



Operating instructions vibrating storage hoppers



Types : BVB-5
BVB-10
BVB-20
BVB-25
BVB-30

Drive types : BSR-2/60-A
BSR-2/80-A
BSR-2/100-A

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General Information

Symbols



Notice

This icon marks notes, which contain information for proper operation.



Attention

This symbol is found in all safety instructions in this manual, where there is danger to life and limb in front of people. These notes and behave in such cases special care. Pass on all occupational safety tips to other users. In addition to these instructions, the general safety and accident prevention rules are considered.

Introduction

This information should be read by those understood and complied with in all respects responsible for the machine.

This manual should always be kept near the machine.

A careful reading of this manual is particularly important, as the producer for damage or disruption, which result from the failure to observe the operation, no liability.

This manual, technical changes designed to improve or technical progress is reserved.

Application and use

The device is designed only to be described in this document functions and services. Any other use is considered improper. Shall not be liable for damages resulting from the manufacturer. The risk is on the user.

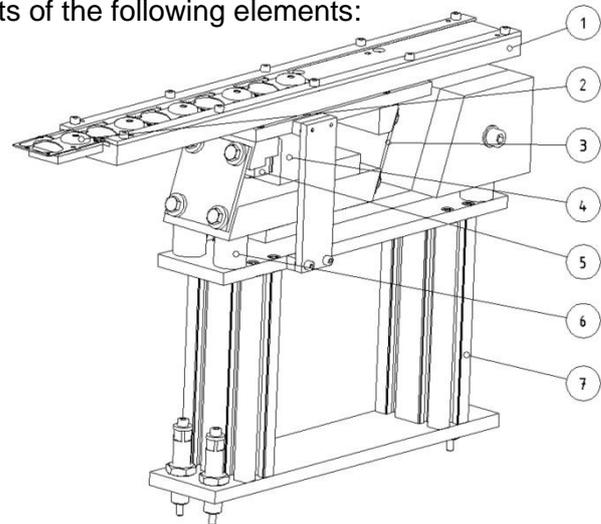
Non-observance of the warranty!

Structure and function description

A linear vibratory conveyor is a device that converts electromagnetically generated vibrations into mechanical vibrations and uses them for linear conveying of workpieces.

The basic structure of a vibratory conveyor consists of the following elements:

- Pos. 1 = Hopper bowl
- Pos. 2 = Workpieces
- Pos. 3 = Spring bracket
- Pos. 4 = Oscillating magnet
- Pos. 5 = Anchor
- Pos. 6 = Vibration mounts
- Pos. 7 = Frame



If the magnet that is permanently connected to the counterweight, electricity is supplied, it produces a force that attracts the armature, depending on the resonant frequency of the network and releases.

Because the armature is connected to the conveyor track (Linear vibrating conveyor) in a fixed, does this also with the haunting movement. This raises the conveyed, from due to the angle of the leaf springs and the slope angle of the spiral, at every vibration of the conveyor belt and carries out little jumps in the direction perpendicular to the leaf spring plane.

In a period of 50 Hz AC system, the magnet reached twice its maximum tension, since it is independent of the direction of current flow. The magnet thus generates an oscillation frequency of 100 Hz.

For heavier or larger workpieces it is advisable to use a resonant frequency of 50 Hz. Here, a half wave of AC current through a diode or a thyristor is blocked.

This is used for devices connected to the drive type BSR-2.



Notice

The devices of type BSR-2 may only be operated in half-wave operation with a mechanical vibration frequency of approx 50 Hz.

It is important to make sure that is set on the connected control device, the correct resonant frequency for the particular drive types. This is done according to the control unit, for example by internal DIP switches, bridges, or via the Settings menu. Otherwise, components of the equipment damaged.

Transport & Mounting

Transport

Any transport of the device must be carried with the necessary caution to prevent damage from rough or careless loading and unloading. Depending on the type of transport corresponding transport Fuses must be provided.

If the unit is stored, so care must be taken to carefully cover against moisture, dirt and dust. Bare metal parts shall be preserved against rust. This conservation must be checked from time to time and to replace if necessary.



Attention

The linear vibratory conveyor may not be raised and / or transported on conveyor rail.

