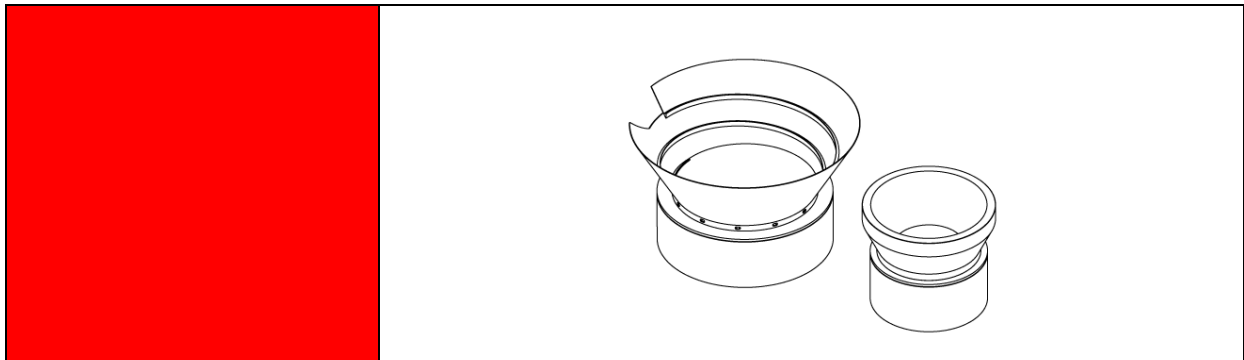


# **Bowl feeder**

## **WV 410-2 / WV 630-2**



**Translation of original operating instruction**

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**This operation instruction applies to:**

Type			Order number
Bowl feeder WV410-2	230 V / 50 Hz	Right	50035667
		Left	50035668
Bowl feeder WV630-2	230 V / 50 Hz	Right	11005888
		Left	11005887

Version of Documentation:

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Release:

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# 1 Declaration of incorporation for the incomplete machine

## Declaration of incorporation according to the EC-Machinery-Directive 2006/42/EC, Annex II B

The manufacturer: Afag GmbH, Wernher-von-Braun-Straße 5a, D-92224 Amberg

[www.afag.com](http://www.afag.com) – Tel. +49 (0)9621 650 27-0

hereby declares, that the incomplete machine: **Bowl feeder**

Designation: **WV410-2 / WV630-2**

Complies with the basic safety and health requirements of the Machinery Directive **2006 /42/EC Annex I.**

The incomplete machine also complies with the following:

Relevant EC Directives:

Machinery-Directive 2006/42/EC

Low Voltage Directive 2006/95/EC

EMC- Directive 2004/108/EC

Applied harmonised standards:

EN ISO 12100-1; EN ISO 12100-2

The technical documentation for this incomplete machine was prepared in accordance with Annex VII, Part B. Upon request, the manufacturer undertakes to transmit these technical documents electronically to national authorities, if requested.

Authorised representative for the compilation of the technical documentation:

Franz Edbauer

Product Development Manager ZTK

Afag GmbH

**The start-up of the incomplete machine is prohibited until installed in a complete machine that complies with the regulations of the EC Machinery Directive and until the EC Declaration of Conformity according to Annex II A is available.**

City, Date Company: Afag GmbH

Amberg, 23. Dec. 2009 First name, last name

Mr. Klaus Bott



Managing Director

Afag GmbH

## 2 Safety instructions



### 2.1 Notes on symbols and instructions


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

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

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

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

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

<b>NOTE</b>	
	<p>Indicates general notes, useful operator tips and operating recommendations which don't affect safety and health of the personnel.</p>

## 2.2 Basic safety information

This operating manual provides the basis for the safe use and operation of the bowl feeder. This operating manual and, in particular, the included safety instructions have to be observed by all individuals working with and on the bowl feeder. In addition, all rules and regulations concerning the accident prevention applicable for the site of operation are to be complied with.

The operating manual must always be kept at the site of operation of the bowl feeder.

