Controller
IRG 1-S

Translation of operating and installation instructions

afag

This operation instruction applies to:

Type		Order number
Controller IRG 1-S	230 V / 50 Hz	50360105
	115 V / 60 Hz	50360106

Version of Documentation:	BA_IRG1-S_R02.3_EN.docx
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Table of contents:

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	
	**Indicates an immediate threatening danger.** **Non-compliance with this information can result in death or serious personal injuries (invalidity).**

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

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

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

1.2 Basic safety information

This description contains the necessary information for the correct application of the product described below. It is intended for use by technically qualified personnel.

Qualified personnel are persons who, because of their training, experience and position as well as their knowledge of appropriate standards, regulations, health and safety requirements and working conditions, are authorised to be responsible for the safety of the equipment, at all times, whilst carrying out their normal duties and are therefore aware of, and can report, possible hazards (Definition of qualified employees according to IEC 364).

DANGER	
	**Hazardous Voltage! Failure to observe can kill, cause serious injury or damage.**

- Isolate from mains before installation or dismantling work, as well as for fuse changes or post installation modifications.
- Observe the prescribed accident prevention and safety rules for the specific application.
- Before putting into operation check if the rated voltage for the unit conforms with the local supply voltage.
- Emergency stop devices must be provided for all applications. Operation of the emergency stop must inhibit any further uncontrolled operation.
- Electrical connections must be covered.
- The earth connection must be checked for correct function, after installation.

1.3 Specified use

The units described herein are electrical controllers for installation in industrial plants. They are designed for power adjustment on vibratory feed equipment.

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

See also our General Terms of Business.

2 Description of the device

2.1 General

Electronic controller IRG1-S for the infinitely variable regulation of magnetically driven vibratory bowl, linear or hopper feeders.

The units operate using the phase-angle control principle to provide a variable output voltage for the drive magnet. Feeder throughput is adjusted with a potentiometer fitted in the front plate. The control range of the potentiometer can be scaled by using internal trimmers U_{min} / U_{max} so that adjustment is linear from 0...100 %. The controller can be used with vibratory feeders that have a tuned frequency of 6000 vibs/min (7200 vibs/min) or 3000 vibs/min (3600 vibs/min) (also referred to as full and half-wave). The running frequency can be selected by setting an internal switch (see settings). An adjustable soft-start timer is provided to ensure that the feeder starts up smoothly when the mains supply is switched on or the control input is enabled.

The controller can be enabled with a 24 Vdc signal from a PLC, for example (controller runs when signal voltage is applied).

Supply voltage variations are eliminated by an internal compensation circuit so that a constant feeder throughput is always maintained.

