

Instruction manual



Reference calibrator PNR 1000 K

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Observe protection note according to DIN ISO 16016!

Prologue

Dear customers,

We are pleased that you have decided to purchase a product from KNESTEL Technologie & Elektronik GmbH.

These operating instructions will familiarize you with the purchased device and its features.

The technical data, illustrations and dimensions in these instructions are not binding.

No claims of any kind can be derived from them.

We reserve the right to make improvements without changing these operating instructions.

Manufacturer & Contact

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1 Introduction

1.1 General information about this documentation

- This documentation applies exclusively to the product shown on the cover sheet.
- This documentation is an essential part of the product and a requirement for safe and successful operation. It must be kept for the entire service life of the product and passed on to any subsequent owner or user.
- Failure to comply with this documentation, in particular the warning and safety instructions, may result in personal injury and damage to property.
- Keep this documentation ready to hand at the place of use of the product at all times.
- Protect this documentation from dirt and moisture.
- The product equipment and the presence of the components described in this documentation are generally dependent on the scope of delivery ordered.
- The content of this documentation has been carefully checked for accuracy. Nevertheless, errors cannot be completely excluded. Please notify us if you find any errors.
- This documentation has been prepared in accordance with EN 82079.
- The company KNESTEL Technologie & Elektronik GmbH is referred to as KNESTEL in the following document.
- The reference calibrator PNR 1000 K is referred to as PNR 1000 K in the following document.
- The target group for this documentation is trained, qualified technical personnel who are entrusted with any work on this product.

1.2 Further documentation

For all operating phases beyond normal operation, the following documentation must be observed:

- Instruction manual for the reference calibrator PNR 1000 K

1.3 Liability and warranty

The company KNESTEL takes no liability for personal injury, property damage, breakdowns and service costs resulting from:

- Improper use, incorrect operation
- Failure to observe the contents of this documentation
- Failure to comply with the maintenance instructions specified in this documentation.
- Use of accessories, spare parts and operating materials that have not been offered, approved or authorized by KNESTEL. This also applies accordingly to assemblies used from other manufacturers.
- Unauthorized structural changes, additions and conversions to this product as well as unauthorized work on the regulation and control technology, unless these have been approved by KNESTEL.
- Improper and/or unauthorized repairs
- Improper handling resulting in destruction of existing warranty seals

All obligations of the company KNESTEL result from our General Terms and Conditions or the respective contract, which also contains the complete and solely valid warranty provisions. These contractual warranty provisions are also neither extended nor limited by the explanations in this documentation.

However, the warranty expires as a result of the above-mentioned points.

Wear parts are generally excluded.

1.4 List of abbreviations / Glossary

ill.	illustration
tab.	table
PN	particle number
HMI	human-machine interface

2 Safety instructions

The PNR 1000 K has been developed and manufactured according to the current state of the art and the recognized safety standards and guidelines.

Nevertheless, failure to observe this documentation and in particular the safety instructions for the PNR 1000 K may result in unavoidable residual hazards that could lead to personal injury or property damage to the user or third parties.



Avoid injuries and property damage! Therefore:

- Read this documentation carefully before operating the PNR 1000 K. Make sure that you have understood the contents.
- Follow all safety instructions and warnings in this chapter ("Safety instructions") and in all other chapters of this documentation without restriction or exception and follow the guidelines.
- Follow the instructions on safety and warning signs attached to the PNR 1000 K.
- In addition to the operating instructions, the generally applicable legal and other binding regulations for accident prevention and safety regulations for occupational health and safety as well as the environmental protection regulations of the country of use must be followed.
- Follow any internal work, operating and safety regulations of the operator.

2.1 Intended use

The PNR 1000 K is intended for the calibration of PN devices. The intended use also includes:

- Observance of these instruction manual and compliance with the instructions and maintenance regulations contained therein.
- Only use the PNR 1000 K in accordance with its intended purpose and within its performance limits as specified in this documentation!
- Any use beyond this or any other use is considered improper and may result in personal injury or property damage to the user or third parties!

2.2 Operating requirements

The PNR 1000 K may only be operated if the following requirements are met on the building side:

- The electrical installation of the premises where the PNR 1000 K is used complies with national standards.
- The premises where the PNR 1000 K is used has adequate fire and explosion protection in accordance with the valid regulations.

2.3 Obligations of the operator

The owner of the PNR 1000 K is considered the operator. The owner is responsible for the intended use. The following requirements must be met by the operator:

- Always keep this documentation handy, in a legible condition and complete near the equipment and ensure that all safety instructions contained therein are observed.
- Make sure that the equipment is only used for its intended purpose, in a safety-conscious and hazard-conscious manner, in compliance with this documentation, and that this is checked regularly.
- Only use instructed and sufficiently adequately qualified personnel. See section "Qualification and training of personnel" in this chapter.

2.4 Operating instructions of the operator

The operator must provide operating instructions in accordance with the applicable accident prevention regulations in a comprehensible form and language. They must be made known to the operating personnel and be accessible at all times. The operating instructions must contain, among other things:

- Notes on the use of personal protective equipment
- Notes on the safe handling of the PNR 1000 K
- Notes on the safe handling of operating materials
- Instructions on what to do in case of injuries (first aid) and emergencies
- Alarm plan. The alarm plan regulates the sequence of actions to be taken and the deployment of persons and resources and, if necessary, takes into account additional hazards that must be considered in aggravated circumstances.

2.5 Qualification and training of personnel

- Any work on and with the PNR 1000 K may only be carried out by personnel who are sufficiently qualified, instructed and authorized for the corresponding work tasks.
- Personnel must be able to assess the work assigned to them and evaluate possible hazards based on their technical training, knowledge and experience, and knowledge of the relevant regulations.
- If the personnel does not have the necessary knowledge, appropriate instruction must be given. If necessary, this can be done by the manufacturer on behalf of the operator. Proof must be provided that the personnel have been instructed. A corresponding form can be found in the appendix to this documentation. Anzulernendes Personal darf nur unter ständiger Aufsicht und Leitung einer hierfür autorisierten und erfahrenen Person am PNR 1000 K arbeiten.
- Personnel must be regularly instructed in all applicable matters of occupational safety and environmental protection.
- The area of responsibility, authority and supervision of the personnel must be precisely regulated.
- Every person who is involved with the PNR 1000 K must have read and understood the complete contents of this documentation before starting work and must be familiar with the position and function of all operating elements and safety devices.
- The PNR 1000 K may only be operated by persons who have reached the minimum legal age and who are physically and mentally fit to do so (rested and not under the influence of alcohol, drugs or medication)
- Work on the electrical system of the PNR 1000 K may only be executed by trained, authorized electricians.