## 2.3 Appropriate use

The bowl feeders are intended for storing, transporting, separating and arranging component parts of different sizes, forms and materials.

The workpieces must meet the following requirements in order to ensure a problem-free operation:

- they must be free of oil, grease and burrs
- they must not be sticky
- they must not be statically charged
- they must not be magnetic (no self-magnetism)
- they must be free of dirt and not be mixed with foreign parts
- rubber parts can be powdered with talcum

### **WARNING**



#### **The KLF may not be used:**

- a) in damply and wet area
- b) in temperature lower than 10°C or higher than 50°C
- c) in areas where readily flammable media are present
- d) in areas where readily explosive media are present
- e) in heavy polluted or dust- laden area
- f) in aggressive area (e.g. saliferous atmosphere)

### 3 Description of the device

#### 3.1 General

In combination with a conveyor bowl, the bowl feeder is used for storing, transporting, separating and arranging bulk material. The material is moved by vibrations. Parts are moved by micro throws in the feeding direction.

The mass of the bowl should not exceed the value specified in chapter 3.4 as this cannot ensure optimum transport behaviour.

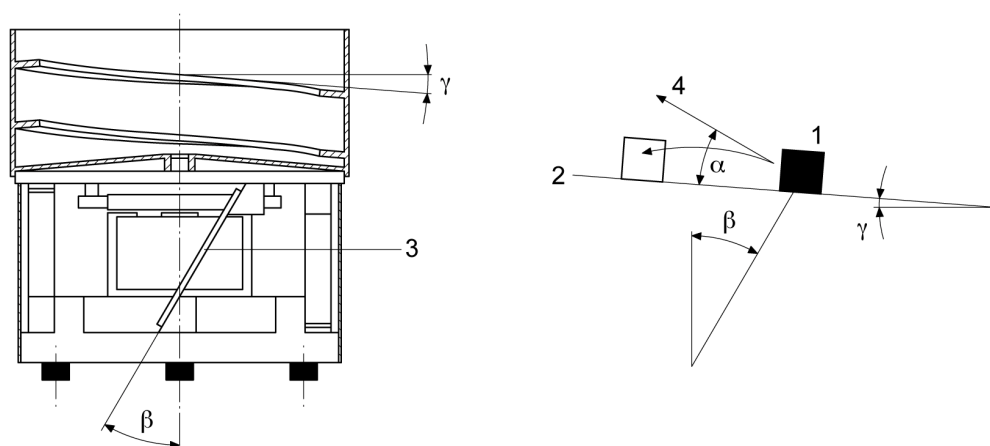
#### 3.2 Functional description

A Bowl Feeder is a unit which transforms magnetic oscillations in order to use the feeding of work pieces.

The basic construction of a bowl feeder comprises the following elements.  
(See Figure 1)

- 1 Material to be conveyed
- 2 Conveyor line
- 3 Leaf spring
- 4 Projectile direction
- $\alpha$  Projectile angle
- $\beta$  Angle of leaf spring inclination
- $\gamma$  Pitch angle of the spiral

Figure 1



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

The pulsating movement of the oscillation plate causes the material to jump from the rail at each oscillation and is conveyed as a result of the angle of inclination of the leaf springs.

On a cycle of the 50 Hz alternating current supply, the magnet achieves twice its maximum pulling force while this is independent of the direction of the current flow. The magnet thereby produces an oscillating frequency of 100Hz. This 100Hz oscillation is necessary to achieve a smooth and gentle transport for small or light work pieces.

With heavy or large work pieces however, it is necessary to use an oscillating frequency of 50Hz. A half-wave of the mains supply is thereby blocked.

