

Controller IRG 2-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	15204235
	115 V / 60 Hz	15182634

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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: **IRG2-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.

 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>

2.2 Basic safety information

These operating instructions provide the information operators require to use the IRG 2-N safely. These operating instructions, and in particular the safety information, must be observed by anyone working on and with the IRG 2-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 2-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.

 GEFAHR	
	High-voltage operations. Non-compliance can lead to death, serious injury or damage to property.

- 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.

HINWEIS	
	Any other use is inappropriate and will result in the warranty becoming null and void.

See also our General Terms of Business.

3 Beschreibung des Gerätes

3.1 General

The IRG 2-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 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 controls the running time of the oscillation conveyor in such a way that unnecessary running time are avoided. Internal variable times (GAN and GAB) are used to switch the oscillation conveyor ON or OFF in dependency on the material level measured via a material sensor. The level of the material conveyed on the linear conveyor floats around the position of the material sensor integrated in the filling section. The controller's power output is switched on if the amount of material conveyed falls below the sensor and the preset ON delay time has expired. Material is now conveyed into the filling section. If the material goes past the sensor position, the OFF delay time is started and after this has expired the controller's power output is switched off again. Gaps in the flow of bulk material reset the time stage so that the time is always measured from the last, or the first, part of the bulk material. The On or OFF delay time can be set at the GAN and GAB trimmers. Two LEDs on the board display the status of the controller input in setting mode: LED 1 shows the status of the controller input, LED 2 the status of the two-channel timer output.

With a jumper on the board the control input can be set to maker or breaker operation mode.

Measurements of the output voltage (effective value measurements) enable changes to the voltage to be registered immediately and compensated by means of a controller stage. This guarantees even running of the bulk material.

HINWEIS



Miniature magnets can also be operated safely at the IRG 2-N controller!

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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.

