

## Operating Instructions

Controller  
for vibratory drive systems

ESR 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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## 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 directives

### 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 vibratory 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.
	Leakage current: Make fixed installation and PE connection according to EN 60204-1!

### Attention



Before opening the controller, pull the mains plug and wait for the periods shown below, allowing the DC link circuit capacitors to discharge down to a safe voltage level.

#### Discharge period:

**ESR 2000**

**5 minutes**

### 2.5.2. Drive protection

Certain device parameter settings may overheat the connected drive magnet, e.g., by prolonged operation with the wrong voltage.

### 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 bowl feeder or linear feeder. The unit offers the following characteristic features:

- Power controller for vibrating drive systems with variable output frequency, load current max. 6A
- 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
  - Bowl feeder or linear feeder
  - Sensors
  - Communication
- 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**

### 3.3. Technical data

<b>Supply voltage:</b>	230 V AC, 50/60 Hz, +15 / -15% 115 V AC, 50/60 Hz, +10 / -15%
<b>Output voltage:</b>	0 ... 208 V <sub>eff</sub> / 230 VAC; 0 ... 98V <sub>eff</sub> / 115VAC
<b>Load current, max.:</b>	6 A <sub>eff</sub>
<b>Load current, min.:</b>	80 mA
<b>Output frequency</b>	30 to 140 Hz
<b>Internal fusing:</b>	F1 = 10 AmT
<b>Soft start delay, soft stop delay:</b>	0 ... 5 sec. separately adjustable
<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 250V AC) / 2 floating changeover contacts, 2 normally-open contacts carrying supply voltage
<b>Status output:</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>	IP 54

### 3.4. Accessories

Marking	Designation	Type	RNA Part No.:
XS1	Load connector	5-pin (EMC)	31002329
XS3	Coupling plug	5-pin, straight	35051144
XS3	Coupling plug	5-pin, angular	35002546
XS4	Coupling socket	7-pin, straight	35051153
XS4	Coupling socket	7-pin, angular	35002545
For XS3	Y adapter	for connection of 2 sensors	39905940

### 3.5. Starting preparations

Bowl feeders and linear feeders, due to their mechanical design, can only be protected against damage by operating them in a proper way.

This is why the electrical operating conditions must be adapted to the vibrating system. The following table shows the variable safe operating ranges for the complete RNA product range.



#### Attention:

Uniform weight distribution on the bowl (balancing) is a prerequisite for a consistent and stable feed rate. A well balanced spring package is described in detail in the operating instructions for the **vibratory feeder**.

Table 1

Vibratory feeder drive type	Max. load current [ $A_{eff}$ ]	Max. air gap on magnet [mm]	Frequency range	Magnet body colour
SRC - N 160 - 2	0.6	0.5	90...120 Hz	black
SRC - N 200 - 2	1.2	0.5	90...120 Hz	black
SRC - B 200 - 2	1.2	0.5	90...120 Hz	black
SRC - N 250 - 2	2.6	1.2	90...120 Hz	black
SRC - B 250 - 2	2.8	1.2	90...120 Hz	black
SRC - N 400 - 1	3.8	2.8	45...60 Hz	red
SRC - N 400 - 2	4.3	1.2	90...120 Hz	black
SRHL 400 - 1	5.7	2.8	45...60 Hz	red
SRHL 400 - 2	5.3	1.5	90...120 Hz	black
SRC - N 630 - 1	5	2.8	45...60 Hz	red

Table 2

Linear feeder drive type	Max. load current [ $A_{eff}$ ]	Max. air gap on magnet [mm]	Frequency range	Magnet body colour
SLL 175	0.07	0.8	90...120 Hz	black
SLL 400	0.6	1	90...120 Hz	black
SLL 800	1.4	3	45...60 Hz	red
SLL 804 <1600	1.4	3	45...60 Hz	red
SLL 804 ≥1600	2.8	3	45...60 Hz	red
SLF 1000	2.6	2.5	45...60 Hz	red
SLF 1500	2.6	2.5	45...60 Hz	red
GL 01	0.6	1.0	90...120 Hz	black
GL 1	1.1	1.2	90...120 Hz	black
SLK - N 6	1.4	2.5	45...60 Hz	red
SLK - N 6 G	1.4	2.5	45...60 Hz	red

RNA feeders have connecting cables of different colours for ease of distinction between vibrating frequencies.