Mounting

Conveyor rail:

The maximum length mentioned in the technical data and the weight of the upper part of the channel must not be exceeded

The rail upper part is structurally sufficiently vibration-resistant and dimensionally designed so that the rear end of the rail projects beyond the drive by a maximum of approx 20 mm to the rear.

The rail upper part can be screwed by means of mounting holes on or laterally of the upper mounting plate and pinned if necessary.

Installation conditions:

When installing the device, ensure that the bearing capacity of the frame used and the soil is sufficient.

The linear feeder is screwed from below with appropriate mounting screws into the anti-vibration mounts, or fixed with centering plates on the base plate.

The environment of the device should provide sufficient clearance for maintenance, operation and repair.



Notice

It is important in establishing the fact that the device can vibrate freely. That has a sufficiently large air gap between the vibrating rail upper part and resting environment be present.

Starting



Notice

Before starting, ensure that the above points being >>Transport & Mounting<< complied with and monitored.

Connection:



Attention

This work may only be performed by qualified personnel in compliance with all safety and local regulations. The control over that no unauthorized persons are in the danger zone of the machine are located is important faults.

Connection lines must be protected.

Terminal voltages and directions of rotation must be checked.

The connection of the device must be installed according to the information under >>Technical Data<<, or the data plate.

Check if the available supply voltage matches the specifications on the nameplate of the unit.

Make sure that the upstream control or regulating device is connected to the correct output frequency of 50 Hz (half-wave).

(See also >>Structure and function description<<)



Notice

Befor Starting are additionally perform the following checks and actions:

Nr.	Pos.	Module	Action
1	1	Linear vibrating feeder	Sufficient number of the transported material refill. Check for foreign objects and jammed material.

Adjustment

A proper tuning of the vibration system is essential for optimal operation of the device. This note is recorded as vibrating conveyors of series BSR-2 by the number of springs.



Notice

In the case of the vibration system is to proceed as follows:

- a) Please first check whether the correct control unit is connected.
- b) Screw off the side cover plates (if present) and tighten all spring and channel fixing screws (100 Nm).
- c) Check the type and frequency of the magnets on accuracy.
- d) Check magnet spacing and adjust if necessary.
- e) Switch vibratory feeders and adjust regulator to 90%
- f) Loosen Slowly loosen the fastening screw at the bottom of a spring assembly (approx. $\frac{1}{4}$ to $\frac{1}{2}$ turn).

When loosening this screw, you can see a change in the running speed of the Material to be conveyed in the upper part of the channel; it follows:

- g) Running speed is lower: Install Additional springs. First, a spring in a spring assembly; should not suffice this, installing additional packages at the individual spring gradually ever a spring with intermediate plate.
- h) Running speed is greater: Remove feathers. Functioning in the same order as in the installation of the springs.

If the conveying speed on the length of the conveyor trough is not uniform, then:

- i) a spring needs to be taken out of the slow site.
- j) a spring has to be installed in the quick site.

If the rough running between two sets of springs, so must be seen in the direction, be installed or removed behind the rough running either a spring.

Installation instructions for oscillating springs**Notice**

If springs are broken due to fatigue or overuse, it is advisable to replace all the springs.

The number of springs is determined by the spring constant, the frequency, the conveying speed and the weight ratio.

There are also many springs installed as were present in the delivery state.

For plastic springs (GfK) occur abrasion phenomena. With steel springs is to pay attention to hairline cracks. Only flawless springs can be used again.

When replacing the mounting bolts are initially just as hard to pull that off, the springs can not move.

The linearity of the upper spring bracket for lower spring bracket must be guaranteed. Then tighten all bolts (100 Nm or 140 Nm, see technical data).

Installation instructions for oscillating magnetic

1. First pour a few conveyor parts in the upper part.
2. Setting the magnets on the smallest distance. The distance must be

	<u>min.</u>	-	<u>max.</u>
BSR-2/60	0,5 mm	-	3,0 mm
BSR-2/80	0,5 mm	-	3,0 mm
BSR-2/100	1,5 mm	-	3,0 mm



Notice

It is important that the surfaces of the magnet and armature are parallel.

