



These operating instructions apply to: **NASmini 16 AC 230 V**
NASmini 16 DC 24 V



INHALT

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Scope of delivery

The sequence controls of the series NAS (hereinafter referred to as „NAS“) are delivered as standard together with the following components:

- NAS
- operating instructions
- 3 x cable gland metric M32 x 1,5 with multiple sealing insert for 6 cables 6 mm in diameter
- 3 x cable gland metric M16 x 1,5 for supply and communication
- 15 x seal insert 6 x 14 mm

Please refer to the delivery note for the scope of delivery.

Check the packaging for any damage in transit. In the event of damage to the packaging, check that the contents are complete and undamaged. If there is any damage, inform the carrier

1 General information

Information on the operating instructions

Usage and storage of the operating instructions

Before installing the NAS read these operating instructions carefully. It is the basis for all actions concerning the NAS, and may be used for training purposes. The operating instructions should be subsequently stored at the operation site.

Target group

The target group for these operating instructions is technical staff, who have basic knowledge in electrics and mechanics.

Therefore, only staff who are qualified in these fields may perform work on the NAS.

The NAS may only be mounted, started up, maintained, troubleshot and disassembled by persons who are authorised by the operator.

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NetterVibration reserves all rights including those to translations, reproduction and duplication of the operating instructions, as well as parts thereof.

Limitation of liability

All technical information, data and instructions on installation, operation and maintenance in these operating instructions are based on the latest information available at the time of printing and take our past experience to the best of our knowledge into account.

No claims can be derived from the information, illustrations and descriptions in these operating instructions.

The manufacturer does not assume liability for damages resulting from:

- Non-compliance with the operating instructions
- Use other than the intended use
- Unauthorised repairs
- Technical modifications
- Use of unauthorised spare parts

Translations are made to the best of our knowledge.

NetterVibration does not assume any liability for translation errors, even if the translation was made by us or on our behalf. Only the original German text is binding.

The following instruction and warning symbols are used in these operating instructions:



DANGER	refers to a possible risk, which, if not avoided, will result in death or serious injury.
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WARNING	refers to a possible risk, which, if not avoided, can result in death or serious injury.
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IMPORTANT	note with especially useful information and tips.
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ENVIRONMENTALLY-FRIENDLY DISPOSAL	refers to the obligation of an environmentally friendly disposal
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Information on Netter Sequence Control Systems of the series NAS

The following directives and harmonised standards were observed for the NAS:

- 2014/35/EU, 2014/30/EU, 2011/65/EU, 1994/9/EU
- EN 61010-1, EN 61000-6-2, EN 61000-6-4, EN 61326-1, EN 60079-0, EN 60079-31.

Special features

- Valve outputs are protected against short-circuiting
- The number of valves is scalable from 1 to max. 64 due to modular extension units.
- Protection type IP 65
- Sequences adjustable from 1 to 9

2 Safety

Intended use:

The NAS are used wherever processes need to be standardised and high quality guaranteed.

It enables time-discrete processing of sequences.

Carefully selected intervals of vibrational duty and pause times optimise sector-independent operational processes by saving drive energy and lowering continuous sound level. Any other use is considered to be improper. No independent safety equipment is present.

Qualification of authorised technical staff:

Installation, commissioning, maintenance and troubleshooting of the NAS may only be performed by authorised qualified personnel.

All use of the NAS lies in the responsibility of the operator.

Accessories that ensure correct operation and safety must have the appropriate protection type suited to its specific purpose.



IMPORTANT

Netter GmbH accepts no liability for physical damage or personal injury if technical modifications are made to the product, or the instructions and specifications in these operating instructions are not observed.



DANGER

Danger of an electric shock at output terminals

The output terminals are immediately live when switched on and lead to an electric shock if touched.

- Wire according to the relevant national regulations.
- Lay measurement lines separately to the power cables.
- Establish a connection between the protective earth terminal (in the respective equipment carrier) and the protective earth.



DANGER

Danger of an electric shock in the case of intermittence

Any kind of disruption of the protective earth in the equipment carrier will make the NAS dangerous.

- Intentional intermittences are not permitted.
- Put the NAS out of operation if safe operation is unlikely to be possible anymore.
- Ensure that it will not be switched on again.



DANGER

Danger of an electric shock from electric parts

Live parts lead to an electric shock.

- Only open the NAS when it is free of voltage!

Note: Live parts can be exposed when opening the NAS or removing covers and parts. Interfaces may also be live.

- Before any work on the NAS switch off all power supplies in usage.



IMPORTANT

If the NAS is supplied with voltage after a power interruption and the start signal is switched, then the next sequence always begins with the duty time set.

The output terminal is immediately live when switched on.

3 Technical data

Type/Description	Permissible operating conditions
Mains voltage	NASmini 16 AC: 100 V to 240 V, 50-60 Hz NASmini 16 DC: 24 V DC $\pm 10\%$ Extension units are supplied by the master control.
Output voltage	24 V DC Extension units are supplied by the master control.
Version	Basic unit as master control with max. 16 valve outputs, extension units as slave controls, 64 valves controllable in total
Duty time	1...99 seconds selectable
Pause time	1...999 seconds selectable
Idle time	0...999 minutes selectable
Power consumption	30 VA at 100–240 V AC controls Max. 30 W at 24 V DC controls
Output terminals	24 V DC, max. 1 A 16 valves per NAS, 64 valves per system
Display	7-segment display, 3-digit, 14 mm high, white valve display, operation mode, parameter and alarm values
LED	13 LED for status display
Keys	Set values: PARA (ESC), UP, DOWN, ENTER, TEST
Digital inputs	START (permanent activation), POSTCL (sequence activation), ENABLE (release or vibration sensor input)
Relay output	1 changeover contact 250 V AC, 5 A as combined operation and error message
Interfaces	RJ 14 socket for USB/TTL-adapter RJ 45 socket for patch cable (I/O-unit) RS 485 as internal communication bus
EMC	Electromagnetic interference: DIN EN 61000-6-4 Interference immunity: DIN EN 61000-6-2
Housing	Polycarbonate

