

Operating & Installation Instructions

Bowl feeder

WV151-1 / WV201-1 / WV310-1



Translation of the Original Assembly Instructions EN

- WV 151-1 (Left 25°) ⇒ Order no.: 11005656
- WV 151-1 (Right 25°) ⇒ Order no.: 11005657
- WV 151-1 (Left 20°) ⇒ Order no.: 11015890
- WV 151-1 (Right 20°) ⇒ Order no.: 11015891
- WV 201-1 (Left 25°) ⇒ Order no.: 11005659
- WV 201-1 (Right 25°) ⇒ Order no.: 11005660
- WV 201-1 (Left 20°) ⇒ Order no.: 11015892
- WV 201-1 (Right 20°) ⇒ Order no.: 11015893
- WV 310-1 (Left 25°) ⇒ Order no.: 11005665
- WV 310-1 (Right 25°) ⇒ Order no.: 11005666
- WV 310-1 (Left 20°) ⇒ Order no.: 11015894
- WV 310-1 (Right 20°) ⇒ Order no.: 11015895

Dear Customer

Thank you for choosing our products and placing your trust and confidence in our company!

These operating and installation instructions contain all essential information you need about your product. Our aim is to provide the required information as concisely and clearly as possible. If, however, you still have any questions on the contents or suggestions, please do not hesitate to contact us. We are always grateful for any feedback.

Our team will also be glad to answer any further question you may have regarding the bowl feeder or other options.

We wish you every success with our products!

With kind regards

Your Afag team

© Subject to modifications

The bowl feeders have been designed by Afag Automation AG according to the state of the art. Due to the constant technical development and improvement of our products, we reserve the right to make technical changes at any time.

Updates of our documentations



Unlike the printed documents, our digital instructions manuals, product data sheets and catalogues are being continuously updated on our website.

Please keep in mind that the digital documents on our website are always the latest versions.

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1 General

1.1 Contents and purpose of this manual

These operating and installation instructions contain important information on assembly, commissioning, functioning and maintenance of the bowl feeder WV to ensure safe and efficient handling and operation.

Consistent compliance with these operating instructions will ensure:

- permanent operational reliability of the bowl feeders,
- optimal functioning of the bowl feeders,
- timely detection and elimination of defects (thereby reducing maintenance and repair costs),
- prolongation of the bowl feeders service life.

The illustrations in this manual shall provide you with a basic understanding of the module and may vary from the actual design of your module.

1.2 Explanation of symbols

The safety notes are marked by a pictogram and a signal word. The safety notes describe the extent of the hazard.



DANGER

Danger!

This safety note indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

Warning!

This safety note points out a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Caution!

This safety note points out a potentially dangerous situation which, if not avoided, can result in minor or slight injuries.

NOTICE

This safety note points out a potentially dangerous situation which, if not avoided, can cause substantial damage to property and the environment.



This note contains important additional information as well as useful tips for safe, efficient and trouble-free operation of the bowl feeders.

Further warning signs:

Where applicable, the following standardised symbols are used in this manual to point out the various potential health risks.



Warning - Dangerous electrical voltage.



Warning - Risk of hand and finger injury due to uncontrolled movements of components.



Warning - Magnetic field

1.3 Additional symbols

In these assembly instructions the following symbols are used to highlight instructions, results, references, etc..

Symbol	Description
1.	Instructions (steps ...)
⇒	Results of actions
↺	References to sections
■	Enumerations not ordered

1.4 Warranty

The warranty terms for Afag handling components and handling systems are the following:

- 24 months from initial operation and up to a maximum of 27 months from delivery.
- Wear parts are excluded from the warranty (The customer is entitled to a product free of defects. *This does also apply to defective accessories and wear parts. Normal wear and tear are excluded from the warranty.*

The warranty covers the replacement or repair of defective Afag parts. Further claims are excluded.

The warranty shall expire in the following cases:

- Improper use of the module.
- Non-observance of the instructions regarding installation, commissioning, operation and maintenance.
- Improper assembly, commissioning, operation and maintenance.
- Repairs and design changes carried out without prior technical instructions of Afag Automation AG.
- Removing the serial number from the product.
- Non-observance of the EC Machinery Directive, the Accident Prevention Regulations, the Standards of the German Electrotechnology Association (VDE) and these safety and assembly instructions.

1.5 Liability

No changes shall be made to the bowl feeders unless described in this manual or approved in writing by Afag.

Afag accepts no liability for unauthorized changes or improper assembly, installation, commissioning, operation, maintenance or repair work.

2 Safety instructions

2.1 General

This chapter provides an overview of all important safety aspects to ensure safe and proper use of the bowl feeders and optimal protection of personnel.

Safe handling and trouble-free operation of the bowl feeder requires knowledge of the basic safety regulations.

Every person carrying out installation, commissioning, maintenance work or operating the bowl feeder must have read and understood the complete user manual, especially the chapter on safety instructions.

Beyond this, there are rules and regulations regarding accident prevention that are applicable to the place of installation which must be observed.



Failure to follow the directions and safety instructions given in this instructions manual may result in serious hazards.

2.2 Intended use

The Afag bowl feeders WV are exclusively designed for storing, conveying, separating and sorting workpieces of different dimensions, design forms and material variants.

The following uses of the WV are considered as **improper use** :

- Use in damp and wet areas
- Use at temperatures below 10°C or above 45°C
- Use in areas with highly flammable media
- Use in areas with explosive media
- Use in heavily polluted or dusty environments
- Use in aggressive environment (e.g. salty atmosphere)



The intended use of the module also includes:

- observance of all instructions given in this manual.
 - compliance with the inspection and maintenance work and the specifications in the data sheets,
 - using only original spare parts.
-

2.3 Foreseeable misuse

Any use other than or beyond the intended use described above is considered a misuse of the bowl feeder WV.

WARNING



Risk of injury if the bowl feeder WV is not used for its intended use or if it is foreseeable used incorrectly!

The improper use of the bowl feeder WV poses a potential hazard to the personnel.

- The bowl feeders may only be used in a technically perfect condition in accordance with its intended use and the instructions in this manual as well as in compliance with the safety requirements!

2.4 Obligations of the operator and the personnel

2.4.1 Follow these instructions

A basic prerequisite for safe and proper handling of the bowl feeders is a good knowledge of the basic safety instructions.



This manual, in particular the safety instructions contained therein, must be observed by all persons working with the bowl feeder.

2.4.2 Obligations of the operating company

In addition to the safety instructions given in this manual, the operating company must comply with the safety accident prevention and environmental protection regulations valid for the field of application of the bowl feeder.

The operating company is required to use only personnel who :

- have the necessary professional qualifications and experience,
- are familiar with the basic rules regarding occupational safety and accident prevention,
- have been instructed in the correct handling of the bowl feeder,
- have read and understood these operating instructions.

The operating company is also required to:

- monitor on an ongoing basis that the personnel work safely considering any potential hazard involved and the assembly instructions are observed,
- ensure that the assembly instructions are always kept at hand at the installation in which the bowl feeder is mounted,
- observe and communicate universally applicable laws and regulations regarding accident prevention and environmental protection,
- provide the necessary personal protective equipment (e.g. protective gloves) and instruct the personnel to wear it.

2.4.3 Obligations of the personnel

All personnel working with the modules are required to:

- read and observe these assembly instructions, especially the chapter on safety,
- observe the occupational safety and accident prevention regulations,
- observe all safety and warning signs on the modules,
- refrain from any activity that might compromise safety and health.



In addition, the personnel must wear the personal protective equipment required for carrying out their work (→ chap. 2.6).

2.5 Personnel requirements

2.5.1 Personnel qualification

The activities described in the assembly instructions require specific requisites at the level of professional qualifications of the personnel.

Personnel not having the required qualification will not be able to assess the risks that may arise from the use of the bowl feeder thus exposing himself and others to the risk of serious injury. Therefore, only qualified personnel may be permitted to carry out the described activities on the bowl feeder.

These operating instructions are intended for skilled personnel (installers, system integrators, maintenance personnel, technicians), electricians and operating personnel.

The following is a description of the professional skills (qualifications) required for carrying out the different activities:

Qualified personnel:

Qualified personnel with appropriate training who are qualified due to their special know-how and fully familiar with the machine and who have been given instructions on how to carry out the task entrusted to them safely.

