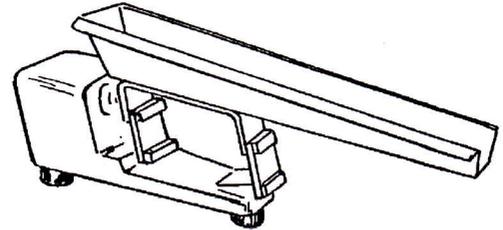


## Service Instructions

### Electromagnetic Feeders Syntron® Small capacities Model: FT-0



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### INTRODUCTION

The TARNOS feeder, model FT-0, is an electromagnetic unit, which is based on a balanced system of two vibrating bodies. This system consists of a tray, coupled by elastic strips to an electromagnetic drive.

**NOTE:** When supplied without the tray, the drive unit may be used with chutes and rails etc. (installed by the customer).

The motor (an encapsulated winding and a fixed magnetic core) are located inside the cast drive casing, and rigidly coupled to the rear part of the casing. A moving magnetic core, which also forms part of the drive, is located in front of the encapsulated winding and the magnetic core, and is also rigidly fixed to the tray by means of a bracket.

The elastic strips, are fixed to the lower part of the drive casing and to the upper part of the tray fixing bracket. This assembly, consisting of the tray, fixing bracket and moving magnetic core forms one of the elastic system bodies.

### OPERATING THEORY

The operation of the model FT-0 feeder produces a vibrating movement on the surface of the feeder tray. The amplitude is obtained by electromagnetic attraction of the tray and its forward recovery via the elastic system. By repeating this at high speed (3,000 r.p.m. with 50 Hz mains power supply), this action produces the vibrating movement of the tray.

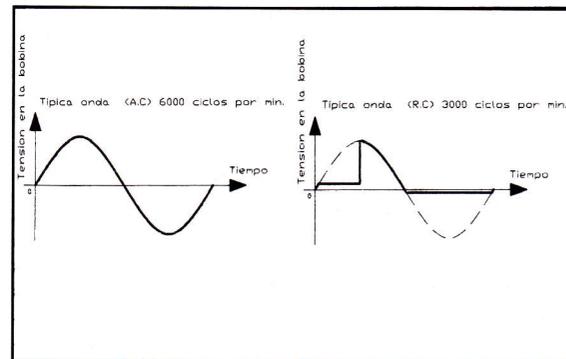


Figure 1 illustrates a typical a.c. sine wave and an RC sine wave (corresponding to the type of pulsed current required to operate a feeder). The winding is only energized by the continuous trace of the RC wave. The broken line represents the portion of the wave, which is blocked by the rectifier. The block portion does not reach the feeder winding and the winding therefore remains de-energized during this period of time.

When the winding is energized, the fixed magnetic core is magnetized and attracts the moving magnetic core.

This pulls the core, moving body and tray downwards and towards the fixed magnetic core.

Each energizing half-cycle is followed by a half cycle of blocked current flow. With the winding de-energized, the voltage which attracts the moving core towards the fixed one disappears, which enables the elastic system to recover its balance position (and even a little forwards). These pulls on the tray, moving body and moving core upwards and forwards.

The FT-0 electromagnetic feeder requires the use of a separate control panel containing a rectifier, which is used to convert the alternating current into pulsed direct current.

## **INSTALLATION**



**PRECAUTION:** The feeder must NEVER be lifted by the tray. The equipment has been factory-adjusted for its specific application, and lifting it by the tray could damage or misadjust it.

When the equipment is received, it should be carefully unpacked, all fastening tape, paper and other packing should be removed and the control panel should be checked.

All received equipment should be checked and a report made out for any damage that might have occurred during transport. If any damage is noted, then TARNOS and the transport company should be notified.

**NOTE:** When installing the feeder, the support structure should be taken into account and examined. An FT-0 feeder is able to support a weight in excess of 6 Kgs, which means that a support should be selected that is able to safely withstand the fully-loaded equipment.



