

Operating Instructions  
Controllers  
for  
Vibratory Drive Systems  
ESK 2000

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## Declaration of Conformity

According to the Low-Voltage Directive 2014/35/EU  
and Electromagnetic Compatibility Directive 2014/30/EU

We hereby declare that the product meets the following requirements:

Applied harmonised standards:	Low-Voltage Directive 2014/35/EC Electromagnetic Compatibility Directive 2014/30/EU
	DIN EN 60204 T1 EN 61439-1

Note:

Rhein-Nadel-Automation  
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Managing Director  
Dr. Tobias Hensen



## 1. About this document



### **Attention**

Read this document carefully and observe the safety directives before commencing any work.

### **Document description:**

This document provides assistance in choosing your product. You will also find information on mechanical and electrical installation, operation, product extensions and accessories.

Non-observance may cause trouble with the product or the environment, reduce the product lifetime or lead to other damage.

## 2. Safety information

### 2.1. Design of safety directives



### **Notice**

This notice identifies useful tips for use of the controller.



### **Attention!**

This symbol identifies hazardous situations.

Non-observance of such warnings may cause irreversible injury or even death!

### 2.2. Fundamental safety directives

Non-observance of the following fundamental safety measures and directives may lead to severe injury and damage to property!

Meeting the requirements given in the related documentation is a precondition for safe and trouble-free operation and for achieving the product properties specified. Further additional safety directives in the other sections must be observed as well.

### 2.3. Personnel



### **Attention!**

Any work on electrical equipment of the machine/system shall be carried out exclusively by a professional electrician, or by instructed persons working under the direction and supervision of a professional electrician, according to electrotechnical rules.

Only qualified professionals are allowed to work on or with the product. IEC 60364 or CENELEC HD 384 define the qualification of these persons:

- They are familiar with set-up, installation, commissioning and operation of the product.
- They possess the qualification required for performance of their work.
- They know all regulations for the prevention of accidents, directives and laws applicable to set-up, installation and commissioning on site, and they are able to apply the same.
- They have knowledge and skills of First Aid.

## 2.4. Intended use

Please observe the following directives for intended use of the controllers:

- The devices herein described must only be stored, fitted and operated under the conditions specified in this documentation.
- Here you are not concerned with domestic devices! They are solely intended to be used as components for commercial or professional applications pursuant to EN 61000-3-2.
- They satisfy the protection requirements of 2014/35/EU: Low Voltage Directive.
- They do not constitute a machine as defined by 2006/42/EU: Machinery Directive.
- A machine comprising the product must not be commissioned or put into operation for the intended use until it has been declared to be in conformity with the EC Directive 2006/42/EU: Machinery Directive; Observe EN 60204-1.
- Commissioning or starting operation for the intended use is only permitted in compliance with the EMC Directive 2014/30/EU.
- Use of the product in living areas may lead to EMC disturbance. The user is responsible for taking interference suppression measures.
- They are optimised for operation of RNA bowl feeders and linear feeders. Observe the limits indicated in the technical specification.

### Attention!



- Prior to start-up make sure that the protective earth conductor is connected and in proper condition. Make the PE conductor test with approved test devices only.
- Never start up despite detected damage.
- Do not make any technical modifications to the device, except as described in this document.
- Never start up in an incompletely installed state.
- Never operate the device without the required guards in place.
- Connect, disconnect or change any electrical connections only in the absence of voltage.

## 2.5. Residual hazards

Residual hazards may remain even if all directives have been observed and protective measures taken. Such residual hazards must be considered by the user in the risk assessment of his machine/equipment. Non-observance may lead to severe injury and damage to property!

### 2.5.1. Device

Pay attention to the warning signs fitted to the device!

Symbol	Description
	<b>Hazardous voltage:</b> Prior to commencing any work on the product check for absence of voltage on all power connections.
	<b>Leakage current:</b> Make fixed installation and PE connection according to EN 60204-1!

### 2.5.2. Protection of the drive system

Certain device parameter settings may cause overheating of the connected drive magnet, e.g., due to prolonged operation with an incorrect voltage setting.

### 2.5.3. Degree of protection - Protection of persons and equipment

- All specifications relate to installed condition ready for operation.
- All slots not used must be closed by protection caps or dummy plugs in order not to reduce the protection against accidental contact.

### 3. Product information

#### 3.1. Characteristic features

The compact controller is designed for operation of a vibratory or belt feeder drive system.

The unit offers the following characteristic features:

- One feed rate output: Bowl feeder, linear feeder max. 10A, variable or AC capacitor motor max. 3A, not variable
- Two sensor amplifiers with independently adjustable timers (On/Off delay).
- External enabling input, 24 VDC
- Two relay outputs and two optocouplers for status messages and other links.
- Membrane keypad for setting and changing the operating parameters in the set-up menus.
- Plug-type connections for
  - Vibratory or belt feeder drive
  - Sensors
  - Communication with higher-level controller
- Bipolar main disconnect switch.

#### 3.2. EC conformity

The controller is compliant with the following standards:

**EC EMC Directive 2014/35/EU**

**EC Low-Voltage Directive 2014/30/EU**

Applied harmonised standards:

**DIN EN 60204, part 1**

**EN 61439-1**

The controller is also available in a UL/CSA compliant version.

