



Operating instructions vibratory bowl feeder



Types : BTH-63
BTH-80
BTH-100

Drive types : BTH-63-A
BTH-80-A
BTH-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

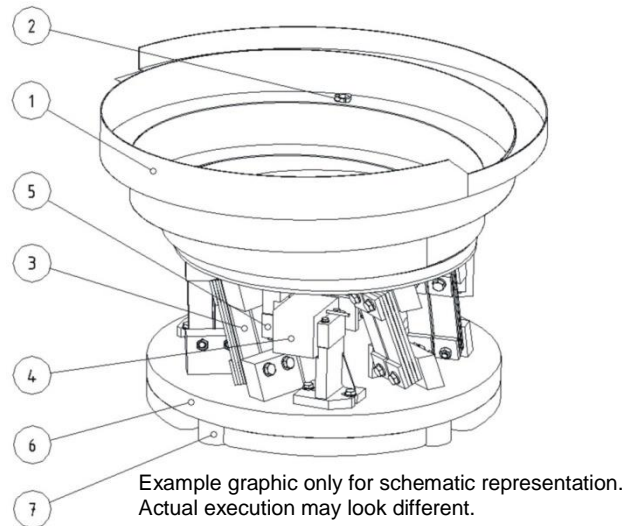
The device is designed only to be described in this document functions and services. Any other use is considered improper. Shall not be liable for damages resulting from the manufacturer. The risk is on the user.

Non-observance of the warranty!

Structure and function description

A vibratory bowl feeder is a device that electromagnetically induced vibrations in mechanical vibrations and converts this transfer of work to use. The basic structure of a vibratory bowl feeder consists of the following:

- Pos. 1 = Funding pot
- Pos. 2 = Conveyed
- Pos. 3 = Spring bank
- Pos. 4 = Oscillating magnet
- Pos. 5 = Anchor
- Pos. 6 = Against ground
- Pos. 7 = Vibration mounts



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 (spiral sort of pot) 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 BTH-63, BTH-80 & BTH-100.



Notice

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 vibrating feeder may not be raised and / or transported on top of sorting.

Mounting

Installation conditions:

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

The bowl feeder is screwed from below with appropriate mounting screws into the anti-vibration mounts, or fixed with Einfanglaschen 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 pot top 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

Before Starting are additionally perform the following checks and actions:

Nr.	Module	Action
1	Vibratory-Bowl Feeder	Sufficient number of the transported material refill. Check for foreign objects and jammed material.

Starting



Hinweis

Vibrationswendelförderer sind in den meisten Fällen nicht stausicher. Für eine ordnungsgemäße Funktion sind daher unbedingt folgende Hinweise zu beachten um Folgestörungen zu vermeiden:

- ⇒ *Es ist eine nachgeschaltete Staustrecke (Linearschwingförderer, Transportband oder Schwerkraftrinne) vorzusehen, welche mit einer Maximum- Füllstandsabfrage ausgestattet ist.*
- ⇒ *Der Vibrationswendelförderer darf nur bei eingeschalteter Staustrecke eingeschaltet werden, damit das Fördergut den Vibrationswendelförderer im freien Durchlauf verlassen kann und nicht bis in das Gerät zurückgestaut wird.*
- ⇒ *Es ist sicherzustellen, dass die Füllstandsabfrage der nachgeschalteten Staustrecke so ausgerichtet ist, dass das Abfragesignal zwischen zwei aneinanderliegenden vorbei geförderten Bauteilen nicht frei wird oder die Abfrage flackert.*
- ⇒ *An dem verwendeten Steuergerät oder der SPS müssen Vor- und Nachlaufzeiten für den Sensoreingang der Füllstandsabfrage getrennt eingestellt werden.*
- ⇒ **Vorlaufzeit: Zeit vom frei werden der Füllstandsabfrage bis zum Einschalten des Vibrationswendelförderers.**
*Wird diese Zeit zu gering gewählt schaltet der Vibrationswendelförderer sofort bei jedem frei werden der Füllstandsabfrage (auch bei kurzzeitigem Flackern) ein. Dies kann mit zunehmender Laufzeit dazu führen dass sich die Teile bis in den Vibrationswendelförderer zurückstauen.
 Wird diese Zeit zu groß gewählt wird die Staustrecke mit zunehmender Laufzeit immer leerer und die Förderleistung wird u.U. nicht mehr erreicht.
Empfehlung: ca. 1 – 3 Sekunden, die optimalen Vorlaufzeiten müssen individuell ermittelt werden.*
- ⇒ **Nachlaufzeit: Zeit vom belegen der Füllstandsabfrage bis zum Abschalten des Vibrationswendelförderers.**
*Wird diese Zeit zu gering gewählt schaltet der Vibrationswendelförderer bei einem einzelnen an der Abfrage vorbeigeförderten Teil ab und erreicht u.U. nicht mehr seine Leistung.
 Wird diese Zeit zu groß gewählt können sich die Teile u.U. bis in den Vibrationswendelförderer zurückstauen.
Empfehlung: ca. 1 – 3 Sekunden, die optimalen Nachlaufzeiten müssen individuell ermittelt werden.*
- ⇒ *Bei Verknüpfung von mehreren Zuführsystemen (Staustrücke, Wendelförderer, Vorratsbunker) ist die Aktivierungsreihenfolge in Abhängigkeit der Füllstände zu beachten.*

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 BTH 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 jacket sheet (if present) Tighten all spring fastening screws and bowl fastening 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 the lower fastening screw at one of the spring assemblies (approx. $\frac{1}{4}$ - $\frac{1}{2}$ rotation). While the spring fastening screw is loosened, you can see a change in the conveying speed; 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 at the periphery of the conveyor pot is not uniform, it must:

 - 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>
BTH-25	0,5 mm	-	3,0 mm
BTH-40	0,5 mm	-	2,4 mm
BTH-63	2,0 mm	-	3,5 mm
BTH-80	2,0 mm	-	3,5 mm
BTH-100	2,0 mm	-	3,5 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:

No.	Location	Description	Cause	Rectification
1	Vibratory Bowl Feeder	Flow rate is insufficient:	too little material to be conveyed in the sorter	Conveyed refill and check conveyor line
2	Vibratory Bowl Feeder	Conveyor is not running when you turn on:	<p>Plug not in socket</p> <p>Connection cable between vibratory feeders and control unit not in the control section housing</p> <p>Fuse defect</p> <p>Level detection of linear vibrating channel (if any) occupied or out of adjustment</p>	<p>Insert the plug</p> <p>Insert the plug, regulate power</p> <p>Replace the fuse</p> <p>Check level query and adjust if necessary</p>
3	Vibratory Bowl Feeder	Vibrating conveyor no longer brings after a certain term of the required performance:	<p>Loose screws on the spring packs</p> <p>Less mounting screws for the sorting bowl</p> <p>Adjusted magnetic gap</p> <p>Broken springs</p>	<p>Tighten the screws</p> <p>Tighten the screws</p> <p>Set the magnetic gap correctly</p> <p>Replace broken springs</p> <p>Re adjust the suspension</p>
4	Vibratory Bowl Feeder	Conveyor developed strong noises:	<p>Jacket sheet (if present) loose</p> <p>Uptight pot bottom</p> <p>Foreign body in the magnetic gap (chips, conveyed, dust)</p>	<p>Tighten jacket sheet</p> <p>Eliminate uptight</p> <p>Shutdown and remove foreign body</p> <p>Check the magnet gap adjustment</p>
5	Vibratory Bowl 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	Vibratory Bowl Feeder - Drive	- Check for unusual noises	daily
2	Vibratory Bowl Feeder - Bowl	- Control of the conveying behavior	daily
3	Vibratory Bowl Feeder - Bowl	- 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 vibratory bowl 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:

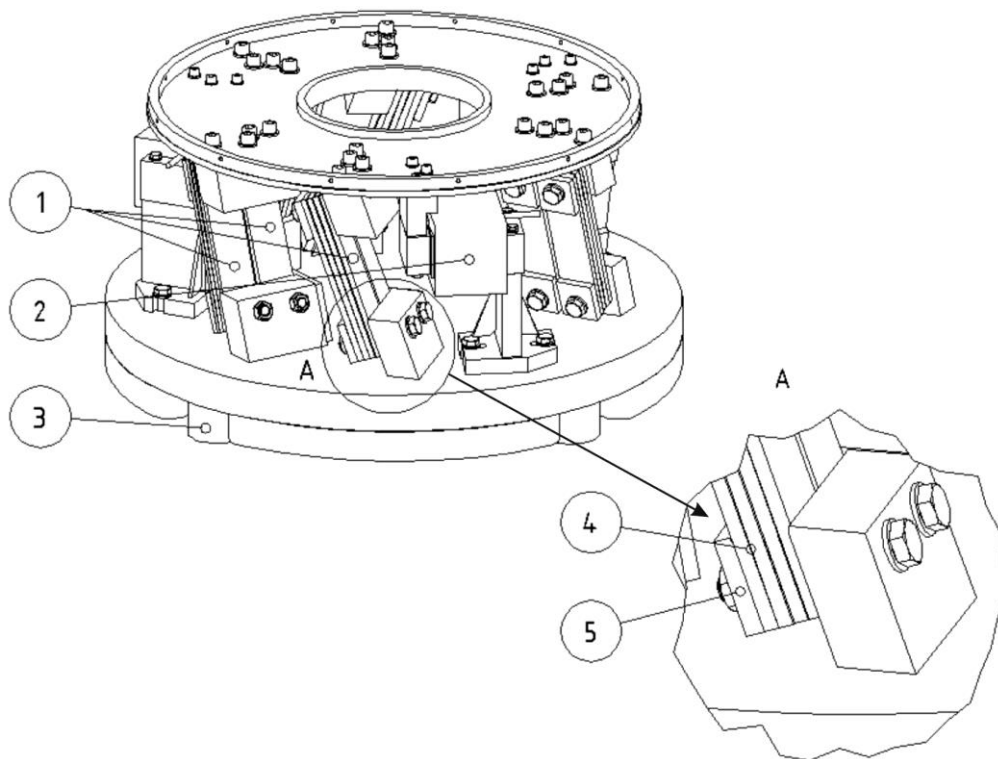
No.	Designation	Possible hazards	Comment
1	Vibratory Bowl Feeder - Drive	Electric shock	Open Control unit only when the power is off.
2	Vibratory Bowl Feeder	Clamping / crushing	Disconnect the control unit from the drive before engaging in the drive.
3	Vibratory Bowl Feeder	Influencing heart pacemakers by electromagnetic field	Safety distance of min. 25 cm.
4	Vibratory Bowl 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	Vibratory Bowl 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:	BTH-63	BTH-80	BTH-100			
Dimension:						
A Drive diameter:	∅ 740 mm	∅ 820 mm	∅ 1100 mm			
B Drive height:	approx. 379 mm	approx. 394 mm	approx. 423 mm			
C Seat diameter:	∅ 630 mm	∅ 800 mm	∅ 1000 mm			
D Seat height from bottom of pot:	approx. 363 mm	approx. 378 mm	approx. 403 mm			
E Sorting bowl attachment:	peripheral mounting 12x M8	peripheral mounting 16x M8	peripheral mounting 20x M8			
F Vibration buffers:	45° Shore, Form C, ∅ 75x55 (M12)	45° Shore, Form C, ∅ 75x55 (M12)	45° Shore, Form C, ∅ 75x55 (M12)			
G Hole circle / pieces:	∅ 640 mm / 4	∅ 720 mm / 4	∅ 990 mm / 6			
Drive weight:	approx. 387 Kg	approx. 563 Kg	approx. 1100 Kg			
Max. weight of the vibrating pot:	> 50 Kg	> 70 Kg	> 90 Kg			
Elektrical connection:						
Protection:	IP 54					
Lead wire length:	approx. 1,5 m	approx. 1,5 m	approx. 1,5 m			
Input:	1575 VA	1575 VA	2100 VA			
Current consumption:	7,14 A	7,14 A	9,52 A			
Magnet nominal voltage:	220 V					
Frequency:	50 Hz					
Number of magnets / Type:	3 WI 111/11	3 WI 111/11	4 WI 111/11			
Max. magnetic gap:	3,5 mm	3,5 mm	3,5 mm			
Mech. frequency:	50 Hz; 3000 min ⁻¹					
Mechanical:						
Number of spring brackets:	6	9	12			
Number of spring assemblies:	12	18	24			
Spring type:	GFK	GFK	GFK			
Spring dimensions:	50 x 8 x 225 mm	50 x 8 x 225 mm	50 x 8 x 225 mm			
Hole spacing:	185 mm	185 mm	185 mm			
Hole diameter (bottom / top):	∅ 15 / ∅ 17	∅ 15 / ∅ 17	∅ 15 / ∅ 17			
Standard spring configuration:	Inside	Outside	Inside	Outside	Inside	Outside
