

Operating Instructions

Frequency controller SIGA (V6)



Translation of the Original Operating Instructions EN

- Frequency controller SIGA (V6) (230 VAC; 50 Hz / 60 Hz) ⇒ Order no: 50195031
- Frequency controller SIGA (V6) (115 VAC; 50 Hz / 60 Hz) ⇒ Order no.: on request

Dear Customer

Thank you for choosing our products and placing your trust and confidence in our company!

These operating and installation instructions contain all essential information you need about your product. Our aim is to provide the required information as concisely and clearly as possible. If, however, you still have any questions on the contents or suggestions, please do not hesitate to contact us. We are always grateful for any feedback.

Our team will also be glad to answer any further question you may have regarding the frequency controller or other options.

We wish you every success with our products!

With kind regards

Your Afag team

© Subject to modifications

The controllers have been designed by Afag GmbH according to the state of the art. Due to the constant technical development and improvement of our products, we reserve the right to make technical changes at any time.

Updates of our documentations



Unlike the printed documents, our digital instructions manuals, product data sheets and catalogues are being continuously updated on our website.

Please keep in mind that the digital documents on our website are always the latest versions.

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1 General

1.1 Contents and purpose of this manual

These operating instructions contain valuable information on assembly, commissioning, functioning and maintenance of the controller to ensure safe and efficient handling and operation.

Consistent compliance with these operating instructions will ensure:

- permanent operational reliability of the frequency controller,
- optimal functioning of the frequency controller,
- timely detection and elimination of defects (thereby reducing maintenance and repair costs),
- prolongation of the frequency controller service life.

The illustrations in this manual shall provide you with a basic understanding of the module and may vary from the actual design of your module.

1.2 Explanation of symbols

The safety notes are marked by a pictogram and a signal word. The safety notes describe the extent of the hazard.

DANGER



Danger!

This safety note indicates an imminently hazardous situation which, if not avoided, will result in death or severe injury.

WARNING



Warning!

This safety note points out a potentially hazardous situation which, if not avoided, could result in death or severe injury.

CAUTION



Caution!

This safety note points out a potentially dangerous situation which, if not avoided, can result in minor or slight injuries.

NOTICE




This safety note points out a potentially dangerous situation which, if not avoided, can cause substantial damage to property and the environment.



This note contains important additional information as well as useful tips for safe, efficient, and trouble-free operation of the frequency controller.

Further warning signs:

Where applicable, the following standardized symbols are used in this manual to point out the various potential health risks.

	Warning - Dangerous electrical voltage.
	Warning - Risk of hand and finger injury due to uncontrolled movements of components.
	Warning - Magnetic field.

1.3 Additional symbols

In these assembly instructions the following symbols are used to highlight instructions, results, references, etc.

Symbol	Description
1.	Instructions (steps ...)
⇒	Results of actions
↻	References to sections
■	Enumerations not ordered

1.4 Warranty

The warranty terms for Afag handling components and handling systems are the following:

- 24 months from initial operation and up to a maximum of 27 months from delivery.
- Wear parts are excluded from the warranty (The customer is entitled to a product free of defects. *This does also apply to defective accessories and wear parts. Normal wear and tear are excluded from the warranty.*)

The warranty covers the replacement or repair of defective Afag parts. Further claims are excluded.

The warranty shall expire in the following cases:

- Improper use of the handling system.
- Non-observance of the instructions regarding installation, commissioning, operation, and maintenance.
- Improper assembly, commissioning, operation, and maintenance.
- Repairs and design changes carried out without prior technical instructions of Afag GmbH.
- Removing the serial number from the product.
- Non-observance of the EC Machinery Directive, the Accident Prevention Regulations, the Standards of the German Electrotechnology Association (VDE) and these safety and assembly instructions.

1.5 Liability

No changes shall be made to the frequency controller unless described in this manual or approved in writing by Afag.

Afag accepts no liability for unauthorized changes or improper assembly, installation, commissioning, operation, maintenance, or repair work.

2 Safety instructions

2.1 General

This chapter provides an overview of all important safety aspects to ensure safe and proper use of the frequency controller and optimal protection of personnel.

Safe handling and trouble-free operation of the controller requires knowledge of the basic safety regulations.

Every person carrying out installation, commissioning, maintenance work or operating the controllers must have read and understood the complete user manual, especially the chapter on safety instructions.

Beyond this, there are rules and regulations regarding accident prevention that are applicable to the place of installation which must be observed.



Failure to follow the directions and safety instructions given in this instructions manual may result in serious hazards.

2.2 Intended use

The devices described here are electrical equipment for use in industrial systems. The frequency controller is designed to control electromagnetic vibratory feeders.

The intended use of the module also includes:



- observance of all instructions given in this manual.
- compliance with the inspection and maintenance work and the specifications in the data sheets,
- using only original spare parts.

Improper use of the frequency controller will invalidate the warranty.

2.3 Foreseeable misuse

Any use other than or beyond the intended use described is considered a misuse of the frequency controller.

WARNING

Risk of injury if the frequency controller is not used for its intended use or if it is foreseeable used incorrectly!



The improper use of the frequency controller poses a potential hazard to the personnel.

- The frequency controllers may only be used in a technically perfect condition in accordance with its intended use and the instructions in this manual as well as in compliance with the safety requirements!

2.4 Obligations of the operator and the personnel

2.4.1 Follow these instructions

A basic prerequisite for safe and proper handling of the frequency controller is a good knowledge of the basic safety instructions.



This manual, particularly the safety instructions contained therein, must be observed by all persons working with the frequency controller.

2.4.2 Obligations of the operating company

In addition to the safety instructions given in this manual, the operating company must comply with the safety, accident prevention and environmental protection regulations valid for the field of application of the frequency controller.

The operating company is required to use only personnel who:

- have the necessary professional qualifications and experience,
- are familiar with the basic rules regarding occupational safety and accident prevention,
- have been instructed in the correct handling of the frequency controller,
- have read and understood these operating instructions.

The operating company is also required to:

- monitor on an ongoing basis that the personnel work safely considering any potential hazard involved and the assembly instructions are observed,
- ensure that the operating instructions are always kept at hand at the installation in which the frequency controllers are mounted,
- observe and communicate universally applicable laws and regulations regarding accident prevention and environmental protection,
- provide the necessary personal protective equipment (e.g., protective gloves) and instruct the personnel to wear it.

2.4.3 Obligations of the personnel

All personnel working with the modules are required to:

- read and observe these assembly instructions, especially the chapter on safety,
 - observe the occupational safety and accident prevention regulations,
 - observe all safety and warning signs on the modules,
 - refrain from any activity that might compromise safety and health.
-



In addition, the personnel must wear the personal protective equipment required for carrying out their work (➔ chap. 2.6).