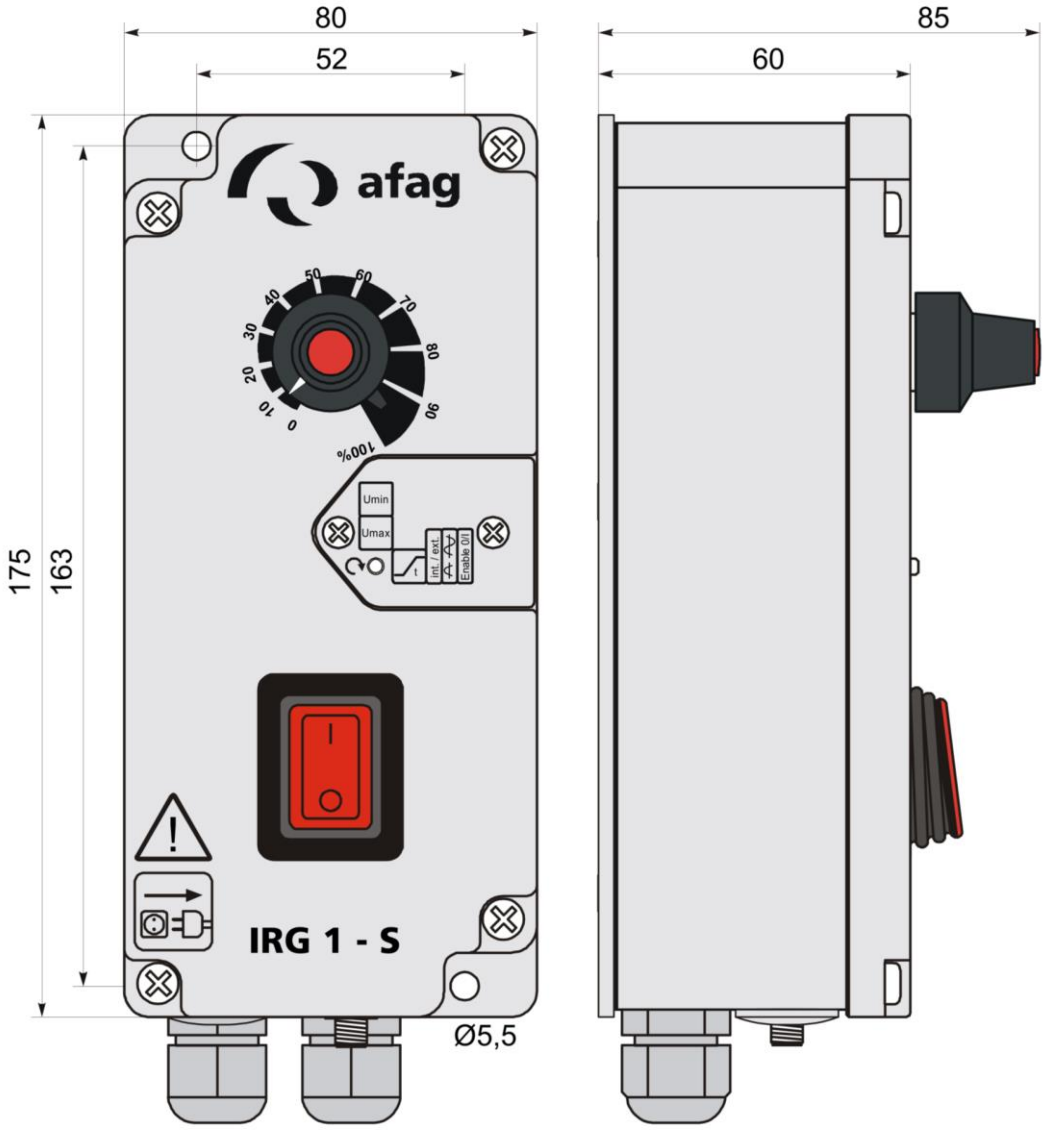
NOTE	
	**Miniature magnets can also be operated safely at the IRG 1-S controller!**

⚠ 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.

2.2 Technical data

Figure 1: *IRG 1-S*



Fixing dimensions: 163 x 52 mm

Table 1: *Technical data*

Type	Units	IRG 1-S	
Operating voltage	[VAC]	230 ±10%	115 / ± 10%
Operating frequency	[Hz]	50 / 60	
Oscillation frequency (Full- / half-wave)	[Hz]	50 / 100 with 50 Hz supply frequency 60 / 120 with 60 Hz supply frequency	
Output voltage	[VAC]	40 - 220	20 – 105
Output current	[A]	0 - 6	
Type of protection	IP	IP54	
Fuses	---	1 x 6,3 A	
Mains connector	---	2m with moulded Schuko angle plug	
Connector to conveyor	---	2m cable 3 x 1 mm² with Hirschmann connector STAK 20	
Dimensions (l x d x h) ca.	[mm]	175 x 80 x 60	
Control input (Optocoupler input)	---	Contact or +24 V DC external voltage	
Soft start	[s]	0 - 4	
Environmental conditions for operation: Temperature range	[°C]	0 to +45	