#### 3.3. Technical data

<b>Mains voltage:</b>	230 V AC, 50/60 Hz, +20 / -15% 115 V AC, 50/60 Hz, +10 / -10%
<b>Output voltage:</b>	0 ... 208Veff; (230VAC in motor mode) at 230V supply voltage; 0 ... 98Veff; (115VAC in motor mode) at 115V supply voltage
<b>Load current:</b>	10 Aeff., in motor mode 3A
<b>Minimum load current:</b>	80 mA
<b>Internal fuse:</b>	F1 = 10A med.time lag
<b>Control-circuit fuse:</b>	2A med.time lag
<b>Soft start delay, soft stop delay:</b>	0 ... 5 sec. separately selectable
<b>External setpoint:</b>	0 ... 10V DC
<b>Sensor inputs:</b>	2
<b>Enabling input:</b>	24V DC (10-24VDC)
<b>Sensor supply:</b>	24V DC, max. 60 mA (per sensor input)
<b>Sensor ON delay:</b>	0 ... 60 sec. separately adjustable
<b>Sensor OFF delay:</b>	0 ... 60 sec. separately adjustable
<b>Outputs:</b>	2 relays (max. 6A 250VAC) 2 floating changeover contacts 2 normally-open contacts carrying supply voltage
<b>2 status outputs (optocoupler):</b>	2 optocouplers, max. 30VDC 10mA,
<b>Ambient temperature:</b>	0 ... 50° C
<b>Cooling:</b>	free convection
<b>Mounting:</b>	vibration-free
<b>Degree of protection:</b>	IP54
<b>Leakage current</b>	Less than 2mA
<b>Power loss</b>	max. 30W

### 3.4. Accessories

Tag	Designation	Type	RNA part No.:
XS1	Load connector	5-pin	31002323 (100Hz drive)
XS1	Load connector	5-pin	31002322 (50Hz drive)
XS3	Male connector	5-pole, straight	35051144
XS3	Male connector	5-pole, right-angled	35002546
XS4	Female connector	7-pole, straight	35051153
XS4	Female connector	7-pole, right-angled	35002545
For XS3	Y adapter		39905940

## 4. Notes on start-up

### Attention:

Make sure that following points are checked prior to making connection to power supply and switching on the controller:



Attention

- Is the controller casing properly closed with all screws tightened?
- Are all plug hooks engaged / firmly screwed in place?
- Are all cables and glands in proper condition?
- Is operation for the INTENDED USE made sure?
- Does the supply voltage specified on the controller match the local supply system?
- Does the supply frequency specified on the vibratory drive match the local supply system?
- Is the correct mode set on the controller? (See description under "Modes of Operation")
- Is sufficient cooling of the controller ensured?
- Is the controller mounting vibration-free?

Only if you can clearly answer all the above questions with "Yes" should the controller be put into operation.



Attention

### Attention:

Set the controller to minimum output before switching-on for commissioning or start-up after repairs or replacement of controllers/vibratory drives. Then check for proper operation while the output is increased.

### 4.1. Modes of operation

RNA vibratory drive systems employ mechanical spring vibrators which are set to a vibrating frequency near the mains frequency or near double mains frequency depending on weight and/or size.

This is why two modes of operation are possible:

Mode 1: Asymmetric half-wave mode:  
The vibrating drive operates at mains frequency.

Mode 2: Symmetric full-wave mode:  
The vibrating drive operates at double mains frequency.

To assist the operator the cable glands on the drive connector are colour-coded.

Mode 1: Black

Mode 2: grey

In terms of the vibrating frequency this means:

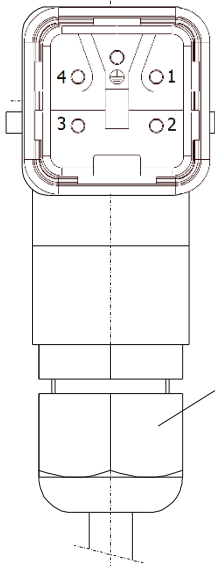
	Mains frequency 50 Hz	Mains frequency 60 Hz	Cable gland colour
<b>Mode 1</b> <b>Half-wave mode</b>	Vibrating frequency 50 Hz $\triangleq$ 3000 min <sup>-1</sup>	Vibrating frequency 60 Hz $\triangleq$ 3600 min <sup>-1</sup>	Black
<b>Mode 2</b> <b>Full-wave mode</b>	Vibrating frequency 100 Hz $\triangleq$ 6000 min <sup>-1</sup>	Vibrating frequency 120 Hz $\triangleq$ 7200 min <sup>-1</sup>	grey

## 4.2. Automatic mode change

Vibratory drive systems by RNA do not require the operator to take care of selecting the right operating mode. The operating mode is determined by a code in the RNA vibrating drive connector. A wire jumper from pin 3 to 4 in the connector switches the controller to mode 2: 100 or 120 Hz. In the absence of this wire jumper the controller operates in mode 1: 50 or 60 Hz.

The RNA vibratory drive systems come with the right code in the connector.

Mode changes are made only and exclusively via the coding in the vibrating drive connector.



### M20 gland

Black: 50/60Hz vibrating frequency  
Grey: 100/120Hz vibrating frequency

(EMC metal gland if frequency controllers are used.)

(Where frequency controllers with selectable output frequency are used, an EMC metal gland and a shielded cable are provided.)