Qualified electrician:

Persons who have obtained their electrical qualifications through appropriate professional training and complementary courses that enables them to identify risks and prevent possible hazards resulting from electricity.

Operator (trained personnel):

Authorized persons who due to their specialized professional training, expertise and experience can identify risks and preventing possible hazards arising from the use of the machine.

2.6 Personal protective equipment (PPE)

The personal protective equipment serves to protect the personnel from hazards affecting their safety and health at work.

When working on/with the bowl feeder, the personnel must use the protective equipment assigned by the safety officer of the operating company or as required by safety regulations. In addition, the personnel are required to:

- wear the personal protective equipment provided by the operating company (employer),
- check the personal protective equipment for proper condition, and
- immediately notify the person responsible on site of any defects found on the personal protective equipment.

2.7 Changes and modifications

No changes may be made to the WV which have not been described in these operating instructions or approved in writing Afag Automation AG.

Exceptions to this are the processes described in ➡chap. 6.2.4 "Assembly of the bowl" and ➡chap. 6.4 "Device-specific adjustment".

Afag Automation AG accepts no liability for unauthorised changes or improper assembly, installation, commissioning, maintenance or repair work.



The bowl feeders may not be changed or modified in any way, except with the prior written consent of Afag.

2.8 General hazards / residual risks

Despite the safe design of the WV and the technical protective measures taken, there remain residual risks that cannot be avoided, and which present a non-obvious residual risk when operating the rotary modules.

Observe the safety instructions in this chapter and in the other sections of this manual to avoid damage to property and dangerous situations for the personnel.

2.8.1 General hazards at the workplace

The bowl feeder WV has been built according to the state-of-the-art and the applicable health and safety requirements. However, improper use of the bowl feeder may cause the following hazards to the personnel:

- danger to life and limb of the operator or third parties,
- on the modules themselves,
- property damage.



Always keep the operating instructions ready at hand at the workplace! Please, also observe:

- the general and local regulations on accident prevention and environmental protection,
- the safety information sheet for the bowl feeder.

WARNING



Danger - Do not use in unsuitable environment !

The WV are designed for use in **non**-explosive atmospheres.

- Do **not** use the WV feeders in potentially explosive atmospheres!

CAUTION



Risk of injuries due to uncontrolled parts movements!

When operating the WV uncontrolled movements may occur which can cause personal injury or property damage.

- Only qualified personnel may work with or on the WV.
- Read this manual carefully before carrying out any work on or with the WV.

2.8.2 Danger due to electricity

WARNING



Danger! Risk of electric shock!

If work on electrical components is required, ensure that the work is carried out properly, failure to do so will cause serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.

2.8.3 Mechanical hazards

CAUTION



Danger of injury by moving components!

Limbs can be crushed by moving components!

- Work on and with the WV may only be carried out by qualified personnel.
- Never reach into the system during normal operation!

2.8.4 Danger due to alternating magnetic fields



DANGER

Danger due to alternating magnetic fields!

The alternating magnetic fields occurring in the immediate vicinity of the HLF can affect the proper functioning of e.g., pacemakers and defibrillators.

- Persons with a pacemaker must keep a **safety distance** of **at least 5 cm**.

2.8.5 Noise hazards



CAUTION

Noise hazards!

In certain cases, an impermissible noise level may result (e.g., when opening the lid of the noise protection hood for filling or refilling the parts).

- Wear hearing protection during noise-critical activities!

3 Technical data

3.1 Dimensional drawing WV151-1 - WV310-1

Type	WV151-1	WV201-1	WV310-1
A	146 mm	194 mm	294 mm
D1	M6	M8	M8
D2	4 x M5	4 x M6	4 x M6
E	120 mm	160 mm	226 mm
H	110 mm	180 mm	180 mm

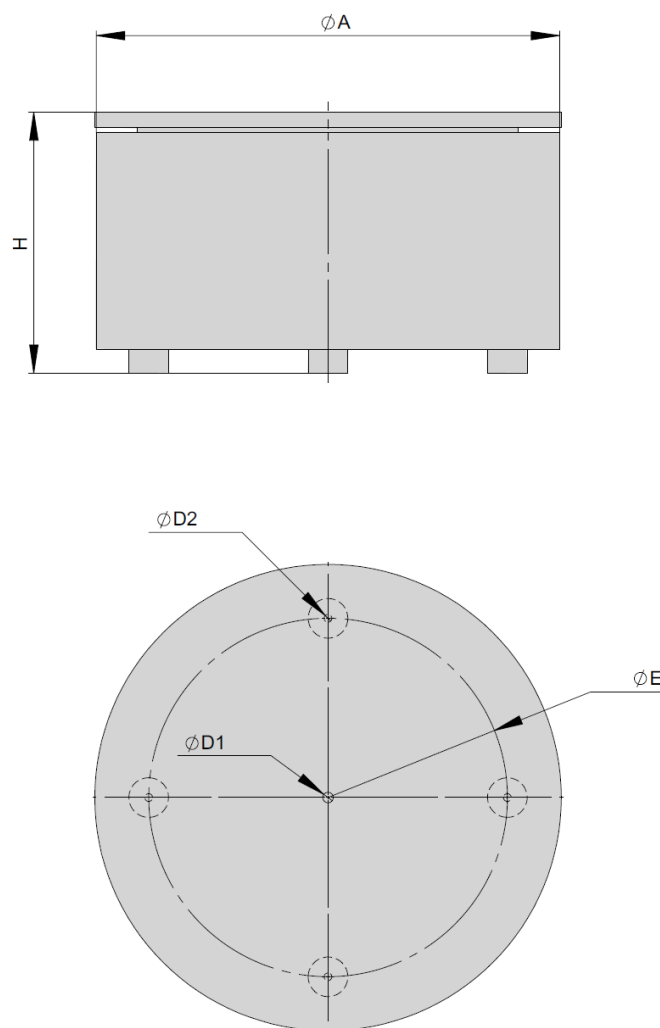


Fig. 1 Dimensional drawing WV151-1 / WV310-1

3.2 Technical data WV151-1 - WV310-1

WV151 - WV310				
Operating temperature	10 - 45 °C			

Type	WV151-1	WV151-1	WV151-1	WV151-1
Order number	11015891	11015890	11005657	11005656
Mechanical vibration frequency	100 Hz	100 Hz	100 Hz	100 Hz
Mains connection (mains voltage/mains frequency)	230 V/50 Hz *	230 V/50 Hz *	230 V/50 Hz *	230 V/50 Hz *
Max. power consumption	66 VA	66 VA	66 VA	66 VA
Net weight	5.4 kg	5.4 kg	5.4 kg	5.4 kg
Admissible bowl weight ± 30 %	1.1 kg	1.1 kg	1.1 kg	1.1 kg
Angle of the gradient of the leaf springs	20 °	20 °	25 °	25 °
Delivery direction	right	left	right	left
Protection type	IP54	IP54	IP54	IP54

Type	WV201-1	WV201-1	WV201-1	WV201-1
Order number	11015893	11015892	11005660	11005659
Mechanical vibration frequency	100 Hz	100 Hz	100 Hz	100 Hz
Mains connection (mains voltage/mains frequency)	230 V/50 Hz *	230 V/50 Hz *	230 V/50 Hz *	230 V/50 Hz *
Max. power consumption	176 VA	176 VA	176 VA	176 VA
Net weight	16.2 kg	16.2 kg	16.2 kg	16.2 kg
Admissible bowl weight ± 30 %	5 kg	5 kg	5 kg	5 kg
Angle of the gradient of the leaf springs	20 °	20 °	25 °	25 °
Delivery direction	right	left	right	left
Protection type	IP54	IP54	IP54	IP54

Type	WV310-1	WV310-1	WV310-1	WV310-1
Order number	11015895	11015894	11005666	11005665
Mechanical vibration frequency	100 Hz	100 Hz	100 Hz	100 Hz
Mains connection (mains voltage/mains frequency)	230 V/50 Hz *	230 V/50 Hz *	230 V/50 Hz *	230 V/50 Hz *
Max. power consumption	176 VA	176 VA	176 VA	176 VA
Net weight	37.6 kg	37.6 kg	37.7 kg	37.7 kg
Admissible bowl weight ± 30 %	7.5 kg	7.5 kg	7.5 kg	7.5 kg
Angle of the gradient of the leaf springs	20 °	20 °	25 °	25 °
Delivery direction	right	left	right	left
Protection type	IP54	IP54	IP54	IP54

* Other electr. configurations on request

Included in delivery

- 4x Leaf spring WV
- 8x Spacers WV

3.3 Accessories


3.3.1 Mounting parts

Designation	Type	Order Number		
		WV151-1	WV201-1	WV310-1
Centring angle		50251550	50251542	
Spacers	5mm	50021483		
	10mm	50021486		
	20mm	50021484		
Distance gauges		On request		

3.3.2 Controller

Type	Power supply	Order Number	Note
IRG1-S	230V/50Hz	50360105	Control without timer function
	115V/60Hz	50360106	External setpoint setting
MSG801	230V/50Hz - 115V/60Hz	50391818	Sensor feed, timer function, valve and interface outputs
MSG802	230V/50Hz - 115V/60Hz	50391819	Sensor feed



For more information on the controller, see  chap. 6.3 and the controller manufacturer's instructions.

