

# Instructions for the Control Units for Vibratory Drives

## ESG 2000

BA

Rhein-Nadel Automation GmbH

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Declaration of conformity  
as defined by  
Low voltage directive 2014/35/EU  
and EMC directive 2014/30/EU

Herewith we declare that the product complies with the following provisions:

applied harmonized standards:

Low voltage directive 2014/35/EU  
EMC directive 2014/30/EU

DIN EN 60204 T1  
EN 61439-1

remarks:

Rhein-Nadel-Automation

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Managing Director  
Jack Grevenstein



## 1.1 Performance Characteristics

This compact control unit has been designed to operate a bowl or linear feeder.  
The unit has the following performance characteristics:

- one power outputs:
  - channel 1 bowl feeder < 10 A
- 24V DC remote control input.
- two optocouplers for status messages and further links.
- a membrane keyboard for setting and editing the operating values (parameters) in the setting menus.
- plug connections for
  - bowl or linear feeder
  - communication
- double-pole mains power switch

## 1.2 EC Conformity / CSA Conformity

The control device corresponds to the following regulations:

**Low voltage directive 2014/35/EU**  
**EMC directive 2014/30/EU**

Applied harmonized standards:

**DIN EN 60204 T1**  
**EN 61439-1**

The control device corresponds also to the UL/CSA regulations.

## 1.3 Technical Data

Mains voltage:	230 Volt AC, 50/60 Hz, +20/ -15%
	110 Volt AC, 50/60 Hz, +10 / -10%
Output voltage:	0 ... 208 Veff /230 VAC ; 0 ... 98 Veff /110 VAC
Load current channel 1:	10 Aeff
Total load current:	10 Aeff
Minimum load current:	80 mA
Internal fuse:	F1 = 10A
Soft start time, soft stop time:	0 ... 5 sec.
Remote control input:	24V DC (10-24 VDC)
Outputs:	2 optocouplers
Status output (optocoupler):	max. 30V DC 10mA
Operating temperature:	0 ... 50° C
Type of protection:	IP 54

## 1.4 Accessoires

Label	Denomination	Type	Manufacteur	Supplier	RNA-Mat-code
XS1	Connector		Harting		
XS1	Mains plug	C16-1	Amphenol		35051469
XS4	Coupler connector, 7-poles, straight	09 0126 70 07	Binder	EVG	35051153
XS4	Coupler connector, 7-poles, angular	99 0126 75 07	Binder	EVG	35002545

## 2 Safety Instructions

It is always necessary to read and understand the safety instructions. This ensures that valuable material is not damaged and injuries are avoided.

Steps must be taken to ensure that all persons working with this control unit are familiar with the safety regulations and observe them.

The device described in this manual is a control unit for operating RNA bowl feeders and linear feeders. The limit values specified in the technical data must be observed.



### Note!

This hand indicates tips on operation of the control unit.

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### Attention!

This warning triangle indicates safety instructions. Failure to heed this warning can lead to severe injuries or death!

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Work on electrical equipment of the machine/plant may be carried out only by a trained electrician or by untrained persons under the leadership and supervision of a trained electrician in accordance with the regulations for electrical engineering!

All safety and danger signs on the machine/plant must be observed!

The electrical equipment of a machine/plant must be inspected and checked regularly. Defects such as loose connections or damaged cables must be remedied immediately!

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Before commencing operation, make sure that the earthing line (power earth, PE) is intact and installed at the connecting point. Only test instruments approved for this purpose may be used for checking the safety grounding conductor.

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## 3 Commissioning Instructions

Before connecting up to the mains and switching on the control unit, it is essential to check the following points:



- Is the control unit in proper working condition and closed with all screws?
  - Are the connector locks clicked in/screwed secure?
  - Are all cables and glands intact?
  - Is PROPER INTENDED USAGE ensured?
  - Does the mains voltage specification on the control unit agree with the local mains voltage?
  - Does the mains frequency specification on the vibratory drive agree with the local mains?
  - Is the correct operating mode set on the control unit? (See "Operating Mode" section)
- 

Operation of the control unit may be commenced only when all questions asked above can be answered unambiguously with YES.



Before you start operation after repair work has been carried out or control units/vibrating drives have been exchanged, set the output on the control unit to minimum before switching on. Check that the system is working properly when you increase the output.

