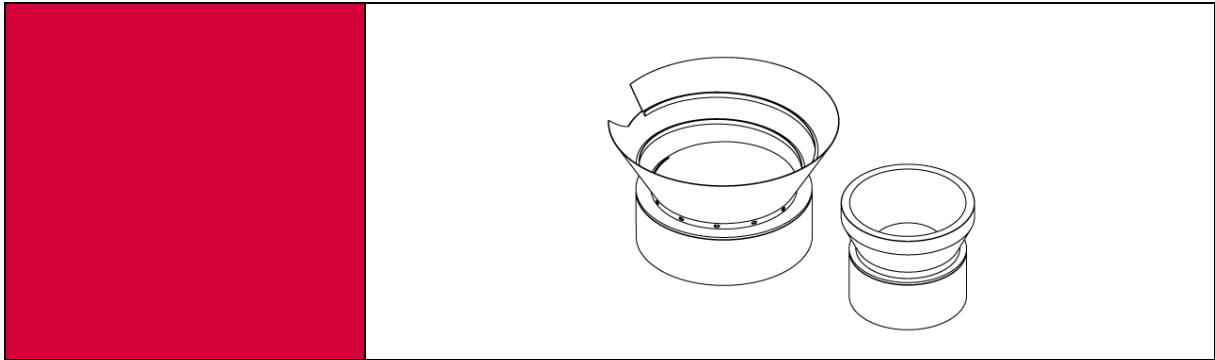


Bowl feeder WV 630-1



Translation of operating and installation instructions

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This operation instruction applies to:

Type			Order number
Bowl feeder WV630-1	230 V / 50 Hz	Right	50455916
		Left	50470026
	115 V / 60 Hz	Right	50508376
		Left	50508383

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1 Safety instructions



1.1 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.

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

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

 CAUTION	
	<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>

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

1.2 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.

1.3 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 45°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)

1.4 Notes for Pacemakers and Defibrillators

Afag vibration conveyors are tested in accordance with regulation 15 of the German Statutory Accident Insurance Association [Deutsche Gesetzliche Unfallversicherung, DGUV] (previously BGV B11 of German Accident Prevention Regulations). The permissible values of exposure area 2 are not exceeded, therefore no measures are required pursuant to Section 4 (2) of the DGUV regulation 15. The definitions of Section 12 "Indirect Effects, Medical Implants" remain unaffected by the above.

The alternating magnetic fields that occur in the immediate vicinity of certain vibration conveyors may affect the proper functions of active implants, i.e. pacemakers and defibrillators. Anyone with active medical implants, for which no individual risk assessment has been provided, must observe the specified safety distances to the vibration conveyors. The distances each relate to the position of the upper body and the active medical implant relative to the field source.

Type	Safety Distance
WV630-1	10cm

2 Description of the device

2.1 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 2.4 as this cannot ensure optimum transport behaviour.

2.2 Functional description

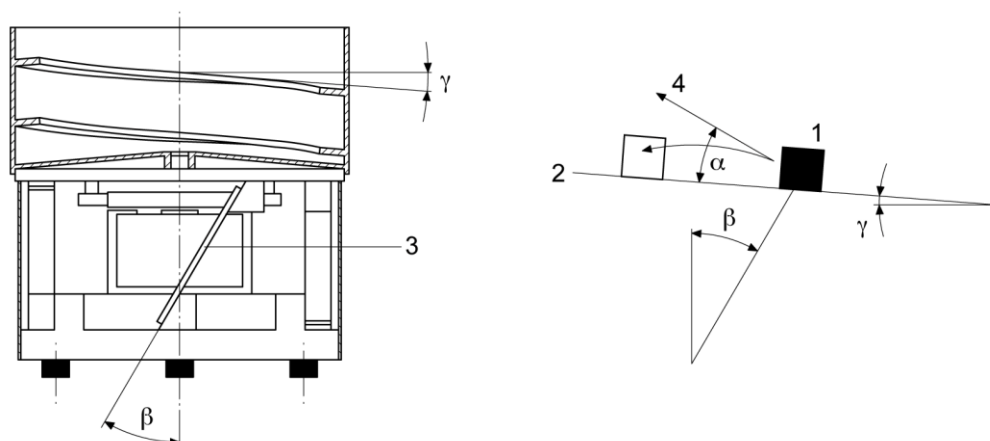
A Bowl Feeder is a unit which transforms magnetic oscillations in order to use the feeding of work pieces.