Type/Description	Permissible operating conditions
Environmental conditions	Storage: -20 °C to +70 °C Transport: -25 °C to +85 °C Operation: -20 °C to +50 °C Rel. humidity: 95 %, no condensation permissible The environmental temperatures must not fall below or exceed the given temperatures.
Degree of protection	The degree of protection IP 65 can only be reached if the cable glands and sealing inserts included are correctly mounted and the correct cable cross sections are used.
Screw connections	3 x cable gland M32 x 1,5 with multiple sealing insert for 6 cables with a diameter of 6 mm; 3 x cable gland M16 x 1,5 for supply and communication
Electrical connections	Supply: cross-section rigid: max. 4,0 mm ² , flexible: max. 2,5 mm ² without wire end ferrule Rest: cross-section rigid: max. 1,5 mm ² , flexible: max. 1,5 mm ² without wire end ferrule
Installation	Wall installation, vertical installation position

4 Design and function

The NAS switches solenoid valves or motor contactors in freely selectable intervals.

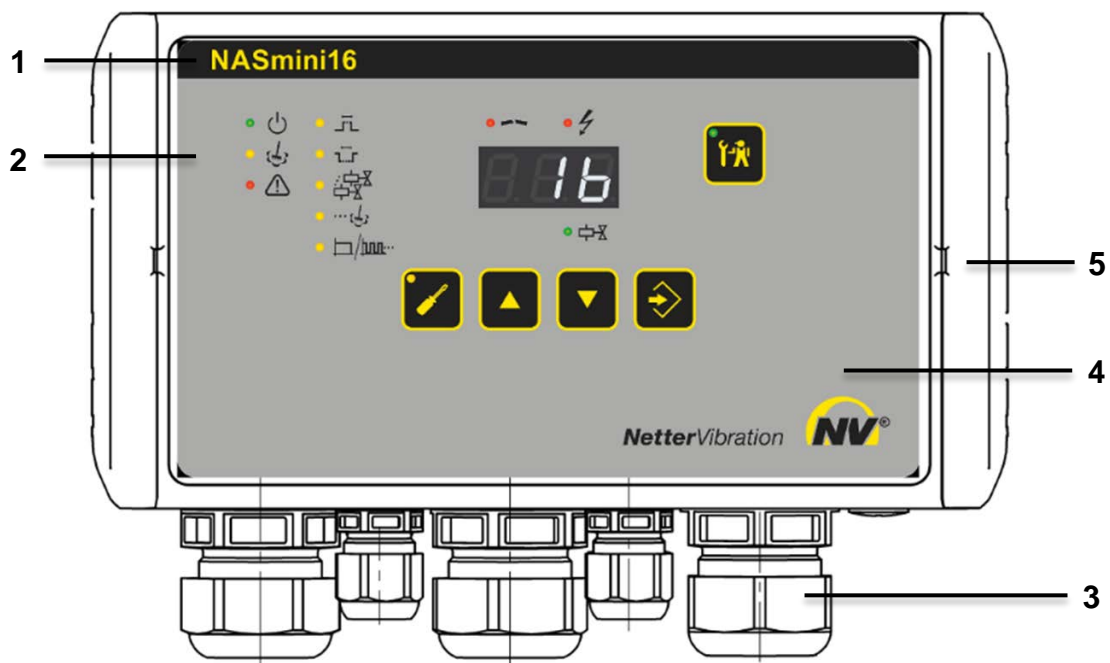
The duty and pause times of the vibrators, the number of sequences and the idle time between the repetitions of the sequences are settable.

The sequence begins with the duty time, which can be set from 1 s to 99 s. During this time there is 24 V DC at the selected output.

After ending the duty time, the pause time runs from 1 s to 999 s. After this, duty time and pause time run at the next output.

When all connected outputs have been processed (duty and pause time) then, depending on the operational mode, a repetition of the sequences or the idle time (0-999 min.) begins.


















4.1 Overview



- 1 Type designation
- 2 Display elements and operator controls
- 3 Screw connections
- 4 Terminal compartment inside housing
- 5 Hinge lock to open the housing cover

4.2 Display elements and operator controls



Display	Signification
<ul style="list-style-type: none">    	<p>Operating signal</p> <p>Permanent activation</p> <p>Alarms active</p>
<ul style="list-style-type: none">      	<p>Duty time</p> <p>Pause time</p> <p>Number of valves</p> <p>Number of sequences</p> <p>Idle time [min.] (LED illuminates during idle time)</p>
	Interruption due to defect valve line or solenoid valves
	Short-circuit of a valve line (excess current)
	Display of current valve, display for operation mode Vibration monitoring (b) and display for parameter values and alarm signals
	Displays the number of the active valve
Keys	Signification
<ul style="list-style-type: none">   	<p>Test mode single valve ON/OFF active</p> <p>Parameter setting mode ON/OFF</p>
	UP key for increasing value
	DOWN key for decreasing value
	ENTER key for accepting value

5 Transport and storage



Check the packaging for any damage in transit.

In the event of damage to the packaging, inspect the contents for completeness and any damage. If there is any damage, inform the carrier.

When transporting the NAS sequence control systems, care should be taken that they are not exposed to any heavy impact or vibrations.