Table 1: Qualification requirements for the operating personnel

Assembly, installation, connection and trial operation	semiskilled workers
Normal operation	semiskilled workers
Surface cleaning	semiskilled workers
Maintenance (as far as described in chapter "Maintenance")	KNESTEL personnel
Troubleshooting (as far as described in chapter "Maintenance")	trained professionals KNESTEL personnel
Repairs	KNESTEL personnel
Work on the regulation and control technology	KNESTEL personnel
Work on the electrical system	KNESTEL personnel
Disassembly, disposal	trained professionals
Transportation	semiskilled workers



In exceptional cases, personnel of the operator can be authorized by the company KNESTEL for activities from the area of responsibility of KNESTEL. Appropriate authorization must be obtained in writing from the KNESTEL company.

2.6 Personal protective equipment

- Wear personal protective equipment as necessary or required by regulations.
- The personal protective equipment must meet the safety requirements for the respective work assignment.

2.7 Operational safety of the PNR 1000 K

- Only operate the PNR 1000 K when it is in perfect technical condition.
- Immediately eliminate any malfunctions that may affect safety.
- Comply with the prescribed intervals for periodic tests, inspections and maintenance work specified in this documentation.
- Protect all parts of the electrical system from moisture and humidity.
- Only use accessories and spare parts that have been offered, approved or authorized by KNESTEL. The use of other accessories and spare parts may impair the function and safety of the PNR 1000 K.
- Do not make any unauthorized structural changes, additions or conversions to the PNR 1000 K without the approval of KNESTEL.

2.8 Initial installation, initial commissioning

- Exclusively KNESTEL employees carry out initial installation and initial commissioning of the PNR 1000 K at the factory.

2.9 Maintenance, troubleshooting, repair, installation of spare parts

- Maintenance, repair, investigation and elimination of faults and deviations from normal operating conditions as well as the installation of spare parts only by personnel who are sufficiently qualified, instructed and authorized for the corresponding work tasks.
- Work on the electrical system of the PNR 1000 K only by trained, authorized electricians.

- Depressurize system sections and pressure lines to be opened according to the module descriptions before starting repair work!
- Lay and assemble lines professionally! Fittings, length and quality of the hose lines must meet the requirements set by us.
- Only use accessories and spare parts that have been offered, approved or authorized by KNESTEL. The use of other accessories and spare parts may impair the function and safety of the PNR 1000 K.
- If it is necessary to dismantle safety devices and/or protective cladding as part of maintenance or repair work, they must be refitted and put back into operation immediately after the work has been completed.
- Follow the warnings and instructions in the "Maintenance" and "Malfunctions" chapters of this documentation.

2.10 Not using the PNR 1000 K

Flush the PNR 1000 K according to regulations, switch it off and secure it against unauthorized switching on.

2.11 Storage, decommissioning, recommissioning


Follow the warnings and instructions in chapter "Storage, decommissioning, recommissioning" of this documentation.

2.12 Transport und Entsorgung

Follow the warnings and instructions in chapter "Disassembly, transport, disposal" of this documentation.


2.13 Specific sources of danger


2.13.1 Electrical energy

<p>WARNING</p> 	<p>Risk of electric shock due to live wires!</p> <ul style="list-style-type: none"> • In the event of damage or defects, the device must be taken out of service immediately and secured against unauthorized use. Have loose connections or damaged cables repaired or replaced before recommissioning. • In the event of faults in the power supply, switch off the PNR 1000 K immediately and disconnect it from the voltage source.
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	<p>Working on the open device</p> <ul style="list-style-type: none"> • Work on the opened and live device may only be carried out by authorized electricians in accordance with the applicable electrical rules and regulations. • Observe the electrical circuit diagrams!
--	--

2.14 Notes on avoiding damage to the PNR 1000 K

<p>CAUTION</p> 	<p>Avoid damage to the PNR 1000 K.</p> <ul style="list-style-type: none"> • Do not use any metallic tools to clean the PNR 1000 K. • Use only suitable, non-aggressive, grease- and hydrocarbon-free cleaning agents. • Comply with maintenance intervals. • Pack and ship only as originally delivered to avoid damage in the mail.
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	<p>Damage and/or service costs caused by non-compliance with these instructions are not covered by the warranty.</p>
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3 General product description

3.1 Area of application

With the Knestel PNR 1000 K, PN field particle counters of all types can be calibrated on site. It combines a highly stable salt generator and a reference particle counter in one portable housing.

3.2 Marking of the product / nameplates

A nameplate with the following information is located on the back or side of the PNR 1000 K:



Figure 1: Nameplate, exemplary

4 Technical description

4.1 Structure of the PNR 1000 K (main component list)

The PNR 1000 K consists of the following main components:

- Particle generator (salt aerosol)
- Reference sensor
- Dryer cartridge
- HMI display with touch display
- Housing
- Extraction pipe



The PNR 1000 K is to be used as a stand-alone unit.

Operation and visualization:

- Touch display in the device
- Optional: RS232 interface via USB 2.0 type B

Top view:



Figure 2: Top view

4.2 Specifications and technical data

 Project-specific deviations from the data given here are possible!

Table 2: Specifications and technical data

Aerosol	NaCl 0,9%, polydisperse, thermally stable
Reference concentrations (DE version)	50.000#/cm ³ , 250.000#/cm ³ , 400.000#/cm ³
Reference concentrations (NL version)	100.000#/cm ³ , 1.000.000#/cm ³
Volume flow	> 7 l/min
Average particle size (DE version)	70 nm, GSD 1,5 – 2,1
Average particle size (NL version)	80 nm, GSD 1,5 – 2,1
User Interface	HMI with 7 inch display
Ambient temperature	+5 to +40°C
Storage temperature*	-10 to +50°C (dry)
Ambient pressure	860 – 1060 hPa
Humidity	10 – 80% rel.; non condensing
Dimensions	ca. 463 x 458 x 532 mm
Power supply	230V AC

* without operation fluids (distilled water, NaCl). Storage <5°C may introduce humidity into the device that could freeze, which can cause damage or very long times for defreezing. Prior to operation the device must be within the specified temperature range for operation and the device must be warmed up completely.