### 3.3 Definition of the feed direction

The feed directions for the WV are defined as follows:

**Left-hand (L), in anti-clockwise direction**

**Right-hand (R), in clockwise direction**

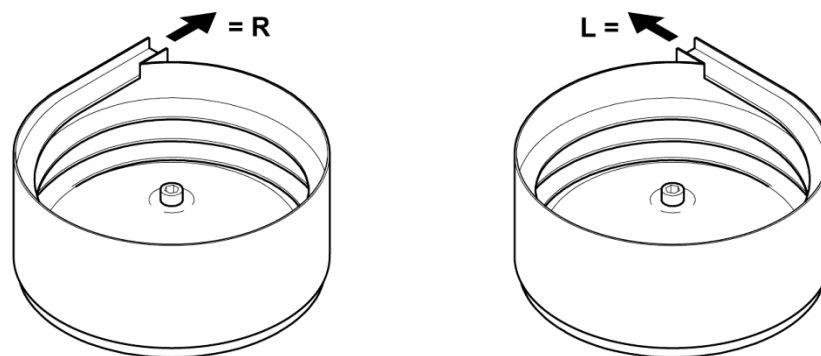


Figure 2

### 3.4 Technical data



**Table 1:** *Technical data*

Description	Units	WV410-2	WV 630-2
Dimensions øxH	[mm]	470x249	660x225
Weight (without bowl)	[kg]	140	168
Protection class	[IP]	54	
Connecting cable length	[m]	0,5	0,5
Power consumption	[VA]	1060	1000
Current consumption	[A]	5,3	5
Magnet nominal voltage / frequency	[V/Hz]	200/50	200/50
Number of magnets	-	3	4
Magnet type	-	WZUW090	YZAW080
Magnet colour	-	black	red
Air gap	[mm]	1 - 1.5	2.3 - 2.8
Vibration frequency	[Hz/min-1]	100 / 6000	50 / 3000
Number of spring assemblies	-	6	4
Standard number of springs; Number per spring assembly	-	5 x 6; 1x5	4 x 8
Spring dimensions length ( gauge for boreholes) x width	[mm]	139 (116) x 40	139 (116) x 40
Spring thickness	[mm]	3	2
Quality of the spring fastening screws		10,9	10,9
Tightening torque spring fastening screws	[Nm]	120	120
Maximum weight of the oscillating units depending on the mass moment of inertia and required running speed	[kg]	45	50
Environmental conditions for operation: Temperature range	[C°]	-10 to +45	
Noise emission: Continuous noise pressure level (without transported material)	[dB]	<70	
Measuring height / measuring distance	[m]	1,6 / 1	
Measurement direction with respect to the noise source	[°]	90	
Measurement method	-	A evaluation	

## 4 Assembly instructions

### 4.1 Transport

 <b>WARNING</b>	
	<p>Improper use of transport means (industrial trucks, cranes, technical aids, sling gear etc.) may lead to bruises and other injuries.</p> <p>Required behaviour:</p> <ul style="list-style-type: none"> <li>▪ Observe and follow the transport and maintenance instructions</li> <li>▪ Proper use of transport means</li> </ul>

 <b>CAUTION</b>	
	<p>During transport, the bowl feeder must only be held by the base. Neither the bowl nor the selection elements are lifting points.</p>

### 4.2 Installing the unit

For operation, the WV must always be mounted on a sufficiently pro-portioned foundation. The type of fixing can be seen in the following drawings:

- WV with base plate (see Figure 3)
- WV with base plate and mounting foot (see Figure 4)
- WV with base plate and adjustment foot (see Figure 5)

When assembling the WV, it must be ensured that the base is horizontal.

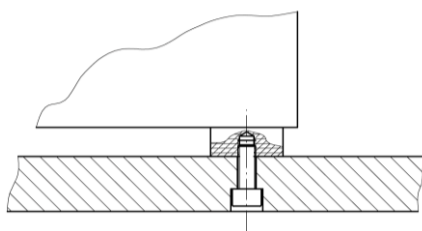


Figure 3

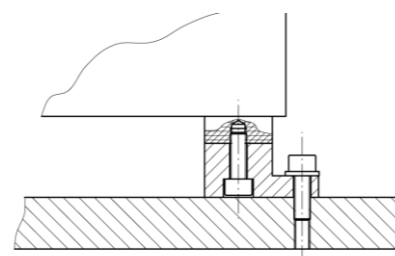


Figure 4

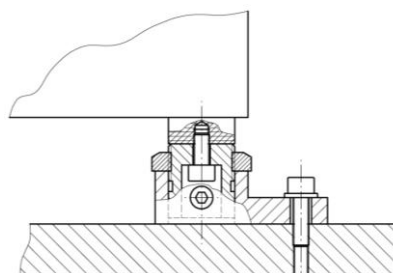


Figure 5

### 4.3 Requirements for the bowl

In order to achieve optimum transport behaviour, the following basic requirements must be fulfilled:

1. Combination bowl and WV must match each other
2. Selection resistant construction of the bowl
3. Control elements in the bowl must be oscillation resistant

### 4.4 Information for the construction of selection elements



Selection elements, which serve the sorting of the transported work pieces in the correct orientation, must be of light but stable manufacture. The selection elements must be well connected to the bowl so that no self-oscillations can occur which could cause possible breakdowns.

The outlets must be as short as possible and must never run beyond the tangents of the bowl. Constructional elements for outlet extensions must not be secured to the oscillating system.

After the construction of selection elements, the oscillation system must always be re-tuned to achieve an optimum conveying capacity.

Increasing of the conveying capacity by means of increasing the amplitude has an extremely negative effect on the system. Broken springs or inadmissible temperature increase of the magnetic coil could be the result.

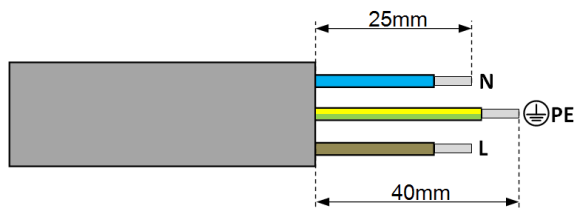
### 4.5 Power supply

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>▪ <b>Any work performed on the electrical supply may only be performed by trained, authorised, qualified personnel!</b></li><li>▪ <b>The power supply must be protected by an FI switch (provided by the customer).</b></li><li>▪ <b>The bowl feeder may only be operated with the power supply specified on the name plate.</b></li></ul>

The control devices IRG 1-N or IRG 2-N are used for the activation of the bowl feeder. The SE 601 or SE 602 can also be used. Please note that an additional CEE connector plug is required for the SE controllers (Order number 11006982)

Installation of the plug is only to be carried out by technically qualified personnel.

Figure 6: End of the wire for additional plug



## 5 Operating instructions

### 5.1 Correlations between the transport speed and the WV spring packages

In principle, the WV and bowl are adjusted in the standard configuration. This means that all oscillating elements of the system are optimally designed.

The following factors however influence the combination WV/bowl:

- a) the parts to be conveyed (size, weight, shape, material and condition)
- b) the conveying capacity
- c) the quantity filled
- d) the selection elements in the bowl (construction and arrangement). Selection elements always present additional weight
- e) outlet in the bowl
- f) support
- g) environment (are there other oscillating components with a disturbing influence)

Procedure for adjustment of the oscillating system:

 <b>WARNING</b>	
	<b>Before removing the casing, unplug the mains cable!</b>

1. check that the correct control unit is connected. Observe the Operating instructions phase control unit
2. Remove the casing and check that all springs and fixing screws are tight.
3. check the magnet distance and set if necessary.
4. Switch on the bowl feeder and set the controller regulator to 90% (SE Position 8).
5. **Slowly** unscrew the lower fixing screw on a spring package. Loosening this screw alters the transport speed of the parts in the bowl.

The result:

### Transport speed is reduced

- a) insert additional springs
- b) at first, one spring in **one spring package**
- c) if this is insufficient, then one spring with spacer plate is to be inserted into the individual spring packages **one by one**

### Transport speed is increased

- a) remove springs
- b) the procedure and sequence are the same as for inserting springs

### Irregular transport speed at bowl perimeter

- a) a spring must be removed from the *slower* location
- b) a spring must be inserted at the *faster* location

### Erratic transport speed between two spring packages

- a) seen, from the direction of transport, a spring must either be removed or inserted behind the area of erratic transport speed.

