Linear feeder
HLF07-M / 12-M / 25-M / 50-M



Translation of operating and installation instructions

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This operation instruction applies to:

Type			Order number
Linear feeder	HLF07	230 V / 50 Hz	50260370
		115 V / 60 Hz	50270718
Linear feeder	HLF12	230 V / 50 Hz	50259924
		115 V / 60 Hz	50270770
Linear feeder	HLF25	230 V / 50 Hz	50259276
		115 V / 60 Hz	50270897
Linear feeder	HLF50	230 V / 50 Hz	50421880
		115 V / 60 Hz	50431259

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Date: 07/01/2021

Following US patents are registered or announced:

- Linear vibratory conveyor (U.S. Patent No.7,784,604)
- Linear vibratory conveyor (U.S. Patent No.8,051,974)

Following Canadian patents are registered or announced:

- Linear vibratory conveyor Hybrid (CA-Patent No.2,636,171)
- Linear vibratory conveyor (CA-Patent No. 2,636,968)

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1 Safety instructions

1.1 Explanation of symbols and notes

Symbols: Assembly and commissioning must be carried out by qualified personnel only and according to these operating instructions.

Please observe the meaning of the following symbols and notes. They are grouped into risk levels and classified according to ISO 3864-2.

DANGER	
	**Indicates an immediate threatening danger.** **Non-compliance with this information can result in death or serious personal injuries (invalidity).**

WARNING	
	**Indicates a possible dangerous situation.** **Non-compliance with this information can result in death or serious personal injuries (invalidity).**

CAUTION	
	**Indicates a possibly dangerous situation.** **Non-compliance with this information can result in damage to property or light to medium personal injuries.**

NOTE	
	**Indicates general notes, useful operator tips and operating recommendations which don't affect safety and health of the personnel.**

1.2 Basic safety information

Familiarity with these basic safety rules and regulations constitutes the fundamental prerequisite for safe handling and trouble-free operation of afag HLF linear feeders.

These operating instructions contain the most significant regulations for safe HLF operation. These operating instructions - and in particular the safety regulations - must be observed by anyone working on and with the HLF. The applicable on-site accident prevention rules and regulations must also be observed. These operating instructions must always be kept handy where the HLF is operated.

Operation of the hopper is only to be carried out by technically qualified personnel.

Qualified personnel are deemed to be persons who, by reason of their training, experience and instructions as well as their knowledge of the prevailing standards, regulations, accident prevention regulations and operational conditions, have been authorized by the people responsible for the safety of the system to perform the required activities, and who are capable of recognizing possible hazards and avoiding them (definition of qualified personnel as per IEC 364).

Any malfunctions that may have an adverse effect on the safety of any persons, the HLF or other material assets must be eliminated without delay.

The following instructions are not only intended to ensure the personal safety of the operators but also the operation of the products described and the devices connected to them:

1.2.1 Electrical hook up

NOTE	
	▪ **Disconnect the power supply prior to assembling or dismantling as well as when changing fuses or carrying out installation modifications.** ▪ **Observe all current accident prevention and safety regulations applicable to particular cases of operation.** ▪ **Check whether the rated voltage of the hopper coincides with the local power supply prior to putting into operation.** ▪ **All E-Stops must remain effective for all modes of operation. Unlocking the E-Stops must not, under any circumstances, cause uncontrolled restarting of the hopper.** ▪ **The electrical connections must be safeguarded!** ▪ **Ground wires must be checked for proper function subsequent to assembly!** ▪ **Hook-up is only to be carried out by authorized personnel.**

1.2.2 Specific danger points

NOTE	
	**Afag HLF linear feeders are state-of-the-art equipment designed in compliance with the EU Machinery Directive and accepted safety regulations. Nevertheless, however, risks may arise from using this equipment that may endanger life and limb of user or third parties and cause interference with the HLF or other material assets.**

1.3 Intended use

The HLF is intended exclusively for the transporting and buffering of components and can also be used for component sorting. For maximum permissible dimensions and weights of add-on components, observe details in chapter 2.3 Table 1: Technical data, chapter 3 Assembly instructions and chapter 4 Operating instructions. Appropriate use also includes observation of all Notes in these operating instructions.

WARNING	
	**The KLF may <u>not</u> be used:** a) in damply and wet area b) in temperature lower than 10°C or higher than 45°C c) in areas where readily flammable media are present d) in areas where readily explosive media are present e) in heavy polluted or dust- laden area f) in aggressive area (e.g. saliferous atmosphere)

None modification or reconstruction are allowed. The Tracks (in the chapter 4.1 Feeder track design and in the chapter 3.3 Mounting of the useful mass) as well as the accessories (chapter 6) are excluded from this arrangement.

NOTE	
	**Any use other than that described above is deemed to be improper and will cause the warranty to terminate.**

Also refer here to our general terms and conditions of sale.

1.4 Notes for Pacemakers and Defibrillators

Afag vibration conveyors are tested in accordance with regulation 15 of the German Statutory Accident Insurance Association [Deutsche Gesetzliche Unfallversicherung, DGUV] (previously BGV B11 of German Accident Prevention Regulations). The permissible values of exposure area 2 are not exceeded, therefore no measures are required pursuant to Section 4 (2) of the DGUV regulation 15. The definitions of Section 12 “Indirect Effects, Medical Implants” remain unaffected by the above.