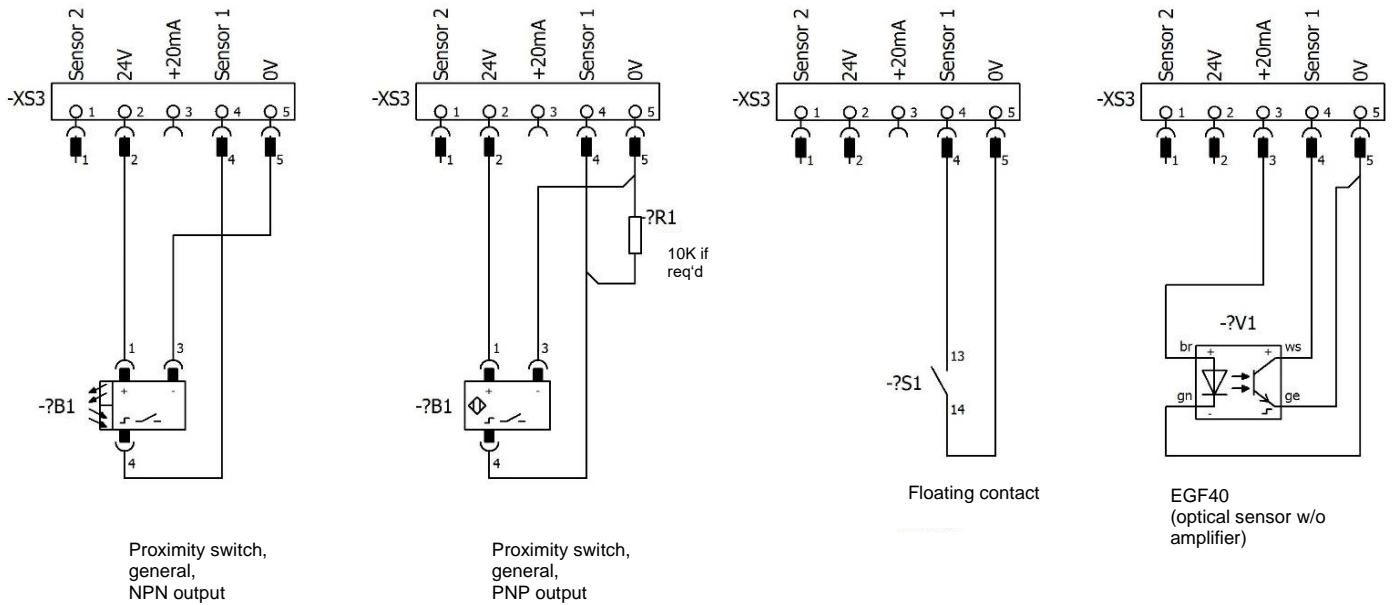
## 4.3. Sensor inputs and sensor linkages

Two sensor inputs are integrated into the controller. They enable you to implement accumulation checks, level checks, cycle monitoring and other monitoring tasks. The following basic assignments are made: Sensor input 1 acts on channel 1, unless otherwise programmed in menu C006. Sensor input 2 is provided for additional functions, see sensor linkage. The sensor inputs can be evaluated only if they are activated in codes C004, C005. For sensor connection (connector XS3) please refer to the connection diagram.

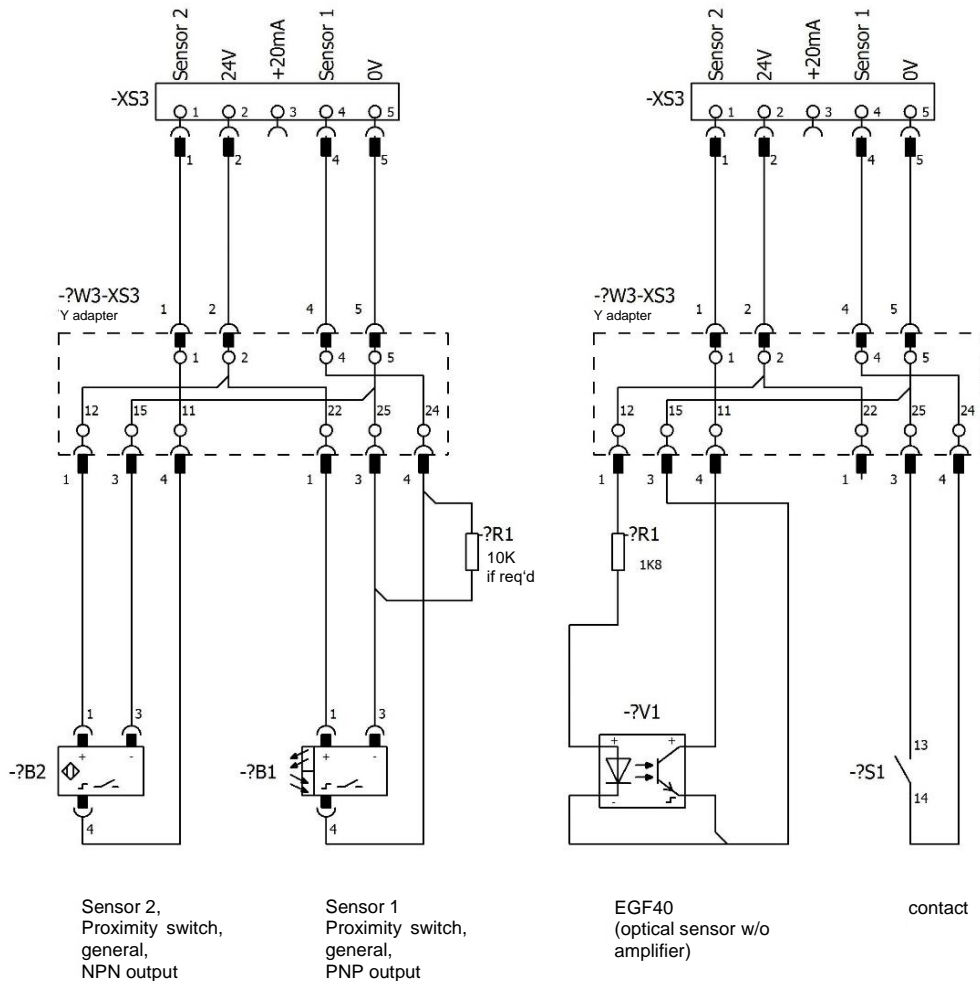


#### 4.4. Sensor connection

The controller has two sensor inputs which can be used for accumulation checking and/or level monitoring purposes. You can connect sensors of type NPN or PNP.