The packaging protects the sequence control systems against transport damage. The packaging materials are selected according to environmentally-suitable and disposal-related aspects and are therefore recyclable.

Returning the packaging to the material circulation preserves raw materials and reduces the amount of waste.

The unit should be stored in a dry, clean environment.

If the NAS have to be kept in storage for a lengthy period, the temperature in the storage area must not be below $-20\text{ }^{\circ}\text{C}$ or above $70\text{ }^{\circ}\text{C}$, and relative air humidity must not exceed 95 %.

6 Installation

Danger of electrical shock

The output terminals are immediately live when switched on and will lead to an electrical shock.

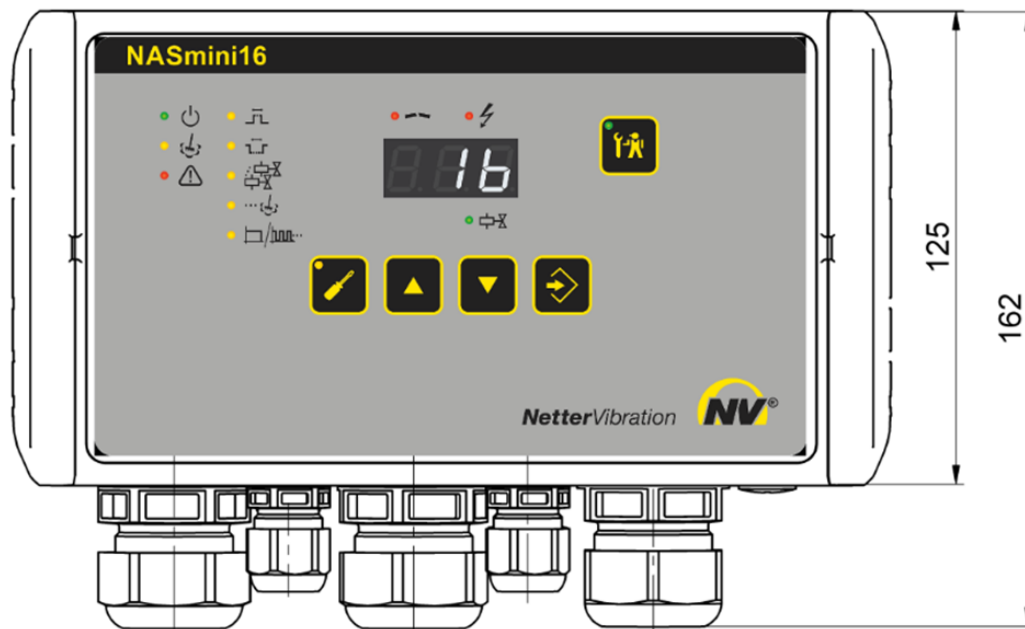


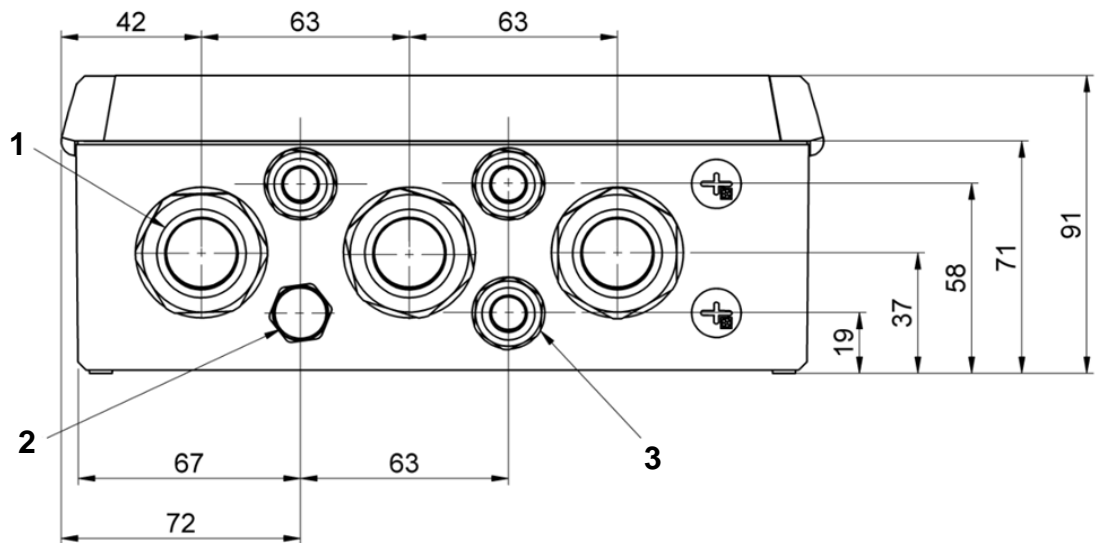
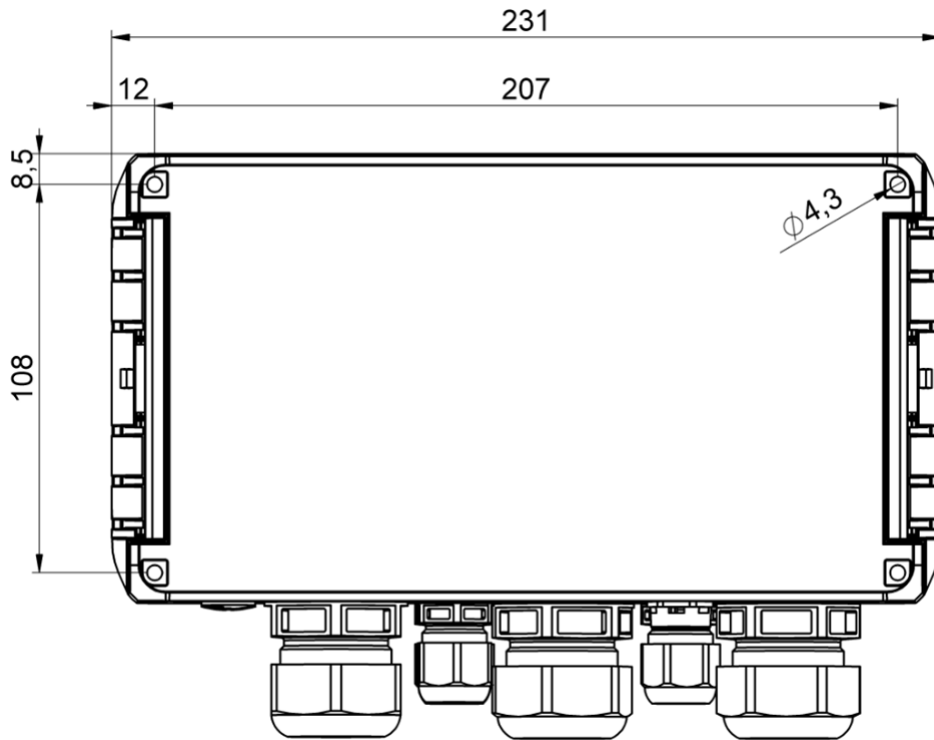
- Switch the NAS off before installation.
- The installation, assembly and start-up may only be carried out by authorised qualified personnel. Observe the valid accident prevention regulations.
- Work with insulated tools.
- Use only suitable cables when connecting the NAS. Cables and protective earth must be properly connected.
- The conductors in the supply cable for connecting the NAS to the mains must have a large enough cross-section, which is adapted to the cable length used.
- Protect the cables against high temperatures, lubricants and sharp edges.
- Observe the safety notes in Chapter 2.