HINWEIS



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 2-N

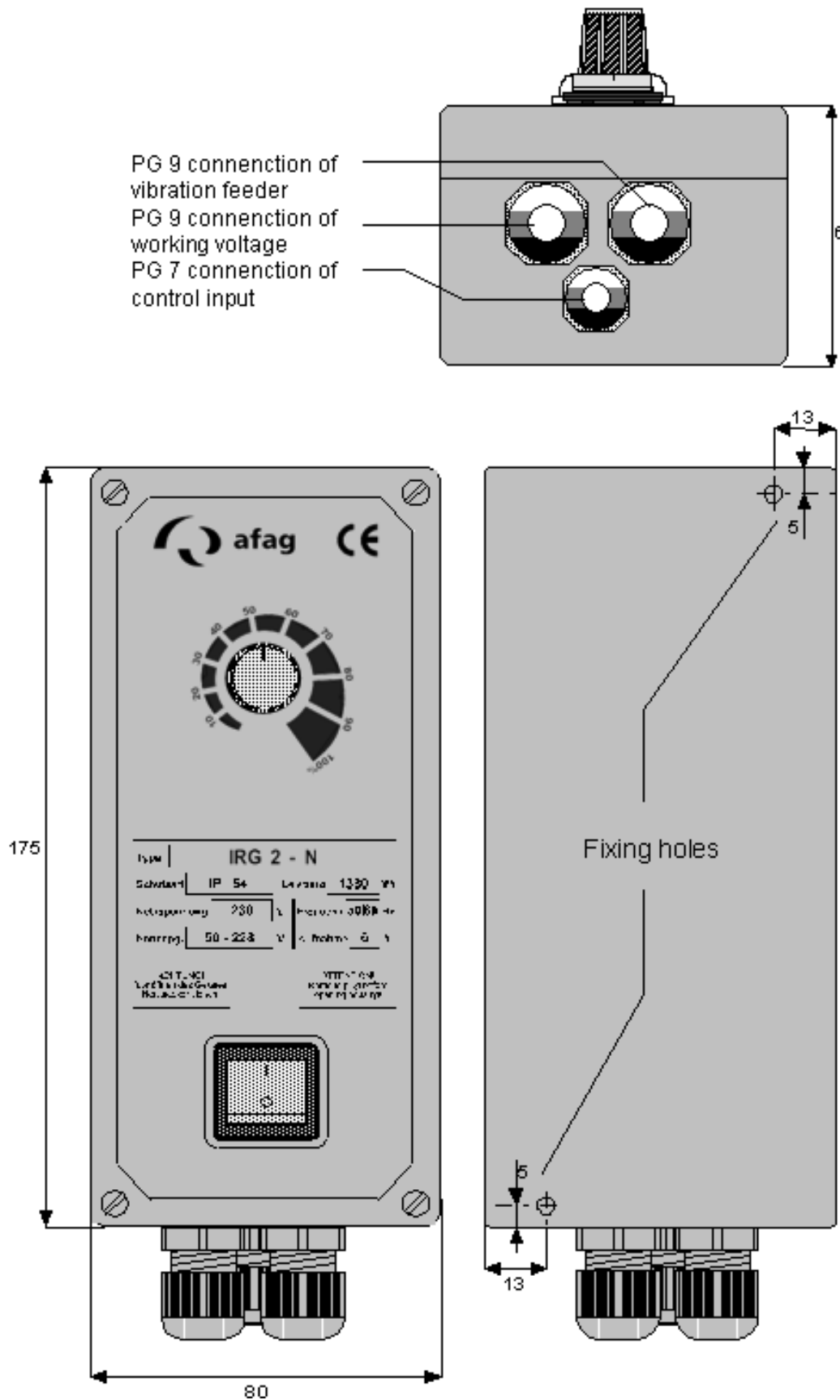


Table 1: Technical data

Type	Units	IRG 2-N	
Working voltage	[VAC]	230 ±10%	115 ± 10%
Working frequency	[Hz]	50	60
Oscillation frequency (Half- / full-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	
Connector to sensor	-	Connecting box M8 x 1	
Housing	-	Diecasting aluminium	
Abmessungen (l x b x h) ca.	[mm]	175 x 80 x 60	
Oscillation frequency	-	reversible	
Control input galvanically isolated	-	<p>+24 V DC /max. 50mA / PNP</p> <p>Opener mode: Output voltage 0 V with applied switching; Voltage of + 24 V DC Preset output voltage with applied switching of 0 V DC</p> <p>Closer mode: Output voltage 0 V with applied switching Voltage of 0 V DC; Preset output voltage with applied switching voltage of + 24 V DC; Twin timer can be deactivated;</p> <p>Twin timer: GAN and GAB: 0 –10 seconds</p>	
Soft start / Soft stop t1		ca. 0.3 - 2 sec. variable	
Mains voltage compensation		Compensation of mains voltage fluctuations at output. With preset output voltage of e.g. 70V AC a max. voltage change of 1 V AC arises, with changes of the input voltage from 115V AC to 100 V AC or from 115 V AC to 130 V AC.	
Standards complied with		DIN EN 50 081 Part 1; Residential, commercial, trade and light industry, industry. DIN EN 50 082 Part 2; Industry VDE 0160	
Environmental conditions for operation: Temperature range	[°C]	-10 to + 50	

