



GmbH

# FMB



## Operating instructions vibrating storage hoppers



**Types** : BVB-300  
BVB-500  
BVB-600  
BVB-750  
BVB-1000  
BVB-1xxx

**Drive types** : BBR-10/2  
BBR-12/4

## Table of contents

Chapter .....	Page
<b>I. General Information .....</b>	<b>3</b>
<b>II. Structure and function description.....</b>	<b>4</b>
a) Transport & mounting .....	5
b) Starting.....	6
c) Adjustment .....	7
d) Installation instructions for oscillating springs .....	8
e) Adjustment instructions for oscillating magnetic.....	9
f) Teaching the BBR .....	10
g) Troubleshooting.....	11
<b>III. Maintenance and cleaning .....</b>	<b>12</b>
<b>IV. Safety instructions.....</b>	<b>13</b>
a) Safety guidelines .....	13-15
b) Residual risks relating to the machine .....	15
<b>V. Technical data .....</b>	<b>16</b>
a) Drawings & Bill of material.....	17
<b>VI. Manufacturer .....</b>	<b>18</b>
<b>VII.Appendix .....</b>	<b>19</b>
a) Data delivery .....	Appendix 01
b) Operating instructions Control unit (if included) .....	Appendix 02
c) Other accessories.....	Appendix 03

## 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.

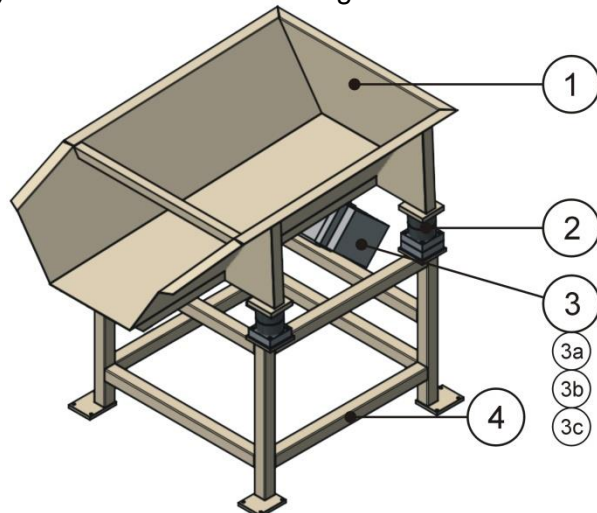
### **Non-observance of the warranty!**

## Structure and function description

The emptying process with the BVB storage bunker is based on the principle of sliding conveyance. With the help of a low-frequency spring-mass drive BBR, the bunker is set in vibration. The bunker is supported by means of soft rubber springs in relation to the console frame or the surroundings, so that no vibrations are introduced into the floor.

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

- Pos. 1 = Hopper bowl
- Pos. 2 = Vibration mounts
- Pos. 3 = Oscillating unit
- Pos. 3a = Oscillating magnet
- Pos. 3b = Anchor
- Pos. 3c = Amplitude Sensor
- Pos. 4 = Undercarriage



With the help of an integrated measuring system, the real system natural frequency is automatically measured and saved. The low-frequency controller then excites the spring-mass drive to vibrations close to resonance, and the system accelerations are constantly monitored.

The control system ensures that the vertical acceleration is always below the gravitational acceleration. An amplitude controller ensures constant delivery. This ensures that the material to be conveyed in the system never leaves the conveyor track (is thrown).

A suitable choice of the acceleration angle also ensures that the material to be conveyed does not slip in the horizontal direction. In this way, the sliding conveyor conditions can be maintained at all times, which enables extremely low-noise and wear-free operation.

## 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 storage bunker must not be lifted and / or transported on the Hopper bowl.**

### Mounting

#### Installation conditions:

- 1) When installing the device, ensure that the load-bearing capacity of the base frame and floor used is sufficient.
- 2) The base frame of the storage and dosing hopper must be firmly anchored to the floor.
- 3) The area around the device should offer sufficient space for maintenance, operation and repair.



