Operating Instructions for Linear Feeders

SLA 175 – 250
SLA 400 – 400
SLA 400 – 600
SLA 400 – 800
SLA 400 – 1000

Table of Contents

Declaration of Conformity

According to the Low-Voltage Directive 2014/35/EU

We hereby declare that the product meets the following requirements:
Low-Voltage Directive 2014/35/EU

Applied harmonised standards: DIN EN 60204 T1

Remarks:
We assume that our product will be incorporated into a stationary machine.

Rhein-Nadel-Automation

Managing Director
Jack Grevenstein

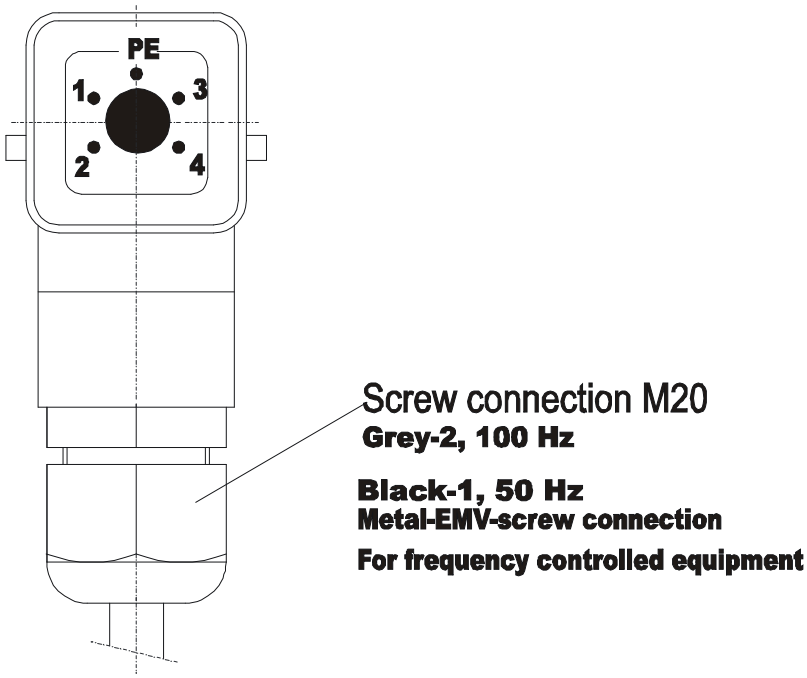
CE

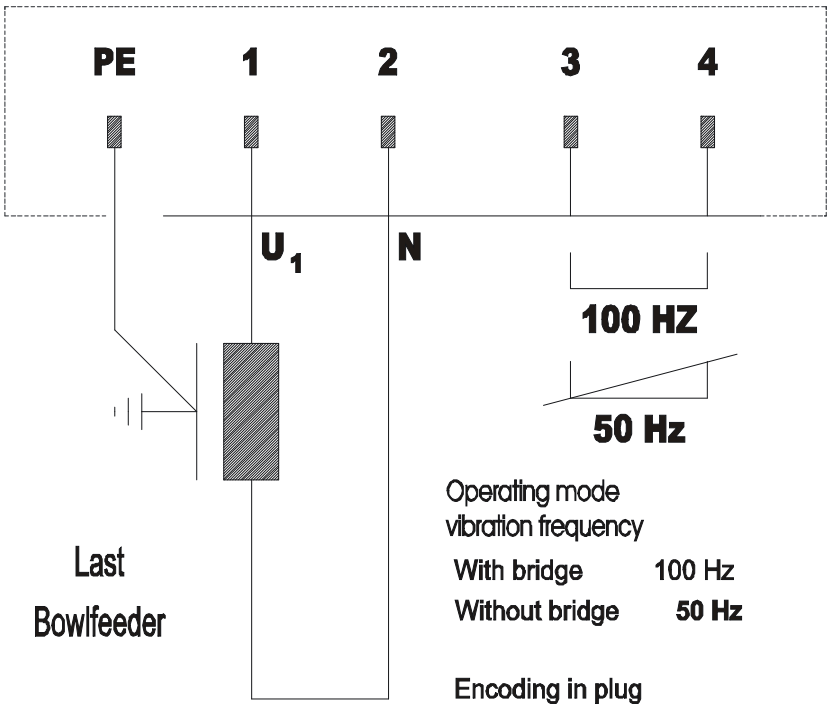
1. Technical data

Notice:
All linear feeders listed in this table shall be operated only in conjunction with an RNA controller and with a mains voltage of 230 V / 50 Hz. For special voltages and frequencies please refer to the separate data sheet.

Notice:
The linear feeders of type SLA are '-2' devices with a vibration frequency of 100 Hz.