Cable colour	Mains frequency mode	Variable frequency mode
Black	50/ (60) Hz	45...60 Hz
Grey	100/ (120) Hz	90...120 Hz



**Attention:**

Make sure that the maximum values of load current and magnet gap are observed because otherwise there is a risk of damage to feeder or controller!

**3.5.1. Commissioning**



**Notice:**

For smooth commissioning RNA offers an adapter of type ESZ 01 which can be plug-connected between controller and feeder without any installation work. The adapter comprises measuring devices for load current and coil voltage as well as a disconnect switch.

When a bowl feeder is delivered complete with ESR 2000 controller the operating parameters are already set to suit the bowl feeder and stored in the 143 USER – 0 parameter. All settings can be retrieved from the RNA archive.



**Attention:**

Improper start-up of a feeder after conversion, controller replacement or mechanical modification creates the risk of damage to springs, vibratory units, orienting devices or carryover devices.

**3.5.2. Controller set-up to suit a vibratory feeder**

**Procedure:**

1. Read frequency range and max. load current from rating plate of the vibratory feeder. (See tables 1 and 2.)
2. Connect controller to power supply and switch it on **without** vibratory feeder.

**3. Select code 001:**

Select code Set code

Code C001

**4. Set amplitude at 50 %:**

Set vibrating amplitude 0 - 100 %

**5. Set frequency to the highest value for the vibrating drive from table 1 or 2:**

Vibratory drive operating frequency 45 - 120

**6. Save the setting:**

Return Save and return to main menu

7. Switch off the controller
8. Connect bowl feeder to the controller
9. Switch on the controller



**The bowl feeder must now be vibrating!**



10. Select code 001 again as described above.

Select code

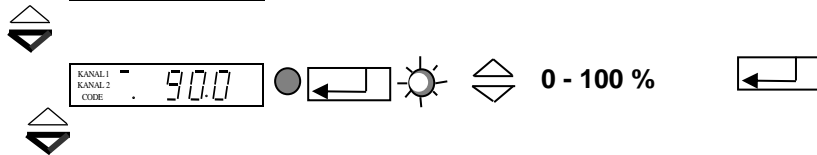


Code C001



11. Increase amplitude to 90 %:

Set vibrating amplitude



12. Reduce the vibrating frequency until the required feed rate is obtained.

Vibratory drive operating frequency



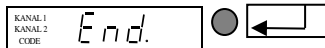
13. Check the load current; it must not exceed the maximum value!



The RNA - plug-in adapter ESZ-01 greatly facilitates start-up and, in particular, determination of the load current.

14. Save the operating parameters chosen


Return



Save and return to main menu

If you are not sure whether the controller is in the factory default setting, select menu C210 "Retrieve parameters" as described under 4.5.10 to call up the default setting.

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**Attention:**  
 In case of bumping of the bowl feeder during commissioning (very loud metallic noise):  
**Stop the controller immediately!**  
 Commissioning without observing the above measures creates the risk of destroying the feeder or parts thereof. This would void any warranty!

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After successful commissioning you can activate the sensor amplifier and set the delay periods and soft start/stop times, if required.

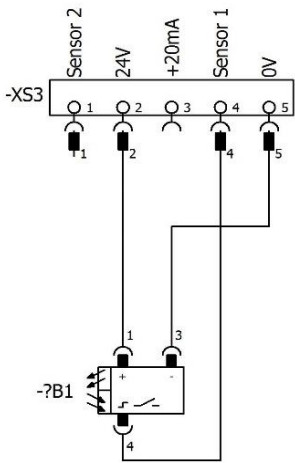
### 3.6. Sensor inputs and sensor linkages

The controller has two sensor inputs which are used for accumulation checking, level checking, cycle monitoring and other monitoring functions. The following basic assignments are made:

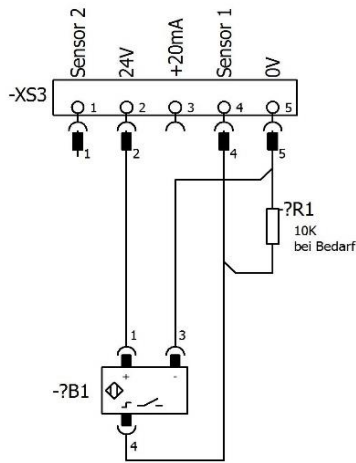
Sensor input 1 acts on channel 1, unless otherwise programmed in menu C006. Sensor input 2 is provided for additional functions, see sensor linkage. The sensor inputs can be evaluated only if they are activated in codes C004 and C005. The connection diagram is shown in the sensor plug connector (XS3).