The alternating magnetic fields that occur in the immediate vicinity of certain vibration conveyors may affect the proper functions of active implants, i.e. pacemakers and defibrillators. Anyone with active medical implants, for which no individual risk assessment has been provided, must observe the specified safety distances to the vibration conveyors. The distances each relate to the position of the upper body and the active medical implant relative to the field source.

Type	Safety Distance
HLF07 / HLF12	--
HLF25 / HLF50	10 cm

2 Description of the device

2.1 General

Afag Type HLF-M Linear Feeders are used to remove parts from upstream machines and/or feed parts to downstream machines. Afag Linear Feeders are also used for sorting parts, with due consideration of various criteria. Linear feeders are fitted in individual feeding units as well as in complex assembly systems.

The different types of Linear Feeders vary in size and application (see Table 1: Technical data)

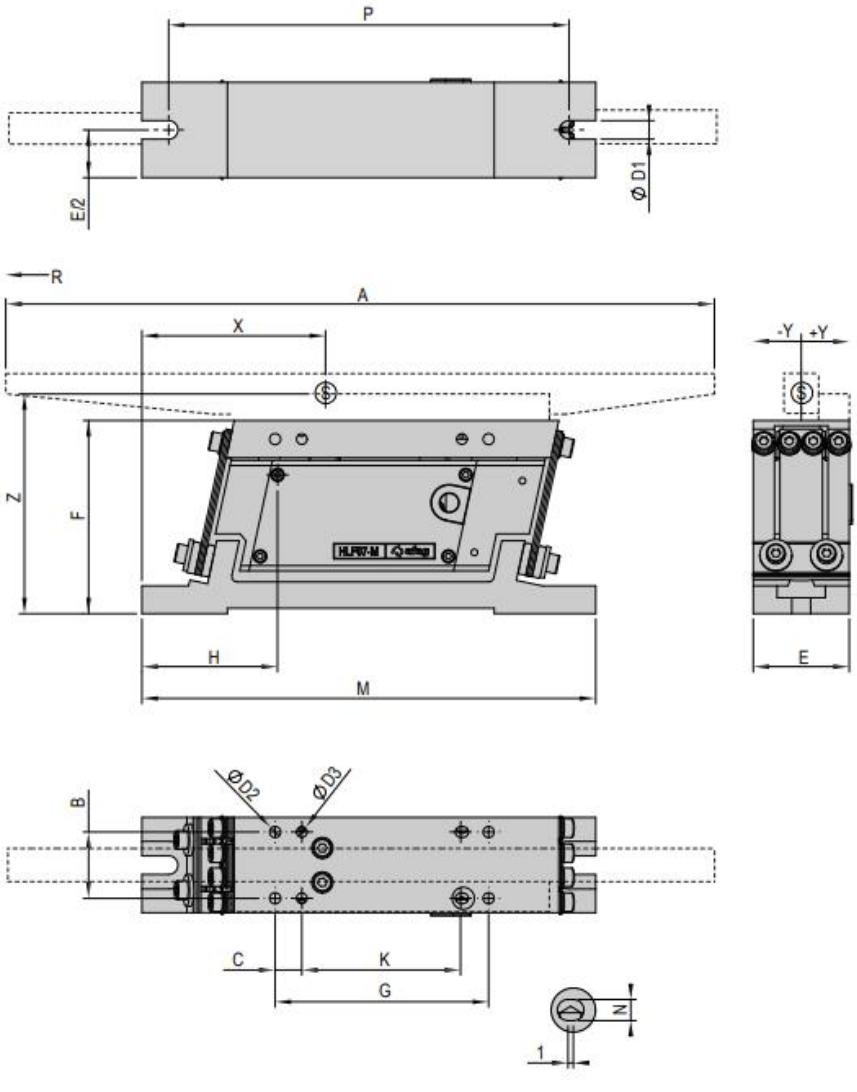
NOTE	
	**HLF feeders are to be operated in conjunction with an Afag control unit. This is the only combination that will guarantee perfect transport characteristics.**

2.2 Functional description

HLF-M devices consist of two oscillating parts arranged on top of each other which oscillate asynchronously. Slotted leaf springs connect these to a common base plate at which the opposing oscillating forces virtually cancel each other out. The oscillating part on top is used as a structure (working weight) for attaching the feeder track. The lower oscillating part is the counterweight. A magnetic system (magnet armature – magnet core) is fitted horizontally between the two oscillating parts. The positive features of the HLF-M Linear Feeder are based on the balance of the working weight and the counterweight, eliminating the majority of free oscillating forces directly in the machine.