4.3 Control of the PNR 1000 K

Operation and visualization, as well as the display of error messages, are carried out via the touch display.

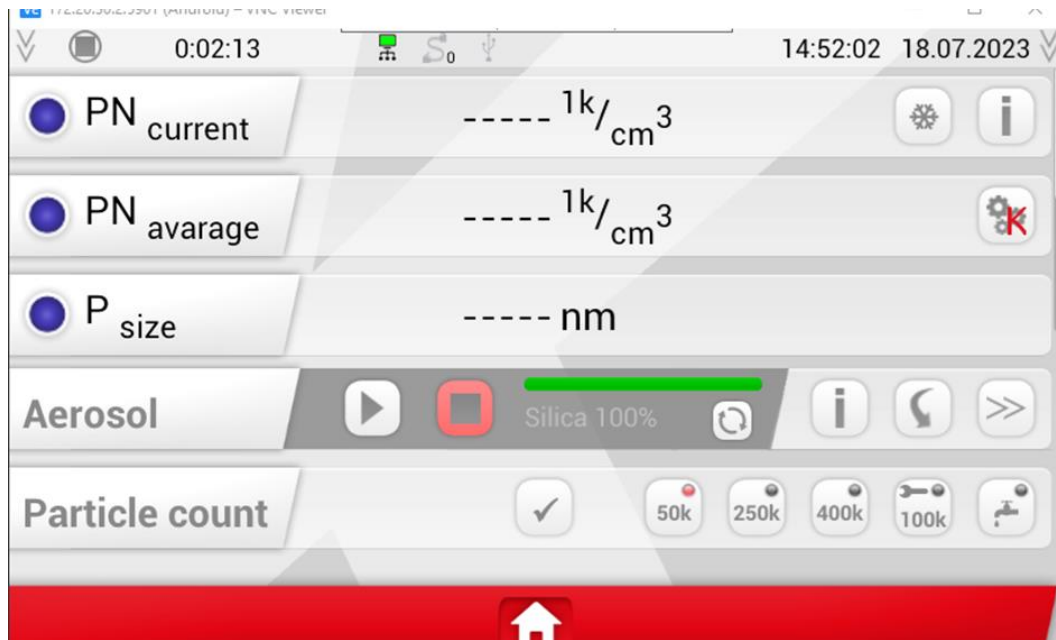



Figure 3: Touch display, exemplary

5 Installation of the PNR 1000 K

<p>WARNING</p> 	<p>Risk of electric shock, risk of system damage!</p> <ul style="list-style-type: none"> • The initial installation of the AES is done exclusively by employees of KNESTEL Technologie & Elektronik GmbH. • Re-installation exclusively by employees of the KNESTEL Technologie & Elektronik GmbH or by appropriately qualified specialists. These are fully responsible for compliance with applicable protection and safety regulations. • Electrical installation work may only be done by authorized electricians in accordance with the applicable electrotechnical rules and regulations.
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The company KNESTEL declines any liability for personal injury and property damage caused by a renewed, unauthorized installation.
If you have any questions, please contact the KNESTEL company. Important contact details can be found on the inside cover page of this documentation.

5.1 Scope of delivery / unpacking

When unpacking, the delivery must be checked for completeness using the parts list below. The packaging and contents must be inspected for possible transport damage.

- Reference calibrator PNR 1000 K
- Integrated particle generator
- Integrated reference particle counter
- Extraction pipe with screw attachment
- Container 0.9% saline solution
- 1 x Laboratory bottle "NaCl", empty, mounted
- 1 x laboratory bottle "dist. Water", filled with distilled water
- Replacement silica gel
- Folding funnel
- Cold device cable
- Quickstart Guide



We recommend storing the silica gel, the folding funnel and the plastic container with lid separately, e.g. in the transporter. This creates additional space for accessories in the lid bag

5.2 Requirements to the installation site

- see **Fehler! Verweisquelle konnte nicht gefunden werden.**
- Power connection: 2 A
- Fire and explosion protection: according to valid regulations
- The device is not intended to be used outside of buildings
- The device must not be used in wet ambient conditions

Other:

- No mechanical vibrations or shocks
- No direct sunlight

- Low dust pollution
- Weather protected installation site
- Ensure sufficient air circulation

5.3 Electrical connection

- Power supply voltage.....230 V AC, N, PE
- Power frequency50 Hz
- Rated current.....2 A
- Connection point..... Back of device
- Power supply cable.....C13 Cold device cable

6 Operation

6.1 General information

6.1.1 User interface

The user interface (HMI) provides the interface between operator and PNR 1000 K. The operating concept works via a touchscreen, similar to what is common in today's smartphones.

To ensure practical operation via the HMI, a capacitive touchscreen is used. This ensures a long service life and is resistant to environmental influences (dust, temperature, scratches, etc.). It also has a low sensitivity to mechanical damage, a good resolution and a good optical transparency. In contrast to resistive touchscreens, zoom and swipe functions are executable and simplify operability.

6.1.2 Operability

The Operation is easily ensured via the "swipe" and "tap" functionalities. All settings can be performed via a single two-dimensional level and are logically structured to avoid a complicated menu hierarchy.

Tap on button



6.2 Operation during use (Quickstart guide)



The following images are examples. The menus shown may differ depending on the country configuration.



The complete instruction manual can be found at www.KNESTEL.de

6.2.1 Switching on the PNR 1000 K

- Set up the reference calibrator horizontally
- Remove the empty NaCl container by opening the service door on the back.
- Fill the container with the enclosed NaCl solution (see marking), screw the container back in.
- Control silica gel
- Screw on sampling tube laterally
- Connect power cable
- Power switch to 'I'



If the temperature of the device was below the specified temperature, a temperature adaption is necessary.

