

Assembly and Operating Instructions

LF 1

LF 2

LF 3

LF 4

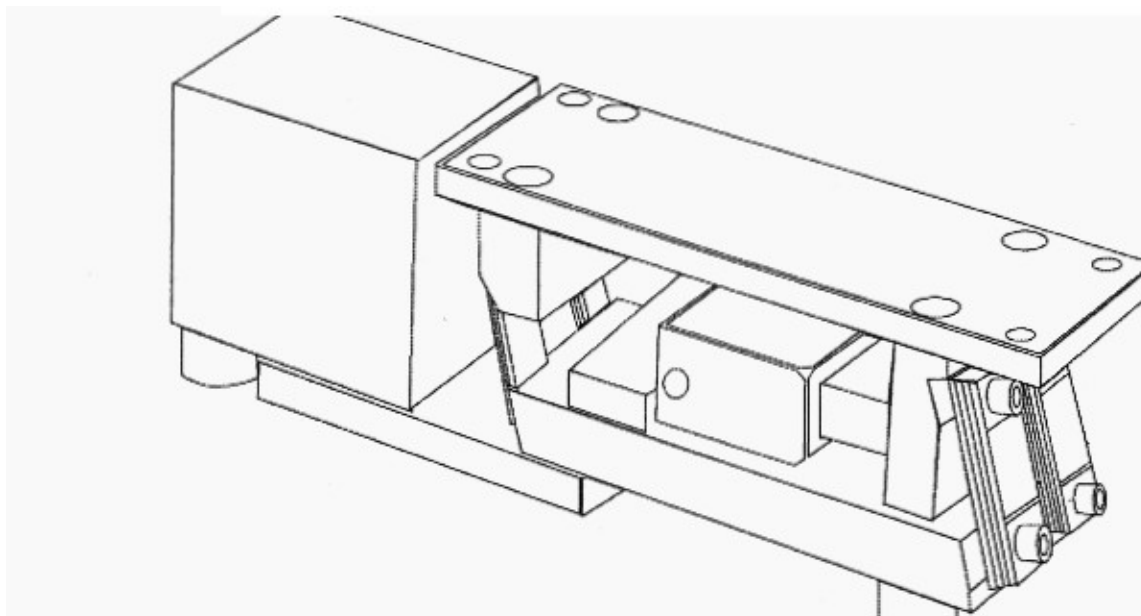


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1 **Technical Data**

| Electrical Data | LF 1 | LF 2 | LF 3 | LF 4 |
|--|-----------------|---------|----------------|----------|
| Supply voltage | 230 VAC | | | |
| Supply frequency | 50 Hz | | | |
| Current consumption | 0.16 A | 0.37 A | 0.44 A | 1,13 A |
| Nominal apparent output | 23 VA | 85.1 VA | 57.5 VA | 172.5 VA |
| Protective system | IP 54 | | | |
| Recommended operating unit | | | | |
| without braking control | RLC 1/ A 1.1 | | | |
| with braking control | RLC 1/ A 1.1 G | | | |
| Mechanical Data | | | | |
| Oscillation frequency | 100 Hz (mech.) | | 50 Hz (mech.) | |
| Maximum working weight including conveyor rail | 2.2 kg | 2.4 kg | 7 kg | 11 kg |
| Weight without conveyor rail | 2.8 kg | 5.5 kg | 13 kg | 29 kg |

Other voltages and frequencies are available in special product versions. In such cases the values in the above table vary accordingly.

If the magnet air gap changed the Ampere-declaration between $\pm 20\%$.

2 **General instructions**

Designation

The SFA vibratory conveyor is to be used exclusively for transport and allocation of parts. It is used in industrial plants of. e.g., the automation and handling technology. Any use outside of this designation, as well as all modifications of the product, are not permissible.

Standards

In project planning and in the operation of the vibratory conveyor special attention must be given to the following regulations:



- Fire prevention regulations
- Accident prevention regulations
- VDE regulations, standards,
- VDE 0100: guidelines for the construction of high voltage power plants with nominal voltages up to 1000 V.
- EN 60204 Part 1

Risk analysis

We strongly recommend that after project planning, and after assembly of the vibratory conveyor at the latest, an analysis be carried out of the risks posed by the complete plant. You must constructively remove these potential hazards, and if this is not possible, point out residual risks by posting warning signs on the machine or installation.