**Then all screws (including springs) must be tightened.
The screws should not be stretched.**

3. Knob to "max." , and switch device. Magnets and armature must not touch during the run. (Sample: on an inserted between the magnet and anchor strip of paper no pressure points may begin to emerge.) Where appropriate distance between magnet and armature gradually enlarge.
4. Now the device is loaded with the usual capacity and the control set at about 2/3 of the scale range. Will cause it to more parts being promoted as needed or it is found that the parts jump on the spiral, the conveyor speed by increasing the distance between magnet and armature must be reduced. It is important to ensure that the max. Spacing is not exceeded.

Troubleshooting

The following faults can occur during operation:

Nr.	Location	Description	Cause	Rectification
1	Linear vibrating feeder	Flow rate is insufficient:	too little material to be conveyed in the sorter	Conveyed refill and check conveyor line
2	Linear vibrating feeder	Conveyor is not running when you turn on:	Plug not in socket Connection cable between vibratory feeders and control unit not in the control section housing Fuse defect	Insert the plug Insert the plug, regulate power Replace the fuse
3	Linear vibrating feeder	Vibrating conveyor no longer brings after a certain term of the required performance:	Loose screws on the spring packs Less mounting screws for the feeding top Adjusted magnetic gap Broken springs	Tighten the screws Tighten the screws Set the magnetic gap correctly Replace broken springs Re adjust the suspension
4	Linear vibrating feeder	Conveyor developed strong noises:	side cover plates (if present) loose Foreign body in the magnetic gap (chips, conveyed, dust)	Tighten side cover plates Shutdown and remove foreign body Check the magnet gap adjustment
5	Linear vibrating feeder	Vibrating conveyor does not run in areas of Scale slider:	Potentiometer defect	Replace control unit

Maintenance and Cleaning



Notice

The oscillating drive the vibrating spiral conveyor is virtually maintenance free. The following inspections and maintenance should also be carried out at the indicated time intervals:

No.	Module	Action	Frequency
1	Linear vibrating feeder - Drive	- Check for unusual noises	daily
2	Linear vibrating feeder - Conveyor rail	- Control of the conveying behavior	daily
3	Linear vibrating feeder - Conveyor rail	- Control for contamination - Cleaning the treads of the transported material - Eliminating foreign parts	daily



Attention

For all maintenance and inspection work the chapter >> *Safety instructions* << is to be noted.

Malfunctions are caused by inadequate or improper maintenance can result in very high cost. Regular maintenance is essential.

Due to the different operating conditions, a general definition of the maintenance and inspection intervals is not possible. Taking into account the operating conditions of an appropriate routine is set.

Cleaning:

It is recommended that the unit regularly, for example, after each end of the shift to clean thoroughly of dirt, debris and possibly falling down. Coatings, such as made of polyurethane, conveyor brush or other product specific surface coatings must be cleaned with non rückfettendem cold cleaner. Coatings in pharmaceutical goat right equipment should be cleaned with pharmaceutically acceptable cleaning agents.

Wear control:

Wear parts, that is all parts that move against each other or come into contact with are conveyed to check from time to time for wear and, if necessary readjust or replace.

Safety instructions**Attention**

The following work safety instructions must be observed especially:

- ⇒ *The device is designed according to state of the art and reliable. This equipment may constitute a hazard if it is used improperly or by untrained personnel to improper use.*
- ⇒ *Any person who is involved in the installation, dismantling, operation and maintenance of the unit must have read and understood the entire manual.*
- ⇒ *Users are recommended to have this confirmed in writing.*
- ⇒ *The unit is designed exclusively for the functions and operations described in this operating manual. Any use deviating is considered improper. The manufacturer is not liable for any resulting damage. The risk is borne solely by the user.*
- ⇒ *Intended use also includes the observance of imposed by manufacturers and component suppliers for installation, commissioning, operation, tool change and maintenance conditions.*
- ⇒ *The device may be operated, serviced and repaired only by authorized, trained and instructed personnel. These personnel must have received special about possible dangers.*
- ⇒ *The responsibilities for the installation, commissioning, operation, tool change and maintenance must be clearly defined and adhered to so ambiguous competencies in terms of security.*
- ⇒ *It is to refrain from any operation that affects the safety of the device.*
- ⇒ *The operator has to make sure that unauthorized people do not work on the device.*
- ⇒ *The operator is obliged to report any changes that occur to the equipment that may affect the security immediately.*
- ⇒ *The user company must ensure that the device is only operated in sound condition.*
- ⇒ *The user company must ensure, through the orders and checks for cleanliness and clarity of the jobs on and around the unit.*

Safety instructions**Attention**

⇒ *It must never be disassembled safety equipment or inoperative.*

Failure to comply with this notice may be fatal!