The ambient temperature at the place of installation must not exceed the permissible operation temperature given in the data sheet.

6.1 Dimensions





- 1 M32 x 1,5 cable gland
- 2 M12 x 1,5 venting plug
- 3 M16 x 1,5 cable gland

6.2 Installation of the NAS

The NAS must be mounted vertically on the wall.

The 4 bores (Ø 4,3 mm) for fastening the NAS can be reached after opening the housing cover.

Dimensions of the mounting bores: 207 mm x 108 mm.

The mounting surface must be even and straight so as to avoid damage to the housing.

6.3 Connecting the NAS

1.	Open the hinge lock by using a slotted screwdriver.
2.	Open the housing cover.
3.	Insert the connecting cables through the particular cable gland.
4.	Connect the NAS by using the terminal strip.

Terminal strips:

	Number of valves	Communication address	Operation message relay	Error message relay	Power supply relay
Potential earth					Communication extension unit
Supply voltage L(+) and N(-) 100-240 V AC or 24 V DC, depending on version					Power supply extension unit
	24 V DC outputs V1-V16				Release/vibration monitoring, potential-free
					Start-sequence, potential-free
					Start, potential-free

7 Start-up and operation

7.1 Electrical start-up

The power supply is centrally applied at the control system; the extension units get their 24 V DC supply from the control system.

Before switching on the NAS ensure that the following was observed:

- Connect cables correctly to the terminals. Ensure that the power supply

ply correspond to the specifications on the type plate

- The NAS must only be operated closed.
- The given temperature restrictions for using the NAS must be kept before and after operation.

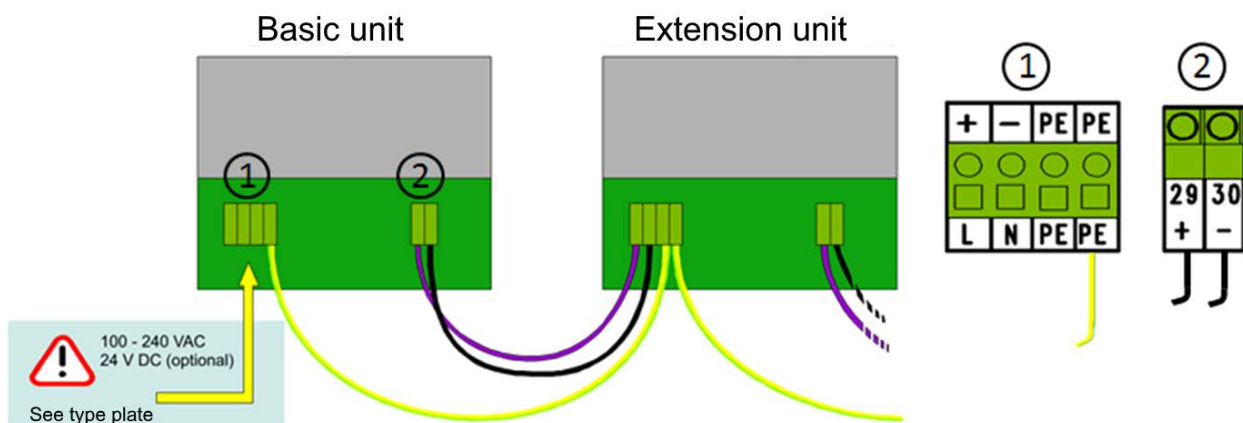


Danger of electrical shock

Live parts lead to an electrical shock.

