

MACHEREY-NAGEL

NANOCOLOR® VARIO C2

NANOCOLOR® VARIO 4



- Handbuch
- Manual
- Manuel

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1. General information and introduction

The following operating instruction includes information for the models *NANOCOLOR*[®] *VARIO C2*, *VARIO C2 M* and *VARIO 4*. The manufacturer is not responsible for direct, indirect, accidental or consequential damages resulting from errors or omissions in this operating manual. The manufacturer reserves the right to make improvements to this manual and the products described herein at any time without prior notice or obligation. Revised editions of this manual are available on the manufacturer's website.

The heating blocks *NANOCOLOR*[®] *VARIO C2*, *VARIO C2 M* and *VARIO 4* from MACHEREY-NAGEL are devices for stationary use in the laboratory. They are used for sample preparation using colorimetric test kits and *NANOCOLOR*[®] digestion chemicals from MACHEREY-NAGEL. Standard parameters for routine digestions are pre-programmed in the heating blocks and help the user to avoid errors. The touch screen and the intuitive menu navigation allow a fast, safe and comfortable workflow with the devices and allow the operation without complex training.

2. CE Marking



The CE marking declares that the product complies with the following European Community harmonization legislation:

European Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE)

European Directive 2014/30/EU on the harmonization of the laws of the member states relating to electromagnetic compatibility (EMC)

European Directive 2014/35/EU of electrical equipment designed for use with certain voltage limits (LVD)










3. Type label



Figure 1: Type label of the heating blocks NANOCOLOR® VARIO C2, VARIO C2 M and VARIO 4

4. Explanation of symbols

The device type plate and these operating instructions contain the symbols or terms listed below, which have the following meaning:

Term / Symbol	Meaning
NANOCOLOR® VARIO 4	Device type designation
SN	Serial number of the device
110/230 V, ~50/60 Hz	Power supply
300/550 VA	Power consumption
	Attention (observe documentation)! Observe the safety instructions in the operating instruction of the device
	According to 2012/19/EU, it is prohibited to dispose of the device through public waste disposal systems. Note also the information in the "Disposal" section.
	The CE symbol indicates fulfillment of the applicable harmonization legislation of the European Community.
	Identification USB interface
MACHEREY-NAGEL	Identification of the manufacturer
	This symbol indicates that there is a risk of electric shock.
	This symbol indicates that the chemicals used have a corrosive effect. Observe the safety measures in the laboratory and wear the suitable protective equipment. Observe the instructions in the current safety data sheets (SDS) of the products used.
	This symbol indicates that there may be a danger by using flammable substances.
	This symbol indicates that the designated area can become hot and must not be touched without suitable protective measures.
	Explanations to the text. Tips and tricks for better handling.

5. Safety instructions

BE SURE TO READ THE FOLLOWING SAFETY INSTRUCTIONS CAREFULLY BEFORE USING THE DEVICE.

Failure to follow these instructions may result in serious injury to the operator, malfunction or damage to the equipment.

Keep this operating instruction in a safe place for future reference.

Follow the safety notes and instructions in the operating instruction and observe the stickers and notices on the device.

Do not work on internal parts of the unit. Non-compliance will invalidate any warranty claim.

Use of the hazard warnings:

DANGER

Indicates an imminent or potentially hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates an imminent or potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Indicates a situation which, if not avoided, may result in malfunction or damage

6. Chemical safety

WARNING

Possible dangers of contact with chemical substances.

Working with samples, reagents and corresponding accessories is associated with dangers.

Wear suitable protective equipment when working with the cuvettes. Observe the safety data sheet (SDS) of the test kit used

During normal operation of this device, it may be necessary to use chemicals that are hazardous to your health or biologically harmful samples.

Before handling these substances, read all hazard statements and safety information printed on the containers with the original solutions and in the safety data sheets. All used solutions must be disposed of in accordance with the national laws and regulations. The type of protective equipment must be selected according to the concentration and amount of the hazardous substance present at the corresponding workplace.

