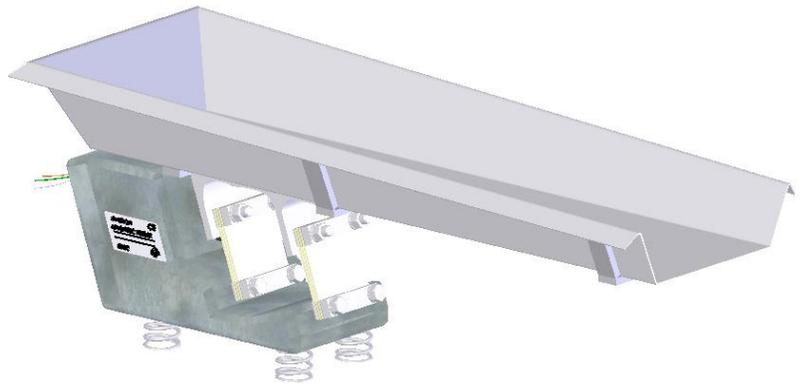


Service Instructions

Syntron®
Vibrating Feeder
Model: FT-02™



Service Manual

Syntron®Vibrating Feeder Model: FT-02™

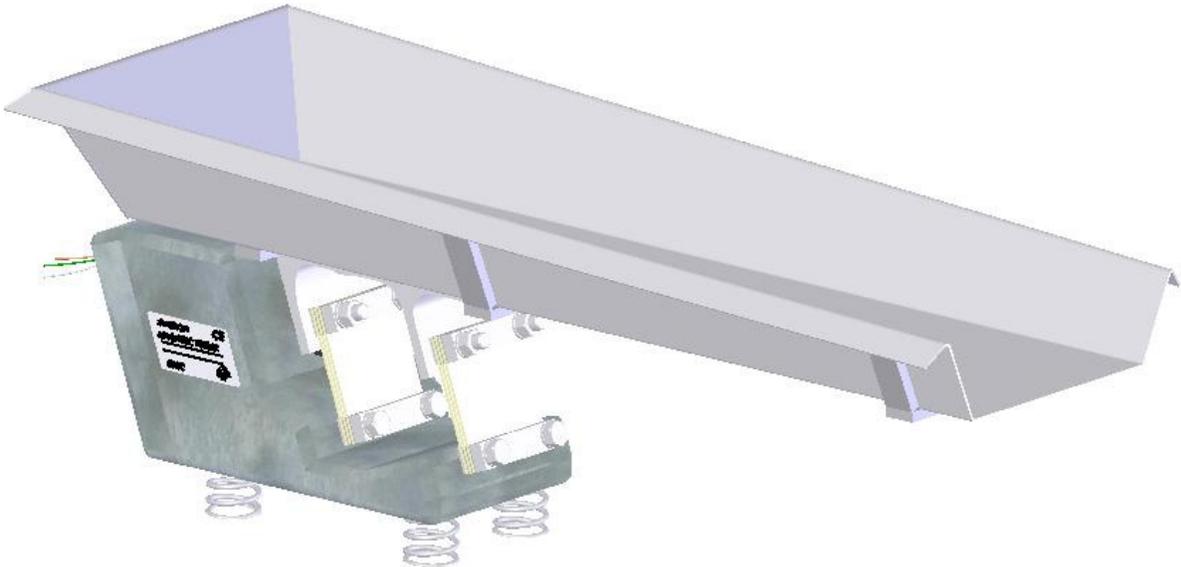


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Safety Instructions

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



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.

NOTE

Notes advise you of information or instructions vital to the operation or maintenance of the equipment.

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 Syntron Material Handling immediately.
- Read instructions carefully. Be familiar with the controls and proper use of the unit.
- Do not operate the unit when 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 instruction manual are vital to the proper operation of this equipment. In order to avoid delays due to faulty installation, please see that these instructions are read by the persons who will operate and maintain this equipment.

INTRODUCTION

The F-T02 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-T02 Vibra-Drive) can be used with chutes, tracks, etc. (supplied by the customer).

The electromagnetic drive (a coil and core assembly) is located within the base housing. This assembly is connected directly to the rear of the drive unit housing. An armature, also included as part of the drive unit is located opposite the core and coil 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 to the drive unit housing, and at the top to the trough mounting bracket. The trough, trough mounting bracket and armature become an assembly, joined to the drive unit through the springs.

THEORY OF OPERATION

Model F-T02 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 (3600 v.p.m. at 60 cycle or 3000 v.p.m. at 50 cycle power supply), this action produces a definite vibrating movement on the trough surface.

The F-T02 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 a-c sine wave and a typical r-c 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 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.