2.3 Technical data

Figure 1: *Dimensions HLF*



R = Feeding direction
S = Track center of gravity

Table 1: *Technical data*

Description		Units	HLF07-M	HLF12-M	HLF25-M	HLF50-M
Dimension	A	[mm]	300	400	500	700
	B	[mm]	25	30	38	44
	C	[mm]	10	10	10	10
	D1	[mm]	7	9	9	11
	D2	[mm]	4 x M5	4 x M5	4 x M6	4 x M6
	D3	[mm]	2 x 4^{H7}	2 x 4^{H7}	2 x 5^{H7}	2 x 5^{H7}
	E	[mm]	36	42	50	60
	F	[mm]	73	80	108	140
	G	[mm]	80	100	120	190
	H	[mm]	50	59	86,5	96,8
	K	[mm]	60	80	100	170
	M	[mm]	170	200	260	350
	N	[mm]	2 x 4^{H7}	2 x 4^{H7}	2 x 5^{H7}	2 x 5^{H7}
	P	[mm]	150	180	240	320
Ideal track weight		[kg]	0,7 ± 0,05	1,2 ± 0,05	2,5 ± 0,1	5,0 ± 0,1
Max. track weight		[kg]	0,9	1,5	3,0	5,5
Weight of basic device		[kg]	1,8	3,0	6,3	12,5
Mech. osc. frequency		[Hz]	Double supply frequency			
Power supply		[V/Hz]	230/50 or 115/60			
Max. power consumption		[VA]	15	19	100	170
Degree of protection		-	IP 54			
Temperature range for operation		[C°]	+10 to +45			
Noise emission: Continuous noise pressure level (without transported material)		[dB]	<70			
Measuring height/measuring distance		[m]	1,6/1			
Measurement direction with respect to the noise source		[°]	90			
Measurement method		-	A-evaluation			

Various sizes are available (see Table 1: Technical data) depending on the area of application and available space. The main criterion is the working weight (track length) and the space available for installation.

Two Afag Linear Feeder versions are available: 230V/50Hz and 115V/60Hz.

Various Afag control devices (see chapter 6.3 Control device) are available for controlling the Linear Feeder.

3 Assembly instructions

3.1 Transport

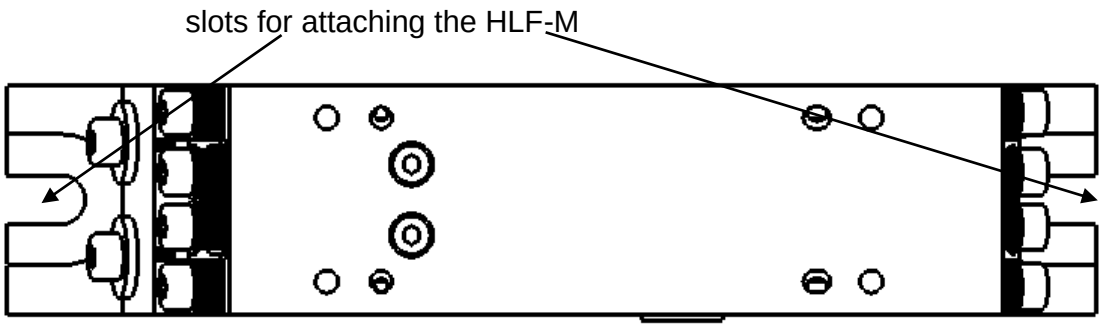
WARNING	
	**Improper use of transport means (industrial trucks, cranes, technical aids, sling gear etc.) may lead to bruises and other injuries.** **Required behaviour:** ▪ **Observe and follow the transport and maintenance instructions** ▪ **Proper use of transport means**

CAUTION	
	**During transport, the linear feeder must only be held by the base.** **The linear track is no lifting point.**

3.2 Installing the unit

The HLF-M is firmly screwed to the foundation structure by means of slots provided in the base plate (see Figure 2). This precisely defines the interfaces where the feeder track enters and exits as well as allowing adjustment. The substructure should be non-oscillating in a horizontal plane in order to be able to take up any residual forces. Self-supporting profile constructions have to be reinforced with a base plate to which the Linear Feeder is attached. A steel plate of at least 20mm thickness and a width of over 120mm should be used for this purpose. The vertical oscillating forces responsible for energy induction in the foundation structure should be virtually completely eliminated by a careful balance of weights (see chapter 4.2 Balance of weights). Height adjustments can be achieved by means of appropriate substructures. Standard Afag components are available for setting up complete units.

Figure 2: *Attachment slots in the base plate*



3.3 Mounting of the useful mass

3.3.1 General

The HLF-M Linear Feeder is based on a balance of the oscillating forces by the principle of opposing oscillation (push-pull). In order to ensure an effective balance of oscillating forces, it is necessary to keep the lines of action of the centres of gravity of the working weight and counterweight as close together as possible. The position of the centre of gravity of the counterweight is determined by the Linear Feeder design. The centre of gravity of the working weight is determined by the construction design specified for the working weight (e.g. feeder track). In order to ensure a good balance of oscillating forces with minimum residual oscillation, the overall centre of gravity of the working weight has to be located within the area specified in Table 2: Limiting coordinates for the position of the centre of gravity of the working weight.