7. Technical description

The heating blocks *NANOCOLOR® VARIO C2*, *VARIO C2 M*, and *VARIO 4* offer space for the sample preparation of cuvettes with 16 mm outer diameter and in the case of the *VARIO C2 M* for cuvettes with 16 mm and 22 mm outer diameter. Six temperatures (70 °C, 100 °C, 120 °C, 148 °C, 150 °C and 160 °C) and five heating times (10 min, 30 min, 60 min, 120 min and continuous) are pre-programmed. The aluminum block of the unit is heated to the set temperature by a heating cartridge. The temperature is automatically maintained for the set heating time after it has been reached. After the time has expired, the heating process is automatically interrupted and an acoustic signal is given.

7.1 Technical Data

Type:	Heating block for chemical-analytical digestion
Bores:	2 × 12 with 16 mm OD (<i>VARIO 4</i>) 8 with 16 mm OD + 2 with 22 mm OD (<i>VARIO C2 M</i>) 12 with 16 mm OD (<i>VARIO C2</i>)
Display:	Backlit, multicolor LCD touchscreen
Operations:	Icon-based menu guidance via touch screen
Temperatures:	6 preprogrammed temperatures 70 °C / 100 °C / 120 °C / 148 °C / 150 °C / 160 °C, 6 free memory locations for individual temperature settings
Temperature range:	40 °C–160 °C (1 °C increments)
Temperature stability:	± 1 °C (according to DIN, EN, ISO and EPA methods)
Warm up time:	From 20 °C to 160 °C within 10 min (at 20 °C)
Heating times:	5 preprogrammed heating times, 10 min / 30 min / 60 min / 120 min / cont. 7 free memory locations for individual heating times
Time range:	0 h:01 min–9 h:59 min (1 min increments)
Safety:	Replaceable safety covers as contact protection, lockable protective lids, overheating protection
Interfaces:	Bidirectional RS-232, USB A (function), USB B (host)
Internal quality control (IQC):	With <i>NANOCOLOR</i> [®] T-Set (REF 919917) and <i>NANOCOLOR</i> [®] USB T-Set (REF 919921) optional fully automatic calibration and generation of a test certificate for device control and monitoring
Languages:	DE / EN / FR / ES / HU / PL / CZ / TR / DK
Update:	via USB-Stick
Operating range:	10 °C–40 °C; max. 80 % relative humidity (non-condensing), up to 3000 m
Power supply:	110 V / 230 V, ~50 / 60 Hz
Power consumptions:	300 / 550 W (<i>VARIO 4</i>) 150 / 300 W (<i>VARIO C2</i> , <i>VARIO C2 M</i>)
Dimensions:	290 mm × 287 mm × 146 mm (<i>VARIO 4</i>) 169 mm × 282 mm × 146 mm (<i>VARIO C2</i> , <i>VARIO C2 M</i>)
Weight:	ca. 3.2 kg (<i>VARIO 4</i>) ca. 2.0 kg (<i>VARIO C2</i> , <i>VARIO C2 M</i>)
Warranty:	2 Years
CE certified:	Yes
Declaration of conformity:	On request
Overvoltage category:	II
Degree of pollution:	2

8. Setting up and connecting the device

WARNING



Risk of burns: The safety cover(s) must be installed to prevent personal injury. The safety cover prevents burns. Always keep the protective cover(s) closed during operation.

DANGER



Risk of electric shock: The safety cover(s) must be installed to prevent personal injury. The safety cover prevents damage to the power cord. Always keep the protective cover(s) closed during operation.

CAUTION

Risk of injury due to the danger of tipping over due to slipping. Place the device on a flat surface. Do not stack the appliance. Set up the unit in a laboratory or similar environment (recommended location: fume hood).

NOTICE

Only place the device in a designated location. Make sure that the surface is dry, clean, level and horizontal to avoid overheating the unit. If possible, set up the unit on a flame-retardant surface (e.g. laboratory bench).

NOTICE

Damage due to condensation and exceeding the temperature limits:
The device is designed for indoor use only. Operate the device in a clean and dry environment.

WARNING

Take care not to overload the mains socket. There is a risk of overload and fire. Make sure that the power cord is not damaged. Check the suitability of the power source used for the equipment.

WARNING

Risk of injury: Familiarize yourself with the device before working with it and read this document carefully. Do not use the device unless you have received instruction in its use.

NOTICE

Defects at the power supply and housing can lead to malfunction of the device. If the device shows an apparent breakage of the housing or a damaged power supply, it must be taken out of operation.

