

# Controller IRG 1-N



**Translation of original operating instruction**

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**This operation instruction applies to:**

Type		Order number
Controller IRG 1-N	230 V / 50 Hz	15083186
	115 V / 60 Hz	15171112

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# 1 Declaration of conformity

The manufacturer: Afag GmbH, Wernher-von-Braun-Strasse 5a, D-92224 Amberg  
www.afag.com – Tel. +49 (0)9621 650 27-0

hereby declares, that the product: **Controller**

Designation: **IRG1-N**

complies with the basic safety and health requirements of the EMC-Directive **2004/108/EC**.

The incomplete machine also complies with the following applied, harmonised standards>

Special basic standard for emitted interference, Residential areas, business and trade areas and light industry	DIN EN 50 081 Part 1
Special basic standard for interference immunity, Industrial areas	DIN EN 50 082 Part 2
Product standard for high frequency interference, for ISM appliances limit-value class B	EN 55 011
Product standard for interference immunity	EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5

Upon request, the manufacturer undertakes to transmit technical documents electronically to national authorities, if requested.

City, Date

Company: Afag GmbH

Amberg, 11. Feb. 2010

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

These operating instructions provide the information operators require to use the IRG 1-N safely. These operating instructions, and in particular the safety information, must be observed by anyone working on and with the IRG 1-N. The applicable on-site accident prevention rules and regulations must also be observed. These operating instructions must always be kept ready to hand where the IRG 1-N is operated.


The following information serves not only the personal safety of the operating personnel but also the safety of the products described herein and appliances connected to them.

 <b>DANGER</b>	
	<b>High-voltage operations. Non-compliance can lead to death, serious injury or damage to property.</b>

- Always disconnect the supply voltage before assembly or dismantling work, when replacing fuses or altering the structure.
- The relevant Accident Prevention and Safety at Work Regulations must be complied with at all times.
- Before commissioning, make sure that the appliance's nominal voltage conforms to the local mains voltage.
- Emergency switches must remain operational in all working modes. Unlocking Emergency switches must not lead to uncontrolled.
- Electrical connections must be covered at all times!
- After assembly, check all protective conductor systems for correct functioning!

## 2.3 Appropriate use

The appliance described here is an electrical device for use in feeder equipment or automation plant. The appliance has been planned for use in oscillation conveyors, in control and automation technology.

<b>NOTE</b>	
	<b>Any other use is inappropriate and will result in the warranty becoming null and void.</b>

See also our General Terms of Business.

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## 3 Description of the device

### 3.1 General

The IRG 1-N electronic controller is used for stepless controls of inductive loads such as spiral conveyors, linear conveyors and hoppers.

The controller works on the phase control principle, the conveyor output is set by setting the magnet voltage via the setpoint potentiometer integrated in the housing lid. The control curve of the setpoint voltage can be limited by means of two trimming potentiometers ( $U_{\min}$  and  $U_{\max}$ ) on the board so that the complete angle of rotation of the setpoint potentiometer can be used.

The ignition pulses can be moved infinitely within the range of the positive or negative mains voltage half-wave through the setpoint voltage that can be varied with the setpoint potentiometer, whereby the voltage-time area of the output voltage is also set. With oscillation conveyors with 60 Hz oscillation frequency both (positive and negative) mains voltage half-waves are controlled, with oscillation conveyors with 30 Hz oscillation frequency only one mains voltage half-wave is controlled. The change-over between full-wave and half-wave mode is carried out as standard with a slide switch on the board (see chapter 4.2 Connection possibilities).

After the working voltage has been switched on the integrated variable soft start is started and guarantees smooth acceleration of the output voltage until it reaches the preset voltage. This eliminates possible switch-on peaks. In addition, the same soft start (coupled with the soft stop via a potentiometer on the board) becomes effective when the output voltage is switched on or off via the controller input and serves to increase or decrease the conveyor output on a time-controlled basis, so that correctly arranged bulk material does not change its position.

The controller input enables the appliance to be switched on or off by another system that makes a switching voltage of 24 V DC available (e.g. a programmable controller). This input has an internal effect on the ignition pulses. If the appliance is to start (switching voltage applied), the ignition pulse are accelerated with the acceleration ramp-up time. If the appliance is to stop (switching voltage not applied), the ignition pulses are slowed down with the ramp-down time.

With two jumpers on the board you can reverse this function. The conveyor starts without external voltage with the ramp-up time, and stops if switching voltage applied without the ramp down time.

## NOTE



Miniature magnets can also be operated safely at the IRG 1-N controller!

## CAUTION



In the case of applications that require the oscillation conveyor to be switched ON and OFF constantly (e.g. dust switching, hopper control system, etc.), the prescribed controller input must be used. If the load circuit is disconnected with a switch or a relay the controller may be damaged.