Figure 3: *Centre of gravity range*

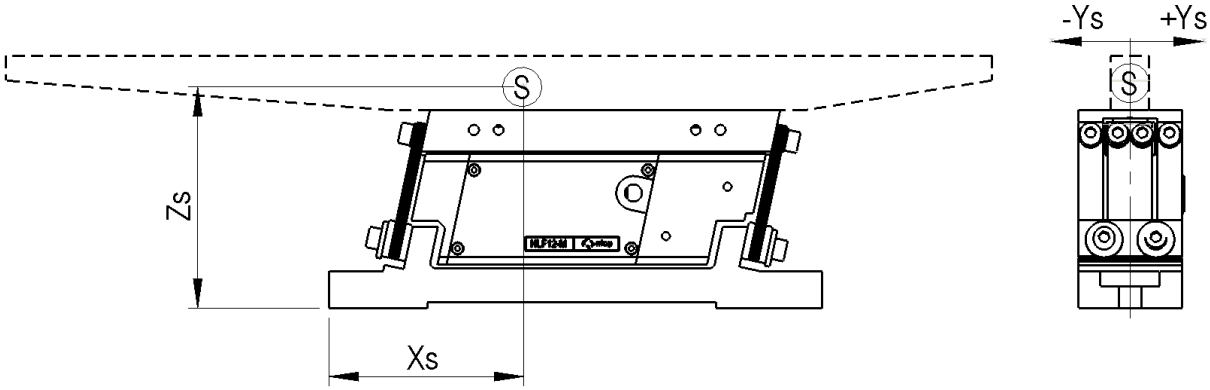


Table 2: *Limiting coordinates for the position of the centre of gravity of the working weight*

		HLF07-M	HLF12-M	HLF25-M	HLF50-M
Dimension [mm]	X_s	85 ± 10	105 ± 10	135 ± 20	120 ± 15
Dimension [mm]	Y_s	0 ± 9	0 ± 10	0 ± 12	0 ± 15
Dimension [mm]	Z_s	$77 \pm 8{,}5$	84 ± 11	110 ± 15	165 ± 10

3.3.2 Mounting a linear track

The feeder track is attached by means of a side plate (see Figure 4). The side plate is fixed precisely and reproducibly using fitting pins. Vertical slits in the side plate are provided for feeder track attachment, allowing fine adjustment of the track entry and exit interfaces in a vertical direction.

Figure 4: *Attachment using a side plate O*

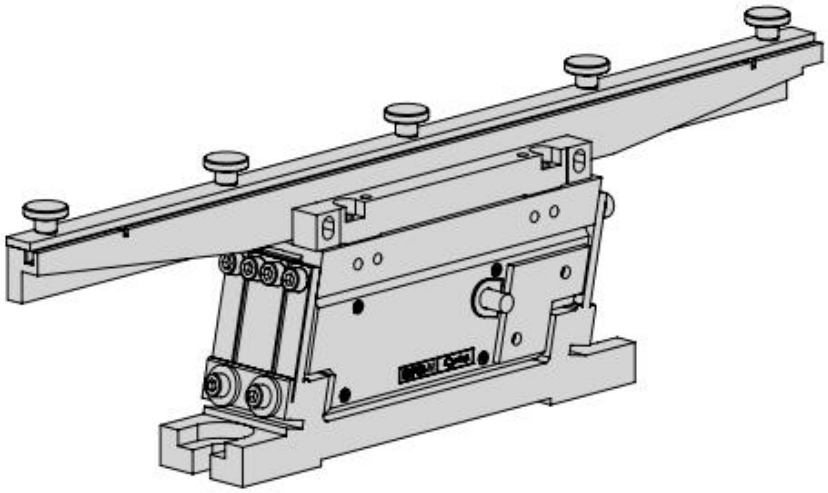
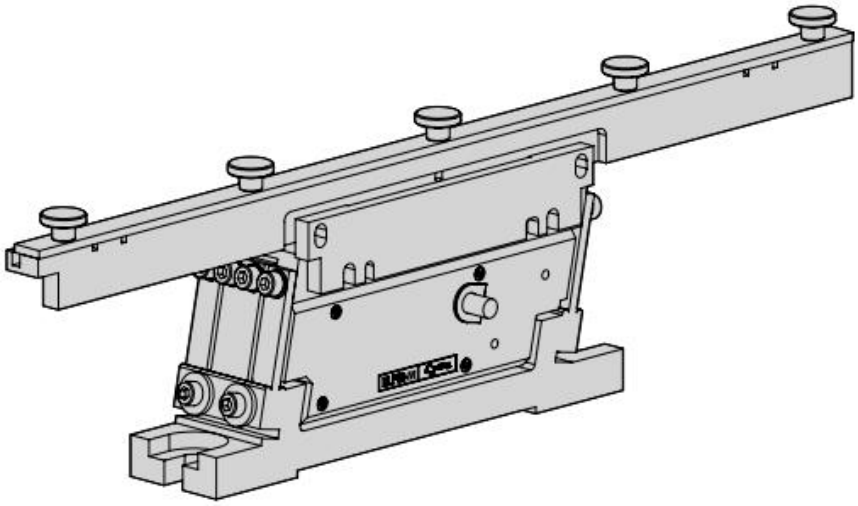


Figure 5: *Attachment using a side plate S*



HINWEIS	
	The useful mass has to correspond to the values specified in chapter 4.2 Balance of weights.