## CAUTION



The casing must be replaced after each procedure!

## 6 Maintenance guidelines

### **WARNING**



The electrical equipment of the bowl feeder must be checked at regular intervals. Loose connections, burnt or damaged cables are to be removed immediately!

### **NOTE**



Check all visible screws for tightened

### 6.1 Troubleshooting and fault repair

#### **WARNING**



- Electrical work must only be carried out by trained personnel!
- Before removing the casing, unplug the power cable!

Interruptions caused by defective components must be repaired by replacing the defective component, only.

### **NOTE**



Defective components must only be replaced by Afag original spare parts! (See chapter 6.3)

Bowl feeder does not run after switch on	
Cause of fault:	Fault repair
Plug not connected	Connect plug
Connecting cable between bowl feeder and controller not plugged in	Connect plug
Regulator on controller set to „0“	Turn regulator to position
Defective fuse in control unit	Replace fuse
Bowl feeder lacks performance after operating for a certain length of time	
Cause of fault:	Fault repair
The spring package fixing screws have become loose	Remove the casing and retighten all spring package screws
The screw securing the bowl to the vibration plate has become loose	Retighten the screw.
The air gap between the magnetic coil and the anchor bolt is no longer correct	Remove the casing and readjust the air gap
Spring broken	Remove the casing and replace the broken spring
Regulator on control unit has moved	Readjust regulator
Bowl feeder develops loud noises	
Cause of fault:	Fault repair
The casing has become loose	Tighten all casing screws
The magnetic coil or anchor bolt have become loose	Tighten the screws
Foreign substance between bowl outlet and line	Remove foreign substance
Air gap between bowl outlet and line is too small	Loosen and slightly turn the bowl. <b>Afterwards, make sure to check the bowl outlet / line crossovers</b>
Bowl feeder does not run at certain levels of the regulator scale	
Cause of fault:	Fault repair
Potentiometer defective	Replace potentiometer (See „Controller operating instructions“)

## 6.2 Cleaning

Coating::	Detergent:	Cleaning method:
hard-anodised / Inox polished	Alcohol or spirit	Ultrasonic bath
Metaline	Soap water	clean with a damp cloth, let it dry
Habasit light green	neither	vacuum cleaner
Habasit white, dark green Polyurethane red, yellow Nextel	Alcohol or spirit	Clean with a damp cloth and let it dry. Don't fill detergent into bowl. Don't placed bowl into a cleaning bath