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
- α Projectile angle
- β Angle of leaf spring inclination
- γ Pitch angle of the spiral

Figure 1



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.

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.

With a 50 Hz AC supply, the WV executes 50 vibrations per second.

2.3 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

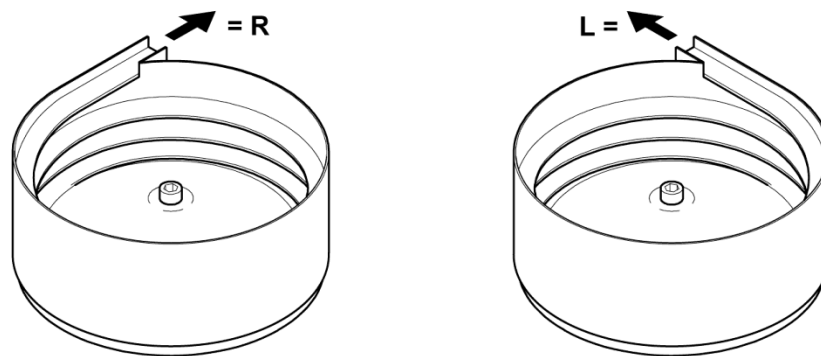


Figure 2



2.4 Technical data



Table 1: *Technical data*

Description	Units	WV630-1
Dimensions øxH	[mm]	660x248
Weight (without bowl)	[kg]	181
Protection class	[IP]	54
Connecting cable length	[m]	2
Power consumption	[VA]	1260
Magnet nominal voltage / frequency	[V/Hz]	230/50 115/60
Number of magnets	-	4
Air gap	[mm]	2.5
Vibration frequency	[Hz/min-1]	50 / 3000 60/3600
Number of spring assemblies	-	4
Maximum weight of the oscillating units depending on the mass moment of inertia and required running speed	[kg]	50
Environmental conditions for operation: Temperature range	[C°]	+10 to +50
Noise emission: Continuous noise pressure level	[dB]	<70
(without transported material)		
Measuring height / measuring distance	[m]	1,6 / 1
Measurement direction with respect to the noise source	[°]	90
Measurement method	-	A evaluation

3 Assembly instructions

3.1 Transport

 WARNING	
	<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"> ▪ Observe and follow the transport and maintenance instructions ▪ Proper use of transport means

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

3.2 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.

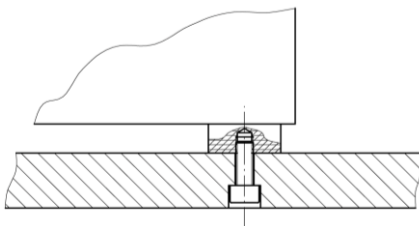


Figure 3

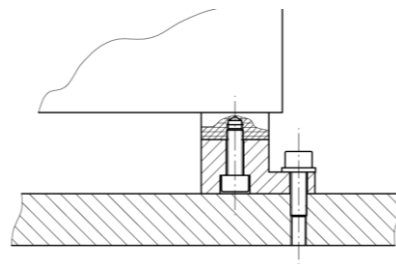


Figure 4

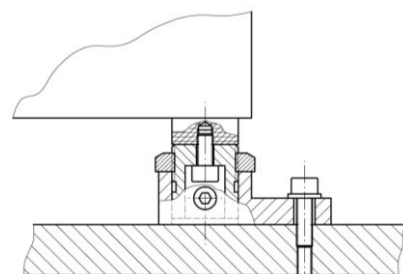


Figure 5

3.3 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

3.4 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.

3.5 Power supply

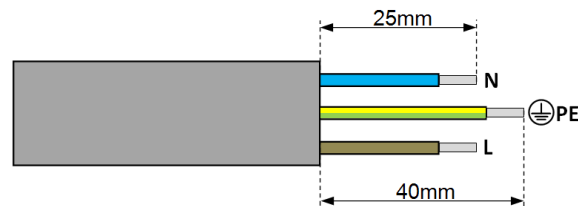
 WARNING	
	<ul style="list-style-type: none"> ▪ Any work performed on the electrical supply may only be performed by trained, authorised, qualified personnel! ▪ The power supply must be protected by an FI switch (provided by the customer). ▪ The bowl feeder may only be operated with the power supply specified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

The control device¹ IRG1-S is used for the activation of the bowl feeder. The MSG801 or MSG802 can also be used. Please note that an additional CEE connector plug is required for the MSG controllers (Order number 11006982).