4 Transport, packaging and storage

4.1 Safety instructions



CAUTION

Danger of injury due to improper transport equipment!

The improper use of transport equipment such as industrial trucks, overhead cranes, slings) can lead to injuries (e.g., crushing)!

- Observe transport and assembly instructions.
- Use the means of transport properly!

NOTICE

Damage to property due to improper lifting!

The bowl feeder must not be lifted by the feed bowl or the arrangement elements! This can damage the bowl feeder!

- Lift the bowl feeder by the base only!



The bowl feeders are packed in the original packaging (cardboard box). Carefully remove the bowl feeder from the original packaging.

4.2 Scope of supply



The corresponding documentation is supplied with each bowl feeder (e.g., operating and installation instructions, etc.).



Fig. 2 Scope of delivery WV

[Unt]	Designation
1 x	Bowl feeder WV
1 x	Operating & Installation Instructions

4.3 Transport



No liability can be assumed for damages caused by improper installation on the part of the operating company.



The following conditions must be complied with for transport and storage:

- Storage temperature: 0-50 °C
 - Relative air humidity: < 90%, non condensing
-

4.4 Packaging

The bowl feeder is transported in the Afag Automation AG transport packaging. If no Afag packaging is used, the bowl feeder must be packed in such a way that it is protected against shocks and dust.

NOTICE

Risk to the environment due to incorrect disposal of the packaging material

Environmental damage can be caused by incorrect disposal of the packaging material.

- Dispose of the packaging material in an environmentally sensitive way in accordance with the local environmental regulations.
-

4.5 Storage

If the bowl feeder is stored for an extended period, observe the following:

- Store the bowl feeder in the transport packaging.
- Do not store the telescope spindle axes outdoors or expose them to weather conditions.
- The storage space must be dry and dust free.
- Room temperature of the storage space: 0-50 °C.
- Relative air humidity: < 90% non condensing.
- Protect the bowl feeder from dirt and dust.

5 Design and description

5.1 Structure of the WV151-1 - WV310-1

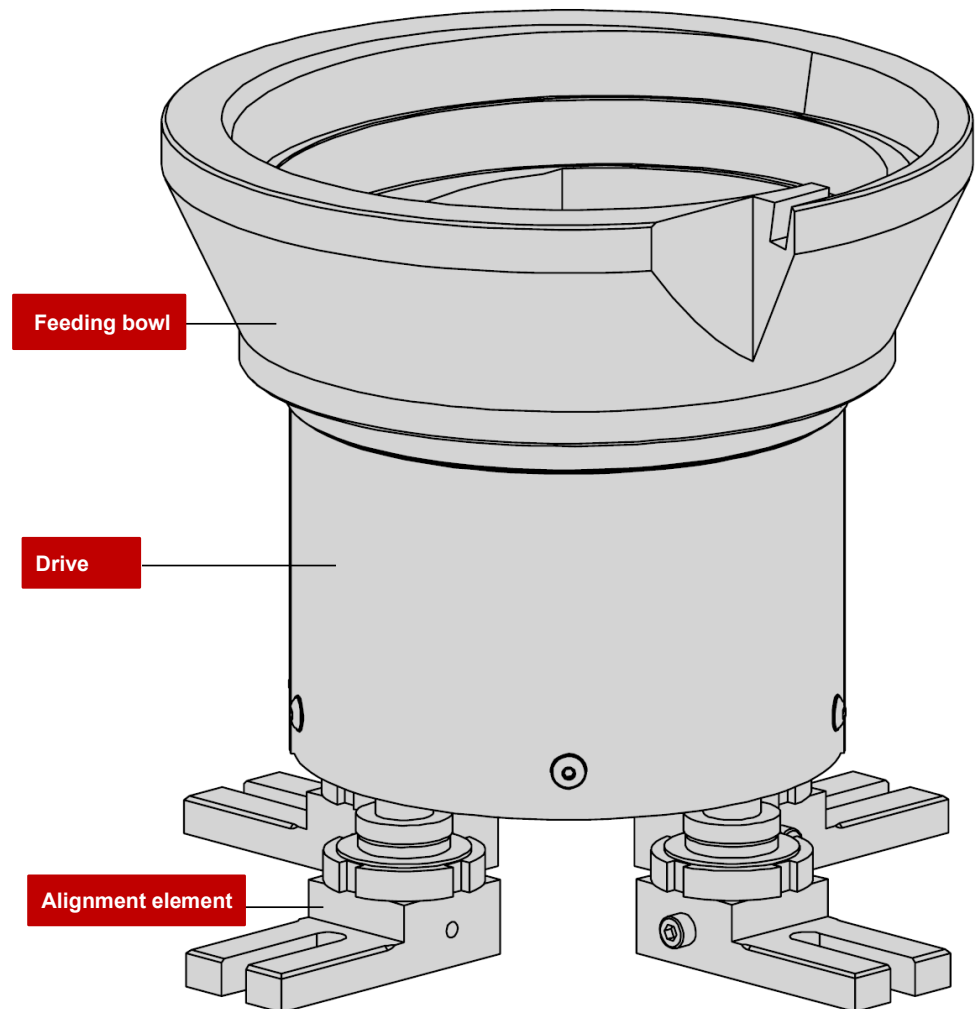


Fig. 3 Structure of the bowl feeder WV151-1 – WV310-1

The bowl feeder WV is used in conjunction with a bowl for storing, transporting, separating and sorting bulk goods.

The transport movement is generated by vibration. Here, the parts are moved in the transport direction by micro-jumps.



The bowl feeders are to be operated in combination with an Afag controller. Only in this combination can optimum conveying behaviour be guaranteed.

5.2 Description of the bowl feeder WV

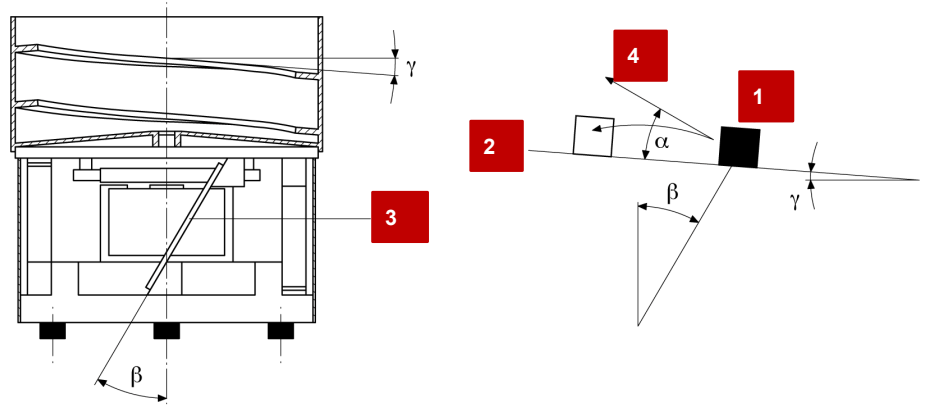


Fig. 4 Bowl feeder basic structure

- 1. Conveyed material
- 2. Feeder rail
- 3. Leaf spring
- 4. Jumping-off direction
- α Jumping-off angle
- β . Inclination of leaf springs
- γ . Pitch angle of the spiral

The magnet, connected to the support, creates a force which attracts reps. releases the oscillating plate dependent on the oscillation frequency of the power supply.