**PRECAUTION:** The equipment must not be installed in such a way that the tray is in contact with fixed objects or nearby surfaces. A minimum distance of 25 mm should be established. Any coupling between the tray and nearby objects should be flexible, preferably made of fabric or rubber.

The regulation assembly or control panel, which is supplied separately, must be installed as close as possible to the feeder. It is recommended that the control panel be installed on a clean, dry vibration-free wall. Where possible, it should be installed where it is able to receive adequate ventilation, since this will prolong its service life.



**WARNING.** The control panel electrical connection should be made via a suitable thermo-magnetic circuit breaker, located close to the panel and which is to be provided by the customer.



**WARNING.** The electrical mains supply must coincide with the voltage and frequency as marked on the specifications plate. The equipment must be correctly bonded to earth.

## **OPERATION**



**PRECAUTION:** Unauthorized modifications, or the use of unauthorized spare parts in the feeder could cause damage to the equipment.

TARNOS shall not be held responsible in any way, for feeder performance after any unauthorized modification to the equipment. Please consult TARNOS before modifying your feeder.

Once the feeder and control panel has been correctly installed, together with all wiring, the equipment is ready for operation.



**WARNING:** The control panel door must always be kept closed while the equipment is operating.

Before starting up the equipment, the regulation button should be placed in its lowest position in an anticlockwise direction, the switch should be set to "ON" and the feeder should then commence operation at a low feed rate.

While the feeder is operating under these conditions, all exterior nuts and bolts etc should be checked, together with the robustness of the feeder assembly.

Check out the feeder support system to ensure that it is not in contact with any rigid object or nearby structure.



**IMPORTANT:** During normal operation, the feeder should produce a buzzing sound.

If a strident, high-pitched noise is heard, the unit should be immediately switched off.

This sound indicates contact between the fixed and moving magnetic cores. This contact can lead to serious damage inside the feeder.

Consult the section "AIR GAP" in page 4 in order to correct this defect.



**WARNING:** The level of noise of the feeder in emptiness is of 70dB. As soon as one installs the feeder, the level of noise will depend on the product that is transported. Don't have direct contact with the feeder, because the constant exhibition to a vibration can cause hurts to the persons.

With the feeder operating normally, load the tray with the product to be transported and adjust the regulation button in accordance with the required flow rate. Clockwise rotation will increase the feed flow. The product will flow along the tray in a gentle fashion, with controlled flow, towards the discharge end of the tray.

## **MAINTENANCE**



**WARNING:** Before effecting any service of maintenance disconnect the supply of electrical energy by means of the differential switch of safety

Because of their very nature, some products tend to adhere to the tray surface. These product deposits will increase the equipment tray dead weight, and if this becomes excessive, it could alter the natural frequency (adjust) of the feeder. Any adhering product on the tray should be removed on a daily basis.

The feeder load zone should be checked for adhering product, especially in the apertures between the transition hopper and the tray. Moist or sticky materials may be handled with the precaution of factory-installed suitable coverings or trays with electrically-heated wear plates.

Clean, dry air should be employed for general equipment cleaning, the use of water is not recommended.

The elastic system must NEVER be greased. This would eliminate the pressure effect between the elastic strips.

In the situation where it becomes necessary to repair the feeder because of defective operation, all possible measures should be immediately taken to prevent personal injury and damage to feeder parts.

When spare parts are ordered, all information given on the feeder specification plate should be provided.



**IMPORTANT:** Any signs of excessive heat or burnt parts indicate a problem.

Any situation of excessive heat should be immediately investigated and the cause should be corrected. This will eliminate any risk of greater damage. Under normal operating conditions, the feeder winding is warm, but it should never be too hot to touch.

## SPRING REPLACEMENT

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

Before replacing springs, disconnect the feeder from the power supply. 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.

Install the new spring assembly in reverse order of that removed. Replace cap screws and torque as specified in page 8.

## AIR GAP

The air gap is the distance between the faces of the two (fixed and moving) magnetic cores. Correct adjustment of this distance is extremely important for correct operation of the feeder.

If the air gap is adjusted so that the distance between the two cores is too small, then they will strike each other and produce a strident noise.