For operation on a 115 V/60 Hz power supply, there is the Reovib Smart RTS 15 A controller. HAN Q5/0 connectors are also included.

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

Figure 6: End of the wire for additional plug



4 Operating instructions

4.1 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:

 WARNING	
	Before removing the casing, unplug the mains cable!

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. Loosing 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!

4.2 Torques

Tightening torques M_{Sp} in Nm for shank screws with metric ISO control threads and head supports 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

by: Dubbel (18th edition), page G175

5 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

5.1 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 5.5)

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. Afterwards, make sure to check the bowl outlet / line crossovers
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“)

5.2 Leaf spring removal

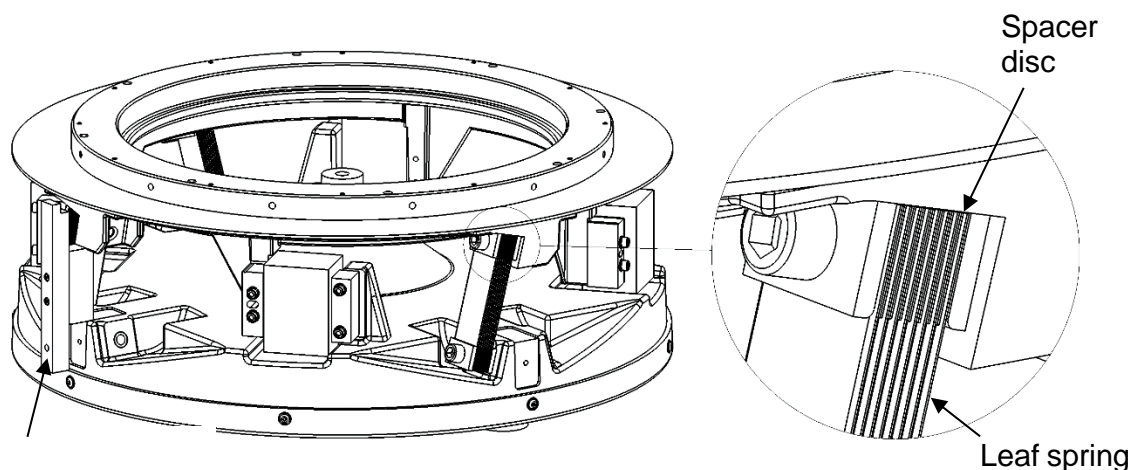
Only one spring assembly may be loosened at a time when removing leaf springs in order to prevent the mounting plate from dropping or moving out of place.

When removing the leaf springs, always release one spring assembly at a time to prevent the mounting plate from hanging down or moving. Before removing the screws, fasten the centering brackets (Table 6: *Order data*) to the drive. They will keep the base and mounting plate in place, preventing them from hanging down or moving.

 CAUTION	
	<p>The leaf springs may not be lubricated with oil or grease, since this will make the springs sticky, which has a negative effect on oscillation.</p>

The number of leaf springs in a spring assembly, as well as the spring assembly structure has to correspond to that of the original spring assembly when fitted. This is necessary to ensure the function of the device.

Figure 7: *Spring assembly*



The screws have to be tightened with the appropriate tightening torque specified in Table 2. The spacer discs should not be displaced when tightening the screws.

Table 2: *Tightening torques for spring attachment*

Typ	WV630-1
Torque specification	135 Nm

5.3 Magnet gap adjustment

In order to readjust the magnet gap of the oscillating magnets, the casing has to be removed and the attachment screws (see Figure 8) of the magnet armatures as well as the positioning screws have to be unscrewed. An appropriate distance gauge (Table 6: *Order data*) then has to be inserted between the magnet armature and the magnet core. The magnet armature can then be pushed against the distance gauge and the magnet core by hand and the attachment screws can be retightened. The attachment screws have to be tightened with the appropriate turning moments (Table 3: *Magnet gap and torque specification*). Once all magnet armatures are fixed again, the positioning screws are screwed back in the magnet armature and secured with hexagonal nuts. It should be possible to remove the distance gauge easily but the clearance should not be excessive, since the magnet gap would then be too large. This would require repetition of the magnet gap adjustment procedure.