2.5 Personnel requirements

2.5.1 Personnel qualification

The activities described in the assembly instructions require specific requisites at the level of professional qualifications of the personnel.

Personnel not having the required qualification will not be able to assess the risks that may arise from the use of frequency controller thus exposing himself and others to the risk of severe injury. Therefore, only qualified personnel may be permitted to carry out the described activities on the frequency controller.

These operating instructions are intended for skilled personnel (installers, system integrators, maintenance personnel, technicians), electricians and operating personnel.

The following is a description of the professional skills (qualifications) required for carrying out the different activities:

Qualified personnel:

Qualified personnel with appropriate training who are qualified due to their special knowledge and fully familiar with the machine and who have been given instructions on how to carry out the task entrusted to them safely.

Qualified electrician:

Persons who have obtained their electrical qualifications through appropriate professional training and complementary courses that enables them to identify risks and prevent hazards resulting from electricity.

Operator (trained personnel):

Authorized persons who due to their specialized professional training, expertise and experience can identify risks and preventing hazards arising from the use of the machine.

2.6 Personal protective equipment (PPE)

The personal protective equipment serves to protect the personnel from hazards affecting their safety and health at work.

When working on/with the controller, the personnel must use the protective equipment assigned by the safety officer of the operating company or as required by safety regulations. In addition, the personnel are required to:

- wear the personal protective equipment provided by the operating company (employer),
- check the personal protective equipment for proper condition, and
- immediately notify the person responsible on site of any defects found on the personal protective equipment.

2.7 Changes and modifications

No changes may be made to the controller which have not been described in these operating instructions or approved in writing by Afag GmbH.

Afag accepts no liability for unauthorized changes or improper assembly, installation, commissioning, maintenance, or repair work.

2.8 General hazards / residual risks

Observe the safety instructions in this chapter and in the other sections of this manual to avoid damage to property and dangerous situations for the personnel.

2.8.1 General hazards at the workplace

The frequency controller has been built according to the state-of-the-art and the applicable health and safety requirements. However, improper use of the frequency controller may cause the following hazards to the personnel:

- danger to life and limb of the operator or third parties,
- on the frequency controllers themselves,
- property damage.

2.8.2 Danger due to electricity



DANGER

Risk of injury due to electric shock!

Work on the electrical system carried out unprofessionally can cause serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.
-

3 Technical data

3.1 Dimensional drawing SIGA

Type	SIGA
A	200 mm
B	100 mm
C	80 mm
D	4 mm
E	20 mm

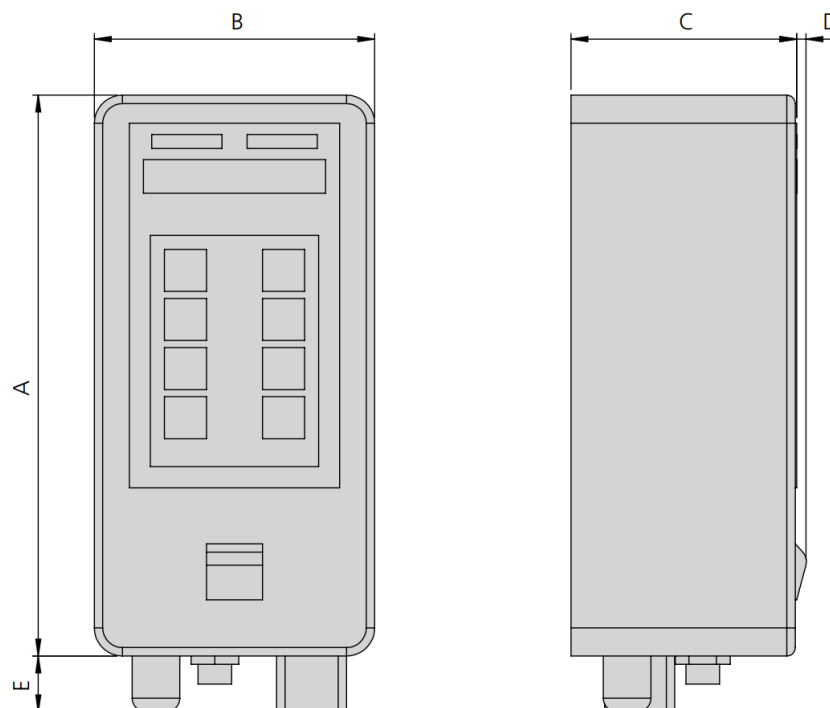


Fig. 1 Dimensional drawing frequency controller SIGA

3.2 Technical data

SIGA	
Operating temperature	0 - 50 °C
Type	SIGA
Order number	50195031
Nominal output current	0.025 - 5 A
Output frequency	5 - 200 Hz
Frequency	50 Hz
Input voltage	230 VAC
Output voltage	50 - 200 VAC
Net weight	1.7 kg
Fuses	2x6.3 A (F)
Protection type	IP54

4 Transport and storage

4.1 Scope of supply



The corresponding documentation is supplied with each frequency controller.



Fig. 2 Scope of delivery SIGA

[Unt]	Designation
1 x	Frequency controller
1 x	Operating Instructions

4.2 Transport



No liability can be assumed for damages caused by improper installation on the part of the operating company.



The following conditions must be complied with for transport and storage:

- Storage temperature: 0-+45 °C
 - Relative air humidity: < 90%, non condensing
-

4.3 Packaging

The frequency controller is delivered in the Afag GmbH transport packaging. If no Afag packaging is used, the controller must be packed in such a way that it is protected against shocks and dust.

NOTICE

Risk to the environment due to incorrect disposal of the packaging material.

Environmental damage can be caused by incorrect disposal of the packaging material.

- Dispose of the packaging material in an environmentally sensitive way in accordance with the local environmental regulations.
-

4.4 Storage

If the controller is stored for an extended period, observe the following:

- Store the frequency controller in the transport packaging.
- Do not store the telescope spindle axes outdoors or expose them to weather conditions.
- The storage space must be dry and dust free.
- Room temperature of the storage space: 0-50 °C.
- Relative air humidity: < 90% non-condensing.
- Protect the frequency controller from dirt and dust.