**PRECAUTION:** If there are a strident hammering disconnect the feeder immediately. The normal functioning of the feeder has to be with an amplitude of soft and uniform vibration.

If they are too far apart, then power consumption could rise to dangerous levels. An excessive level of power consumption could lead to a burnt-out winding, deterioration of control panel components or a reduction in feeder performance.

The feeder air gap is correctly adjusted before it leaves the factory and rarely requires readjustment. However, if excessive voltages are applied, or the air gap is poorly adjusted due to incorrect handling during transport or operation, then readjustment may become necessary (see figure in page 8).

Loosen nut (K) and insert a screwdriver in the slot at the end of the fixed core (P). By rotating the screwdriver in a clockwise direction. The air gap is decreased, whereas anticlockwise rotation will increase it. Correct air gap adjustment is obtained when it is as small as possible, but without the magnetic cores actually coming into contact.

Electrical power consumption should not exceed that given in the specifications in this manual. If a clip-on ammeter is

employed to measure the consumption, a correction coefficient multiplier of 1.7 must be used. Once the correct air gap has been achieved, the fixed core should be fixed in place using nut (K).

The FT-0 feeders operate with tray vibration amplitude of between 1 and 1.3 mm. This may be verified by sticking an amplitude label on the feeder tray.

NOTE: The air gap adjustment is a delicate procedure, which requires time. The correct adjustment position is achieved with the smallest possible air gap distance, but without the magnetic core faces actually making contact when maximum power is applied to the feeder.

## **FEEDER AMPLITUDE**

The feeder amplitude is the distance through which the tray moves during a complete vibration cycle. Ensure that the graduation lines on the label are parallel to the drive action. The label itself may be stuck to any point on the side of the tray, as close as possible to the drive central line

With the feeder vibrating, a black "V" should appear on the label. The tray amplitude coincides with the mark of the "V" vertex; the lines should appear solid.

if not, it means the graduation lines on the label are not parallel to the drive line.

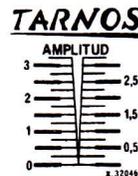
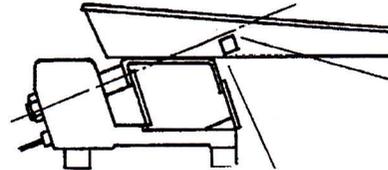


FIGURE 2 – AMPLITUDE LABEL

## GUIDE FOR RESOLVING PROBLEMS

PROBLEM	CAUSE	SOLUTION
The feeder is operating too slowly	The main voltage is below the rated voltage	Increase the mains line voltage to that indicated on the specification plate
	The equipment is in contact with the surface or rigid object	Remove contact with whatever is preventing free operation
	Restricted elastic strip impulse	Remove and clean the sets of strips (see separate instruction)
	Defective elastic strips	Replace (*)
	Worn or cracked tray	Replace (*)
The feeder is operating too quickly	The main voltage is above the rated voltage	Reduce the mains line voltage to that indicated on the specification plate
	Excessive voltage is causing the cores to strike each other	
The feeder does not vibrate, but produces a buzzing sound	Control panel power encapsuled failure (see the instructions)	Replace (*)
The feeder does not operate	Control panel power supply failure	Check for broken wiring or shorts to earth Replace (*)
	Switch or fuse failure	Replace the burnt-out winding Remove the short circuit to earth (*)
	The feeder winding may be burnt-out or shorted to earth	
	Wiring short circuit	Repair
	Open rheostat winding	Replace (*)

(\*) Replace only with parts supplied or recommended by TARNOS.