8.1 Scope of delivery

- Check the delivery for completeness. If parts of the delivery are missing, contact MACHEREY-NAGEL or your local distributor directly.
- Heating block *NANOCOLOR® VARIO C2 / VARIO C2 M / VARIO 4*
- Power cable
- Fuse with socket, Size: 5x20mm T3,15AH (time lagging, high breaking capacity)
- 1 × protective cover (*VARIO C2* and *VARIO C2 M* only)
- 2 × protective cover (*VARIO 4* only)
- USB data cable (A/B)
- Software DVD
- Quick start Guide

8.2 Connecting the device

NOTICE

Use only the approved power cord.

The separately packed fuse of the heating block is marked by a sticker in the delivery box.

1. Remove the fuse and insert it into the socket on the back of the heating block. The insertion direction is determined by the locking device. (Figure 2)
2. Place the supplied protective hood(s) on the device.
3. Connect the supplied power cord to the unit and then to the power outlet.



Figure 2: Insertion of the fuse into the heating block

8.3 Transport

To transport the device, the delivery box with its protective interior is best suited. Therefore, keep the packaging. If you no longer have the packaging in hand, use a suitable cardboard box as outer packaging and soft padding material so that the device cannot slip during transport.

9. Device views



Figure 3: Front view VARIO 4



Figure 4: Rear view VARIO 4



- ① Display / Touchscreen
- ② Safety cover as contact protection
- ③ Foldaway protective cover
- ④ USB-A interface
- ⑤ USB-B interface
- ⑥ RS-232 interface
- ⑦ I/O switch
- ⑧ Fuses
- ⑨ Device type label
- ⑩ Power connection


10. Initial operation

10.1 Turning on the device

Connect the heating block to the power supply and switch it on with the main I/O switch (Figure 4, No. ⑦) located on the back of the device. The device will start up and the manufacturer's logo will be displayed. After a few seconds the start screen will appear.

NOTICE



By pressing , the info screen will be displayed. The serial number, installed software- as well as bootloader versions will be displayed.

NOTICE

The device must always be set up in such a way that the on / off switch can be operated at any time.

10.2 Switching off

NOTICE

If you are not going to use the device for a longer period of time, take it out of operation and disconnect it from the power supply.

To switch off the device, tilt the I/O switch on the back of the device (Figure 3, No. ⑦) to the right (O).



11. Operation and user guidance


NOTICE


Do not operate the touch screen with sharp or pointed objects, as this will damage the screen.


The heating block has an illuminated, color touch screen display (Figure 4, No. ①). The display is operated by touching individual fields. Familiarize yourself with the operation of the touch screen display by touching individual buttons with your finger or a special stylus. Touching buttons selects the corresponding function.

12. Program selection

On the Home screen (Figure 4), select the desired temperature or time by pressing  or  several times. By setting the values on the right side of the display, the right half of the heating block is controlled. The same applies accordingly to the left side (VARIO 4 only).

 Call a pre-programmed temperature. The last used temperature is always displayed first. The keys work in jog-roll mode. Only programmed temperatures from the smallest to the largest are displayed.

 Call a pre-programmed time. The last used time is always displayed first. The keys operate in jog-roll mode. Only programmed times from the shortest to the longest are displayed.

Press  to start the digestion (see Performing a digestion, page 48).

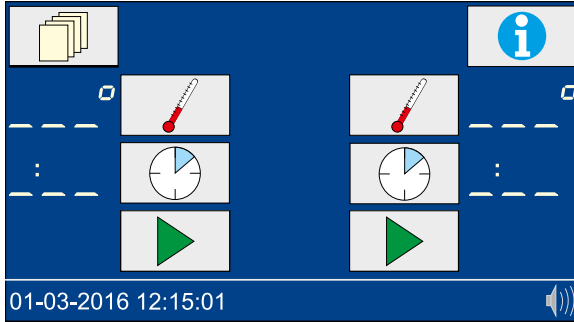





Figure 5: Home screen

12.1 Settings

Press  on the Home screen to access the settings (Figure 6). Press  to return to the home screen. Pressing  in the respective settings menus will return to the Settings overview menu without saving the selection.