Figure 8: Magnet gap adjustment with distance gauges

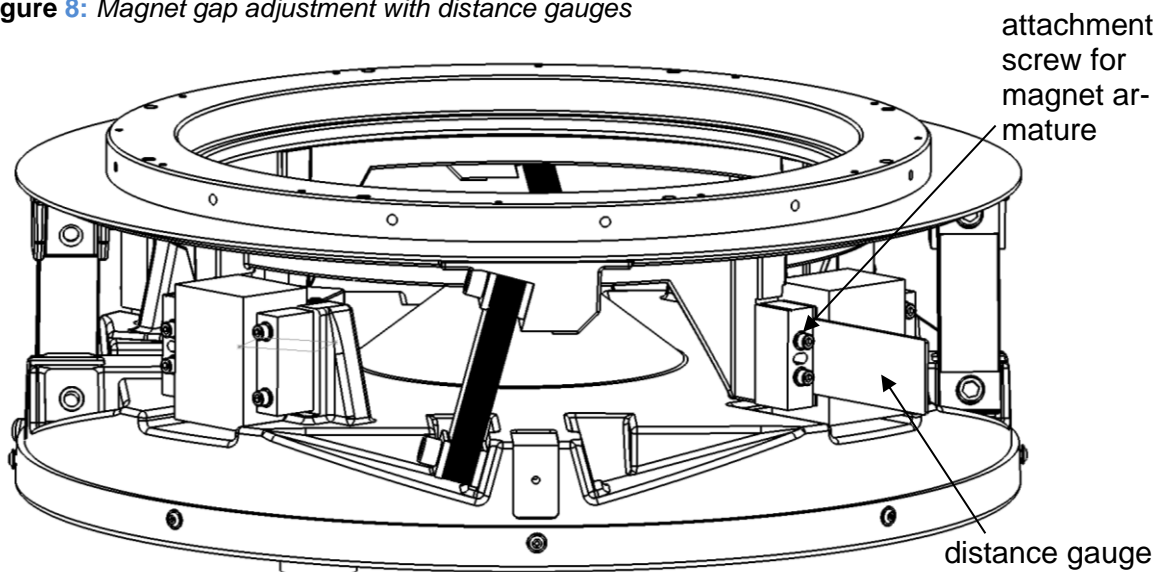


Table 3: Magnet gap and torque specification

Type	Units	WV 630-1
Magnet gap	[mm]	2,5
Torque specification	[Nm]	16,5

5.4 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

5.5 Wear and Spare parts

Table 4: *Wear parts*

Type	Order N°
Leaf spring 2.0 mm	50103702
Leaf spring 2.5 mm	50546690
Spacer	50103708
Rubber buffer	50177631

Table 5: *Spare parts*

Order N°	Type	Designation
15211762	Magnet	230V/50Hz
15018561	Magnet	115V/60Hz

6 Accessories

6.1 Adjustment tool

Table 6: Order data

Designation	Order number
Centering device	50484913
Spacer Gauge	50578277

6.2 Control device

The WV is connected to the 230 V/50 Hz AC supply by a Type IRG or MSG controller. It can also be designed for other mains voltages and frequencies, e.g. 115 V/60 Hz. However, this would require the use of a Smart RTS 15 A. The helical conveyor runs in half-wave mode with the basic mains frequency, e.g. 50 Hz or 60 Hz.

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

All controllers operate with a soft start and can be structured and attached in various ways as well as actuated in various ways. For a detailed description of the controllers, refer to the AFAG "Modular feeding technology" catalog.

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

Table 7: Controllers for WV- Bowl feeder

Type	Power supply	Order N°	Comments
IRG1-S	230V/50Hz	50360105	Control with no timer function External target value preset
MSG801		50391818	With timer function, valve and interface outputs, sensor feed
MSG802		50391819	With sensor feed
REOVIB SMART RTS 15A	115V/60Hz	50528967	Control with no timer function External target value preset

7 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.

7.1 Address for orders

Germany:

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Wernher-von-Braun-Straße 1
D – 92224 Amberg
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