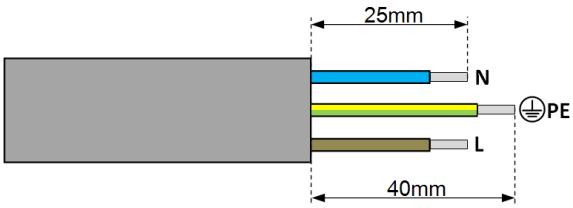
3.4 Power supply

WARNUNG	
	▪ **Any work performed on the electrical supply may only be performed by trained, authorised, qualified personnel!** ▪ **The power supply must be protected by an FI switch (provided by the customer).** ▪ **The linear feeder may only be operated with the power supply specified on the name plate.**

The control device IRG1-S is used for the activation of the linear feeder. The MSG801 or MSG802 can also be used. Please note that an additional CEE connector plug is required for the MSG controllers (Order number: 11006982)

Installation of the plug is only to be carried out by technically qualified personnel according Figure 6: End of the wire for additional plug.

Figure 6: *End of the wire for additional plug*



4 Operating instructions

The first step in adjusting the linear feeders is always to balance the masses and then to adjust the natural frequency.

4.1 Feeder track design

The linear tracks must be unyielding so that the transport pulses generated by the unit are fully transferred to the work pieces and no superimposed natural vibration can adversely affect the transport process. This requirement has priority over mass reduction measures. The preferred material for linear tracks is tool steel (e.g. 1.2842, 90MnCrV8). Linear track design should adhere to the useful masses specified in chapter 2 Table 1: Technical data and Table 4: Obligatory values for the working weight

The following size ratio should be aimed for with regard to the feeder track cross-section:

$$\frac{Height}{Breadth} = \frac{2}{1}$$

The recommended dimensions are listed in Table 3: *Linear track dimensions*. The dimensions are for one vibrating section and can be applied to each of the two vibrating sections.

Table 3: *Linear track dimensions*

	HLF07	HLF12	HLF25	HLF50
Length [mm]	400	500	600	800
Breath [mm]	17	17	24	24

4.2 Balance of weights

The oscillating forces in the base plate of the Afag Linear Feeder are compensated almost completely due to the principle of opposing oscillations (push-pull). This balance of oscillating forces is however only achieved if:

1. The working weight and the counterweight are balanced as closely as possible.This means that the working weight and the counterweight are equal. The working weights specified for respective sizes are listed in Table 4 below. The working weight is the total weight of all components attached to the mounting plate including the side plate. The balance of weight is verified by simply weighing the working weight.

2. The centre of gravity of the working weight is located in the range represented in Figure 3.

Both conditions have to be taken into consideration at the construction stage of the feeder track. An optimal balance of weight is achieved when almost no residual vibrations can be detected in the substructure.

Table 4: *Obligatory values for the working weight*

Type	Ideal useful mass [kg]	Max. useful mass [kg]
HLF07-M	0,7 ± 0,05	0,9
HLF12-M	1,2 ± 0,05	1,5
HLF25-M	2,5 ± 0,1	3,0
HLF50-M	5,0 ± 0,1	5,5

NOTE

Useful and counter masses should correspond to the values specified in Table 4.

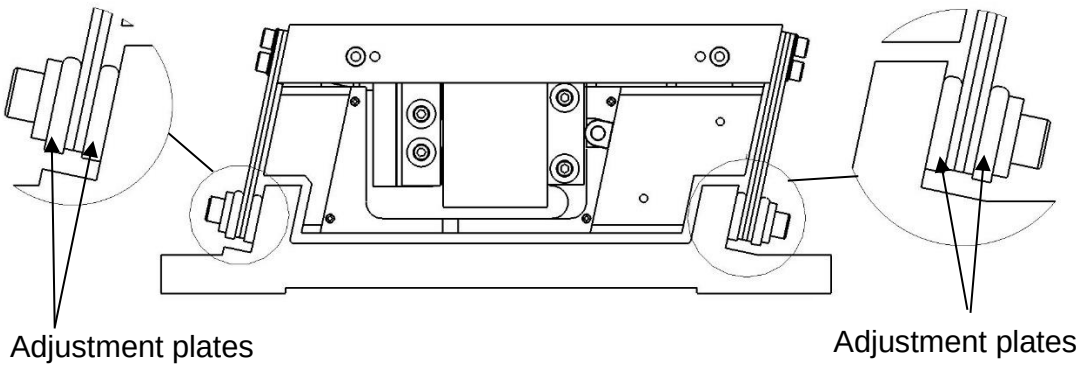
NOTE

1. **Masses are fully balanced if hardly any vibrations are noticeable in the floor.**
2. **When masses are fully balanced, the transport speeds at useful and counter sides are identical.**

4.3 Fine adjustment of natural frequency

The Afag Linear Feeder is a spring/weight based vibrating system that operates by making use of resonance. Weights that are not exactly balanced require a spring stiffness modification. Movable adjustment plates are provided at the base plate attachment of the spring assemblies (see Figure 7). The natural frequency can be adjusted by moving these adjustment plates.

Figure 7: *Spring assembly with adjustment plates*



The Linear Feeder always has to be adjusted ‘subcritically’, i.e. the inducing frequency has to be about 5% less than the natural frequency. This means that a natural frequency of about 97Hz is required for a 100Hz feeder, and a natural frequency of about 117Hz is required for a 120Hz feeder.