PNP switching sensors may require a 10K resistor between sensor output and 0V.



Connection of 2 sensors via Y adapter

## 4.5. Status outputs and relays

The status outputs are used for remote diagnostics of the controller status or of the links of several controllers with one another. They are designed as freely available NPN-doped transistor circuits and they are floating. With the status output **READY** the transistor circuit is switched through whenever the controller is connected to power supply and switched on by its power switch closed.

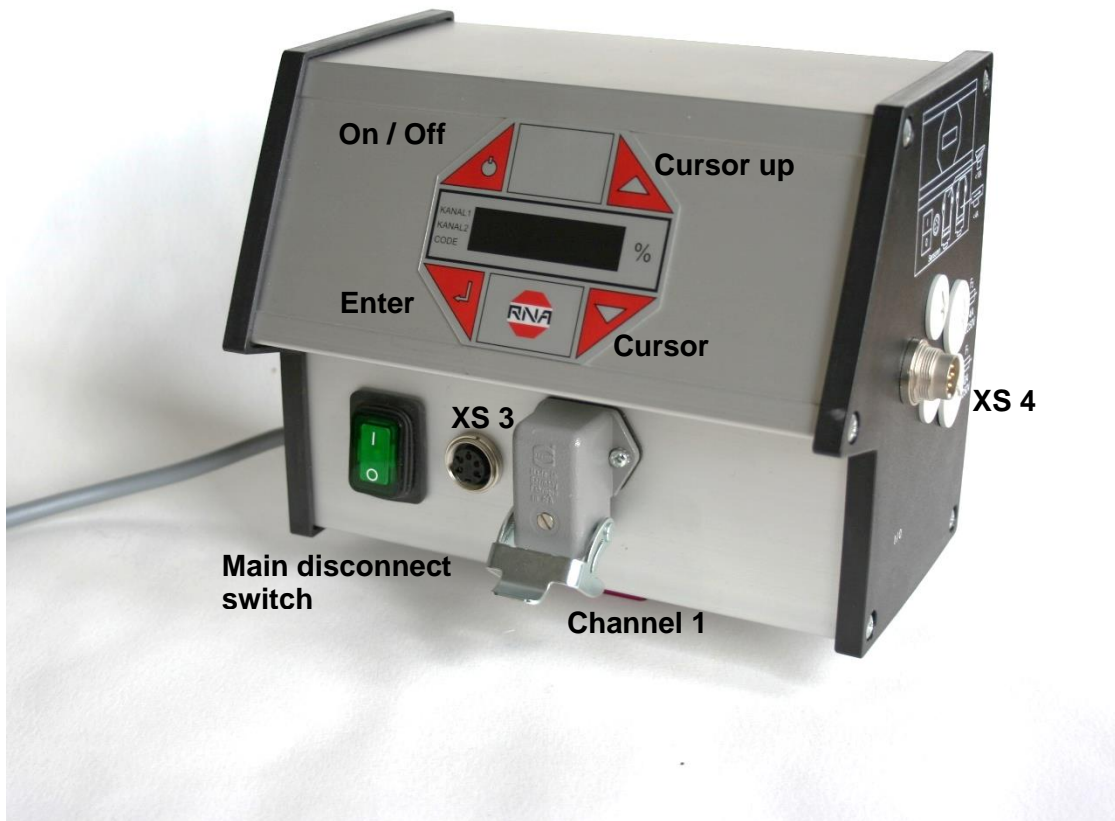
The status output **ACTIVE** requires the same conditions for switching-through as "READY". In addition, channel 1 must be operating actively, the transistor blocks in case of ACCUMULATION, OFF or STOP.

The status outputs and inputs as well as the external enabling input are to be wired via plug connector XS4. The two relays have different functions. K1 operates as a status relay parallel to the **ACTIVE** status output. K2 serves either for a blowing air switch-off delay (4 sec.) or for cycle monitoring of one of the two sensor channels.

Connections and cable entry are located on the right side panel of the controller. The terminal block is located behind the controller side panel.

## 5. Operation





### 5.1. General



### Controller plug connections

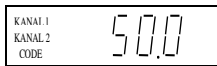
Main disconnect switch	Double-pole isolation of the controller from power supply
XS 3	Connector for sensors
Channel 1 (XS1)	Connector for bowl feeder or linear feeder or motor (<10A)
XS 4	Connector for optocoupler outputs and external enabling input

## The controller display (membrane keypad)

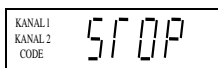
	<p><b>On / Off</b> Pressing this button switches off all connected devices. The display shows "OFF". The controller remains ready for operation.</p>
	<p><b>Cursor up and cursor down</b> Use these buttons to scroll through the controller menu or set the parameters.</p>
	<p><b>Enter</b> Press this button to acknowledge the parameters entered with the cursor.</p>
	<p><b>Decimal point in the display</b> The decimal point is not blinking. You cannot make any entry.  The decimal point is blinking, an entry can be made.</p>

### 5.2. Starting-up the controller

To start up the controller, close the main disconnect switch. The main menu appears on the display showing the last setpoint entered (feed rate of the vibratory feeder or linear feeder).