4 Assembly instructions

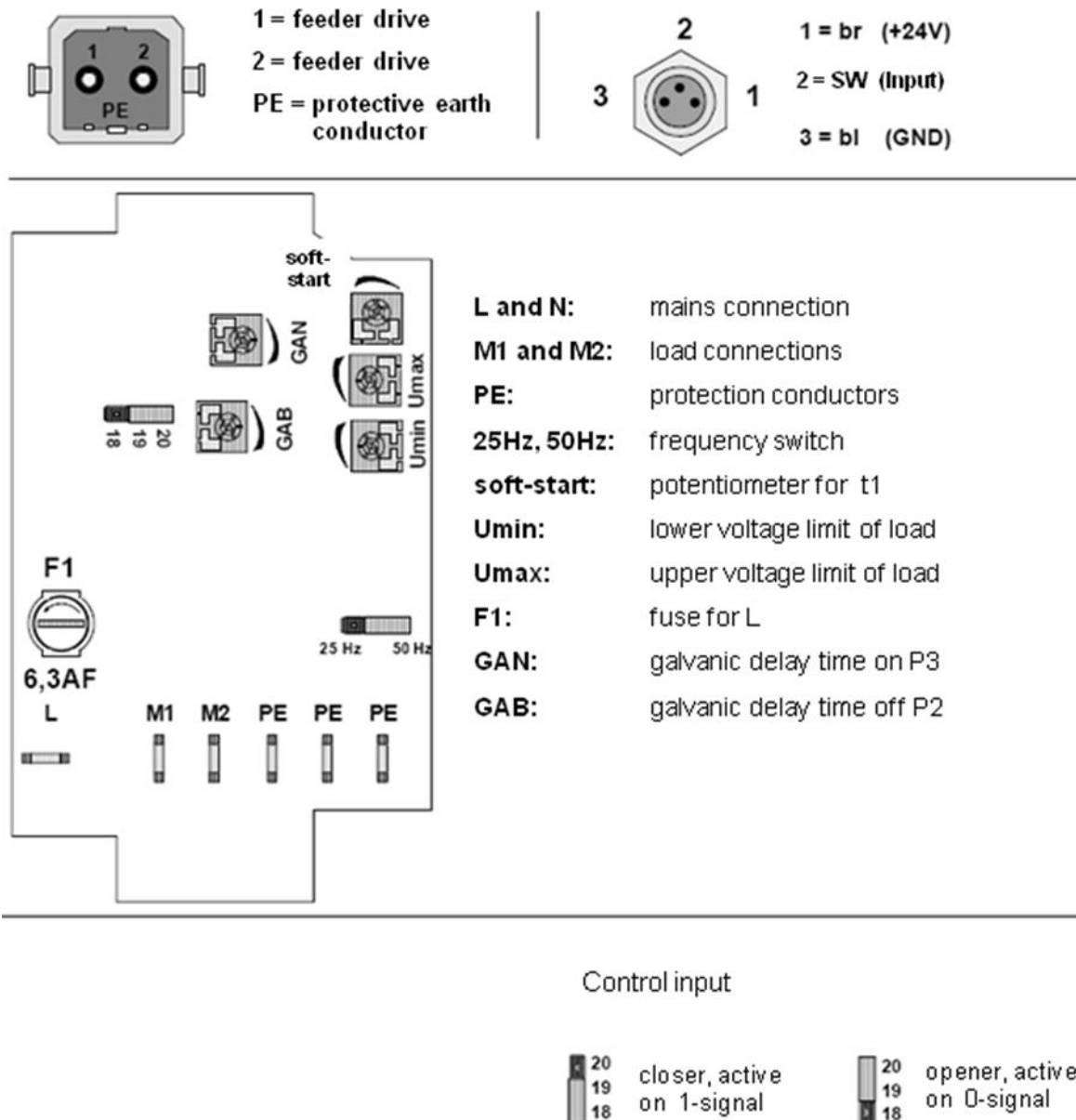
4.1 Installing the unit

There are four holes on the underside for mounting the controller. The holes are separated from the interior of the housing.

- 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



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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:

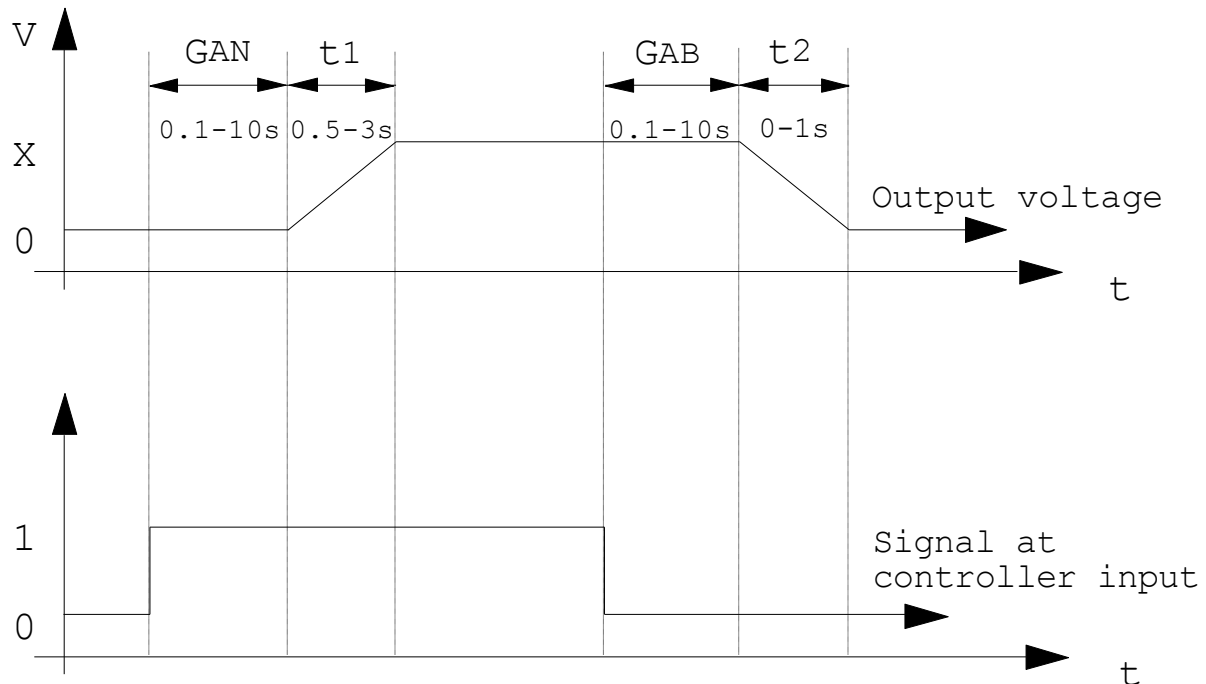
- Bring the external control potentiometer P1 (connected at terminals 13, 14, 15) to the end position by turning to the right.
- Bring the trimming potentiometer U_{\min} to the zero position by turning to the left.
- Bring the trimming potentiometer U_{\max} to the end position by turning to the right. 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 Setting the ON and OFF time delay for the level controller:

The level of the material in the filling section is measured by the GAN and GAB trimmers. To increase the material back-up downstream from the sensor, use the GAB trimmer to lengthen the controller's OFF delay time. Reduce the GAB time to reduce the back-up of material. The GAN trimmer can now be used to determine the time that passes from when the last part of the material leaves the sensor position until the feeder appliance is switched on.

Figure 3: The diagram shows the time sequence in operations with the controller input low active



5.4 Starting

Before connecting the IRG 2-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.

5.5 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

Cause of 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:

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D – 92224 Amberg
Tel.: ++49 (0) 96 21 / 65 0 27-0
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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.