Limitation of liability

Due to the information contained in this manual HENSLE GmbH is not liable for any direct or indirect damage which may result from the use or misuse of this vibratory conveyor. Modifications serving technical advancement may be implemented at any time without prior notice.



3 **Safety instructions**

Generally valid laws, regulations and technical guidelines of the respective countries as well as relevant professional associations, organisations, and possibly those of customers and users must be observed and obeyed.

All the safety instructions contained in this manual serve to make sure the vibratory conveyor is used properly and must be heeded.



Warning signs and their meaning:

Danger!

Ignoring these warnings causes risks to life and health of persons.

Caution!

Warning against possible damage to the device or other material goods.

4 **Transport and Storage**

The LF vibratory conveyor leaves the factory pre-set and adjusted as far as possible. Falls from any height will lead to impairment of its functions.

Do not throw, and do not drop !

Storage temperatures below -30°C and above $+80^{\circ}\text{C}$ can be damaging to greased mechanical parts, elastics (rubber), and any electronic modules supplied with the device.

For dry locations only!

Protect against moisture. Water in electrical connectors or in the drive magnet will always lead to damage, and it is a deadly hazard in principle. Any electronic parts supplied with the device, e.g., in the braking control mechanism, are rendered unusable as a rule, and will cause malfunction, which may cause injury to persons and damage to objects.



Electric
voltage

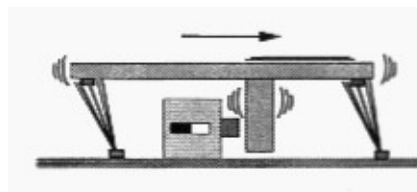
5 **Product description**

The vibratory conveyor, LF, is an electromagnetic drive for vibratory conveyor appliances such as part bins and sorting containers.

The conveying motion of the workpieces originates in the utilisation of friction between the conveyor rail and workpieces placed on it during the oscillatory motion. Leaf springs slanted at a defined angle cause the conveying motion.

Important: oil and grease on the surface of conveyor sections or workpieces can reduce the required friction to the point of complete malfunction.

The choice of leaf springs depends on the weight of the material to be conveyed. Significant changes necessitate appropriate adjustments.

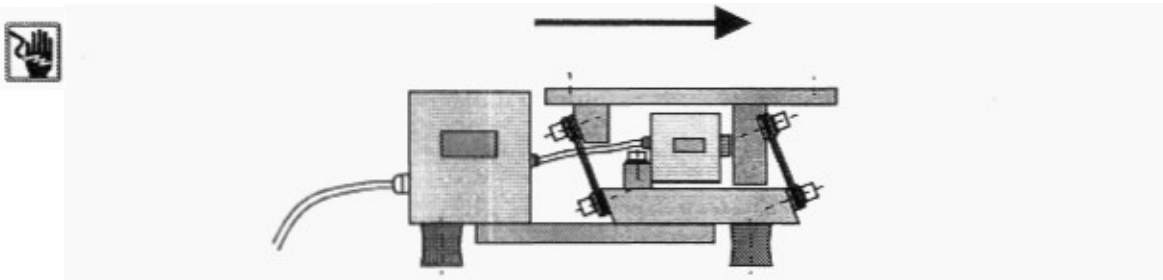


The construction must be stable during vibration.

For operation the vibratory conveyor drive must be connected to a suitable control unit.

6 Setup

Conveying direction:



The vibratory conveyor drive must be set up such that it remains stable during vibration. If a steel plate is used for a base plate we recommend the following minimum thicknesses:

| LF 1 | LF 2 | LF 3 | LF 4 |
|------|------|-------|-------|
| 8 mm | 8 mm | 10 mm | 15 mm |

The vibratory conveyor is screwed onto the base plate at the threads of the 4 rubber buffers.

Caution!

Possible impairment of functions due to abrasions.

Adjacent machine parts, as well as particularly sensitive pipes, cables, or pneumatic and hydraulic hoses must not be in contact with the vibratory conveyor under any circumstances. Besides the risk of damage this causes damping of the free vibrations of the drive, leading at the least to a reduction in conveyor performance.