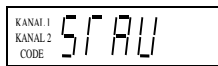
Alternatively, the following may appear on the display depending on the switching status of the device:



External enabling signal has been activated but it is withdrawn from the device at the moment. (medium priority)



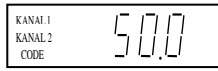
Device has been switched off by operating the top left button of the membrane keypad, inhibiting all functions. (high priority)



The accumulation monitoring sensor is operated, switching off the vibratory drive. (low priority)

### 5.3. Main menu / Setpoint entry and display

**Display of setpoint or feed rate  
(vibratory feeder)**  
**Alternatively: STOP, OFF or AC-  
 CUMULATION (see above)**



No entry possible ,



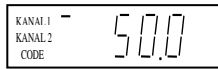
**Entry of the codes to change or  
 execute the required settings.**



**Enter code.**  
 Description of codes  
 see under 4.4.



**Setpoint entry for channel 1  
 (bowl feeder or linear feeder)**



Entry in %; return to  
 display mode for  
 saving



Use the cursor buttons (UP/ DOWN) to scroll through these three basic screens of the main menu. In each individual item of the main menu you can press ENTER to activate this item for setting or changing. Upon pressing of the ENTER button the decimal point starts blinking. Now you can make changes using the cursor buttons (UP/DOWN). Press ENTER again to acknowledge the entries made. The decimal point is no longer blinking. Using the cursor buttons you can continue scrolling in the menu. Same procedure analogously applies to the code menus described below.

All the following display screens show the default setting. If the actual indication on the controller differs from what is shown here, the default setting has been changed in individual codes to suit a specific application.

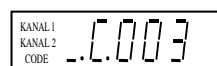
## 5.4. Description of individual codes for controller programming.



### Settings for channel 1

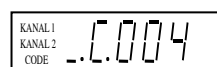
In this sub-menu you can set or limit the following functions for channel 1:

- Vibrating amplitude
- External enabling, signal direction of external enabling input
- Soft start and stop delay
- Selection of vibratory or belt feeder drive



### Sealing a setpoint

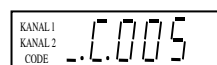
In this sub-menu you can lock the setpoints (vibrating amplitude) of the main menu. It is no longer possible to change the setpoints for channel 1 in the main menu. This avoids accidental changes to performance parameters. You can only make any changes now through code C001.



### Setting the sensor input 1

This is the sub-menu for activation of sensor input 1. In addition you can set the following functions:

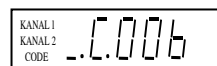
- Invert input signal direction
- Start delay
- Stop delay



### Setting the sensor input 2

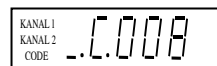
This is the sub-menu for activation of sensor input 2. In addition you can set the following functions:

- Invert input signal direction
- Start delay
- Stop delay



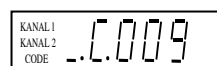
### Choosing the sensor links

In this sub-menu you can link the sensors activated by codes C004 and C005 with one another.



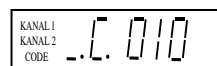
### Setting the cycle watchdog

Here you can set which sensor input is to be monitored and how the controller is to react to an error.



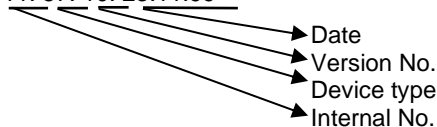
### Show status

This sub-menu serves for checking of the set vibrating frequency and of the sensor inputs.



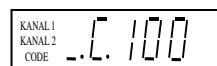
### Calling-up the software version

Definition: 411. 57. 10. 23.11.99

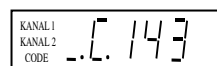


Device type:

59 = ESK 2001  
58 = ESG 2001  
57 = ESK 2000  
56 = ESG 2000

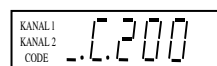


Setting the feed rate by external voltage input 0-10V or potentiometer



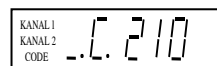
### Saving parameters

You can save the (application-specific) settings previously made in various sub-menus under code 143.



### Inhibiting all setting functions

With the aid of this code you can disable all input facilities of the controller. It is no longer possible to change any values. The only way now to enable the menu again is through this code.



### Retrieving parameters

Inn this sub-menu you can return the controller to the default settings. You can also return to application-specific settings, if previously saved.

## 5.5. Application-specific changes to default settings

### 5.5.1. Code C001 feed rate output

**Objective:** Setting and limiting the vibration amplitude, external enabling, soft start delay and soft stop delay.

<b>Select code</b>					Set code	
<b>Code C001</b>						
<b>Set vibrating amplitude</b>					0 - 100 %	
<b>Limit vibrating amplitude</b>					50 - 100 % (*)	
<b>External enabling signal</b>					1 = active 0 = not active	
<b>External enabling signal direction</b>					1 = Start = 24V DC 0 = Stop = 24V DC	
<b>Soft start time</b>					0 - 5 sec.	
<b>Soft stop time</b>					0 - 5 sec.	
<b>Select vibratory drive or belt drive</b>					0 = vibratory drive 1 = belt drive	
<b>Return</b>					Save and return to main menu	

(\*) For RNA feeders with 200 V magnets = 90 %

### 5.5.2. Code C003 Seal setpoint

**Objective:** Sealing-in the setpoints in the main menu. A direct change of the values is no longer possible. You can only make changes now through code C001.