If the controller is switched on, never insert or remove the plug at the vibration conveyor being operated. This can damage the appliance.

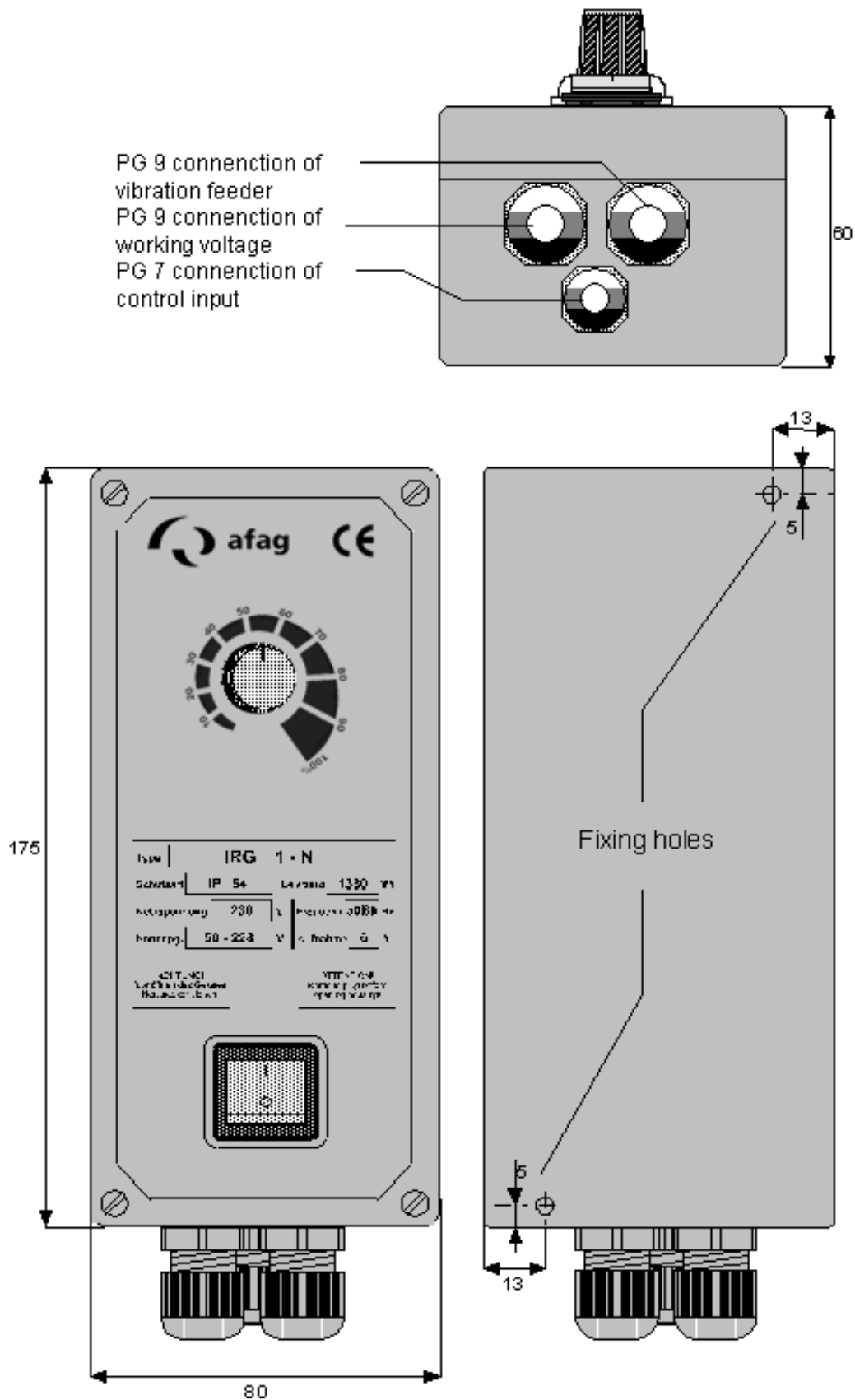
## NOTE



Repair work must be carried out by qualified personnel only. We recommend that repairs are carried out on our premises.