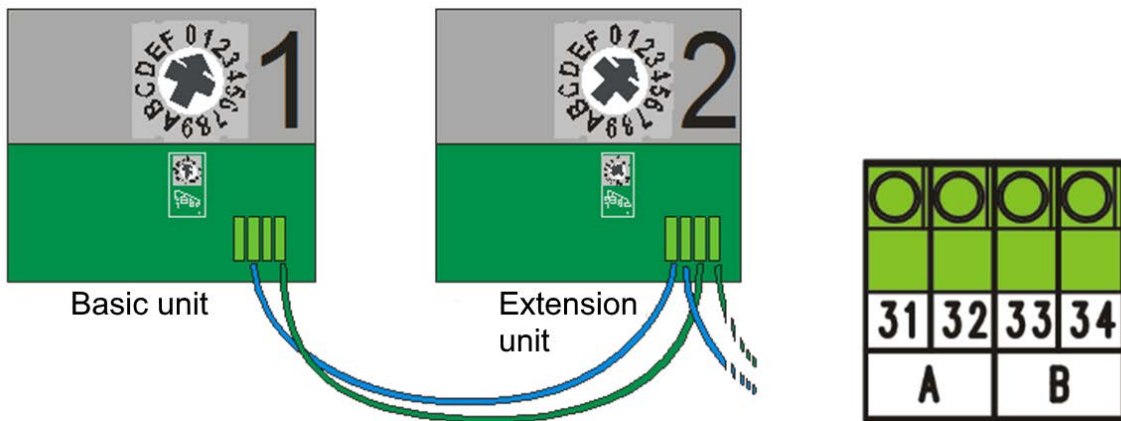
- Perform the electrical installation only in a potential-free state.
- Work on the NAS must only be carried out by qualified personnel.

7.1.1 Supply voltage:



1.	Open the cover of the basic unit.
2.	Take note of the power supply value on the type plate. There are basic units with 100 – 240 V AC and basic units with 24 V DC (optional) mains voltage.
3.	The extension units supply comes from the basic unit via the terminals 29 and 30 at 24 V DC.
4.	Ensure that the PE conductor is connected.

7.1.2 Communication:

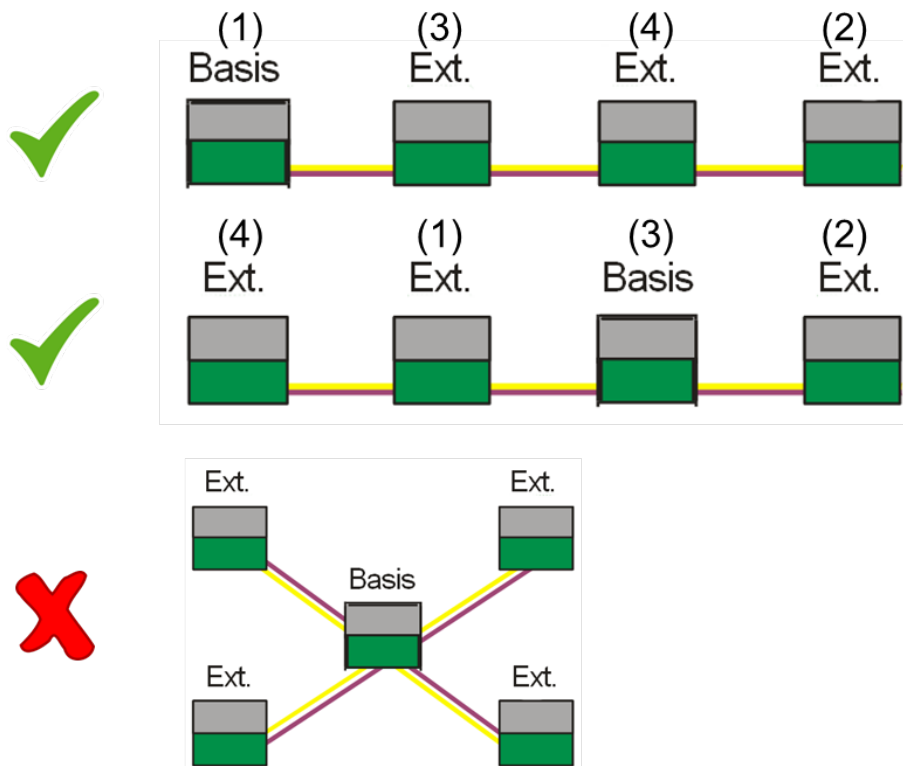


Serial communication is enabled by joining the „A“ and „B“ connections from device to device. The coding switch gives the logical position in the sequence of the controls, which do not have to correspond to the wiring sequence.

Note: The cables A and B must not be interchanged.

7.1.3 Bus structure

The controls take place one by one in ascending order | 1...2...3...4 | :



Note: A star-formed wiring of the serial connection or branches is not permitted.

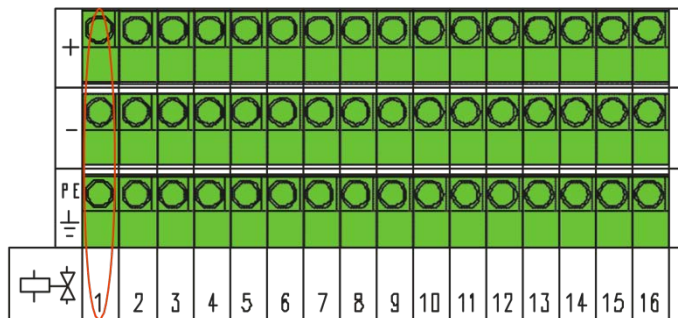
7.1.4 Valve connections:



Maximum 16 valves can be connected to each NAS. The number of valves, which are controlled by this NAS, are set from 1-16 using the coding switch (valve 10-15 = A-F, valve 16 = 0). If the basic unit is operated without an extension unit then the number of valves can stay set at "16". Only the valves set in the menu are processed.



The coding switch gives the logical position in the sequence of the controls, which do not have to correspond to the wiring sequence. The valves are connected starting at control unit 1. Control unit 5 is for an operating and control unit without an effective valve connection.