5 Design and description

5.1 Design of frequency controller

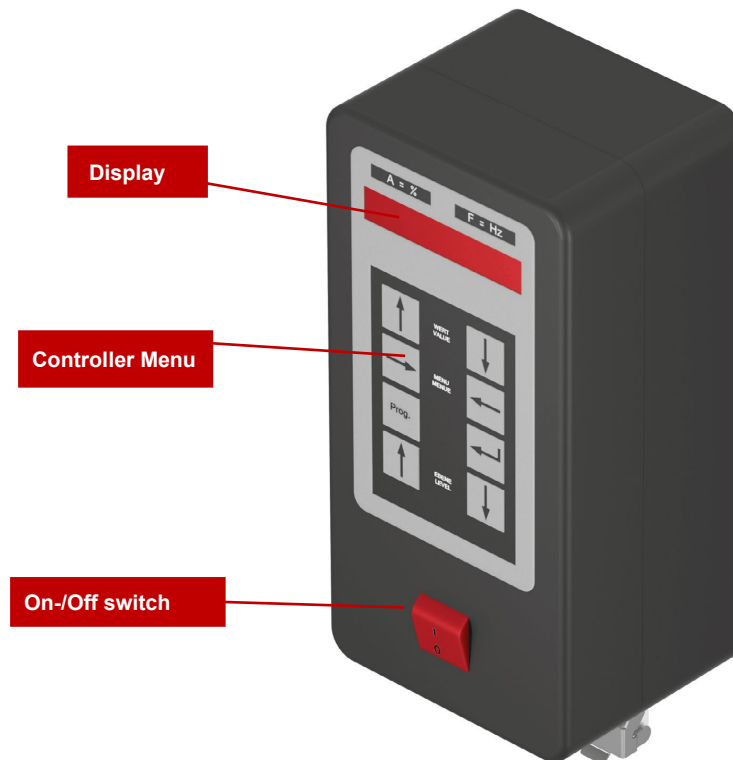


Fig. 3 Design of the frequency controller SIGA



Even the smallest solenoids can be operated safely with the frequency controller SIGA!

5.2 Description

The frequency controller SIGA is used for the control of inductive loads such as bowl feeders and linear feeders. The controller works according to the principle of pulse width modulation (PWM) within the half-waves with an adjustable period between 20 Hz and 99 Hz.

Function:

After switching on the operating voltage, the integrated, adjustable soft start is started after a forced inactive time and guarantees a smooth ramp-up of the output voltage to the set voltage value.

The charging current of the capacitors is limited to 4A via a limitation stage now of switch-on. Possible switch-on peaks are thus eliminated.

Furthermore, both the soft start and the soft stop are activated when the output voltage is switched on or off via the control input or the keypad and are used to increase or decrease the delivery rate in a time-controlled manner. Bulk goods that have already been organized do not change their position again. Both times can be set separately.

Switch-on and switch-off system:

The control input enables the device to be switched on or off by another system (PLC, sensor, etc.). The controller provides its own supply voltage of +24 V DC for this purpose.

Switching on and off can also be carried out via an external voltage of + 24 VDC. The input acts internally on the PWM.

The control input and the integrated, programmable switch-on and switch-off times are used to control the running times of the vibratory bowl feeder so that unnecessary running times are avoided.

The keypad can be used to specify whether to operate in normally closed or normally open mode.

Settings:

The delivery rate is adjusted by setting the solenoid voltage using the input keypad in the range of 10 - 99%. The setpoint can also be set via the keypad using an external analogue voltage 0-10 VDC, analogue current 4-20 mA or a potentiometer.

The width of the sinusoidal output voltage (half-wave) depends on the set period and is therefore constant.

The width of the clocked pulses in this sinusoidal output voltage can be infinitely varied by input via the keypad or the externally applied setpoint value in the positive or negative half-wave range, whereby the voltage time surface of the output voltage is adjusted.

The oscillation frequency can be variably set from 20-99 Hz for all vibratory conveyors; the setting is made via the keypad as standard.

6 Mounting, installation and commissioning

For safe operation, the module must be integrated into the safety concept of the system in which it is installed.



The system operator is responsible for the installation of the controller in a system!

6.1 Safety instructions



DANGER

Risk of injury due to electric shock!

Work on the electrical system carried out unprofessionally can cause serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.
 - Disconnect the power supply before assembly and disassembly work and when making changes to the installation!
-



No warranty will be granted for damage caused by improper installation on the part of the operating company.



Observe the safety instructions in ➔ chap. 2 "Safety instructions" of this manual as well as the instructions in ➔ chap. 6.

6.2 Assembly

Fastening the controller

Two holes are provided on the lower part of the housing for mounting the controller. These are separated from the interior of the housing.