Pin assignment





Linear feeder type SLA 175

Linear feeder type	SLA175-250
Dimensions L x W [2)]x H (mm)	305x70x97
Weight	3.3
Degree of protection	IP54
Connecting cable length (m)	1.5
Power input[1)] (VA)	16
Current [1)] (A)	70 mA
Nominal magnet voltage [1)] / frequency (V / Hz)	200/50
Number of magnets	1
Magnet type	WZAW010
Magnet colour	black
Air gap (mm)	0.8
Vibration frequency in Hz/min^{-1}	100 / 6000
Number of spring packs	2
Standard spring configuration of all spring packs	2x neutral springs 1.5mm / 4x 0.75mm / 4x 1.0mm
Spring dimensions (mm) length (borehole gauge) x width	44.3 (35) x 26.7 (12)
Spring thickness (mm)	0.75, 1.0 and 1.5
Property classes of spring fastening bolts	8.8
Tightening torque of spring fastening bolts	3 Nm
Max. weight of vibrating units, linear rail and mounting parts	1.0 - 1.7 kg
Maximum rail length (mm)	375
Maximum part weight of all parts present on the linear feeder	500 g

Linear feeder type SLA 400

Linear feeder type	SLA 400 - 400
Dimensions L x W [2)]x H (mm)	511 x 102 x 168
Weight	11
Degree of protection	IP 54
Connecting cable length (m)	1.5
Power input[1)] (VA)	120
Current [1)] (A)	600 mA
Nominal magnet voltage [1)] / frequency (V / Hz)	200 / 50
Number of magnets	1
Magnet type	WZAW 040
Magnet colour	black
Air gap (mm)	1.2
Vibration frequency in Hz/min$^{-1)}$	100 / 6,000
Number of spring packs	2
Standard spring configuration of all spring packs	2x neutral springs 3mm / 2x 3mm / 2x 3.5mm
Spring dimensions (mm) length (borehole gauge) x width	70 (56) x 40 (18)
Spring thickness (mm)	2.0, 3.0 and 3.5
Property classes of spring fastening bolts	8.8
Tightening torque of spring fastening bolts	12 Nm
Max. weight of vibrating units, linear rail and mounting parts	4 – 5kg
Maximum rail length (mm)	650
Maximum part weight of all parts present on the linear feeder	1 kg

SLA 400 - 600	SLA 400 - 800	SLA 400 - 1000
711 x 102 x 168	911 x 102 x 168	1111 x 102 x 168
14	18.5	22.5
IP 54	IP 54	IP 54
1.5	1.5	1.5
120	120	120
600 mA	600 mA	600 mA
200 / 50	200 / 50	200 / 50
1	1	1
WZAW 040	WZAW 040	WZAW 040
black	black	black
1.2	1.2	1.2
100 / 6,000	100 / 6,000	100 / 6,000
2	4	4
2x neutral springs 3mm / 4x 3mm	4x neutral springs 3mm / 16x 2mm	4x neutral springs 3mm / 8x 3mm
70 (56) x 40 (18)	70 (56) x 40 (18)	70 (56) x 40 (18)
2.0, 3.0 and 3.5	2.0, 3.0 and 3.5	2.0, 3.0 and 3.5
8.8	8.8	8.8
12 Nm	12 Nm	12 Nm
5 - 6.5 kg	6 - 8 kg	8 - 10 kg
850	1050	1250
1 kg	1 kg	1 kg

[1] For special connections (voltage / frequency) see rating plate on the magnet
[2] Width indication for version b (= breit/wide)

2. Safety directives

We have taken great care in design and manufacture of our linear feeder in order to ensure smooth and safe operation. You, too, can make an important contribution towards safety at work. We therefore ask you to read the brief operating instructions completely prior to commissioning the system. Observe the safety directives at all times!

Make sure that all persons working with or at the equipment also read the following safety directives carefully and follow them!

These Operating Instructions only apply to the equipment types indicated on the cover page.

Notice:
This hand indicates useful tips for operation of the linear feeder.

Attention:
This warning triangle indicates safety notices. Non-observance of such warnings may cause serious injury or even death.

Machine hazards

- Hazards arise mainly from the electrical components of the linear feeder. If the linear feeder comes into contact with moisture or liquids there is risk of electric shock.
- Make sure that protective earthing of the power supply system is in perfect condition!

Intended use

The intended use of the linear feeder is the driving of feed rails. They serve for linear transfer as well as correctly oriented and metered supply of bulk products.

Intended use also includes observance of the operating instructions and compliance with the maintenance rules.

For the technical data of your linear feeder please refer to 'Technical Data' in Section 1. Make sure that the rating data of the linear feeder, control system and power supply are compatible.

Notice
Operate the linear feeder in perfect condition only.

Never operate the linear feeder in areas subject to explosion hazards or in wet areas.
Operate the linear feeder only in the configuration of drive unit, control unit and vibratory system agreed with the manufacturer.

The linear feeder must never be subjected to any loads other than the parts for which this special type has been rated and dimensioned.

Attention:
It is strictly forbidden to disable any guards or safety devices!