### 3.7. Sensor connection

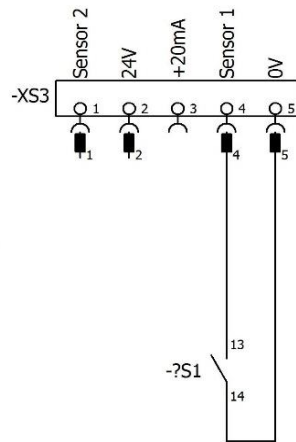
The controller has two sensor inputs which can be used for accumulation checking and/or level monitoring purposes. You can connect sensors of type NPN or PNP.



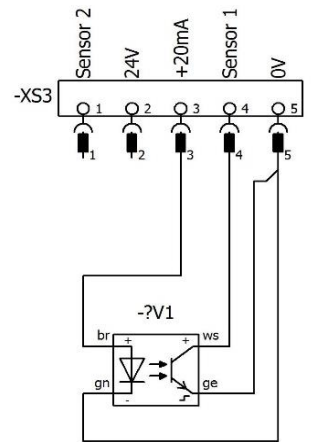
Proximity switch General NPN output



Proximity switch General PNP output

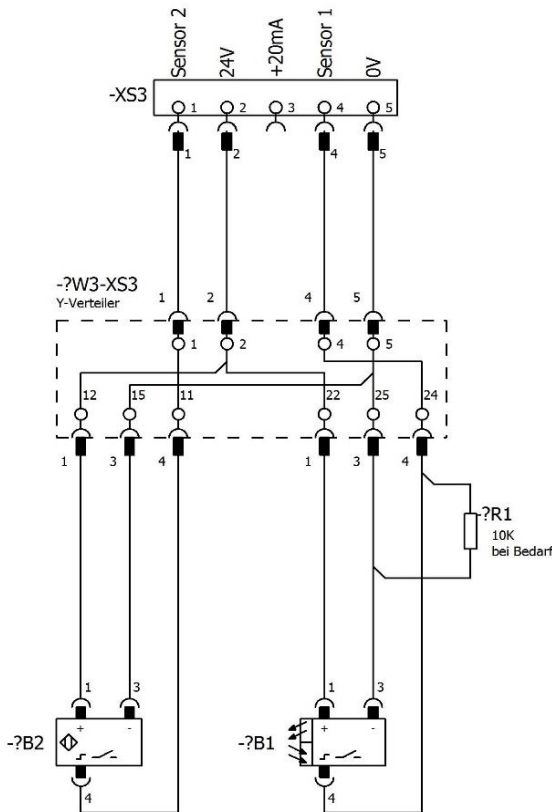


Floating contact



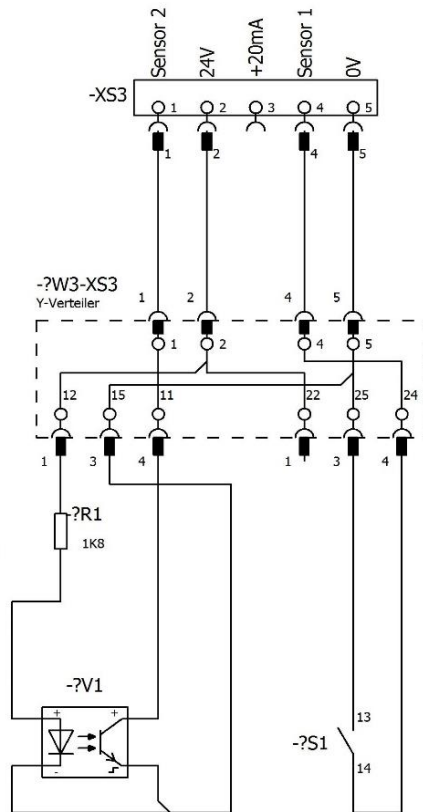
EGF40 (Optischer Sensor ohne Verstärker)

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



Sensor 2 Proximity switch General NPN output

Sensor 1 Proximity switch General PNP output



EGF40 (optical sensor w/o amplifier)

Contact

EGF40 (optical sensor w/o amplifier)

### Connection of 2 sensors via Y adapter

### 3.8. 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 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 on the right-hand side of the controller with the terminal block behind the panel.