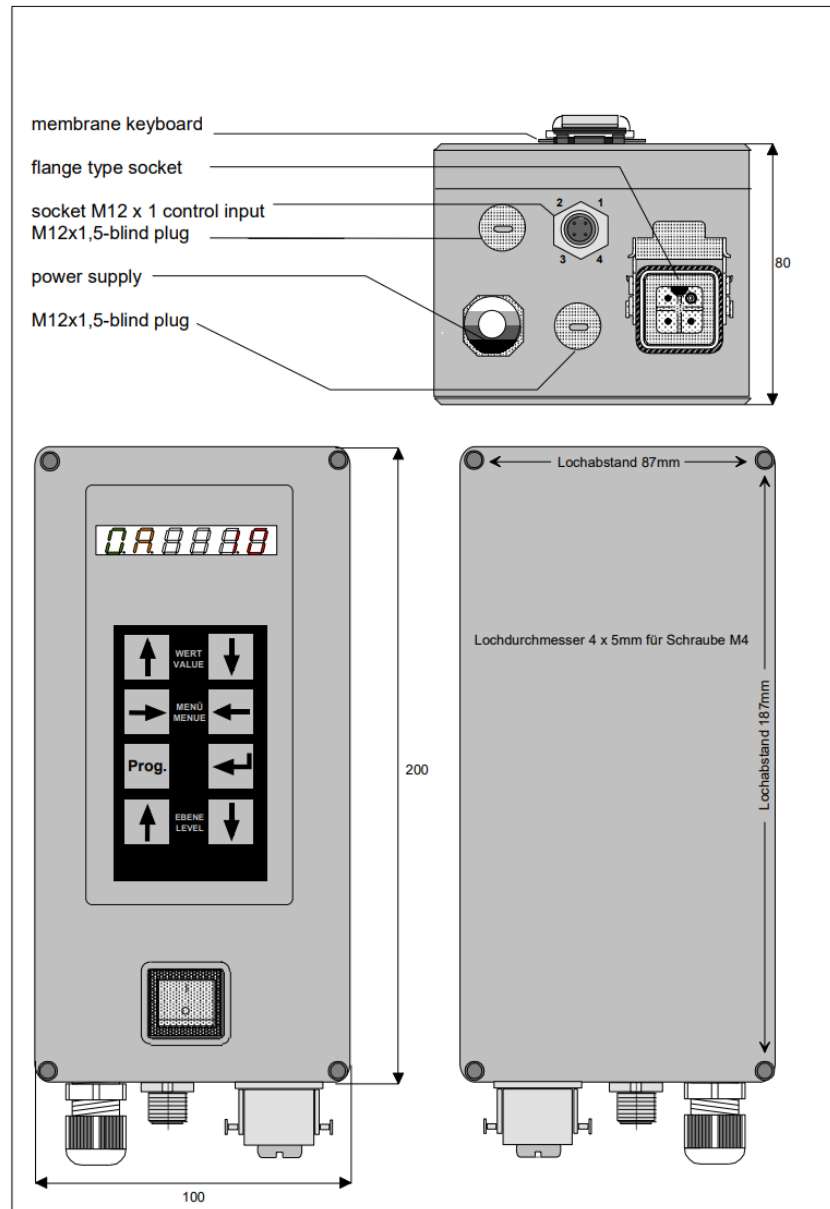


Fig. 4 SIGA controller mounting holes

Procedure:

1. Loosen the cover fastening screws.
2. Remove the cover.
3. Insert the fastening screws into the channel and use them to fasten the controller to a vibration-free surface.
4. Shield the drive cable.
 - ⇒ The process is completed.

6.3 Installation / electrical connection



DANGER

Risk of injury due to electric shock!

Work on the electrical system carried out unprofessionally can cause serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.
-

NOTICE

Risk of malfunction or damage to the circuit board!

Incorrectly set slide switches can lead to a malfunction or damage to the circuit board.

- Set the slide switch only for the respective application!
-

NOTICE

Danger of malfunction!

Electrical appliances, equipment and rooms must be protected from the influence of electrical, magnetic, and electromagnetic fields by shielding to prevent faulty operation.

- The connection between the controller and the vibratory conveyor must be made with a shielded cable!
-

6.3.1 Connection options

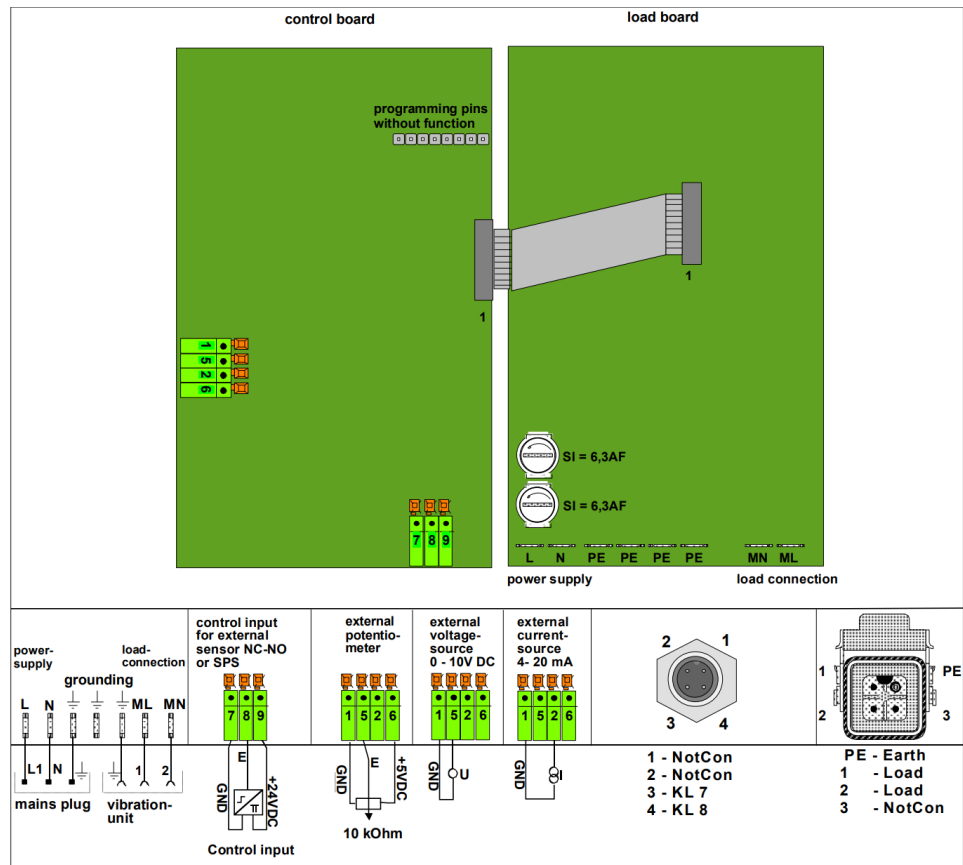


Fig. 5 Connection options for SIGA controller

6.3.2 Important notes on the electrical connection

- Disconnect the supply voltage before assembly or disassembly work, as well as when changing fuses or modifying the structure.
- Before connecting the controller, determine the electrical data of the vibratory bowl feeder to be operated and compare it with the technical data of the controller.
 - ⇒ The output current of 5A must not be exceeded!
- Emergency-STOP devices must remain effective in all operating modes. Unlocking the Emergency-STOP devices must not cause an uncontrolled restart!
- The electrical connections must be covered!
- Protective conductor connections must be checked for proper function after installation!

6.3.3 Notes on the high voltage test

The following safety-relevant points must be observed during the high voltage test:

- L and N must be connected to each other!
- Test voltage must not be higher than 1000 VAC!

Each device must be tested individually!

NOTICE

Risk of damage to the device if the high voltage test is carried out incorrectly!

Failure to follow the instructions for carrying out the high-voltage test may damage the appliance and invalidate the warranty.

- Always follow the instructions for carrying out the high voltage test!
-

6.4 Commissioning

6.4.1 Settings before commissioning

Determine the mechanical resonance frequency:

1. Load the vibratory conveyor with only one test part.
 2. Move slowly through the drive frequency with the aid of the SIGA.
 - At mechanical resonance, the test part has the highest speed.
 - Important: Two or more resonance points are possible!
 - The main resonance point is the one with the highest part speed.
-



In this state, the conveying speed is dependent on the damping, so that the output frequency must be set accordingly.

Setting the output frequency and delivery rate:

3. Set the output frequency on the SIGA to **approx. 1.5 Hz** deviating from the mechanical resonance frequency (forced oscillation).
 - This makes the conveyor system mechanically stable, and the conveyor speed remains constant even when the weight changes.
 4. Set the delivery rate via the setpoint (vibration force).
 - ⇒ The process is completed.
-

This concept guarantees:



- a multiplication of the efficiency through electricity recovery,
- high stability of the conveying speed,
- a significant simplification of the mechanical adjustment work.