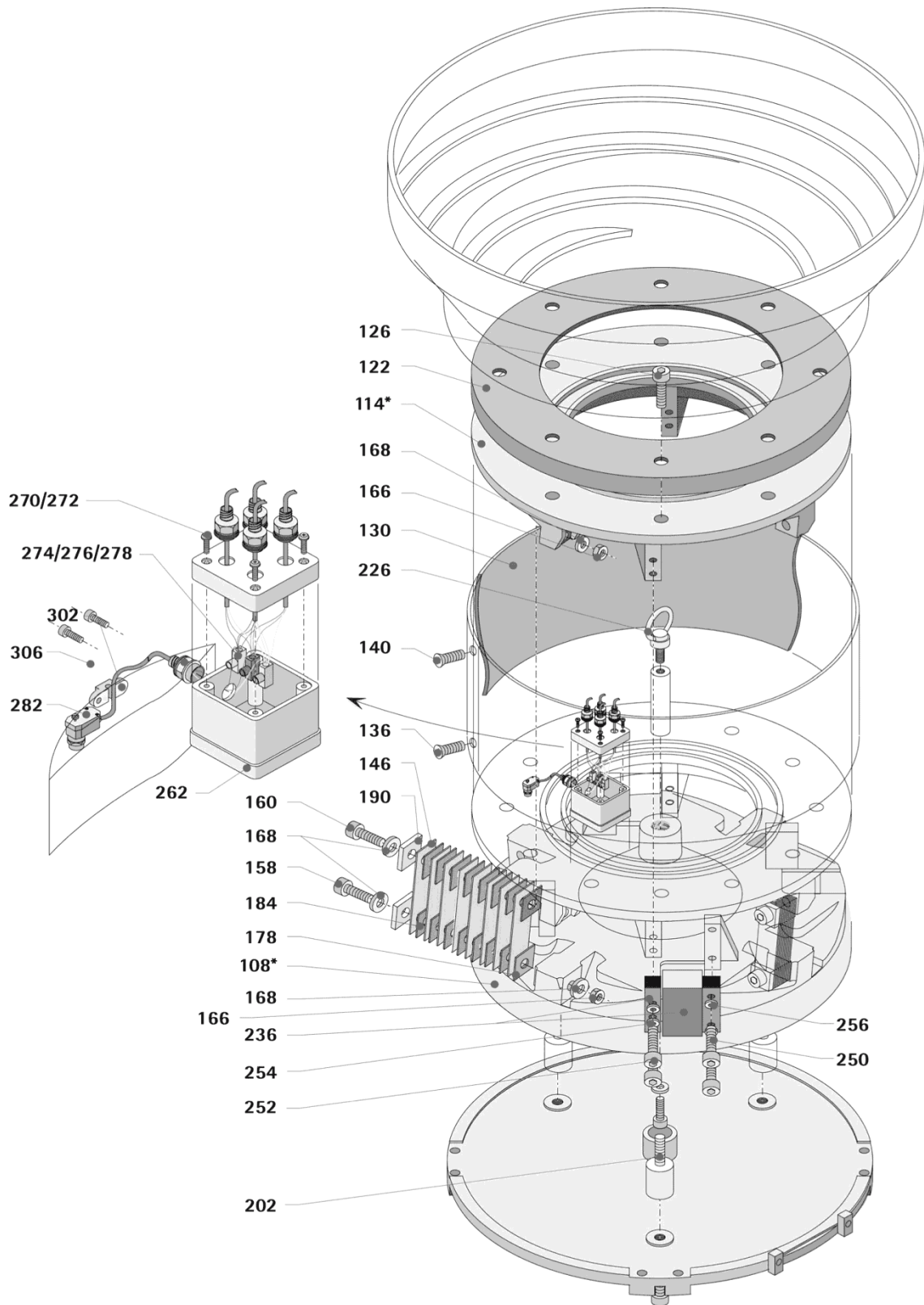
## 6.3 Wear and Spare parts

**Table 2:** *Wear parts*

Pos.	Type
146	Leaf spring
202	Rubber buffer
184	Shims
190	Clamping plate
226	Screw
120/122	Chip protection ring

**Table 3:** *Spare parts*

Pos.	Type	Designation
236	Magnet	230V / 50Hz



## 7 Accessories

### 7.1 Mounting parts

**Table 4:** Order data

Type	Designation	Order number
Mounting plate	For the connection of cylindrical and conical bowls with radial fixation	50038590

### 7.2 Control device

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

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

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

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

**Table 5:** Controllers for WV- Bowl feeder

Type	Power supply	Order number	Comments
IRG1-N	230V/50Hz	15083186	Control with no timer function
	115V/60Hz	15171112	
IRG2-N	230V/50Hz	15204235	Control with timer function using sensors
	115V/60Hz	15182634	
SE 601	230V/50Hz	11015601	With timer function, valve and interface outputs, sensor feed
	115V/60Hz	50018668	
SE 602	230V/50Hz	11015602	With sensor feed
	115V/60Hz	50018674	

### 7.3 Address for orders

#### **Germany:**

Afag GmbH  
Wernher-von-Braun-Straße 5a  
D – 92224 Amberg  
Tel.: ++49 (0) 96 21 / 65 0 27-0  
Fax: ++49 (0) 96 21 / 65 0 27-390

#### **Sales**

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CH – 4950 Huttwil  
Tel.: ++41 (0) 62 / 959 86 86  
Fax: ++41 (0) 62 / 959 87 87

## 8 Disposal

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