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### 3.1 OPERATING MODE

Bowl feeder frequency coding in connector.

#### Operating mode 2

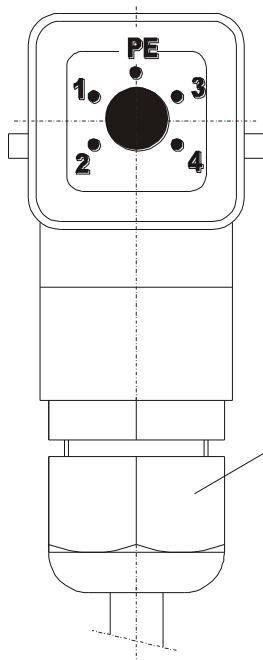
With bridge: 100 / 120Hz

With bridge: 6000 / 7200 oscillations/min

#### Operating mode 1

Without bridge: 50 / 60Hz

Without bridge: 3000 / 3600 oscillations/min



**Screw connection M20**  
**Grey-2, 100 Hz**

**Black-1, 50 Hz**  
**Metal-EMV-screw connection**  
**For frequency controlled equipment**

### 3.2 Status Outputs

The status outputs are used for remote diagnostics of the control unit operating mode or for linking several control units together. They are unassigned NPN-doped transistor routes and are potential-free.

The transistor route is always connected at the **STANDBY** status output when the control unit is connected to the mains and switched on with the mains power switch.

The **ON ACTION** status output requires the same conditions as STANDBY. Channel 1 must also be active and the transistor will block if it is set to OFF or STOP. The status outlet and the remote control should be wired via the XS4 plug connection.

The connections and the cable inlets are on the right-hand side of the control unit. The terminal strip is behind the control unit panel.

## 4. Operation

### 4.1 General



#### Control unit plug connections

**Mains power switch** The control unit is isolated from the mains with a double-pole switch.

**Channel 1** Plug connector for bowl feeder (< 10A)

**XS 4** Plug connector for optocoupler outputs and remote control input

#### The control unit display (membrane keyboard)



**On/off**

This key switches all connected devices off. "OFF" will appear in the display. The control unit is still ready for operation.



**Cursor up and cursor down**

Use these keys to page through the control unit menu or to set parameters.



**Enter**

Use this key to confirm the parameters entered with the cursor.



**Decimal point in display**

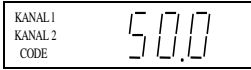
If the decimal point is not flashing, you cannot make an entry.



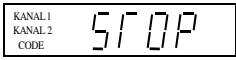
If the decimal point is flashing, you can make an entry.

### 4.2 Switching on the Control Unit

Switch on the control unit with the mains power switch. The main menu will appear in the display showing the last set-point set in channel 1 (bowl feeder or linear feeder feed rate).



The following displays may also appear depending on the circuit state of the unit.



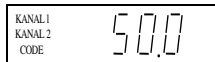
The remote control has been activated but is currently not available on the unit. (low priority)



The unit has been switched off with the upper left-hand key on the membrane keyboard, all functions are blocked. (high priority)

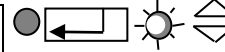
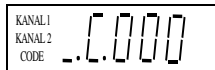
### 4.3 Main Menu/Setting and Displaying Setpoints for Channel 1

**Display of setpoint or the channel 1 output (bowl feeder)**  
**Alternatively: STOP, OFF**  
 (see above)



**No entries possible**

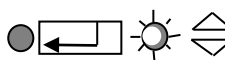
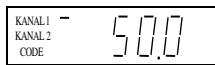
**Enter code to change or make required settings.**



**Enter code.**  
 See section 4.4 for description of code.



**Setpoint preset for channel 1 (bowl feeder)**



**Entry in %; return to display mode to store**



From these three basic displays you can page through the main menu using the cursor keys (UP/DOWN). Press the ENTER key in the main menu to activate a menu item for setting or adjustment. The decimal point will flash once you have pressed the ENTER key. Changes can now be made using the cursor keys (UP/DOWN). Confirm the entries by pressing the ENTER key again. The decimal point will no longer flash. You can scroll further through the menu using the cursor keys. This procedure is also used in the code menus described below.