The output frequency of the SIGA is stable.

6.4.2 Commissioning

Procedure for commissioning:

1. Before commissioning, check whether the rated voltage of the device matches the local mains voltage.
 2. Plug in the mains plug of the controller.
 3. Switch on the controller.
 4. Set the operating frequency of the vibratory feeder according to the setting instructions on the keypad.
- ⇒ The process is completed.

7 Operation

7.1 Safety instructions

NOTICE

Damage to the frequency controller!

If the controller plug is plugged in or unplugged from the vibratory drive when the controller is switched on, the controller may be damaged!

- Never connect or disconnect the device plug to the vibratory drive when the controller is switched on!
-

NOTICE

Damage to the controller due to incorrect control input!

If the load circuit is interrupted via a switch or relay, the controller may be damaged in certain applications if the wrong control input is used!

- For applications that require constant ON and OFF switching of the vibratory drive (e.g., accumulation shut-down, hopper control, etc.), the control input provided for this purpose must be used!
-



Observe the safety instructions in ➔ chap. 2 "Safety instructions" of this manual as well as the instructions in ➔ chap. 6.4.

7.2 Keyboard and displays



For reasons of simplification and standardization, the following sections describe how the task is performed using the keyboard.

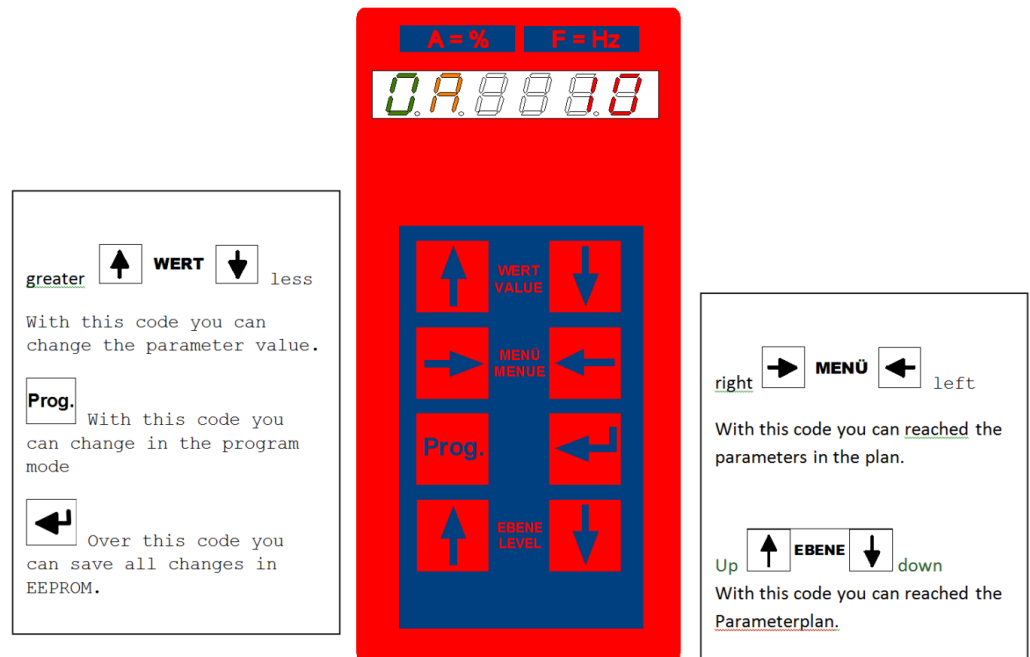


Fig. 6 SIGA keypad and display

7.2.1 Switch on the device

To adjust the controller, proceed as follows:

1. Check that the plug connection to the vibratory bowl feeder is correct.
2. Switch on the control unit with a mains switch.
 - After an initialization phase, the control unit is ready for operation.
 - The following messages appear one after the other on the display:



Here: SIGA system



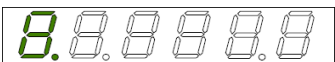

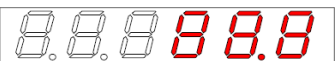

Day, month, year of compilation

3. If necessary, adjust the setpoint until the vibratory bowl feeder reaches the desired conveying capacity.
 - ⇒ The process is completed.



7.2.2 Display of the control unit



In principle, the six digits of the display are permanently defined for specific tasks.

Location	Display	Meaning
1		Digit 1 indicates the level (parameter block assigned to physical inputs and outputs) for which you want to configure the parameters
2; 3		Digits 2 and 3 indicate the parameter to be set
4; 5; 6		The digits 4, 5 and 6 indicate the value to be set at
point		Exception: Dot as symbol for programming mode

7.2.3 Parameter setting

Symbol	Description
	<p>Programming button</p> <ul style="list-style-type: none"> To change the value of a parameter, the system must be set to programming mode. Pressing this button once prompts the system to authorize changes. Some areas of the parameters are protected with a CODE and require further entries.
	<p>Save button</p> <ul style="list-style-type: none"> This button must be pressed once to save the changed values and after a mains ON/OFF. SAVE appears briefly on the display to confirm the saving process.

Notes on parameter settings:

The device parameters are set using eight buttons on the front panel of the controller. All parameter settings can be made via this control panel.

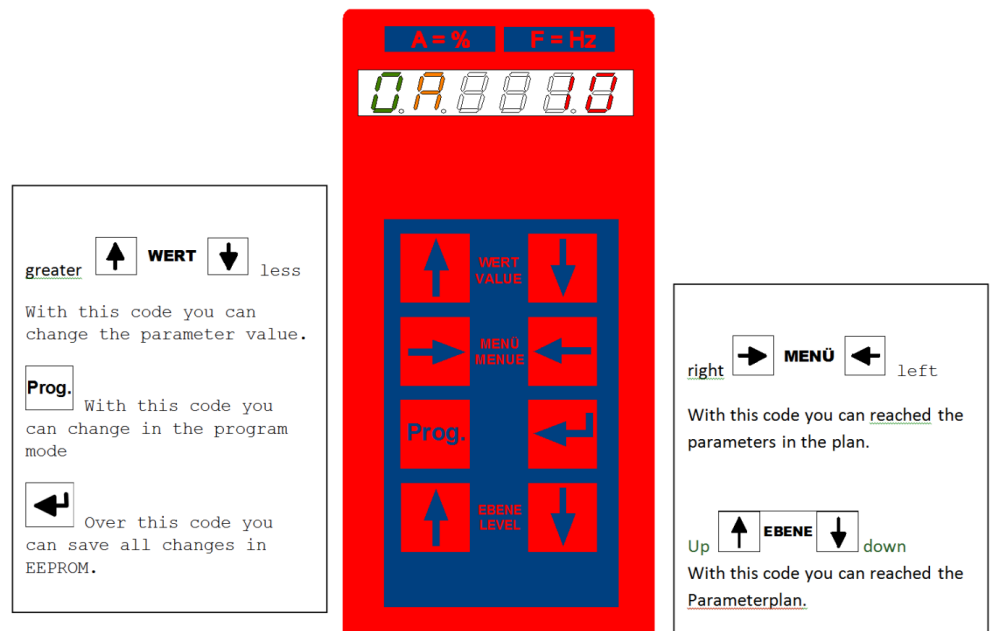


Fig. 7 SIGA keypad and display

Manual setting:

Briefly pressing the value buttons increases/decreases/changes the displayed value by one digit (one, tenth or letter).