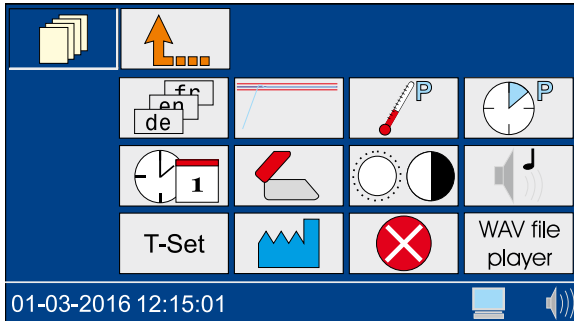


Figure 6: Settings

12.1.1 Language

Pressing  takes you to the language selection (Figure 6). Select the desired language and confirm with .

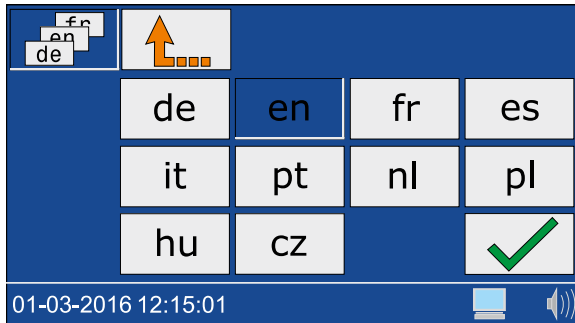







Figure 7: Language selection

12.1.2 Graphic mode

Pressing  displays a window for switching on (icon ) and off (icon ) the graphic mode. Confirm the desired setting with .

When the graphics mode is active, the temperature curve appears on the display (see Temperature monitoring, page 51).

12.1.3 Programming the temperature

Press  to access the selection of programmed temperatures (Figure 8).

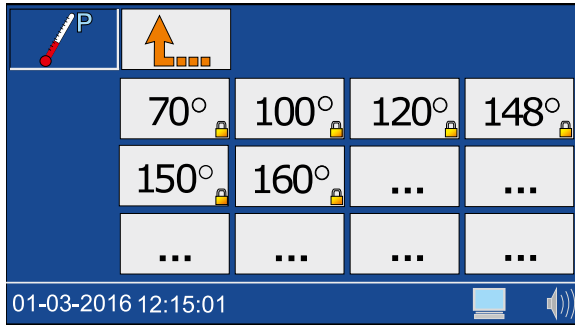




Figure 8: Programming the temperature

Select a free memory location () and enter the desired temperature in the range 40 °C–160 °C (Figure 9). Confirm the temperature with .

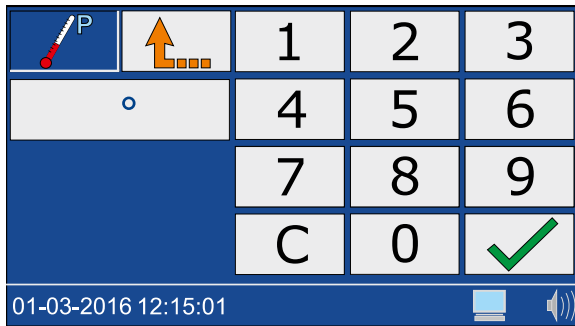


Figure 9: Setting the temperature

Temperatures programmed by the user can be deleted or edited in the same way. Preprogrammed temperatures cannot be changed.

12.1.4 Programming heating times

Press  to access the heating time settings (Figure 10).

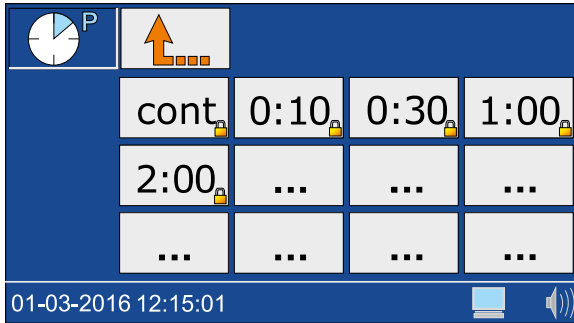




Figure 10: Programming the heating time

Select a free memory location () and enter the desired heating time in the range 0h:01 min-9h:59 min (Figure 11). Confirm the heating time entry with .