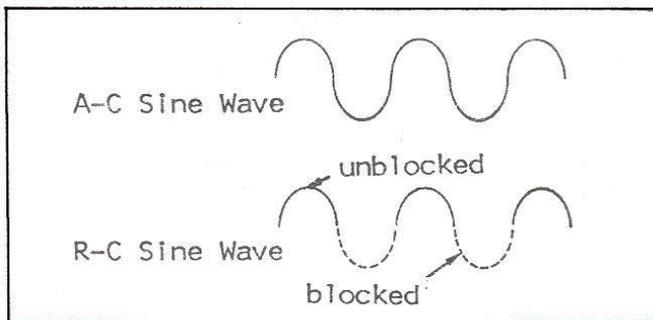


FIGURE 1 - THE RECTIFIED SINE WAVE

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.

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 11.

The magnetic pull between the armature and core exists during the time and 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 through) 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 up and 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.

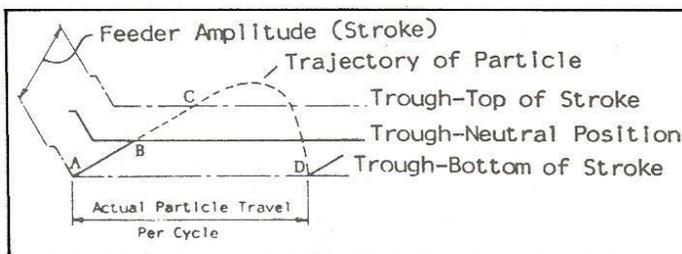


FIGURE 2 - MATERIAL FLOW ON TROUGH

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 SMH 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. SMH 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, contact SMH and the shipping carrier at once.

NOTE: When installing the feeder, consideration must be given to the area of support. Some of the heavier Model F-T02 Feeders can weigh over 43 pounds (19.5 kg) and a support must be selected that will safely carry the full weight of the unit under load conditions.

Most Model F-T02 Feeders can be furnished with a choice of mounting feet:

- (1) Standard coil spring
- (2) Optional rubber
- * (3) Rubber foot, double stud, with 1/4-20 mounting stud
- * (4) Rubber foot, sandwich type, with 1/4-20 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” clearance must be maintained. Any connections (such as dust seals) between the trough and adjacent objects must be flexible, preferable 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 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 insure 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!!

OPERATION



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

SMH 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 faces of the armature and core making contact. Striking can result in serious damage to the unit! Refer to the air gap section on page 11 for correcting 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 feed rate. The material will flow along the trough surface in a smooth, controlled rate of feed 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. Wet or sticky material build-up can be prevented by using electrically heated liner plates.

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 is 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.

TROUBLE SHOOTING

PROBLEM	CAUSE	CORRECTION
Feeder operates too slow	Line voltage below designated current rating. Unit in contact with rigid object or surface Spring action may be hampered Defective leaf springs Worn or cracked trough	Increase line voltage to that designated on nameplate Isolate unit Remove and clean spring assemblies, see separate instructions *Replace *Replace
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	No power to controller. Defective switch or fuse. Defective SCR within controller (Refer to controller Instructions). Feeder coil may be burned out or grounded. Short circuit in wiring. Open winding on rheostat.	Check for broken or grounded lines. *Replace *Replace *Replace burned-out coil, repair grounded coil. Repair *Replace

*Replace parts only with those 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. SMH 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 13.

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, and 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 15.)

Remove ¼-20 plug, insert a screwdriver into the hole on the side of the backplate (N), and loosen set screw (T). Remove the plug (K). Using a large screwdriver, turn the core. Turning the core clockwise will narrow the air gap; counterclockwise will widen the air gap. The proper air gap is reached when the air gap is as narrow as possible without a striking condition. Retighten set screw and replace plug.

The designated current rating must not be exceeded.

When proper air gap has been obtained, lock the core in place by tightening the setscrew (T). Install plug (K) FT02 units operate with the trough stroke between .085" to .090". This is checked at the stroke gauge on 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.