6.2.2 Menu and controls

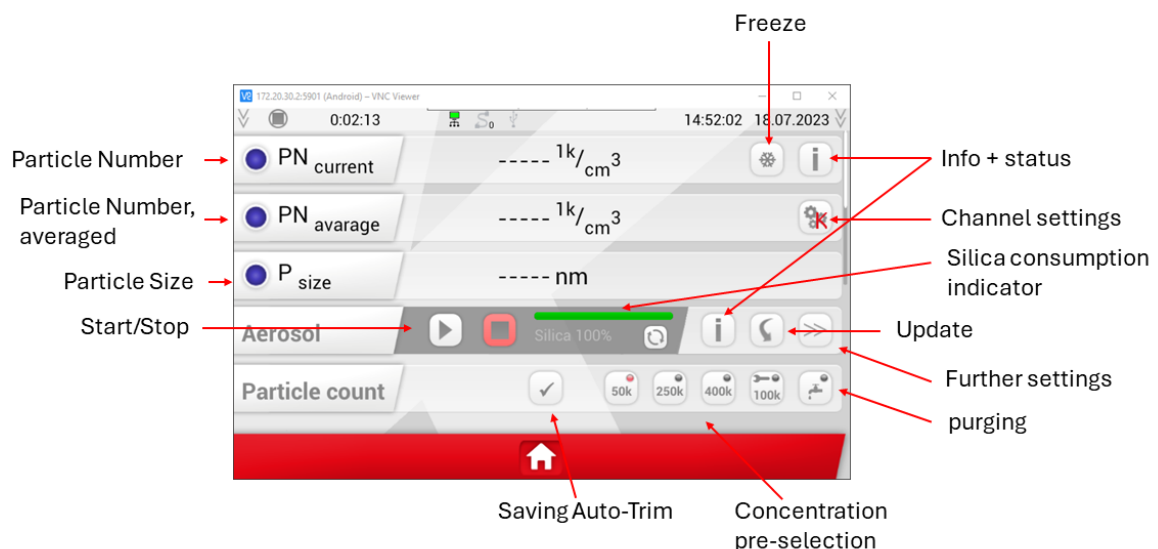


Figure 4: Homescreen



The **Home button** is always displayed, regardless of which page you are on. By tapping this button, you will always return to the home screen described above.

6.2.3 Stop mode

- After switching on, the device is in stop mode
- Device startup at low temperature: If the device is in a cold state at startup, a blue thermometer symbol appears as shown below. The symbol disappears as soon as the minimum temperature of the device is reached. Meanwhile, the device remains in stop mode (start button is inactive). **Even though the temperature symbol has disappeared, the device must adapt to the specified operating temperature before operation!**

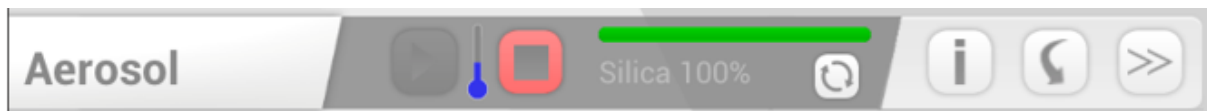


Figure 5: blue thermometer symbol during temperature adjustment

- Self tests of the particle counter have been passed
- Particle counter is on standby
- Atomizer (particle generator) is deactivated
- Generator dilution/fan is deactivated
- Lowest concentration selected as default setting

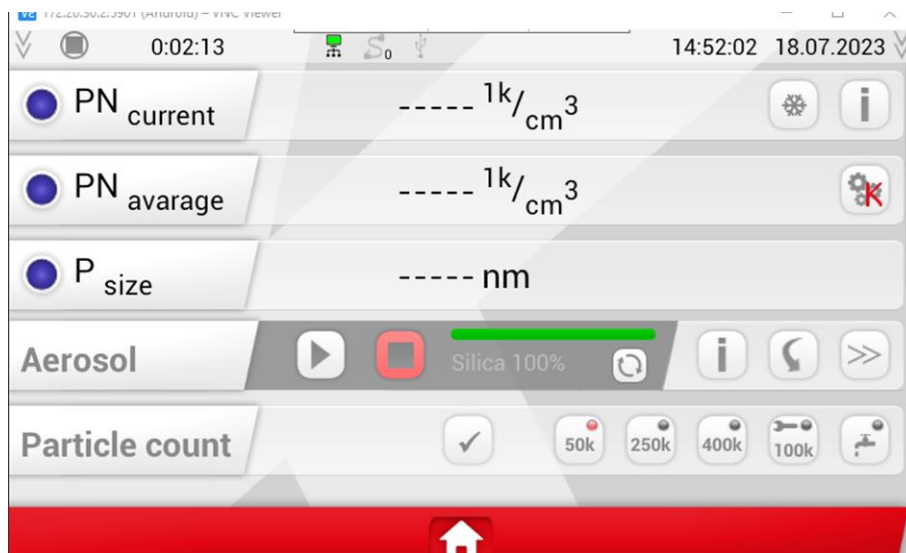


Figure 6: Device in stop mode

6.2.4 Measuring mode / Status LED

- The measuring mode can be activated directly after the start by tapping on the start button (highlighted in green in the following images)
- The generator starts at the lowest concentration
- Meaning of the colors of the status LEDs on the left edge of the screen:

- (1) Blue: Off (no data)
- (2) Red/Cross: Error / not ready for measurement
- (3) Yellow: Warning / deviation from the nominal state
- (4) Green/Check: Everything okay + settled
- Special status particle size:
 - Yellow/Grey (flashing): Warning "Particle size outside the specified range "



6.2.5 Measuring mode / Calibration

- After a stabilization phase and auto-trimming, the status LED for the particle count appears green, calibration can be performed
- In the second line the operator can already read an averaged value
- Per "Freeze function" (snowflake) all values can be frozen for a better reading
- As soon as the calibration of the first level has been completed, the next concentration levels can be set by tapping on "250k" or "400k"

6.2.6 Auto-trimming

- As of software version V1.00.030 / V0.09
- Manual trimming of older versions is no longer necessary

- After the waiting time of the generator (3 minutes after starting the device, 1 minute between the concentration levels), the auto-trimming starts and automatically trims the concentration up to the set level
- „Auto-trimming position saving“ → Tap on the checkmark to the left of the concentration buttons + confirm as shown below.
- Recommended for:
 - Setting of new concentration levels („teach-in“ of the new position)
 - Long waiting time until concentration is reached