<b>Select code</b>					Set code	
<b>Code C003</b>						
<b>Setpoint (vibrating amplitude)</b>					1 = adjustable 0 = input inhibited	
<b>Return</b>					Save and return to main menu	

### 5.5.3. Code C004 sensor input 1 and code C005 sensor input 2

**Objective:** Activating and setting the sensor inputs






<b>Select code</b>							Set code	
<b>Code C004</b>								
<b>Sensor 1 input</b>							I = active 0 = not active	
<b>Invert input signal direction</b>							I = Start = 24V DC 0 = Stop = 24V DC	
<b>Delay of sensor status CLEAR, Start delay</b>							0 - 60 sec.	
<b>Delay of sensor status OPERATED, Stop delay</b>							0 - 60 sec.	
<b>Return</b>							Save and return to main menu	






Same applies analogously to code C005 (sensor input 2).

### 5.5.4. Code C006 Sensor linkage


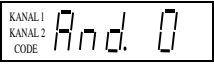





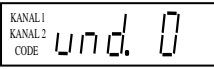





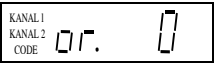





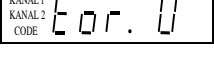





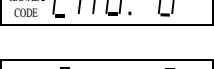





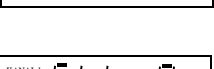





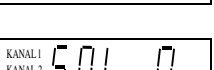





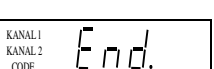







**Objective:** Linking of the two previously activated sensor inputs.

**Select code**     **Set code** 

**Code C006**   



You can activate only one of the eight sensor links.

<b>Logic <u>with</u> blowing-off the exit tracks</b>						I = active 0 = not active	
<b><u>AND</u> logic <u>without</u> blowing off the exit tracks</b> <i>(Version No. 10 and higher)</i>						I = active 0 = not active	
<b><u>OR</u> logic</b>						I = active 0 = not active	
<b><u>Min/Max</u> logic</b>						I = active 0 = not active	
<b><u>AND / S2</u> logic</b> <i>(Version No. 10 and higher)</i>						I = active 0 = not active	
<b>Level check with external controller</b>						I = active 0 = not active	
<b>Level check with indicator light</b>						I = active 0 = not active	
<b>Individual link</b>						I = active 0 = not active	
<b>Return</b>						Save and return to main menu	

#### Brief description of individual links

AND logic of the two sensor inputs with blowing-off the exit tracks.

Example:

Application:	Twin-track feeders with accumulation checker.
Solution:	Track 1 (sensor 1) full = Blow-off track 1 (relay K1) Track 2 still clear Track 2 (sensor 2) full = Blow-off track 2 (relay K2) Track 1 still clear Track 1 + Track 2 full = Bowl feeder (channel 1) Stop about 4 sec. later blowing air stop





**AND** logic of the two sensor inputs without blowing-off the exit track. Bowl feeder (channel 1) stops when both sensors are operated. Orienting air can be switched off with delay (4 sec.) via relay K2.

---



**OR** logic of the two sensor inputs.  
Bowl feeder (channel 1) stops when one of the two sensors is operated. Orienting air can be switched off with delay (4 sec.) via relay K2.

---



**Min/Max** logic of the two sensor inputs.

The bowl feeder stops when both sensors are operated. The vibratory feeder (channel 1) will re-start only after both sensors are cleared again.

Relay K1 operates on stopping of bowl feeder. Relay K2 operates 4 sec. later (stopping the blowing air)

---



**AND / S2** logic

Bowl feeder (channel 1) stops when both sensors are operated. It starts when sensor 2 is cleared again. Orienting air can be switched off with delay (4 sec.) via relay K2.

---



**Level check for hoppers with external hopper control**

Sensor 2 operates relay K1 following the delay period entered (C005).

When sensor 1 is operated, relay K1 drops out (hopper interlock).

Application:   Sensor 1 = accumulation check;  
                  Sensor 2 = level check;  
                  Relay K1 = hopper control

---



**Level check with indicator light**

Sensor 2 operates relay K1 following the delay period entered (C005).

Application:   Sensor 2 is used as a level checker (e.g., LC-N 24V DC).  
                  Relay K1 operates an indicator light: *Bowl feeder or linear feeder empty.*

---

### 5.5.5. Code C008 cycle monitoring

**Objective:** Monitoring of sensors 1 (accumulation check) and/or 2.

When activating the cycle monitoring function, the "AND, SOL" links in code C006 must not be activated!!!

<b>Select code</b>							<b>Set code</b>	
<b>Code C008</b>								
<b>Sensor input 1 is monitored</b>							I = active 0 = not active	
<b>Sensor input 2 is monitored</b>							I = active 0 = not active	
<b>Monitoring depending on channel 1</b>							I = active 0 = not active	
<b>Time till alarm comes up</b>							3 - 240 sec.	
<b>Switching off channel 1</b>							I = see below 0 = see below	
<b>Switch</b>							I = Alarm on relay K1 0 = Alarm on relay	
<b>Return</b>							Save and return to main menu	



The cycle watchdog monitors the CLEAR sensor status. The time (A 180) sets the maximum duration for which a sensor is allowed to be clear before an alarm message is generated. In case of an alarm the relay K2 is clocked on and off. Reset takes place automatically when the sensor is operated again.



If OUT = 1 the alarm operates relay K2 (indicator light: Error) and also stops the bowl feeder or linear feeder. An ERROR message appears on the panel display. Use the bottom right cursor button for reset.  
If OUT = 0 the alarm only operates relay K2 (indicator light: Error). Reset takes place automatically when sensor 1 is operated.



If A.I. = 1 relay K1 is clocked on and off in response to the alarm (switching from relay K2 to relay K1).