Equipment user's duties

- Observe the directives given in the operating instructions for any kind of work (operation, maintenance, repairs, etc.).
- Refrain from any working practice that affects the safety at the linear feeder.
- Make sure that only authorised personnel work at the linear feeder.
- Give immediate notice to the management of any changes that have occurred on the linear feeder affecting safety.

Attention:
The linear feeder must be installed, put into operation and maintained by professional personnel only. Observe the legally binding provisions for the qualifications of qualified electrical workers and instructed workers as defined by standards IEC 364 and DIN VDE 0105, part 1.

Caution: Electromagnetic field
Magnetic fields may affect a cardiac pacemaker. Therefore, persons wearing a cardiac pacemaker are recommended to keep a distance of at least 25 cm.

Noise emission

The noise level at the place of use depends on the complete line into which the hopper will be incorporated and on the material to be conveyed. For this reason, sound pressure levels in accordance with the 'Machinery' directive can only be determined at the place of installation. If the noise level at the place of use exceeds the permissible, sound-insulating hoods can be installed which we can offer on request.

2.1. Applicable directives and standards

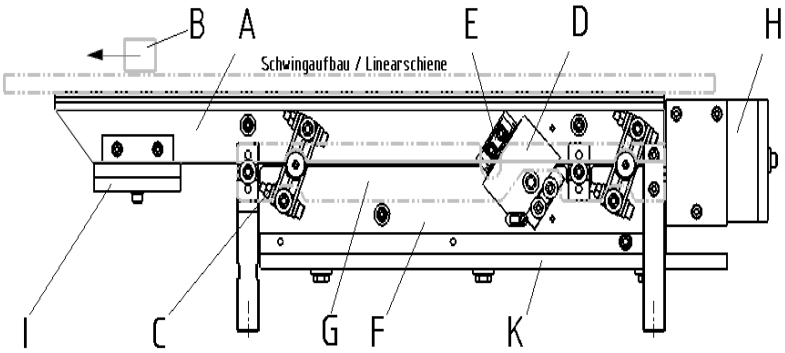
The linear feeder has been manufactured in accordance with the following directives:

- EC Low-Voltage Directive 2014/35/EU
- Electromagnetic Compatibility Directive 2014/30/EU

We assume that our product will be incorporated into a stationary machine.
The applicable standards are specified in the Declaration of Conformity.

3. Design and functional description of linear feeder

Intended use of linear feeders is the feeding of parts. The driving force is provided by an electromagnet. The figure below is a schematic representation of a linear feeder:



A Feed rail and vibrating mass
B Parts handled
C Spring pack
D Driving magnet
E Armature
F Counter mass
G Framework
H Counterweight for counter mass
I Counterweight for vibrating unit
K Balancing weight

The linear feeder belongs to the family of vibratory feeders, but produces a straight-line motion. Electromagnetic oscillations are converted into mechanical vibrations that are used for conveying the parts. When alternating current is applied to the magnet which is rigidly connected to counter mass F, the magnet exerts a force which attracts and releases armature E in synchronism with the mains frequency. Within each period of the 50 Hz A.C. mains supply, the magnet will achieve its maximum power of attraction twice as this force builds up independently of the current flow direction. Accordingly, the vibration frequency is 100 Hz in this case.

A linear feeder is a resonant system (spring-mass system). As a result, its factory set-up will rarely meet your on-site requirements. Section 5 describes in detail how you can adapt the feeder to your specific requirements.

The linear feeder is controlled by a low-loss ESR 2000 type electronic control unit. The linear feeder controller is supplied loose (not installed). The controller has a 5-pin connector on its front panel for connection to the linear feeder. For assignment of the socket pins refer to the technical data in Section 1.

Notice:
For comprehensive information on the full range of control devices please refer to the 'Control Units' operating instructions.

All control devices have two essential operating elements:

- The **power switch** is used to energize and de-energize the linear feeder.
- The **membrane keypad** can be used to set the feed rate of the system.

4. Shipment and installation

Shipment

Notice:
Take care that the linear feeder cannot collide with other objects during handling operations. **The locking pins also serve as shipping braces.**

For the weight of the linear feeder please refer to the table titled 'Technical Data' in Section 1.

Notes on shipping braces
Linear feeder

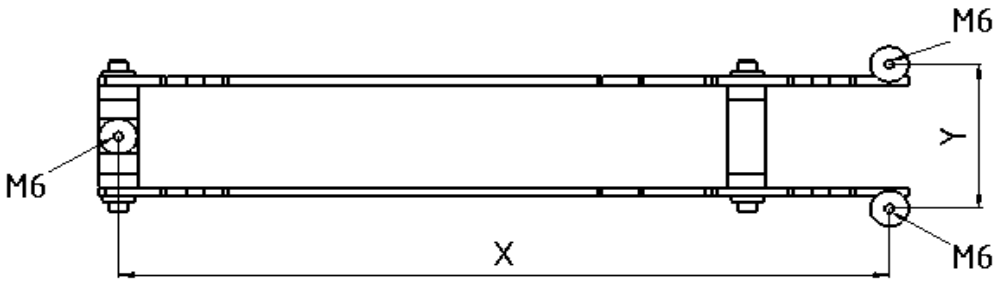
Prior to commissioning, remove the shipping braces marked black and yellow.