3 Assembly instructions

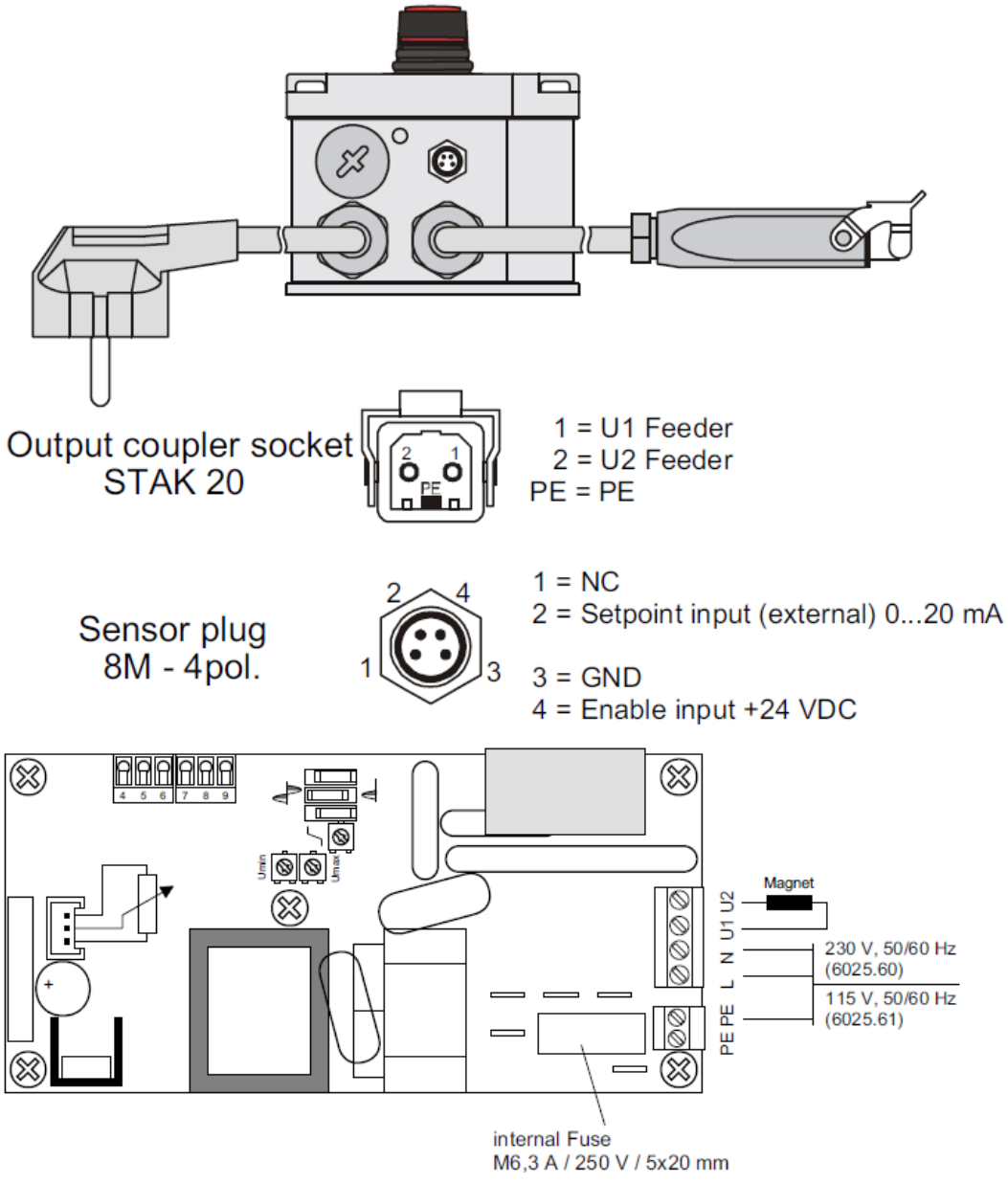
3.1 Installing the unit

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

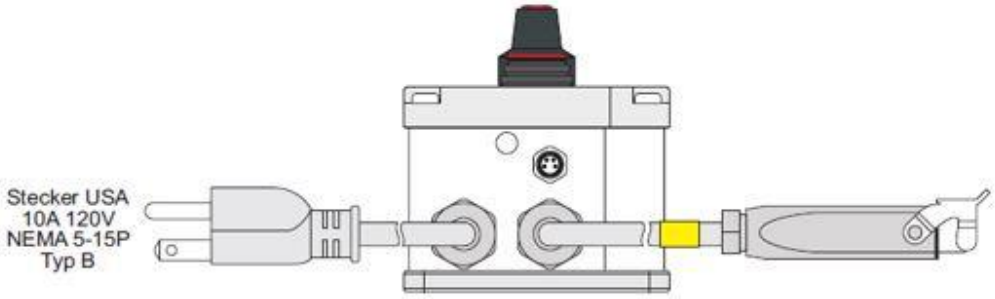
3.2 Connection possibilities

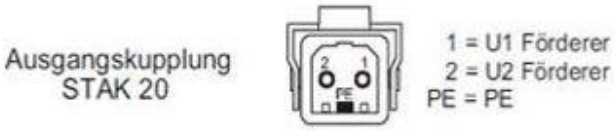
Type 230V/50Hz