The valve connections are arranged on top of each other. Each terminal is for the PE connection of one valve.

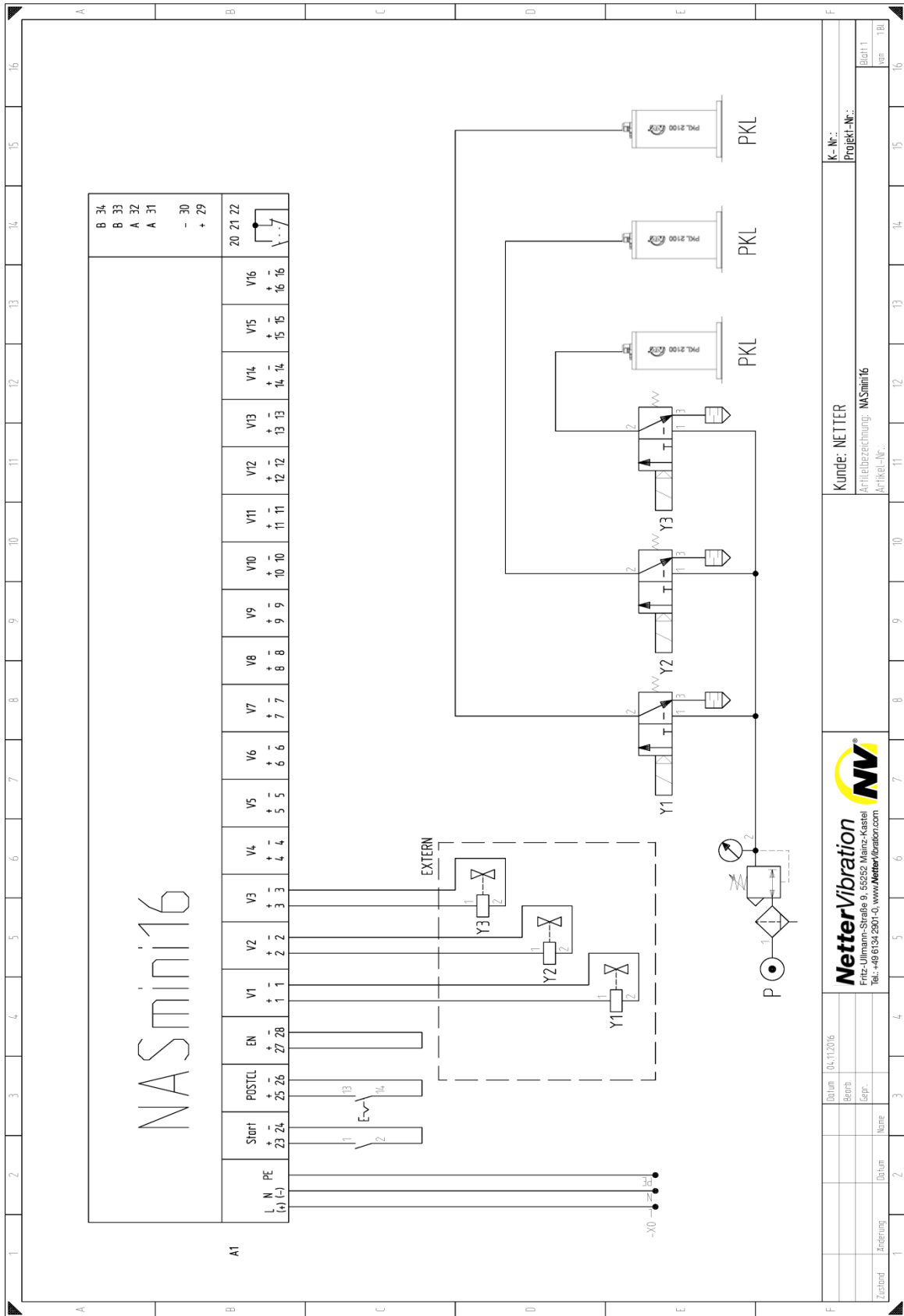
The valve outputs are designed for 24 V DC and 1 A.

Note: All valve outputs of the system relate to the same earth (-).

It is allowed to use one earth lead for several valves.

The valves are electrically monitored. A short-circuit or interruption is indicated on the control unit. A test function allows single valves to be checked.









7.1.5 Circuit diagram:



Zustand		Zuordnung		Datum		Name	
Datum		06.11.2016					
Bearb.							
Gepr.							
NetterVibration Fritz-Ullmann-Str. 9, 55959 Mainz-Kastel Tel.: +49 6134 2801-0, www.NetterVibration.com				Kunde: NETTER Artikelbezeichnung: NASmini16 Artikel-Nr.:			
K.-Nr.: Projekt-Nr.:				Blatt 1 von 13			








7.2 Parameter settings

Parameter	Setting range	Factory setting
Duty time	1 s - 99 s	1 s
Pause time	1 s - 999 s	1 s
Number of valves	1 - 64	16
Number of sequences	OFF, 0 - 9	1
Idle time	0 - 999 min.	0

Parameter setting with keyboard of device	
1.	Press para-key  to change system parameter values. A blinking LED signals the current value to be changed.
2.	Select required parameters with the arrow keys   . The current value is displayed.
3.	Press enter  to change the set parameter values. The first digit to be changed blinks on the display (e.g. 1 from the value 12).
4.	Set or change digit value with arrow keys   .
5.	Press enter  to accept the value. After this, the next digit blinks on the display (e.g. 2 from the value 12).
6.	Repeat steps 4 - 5 until the last digit has been changed. The next parameter is shown.
7.	Change next parameter, if necessary.
8.	By pressing the para-key  again the parameter setting mode is ended.