### Notice

When setting up, make sure that BVB can swing freely. That There must be an air gap of at least 10 mm between the vibrating hopper and the resting area.

## 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	Hopper bowl	Sufficient number of the transported material refill. Check for foreign objects and jammed material.



### Attention

The maximum filling weight specified in the technical data must not be exceeded.

## Adjustment of the vibration System

A proper tuning of the vibration system is essential for optimal operation of the device.



### Notice

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

#### 1. Resonance tuning of the vibratory drives

If the delivery capacity of one of the vibratory drives decreases despite the unchanged control position, proceed as follows:

- a) Check the setting of the associated potentiometer and adjust if necessary.
- b) Reduce the magnetic gap (in 1/10 mm steps). Use a feeler gauge to set the magnetic gap. The gap between the magnet and the armature may only be reduced to such an extent that the two parts do not collide with one another in vibration mode. A check can e.g. with a paper strip held in the magnetic gap during operation: if the paper strip shows traces of dirt, the magnetic gap is too small. Loud rattling noises also indicate that the magnetic gap is too small.
- c) If b) does not lead to the goal, the excitation frequency (specified on the network side at 50 Hz) and the natural frequency must be matched closer to the resonance. Proceed as follows:
  - 1) reset the original magnetic gap (approx. 3,5 - 4 mm)
  - 2) Visual inspection of all spring groups in order to determine any existing spring breaks. Replace broken springs if necessary. Then check the delivery rate again.
  - 3) Slowly loosen a spring group (screw connection) during the conveyor operation and observe the conveyor speed. If the speed now increases, springs must be removed. If the speed decreases when the spring assembly is released, additional springs must be installed.
  - 4) After installing the correct number of springs, check the conveying speed again.

## 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. (See >> *Appendix Data delivery* <<)

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 to the lower spring bracket must be guaranteed. Then tighten all screws with the appropriate torque (see >> Technical data <<).

After changing the springs, the electronics must be re-taught as described in the operating instructions for the frequency control device and the delivery rate must be checked again.



### Adjustment instructions for oscillating magnetic

Use a feeler gauge to set the magnetic gap.

The gap between the magnet and the armature may only be reduced to such an extent that the two parts do not collide with one another in vibration mode. A check can e.g. with a paper strip held in the magnetic gap during operation: if the paper strip shows traces of dirt, the magnetic gap is too small. Loud rattling noises also indicate that the magnetic gap is too small.



### 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.**

<b>Teaching the BBR</b>
-------------------------

**Preparations for teaching:**

- 1) Before starting, fill the Hopper bowl approx. 1/3 full with products.
- 2) Select code 008 on the MFS 268 frequency controller.
- 3) If it is not possible to select code 008, code 117 must first be set from 1 to 0.
- 4) Then turn the potentiometers almost to 0, the ext. Activate release for shaking and turn the potentiometer slightly so that you can feel slight vibrations.
- 5) Then start the teaching process as described below.

**Please proceed as follows on the control and display:**

- a) via key P in C000
- b) with arrow key up on C008
- c) with P to AFS is shown in the display
- d) Start the teach-in process with the up arrow key

The frequency range is then run through in the display until the amplitude is then permanently displayed again.

- 6) If code 117 was previously blocked, please reset C117 to 1 after teaching.

After completing the work, fill the bunker completely and set the potentiometers for pre and post dosing.

## Troubleshooting

The following faults can occur during operation:

Nr.	Location	Description	Cause	Rectification
1	Storage and dosing bunkers	Flow rate is insufficient:	too little material to be conveyed in the hopper bowl	Conveyed refill and check conveyor line
2	Storage and dosing bunkers	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	Storage and dosing bunkers	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	Storage and dosing bunkers	Conveyor developed strong noises:	Foreign objects in the magnetic gap (chips, material to be conveyed, dust)  Magnetic gap too narrow	Shutdown and remove foreign body  Check the magnet gap adjustment
5	Storage and dosing bunkers	Vibrating conveyor does not run in areas of Scale slider:	Potentiometer defect	Replace control unit

## Maintenance and Cleaning



### Notice

#### Maintenance:

The vibratory drive of the storage and dosing hopper is maintenance-free.