### 5.5.6. Code C009 Show status

**Objective:** Checking of the set vibrating frequency and of the sensor inputs.

<b>Select code</b>					<b>Set code</b>	
<b>Code C009</b>						
<b>External enabling signal</b>					I = active 0 = not active	
<b>Channel 1</b>						
<b>Channel 1 vibrating frequency</b>					I = 50 Hz 0 = 100 Hz	
<b>Signal at sensor input 1</b>					I = active 0 = not active	
<b>Signal at sensor input 2</b>					I = active 0 = not active	
<b>Return</b>					<b>Save and return to main menu</b>	



Under menu item HA = half wave you can check whether the correct operating mode (50/60Hz or 100/120Hz) is set.

### 5.5.7. Code C200 Inhibiting all code entries

**Objective:** An (accidental) change of the set values by the user is not possible any more.

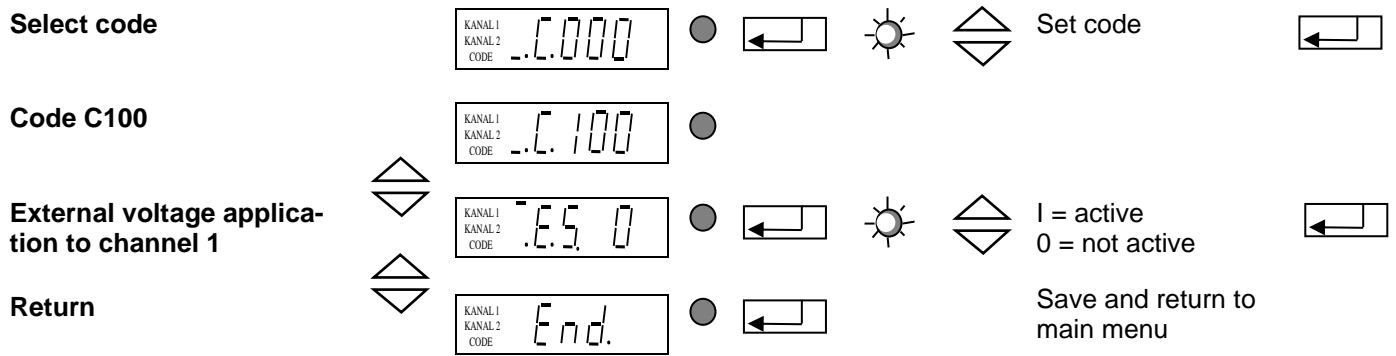
<b>Select code</b>					<b>Set code</b>	
<b>Code C200</b>						
<b>Inhibiting the setting functions</b>					I = enable 0 = disable	
<b>Return</b>					<b>Save and return to main menu</b>	



Only code C200 is accepted!!!  
You can change the setpoints for channels 1 and 2 in the main menu (see under 4.3).

### 5.5.8. Code C100 Setting the feed rate by external voltage input.

**Objective:** Setpoint change by external voltage



If external voltage application is activated the last digital feed rate set (%) constitutes the minimum feed rate for 0 volt. Set the maximum feed rate for 10 volt by the P parameter in C001.



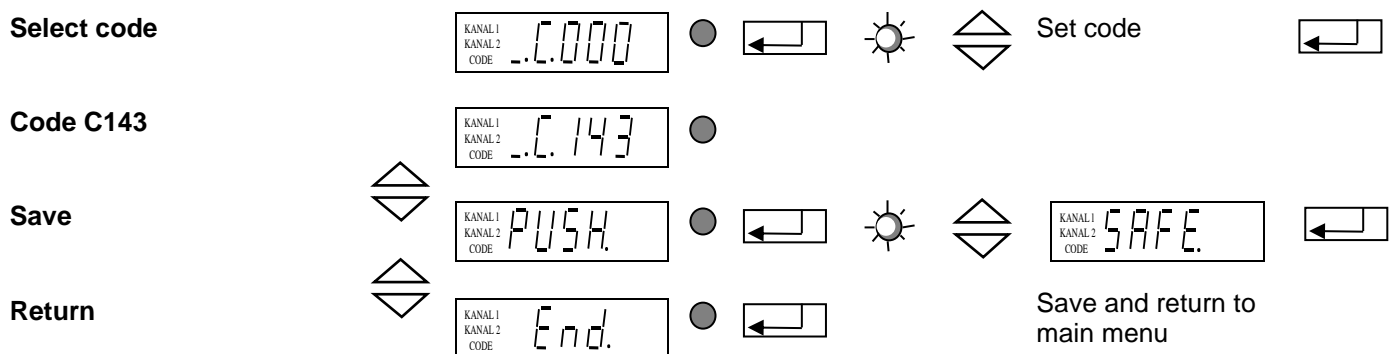
Connect the external voltage to terminals 31, 32 and 33 in the controller.  
You find the terminals behind the right-hand side panel.  
Terminal 31 = +10V  
Terminal 32 = E  
Terminal 33 = 0V