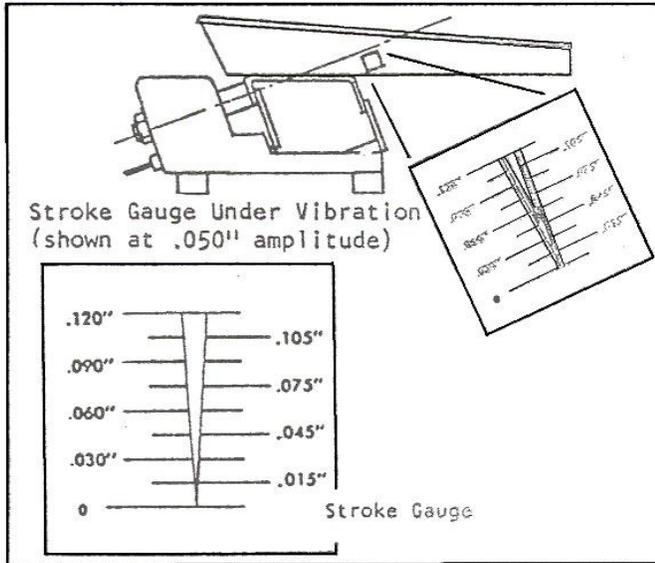


FIGURE 3 - THE STROKE GAUGE

OPERATING SPECIFICATIONS

Maximum trough weight:	9 Lbs (4.1 Kg)	
Trough stroke:	.085" to .090" (2.2 mm to 2.3 mm)	
Operating voltage:	120/240 V 60 HZ	120/240 V 50 HZ
Minimum natural frequency:	3800 VPM	3150 VPM
Maximum current rating:	1.5/0.75 amps avg.	1.0/0.5 RMS
(nameplate)		
Expected current:	1.1/0.55 amps avg.	0.8/0.4 RMS

TORQUE SPECIFICATIONS

Item No.	Torque Value*
C, D	420 In-Lbs (47 Nm)

*Dry torque used in factory assembly on plated fasteners.

PARTS LIST

ITEM	DESCRIPTION	QTY.	PART NO.
A	Armature	1	232575-001
	Dust Seal	1	232574-001
B	Armature Mounting Bracket	1	226957-001
C	Hex Nut (3/8"-16) ZnPl	4 or	H0122194
	Hex Nut (3/8"-16) Stainless	4 (Stainless)	H0111580
	Cap Screw, Hex Hd. (3/8"-16 x 1 1/2"), ZnPl	4 or	H0347922
	Cap Screw, Hex Hd. (3/8"-16 x 1 1/2"), Stainless	4 (Stainless)	H0340926
D	Cap Screw, Hex Hd. (3/8"-16 x 1 1/4"), ZnPl	4 or	H0354446
	Cap Screw, Hex Hd. (3/8"-16 x 1 1/4"), Stainless	4 (Stainless)	H0340826
E	Spring Clamping Bar (Zn. Pl.)	4 or	059177
	Spring Clamping Bar (Stainless)	4 (Stainless)	192454
	Ground Strap	1	6510-014-B
	Drive Screw	2	H0457102
F	Spring Spacer	As Reqd.	111097
G	Leaf Spring (.050" Tk.) (1.3 mm)	As Reqd.	096252-A
	Leaf Spring (.070" Tk.) (1.8 mm)	As Reqd.	096252-B
	Leaf Spring (.090" Tk.) (2.3 mm)	As Reqd.	096252-C
	Spring Seat	4 or	059176
	Spring Seat (Stainless)	4 (Stainless)	098650
H (coil Spring)	Coil Spring	4	229410-001
	Spring Retainer Washer	4	226615-002
	Rd. Hd. Screw (1/4"-20 x 5/8")	4	H0205003
	Flat Washer (3/8")	4	H0117004
H (rubber)	Rubber Isolator	Or 4 (rubber)	0207X038
H (stud)	Rubber Isolator with 1/4-20 stud mounting	Or 4 (stud)	0207X035
H (sand.)	Rubber Isolator with 1/4-20 female thread	Or 4 (sand.)	0207X039
J	Mach. Screw, Rd. Hd. (#10-32 x 3/8"), Br.	1	H0203102
	Lockwasher (#10)	1	H0112458
K	Plug	1	0188X025
M	Core	1	232576-001
	Set Screw (1/4-20 x 3/8)	1	H0430426
N	Backplate	1	232570-A1
	Backplate Gasket	1	231581-001
	Cap Screw, Soc. Hd., (3/8"-16 x 1")	4 or	H0456808
	Cap Screw, Soc. Hd., (3/8"-16 x 1") Stainless	4 (Stainless)	H0430102
	Lockwasher (3/8")	4 or	H0113258
	Lockwasher (3/8") Stainless	4 (Stainless)	H0113210
P	Coil & Cable Assembly (115V)	1 (115V) or	232579-A
	Coil & Cable Assembly (230V)	1 (230V)	232622-A
Q	Coil Washer	2	232577-001
R	Base Casting	1	232569-A
	*Nameplate	1	062245
	*Label (Disc. Elec.)	1	125694
	*Label (Adjustment)	1	195774
S	Cord Grip	1	0102X001

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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