**The following checks and maintenance work should, however, be carried out at the specified time intervals:**

Nr.	Module	Action	Frequency
1	Oscillating unit	- Check for unusual noises	täglich
2	Storage and dosing bunkers	- Control of the conveying behavior	täglich
3	Hopper bowl	- Control for contamination - Cleaning the treads of the transported material - Eliminating foreign parts	täglich



### 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:

Nr.	Designation	Possible hazards	Comment
1	Control Unit	Electric shock	Open Control unit only when the power is off.
2	Oscillating drive	Clamping / crushing	Disconnect the control unit from the drive before engaging in the drive.
3	Oscillating drive	Influencing heart pacemakers by electromagnetic field	Safety distance of min. 25 cm.
4	Storage and dosing bunkers	Malaise / discomfort / headache by: - noise - vibration	- Use hearing protection - Use sound insulation hood - Increase distance to the running device
5	Storage and dosing bunkers	Risk of injury to the eyes and / or other parts of the body from: - falling out workpieces	- Put on protective goggles - Wear personal protective equipment - Do not stand in front of or under the bunker outlet.

## Technical data

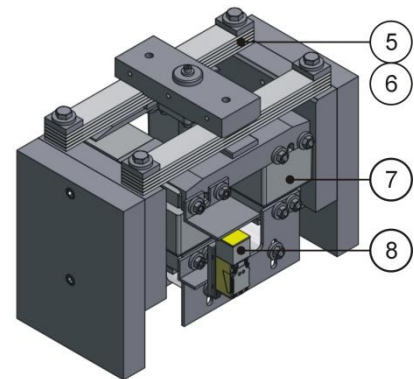
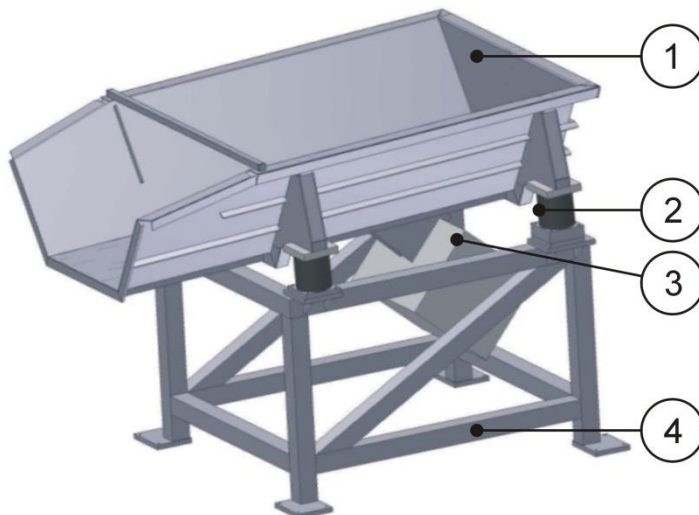
	Storage and dosing bunkers Type:	BVB-300	BVB-500	BVB-600	BVB-750	BVB-1000 up to BVB-1xxx
<b>Dimensions:</b>						
	Dimensions L x B x H: (without additional weights)	See diagram	See diagram	See diagram	See diagram	See diagram
	Net filling volume in liters:	300	500	600	750	1000 - 1xxx
<b>Loads:</b>						
	Max. Filling weight in kg:	around 1500	around 2000	around 2000	around 2000	around 2000
<b>Decoupling:</b>						
	Vibration buffers/ Dimensions:	45° Shore Model C Ø 100x55 mm	45° Shore Model C Ø 150x75 mm	45° Shore Model C Ø 150x75 mm	45° Shore Model C Ø 150x75 mm	45° Shore Model C Ø 150x75 mm
	Pieces:	8	8	8	8	8
<b>Electrical connection:</b>						
	Protection:	IP 54				
	Connection cable length:	ca. 1,5 m	ca. 1,5 m	ca. 1,5 m	ca. 1,5 m	ca. 1,5 m
	Theoretical max. power consumption:	1.050 VA	4.000 VA	4.000 VA	4.000 VA	4.000 VA
	Theoretical max. Current consumption:	4,8 A	17,39 A	17,39 A	17,39 A	17,39 A
	Magnet nominal voltage:	220 V				
	Frequency:	10 Hz				
	Number of magnets / Type:	2x W11	4x WS12B2	4x WS12B2	4x WS12B2	4x WS12B2
	Max. magnetic gap:	3,5 mm	4,0 mm	4,0 mm	4,0 mm	4,0 mm
	Mech. frequency:	around 20 Hz; 1200 min <sup>-1</sup>				
<b>Mechanical:</b>						
	Number of spring brackets:	2	2	2	2	2
	Number of spring assemblies:	2	2	2	2	2
	Spring type:	GFK	GFK	GFK	GFK	GFK
	Spring dimensions:	50x6x440 mm	50x6x440 mm	50x6x440 mm	50x6x440 mm	50x6x440 mm
<b>Standard spring configuration:</b>						
	1. Spring group:	5	5	5	5	5
	2. Spring group:	5	5	5	5	5
	Intermediate plate numbers:	16	16	16	16	16
	Intermediate plate dimension	40x0,5x30 mm	50x0,5x60 mm	50x0,5x60 mm	50x0,5x60 mm	50x0,5x60 mm
	Pressure plate numbers:	4	4	4	4	4
<b>Spring mounting:</b>						
	Screw Type / quality:	M12 / 12.9	M16 / 12.9	M16 / 12.9	M16 / 12.9	M16 / 12.9
	Torque:	120 Nm	120 Nm	120 Nm	120 Nm	120 Nm