## 4. Operation

### 4.1. General



### Controller plug connections

**Main disconnect switch**

Double-pole isolation of the controller from power supply

**XS 3**

Connector for sensors

**Load connection**

Connector for bowl feeder or linear feeder (</= 10A)

**XS 4**

Connector for optocoupler outputs and external enabling input

## The controller display (membrane keypad)



### On / Off

Pressing this button switches off all connected devices. The display shows "OFF". The controller remains ready for operation.



### Cursor up and cursor down

Use these buttons to scroll through the controller menu or set the parameters.



### Enter

Press this button to acknowledge the parameters entered with the cursor.



### Decimal point in the display

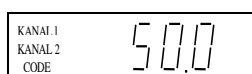
The decimal point is not blinking. You cannot make any entry.



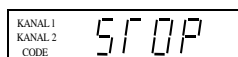
The decimal point is blinking, an entry can be made.

## 4.2. 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 bowl feeder or linear feeder).



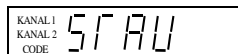
Alternatively, the following may appear on the display depending on the switching status of the device:



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



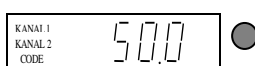
Device has been switched off by operating the top left button of the membrane keypad, inhibiting all functions. (high priority)



The accumulation monitoring sensor is operated, switching off the bowl feeder. (low priority)

## 4.3. Main menu / Setpoint entry and display

**Display of setpoint or feed rate of the bowl feeder**

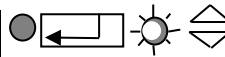
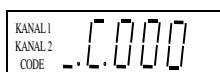


**No entry possible**

**Alternatively: STOP, OFF or ACCUMULATION (see above)**



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

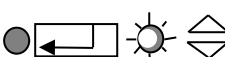
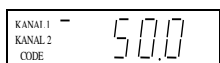


**Enter code.**

Description of codes see under 4.4.



**Setpoint entry (bowl feeder or linear feeder)**



**Entry in %; return to display mode for saving**



From these three basic screens of the main menu you can scroll in the main menu using the cursor buttons (UP/DOWN). 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 display on the controller differs the default setting has been changed in individual codes to suit a specific application.

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

KANAL 1  
KANAL 2  
CODE ..C.001

##### Settings for the vibrating drive

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

- Vibrating amplitude signal direction of external enabling input
- External enabling
- Soft start and stop delay
- Output frequency

KANAL 1  
KANAL 2  
CODE ..C.003

##### 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.

KANAL 1  
KANAL 2  
CODE ..C.004

##### 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

KANAL 1  
KANAL 2  
CODE ..C.005

##### 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

KANAL 1  
KANAL 2  
CODE ..C.006

##### Choosing the sensor links

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

KANAL 1  
KANAL 2  
CODE ..C.008

##### 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.

KANAL 1  
KANAL 2  
CODE ..C.009

##### Status display and error reset

Use this sub-menu for checking the set vibrating frequency and the sensor inputs and for error message reset.

KANAL 1  
KANAL 2  
CODE ..C.020

##### Typical application programs

Here you can call up permanently stored settings P1-P10 in application examples.

KANAL 1  
KANAL 2  
CODE ..C.100

##### Setting the feed rate by external voltage input. 0 – 10 V or potentiometer.

KANAL 1  
KANAL 2  
CODE ..C.143

##### Saving parameters

Open this sub-menu for saving the (application-specific) settings previously made in various sub-menus.

KANAL 1  
KANAL 2  
CODE ..C.200

##### 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.

KANAL 1  
KANAL 2  
CODE ..C.210

##### 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.

## 4.5. Application-specific change of default settings

### 4.5.1. Code C001 for feed rate output

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

<b>Select code</b>			<b>Set code</b>	
<b>Code C001</b>				
<b>Set vibrating amplitude</b>			<b>0 - 100 %</b>	
<b>Limit vibrating amplitude</b>			<b>50 - 100 % (*)</b>	
For RNA feeders with 100V/200V magnets 90%				
<b>External enabling</b>			<b>1 = active</b> <b>0 = not active</b>	
<b>External enabling signal direction</b>			<b>1 = Start = 24V DC</b> <b>0 = Stop = 24V DC</b>	
<b>Soft start delay</b>			<b>0 - 5 sec.</b>	
<b>Soft stop delay</b>			<b>0 - 5 sec.</b>	
<b>Vibrating drive operating frequency</b> (See also under 3.5.1 Commissioning)			<b>35 - 140</b>	
<b>Return</b>			<b>Save and return to main menu</b>	