Installation

The linear feeder should be mounted on a stable substructure (available as an accessory) at the point of use. This substructure must be dimensioned such as to ensure that it does NOT vibrate during operation.
Fix the linear feeder to the supporting columns (part G in overview drawing of Section 3) from below. Following table gives an overview of the drilling data for the drive units used:

Linear feeder type	Length X in mm	Width Y in mm	Shock absorber thread
SLA 175 - 250	180	58	M6
SLA 400 – 400	250	82	M6
SLA 400 - 600	400	82	M6
SLA 400 - 800	600	82	M6
SLA 400 - 1000	800	82	M6

Table: Drilling data



Make sure that the linear feeder cannot touch other devices during operation.
For further details on the control unit (drilling template, etc.), please refer to the separate operating instructions manual of the controller.

5. Commissioning

Attention:
Make sure that the machine frame (rack, substructure, etc.) is connected to the protective earth conductor (PE). Protective earthing has to be provided by user as necessary.

Attention:
It is imperative that the vibrating drive be connected to the equipotential bonding system of the overall equipment before commissioning. The adaptation points are marked with earth symbols.
See also: DIN EU 60204 / VDE 0100-540

Attention:
Electrical connection of the linear feeder must be made by trained professional electricians only! When making any change to the electrical connection make absolutely sure that the 'Control Units' operating instructions are duly observed.

Verify that

- the linear feeder is arranged freely without contact to any solid body
- the linear rail is properly aligned and firmly bolted in place
- the linear feeder connecting cable is plugged into the control unit.
- The available electricity supply (frequency, voltage, power) must correspond to the connection data of the control system (see rating plate on the control unit).

Plug the cable of the control unit into a power socket and operate the power switch to energize the control unit.

Notice:
For linear feeders that are supplied as a completely set-up system the optimum feed rate has been factory-set.

Optimum tuning is achieved when the desired feed rate is obtained with a controller setting of 80 %. In case of larger deviations (> +/- 15%) you should re-tune the system mechanically.

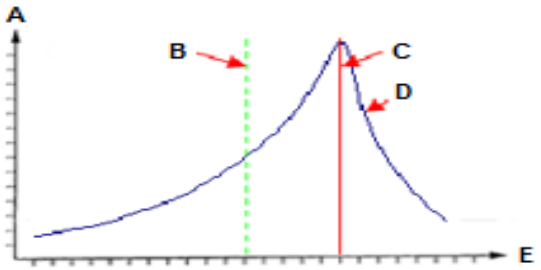
5.1. Tuning

The spring configuration of the linear feeder is dimensioned such that no tuning of the springs is required for the specified rail weights. The feeding speed is controlled via the driving frequency (which must be above than the natural frequency of the vibration system).

Notice:
As a first step, balance the masses by adjusting the weight of the counter mass to match the weight of the linear rail (vibrating mass).

5.1.1. Setting the desired feeding speed

If the desired feeding speed cannot be achieved with the standard spring configuration, you must remove or add springs uniformly on both sides of the spring pack, using a spring stacking device.
The following graph shows the resonance curve of a linear feeder:



A Feed rate
B Desired feeder speed
C Resonance frequency of the system
D Resonance curve
E Spring force (number of springs) increasing

Notice
The resonance frequency of the linear feeder must not coincide with the mains frequency (driving frequency). In most cases, it should be lower than this driving frequency.

When changing springs, take into account that leaves of different thicknesses have different spring forces. As the spring force increases to the square of spring thickness, please note the following examples:

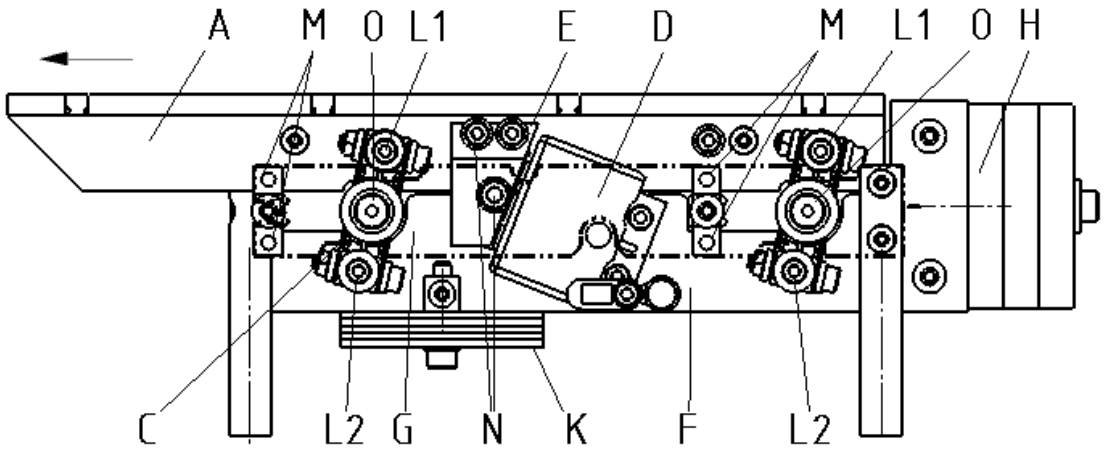
- 0.75 mm spring thickness = 0.56 spring force
- 1.0 mm spring thickness = 1.00 spring force
- 1.5 mm spring thickness = 2.25 spring force
- 2.0 mm spring thickness = 4.00 spring force
- 3.0 mm spring thickness = 9.00 spring force
- 3.5 mm spring thickness = 12.25 spring force