**Attention!**  
Before opening the device be sure to observe the safety directives in chapter 2.

### 5.5.9. Code C143 Saving parameters

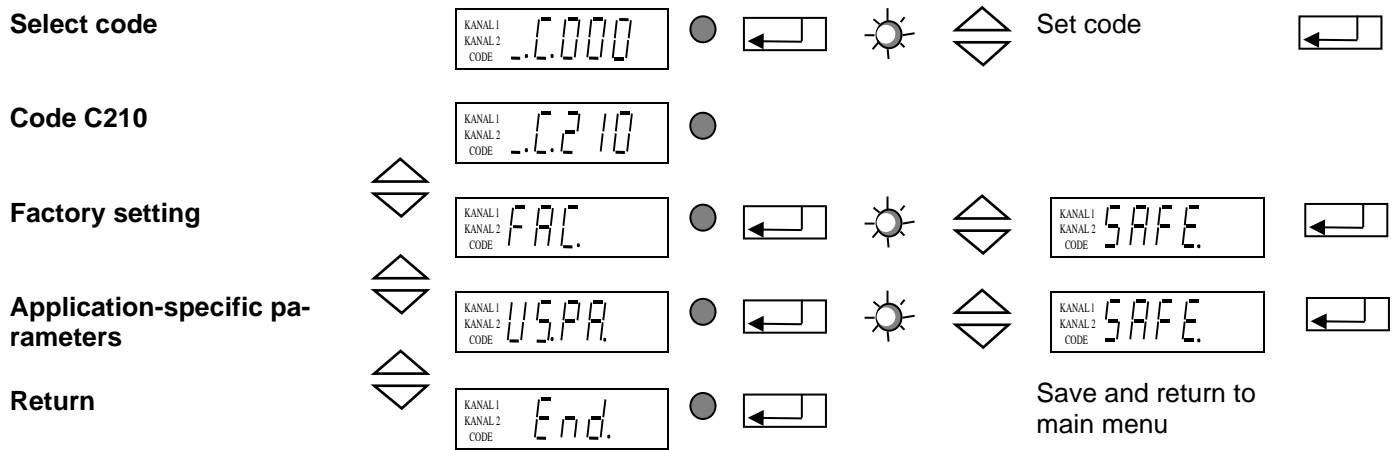
**Objective:** Saving of application-specific parameters



Having pressed ENTER to acknowledge PUSH you can save the selected parameters separately by pressing a cursor button.

### 5.5.10. Code C210 Retrieving parameters

**Objective:** Resetting to default values or retrieving stored application-specific settings



**FAC:** Select and acknowledge FAC to reset the controller to the factory default settings.

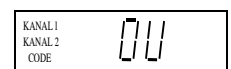
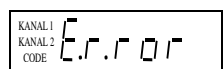


**US.PA.:** Select and acknowledge US.PA to retrieve the application-specific set of parameters previously saved under C143.

## 6. Error message

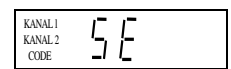
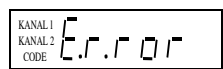
If a fault occurs during operation the controller switches itself off automatically and the display alternates between blinking ERROR and an error message. Power down and power up to reset.

### Overvoltage cut-out



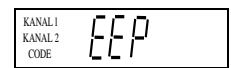
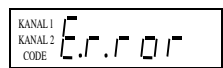
The supply voltage is or was too high. Check supply voltage. This error message is often caused by transient mains voltage peaks (e.g. by switching of inductive consumers). Install upstream filter, use other circuit, eliminate inductance, as necessary.

### Sensor timeout



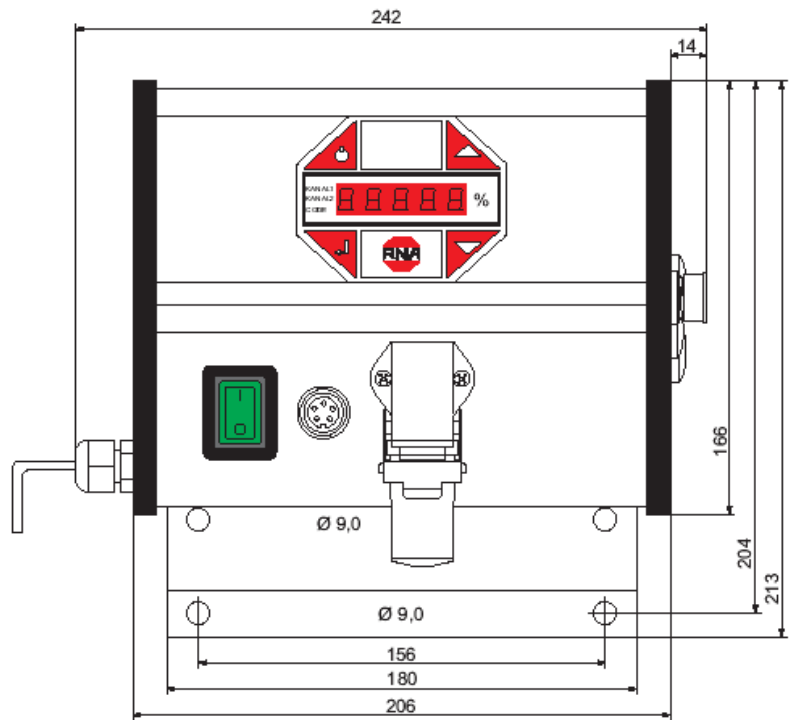
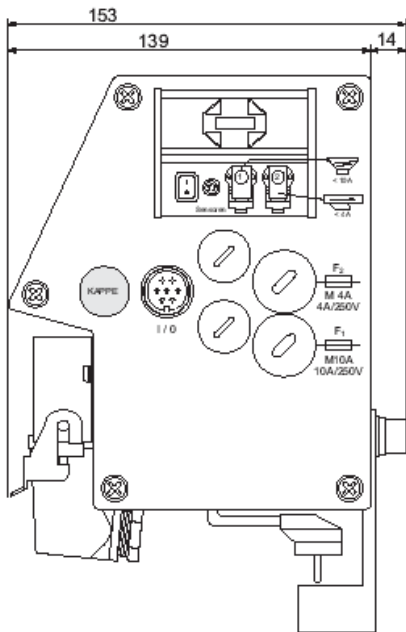
Response of the set cycle watchdog. Remove the product flow malfunction. See code C008 cycle monitoring.

### Memory error



Repair required

# 7. Dimensioned drawing







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