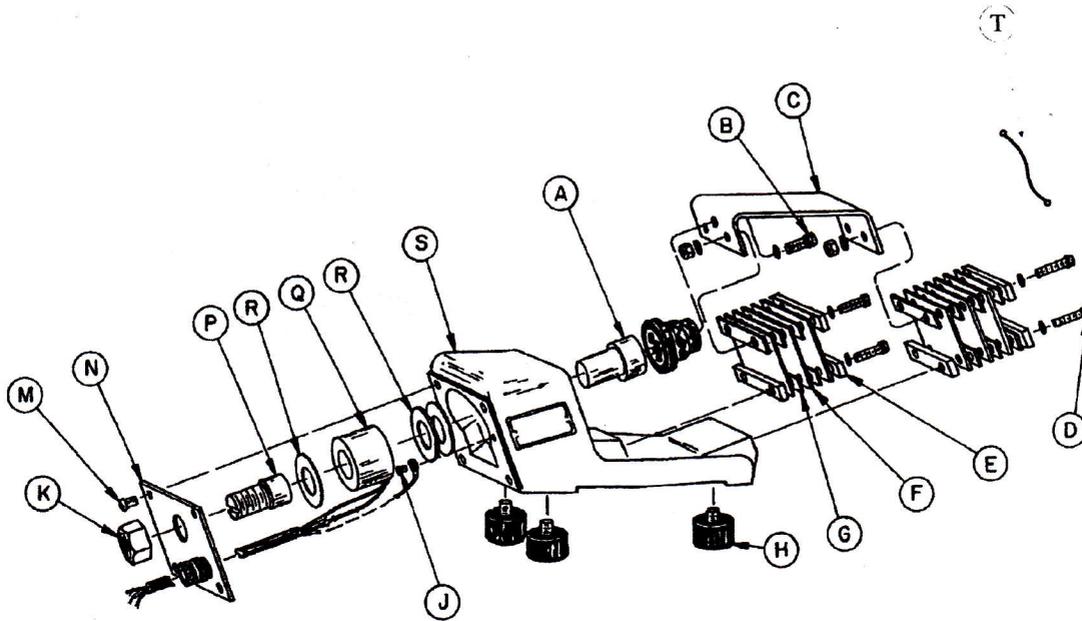
TARNOS reserves the right to modify, at any time, without prior notification, or any other obligation, the materials, models, equipment and specifications, or to cease production of them or their components. For further details, please consult TARNOS, S.A.

**LIST OF MATERIALS.****Model FT-0**

ITEM	DESCRIPCION	CANT	REFERENCIA
A	Moving core	1	A.41697
	Cable	1	A.59185
B	Bolt C/cil allen M.6 x 15	1	DIN.912
	Lock washer $\varnothing=6$	1	DIN.127
C	Moving core	1	A51441
D	Bolt C/cil allen M.5 x 20	8	DIN.912
	Nut hexg. M.5	4	DIN.934
	Lock washer $\varnothing=5$	4	DIN.127
E	Taco de apriete	4	A.36733
F	Bieleta	6	A.68840-A
	Bieleta	S/A	A.68840-B
G	Separador	18	A.68839
H	Elastic bushing	3	X.30477-3
J	Bolt latón M. 4 x 10	1	DIN.86
	Lock washer $\varnothing=4$	4	DIN.127
	Nut reduced M. 18/150	1	DIN.936
K	Bolt C/red M. 4 x 10	4	DIN.86
M	Lock washer $\varnothing=4$	4	DIN.127
	Cover	1	A.86403
N	Fixed core	1	A.41965-A
P	encapsulated winding 220V	1	B-128541-BT
Q	Winding seating	3	A.41968
R	Fixed body	1	C.55228
S	Label characteristics	1	
	Label Safety	1	X.42506
	Label electricity	1	125694
T	Trencilla	1	W.37654-A

Note: Some of the indicated materials and quantities on this list may vary depending on the exact application for which the equipment is used.

## **SPECIFICATIONS MODEL FT-0**



## **TORQUE SPECIFICATIONS**

<u>ITEM</u>	<u>TORQUE(KG/M)</u>
B	1,4
D	0,5

## **OPERATING SPECIFICATIONS**

MAXIMUM TRAY WEIGHT:	1,5 Kg
AMPLITUDE RANGE:	1.1 to 1.3 mm
MAXIMUM CURRENT:	0,36A, 125V, 50Hz
(Specifications plate)	0,18 A, 220V, 50Hz