All displays shown in the following section represent the factory settings. If the actual display on the control unit differs, the factory setting has been changed in the individual codes for a specific application.

### 4.4 Description of the Individual Codes for Programming the Control Unit



### Settings for channel 1

The following functions can be set or limited for channel 1 in this submenu:

- vibration amplitude
- remote control
- signal direction of the remote control
- soft start time and soft stop time



### Lock setpoint

This submenu allows the setpoints (vibration amplitude) to be blocked in the main menu. The setpoints for channel 1 and channel 2 can no longer be changed in the main menu. This prevents the output values being accidentally changed. Changes can only be made using code C001.



### Display status

This submenu is used to check the set vibration frequency.

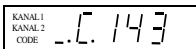


### To call software version

Determinat. 411. 59. 10. 23.11.99

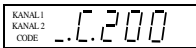
- date
- version -no.
- type
- internal no.

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



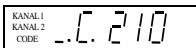
### Store parameters

If the values (user parameters) previously set in the different submenus are to be stored, call this submenu.



### Block all setting functions

This code blocks all entry options on the control unit. The values can no longer be changed. The menu can now only be enabled using this code.



### Reset parameters

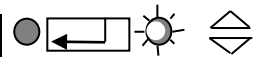
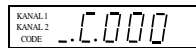
This submenu allows the user to reset the control unit to the factory settings. If user parameters have been stored, the control unit can also be set to these settings.

## 4.5 Application-specific Changes to the Factory Settings

### 4.5.1 Code C001 for Channel 1 and Code C002 for Channel 2

**Aim:** Setting and limiting the oscillation amplitude, the remote control, the soft start time and the soft stop time.

Select code



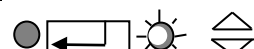
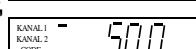
Set code



Code C001



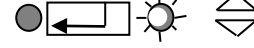
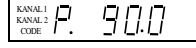
Set vibration amplitude



0 - 100 %



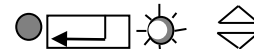
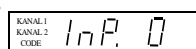
Limit vibration amplitude



50 - 100 % (\*)



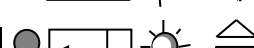
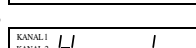
Remote control



1 = active  
0 = inactive



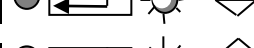
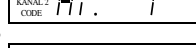
Remote control signal direction



1 = start = 24V DC  
0 = stop = 24V DC



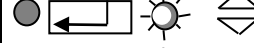
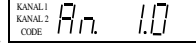
Soft start time



0 - 5 sec.



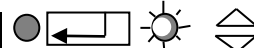
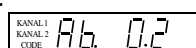
Soft stop time



0 - 5 sec.



Return



Store and return to main menu



\* For RNA-Feeder with 200 V = 90 %

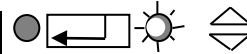


## 4.5.2 Code C003 Lock Setpoint

**Aim:** Blocking the setpoints in the main menu. The values can no longer be changed directly. Changes can only be made using code C001.

Select code

KANAL1  
KANAL2  
CODE ..C.000



Set code



Code C003

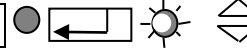
KANAL1  
KANAL2  
CODE ..C.003



Setpoint (vibration amplitude)



KANAL1  
KANAL2  
CODE P.SP. 1



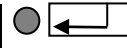
1 = can be set  
0 = entry blocked



Return



KANAL1  
KANAL2  
CODE End.



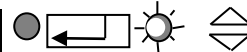
Store and return to main menu

## 4.5.3 Code C009 Display Status

**Aim:** Checking the set oscillation frequency.

Select code

KANAL1  
KANAL2  
CODE ..C.000



Set code



Code C009

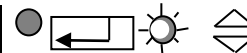
KANAL1  
KANAL2  
CODE ..C.009



Remote control signal  
Channel 1



KANAL1  
KANAL2  
CODE -En. 1



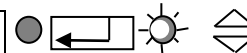
1 = active  
0 = inactive



Vibration frequency channel 1



KANAL1  
KANAL2  
CODE -HA. 1



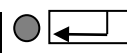
1 = 50 Hz  
0 = 100 Hz



Return



KANAL1  
KANAL2  
CODE End.