### 3.2 Technical data

Figure 1: IRG 1-N



**Table 1: Technical data**

Type	Units	IRG 1-N	
Operating voltage	[VAC]	230 ±10%	115 / ± 10%
Operating frequency	[Hz]	50	60
Oscillation frequency (Full- / half-wave)	[Hz]	25 / 50	30 / 60
Output voltage	[VAC]	50 - 228	30 – 113
Output current	[A]	0,025 - 6	
Type of protection	IP	54 (except setpoint potentiometer)	
Fuses	-	1 x 6,3 A F fast-acting	
Setpoint potentiometer P1	[kΩ]	10 (fixation button)	
Mains connector	-	2m with moulded Schuko angle plug	
Connector to conveyor	-	2m with Hirschmann connector STAK 20	
Housing	-	Die casting aluminium	
Dimensions (l x d x h) ca.	[mm]	175 x 80 x 60	
Oscillation frequency	-	reversible	
Control input (Optocoupler input)	-	<p>+24 V DC external voltage</p> <p>If controller input with active jumper 18-19/21-22 and external voltage applied, oscillation conveyor moves. If external voltage not applied, oscillation conveyor at standstill.</p> <p>If controller input with active jumper 19-20/22-23 and external voltage applied, oscillation conveyor at standstill. If external voltage not applied oscillation conveyor moves.</p>	
Soft start / Soft stop t1	-	ca. 0.3 - 2 sec. variable	
Environmental conditions for operation: Temperature range	[°C]	-10 to + 50	

## 4 Assembly instructions

### 4.1 Installing the unit

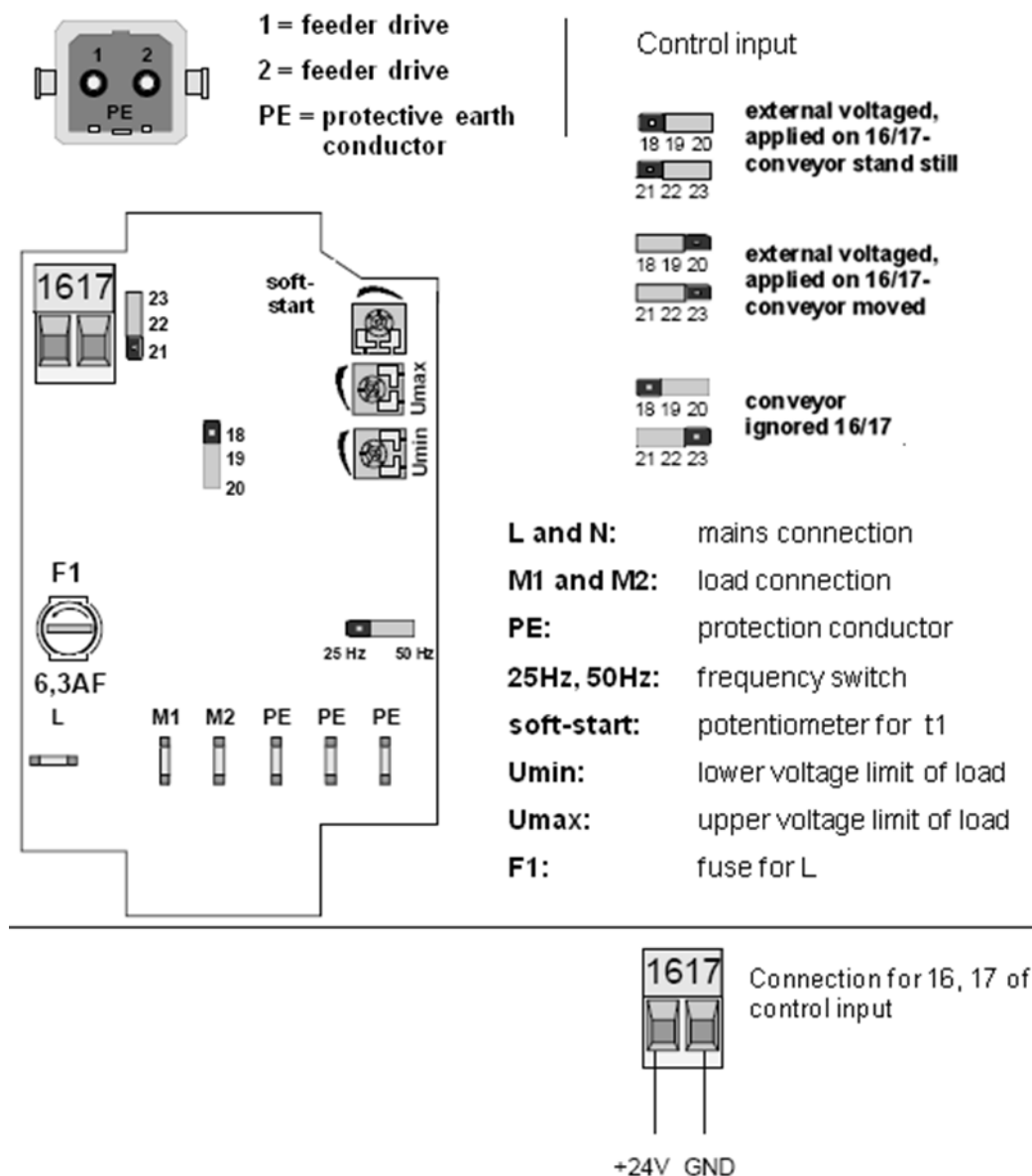
There are four holes on the underside for mounting the controller. The holes are separated from the interior of the housing. (See Figure 1)

#### Procedure:

- Unscrew the cover fastening screws.
- Remove the cover.
- Insert the fastening screws into the channels and use them to attach the controller to a vibration-free base.