Adjustment should be carried out as follows:

Put a test part on the feeding track and switch on the control device. Use the turning knob to reduce the feed rate of the Linear Feeder until the part on the feeder track is only moving slowly. Maintain the control device setting and slowly unscrew the adjustment plate screws of a spring assembly of the Linear Feeder (see Fig 5). Check the feed rate of the test part while loosening the screws. If the feed rate first increases briefly and then starts to decrease on further loosening the screw, the Linear Feeder is not adjusted properly, with the natural frequency slightly above the inducing frequency. The adjusting plates have to be reset to the position they were in before loosening the screws.

If the feed rate increases when the screws are loosened and does not or only minimally decrease when fully unscrewed, the Linear Feeder adjustment is too stiff, i.e. the natural frequency is still too high. The adjustment plates have to be pushed downwards or, if the weight difference is significant, a leaf spring may have to be removed. The test has to be repeated afterwards.

If the feed rate decreases immediately on loosening the screws, the Linear Feeder adjustment is too soft. The adjustment plates then have to be pushed upwards or if necessary, an additional leaf spring has to be fitted. The test has to be repeated afterwards.

When moving the adjustment plates, it should be kept in mind that the adjustment plates always have to be horizontal and exactly opposite to each other.

Adjustment plates up ⇒ Natural frequency increases

Adjustment plates down ⇒ Natural frequency decreases

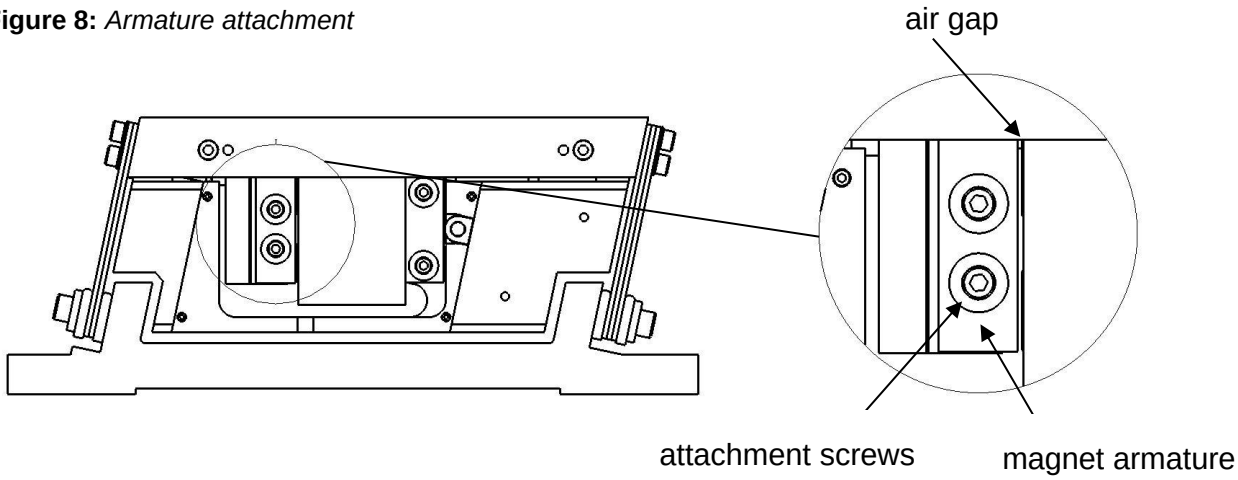
To avoid the vibrating sections from subsiding, make sure to loosen the adjustment plates of one spring assembly only at a time during frequency setting.

NOTE	
	**The adjustment plates must be aligned horizontally. The top edges must always be arranged opposite each other.**

4.4 Setting the air gap

During series assembly, the air gap of the magnet system is set to the values specified in Table 5. If this air gap deviates from the values specified in Table 5, e.g. after a natural frequency adjustment, then this has to be reset. The cover is removed for this purpose, and the side attachment screws of the armature are unscrewed and the air gap is readjusted using a distance gauge (Table 9).

Figure 8: *Armature attachment*



The values specified in Table 5 are only applicable for the respective power supply. When making adjustments, it is imperative that the surfaces of the magnet core and armature are exactly parallel to each other. To achieve the required precision, it is necessary to tighten the screws alternately and in stages.

Table 5: *Settings for the air gap between armature and magnet core*

Type	Power supply	Air gap value [mm]	Tolerance
HLF07	230V/50Hz	1,00	± 0,05
	115V/60Hz	0,80	± 0,05
HLF12	230V/50Hz	1,00	± 0,05
	115V/60Hz	0,80	± 0,05
HLF25	230V/50Hz	1,15	± 0,05
	115V/60Hz	0,95	± 0,05
HLF50	230V/50Hz	1,00	± 0,05
	115V/60Hz	1,00	± 0,05

⚠ CAUTION



Setting an air gap larger than specified may cause the magnet to overheat and the coil to burn out. It is therefore vital that the specified air gaps be adhered to.