As the magnetic anchor is connected to the feed bowl, it also follows the frequenting movement. As a result, due to the angle of inclination (β) of the leaf spring and the pitch angle (γ) of the spiral, the conveyed material (1) lifts off the conveyor track (2) during each oscillation and performs small throwing movements in the direction perpendicular to the leaf spring plane (3).

On a cycle of the 50Hz alternating current supply, the magnet achieves twice its maximum pulling force while this is independent of the direction of current flow. The magnet thereby produces an oscillating frequency of 100 Hz.

This 100 Hz oscillation is necessary to achieve a smooth or gentle transport.

6 Installation, assembly and setting

For safe operation, the module must be integrated into the safety concept of the system in which it is installed.

During normal operation, it must be ensured that the user cannot interfere with the working area of the bowl feeder. This can be achieved through suitable protective measures (e.g., enclosure, light grid).

When the system is running in special operating modes, it must be ensured that there is no danger to the operator.



The system operator is responsible for the installation of the bowl feeder in a system!

6.1 Safety instructions

WARNING

Danger! Risk of electric shock!

If work on electrical components is required, ensure that the work is carried out properly, failure to do so will cause serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.
- Disconnect the power supply before assembly and disassembly work and when making changes to the installation!



The noise level can be reduced by using noise protection hoods.



No liability for damages can be assumed for damages caused by improper installation on the part of the operator.



Observe the safety instructions in ➞ chap. 2 "Safety instructions" of this manual as well as the instructions in ➞ chap. 6.3.

6.2 Assembly

6.2.1 Tightening torques

Tightening torques M_{Sp} in [Nm] for shaft bolts with metric ISO standard threads and head rests 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

6.2.2 Definition of the feed direction

For the bowl feeder, the feed directions are defined as follows:

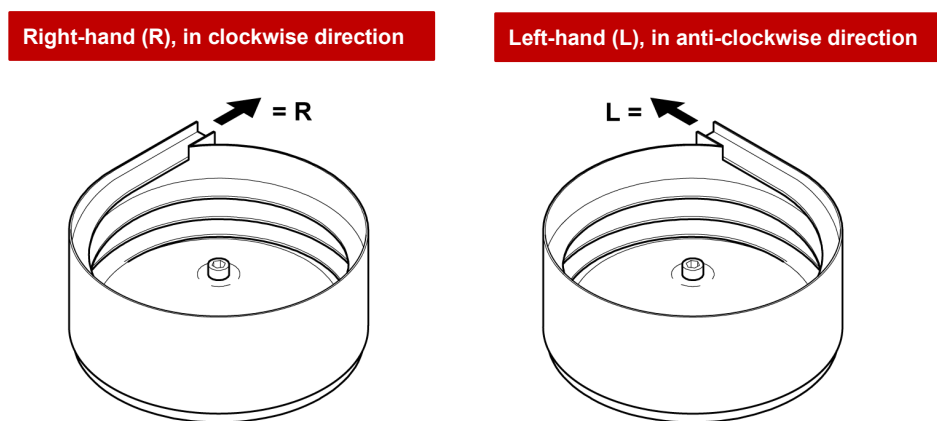


Fig. 5 Defined feed direction

6.2.3 Fastening of bowl feeder

The bowl feeder must always be mounted on a sufficiently dimensioned substructure (observe dimensions) for operation.

The spiral conveyor can be fixed as follows:

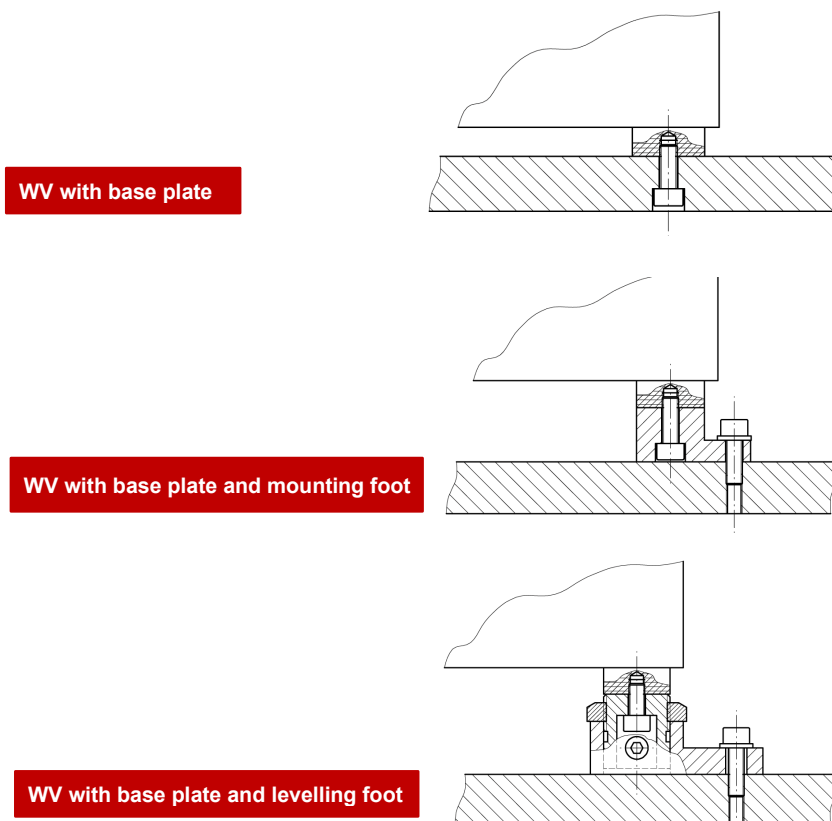


Fig. 6 Fastening of the bowl feeder

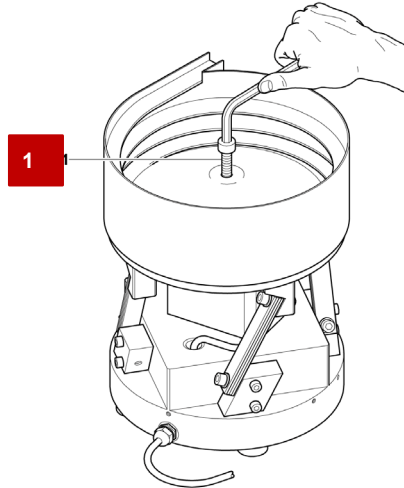


When mounting, make sure that the base is horizontal.

6.2.4 Mount the feeding bowl

To mount the feeding bowl, proceed as follows:

1. Connect the feeding bowl to the oscillating plate using the central screw (1).



2. Tighten the screw firmly with an Allen key

- WV151-1 M6 screw
- WV201-1 M8 screw
- WV310-1 M8 screw

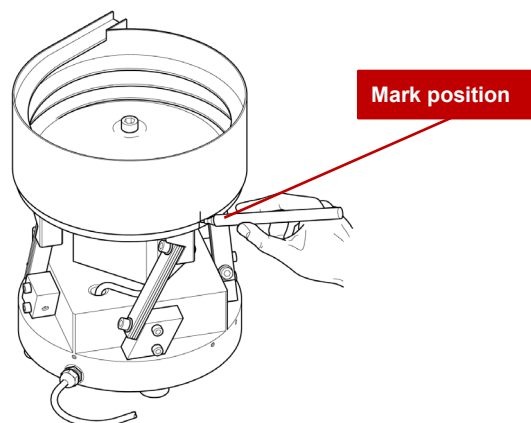
⇒ The process is completed.



No specific tightening torque is prescribed for this operation.

Position of the feeding bowl after removing or loosening the screws

After loosening or removing the feeding bowl from the oscillating plate, the feeding bowl must be refitted in the same position. Here it is recommended to mark the position "feeding bowl and oscillating plate" as shown below before removing:



6.3 Electrical connection

WARNING



Danger! Risk of electric shock!

Improperly performed work can result in serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.