⇒ *If dismantling of safety equipment during repair and maintenance work required, must be made immediately after completion of the work the reassembly of the safety devices.*

⇒ *The proper installation and functioning of the safety devices must be checked before using the equipment.*

⇒ *Unauthorized modifications and changes which affect the safety of the appliance are not permitted.*

⇒ *All work on the unit must always be carried out only at a halt.*

⇒ *Before starting any work on the unit with drives and ancillary equipment must be secured against accidental operation.*

⇒ *After proper electrical installation or repair the protective measures are used to test (eg grounding resistance).*

⇒ *To operate the device, the local safety and accident prevention regulations apply in every case.*

⇒ *The linear vibratory feeder may not be employed in the Ex area or water area.*

**Attention****Elektromagnetic Field**

For persons with heart pacemakers the influence of the electromagnetic field is possible. It is therefore recommended that individuals maintain a minimum distance of 25 cm.

Residual risks relating to the machine



Attention

From the following areas goes to the extent described in all operating and maintenance a possible threat from:

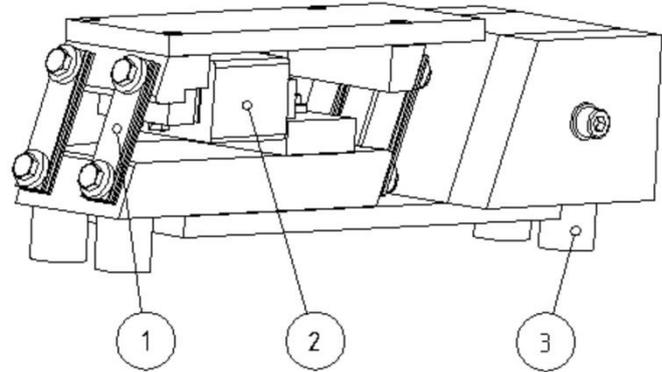
No.	Designation	Possible hazards	Comment
1	Linear vibratory feeder - Drive	Electric shock	Open Control unit only when the power is off.
2	Linear vibratory feeder	Clamping / crushing	Disconnect the control unit from the drive before engaging in the drive.
3	Linear vibratory feeder	Influencing heart pacemakers by electromagnetic field	Safety distance of min. 25 cm.
4	Linear vibratory feeder	Malaise / discomfort / headache by: - noise - vibration - Flow air (only for units with air support)	- Use hearing protection - Use sound insulation hood - Increase distance to the running device - Do not look or see in the airflow
5	Linear vibratory feeder	Risk of injury to the eyes and / or other parts of the body by: - Airflow or spewing particles (only on devices with air support)	- Put on protective goggles - Wear personal protective equipment