1. Spring group:	4	3	3	2	3	2
2. Spring group:	4	3	3	2	3	3
3. Spring group:	4	3	3	2	3	2
4. Spring group:	4	3	3	2	3	3
5. Spring group:	4	3	3	2	3	2
6. Spring group:	4	3	3	2	3	3
7. Spring group:	--	--	3	2	3	2
8. Spring group:	--	--	3	2	3	3
9. Spring group:	--	--	3	2	3	2
10. Spring group:	--	--	--	--	3	3
11. Spring group:	--	--	--	--	3	2
12. Spring group:	--	--	--	--	3	3
Spring mounting:	Top	Bottom	Top	Bottom	Top	Bottom
Intermediate plate Type:	Ms, d=17	Ms, d=15	Ms, d=17	Ms, d=15	Ms, d=17	Ms, d=15
Intermediate plate numbers:	30	30	30	30	30	30
Pressure plate Type:	St, d=17	St, d=15	St, d=17	St, d=15	St, d=17	St, d=15
Pressure plate numbers:	12	12	18	18	24	24
Screw Type / quality:	M16 / 10.9	M14 / 10.9	M16 / 10.9	M14 / 10.9	M16 / 10.9	M14 / 10.9
Screw numbers:	12	12	18	18	24	24
Torque:	140 Nm		140 Nm		140 Nm	

Drawings & Bill of material BTH-63, BTH-80 & BTH-100

Drawing:



Bill of material:

Pos.	Designnation	Type	Dimensions in mm	Supplier
1	Leaf spring	GFK	Fl 50 x 8 x 225	FMB GmbH
2	Magnet	see technical Data	---	REO AG
3	G/M buffer	45° Shore, Form C	Rd 75x55 (M12)	Franksa GmbH
4	Intermediate plate	Ms, d=15 (17) mm, see technical Data	50 x 0,5 x 45	FMB GmbH
5	Pressure platte	St, d=15 (17) mm, see technical Data	50 x 10 x 53	FMB GmbH

Manufacturer

Manufacturer of oscillating drive:

FMB GmbH

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Declaration of conformity

as defined by Low voltage directive 2014/35/EU

Herewith we declare, that the product complies with the following provisions:

- Low voltage directive 2014/35/EU

Applied harmonized standards:

- DIN EN 60204 T1

Remarks:

We assume that our product is to be integrated in a fixed machine. The provisions of the EMC directive 2014/30/EU has to be considered by the user.

FMB GmbH

Manager: Hartmut Striepe, Edwin Neue



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

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Date: 10/2021

Technical changes and misprints excepted.

Appendix