Important notes on the electrical connection

- The mains supply must be provided by the customer via a residual current circuit breaker!
- The feeder may only be operated with the mains supply specified on the type plate!
- Emergency-STOP devices must remain effective in all operating modes. Unlocking the Emergency-STOP devices must not cause an uncontrolled restart!

Power connection via controller

The WV is connected to the AC mains 230 V/50 Hz via a control unit type IRG. The design for other mains voltages and frequencies is possible, e.g. 115V/60Hz.

The IRG1-S controller is available for controlling the WV. The MSG801 or MSG802 can also be used. An additional CEE appliance plug (Fig. 8) is required for the MSG controls (order no.: 11006982!).

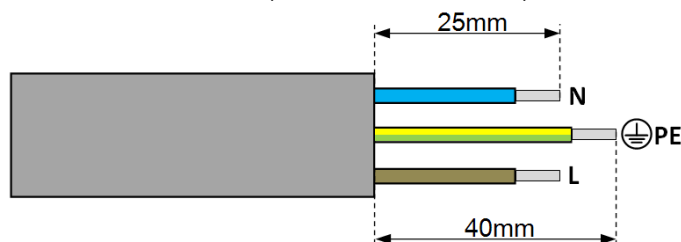


Fig. 7 Cable end additional plug

The bowl feeder operates in full-wave mode at twice the mains frequency, i.e., at 50Hz AC with a mechanical vibration frequency of 100Hz; for half-wave operation with the simple mains frequency, i.e. with 50Hz.

Vibration displacement and thus the transport speeds are infinitely adjustable due to magnet current and thus magnetic force variability. All IRG types operate with soft-starting and offer different options for mounting, attachment and control.



A detailed description of the controller can be found in the AFAG general catalogue. Third-party control units can also be used, provided they meet the technical conditions.

6.4 Adjustment of the oscillation system

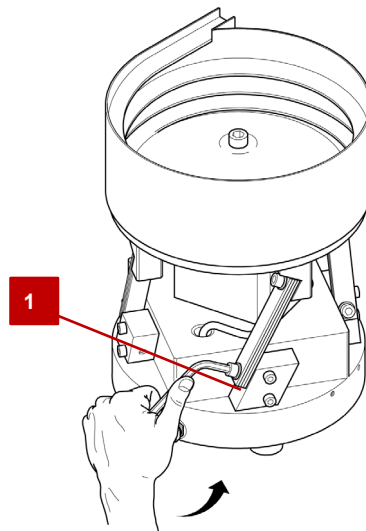
Basically, the bowl feeder and the feeding bowl must be coordinated.

The following factors influence the running behaviour of the oscillating system:

- the conveyed material (size, weight, shape, material and composition)
- the conveying capacity,
- the filling quantity
- The organisational elements in the feeding bowl (structure and arrangement). Arrangement elements always represent an additional weight.
- The outlet on the feeding bowl
- The substructure
- The environment (are there other vibrating components with a disturbing influence?)

To adjust the oscillating system, proceed as follows:

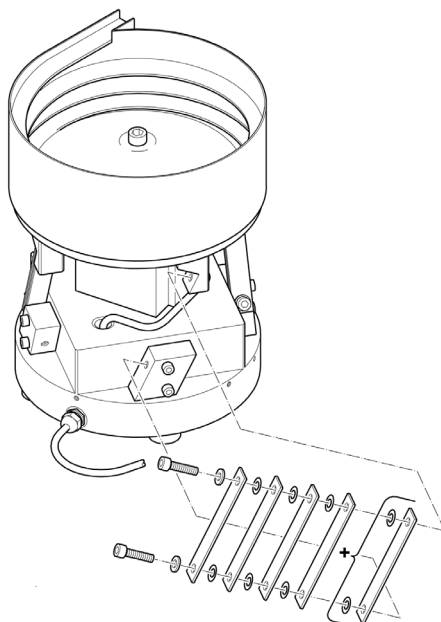
1. Pull out the mains plug.
2. Remove the housing.
3. Check the settings on the control unit.
4. Unscrew the housing and check all spring and feeding bowl fastening screws for tightness.
5. Check air gap and adjust if necessary (➡ chap. 9.4.1, 9.4.2).
6. Switch on the bowl feeder and set the controller to 90% (with SE position 8)
7. Slowly loosen the lower fastening screw (1) on one spring assembly.



- **The speed of the material in the feeding bowl changes!**

Running speed becomes slower:

1. Install additional leaf springs (➡ chap. 9.3.1).
2. Start with a spring in a spring assembly.
3. If this is not sufficient, gradually install a spring with an intermediate plate on each of the spring assemblies.



⇒ The process is completed.

Running speed becomes greater:

1. Remove leaf springs (➡ chap. 9.3.1).
2. Start with a spring in a spring assembly.
3. If this is not sufficient, remove one spring at a time from the individual spring assemblies.

⇒ The process is completed.

Uneven running speed around the circumference of the feeding bowl:

1. Remove a spring at the slowest point.
2. Add a spring at the fastest point.

⇒ The process is completed.

Unsteady running speed between two spring packs:

1. Viewed in the running direction behind the unsteady running speed, either install a spring or remove a spring.



After completing the adjustment work, refit the housing!

7 Operation



After the control unit is switched on, no further settings are necessary in normal operation.

Only the refilling of the feed bowl must be ensured for uninterrupted running.

7.1 Safety instructions for commissioning

CAUTION



Noise hazards!

In certain cases, an impermissible noise level may result (e.g. when opening the lid of the noise protection hood for filling or refilling the parts).

- Wear hearing protection during noise-critical activities!

NOTICE

Material damage due to jamming of the parts!

If the bulk material is not filled into the centre of the feed bowl, the arrangement device can be damaged or the required output can no longer be achieved, as the falling parts can jam in the arrangement device!

- Fill bulk material into the centre of the feed bowl!

7.2 Preparatory activities for commissioning

7.2.1 Notes on the control unit used

The bowl feeder is designed for operation with AFAG - controllers. The modules can also be operated with other control systems.

The operation of the AFAG controllers is described in the separate installation manual for the respective controllers.

Perform a test run in preparation for commissioning. To turn de connectors, proceed as follows:

1. Connect the controller to the computer (operating software must be installed).
 - The use of the operating software is described in the installation instructions for the controllers used.
2. If the module is supplied with an Afag controller, no further action is required (operating parameters already stored in the controller).
3. When using a different controller, special cables must be made, and the operating parameters determined.
 - ⇒ The test operation can now be carried out.

7.2.2 Notes for trouble-free feeding

For trouble-free feeding, the workpieces must fulfil the following conditions:

- Oil, grease and burr-free
- Not sticky
- Not statically charged
- Non-magnetic (must not have any intrinsic magnetism)
- Dirt-free and not mixed with foreign parts
- Rubber parts can be talcumed

7.3 First commissioning

Proceed carefully and follow the instructions step by step when commissioning the modules for the first time:

1. Observe the permissible technical values (➡ chap 2.8).
 - Payload, frequency, moment load
2. First, make sure that there are no persons or tools in the working area.
3. Perform test run:
 - Start with slow movements.
 - Then continue under normal operating conditions.
 - ⇒ Commissioning is completed.

8 Fault elimination

8.1 Safety instructions



Observe the safety instructions in ➡ chap. 2 "Safety instructions" of these installation instructions as well as the safety instructions of the controller manufacturer.

8.2 Fault causes and remedy



Faults caused by defective components may only be remedied by replacing these components.

Only Afag original spare and wear parts may be used!