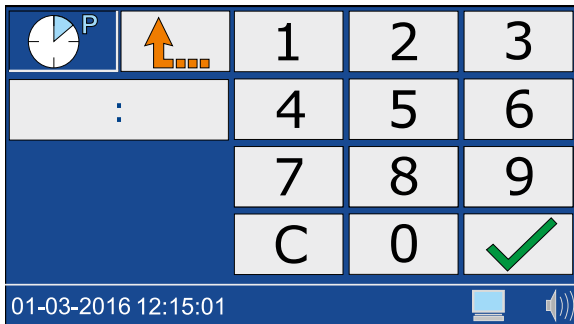


Figure 11: Editing heating times

Heating times programmed by the user can be deleted or edited in the same way. Preprogrammed heating times cannot be changed.

12.1.5 Date/Time







Pressing  takes you to the date and time settings (Figure 12). Enter the time in the form hh:mm. Select the date field by touching it. Enter the date in the form dd:mm-20yy and confirm with .

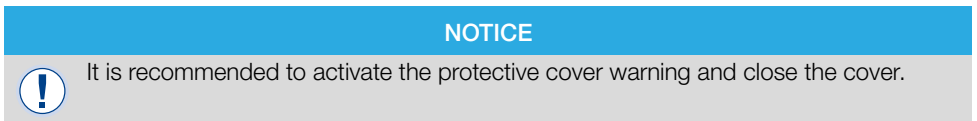


Figure 12: Setting the date and time








12.1.6 Protective cover warning

Pressing  displays a window for switching the protective cover warning on (icon ) and off (icon ). Select the desired setting and confirm with .

If the protective cover warning is activated and the cover is not closed, an icon appears in the start screen during measurement and an entry is generated in the error log.



12.1.7 Display settings

Pressing  takes you to the display settings (Figure 13). By pressing the arrow keys  and , you can adjust the brightness , contrast  and the saturation of the display  to the desired conditions. Select the desired settings and confirm them with .

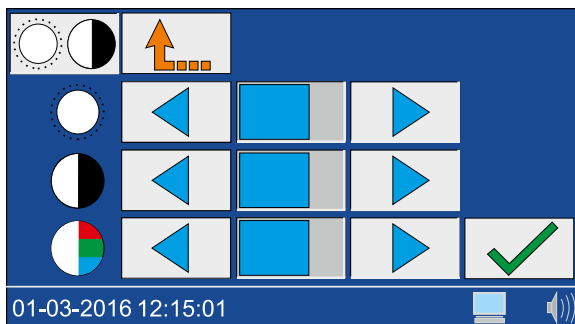








Figure 13: Display settings

12.1.8 Signal tone



Pressing  takes you to the signal tone settings. Use the arrow keys  and  to adjust the volume. The setting is indicated in the status line by the icon . Select the desired settings and confirm with .





When the signal tone is activated, different device states (e.g. finished digestion) are indicated acoustically.

12.1.9 T-Set


Press  to access test equipment monitoring with the T-Set. Here you can independently carry out quality controls with the *NANOCOLOR*[®] USB T-Set (REF 919921) or *NANOCOLOR*[®] T-Set (REF 919917). For further details, refer to chapter Quality Control, page 53.

12.1.10 System settings

Pressing  takes you to the menu for restoring the factory settings. Press  again to reset the factory defaults for the following settings:

-  User-defined temperatures
-  User-defined heating times
-  Display settings
-  Sound settings

Select the desired setting that you want to reset to factory defaults and confirm with .

The service menu (icon ) is secured by a service code. The use of this menu is reserved exclusively for service personnel for service work.

12.1.11 Error log

Press  to enter the error log menu. A window appears with a list of the errors that have occurred.

All system messages that have occurred are logged. The messages can be filtered by the categories Notes/Warnings and Error messages by clicking on the respective icon.

12.1.12 WAV-Player

To use the “WAV File Player”, contact MACHEREY-NAGEL.

13. Performing a digestion

13.1 Sample preparation

WARNING



Risk of chemical burn: Test kits with corrosive and dangerous substances. Wear suitable protective equipment when working with the cuvettes. Refer to the Safety Data Sheet (SDS) of the test kit used.

WARNING



Cuvettes can overheat! Risk of burns, chemical burns and cuts. Check the digestion conditions. Check the notes and instructions in the operating manual of the test kit used. Pay particular attention to the specified digestion temperatures and digestion times.

! WARNING

Damaged cuvettes can break during the digestion process. Do not use cuvettes that are damaged or were dropped. Make sure that the cuvettes are not damaged before inserting them into the heating block.