Danger!

Risk of cable damage.

Electric cables with worn out insulation pose the danger of electric shock.

All such cables or parts must be mounted firmly and in such a way that they cannot come loose by themselves.

7 Connection

The vibratory conveyor must not be run permanently without a control unit. It is delivered with a plug that is mounted in a fixed position.

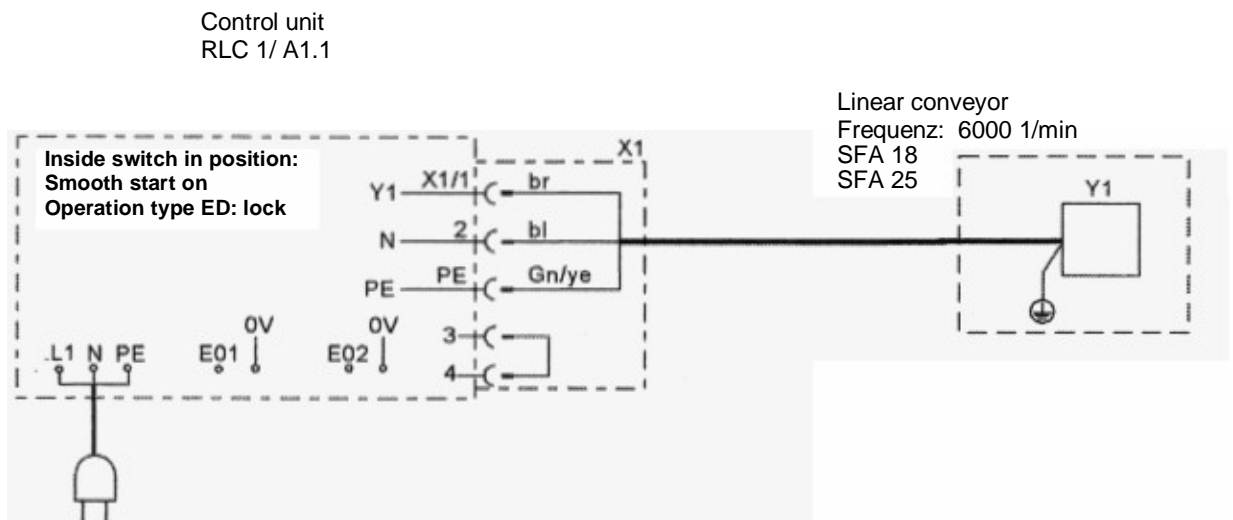
The vibratory conveyor drive is connected to the control unit as specified in the terminal diagram and the control unit is connected to the electric power supply.

Danger!

Electrical connection

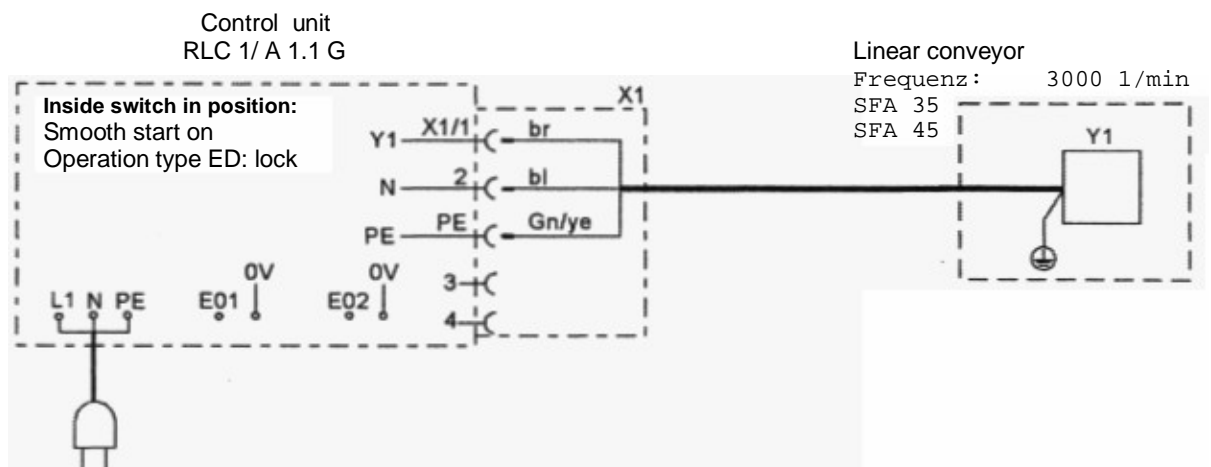
Do not disassemble the electric plug.