Automatic setting:

If the buttons remain pressed, the system first switches to continuous operation and after 3 seconds to fast operation:


- The values increase/decrease/change automatically at different speeds.

Secure against unauthorized adjustment:

To prevent unintentional or unauthorized adjustment, the setting parameters are protected by a CODE except for the amplitude.

Saving the changed values:

Changed settings are not saved automatically. The settings are lost approx. 20 seconds after the last button movement.

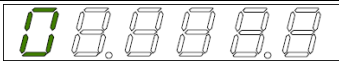

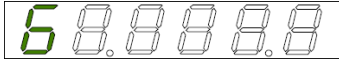

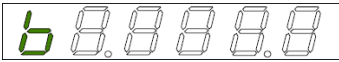

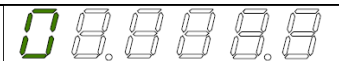

- The values must be saved after changing with the key .

7.3 Overview of parameter levels

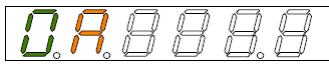
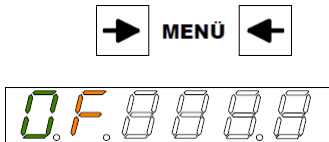
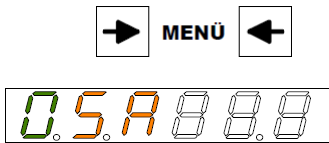
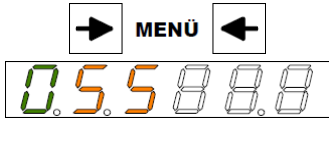
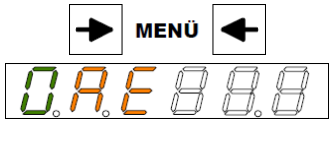


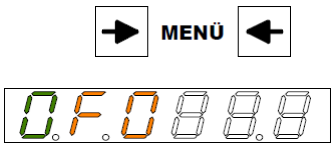
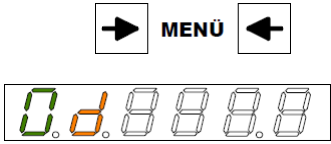
The following abbreviations are used in the following tables:

- **LO:** defines the logic level at the inputs or outputs. The state “0” is thus defined.
- **HI:** defines the logical level at the inputs or outputs. The state “1” is thus defined.


Level	Display	Explanation
0	 	Level 0 contains all adjustable parameters for the vibratory drive. A ; F ; SA ; SS ; AE ; F0 ; d
6	 	Level 6 contains all adjustable parameters for a sensor / PLC input. F1
b	 	Level b contains all adjustable parameters for the status of the vibratory drive used as an input. F1 ; S1 ; S2
0	 	Level 0. contains all adjustable parameters for defining the logical dependency of the vibratory drive on the controlling inputs. L ; E6 ; Eb

7.3.1 Parameter level 0

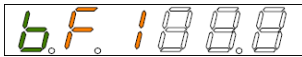
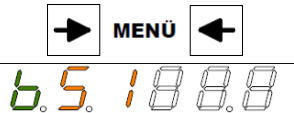

Parameter	Display	Explanation
A		Defines the amplitude (output voltage) as a percentage. Value between 10 and 99 in increments of 1. 10 = min. set output voltage. 99 = max. set output voltage.
F		Defines the oscillation frequency for the oscillating drive. Value adjustable between 20.0 and 99.9 in 0.1 increments 20.0 = 2400 oscillations/min 99.9 = 11988 oscillations/min. (independent of mains frequency)
SA		Defines the set soft start ramp of the vibratory drive. Value between 0.1 and 2.9 seconds; increment 0.1 seconds. After activation of the oscillating drive, the output voltage runs linearly from 0 V AC to the set amplitude value within the set time SA.
SS		Defines the set soft stop ramp of the vibratory drive. Value between 0.1 and 2.9 seconds; increment 0.1 sec. After deactivation of the oscillating drive, the output voltage runs linearly from the set amplitude value to 0 V AC within the set time SS.
AE		Defines the setpoint specification for the system. (Value can be set to P, U, I, F.) P = Specification via external potentiometer (recommended 10K linear) U = Specification external voltage 0-10 V DC I = Specificat. external current 4-20 mA DC F = Specification via own membrane keypad Important: If there are no external specifications for the connection, the system will no longer respond! External specifications should be programmed and specified.

Parameter	Display	Explanation
F0		<p>Defines the mode in which the vibratory drive should operate. Value adjustable to G and H.</p> <p>G = Full wave operation (El. oscillation - current - above and below the zero line) H = Half-wave operation (electrical oscillation - current - only on one side of the zero line, the other side is faded out)</p>
d		<p>Defines the mode in which the vibratory drive should operate. Value adjustable to 0; 1 and E.</p> <p>0 = Vibratory drive runs continuously. 1 = Vibratory drive is permanently stopped. E = Vibratory drive runs or is dependent on the control specifications (active programmed logic).</p> <p>The closer the actual value is to the programmed setpoint, the smaller the control deviation.</p>

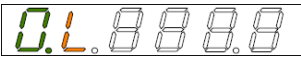
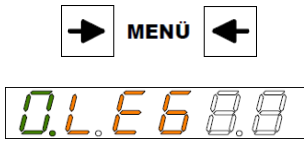
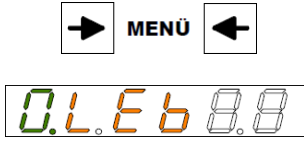
7.3.2 Parameter level 6 (rolling sequence of parameters)

Parameter	Display	Explanation
F1		<p>Defines a logic element with the valency S or O. The logic signal applied to the input is processed as follows according to the set valency (i.e., signal is inverted or not inverted):</p> <p>O = logical HI applied remains HI (not inverted). logical LO remains LO (not inverted).</p> <p>S = logic HI applied becomes LO (inverted). logically LO is applied HI (inverted).</p>