Store and return to main menu



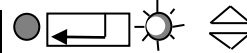
With the menu item HA = half-wave you can check whether the operating mode (100–50Hz) has been correctly selected.

## 4.5.4 Code C200 Blocking all Setting Functions

**Aim:** The user can no longer (accidentally) change the set values.

Select code

KANAL1  
KANAL2  
CODE ..C.000



Set code



Code C200

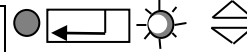
KANAL1  
KANAL2  
CODE ..C.200



Block the setting functions



KANAL1  
KANAL2  
CODE En.C. 1



1 = enabled  
0 = block



Return



KANAL1  
KANAL2  
CODE End.



Store and return to main menu



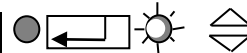
Now only code C200 will be accepted!!!

## 4.5.5 Code C143 Store Parameters

**Aim:** Storing user parameters.

Select code

KANAL1  
KANAL2  
CODE ..C.000



Select code



Code C143

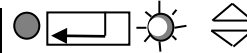
KANAL1  
KANAL2  
CODE ..C.143



Store



KANAL1  
KANAL2  
CODE PUSH.



KANAL1  
KANAL2  
CODE SAFE.



Return



KANAL1  
KANAL2  
CODE End.



Store and return to main menu



Once PUSH has been confirmed with ENTER, the selected parameters will be stored separately by pressing a cursor key.

## 4.5.6 Code C210 Reset Parameters

**Aim:** Resetting to factory settings or restoring the stored user parameters.

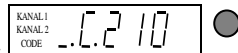
Select code



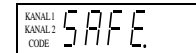
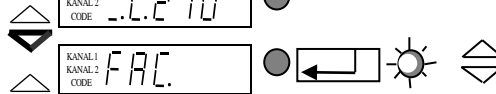
Set code



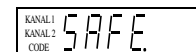
Code C210



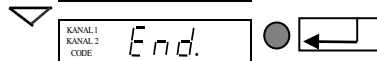
Factory setting



User parameters



Return

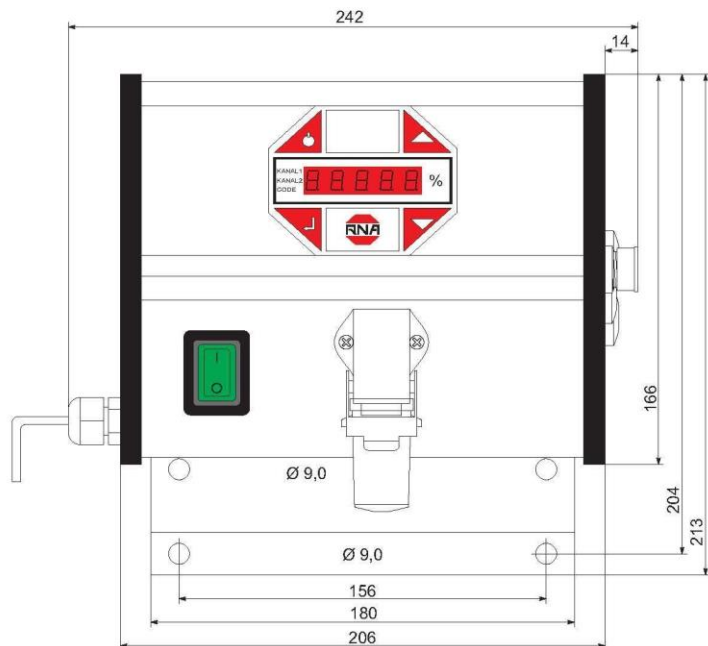
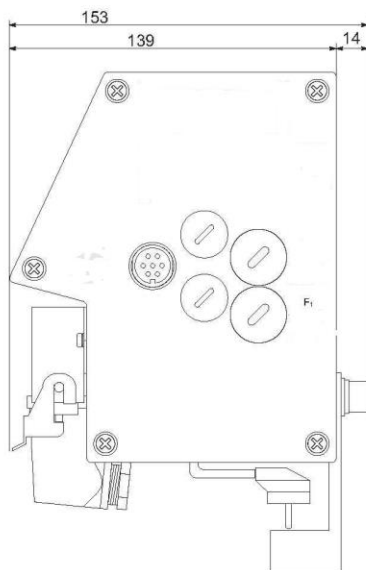