### 4.2 Connection possibilities

Figure 2: Connection possibilities



 **CAUTION**

Jumpers may only be inserted for the respective application, otherwise this may lead to a malfunction of or damage to the p.c.b.

## 5 Operating instructions

### 5.1 Quick setting:

- Bring the external control potentiometer P1 (connected at terminals 13, 14, 15) to working position by turning.
- Bring the trimming potentiometer  $U_{\min}$  to the middle position by turning.
- Bring the trimming potentiometer  $U_{\max}$  to the zero stop by turning to the left. Then turn to the right until the working speed has been reached.

### 5.2 Range setting:

- Bring the external control potentiometer P1 (connected at terminals 13, 14, 15) to the end position by turning to the right.
- Bring the trimming potentiometer  $U_{\min}$  to the zero position by turning to the left.
- Bring the trimming potentiometer  $U_{\max}$  to the end position by turning to the right. Now turn to the left until the max. required voltage is reached (e.g. 200 V AC).
- Bring the control potentiometer P1 to the zero position by turning to the left.
- Now set the trimming potentiometer  $U_{\min}$  to the max. required lower voltage range (e.g. 65V AC) by turning to the right

As the two trimming potentiometers influence each other reciprocally, further readjustment of the two potentiometers is necessary.

### 5.3 Starting

Before connecting the IRG 1-N controller measure the working voltage and frequency of the oscillation conveyor you want to operate with the controller and compare the values with the controller's technical data. The output current of 6A should not be exceeded.

#### Procedure:

1. Set the slide switch on the board in accordance with the working frequency of the oscillation conveyor:
  - Full-wave operations 50/60 Hz (slide switch left)
  - Half-wave operations 25/30 Hz (slide switch right)
2. Check the jumpers on the board for the type of switching and set.
3. Connect the vibration conveyor with the earthed connector.
4. Set the setpoint potentiometer to zero.
5. Switch the controller on.
6. Use the  $U_{\min}$  and  $U_{\max}$  potentiometers to set the required control range.

### 5.4 Service tips

1. Before switching on, check that the controller is correctly connected to the oscillation conveyor.
2. Switch the controller on with the mains switch.
3. If required, set the setpoint potentiometer until the vibrations conveyor reaches the required output.

## 6 Maintenance instructions

### 6.1 Replacing the fuse

#### Procedure:

1. Always pull the plug out before opening the controller.
2. Unscrew the housing cover screws.
3. Replace the defective fuse with an 8 A FF fuse.
4. Close the housing again.

## 6.2 Troubleshooting and fault repair

Fault:	Fault repair
Appliance not working	Check the mains voltage, check the fuses and replace if necessary.
	Is the controller input set correctly, are the jumpers correct?
Conveyor not working	Check whether the right oscillation frequency has been set, where necessary alter the setting.
	Check the mains frequency (50/60 Hz). The oscillation frequency and the mains voltage must conform to one another.
	$U_{\max}$ trimmer setting too low, set $U_{\max}$ .
Conveyor vibrates too much, magnet knocking (noises)	Incorrect oscillation frequency setting. CAUTION! Magnet may have been destroyed by overheating, or mechanically damaged by knocking against something.
	$U_{\max}$ trimmer setting too high, reset $U_{\max}$ if necessary.
Magnet heats up	Incorrect mains voltage for magnet, check.
	Incorrect oscillation frequency set, reset if necessary.
Control input not working	Polarity reversal of control voltage, check
	Correct jumper for control input, check

## 7 Accessories

### 7.1 Fixture

Table 2: Order data

Type	Designation	Order number
Fixture	For one device.	50205146
	For two devices.	50205144

## 7.2 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**

Afag GmbH  
Berliner Straße 31  
D – 71229 Leonberg  
Tel.: ++49 (0) 71 52 / 60 08-0  
Fax. ++49 (0) 71 52 / 60 08-10

[sales@afag.com](mailto:sales@afag.com)

[www.afag.com](http://www.afag.com)

### Switzerland:

Afag Automation AG  
Zuführtechnik  
Fiechtenstrasse32  
CH – 4950 Huttwil  
Tel.: ++41 (0) 62 / 959 86 86  
Fax: ++41 (0) 62 / 959 87 87

## 8 Disposal

IRG's 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.