4.5 Torques

Tightening torques M_{Sp} in Nm for shank screws with metric ISO control threads and head supports according to DIN 912 or DIN 931:

Screw	Tightening torques M_{Sp} in Nm		
	Strength class 8.8	Strength class 10.9	Strength class 12.9
M4	2,8	4,1	4,8
M5	5,5	8,1	9,5
M6	9,5	14,0	16,5
(M7)	15,5	23,0	27,0
M8	23,0	34,0	40,0
M10	46,0	68,0	79,0
M12	79,0	117,0	135,0
M14	125,0	185,0	215,0
M16	195,0	280,0	330,0
M18	280,0	390,0	460,0
M20	390,0	560,0	650,0
M22	530,0	750,0	880,0
M24	670,0	960,0	1120,0
M27	1000,0	1400,0	1650,0
M30	1350,0	1900,0	2250,0

by: Dubbel (18th edition), page G175

5 Maintenance Instructions

An HLF-M type linear conveyor requires minimal maintenance. Depending on the manner in which it is used, signs of wear may occur, which can be compensated for by resetting the adjustment plates.

Spring wear/ oxidation (increased resonance frequency)

Depending on the operating mode and environment, a layer of oxidation may develop on the springs at the contact surfaces which over time may adversely affect the vibration behavior. In cases such as these, the resonance frequency will increase and it may be necessary to compensate for the increase by lowering the adjustment plates.

Spring setting behavior (reduced resonance frequency)

The result of longer storage periods may be that installed springs can show a setting behavior, and in consequence a reduction in the spring stiffness and reduced resonance frequency. In this case, the resonancy frequency can be re-calibrated, which may cause the spring stiffness to be reduced as well as a drop in the resonance frequency.

In some cases, it may be necessary to remove the leaf springs to clean them or, if they are heavily worn, to replace them entirely. Here, the vibration parts must be supported in vertical direction. Then, only one spring package at a time may be removed, because otherwise the vibration parts would move, making it impossible to guarantee that they function properly.

⚠ CAUTION	
	**The leaf springs must not be oiled or greased as this would make the springs sticky and in turn adversely affect the vibration response.**

5.1 Troubleshooting

Conveyor does not run, there is no vibration detectable	
Cause of fault	**Fault repair**
Supply voltage too low or instable, e.g. only 180 V	Check the supply voltage, readjust the conveyor to the existing supply voltage, if necessary
Connection to the power supply interrupted	Check the connection between drive control unit and control mains adapter
Control unit is switched off <0>	Switch on the control unit <1> or check the jam control signal if a jam control is used
Control unit is defective	Electrical check of the device, use an exchange or a replacement unit
The magnet is damaged, the field winding has burnt out	Electrical check of the magnet, replace damaged magnet. Check settings: 50 Hz position, full wave (exciting frequency = 100 Hz)
The air gap between magnet and rotor is too small (striking) or too large	Set the air gap according to the operating manual

Foreign part jammed in the air gap between magnet and rotor	Remove foreign part
Conveyor runs too slowly, there is no movement recognisable	
Cause of fault	**Fault repair**
Supply voltage too low or instable, e.g. only 180 V	Check the supply voltage, readjust the conveyor to the existing supply voltage, if necessary
Output frequency of the control unit is set improperly	Set the switch in the control unit according to the required frequency: 50 Hz position, full wave (exciting frequency = 100 Hz)

The conveyor rail is not sufficiently fastened to the corresponding drive	Tighten fastening screws, check thread, if necessary
The magnet is damaged, the field winding has burnt out	Electrical check of the magnet, replace damaged magnet. Check settings: 50 Hz position, full wave (exciting frequency = 100 Hz)
The air gap between magnet and rotor is too small (striking) or too large	Set the air gap according to the operating manual
Change of the system's natural frequency due to a broken spring	Undo screws of the spring assemblies, check springs, and replace broken or damaged springs. CAUTION! Cause for a broken spring is often too high oscillation amplitude. --> Check air gap
The drive is improperly adjusted, i.e. the system's natural frequency does not match the exciting frequency	Adjust the drive by changing the spring stiffness: Change the position of the adjustment plates. Tighten the screws of the spring assemblies. CAUTION! Adjust the conveyors according to the operating manual!
The weight (moment of inertia) of the conveyor bowl exceeds the maximum permissible limit value for the corresponding drive	Carry out a mass balance according to the instructions in the operating manual
Foreign part jammed in the air gap between magnet and rotor	Remove foreign part
The conveying behaviour is instable, the conveyor speed varies	
Cause of fault	**Fault repair**
Supply voltage too low or instable, e.g. only 180 V	Check the supply voltage, readjust the conveyor to the existing supply voltage, if necessary
Output frequency of the control unit is set improperly	Set the switch in the control unit according to the required frequency: 50 Hz position, full wave (exciting frequency = 100 Hz)
The conveyor rail is not sufficiently fastened to the corresponding drive	Tighten fastening screws, check thread, if necessary
The magnet is damaged, the field winding has burnt out	Electrical check of the magnet, replace damaged magnet. Check settings: 50 Hz position, full wave (exciting frequency = 100 Hz)

Change of the system's natural frequency due to a broken spring	Undo screws of the spring assemblies, check springs, and replace broken or damaged springs. CAUTION! Cause for a broken spring is often too high oscillation amplitude. --> Check air gap
The drive is improperly adjusted, i.e. the system's natural frequency does not match the exciting frequency	Adjust the drive by changing the spring stiffness: Change the position of the adjustment plates. Tighten the screws of the spring assemblies. CAUTION! Adjust the conveyors according to the operating manual!
The weight (moment of inertia) of the conveyor bowl exceeds the maximum permissible limit value for the corresponding drive	Carry out a mass balance according to the instructions in the operating manual
Foreign part jammed in the air gap between magnet and rotor	Remove foreign part