Only qualified electricians are permitted to disassemble the electric plug and to shorten or extend electric cables. Only materials of equal quality should be used, and according to the proper technical standards.



Line power via shock-proof plug

230 VAC, L1, N, PE, f=50Hz
maximum prefuse current 16A



Line power via shock-proof plug

230 VAC, L1, N, PE, f=50Hz
maximum prefuse current 16A

8 *Initial Operation*

The conveyor rail on the vibratory conveyor drive must still be empty when first turned on.

- Set the set-point potentiometer to zero.
- Turn on the vibratory conveyor drive with the mains switch.
- Slowly turn the set-point potentiometer of the control unit from zero to 100%.

You should not hear any sound except a slight (more or less so, depending on the potentiometer setting) **humming noise.**

Hard clattering or hammering noises are always a sign of some defect that must be removed.

9 *Operational check*

- Set the set-point potentiometer on the control unit to about 50%. The conveyor motion must have started by now.
- Set optimum conveyor performance by turning up the set-point potentiometer. At the factory the vibratory conveyor was set and tested at some value between 50% and 80% on the set-point potentiometer.

Important: do not set the set-point potentiometer to values higher than absolutely necessary. An excessive vibration amplitude can lead to reduced conveyor performance, and it increases the noise level.

- Monitor the operation for a period of 15 minutes.
Thereby defects caused by transport or improper handling can be detected and repaired before the device starts Production.

10 *Maintenance*

The vibratory conveyor drive and the electronic control unit are maintenance-free. Depending on the model and conveyed material the conveyor rails may show certain signs of wear after a longer period of time. Worn surface coatings can cause a change in conveyor performance.

11 *Trouble-shooting*

11.1 The conveyor does not function at all

If the vibratory conveyor drive fails completely, the control unit and the electric power supply must first be checked by a qualified electrician.

Only qualified electricians may carry out the following work!

Danger due to electric current

Electric wires or plugs with 230V supply may be damaged and may lie exposed.

- Pull out the mains plug and first look for any damage and exposed wires.

Possible sources of malfunction:

-power supply, - switch, - electric fuse, - connecting wires, - power plug of the vibratory conveyor.

- Further measures:

In order to test if the control unit is functional the electromagnet of the vibratory conveyor drive may be run directly on line power for short periods of time.



Important:

In the cases of LF 1 and LF 2 this must be done via an appropriate diode because of the 100 Hz-operation (mechanical frequency).

Please note:

current consumption LF 1: 0.25 A
 LF 2: 0.30 A

If the conveyor drive still does not vibrate the electromagnet must be checked.

For that purpose:

- A strip of sheet steel (no unmagnetisable special steel, or VA etc.) should be held near the magnet air gap.
There should be a noticeable vibration of the sheet.
- Measure the electrical resistance.

A total breakdown caused by mechanical parts is quite unthinkable, since fractures of the leaf spring or a screw can be practically ruled out.

11.2 Conveyor performance decreases

Various reasons for this are possible and must be determined by careful observation.

1. Differences in dimensions and geometry of the conveyed material in comparison to earlier workpieces. Among these may be, e.g., burrs on injection molded parts, or stalks.
2. Excessive vibrational amplitude of the vibratory conveyor drive. The conveyed material is too heavy, slides forward and backward, and cannot follow the large vibrational motion.
3. The vibrational amplitude of the vibratory conveyor drive is too small. Power is lacking.
4. Greased or oily conveyed material (workpieces). The conveyor principle is based on friction between workpiece and conveyor rails. The problem is immediately solved by removing the grease.