Fault	Possible cause	Remedy:
Bowl feeder does not run after switching on	<ul style="list-style-type: none"> ▪ Plug not connected to mains ▪ Connecting cable between bowl feeder and control unit not plugged in ▪ Set the controller to "0" ▪ Fuse in controller defective 	<ul style="list-style-type: none"> ▪ Plug in the connector. ▪ Plug in the connector. ▪ Turn the controller to position. ▪ Replace fuse.
Bowl feeder does not provide the required performance after a certain running time	<ul style="list-style-type: none"> ▪ Fastening screws of the spring assemblies have loosened ▪ Fixing screw between oscillating plate and bowl has loosened ▪ Air gap between solenoid coil and yoke has formed ▪ Spring broken ▪ Controller on the control unit has been adjusted 	<ul style="list-style-type: none"> ▪ Remove the screw fitting and tighten the screw ▪ Tighten the screws ▪ Remove the housing and readjust the air gap (➡ chap. 9.4.1, 9.4.2) ▪ Remove housing and replace broken spring (➡ chap. 9.3.2) ▪ Readjust controller
Bowl feeder generates strong noise	<ul style="list-style-type: none"> ▪ Housing has loosened ▪ Solenoid coil or yoke have come loose. ▪ Foreign body between bowl outlet and linear section ▪ The air gap between the bowl outlet and the linear path are too small ▪ Air gap too small, solenoid coil and yoke touch each other 	<ul style="list-style-type: none"> ▪ Tighten the screws of the housing ▪ Tighten the screws (➡ chap. 9.3.3) ▪ Remove foreign body ▪ Loosen the bowl and turn it a little. Then check the transitions between the bowl discharge and the linear section! ▪ Adjust the air gap (➡ chap. 9.4.1, 9.4.2)
Bowl feeder does not run in certain ranges of scale	<ul style="list-style-type: none"> ▪ Potentiometer defective 	<ul style="list-style-type: none"> ▪ Replace potentiometer (➡ Operating instructions of the control unit)

9 Maintenance and repair

9.1 General notes

The bowl feeder requires minimal maintenance. Depending on the type and manner of use, signs of wear may occur which can be compensated for by readjusting the adjustment plates.

9.2 Safety instructions



DANGER

Risk of injury due to electric shock!

There is a risk of electric shock when working on the electrical equipment and when removing the housing!

- Pull out the mains plug before removing the housing!
- Work on the electrical equipment may only be carried out by trained, authorized personnel!



WARNING

Danger of injury due to improper maintenance!

Improperly carried out maintenance activities can cause considerable damage to property and serious injury.

- Only use trained specialist personnel to carry out the activities.
- Always wear personal protective equipment when carrying out maintenance and repair work!



WARNING

Risk of injuries due to uncontrolled parts movements!

Signals from the controller can trigger unintentional movements of the bowl feeder, which can cause injury.

- Before starting any work on the bowl feeder, switch off the controller and secure to prevent it from being switched on.
- Observe the operating instructions of the controller used!



Also observe the safety instructions in ➡ chap. 2 „Safety instructions“ in this manual.

9.3 Maintenance activities and maintenance intervals







The maintenance intervals must be strictly observed. The intervals refer to a normal operating environment.

9.3.1 Overview of the maintenance points



Fig. 8 Maintenance of bowl feeder WV

No.	Maintenance point	Maintenance work	Interval	System [On/Off]	Remarks
1	Leaf spring	Check 	Regularly	[Off]	- ▪ Check leaf spring for tightness
2	Electrical equipment	Check 	Regularly	[Off]	- ▪ Check for: - Loose connections scorched or otherwise damaged cables. - Replace damaged cables immediately!
3	Feeding bowl	Cleaning 	Regularly	[Off]	- ▪ Clean the feeding bowl. Observe notes in  chap. 9.3.1!

9.3.1 Notes on cleaning

NOTICE

Risk of material damage if the following instructions are not observed!

If cleaning agents or cleaning methods other than those listed are used, there is a risk of permanent damage to components and the function of the bowl feeder can no longer be guaranteed.

- Only use the specified cleaning agents!
- It is essential to observe the cleaning methods!

WARNING



Risk of injury from volatile substances!

The cleaning agents to be used contain volatile substances that can cause irritation or injury to the eyes or respiratory tract.

- Wear safety glasses.
- Ensure sufficient ventilation!

Cleaning the feeding bowl (according to its coating):

Bowl coating:	Cleaning agent:	Cleaning method:
Hard anodised / Inox raw or polished	Benzine or spirit	Ultrasonic bath
Metaline	Soapy water	Wash off with a damp cloth, allow to dry
Habasite light green TS10	Hoover	Vacuum cleaning
Polyamide pot raw, Habasit white, dark green Polyurathan red, yellow, grooved Nextel coating	Benzine or spirit	Wipe out with a damp cloth and dry again, cleaning agent must not be poured into the feeding bowl. Feeding bowl must not be immersed in cleaning bath.
Teniferated, blue chromated	Nitro thinner	Dampen a rag with nitro thinner and rub with it
Colour sprayed / painted / powder coated	Soapy water / universal cleaner	Wipe with a damp cloth
PET / Makrolon / Plexi	Hoover and anti-static spray	Vacuum clean before rubbing down, then spray with an anti-static spray and rub off

9.3.2 Change leaf springs

The leaf springs only need to be changed if the following conditions are present:

- The vibration behaviour of the bowl feeder has changed.
- There is a spring breakage.
- The bowl feeder is converted for processing another product.

To remove the leaf springs, please proceed as follows:

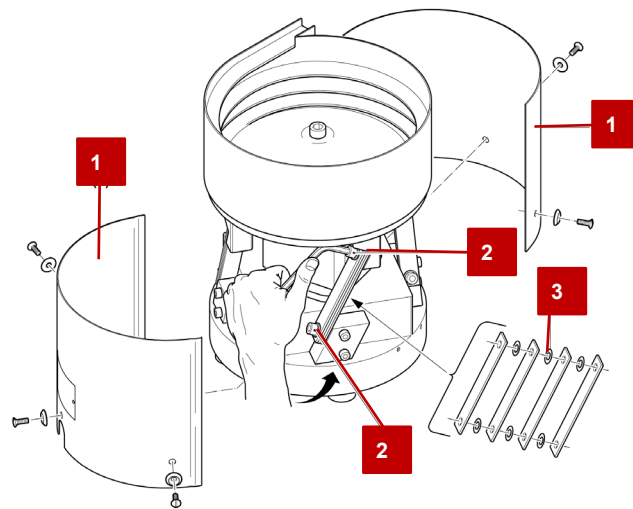


Fig. 9 Replacing the leaf springs

1. Pull out the mains plug and remove the housing (1).
2. Remove the screws (2) of the spring assembly to be replaced.
3. Reassemble the spring assembly.
 - Do not forget the spring shims (3)!
 - In case of spring breakage, the number and thickness of the leaf springs must correspond to the old spring assembly.
 - Opposite spring assemblies must contain identical springs.
4. Fit the spring assembly and tighten the screws (2).
5. Check air gap between solenoid coil and yoke and readjust if necessary (➔ chap. 9.4.1, 9.4.2).
6. Assemble the housing (1).
7. Perform test run.
 - ⇒ The process is completed.



For the corresponding spring cross-sections of the bowl feeder, please refer to the technical data (➔ chap. 3).

9.3.3 Replace solenoid coil

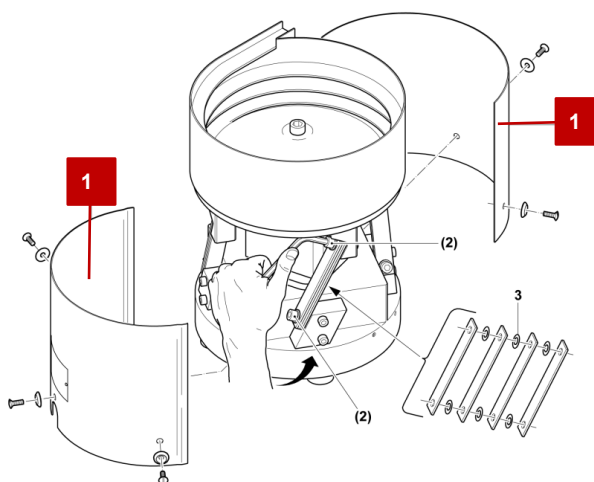


The solenoid coil is only replaced if it is defective.