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

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

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

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

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

#### 4.5.4. Code C006 Sensor linkage

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

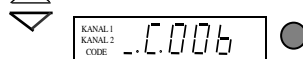
Select code



Set code

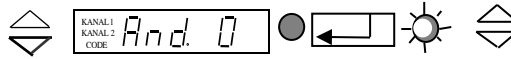


Code C006



You can activate only one of the eight sensor links.

**AND logic with blowing-off the exit tracks**



I = active  
0 = not active



**AND logic without blowing-off the exit tracks** (from version No. 10)



I = active  
0 = not active



**OR logic**



I = active  
0 = not active



**Min/Max logic**



I = active  
0 = not active



**AND / S2 logic** (from version No. 10)



I = active  
0 = not active



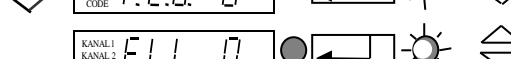
**Level check for hopper control** (From version No. 10)



I = active  
0 = not active



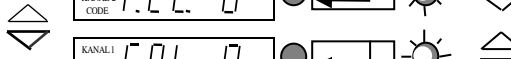
**Level check indicator light**



I = active  
0 = not active



**Individual link**



I = active  
0 = not active



**Return**



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 bowl 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 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


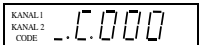
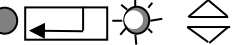


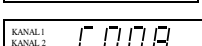


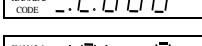
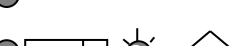


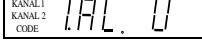
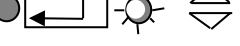


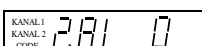
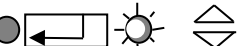


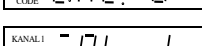
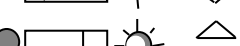


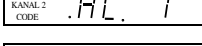



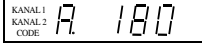




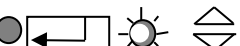

**Level check with indicator light**  
Sensor 2 operates relay K1 following the delay period entered (C005).


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.*

#### 4.5.5. 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!!!

Select code				Set code	
Code C008					
Sensor input 1 is monitored				I = active 0 = not active	
Sensor input 2 is monitored				I = active 0 = not active	
Monitoring depending on Channel 1				I = active 0 = not active	
Time till alarm comes up				3 - 240 sec.	
Switching off channel 1				I = see below 0 = see below	
Switch				I = Alarm on relay K1 0 = Alarm on relay K2	
Return				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 the bowl feeder or linear feeder is stopped. An ERROR message appears on the operator panel display.


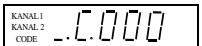
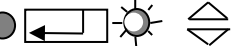


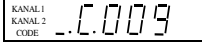


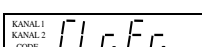


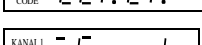


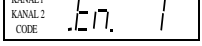


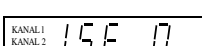


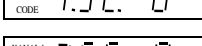

Use the bottom right cursor button for reset.

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).

#### 4.5.6. Code C009 Show status / Reset ERROR message

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

Select code				Set code	
Code C009					
Clear Error				Reset error message	
External enabling signal Channel 1				I = active 0 = not active	
Signal at sensor input 1				I = active 0 = not active	
Signal at sensor input 2				I = active 0 = not active	
Return				Save and return to main menu	



#### 4.5.7. Code C200 Inhibiting all code entries

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

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

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

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

**Objective: Setpoint change by external voltage**

Select code			Select code	
Code C100				
External voltage application to channel 1			I = active 0 = not active	
Return			Save and return to main menu	

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.