12 Alteration of the balance

The vibrational amplitude of the spring-mass system is affected by variations in its balance. Basically there are two possibilities for this:

12.1 Variation of the masses

The total moving mass consists of:

mass of the lower part of the vibratory conveyor, mass of the upper part of the vibratory conveyor, in addition

mass of conveyor rail

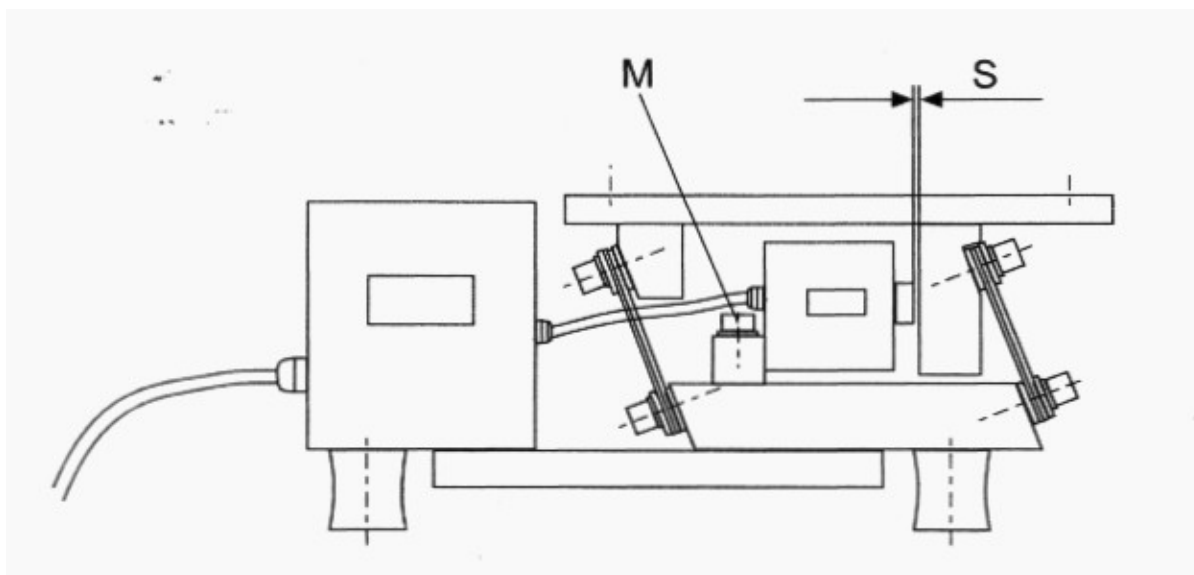
and

mass of part of the load.

Here the user can carry out only very limited alterations. We recommend that you consult with the manufacturer.

12.2 Checking and setting the magnet air gap

With a feeler gauge, check or adjust the magnet air gap in accordance with the following table.

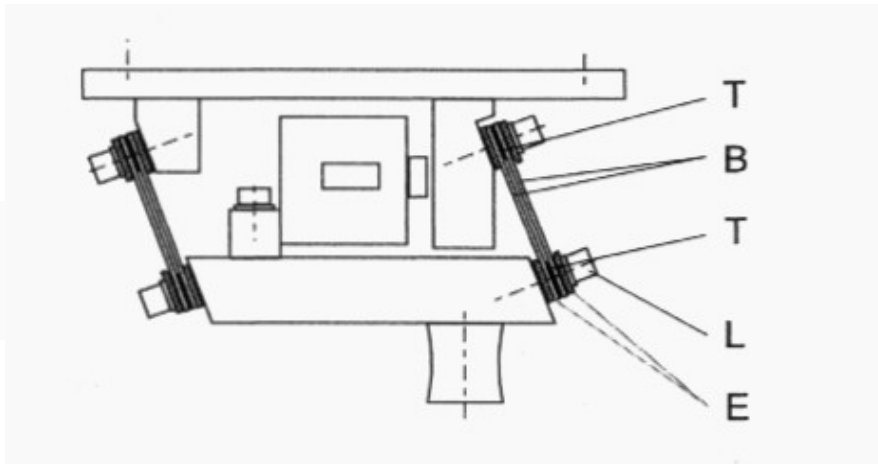


| | LF 1 | LF 2 | LF 3 | LF 4 |
|----------------------------|-----------|---------|-----------|-----------|
| Nominal air gap "S"(mm) | 0.7 - 0.9 | 0.8 - 1 | 1.4 - 1.6 | 2.0 - 2.2 |

- The adjustment is carried out by undoing the screws "M" and moving the magnet.
- Tighten the screws again.