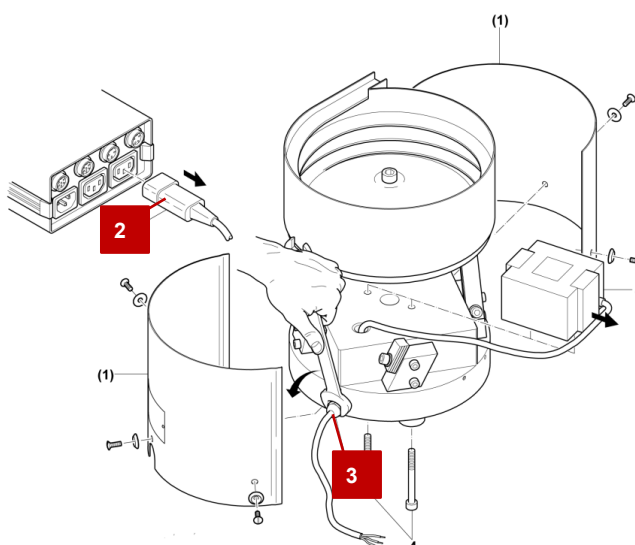
Replacing the solenoid coil always requires readjustment of the air gap between the solenoid coil and the yoke (➔ chap .9.4.1, 9.4.2).

To remove the solenoid coil, proceed as follows:

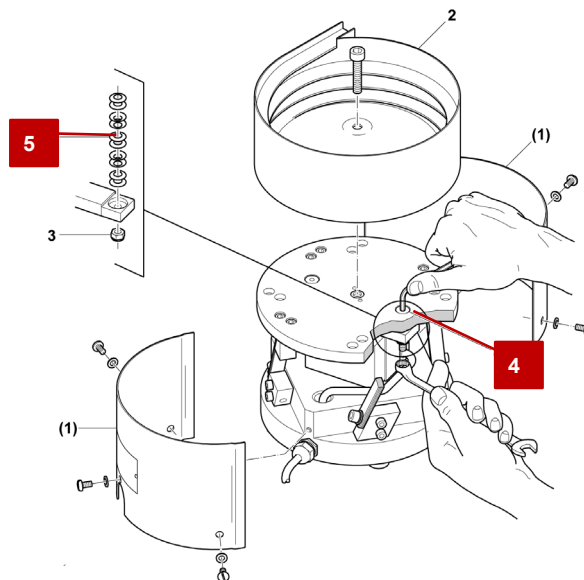
1. Pull out the mains plug.
2. Remove the housing (1).



3. Remove the plug (2) from the controller and dismount it.
4. Undo the cable strain relief (3) and pull cable (4) through.



5. Remove screws (4) and take out magnet (5).
6. Insert new magnet and tighten screws (4).



7. Reassemble dismantled components in reverse order.
⇒ The process is completed.

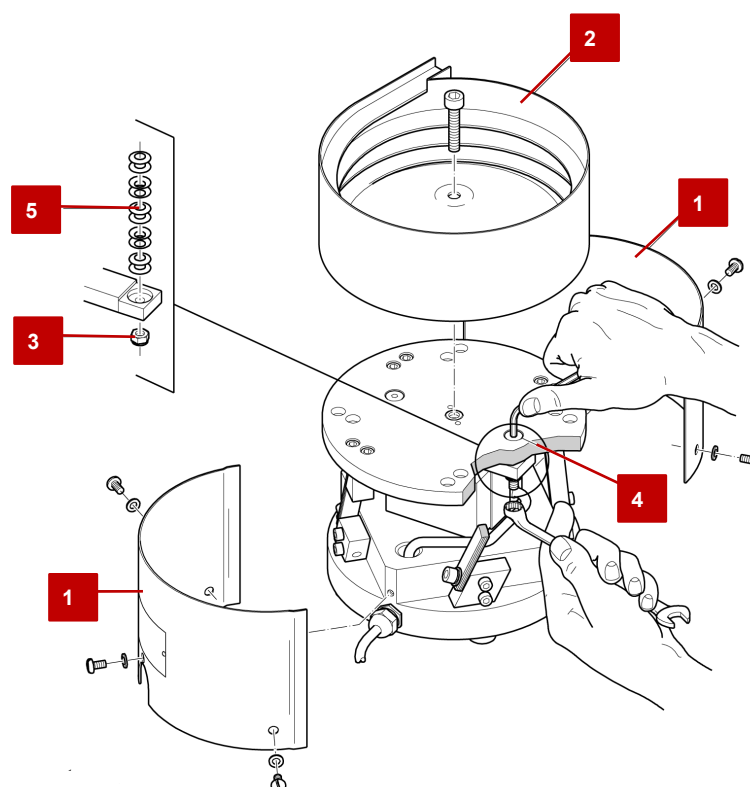
9.4 Settings

9.4.1 Adjusting the air gap on the WV151-1

This procedure is necessary when the following conditions exist:

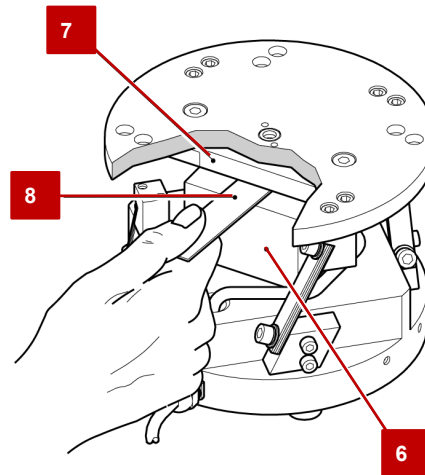
- The swing plate was readjusted to the base ground plane.
- The springs or spring assemblies were replaced.
- The solenoid coil has been replaced.

To adjust the air gap on the WV151-1, proceed as follows:



1. Pull out the mains plug.
2. Remove the housing (1).
3. Apply ring spanner (size 8) to the hexagonal stop nut (3) and turn the countersunk screw (4) with an Allen key (size 3) in the desired direction against the cup springs (5).

4. Adjust the air gap between the solenoid coil (6) and the yoke (7) using a feeler gauge (8).



- Adjust the yoke so that there is a parallel air gap between the solenoid coil and the yoke.
- If the solenoid coil and yoke collide, the air gap is too small!

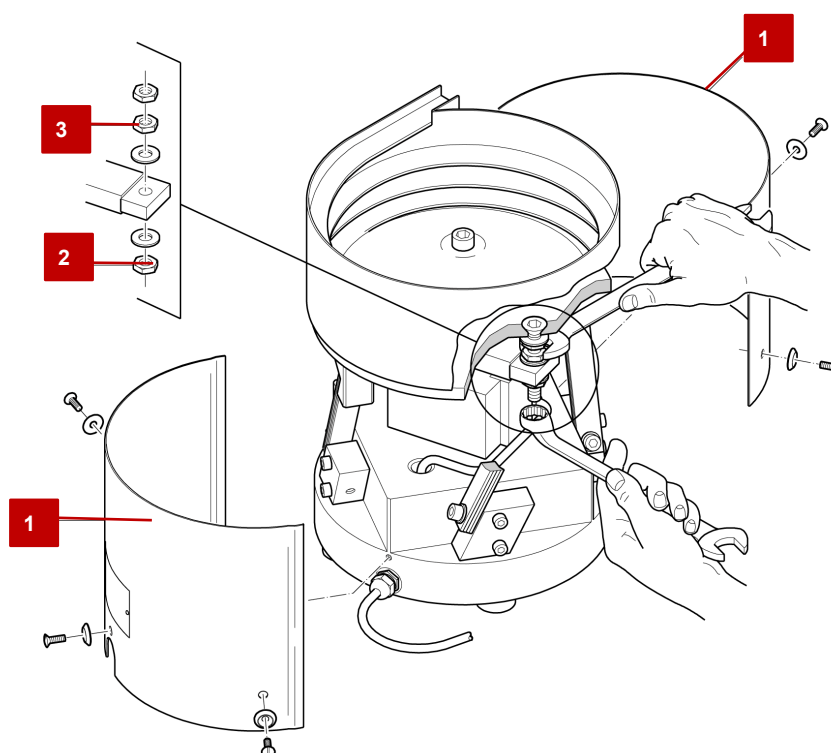
5. Refit the housing (1) and the feeding bowl.
⇒ The process is completed.

9.4.2 Adjusting the air gap on the WV201-1 / 310-1

This procedure is necessary when the following conditions exist:

- The swing plate was readjusted to the base ground plane.
- The springs or spring assemblies were replaced.
- The solenoid coil has been replaced.