Figure 7: auto-trimming button

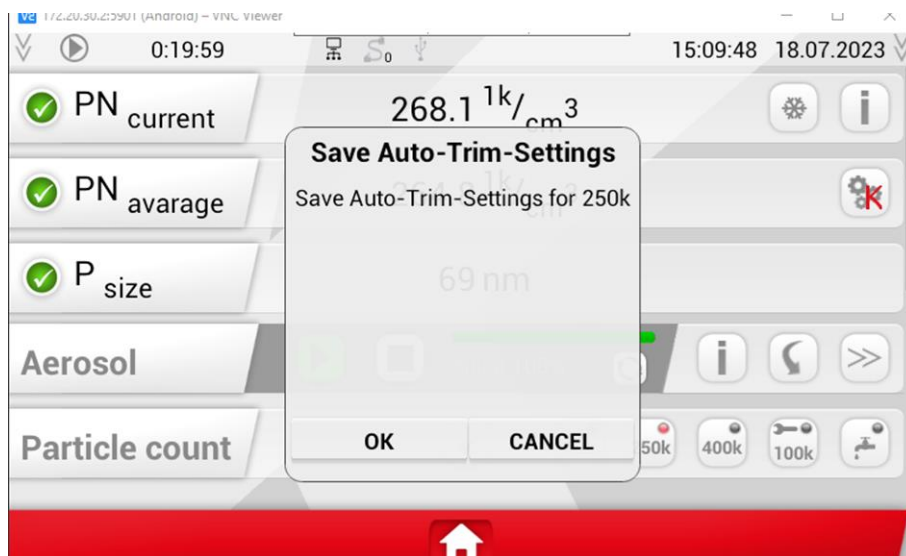


Figure 8: Save auto-trimming



Be aware that the auto trim button must be pressed only if a concentration has been reached and the LEDs are green.

6.2.7 Switch of the PNR 1000 K

Cleaning after each use!

- Select "Flush" level (water tap) and follow instructions in the display

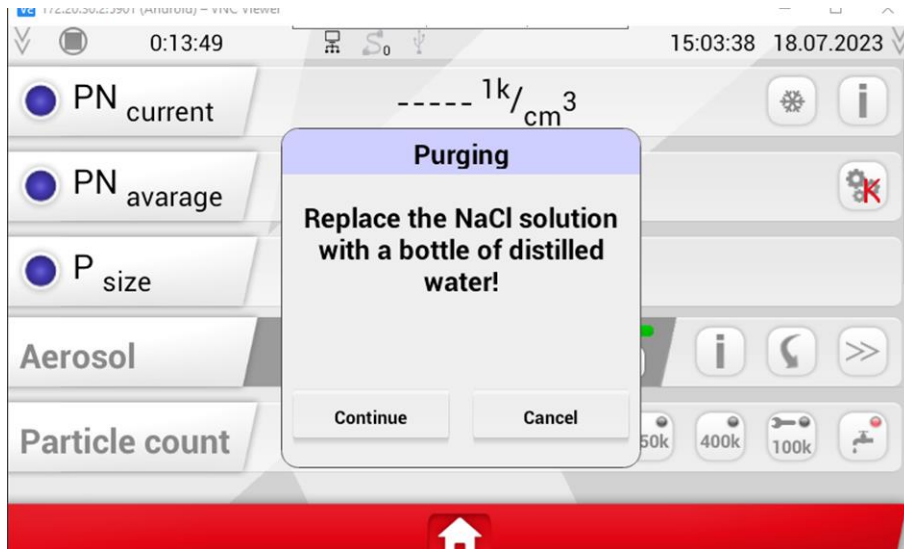


Figure 9: Start flushing



Figure 10: Progress display of flushing process



Figure 11: Dry flush

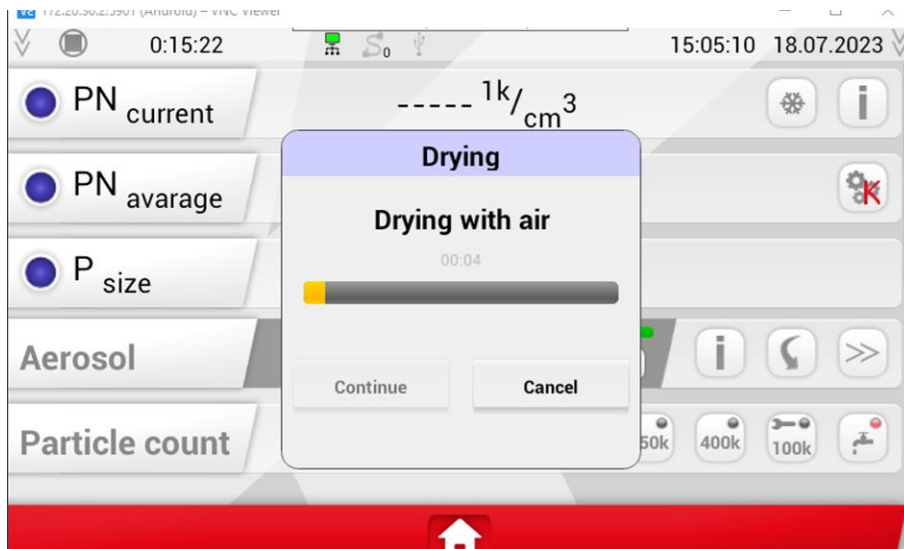


Figure 12: Dry flush progress indicator

👉 During air drying an empty container is recommended to be mounted.

- Dispose of used NaCl solution.

👉 It is recommended to also renew the distilled water after each use!

Switch off

- After flushing, wait until all pumps are inactive and the device is in stop mode
- Power switch to „0“

6.3 Other functions

6.3.1 System information

The current software version numbers are displayed in this menu.



Figure 13: System information

6.3.2 Status menu

- „Expert“-menu for error diagnosis
- Accessible via the info button
- Detailed information about generator as well as particle counter
- Return to main menu via "Home" button