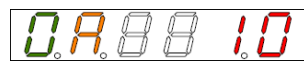
7.3.3 Parameter level b

Parameter	Display	Explanation
F1		<p>Defines a logic element with the value S or O. The logic signal applied to the input (logic LO when the vibratory drive is running, logic HI when the vibratory drive is stationary) is processed according to the set value as follows (i.e., signal inverted or not inverted):</p> <p>O = logical HI applied remains HI (not inverted). logical LO remains LO (not inverted).</p> <p>S = logic HI applied becomes LO (inverted). logically LO is applied HI (inverted).</p>
S1		<p>Parameter S1 has the value 0.0 to 9.9 seconds with a step width of 0.1 seconds and defines the set delay of the associated input as follows:</p> <p>Changing logic level from LO to HI not inverted by F1 only transfers the logic level HI to logic control after a set time, provided the logic level at the input does not change again.</p> <p>Times are restarted with every logic change.</p> <p>Release delay, F1 is programmed as O.</p> <p>Pull-in delay, F1 programmed as S</p>
S2		<p>Value 0.0 to 9.9 sec. with an increment of 0.1 sec., defines the set delay of the associated input as follows:</p> <p>Changing logic level from HI to LO not inverted by F1 only transfers the logic level LO to logic control after a set time, provided the logic level at the input does not change again.</p> <p>Times are restarted with every logic change.</p> <p>Changing logic level from HI to LO inverted by F1 only transfers the logic level HI to logic control after a set time, provided the logic level at the input does not change again.</p> <p>Times are restarted with every logic change.</p> <ul style="list-style-type: none"> ▪ Pull-in delay when F1 is programmed as O. ▪ Release delay if F1 is programmed as S.

7.3.4 Parameter level 0 (rolling sequence of parameters)

Parameter	Display	Explanation
L		<p>Parameter L specifies the logical connection of the selected inputs in relation to the vibratory drive.</p> <p>AND (U), OR (O), STAU (S) can be selected as the link.</p> <p>All programmable inputs offered by the software are available. The inputs that are to be actively linked must be labelled with 1 when selected.</p> <p>The inputs that are to be ignored must be labelled with 0.</p> <p>You will find the truth table of the links for 2 inputs at the end of the parameter description.</p>
LE6		<p>Parameter LE6 provides the option of selection. 0 -> Input signal E6 is not considered in the logic operation 1 -> Input signal E6 is considered in the logic operation</p>
LEb		<p>Parameter LEb (status of the oscillating drive) provides the option of selection.</p> <p>0 -> Input signal Eb is not considered in the logic operation.</p> <p>1 -> Input signal E6 is considered in the logic operation.</p>

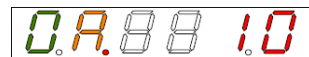
7.3.5 Amplitude setting



Original display



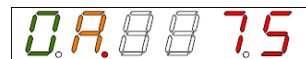
Press the key



Dot appears in second LED
Programming mode active
Amplitude can be changed



Set value



Example: Value set to 75



Press button, save change

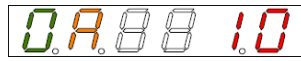


Confirmation that changes
were saved



If no button is pressed for 20 seconds, programming mode is exited, and the original display is shown without a dot.

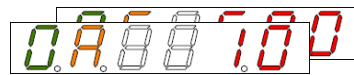
7.3.6 Frequency setting



Original display



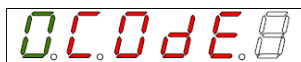
Press the button



Parameter Frequency set to 50.0 Hz is displayed.



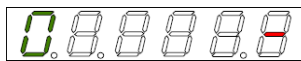
Press the button



The code input is expected



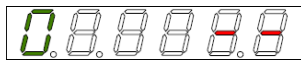
Press the button



Press the button



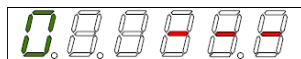
Press the button



Press the button



Press the button



Press the button



Press the button



a dot appears in the second LED
Programming mode active



the value can be set using the value buttons.



e.g., to 55.8 Hz



Press the button

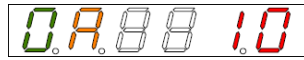


It is briefly displayed that the changes have been saved.



If no button is pressed for 20 seconds, programming mode is exited, and the original display is shown without a dot.

7.3.7 Setpoint setting



Original display



Press the button



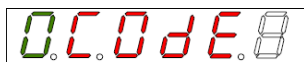
Parameter frequency set to 50.0 Hz is displayed.



Press the button



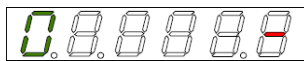
Press the button



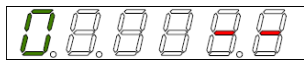
The code input is expected



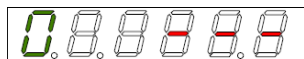
Press the button



Press the button



Press the button



Press the button



A dot appears in the second LED
Programming mode active.



The value can be set using the value buttons.

e.g. U for analogue voltage 0 - 10 V DC



Press the button

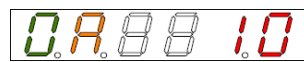


it is briefly displayed that the changes have been saved.



If no button is pressed for 20 seconds, programming mode is exited, and the original display is shown without a dot.

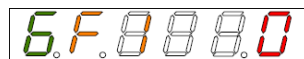
7.3.8 Invert control signal (here input E6)



Original display



Press the button



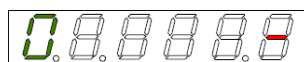
Press the button



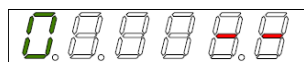
code input is expected



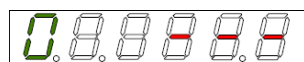
Press the button



Press the button



Press the button



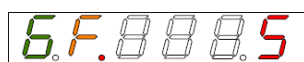
Press the button



a dot appears in the second LED
Programming mode active



the value can be set using the value buttons.



Control signal switched to NO contact.
LO signal at input E6 is further processed as HI signal.



Press the button



it is briefly displayed that the changes have been saved.



If no button is pressed for 20 seconds, programming mode is exited, and the original display is shown without a dot.