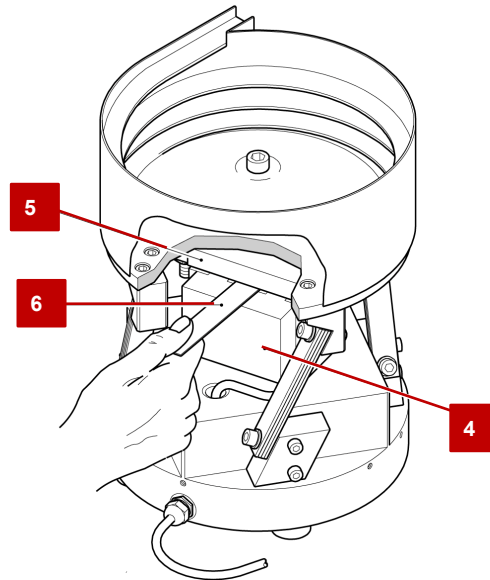
To adjust the air gap on the WV201-1 /310-1, proceed as follows:



1. Pull out the mains plug.
2. Remove the housing (1).
3. Place the ring spanner (size 13) on the hexagon nut (2) and (3) and loosen.
4. Now turn the hexagon nuts in the corresponding direction to change the air gap.
5. Then lock the two hexagon nuts together.

6. Adjust the air gap between the solenoid coil (4) and the yoke (5) using a feeler gauge (6) as follows.

- WV201-1 = 0.3mm - 0.7mm
- WV310-1 = 0.3mm - 0.8mm



- Adjust the yoke so that there is a parallel air gap between the solenoid coil and the yoke.
- If the solenoid coil and yoke collide, the air gap is too small!

7. Mount the housing (1) again.

⇒ The process is completed.

9.4.3 Adjusting the distance between the vibrating plate and the base

This setting is only necessary when the following conditions are present:

- All spring assemblies were replaced or reassembled.
- The bowl feeder was dismantled.

Adjustment of the swing plate distance to the base:

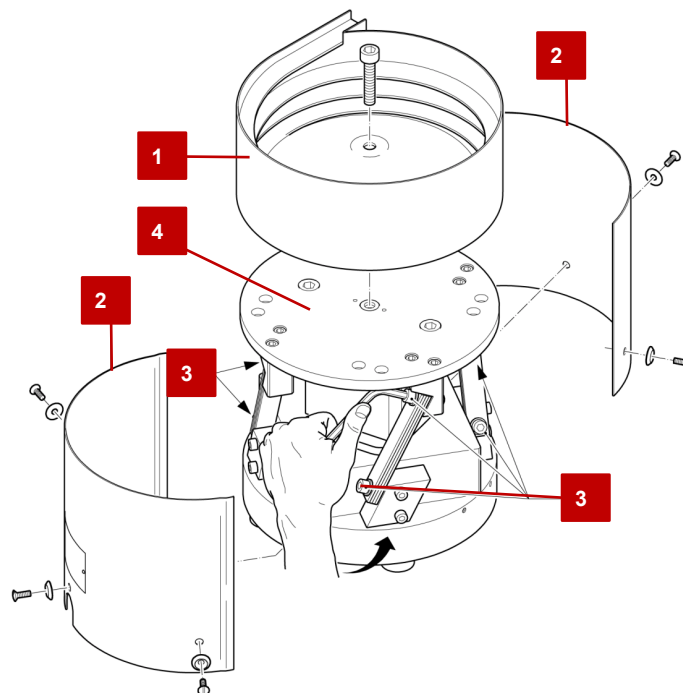
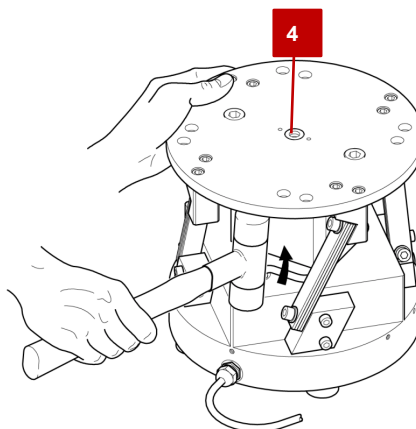
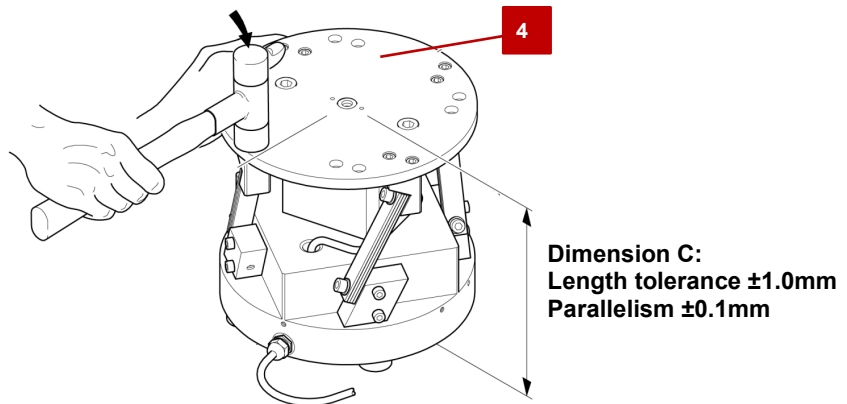


Fig. 10 Adjustment of vibrating plate distance

1. Remove the feeding bowl (1) (recommended).
2. Pull out the mains plug.
3. Remove the housing (2).
4. Slightly loosen the screws of the spring assemblies (3).
5. First tap the swing plate (4) into the upper position with a plastic hammer.



6. Then tap the oscillating plate (4) downwards until a height tolerance of $\pm 1.0\text{mm}$ and a parallelism tolerance to the base surface of 0.1mm is achieved.



7. Tighten the screws (3) of the spring assemblies again.
 8. Refit the feed bowl (1).
 9. Carry out the necessary settings (➔ chap. 6.4).
- ⇒ The process is completed.

9.5 Further maintenance

Further maintenance is not required, if the ambient conditions listed below are complied with:

- Clean working area.
- No use of splash water.
- No abrasion or process dusts.
- Environmental conditions as specified in the technical data.

9.6 Spare and wear parts, repairs

Afag Automation AG offers a reliable repair service. Defective bowl feeders can be sent to AFAG for warranty repair within the warranty period.

After expiry of the warranty period, the customer may replace or repair defective modules or wear parts himself or send them to the Afag repair service.



Please note that Afag does not assume any warranty for modules that have not been replaced or repaired by Afag!

9.6.1 Spare parts

Item	Type	Designation	Order Number		
			WV151-1	WV201-1	WV310-1
3	Vibrating magnet	230V/50Hz	50425627	50425625	50425625
		115V/60Hz	Request	Request	Request

9.6.2 Wear parts

Item	Type	Designation	Order Number		
			WV151-1	WV201-1	WV310-1
8	Leaf spring	0.5mm	11006710	-	-
		1mm	11006711	-	-
		2mm	-	11006736	
		3mm	-	11006738	
11	Rubber buffer	M5	11006834	-	-
		M6	-	11006838	
26	Intermediate spring layer	0.2mm	-	11006741	

10 Decommissioning and disposal

The bowl feeder must be properly dismantled after use and disposed of in an environmentally friendly manner.

10.1 Safety instructions

WARNING



Risk of injury due to improper decommissioning and disposal!

Improperly carried out activities can result in considerable material damage and serious injury.

- Only use trained specialist personnel to carry out the activities.
- Disconnect the media supply before dismantling the module!
- Only remove the bowl feeder when the controller is switched off and secured!

10.2 Decommissioning

If the bowl feeders are not used for a longer period, they must be properly commissioned and stored as described in ➡ chap. 4.5.

10.3 Disposal

The bowl feeders must be disposed of properly at the end of their service life and the raw materials used must be recycled. Observe the legal regulations and company requirements.

The bowl feeder must not be disposed of as a complete unit. Dismantle the bowl feeder and separate the various components according to type of material and dispose of them properly:

- Scrap the metallic materials.
- Hand over plastic parts for recycling.
- Sort the rest of the components by their material properties and dispose of them accordingly.

NOTICE

Risk to the environment due to incorrect disposal of the bowl feeder!

Environmental damage can be caused by improper disposal.

- Electronic parts, electrical scrap, auxiliary and operating materials must be disposed of by approved specialist companies.
- Information on proper disposal can be obtained from the responsible local authorities.