Parameter setting with service PC	
It is advisable to set the parameters with the service PC if several NAS need to be set. The necessary USB/TTL-adaptor is available from NetterVibration . The parameters can be changed per PC with the programme „EasyTool Controls“. A configuration can be saved or a saved configuration can be restored using the programme.	
1.	Connect the PC per USB cable with the control unit.
2.	Start „EasyTool Controls“ to transfer files or data.





A manual with the most important programme functions is available from **NetterVibration**.

Activate / deactivate the parameter protection	
1.	Press keys   simultaneously for 5 seconds when switching on. The display shows „cod“.
2.	Confirm display with the enter key  .
3.	Set code to protect parameters with the keys   . The code must be entered before changing the parameters. Further parameter changes are possible until leaving the parameter setting mode. If the current code needs to be read then press the   keys again when switching on. If “0” is set as code then the parameter protection is deactivated.

Reset to factory settings

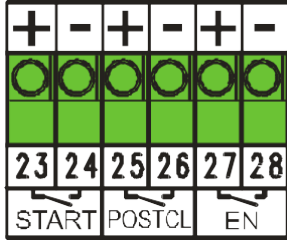
1. When switching on the NAS, press **para-key**  and **enter-key**  simultaneously for 5 seconds.

Activate / deactivate vibration monitoring


- | | |
|-------------|--|
| Activate: | Press TEST-key  and UP-key  simultaneously. "b" is shown on the display. |
| Deactivate: | Press TEST-key  and UP-key  simultaneously. |

7.3 Operation of controls

7.3.1 Operation without vibration sensor

	<p>Permanent operation: As long as the start input (START) is closed, the valves are actuated by the set control times. Condition: the release input (ENABLE) is closed.</p> <p>Sequence operation with idle time: Closing the input (POSTCL) starts repeated activation of the valves with set control times. The number of sequences is given in the parameters. Condition is a closed release input (ENABLE).</p>
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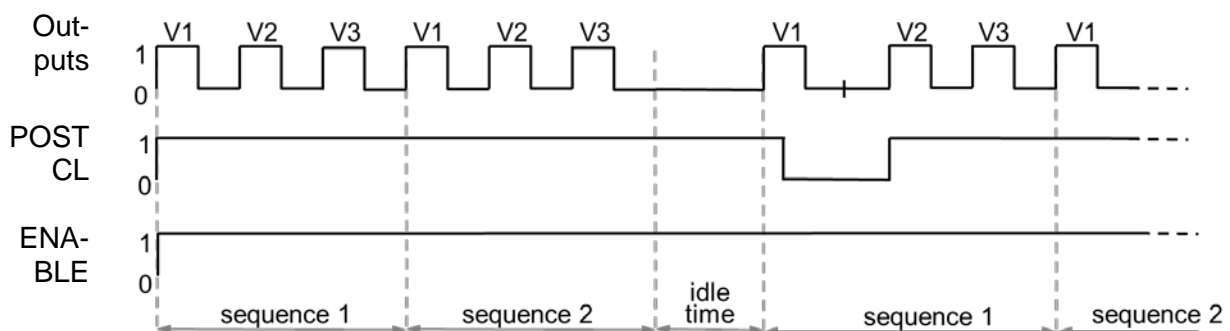
Repeated activation:

Repeated activation of the outputs with adjustable idle time: When the terminal „POSTCL“ is closed, the controls with its set duty and pause times activate the outputs for the set number (0...9) of sequences. When the set sequence ends, an adjustable idle time (0...999 min) begins. The LED  illuminates during the idle time. When the

terminal „POSTCL“ is opened, the controls end the duty time/pause time of the current valve. When the terminal „POSTCL“ is opened, the controls end the activation and go into a waiting position at the last activated valve output. If it is closed again, the process continues at the next valve output.

Example: 3 valves

2 sequences

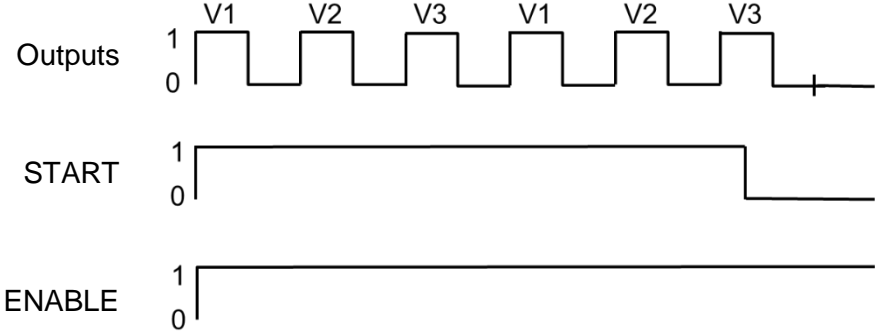


Permanent activation:

When closing the terminal „START“ the controls with set duty and pause times activate the outputs. When opening the terminal „START“ the controls end the

activation and go in waiting position to the last activated valve output. When closed again, the process continues at the next valve output.

Example: 3 valves



7.3.2 Operation with vibration sensor

+	-	+	-	+	-
○	○	○	○	○	○
23	24	25	26	27	28
START	POSTCL	EN			

Permanent operation:
 The vibration sensor is connected at the input (ENABLE). As long as the start input (START) is closed, the valves with the set control times are actuated.

