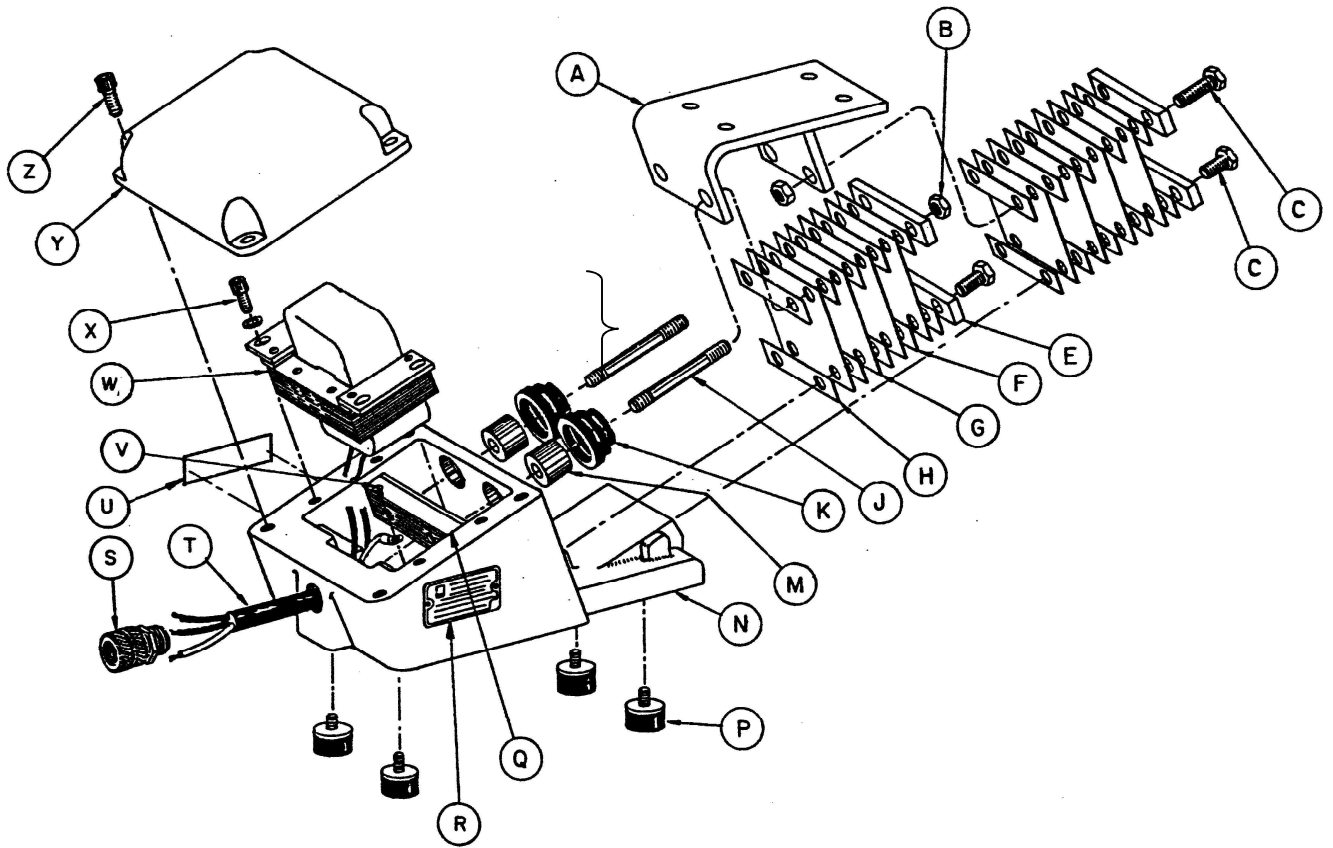
TROUBLE SHOOTING

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

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

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

TORQUE VALUES-in lb (Nm)		
Item	DRY FASTENERS	LUBRICATED FASTENERS
B,C	350(39.54)	260(29.37)
X	144 (16.27)	108 (12.2)



PARTS LIST – VIBRATING FEEDER MODELS: F-010-B and DF-010-B

ITEM	DESCRIPTION	QUANTITY	PART NO.
A	Armature Mounting Bracket Assembly	1	D-226957-001
	∇ Armature Mounting Bracket Assembly	1	D-226957-002
B	Hex Nut Ni. Pl. (3/8"-16)	4	H0103059
C	Cap Screw, Hex Hd., Ni. Pl. (3/8"-16 x 1-1/2")	6	H0310622
E	Spring Clamp Bar	4	A-59177
	∇ Spring Clamp Bar	4	A-97584
F	⊗ Leaf Spring Spacer (Fiber)		A-63773
G	⊗ Leaf Spring (.050" Tk)	As	A-96252-A
	⊗ Leaf Spring (.070" Tk)	Req'd	A-96252-B
	⊗ Leaf Spring (.090" Tk)		A-96252-C
H	Leaf Spring Seat	4	A-59176
	∇ Leaf Spring Seat	4	A-98650

J	Armature Stud	2	A-96177
	∇ Armature Stud	2	A-96177-A
K	Dust Seal	2	A-59185
M	Armature Spacer	2	A-59179
N	Base casting	1	D-59148-B01
	∇ Base Casting	1	D-59148-B02

PARTS LIST (cont'd.)

ITEM	DESCRIPTION	QTY	PART NO.
P	Rubber Cushion – No. 1 Standard	4	0207X033
	Rubber Cushion – No. 2 Double Stud	4	0207X040
	Rubber Cushion – No. 3 Sandwich	4	0207X037
Q	Armature Assembly	1	A-96250
R	* Nameplate	1	A-62245
S	Cable Grip	1	0102X001
T	Cable Assembly (33-in lg)	1	C-160136-C
	Cable Assembly (55-1/2-in lg)	1	C-160136-G
U	* Label (Disc. Elec.)	1	A-125694
V	Mach. Screw Br. Rd. Hd. (#10-32 x 3/8")	1	H0203102
	Lockwasher (#10)	1	H0112458
W	Magnet Assembly 115V/60 Hz	} 1	B-126155-A
	Magnet Assembly 230V/60 Hz		B-126155-B
	Magnet Assembly 115V/50 Hz		Only B-126155-C
	Magnet Assembly 230V/50 Hz		B-126155-D
X	Cap Screw, Soc. Hd. (1/4"-20 x 3/4")	4	H0416900
	Plainwasher (1/4") Stn. Stl.	4	H0116604
Y	Cover Casting	1	C-59147-A01
	∇ Cover Casting	1	C-59147-A02
Z	Cap Screw, Soc. Hd. Ni. Pl. (1/4"-20 x 1/2")	4	H0416508

* Do not remove or paint over safety labels. If labels should require replacement contact, Syntron Material Handling, Material Handling Solutions for an additional supply free of charge.

∇ Applicable to DF-010-B Units Only.

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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