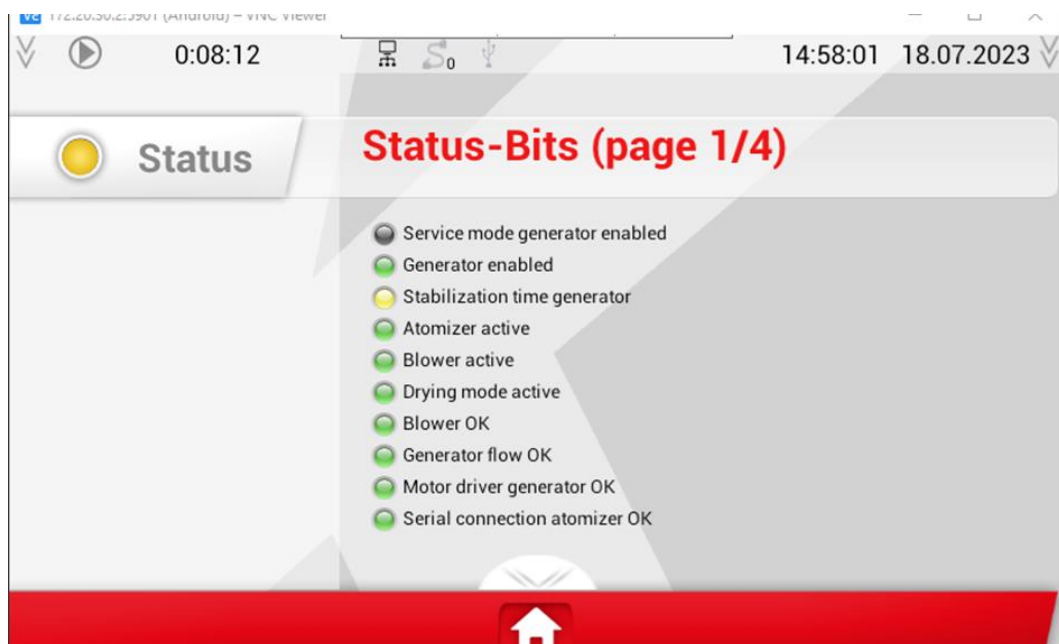


Figure 14: Status screen page 1/4

6.3.3 Status bar

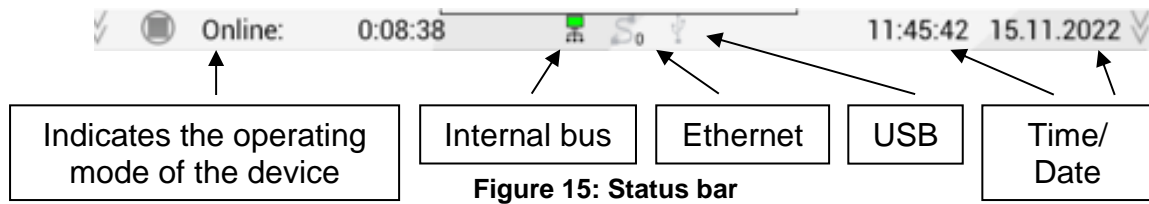



Figure 15: Status bar

 The status bar is always displayed, regardless of which menu item is selected. Tapping on the bar opens the status page. All temperatures and pressures can be read and checked here.

6.3.4 Detailed information about system parameters


- Can be called up by "swiping down" from the top of the display.

Temperatures		Actual(°C)	Target(°C)	Tol.(°C)
Temperature of generator	↓	34.0	----	----
Pressures		Actual(bar)	Target(bar)	Tol.(bar)
Housing pressure	↻	0.925	----	----
Generator pressure	↻	0.629	----	----
Currents		Actual(mA)	Target(mA)	Tol.(mA)
Separator current	⚡	209.8	----	----
Voltages		Actual(V)	Target(V)	Tol.(V)
Charger voltage	⚡	1497.785	----	----
Separator voltage	⚡	78.195	----	----
Flows		Actual(l/min)	Target(l/min)	Tol.(l/min)
Generator flow setpoint	SSSS	69.000	----	----
Generator flow	SSSS	69.100	----	----

Figure 16: System parameters

The detailed information about selected system parameters appears, such as:

- temperatures
- pressures
- power currents
- voltages
- flows

 The volume flow "Generator flow actual" must always be at least 1 liter higher than the withdrawal flow of the device(s) to be calibrated.

6.3.5 Channel settings

- Retrievable by tapping the settings button "K" next to the display of the averaged particle count
- The averaging time for the displayed particle count in the second line of the home screen can be set here

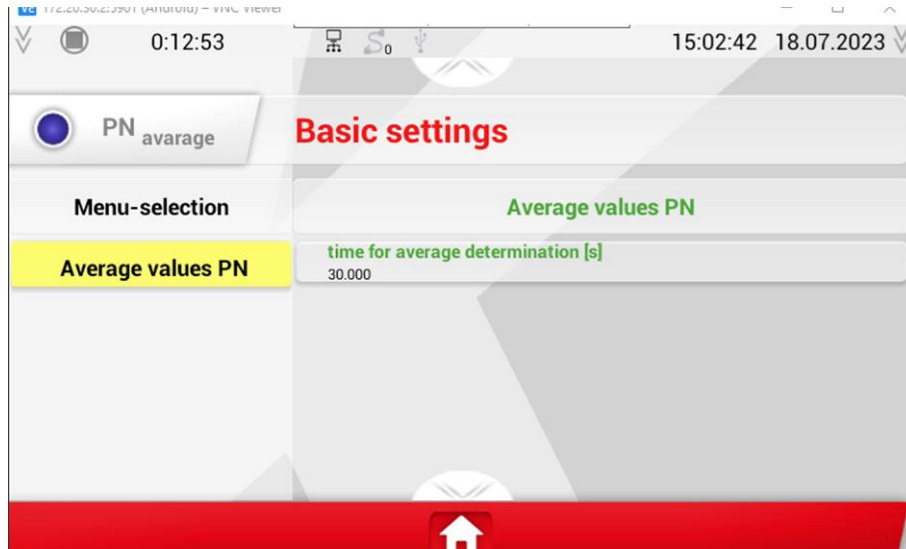


Figure 17: Basic settings/channel settings

6.3.6 System settings

- Available in the submenu see photo by tapping on the "double arrow" → Settings button "S".