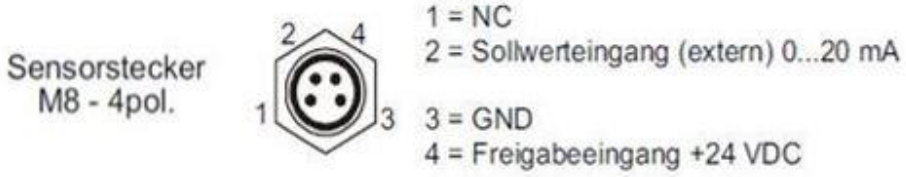
Figure 2: *Connection possibilities*

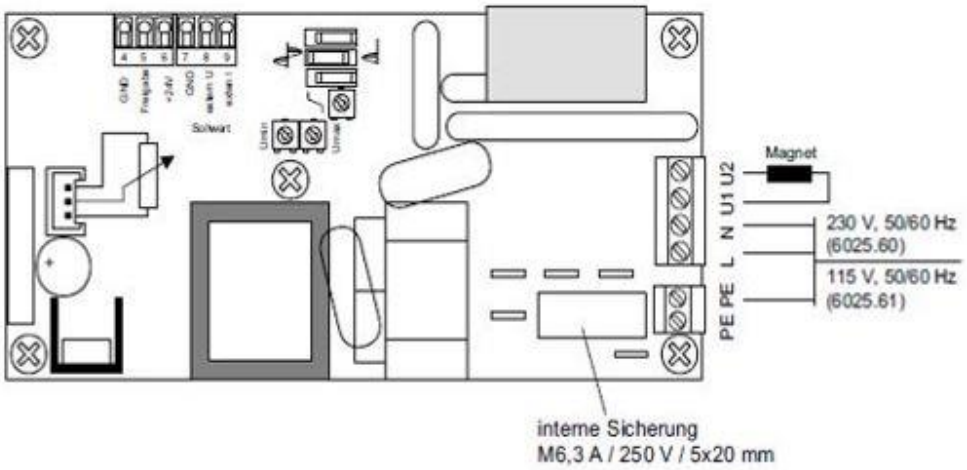


Type 115V/60Hz







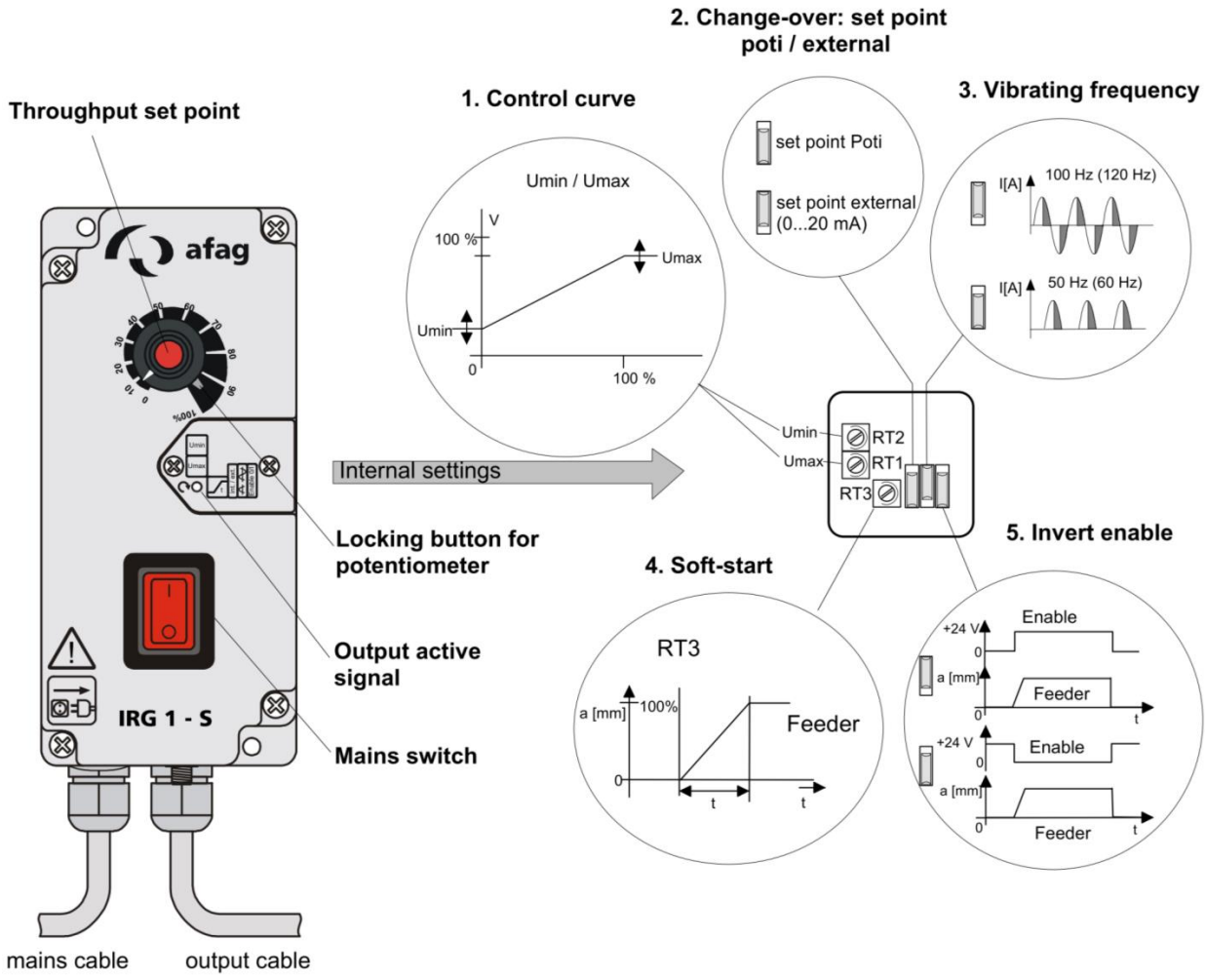


⚠ CAUTION	
	**Jumpers may only be inserted for the respective application, otherwise this may lead to a malfunction of or damage to the p.c.b.**

4 Operating instructions

Standard settings can be made without removing the front-panel. The setting up components are accessed by removing the small cover on the right hand side of the front-panel.