#### 4.5.9. Code C143 Saving parameters

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

Select code			Select code	
Code C143				
Select memory location 0-3				
Save				
Return			Save and return to main menu	

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

#### 4.5.10. Code C210 Retrieving parameters

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

<b>Select code</b>			<b>Set code</b>	
<b>Code C210</b>				
<b>Default setting</b>				
<b>Select memory location 0-3</b>				
<b>Load parameters</b>				
<b>Return</b>			<b>Save and return to main menu</b>	

- FAC** Select and acknowledge FAC to apply the factory default settings
- US.I** Select the application-specific set of parameters previously saved under C143.
- US.PA.** Retrieve the application-specific set of parameters previously selected under US.I.

#### 4.5.11. Error messages

If a fault occurs during operation the controller switches itself off automatically and the display shows ERROR and a brief message text blinking in alternate succession. The controller keeps this error message in the memory even after disconnection from power supply until the message is reset in C009.

<b>Overload limitation</b>		
----------------------------	--	--

The output is above the admissible limit.  
Check power input to the feeder and adjust, if necessary. Check frequency setting.

<b>Short circuit cut-out</b>		
------------------------------	--	--

A short circuit occurred during operation.  
Check cabling and magnets for damage.

<b>Overvoltage cut-out</b>		
----------------------------	--	--

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.

<b>Current peak limitation</b>		
--------------------------------	--	--

An inadmissibly high current peak occurred. Maybe the soft-start period is too short.

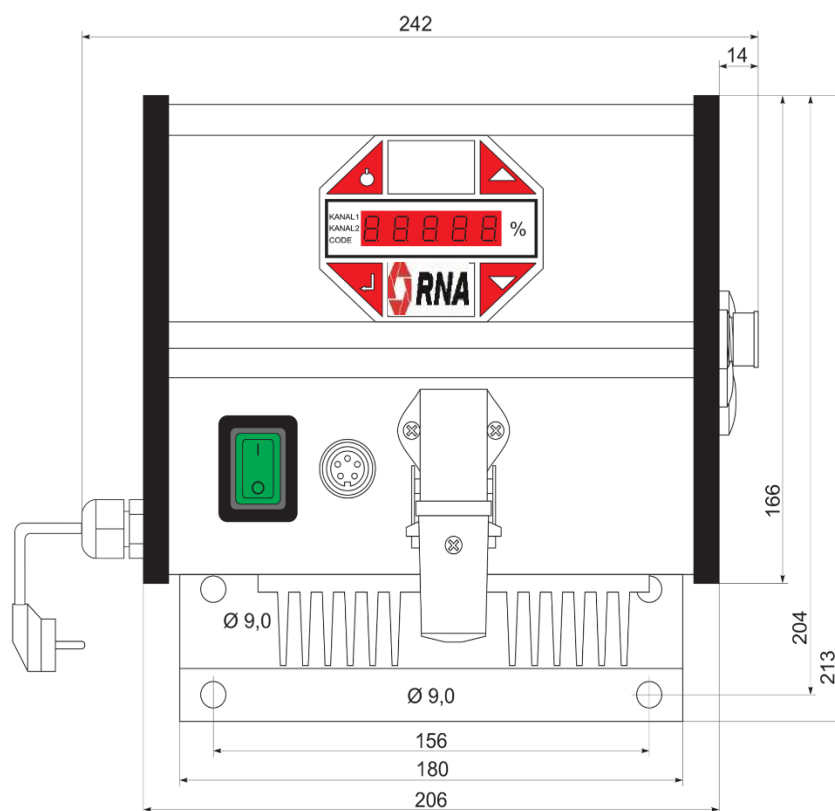
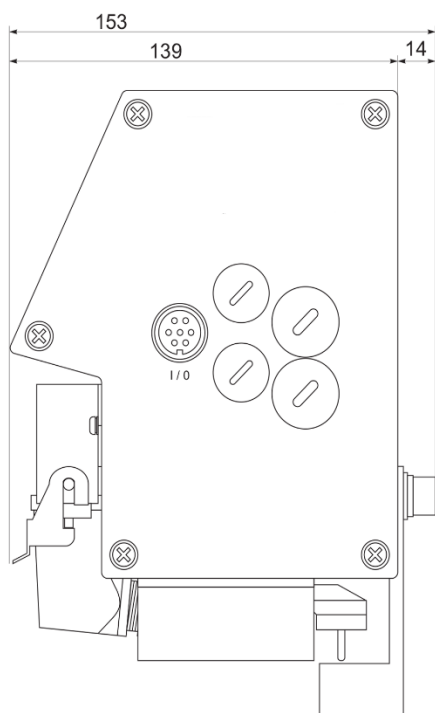
<b>Sensor timeout</b>		
-----------------------	--	--

Response of the set cycle watchdog.  
Remove the product flow malfunction.