One 2.00-mm thick leaf spring produces approximately the same spring force as four 1.00 mm thick leaf springs. It is always recommended, therefore, to perform the final adjustment / fine-tuning with thin leaf springs.

Notice:
Changing the counter mass or the vibrating mass (by adding or removing counterweights or add-on weights) will change the conveying speed or the natural frequency, respectively, of the linear feeder. It may become necessary to change the driving frequency. The driving frequency should be between 95 and 105 Hz.

It can be assumed that if the masses of vibrating and counter mass are equal the amplitudes of the two masses will be equal, too. If this is not the case with the linear rail attached the difference in speed must be compensated by adding or removing weights. For a system with sub-critical tuning (natural frequency is below the driving frequency of current) the amplitude can be decreased by mounting weights.

Changing the spring configuration on SLA 175 type linear feeders



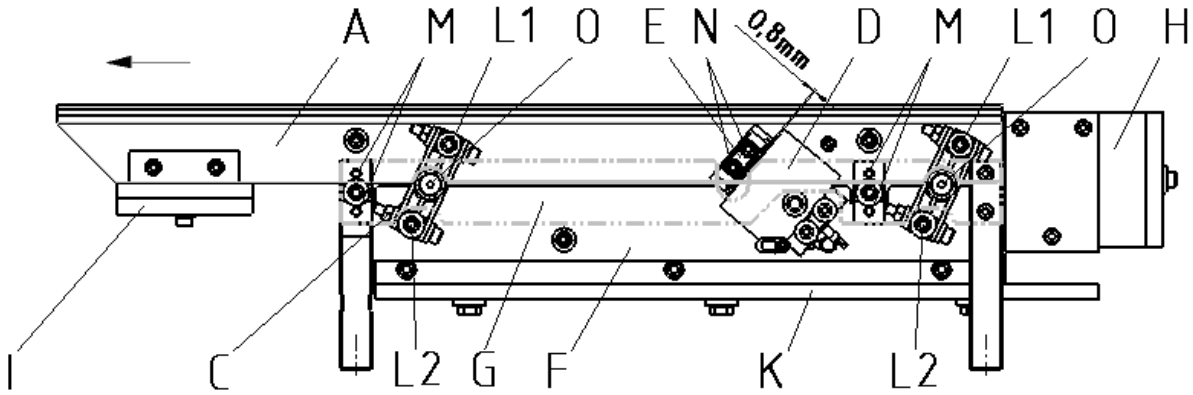
Remove the 4 upper lateral spring fastening screws 'L1' (M4 x 10 DIN 912). Now you can lift out the complete vibratory unit, with feed rail attached. The linear feeder is now open to the top. Insert the Ø4 mm locking pins supplied into the lower holes marked with 'M' to ensure that the framework stays properly aligned to the counter mass.
Remove the desired spring pack by removing the lower lateral spring fastening screws 'L2' (M4 x 10 DIN 912) and shaft 'C' (SW 4).

When working on the dismounted spring pack use a spring stacking device to ensure that the individual components of the spring pack stay in position. Screw the spring pack into the device and clamp the device into a vise. Always add or remove springs symmetrically to the axis, i.e. always add or remove 2 springs at a time. Insert spacers between the individual springs. Then tighten the spring fastening screws to a torque of 3.5 Nm. Now insert the entire spring pack into the substructure. Insert the lower spring fastening screws, mount the shaft and put the vibratory unit back in place. For alignment of the vibratory unit insert the pins supplied into the upper holes marked with 'M'. Now you can tighten the individual spring packs at the desired spring angle.

Notice:
Tighten the upper and lower spring fastening screws 'L1 / L2' to a torque of 3.5 Nm. Make sure to slightly tighten **shafts** 'O' **carefully** to a torque of 2 Nm only.

The locking pins supplied serve for alignment of the components and as shipping braces.
Take care to remove these pins before starting the linear feeder.