7.3.9 Remaining parameters

All other available parameters must be programmed in the same way as follows:

1. Moving to the parameter point.
2. Activate programming mode via CODE.
3. Change value.
4. Save.

7.4 Truth tables (examples)

Truth table for AND operation and F1 = O for E6 and Eb

Input E6	LO	HI	LO	HI
Input Eb	LO	LO	HI	HI
Output A0	running	running	running	off

Truth table for AND operation and F1 = S for E6 and Eb (F1 inverts the input signals)

Input E6	LO	HI	LO	HI
Input Eb	LO	LO	HI	HI
Output A0	stands	running	running	running

Truth table for OR operation and F1 = O for E6 and Eb

Input E6	LO	HI	LO	HI
Input Eb	LO	LO	HI	HI
Output A0	running	off	off	off

Truth table for OR operation and F1 = S for E6 and Eb (F1 inverts the input signals)

Input E6	LO	HI	LO	HI
Input Eb	LO	LO	HI	HI
Output A0	off	off	off	running

Truth table for STAU link and F1 = O for E6 and Eb

Input E6	LO	HI	LO	HI	LO	HI	LO	HI
Input Eb	LO	LO	HI	HI	LO	LO	HI	HI
Flag	LO	LO	LO	LO	HI	HI	HI	HI
Output A0	runni ng	running	runnin g	off	runni ng	off	off	off

Truth table for STAU link and F1 = S for E6 and Eb (F1 inverts the input signals)

Input E6	LO	HI	LO	HI	LO	HI	LO	HI
Input Eb	LO	LO	HI	HI	LO	LO	HI	HI
Flag	LO	LO	LO	LO	HI	HI	HI	HI
Output A0	off	running	running	running	off	off	off	off

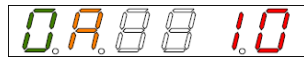


The flag is set to HI when two inputs are HI and is reset to LO when both inputs become LO again.

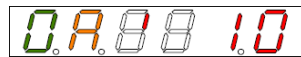
7.5 Status display of the inputs and outputs



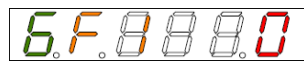
Only in display mode 1st parameter - point in the second LED is off / signal levels are inverted as soon as F1 is programmed as S.



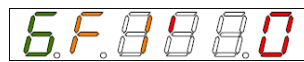
Drive running.



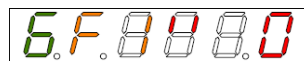
Drive stopped.



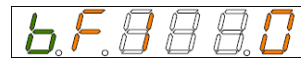
There is no signal at the sensor input. Signal level LO is processed further.



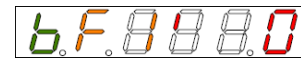
A signal is present at the sensor input. Signal level LO is processed further.



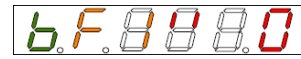
A signal is present at the sensor input. Signal level HI is processed further.



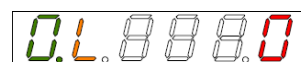
Drive running. Signal level LO is processed further.



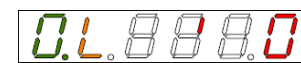
Drive stopped. Signal level LO is processed further.



Drive stopped. Signal level HI is processed further.



Drive running.




Drive stopped.

8 Fault elimination


8.1 Safety instructions



The safety instructions in  chap. 2 "Safety instructions" of these installation instructions and the safety instructions of the manufacturer of the frequency controller must be observed.

8.2 Fault causes and remedy

The following table contains an overview of fault causes and how to proceed to eliminate them.

Fault	Cause	Remedy:
Device does not work	<ul style="list-style-type: none"> ▪ Mains voltage incorrect / fuses defective ▪ Control signals incorrect 	<ul style="list-style-type: none"> ▪ Check mains voltage, check/ replace fuse if necessary ▪ Check control signals
Feeder does not perform	<ul style="list-style-type: none"> ▪ Incorrect oscillation frequency setting 	<ul style="list-style-type: none"> ▪ Check whether the correct oscillation frequency is set, readjust if necessary
Feeder vibrates too much, magnet strikes (unusual noises)  See warning below!	<ul style="list-style-type: none"> ▪ Incorrect setting of the oscillation frequency or amplitude ▪ Setpoint too high 	<ul style="list-style-type: none"> ▪ Check oscillation frequency and correct if necessary ▪ Correct setting
Magnet gets hot	<ul style="list-style-type: none"> ▪ Incorrect setting of the oscillation frequency 	<ul style="list-style-type: none"> ▪ Check oscillation frequency setting, correct if necessary
Control input does not work	<ul style="list-style-type: none"> ▪ Control voltage polarity reversed 	<ul style="list-style-type: none"> ▪ Check control voltage

NOTICE

Damage to the solenoid due to overheating / stop operation!

Excessive vibrations of the conveyor can damage the magnet due to overheating or stop operation!

- Avoid excessive vibrations of the conveyor at all costs!

9 Maintenance and repair

9.1 Safety instructions



DANGER

Risk of injury due to electric shock!

Work on the electrical system carried out unprofessionally can cause serious or fatal injuries.

- Work on the machine's electrical equipment may only be performed by skilled electrician or trained personnel under the supervision of a skilled electrician in accordance with all relevant electrical regulations.




Also observe the safety instructions in ↪ chap. 2 „Safety instructions“ in this manual.

9.2 Maintenance activities and maintenance intervals



The frequency controller is maintenance-free. Only the fuse needs to be replaced if necessary.

9.2.1 Maintenance point

No.	Maintenance point	Maintenance work	Interval	System [On/Off]	Remarks
1	Fuse	Check, replace if necessary 	As required	[Off]	-

- Replace the fuse as needed:

9.3 Spare and wear parts, repairs

Afag GmbH offers a reliable repair service. Defective devices can be sent to Afag for warranty repair within the warranty period.



Repair work may only be carried out by qualified personnel! We recommend that you have the repair carried out at our premises.

10 Decommissioning and disposal

The controller must be properly dismantled after use and disposed of in an environmentally friendly manner.

10.1 Safety instructions

WARNING



Risk of injury due to improper decommissioning and disposal!

Improperly carried out activities can result in considerable material damage and severe injury.

- Only use trained specialist personnel to carry out the activities.
 - Disconnect the media supply before dismantling the module!
 - Only remove module when the controller is switched off and secured!
-

10.2 Decommissioning

If the modules are not used for a longer period, they must be safely stored as described in [chap. 4.4](#).

10.3 Disposal

Appliances that are no longer usable should not be dismantled and recycled as a whole unit, but rather in individual parts and according to the type of material. Non-recyclable components must be disposed of appropriately.

NOTICE

Risk to the environment due to incorrect disposal of the frequencies!

Environmental damage can be caused by improper disposal.

- Electronic parts, electrical scrap, auxiliary and operating materials must be disposed of by approved specialist companies.
 - Information on proper disposal can be obtained from the responsible local authorities.
-