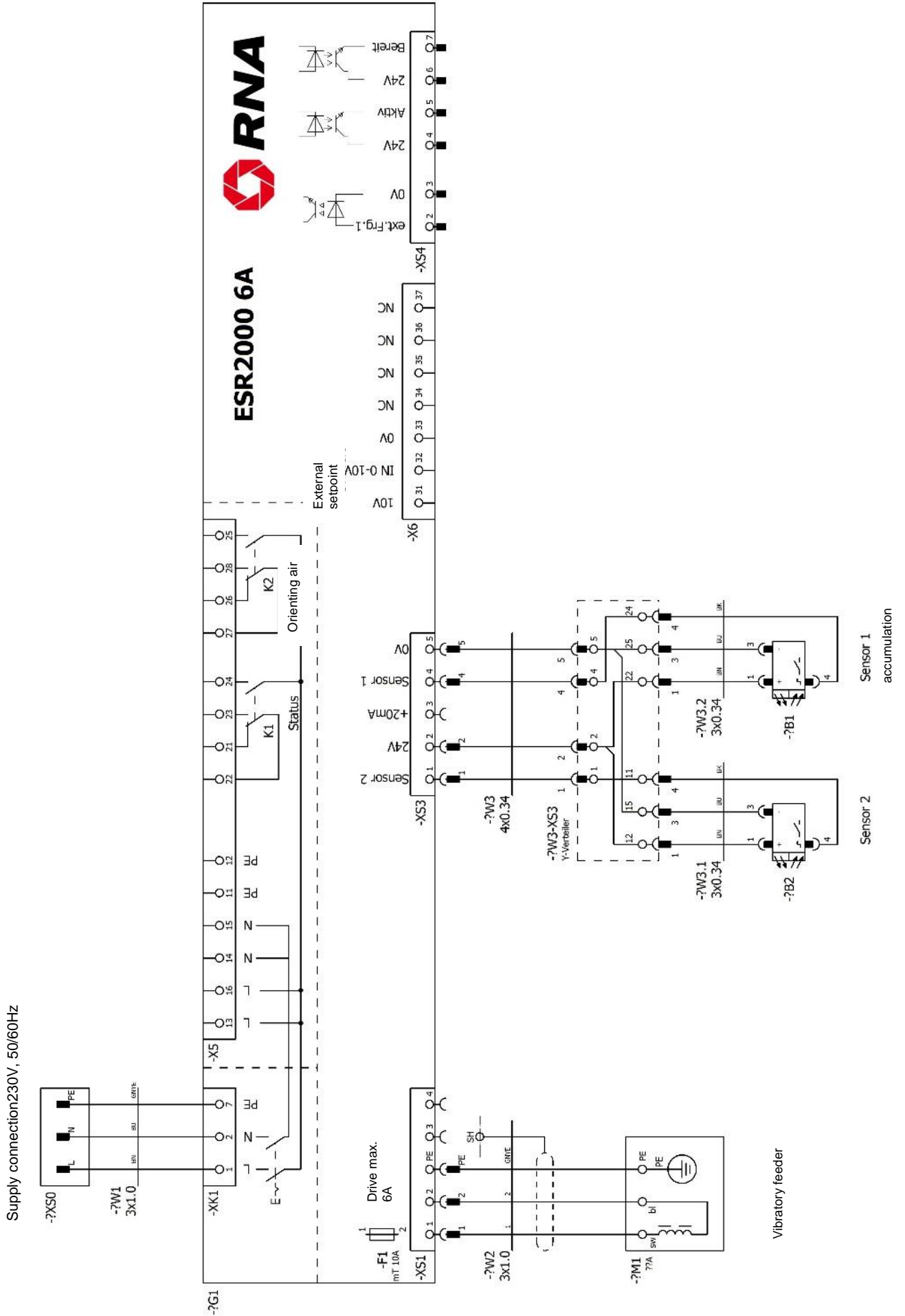
<b>Low supply voltage</b>		
---------------------------	--	--

Supply voltage is too low.  
Check supply voltage.  
Appears on the display briefly on power On and power Off.

## 5. Dimensional drawing



# 6. Connection diagram





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