Changing the spring configuration on SLA 400 type linear feeders



Remove the 4 upper lateral spring fastening screws 'L1' (M6 x 14 DIN 912). Now you can lift out the complete vibratory unit, with feed rail attached. The linear feeder is now open to the top. Insert the Ø6 mm locking pins supplied into the lower holes marked 'M' to ensure that the framework stays properly aligned to the counter mass. Remove the desired spring pack by removing the lower lateral spring fastening screws 'L2' (M6 x 16 DIN 912) and shaft 'C' (SW 5).

When working on the dismounted spring pack use a spring stacking device to ensure that the individual components of the spring pack stay in position. Screw the spring pack into the device and clamp the device into a vise. Always add or remove springs symmetrically to the axis, i.e. always add or remove 2 springs at a time. Insert spacers between the individual springs. Then tighten the spring fastening screws to a torque of 12 Nm. Now insert the entire spring pack into the substructure. Insert the lower spring fastening screws, mount the shaft and put the vibratory unit back in place. For alignment of the vibratory unit insert the lock pins supplied into the upper holes marked 'M'. Now you can tighten the individual spring packs at the desired spring angle.

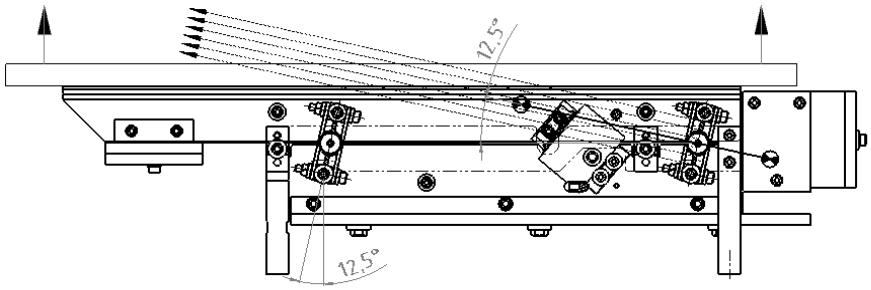
Notice:
Tighten the upper and lower spring fastening screws 'L1 / L2' to a torque of 12 Nm. Make sure to slightly tighten **shafts** 'O' **carefully** to a torque of 3.5 Nm only.

The locking pins supplied serve for alignment of the components and as shipping braces.
Take care to remove these pins before starting the linear feeder.

5.1.2. Adjusting the desired feeding behaviour / synchronism of the linear feed rail

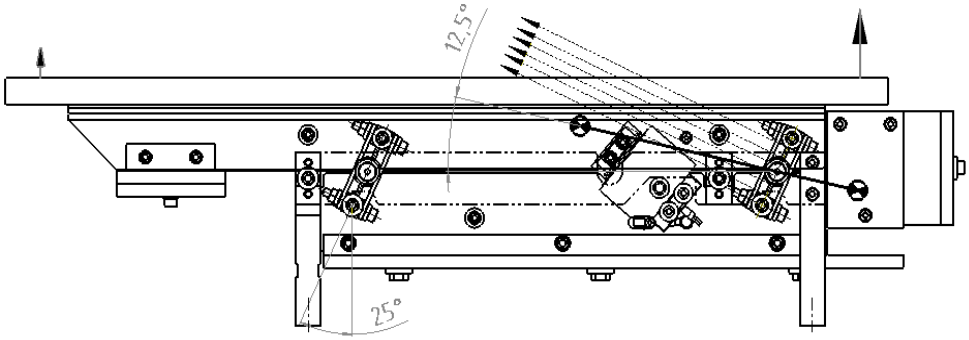
For a linear feed rail to operate smoothly and in synchronism, the spring angle must be set to be identical to the centre-of-gravity angle. The centre-of-gravity angle is determined by the locations of the centres of gravity of the vibrating mass and of the counter mass.
In the drawing the centres of gravity of vibrating mass and counter mass are marked by circles.

Example based on a centre-of-gravity angle of 12.5 deg.



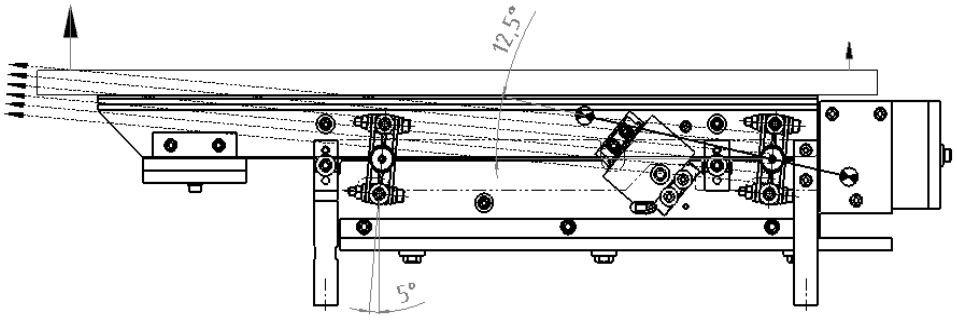
Spring angle equal to centre-of-gravity angle

The spring force is directed to attack exactly at the vibratory unit's centre of gravity.
Result: the height amplitude is equal on the run-in and run-out sides.