Figure 18: Settings submenu

- Language selection
 - other languages on request
- Individual configuration of the concentration buttons
 - all target concentrations freely configurable
 - adjustment button as quick selection, e.g. for adjustment with additional concentration values

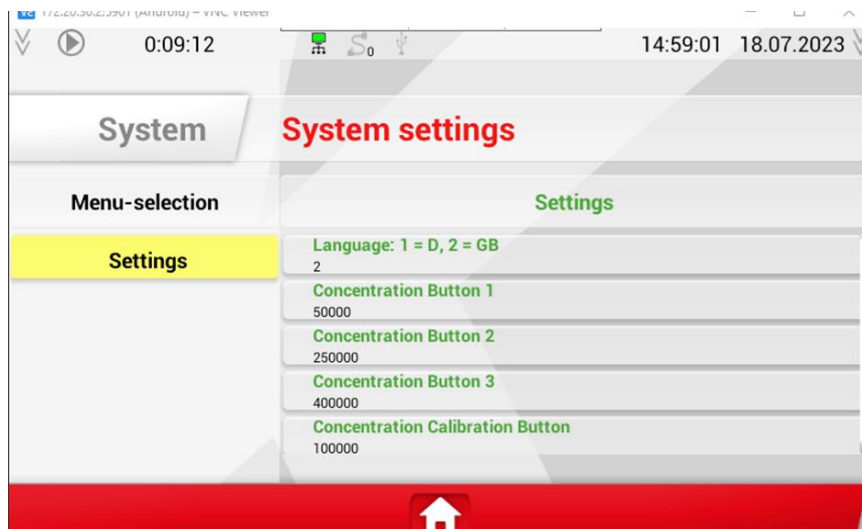


Figure 19: System settings

6.3.7 Calendar settings

- By pressing the "Calendar" key, the following settings can be made:
 - Time zone
 - Time format
 - Date format
 - Reference of the time and date

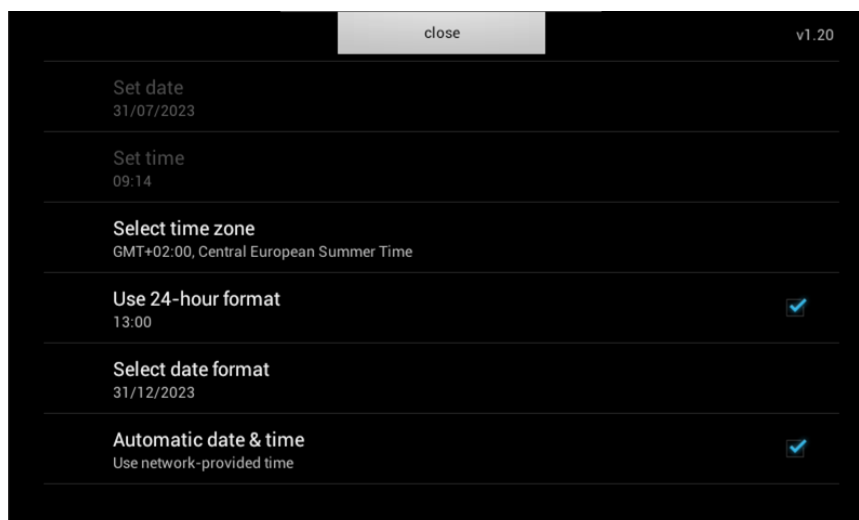




Figure 20: Calendar settings

7 Maintenance

7.1 Safety instructions for maintenance

<p>WARNING</p> 	<p>Risk of injury due to unprofessional work on the PNR 1000 K!</p> <ul style="list-style-type: none"> • Malfunctions, faults and deviations from normal operating conditions are to be investigated exclusively by personnel who are sufficiently qualified, instructed and authorized for this purpose. • Follow the relevant safety regulations.
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	<p>Please always quote the serial number of the device and the version number of the device software when contacting KNESTEL.</p>
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7.2 Maintenance plan

Interval	Maintenance work
Daily / with every use	<p>Before operation</p> <ul style="list-style-type: none"> • Visual inspection of all visible components (dryer, hoses, nozzle, display, etc.) • Check the color of the silica gel as well as the consumption indicator and replace the silica gel if necessary. • Filling up with new NaCl solution / level control NaCl solution <p>After operation</p> <ul style="list-style-type: none"> • Cleaning and drying of the nozzle according to instructions (flushing function) • Disposal of the used NaCl solution and distilled water • Distilled water: exchange regularly, at least every 3-5 calibrations, recommended: after every calibration
Annually by KNESTEL	<ul style="list-style-type: none"> • Maintenance and recalibration • → Appointment requests to service@KNESTEL.de

Table 3: Maintenance plan

7.3 Spare parts & accessories

Description	Knestel order number
Silica gel <i>Specification:</i> Silicon Dioxide, color change orange → colorless, grain size 2.0 - 5.0 mm, solid spheres.	ME SILICAGEL 1
Filling funnel	ME TRICHTER 1
Screw-in bottle for NaCl or distilled water	ME FLASCHE 1
Lid for screw-in bottle ME BOTTLE 1	ME KAPPE 7
Nozzle of the salt particle generator	ME DÜSE ATOMIZER
O-ring for the Nozzle	ME O R 7X1.5 V
Dryer cartridge for silica gel	ME TR PATRONE 1
Commercially available distilled water	Available in stores
NaCl solution / saline solution 500ml <i>Specification:</i> 0.9 Ma.-% (NaCl) saline solution	VM NACL 0,9% 2
Connector set for Silica cartridge	ME TR ANSCHL 1

Table 4: Spare parts & accessories

7.4 Replacing the silica gel

Disassembly overview



Figure 21: Disassembly overview

Open dryer cartridge



Figure 22: Open dryer cartridge (use screwdriver or coin)

The used silica gel must first be emptied from the dryer cartridge, then:

Fill in fresh silica gel using a funnel



Figure 23: Fill in silica gel

After the dryer cartridge has been filled with new silica gel, the consumption indicator in the display can be reset.


To do this, press the following button .



Figure 24: Reset consumption display

Spent silica gel can basically be regenerated, we recommend the following procedure:

- Empty the silica gel from the drying unit into a fireproof form (e.g. porcelain bowl, glass baking pan)


- Place the refractory mold with the silica gel in an oven (note: do not preheat)
- Operate the oven at 105 °C - 150 °C for about 4 hours. (Attention: higher temperatures can decompose the color indicator)
- Remove the refractory mold from the oven (Caution: risk of burns: use heat-resistant gloves/rags or a suitable tool for this purpose)
- You can see successful regeneration by the orange coloration of the silica gel
- Carefully empty the silica gel from the refractory mold into a temperature-resistant, sealable glass bottle. It is also best to use a temperature-resistant funnel for this purpose.
- Close the glass bottle and allow the silica gel to cool to ambient temperature.
- Once the silica gel has cooled it can be used again


7.5 Update menu



Figure 25: Update menu

7.6 Storage, decommissioning, recommissioning

<p>CAUTION</p> 	<p>Avoid damage to plant components due to unfavorable environmental conditions and improper handling during a storage or shutdown period!</p> <ul style="list-style-type: none"> • Keep system components away from negative influences such as moisture, dust, chemicals, vibrations, etc.! • Follow all instructions in this chapter. • Damage and/or service costs caused by non-compliance with these instructions are not covered by the warranty.
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 If you have any questions, please contact KNESTEL. Important service numbers can be found on the inside cover of this documentation.