12.3 Changing the spring constant

When there is a change in the workpieces, the material to be conveyed, and hence the mass that is to be conveyed, the spring constant must be adjusted. This can be done by replacing, removing, or adding leaf springs "B".



Determination of the necessary alteration

- Load the vibratory conveyor with material and turn it on, setting a low conveyor speed on the control unit.
- Carefully undo the lower fastening screw of any one of the spring packets while watching any change in the conveying speed.

If the conveying speed increases: **remove** a leaf spring.

If the conveying speed decreases: **add** a leaf spring.

Please note:

The individual spring packets must contain equal numbers of leaf springs if at all possible. Redistribute accordingly, please

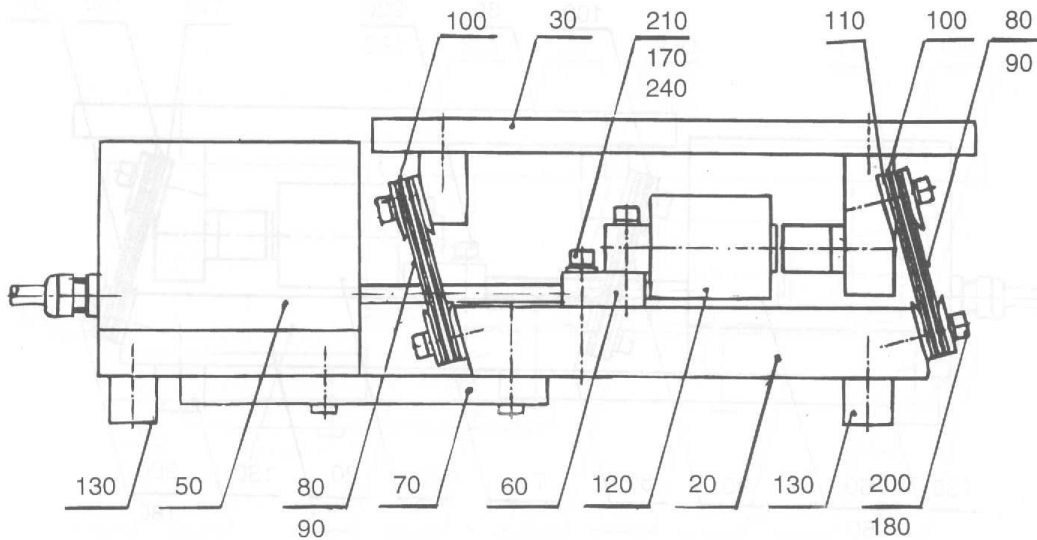
Important:

- Separator plates "T" must always be inserted between individual leaf springs (one each at the upper and lower ends), in order to prevent any rubbing motion between the springs.
- At the outside and inside of the spring packet a clamping plate "E" must be mounted, both at the upper and lower ends.
- Check if all screws are fastened tight.

Note:

Do not use screws stronger than 8.8, and no galvanised screws!

| Pos. | Bezeichnung | Part specification | Pièces détachées |
|------|-------------------|--------------------|--------------------------|
| 10 | | | |
| 20 | Grundplatte | Base plate | Plaque de base |
| 30 | Deckplatte | Plate | Plaque |
| 40 | | | |
| 50 | Gegengewicht | Block | Bloc – cale |
| 60 | Magnethalteplatte | Magnet holder | Support d'électro-aimant |
| 70 | Verbindungsplatte | Shackle | Patte |
| 80 | Blattfeder | Leaf spring | Ressort à lame |
| 90 | Blattfeder | Leaf spring | Ressort à lame |
| 100 | Zwischenplättchen | Separater | Séparateur |
| 110 | Federdruckplatte | Clamping plate | Plaque de fixation |
| 120 | Magnet | Vibration magnet | Aimant vibrant |
| 130 | Gummifuß | Rubber buffer | Tampon en caoutchouc |
| | | | |



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