Spring angle larger than centre-of-gravity angle

The spring force is directed to attack ahead of the vibratory unit's centre of gravity.
Result: the height amplitude on the run-in side is greater than on the run-out side.



Spring angle smaller than centre-of-gravity angle

The spring force is directed to attack behind the vibratory unit's centre of gravity.
Result: the height amplitude on the run-in side is smaller than on the run-out side.

If the two angles are not identical, the feed rail will not run smoothly.

You can adjust the centres of gravity or spring angles, respectively, by the following means:

- adding or removing counterweight 'H'
- adding or removing additional counterweight in the vibratory unit's run-out area 'I'
- dimensioning the rail length and height such as to create an adjustable centre of gravity at the vibrating mass
- dimensioning the rail weight according to specifications such as to ensure equal weight of vibrating mass and counter mass
- adjusting the spring angle to match the centre-of-gravity angle.

On linear feeders of types SLA 175 and SLA 400, the spring angle can be adjusted between 5 and 25 degrees. If the centre-of-gravity angle lies outside this range, the rail cannot run smoothly and in synchronism. It is necessary in that case to adapt the centres of gravity of the reaction mass and vibrating mass through the measures listed above.

Spring angle adjustment

In order to adjust the spring angle fix the position of the vibratory unit relative to the counter mass. (see section 5.1.1 'Changing the spring configuration on linear feeders'). For this, insert the four locking pins supplied. Then loosen the four lateral spring fastening screws ('L1' + 'L2). Now adjust the spring packs as uniformly as possible (see also section5.1.2). Then re-tighten the spring fastening screws to the specified tightening torque (see Section 1, 'Technical Data') and remove the locking pins.

Adjusting the magnet air gap

The factory setting of the air gap between armature and coil is indicated in the 'Technical Data' in Section 1.

Adjustment of this air gap can be performed from the outside without dismounting any components. Slightly slacken the two exterior armature fastening screws 'N'. Insert a wire (0.8 / 1.2 mm in diameter, 80 mm long) in each of the two holes in the vibratory unit's supporting member. Make sure that the wire does not enter the groove of the armature. Adjust the air gap (0.8 / 1.2 mm, see section 1, 'Technical data') by pressing down the two armature fastening screws against the direction of travel, then tightening them.

Notice:
If the rotary knob on the controller is set to 100% and the air gap correctly set, the magnet must not hit the armature upon power-on. If it does, proceed as described under section 5.2. (removal of springs)

Objective of the tuning procedure:

When the desired feeding speed is obtained at a controller setting of 80%, it must increase when a weighting plate is removed.

Notice:
Make sure that the number of springs per spring pack will not deviate by more than 1 spring.
Also make sure that the springs are packed symmetrically to the bearing spring.

6. Feed rail design rules

As the rail section (vibratory mass) and the counter mass of linear feeder type SLA must be equal, the weight of the feed rail must be considered during rail design.

Rail projections beyond the vibratory unit of max. 50 mm at the entry (25 mm for SLA 175) and max. 200 mm at the exit (100 mm for SLA 175) can be realized, however, the rail projection at the exit should always be larger than that at the entry (observe a ratio of 1/3 to 2/3).

In order to obtain resistance to lateral torsion use a one-piece support plate / adapter plate for the rail.

Recommended adapter plate thicknesses for SLA linear feeders in mm and rail weight in kg

Size	Adapter plate / aluminium	Rail weight of complete rail
SLA175-250	10	1.0 - 1.7 kg
SLA400-400	12	4.0 - 5.0 kg
SLA400-600	12	5.0 - 6.5 kg
SLA400-800	12	6.0 - 8.0 kg
SLA400-1000	12	8.0 - 10.0 kg

By changing the profiles of the linear feeder from the left to the right and vice versa you can obtain the narrow 'S' version or the wide 'B' version.
The higher the feeding speed the higher the clearance should be made between top of product and bottom of feed rail cover. This clearance should be set to the largest acceptable value. When mounting the feed rail observe the following:

- Mount it closely above the top of the vibratory unit.
- Locale as precisely as possible on the aluminium profile center.
- Use stable rigid screws (M5 as a minimum). For type SLA 175 use M4 for the adapter plate.
- In order to obtain a higher feeding speed the linear feeder can be installed with a slight inclination in feeding direction /about 3 to 5 degrees).
- Never use any loose or hinged covers not firmly bolted in place.

The feed rail may be made up of several short sections to be joined and screwed in place on the adapter plate. At the entry, flat chamfers assist product transfer from one feed rail section to another.

The split design of several sections is recommended especially for hardened or case-hardened rails (made for low distortion).

Lightweighting of feed rails can be realized by using aluminium strips or profiles. The required wear resistance can then be obtained by segments of hardened spring steel strip bolted in or on.