The conveyor transmit vibrations	
Cause of fault	**Fault repair**
The conveyor rail is not sufficiently fastened to the corresponding drive	Tighten fastening screws, check thread, if necessary
Change of the system's natural frequency due to a broken spring	Undo screws of the spring assemblies, check springs, and replace broken or damaged springs. CAUTION! Cause for a broken spring is often too high oscillation amplitude. --> Check air gap
The drive is improperly adjusted, i.e. the system's natural frequency does not match the exciting frequency	Adjust the drive by changing the spring stiffness: Change the position of the adjustment plates. Tighten the screws of the spring assemblies. CAUTION! Adjust the conveyors according to the operating manual!
The weight (moment of inertia) of the conveyor bowl exceeds the maximum permissible limit value for the corresponding drive	Carry out a mass balance according to the instructions in the operating manual
Conveyor rail lifts off or hits	
Cause of fault	**Fault repair**
The conveyor rail is not sufficiently fastened to the corresponding drive	Tighten fastening screws, check thread, if necessary
The air gap between magnet and rotor is too small (striking) or too large	Set the air gap according to the operating manual
Foreign part jammed in the air gap between magnet and rotor	Remove foreign part
Change of the system's natural frequency due to a broken spring	Undo screws of the spring assemblies, check springs, and replace broken or damaged springs. CAUTION! Cause for a broken spring is often too high oscillation amplitude. --> Check air gap
The drive is improperly adjusted, i.e. the system's natural frequency does not match the exciting frequency	Adjust the drive by changing the spring stiffness: Change the position of the adjustment plates. Tighten the screws of the spring assemblies. CAUTION! Adjust the conveyors according to the operating manual!

5.2 Wear parts and spare parts

Table 6: *Wear parts*

Type	Designation	Order number
HLF07	Leaf spring	50203877
HLF12	Leaf spring	50203471
HLF25	Leaf spring	50254134
HLF50	Leaf spring	50411551

Table 7: *Spare parts*

Type	Designation	Power supply	Order number
HLF07	Magnet	230V/50Hz	15054450
		115V/60Hz	15002283
HLF12	Magnet	230V/50Hz	50277472
		115V/60Hz	50277904
HLF25	Magnet	230V/50Hz	50270048
		115V/60Hz	50280087
HLF50	Magnet	230V/50Hz	15019167
		115V/60Hz	50307820

6 Accessories

6.1 Mounting parts

Table 8: *Order data*

Type	Designation	Remark	Order number
HLF07	Trimming weight NM07	mass: 25g	50217298
	Trimming weight GM07	mass: 15g	50216944
	Side plate O-07	-	50197283
	Side plate S-07	-	50217291
HLF12	Trimming weight NM12	mass: 50g	50216719
	Trimming weight GM12	mass: 25g	50216708
	Side plate O-12	-	50197284
	Side plate S-15	-	50216714
HLF25	Trimming weight NM25	mass: 100g	50217316
	Trimming weight GM25	mass: 50g	50217312
	Side plate O-25	-	50197285
	Side plate S-25	-	50217314
HLF50	Trimming weight NM50	mass: 100g	50217677
	Trimming weight GM50	mass: 50g	50217621
	Side plate O-50	-	50197286
	Side plate S-50	-	50217676

6.2 Adjustment aids

Table 9: *Distance gauge*

Designation	Drive type	Order number
Distance gauge	HLF07-M	50185560
	HLF12-M	50185560
	HLF25-M	50273499
	HLF50-M	50185562

6.3 Control device

The HLF is connected to the 230V/50Hz AC system via an IRG or MSG controller and can be rated for other mains voltages and frequencies, e.g. 115V/60Hz. They operate in full-wave mode at double mains frequency, i.e. at 50Hz AC, with a vibration frequency of 100Hz, in half-wave mode at single mains frequency with a vibration frequency of 50Hz.

Vibration displacement and thus the transport speeds are infinitely adjustable due to magnet current and thus magnetic force variability.

Soft-starting, all IRG and MSG types can be mounted in various different ways and offer extra controls for photoelectric barriers, initiator elements, or extern 24VDC signal. For a detailed description of the controllers refer full-range catalogue from AFAG GmbH.

Third-party controllers can also be used as long as they meet the technical requirements.

Table 10: *Controllers for HLF- Linear feeder*

Type	Power supply	Order number	Comments
IRG1-S	230 V / 50 Hz	50360105	Control with no timer function External target value preset
	115 V / 60 Hz	50360106	

6.4 Ordering address

Germany:

Afag GmbH

Wernher-von-Braun-Straße 1

D – 92224 Amberg

Tel.: ++49 (0) 96 21 / 65 0 27-0

Fax: ++49 (0) 96 21 / 65 0 27-390

Sales

sales@afag.com

www.afag.com

Switzerland:

Afag Automation AG

Luzernstrasse 32

CH – 6144 Zell

Tel.: ++41 (0) 62 / 959 86 86

Fax: ++41 (0) 62 / 959 87 87

7 Disposal

HLF feeders that are no longer in use should not be disposed of as complete units but dismantled into separate materials and recycled. Non-recyclable components must be disposed of correctly.