7.6.1 Instructions for storage and decommissioning times

When storing the device, make sure that the enclosed liquids do not freeze. It is recommended to keep the specified operating temperature also during storage

7.6.2 Further instructions:


- Check painted metal surfaces for damage. Repair paint damage professionally.
- Treat bare (unpainted) metal surfaces with corrosion inhibitor.
- Close open connections with plugs (if supplied).

7.7 Troubleshooting

Error	Possible cause	Elimination
Device does not start	No power supply	Check voltage supply
	Power switch off	Switch on power switch
	Power supply unit defective	Manufacturer service
	Temperature too low (blue thermometer symbol is displayed)	Temperature adjustment within specified operating temperature
	"Self test error"	Contact Knestel for latest Software Updates
No particles are generated	No NaCl solution available	Refill NaCl solution and screw in
	Blocked nozzle	See next chapter
	Generator does not start	Check whether the solution in the NaCl container is "bubbling". If not, restart the device, check whether the measuring mode is active.

Concentration is not reached (status LED Auto-Trim remains yellow)	Nozzle of the salt particle generator clogged	Perform flushing function repeatedly Clean nozzle as in next chapter Clean (ultrasonic bath) or replace the nozzle of the salt particle generator. Perform the rinsing function after each use!
	Leakage	Check for leakage at the hoses and at the silica container.
		Check NaCl solution, Check tightness of screw bottle, Check tightness of hose lines and silica container
	No/wrong NaCl solution present	Check NaCl solution, refill and screw in
Particle Size is too high or jumps (duration > 20 minutes)	High humidity, condensing atmosphere	Perform temperature adaption prior to operation Assure no condensing conditions Let device operate at any concentration as long as required to reach the correct particle size Contact Knestel for latest product updates
	Rinsing function was not used at last operation	Perform rinsing function after each use
"Blower Limit error"	Indication for Software issue	Contact Knestel for latest Software Updates

Table 5: Troubleshooting

 If the malfunctions cannot be corrected, please contact service@KNESTEL.de. For a quick response please also take pictures of all status screens (see 6.3.2) and the system parameters (see 6.3.4)

7.7.1 Cleaning the Nozzle

- Remove Nozzle (lower part) including the extension (upper part)
- Check O-rings for damages
- Clean Nozzle with pressurized air or ultrasonic bath
- Assemble all parts again (be careful with the O-rings, ideally put distilled water on them for smooth assembly). Assure the Nozzle is tightened.



Figure 26: Nozzle (upper and lower part) of the salt generator

8 Transport and disposal



Disassembly, transport and disposal of the PNR 1000 K may only be carried out by specially authorized and trained personnel. Special hazards that must be expected are listed below.

8.1 Safety instructions for transport and disposal

WARNING



Risk of injury from improperly secured loads.

- Transport only by qualified personnel.
- Observe all valid national accident prevention regulations and safety regulations for occupational health and safety.
- For dismantling and transporting heavy components, use suitable transport aids and suitable load handling attachments with sufficient load-bearing capacity.
- Secure the load against tipping/falling off.
- Do not stand or work under suspended loads.

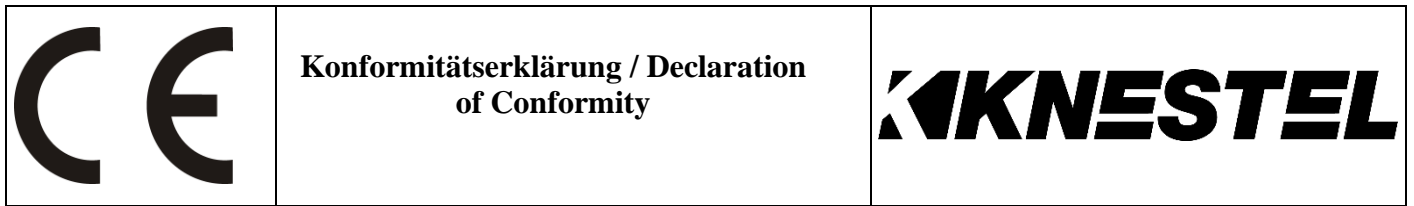
8.2 Transport

- The packaging for transport must be done as originally delivered from Knestel to avoid damage during shipment
- During transport, avoid shocks and impacts to components of the PNR 1000 K, especially when lifting and setting down.
- Dimensions and weights can be taken from the technical data
- If you have any questions, please contact KNESTEL. Important contact information can be found on the inside cover of this document.

8.3 Disposal

- In the event of disposal of the PNR 1000 K, it must be disposed of in an environmentally compatible manner on the basis of the locally applicable legal regulations.
- All materials are to be dismantled according to type and taken to a suitable recycling center.

9 Appendix A: Delaration of Conformity



KNESTEL Technologie & Elektronik GmbH

erklärt hiermit als Hersteller in alleiniger Verantwortung, dass nachstehend bezeichnetes Produkt in Konzeption und Bauart den grundlegenden Sicherheits- und Gesundheitsanforderungen der hier genannten EG-Richtlinien entspricht.
Bei Änderungen am Produkt, die nicht mit oben genannter Firma abgestimmt und genehmigt wurden, verliert diese Erklärung ihre Gültigkeit.

This declares the manufacture responsibility to ensure that the product named here meets the safety and health regulations both in design and construction required by the EC Guidelines stated below.

This declaration becomes invalid if any change is made to the product that was not discussed and approved by named company beforehand.

Typ / Model

PNR 1000 K

Bezeichnung / Designation

Referenz Kalibrator PNR 1000 K

EG-Richtlinien / EC Guidelines

- 2014/30/EU
- 2006/95/EG
- 2011/65/EU
- 2014/30/EC
- 2006/95/EC
- 2011/65/EC

EN-Normen / EN Standards

- EN 61000-6-2:2006+A1:2011-06
- EN 61000-6-4:2011
- EN 60950-1:2014-08
- EN 50581:2013

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen /
Authorized representative for the compilation of technical documentation

Hans Hartig

Hopferbach, 2022-11-16

Geschäftsführer / Managing Director
Dr. Ing. Markus Knestel