7. Maintenance

Linear feeders basically require no maintenance. They should be cleaned when soiled or after coming into contact with liquids.

- Before starting such work be sure to pull the mains plug.
- Clean the inside of the linear feeder (dismount components as necessary), and in particular the air gap of the coil.
- After remounting the components and plugging in the mains plug the linear feeder is again ready for operation.

8. Spare parts and customer service

For efficient work on the linear feeders several tools are required, among others the spring stacking device, the locking pins and the coil gap gauge.

As the linear feeder is designed for a long service life, spare parts are not required frequently.
Should a defect occur nonetheless, it mostly concerns the rubber bearings or magnets.
When ordering new parts, please specify the device type (see rating plate), the spare part designation (with article code if available) and the quantity required.

For a list of Service Center addresses refer to the back cover page of this manual.

9. What if... (Advice on troubleshooting)

Attention:
Only professional electricians are allowed to open the control unit or connector. Pull the mains plug before opening!

If the rail feeding speed or height amplitude is not uniform but rather higher at the exit than at the entry, this indicates that the spring angle is incorrectly set relative to the centre-of-gravity angle (see Section 5.2.2. In this case proceed as follows:

- Increase the spring angle on all spring packs.
- Fit additional weighting plates to counterweight 'H'.
- Install additional weight 'I' in the vibratory unit's supporting member.

If the rail feeding speed or height amplitude is not uniform but rather higher at the entry than at the exit, this indicates that the spring angle is incorrectly set relative to the center-of-gravity angle (see Section 5.2.2.). In this case proceed as follows:

- Decrease the spring angle on all spring packs.
- Remove additional weighting plates from counterweight 'H'.
- Remove additional weight 'I' from the vibratory unit's supporting member.

If the rail speed is uniform but the running behaviour is instable and the product jumps too much between rail contact surface and top cover, this indicates that the centre-of-gravity angle and the set spring angle of the overall system and thus the height amplitude is too large. In this case proceed as follows:

- Change the centre-of-gravity angle (more 'flat') by attaching additional weighting plates to the counterweight 'H', installing an additional weight into the vibratory unit supporting member 'I' and making the feed rail lighter, if necessary.
- Adjust the spring angle to match the new centre-of-gravity angle.

If despite uniform height amplitude the running behaviour is unstable, especially with product having a large contact area or oil-contaminated parts, this indicates that the centre-of-gravity angle and the set spring angle of the entire system is too small. The height amplitude is too small. This prevents the throwing motion and in case of oily product the adhesive force is higher than the throwing force, i.e. the product cannot take off. In this case proceed as follows:

- Change the centre-of-gravity angle (more 'steep') by removing weighting plates from counterweight 'H' and removing the additional weight from the vibratory unit supporting member 'I'.
- Adjust the spring angle to match the new centre-of-gravity angle.

If it is impossible to set-up the feed rail properly by following the above procedures and if lateral oscillation occurs or 'dead spots' are found in certain areas, then the stiffness of the rail is insufficient. The abutment joints move relative to one another or non-symmetric rail sections lead to non-uniform running behaviour. In this case proceed as follows:

- Mount lateral and transversal ribs in order to increase the section modulus and screw abutment joints together in overlapping fashion.

- Counter-balance non-symmetric sections by weights or replace by material lighter in weight.

Fault	Potential cause	Remedy
Linear feeder does not start on power up	- Power switch off - Mains connector of control unit not plugged-in - Connecting cabled between linear feeder and control unit not plugged-in - Defective fuse in control unit	- Close power switch - Plug in the mains connector - Plug 5-pin connector into control unit - Replace fuse
Only slight feeder vibration 	- Controller setpoint too small - Shipping locks or braces not removed - Wrong vibration frequency **Attention:** **If you operate the linear feeders of type SLA 175 - 400 without having inserted the jumper in the 5-pin connector, there is a risk of damage to the controller and magnet!**	- Set controller to 80 % - Remove shipping locks or braces. - Check that coding in plug connector of the linear feeder is correct (see rating plate and 'Technical Data' (Section 1)) - Vibration frequency between 95 Hz and 105 Hz when using a frequency controller.
The linear feeder no longer meets the required feed rate after prolonged operation.	- Fixing screws of linear rail have come loose. - Screws of one or more spring packs have come loose. - Misadjusted coil-to-armature gap - Vibratory unit displaced towards the counter mass	- Re-tighten the screws - Tighten screws (for tightening torques see 'Technical Data' in Section 1). - Readjust the air gap (for gap size see 'Technical Data' in Section 1). - Re-adjust the vibratory unit (see Section 5.2.1).
Linear feeder makes loud noises	- Foreign matter in air gap	- Stop linear feeder and remove foreign matter. Then check the coil-to-armature gap.
Linear feeder cannot be tuned to a permanently constant feeding speed.	- The spring constant of the vibrating system has changed. The linear feeder operates close to the resonance point.	- Re-tune the linear feeder. Remove springs. See Section 5: Tuning

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