Figure 3: *Settings*



4.1 Internal Trimmers

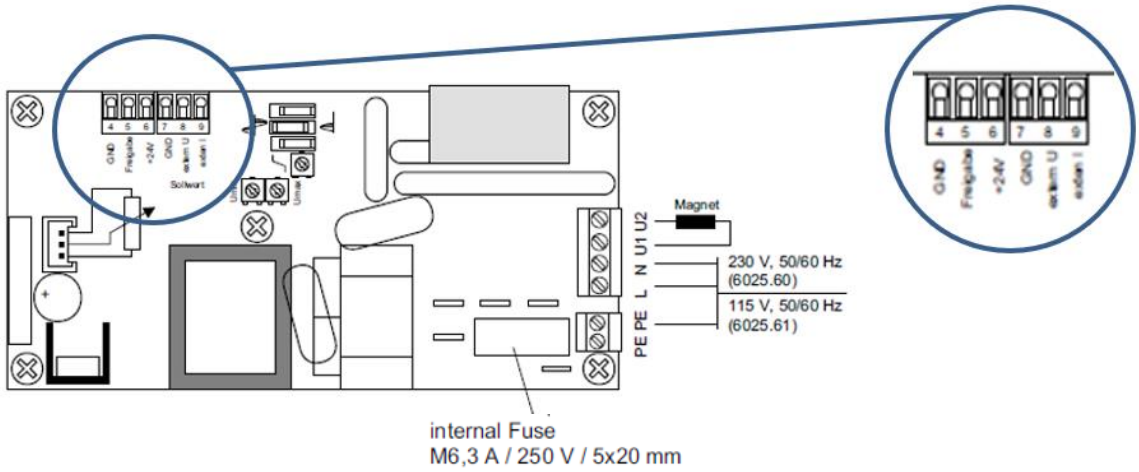
Trimmers U_{min} and U_{max} can be used to scale the set-point range of the controller so that it matches the output characteristics of a particular feeder. The U_{max} trimmer determines the 100% value of the output voltage and the U_{min} trimmer limits the lower setting of the set-point potentiometer. Because the U_{max} trimmer setting can influence the U_{min} setting, when adjustments are made the U_{max} trimmer should be adjusted first, followed by the U_{min} trimmer. The trimmers are factory set so that U_{min} is approximately 40V and U_{max} is approximately 220V (at 115V Units: U_{min} 20 V, U_{max} 105 V)

4.2 Setpoint source

Selection: Setpoint Potentiometer or Setpoint external (control current 0...20 mA)

Selection of control voltage:

For operation via the control voltage, the wiring must be changed from terminal 9 to terminal 8.



4.3 Half- and full wave

The correct setting of the vibrating frequency is particularly important because the wrong frequency could cause the magnet to be overloaded. This setting is made with an internal slider switch. The mechanical frequency of the feed system must be checked before a setting is made.

4.4 Soft start

The soft-start ramp time for the output voltage is adjusted with trimmer RT3 (0...4 sec).

4.5 Invert enable:

Change the logic function of the enable input.

5 Maintenance instructions

5.1 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.
4. Close the housing again.

5.2 Troubleshooting and fault repair

Table 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.

6 Accessories

6.1 Fixture

Table 3: *Order data*

Type	Designation	Order number
Fixture	for 1 IRG	50450178
	for 2 IRG	50450179
	for 1 IRG extended	50450145
	for 2 IRG extended	50450147

6.2 Address for orders

Germany:

Afag GmbH

Wernher-von-Braun-Straße 1

D – 92224 Amberg

Tel.: ++49 (0) 96 21 / 65 0 27-0

Fax: ++49 (0) 96 21 / 65 0 27-490

Switzerland:

Afag Automation AG

Luzernstrasse 32

CH – 6144 Zell

Tel.: ++41 (0) 62 / 959 86 86

Fax: ++41 (0) 62 / 959 87 87

Sales

sales@afag.com

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7 Disposal

Controllers 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.