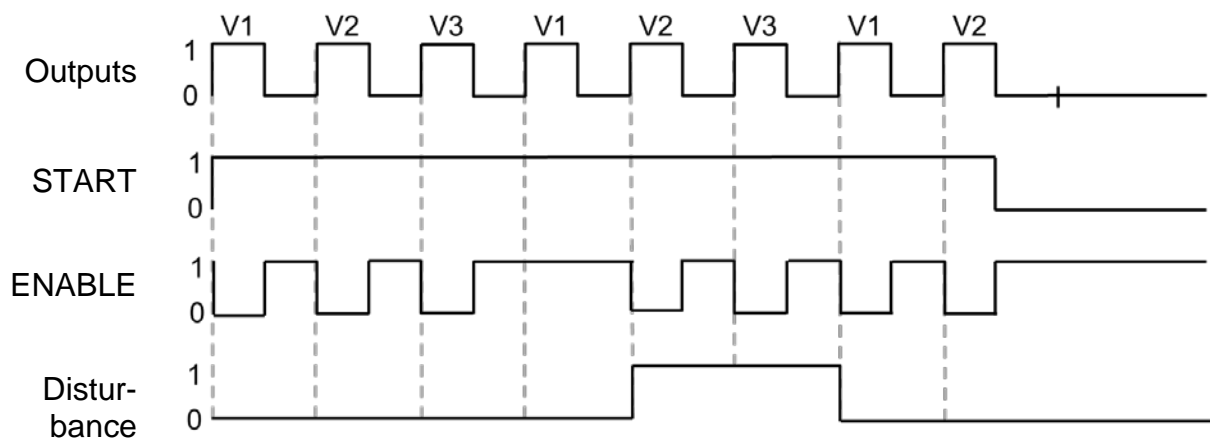
Sequence operation with idle time:
 Closing the input (POSTCL) starts repeated activation of the valves with set control times. The number of sequences is given in the parameters.

Operation mode vibration monitoring:

When vibration monitoring is activated, the controls expect potential-free opening of the contact „ENABLE“-release input during each duty time, e.g. from connected vibration sensors in series. The release mode is not available in this operation mode. Before ending the pause time at the pulsed output, the contact must be closed again. If the contact stays open, the controls signal

the affected output number and the indicator of the vibration monitoring blinks. The LED „alarms active“ light up and the relay „operation/error“ change to error. This state is cancelled as soon as the contact ENABLE is closed in the next sequence or if the affected valve output is actuated manually.






Example: 3 valves



7.3.3 External status message:

	<p>Operation and error message relay: The contact between the terminals 20 and 22 is closed when in fault-free operation. The following causes lead to an error message:</p> <ol style="list-style-type: none"> 1. Power failure (fail-safe operation) 2. Bus error 3. Device error (parameter error) 4. Valve error 5. Vibration sensor error
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7.3.4 Test function

1.	Press TEST-key  to perform a valve function test.
2.	Select desired valve with the arrow keys UP and DOWN   .
3.	Press enter  . The selected valve is permanently operated with the saved pulse and pause time.
4.	End the test by pressing the para-key  or the TEST-key twice.
5.	Test next valve, if necessary.
The active test mode is shown by the illuminated LED.	

7.4 Shutdown





Danger of electrical shock

Live parts will lead to an electrical shock.

- Switch all poles of the power supply off when the NAS is shut down.
- Ensure that the NAS cannot be operated unintentionally.
- If the NAS is interconnected with other devices and/or equipment then think of the consequences before switching it off and take appropriate precautions.

8 Troubleshooting

Display	Cause	Troubleshoot
„buS“ blinks on display, alarm LED is on.	The sum of the set valves on the NAS is less than the total set number of valves.	<ol style="list-style-type: none"> 1. Check set total number of valves. 2. Check set number of valves on coding switch. 3. Check wiring of interface and supply (terminals 29-34 as well as + and - on the extensions).
The LED  blinks. The affected valve is shown on the display.	No electrical current flows through the valve line.	<ol style="list-style-type: none"> 1. Check if wiring to displayed valve is disrupted. 2. Check affected valve. 3. Check if valve connector fits.
	The permissible valve current exceeds 1 A.	<ol style="list-style-type: none"> 1. Check if wiring to displayed valve has short-circuited. 2. Check the affected valve. 3. Check if valve connector fits.
Sequential activation does not function.	No signal at input “Sequential activation” (POSTCL).	<ol style="list-style-type: none"> 1. Check input.
Display is dark or illuminates for a short time and then goes out again.	The internal fuse has blown. Note: After a recovery time of a few minutes the controls can be switched on again.	<ol style="list-style-type: none"> 1. Switch controls off. 2. Check whether ambient temperature is above permissible value. 3. Check duty time in relation to pause time. 4. Check current consumption of solenoid valves. Observe the restrictions.
Segment display blinks, in the first box there is a „b“. 	Vibration monitoring signals shows a malfunction at the displayed valve.	<ol style="list-style-type: none"> 1. Check valve. 2. Check VibroMonitor sensor. 3. Check if set pause time is too short.
The red LED illuminates at the valve extension.	Node number was incorrectly set.	<ol style="list-style-type: none"> 1. Check set node number and correct, if necessary.

9 Maintenance and servicing



Danger of electrical shock

Work on switched-on control sequences lead to severe or fatal injuries.

- **Before beginning** work switch off the NAS.
- Ensure that the NAS cannot be switched on again.
- Ensure that the NAS are separated from the current supply.



Danger from defect electrical cables

Defect electrical cables lead to severe or fatal injuries.

- Check electrical cables regularly, but at least every six months.
- Fix errors immediately.



When the NAS is supplied with current again after disconnection and when the start signal is switched, the next sequence always begins with the set duty time.

The output terminals are immediately live when switched on.

10 Disposal

Material specifications:

Polycarbonate	housing cover
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All NAS may be disposed of via **NetterVibration**.

The disposal prices are available upon request.