Store and return to main menu

 **FAC** Selection and confirmation of **FAC**. applies the factory settings.

 **US.PA** Selection and confirmation of **US.PA** restores the user parameters previously stored under C143.

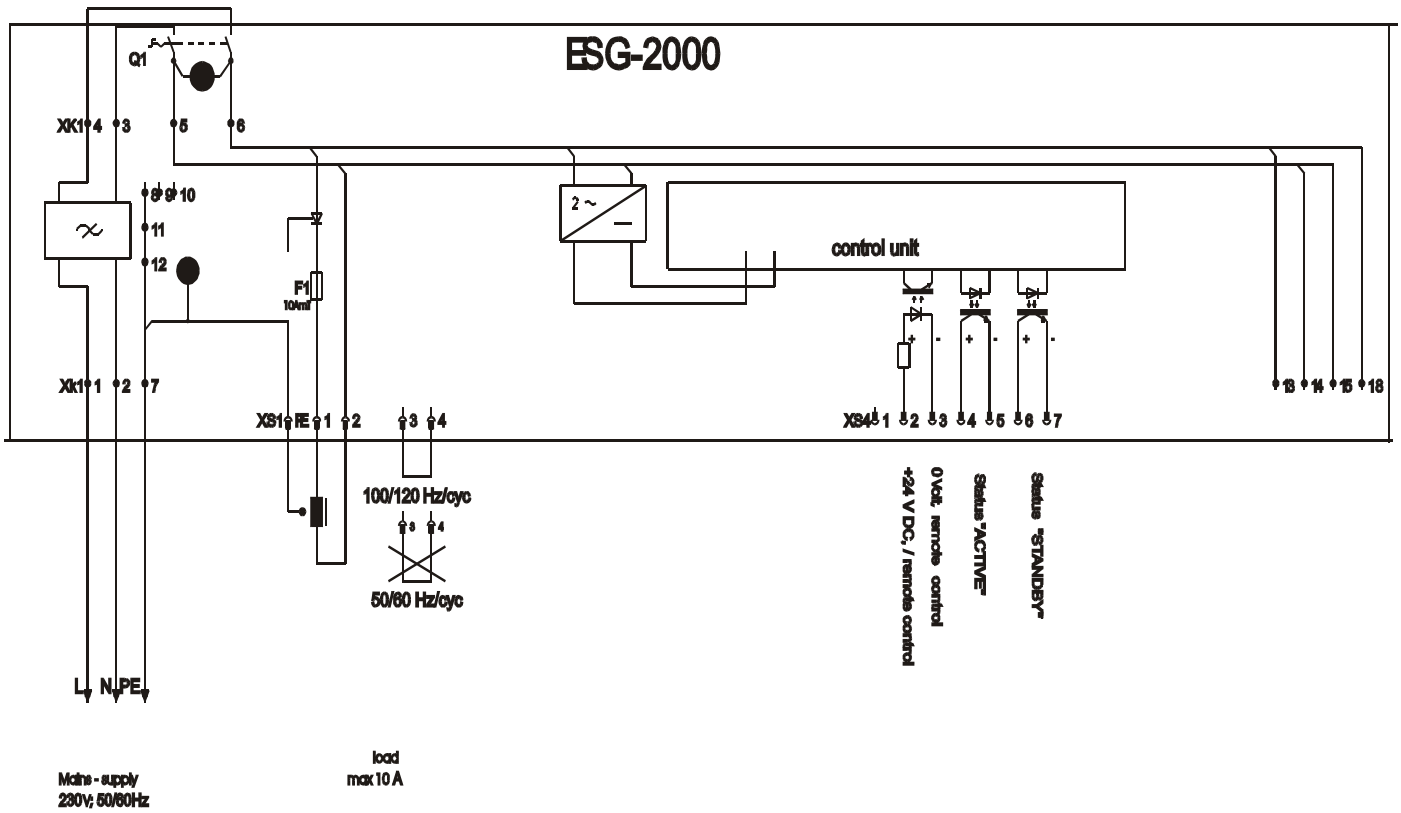
## 5 Scale Drawing



# 6 Connecting Diagram

drawing is valid fro serial - number 05R5000

drawing no.  
2-4-01-ESG20-02-00



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