## Drawings & Bill of material

### Storage and dosing bunkers:

### Pos. 3, Oscillating drive BBR-10/2 & 12/4:



### Purchase and part list:

Pos.	Designnation	Type	Dimensions	Supplier
1	Hopper bowl	See technical data	See technical data	FMB GmbH
2	G/M buffer	45° Shore, Form C	See technical data	Franksa GmbH
3	Oscillating unit	BBR-10/2 or 12/4	See technical data	FMB GmbH
4	Undercarriage	UG	On order	FMB GmbH
5	Leaf spring	GFK, d=13/17	See technical data	P.J. Prause Durotec GmbH
6	Intermediate plate	Ms, d=13/17	See technical data	FMB GmbH
7	Magnet	See technical data	-	Kendrion Magnettechnik GmbH
8	Amplitude sensor	Ni25-CP40-LIU	-	Hans Turck GmbH & Co. KG

<b>Manufacturer</b>
---------------------

**Manufacturer of oscillating drive:****FMB GmbH**

Arndtstraße 18

D-38120 Braunschweig

Tel.: +49 531 88505-0

Fax: +49 531 85 263

E-Mail: [info@fmb.de](mailto:info@fmb.de)Internet: [www.fmb.de](http://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):****FMB GmbH**

Arndtstraße 18

D-38120 Braunschweig

Tel.: +49 531 88505-0

Fax: +49 531 85 263

E-Mail: [info@fmb.de](mailto:info@fmb.de)Internet: [www.fmb.de](http://www.fmb.de)

Operating instructions storage bunker BVB with BBR drive

Date: 02/2024

Technical changes and misprints excepted.

FMB GmbH – Operating instructions vibrating storage hoppers with BBR drive Seite 18 / 19

## Appendix