Technical Data

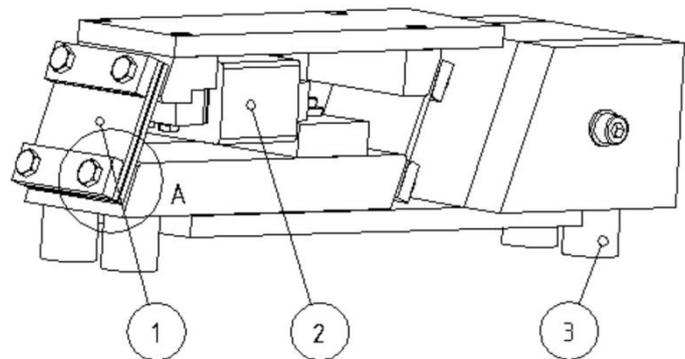
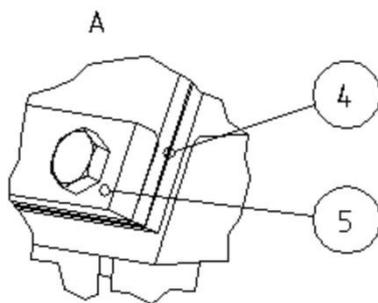
Type:	BSR-2/60	BSR-2/80	BSR-2/100
Dimension:			
Dimensions L x B x H: (without additional weights)	270 x 60 x 119 mm	380 x 80 x 129 mm	480 x 100 x 153 mm
Width of the mounting plate:	60 mm	80 mm	100 mm
Drive weight (with additional weights):	ca. 9 Kg	ca. 20 Kg	ca.38 Kg
Vibration buffers:	45° Shore, Form C	45° Shore, Form C	45° Shore, Form C
Dimensions:	Rd 20x20 (M6)	Rd 30x30 (M8)	Rd 30x30 (M8)
Pieces:	4	4	4
Elektrical connection:			
Protection:	IP 54		
Connection cable length:	ca. 1,5 m	ca. 1,5 m	ca. 1,5 m
Input:	129 VA	129 VA	315 VA
Power consumption:	0,59 A	0,59 A	1,43 A
Magnet nominal voltage:	220 V		
Frequency:	50 Hz		
Number of magnets / Type:	1 WI 7/16	1 WI 7/16	1 WS9B2
Max. magnetic gap:	3,0 mm	3,0 mm	3,0 mm
Mech. frequency:	50 Hz; 3000 min ⁻¹		
Mechanical:			
Number of spring brackets:	2	2	2
Number of spring assemblies:	4	4	4
Spring type:	GFK	GFK	GFK
Version with narrow springs:			
Spring dimensions:	20 x 1,5 x 80 mm	20 x 1,5 x 80 mm	20 x 2 x 105 mm
Standard spring configuration:	Links Rechts	Links Rechts	Links Rechts
Front Spring group:	5 5	5 5	5 5
Rear Spring group:	5 5	5 5	5 5
Intermediate plate numbers:	-	-	-
Pressure plate numbers:	-	-	-
Version with wide springs:			
Spring dimensions:	-	75 x t x 80 mm	90 x t x 105 mm
Standard spring configuration:	-	t=2 mm t=4 mm	t=2 mm t=4 mm
Front Spring group:	-	2 1	2 1
Rear Spring group:	-	2 2	2 2
Intermediate plate numbers:	-	6	8
Pressure plate numbers:	-	4	4
Spring mounting:			
Screw Type / quality:	M8 / 8.8	M8 / 8.8	M8 / 8.8
Torque:	100 Nm	100 Nm	100 Nm
Loads:			
Min. Length of feed rail:	300 mm	400 mm	500 mm
Max. Length of feed rail:	400 mm	700 mm	850 mm
Max. Weight of feed rail:	ca. 3-5 Kg	ca. 5-8 Kg	ca. 8-11 Kg

Drawings & Bill of material

Drawing BSR-2 with narrow springs:



Drawing BSR-2 with wide springs:



Bill of material:

Pos.	Designation	Type	Dimensions in mm	Supplier
1	Leaf spring	GFK, d=8,5	see technical Data	P.J. Prause Durotec GmbH
2	Magnet	see technical Data	-	Kendrion Magnettechnik GmbH
3	G/M buffer	45° Shore, Form C	see technical Data	Franksa GmbH
4	Intermediate plate	Ms, d=9	21,5 x 0,5 x 75	FMB GmbH
5	Pressure platte	St, d=10	21,5 x 10 x 75	FMB GmbH

Manufacturer

Manufacturer of oscillating drive:

FMB GmbH

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Fax: +49 531 85 263
E-Mail: info@fmb.de
Internet: www.fmb.de



Declaration of incorporation
of partly incomplete machine
according to EC machinery directive (2006/42/EC)

We hereby declare that the product complies with the following provisions:

- EC Machinery Directive 2006/42/EC
- Low voltage directive 2014/35/EU
- EMC directive 2014/30/EU

Applied harmonised standards:

- DIN EN 60204-1
- DIN EN ISO 12100-2010

Comments:

We assume that our product will be incorporated into a stationary machine. The owner must observe the provisions of EMC Directive 2014/30/EU.

The commissioning of this incomplete machine is prohibited until it has been established that the machine into which the above-mentioned incomplete machine was installed complies with the provisions of the EC Machinery Directive.

FMB GmbH

Managing Director: Hartmut Striepe, Edwin Neue

Manufacturer of oscillating construction (only in complete units from the factory FMB):

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Operating instructions vibrating storage hoppers with linear vibratory feeder BSR-2

Date: 02/2024

Technical changes and misprints excepted.

FMB GmbH – Operating instructions BVB with drive BSR-2

Appendix