Prepare the sample according to the instructions in the package insert and the pictogram instructions (Figure 14).

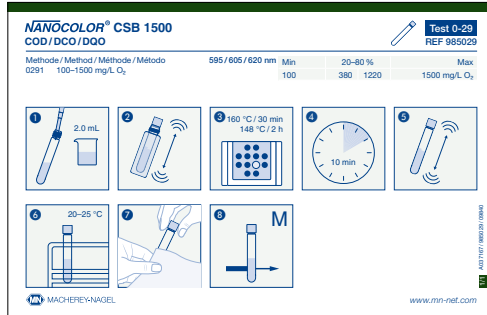


Figure 14: Example of pictogram instructions

13.2 Insert cuvettes

NOTICE



Contaminated cuvettes can damage the heating block. Clean the outside of the cuvette before inserting it into the bores of the heating block.

WARNING



The heating block becomes very hot, there is a risk of burns. Do not insert your fingers into the bores of the heating block. Close the protective lid during operation and keep the lid closed during the entire heating and cooling phase.

Prepare the cuvettes as described in the instruction manual of the test kit and insert them into the provided bores of the heating block (Figure 15). Close the protective lid(s) of the heating block.



Figure 15: Inserting cuvettes into the heating block

13.3 Perform digestion

WARNING

The protective cover(s) must be installed and closed to prevent injury.


WARNING

Risk of inhalation of irritant vapors. During digestion in an open system (e.g. digestion with top-mounted cooler) harmful vapors may escape. When performing a digestion with open cuvettes (digestion with top-mounted cooler), the heating block must be operated in a fume hood.

WARNING





Risk of chemical burns: If a cuvette breaks, make sure that the liquid does not come into contact with the skin. If necessary, use an exhaust system to remove chemical vapors.

Press  to start the selected program. The selected temperature will flash on the display during the heating phase. When the desired program temperature has been reached, a signal tone sounds and the selected time runs out. The colon between hours and minutes flashes in the display while the heating time is running.

During the heating phase, the current temperature can be displayed by pressing the  key.

NOTICE



A running program can be aborted at any time. A program abort is initiated by pressing the  key. STOP appears on the display. Within 5 s, the abort must be confirmed by pressing the  key again, otherwise the program will continue to run normally.

13.4 Temperature monitoring

When Graphic mode is activated (see chapter Graphic mode, page 44), the start screen changes to Graphic mode (Figure 16) a few seconds after a program is started and displays the temperature curve of the current heating process.

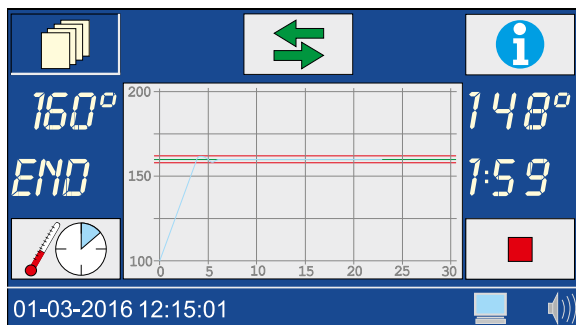




Figure 16: Graphic mode

The temperature range can be enlarged or reduced by tapping the graphic field. Pressing the  button takes you back to the program selection. With the heating block NANOCOLOR® VARIO 4 it is possible to switch between the two sides of the heating block in the graphic mode (see chapter Graphic mode, page 44) by pressing the  key. If the display is not touched for some time in the program selection, the view automatically changes back to the graphic mode.

13.5 Remove cuvettes

WARNING



Danger of burns. The sample cuvettes are hot. Wear suitable protective equipment (e.g. thermally insulating gloves). Remove the vials only when the temperature is below 80 °C.

WARNING




Risk of injury: If the cuvettes cool down quickly, there is a risk that they will break and cause cuts. Do not cool hot vials with cold water unless specifically required. Allow the vials to cool in the air or in the heating block.

! WARNING



Dispose of chemicals, waste and used cuvettes according to national, regional and local regulations.

When a program is finished, a signal tone is emitted (see chapter Signal tone, page 48) and the digestion is finished. "END" appears in the display. Open the protective hoods and remove the vials from the heating block (Figure 17).

After pressing one of the keys ,  or  the last selected program is recalled.

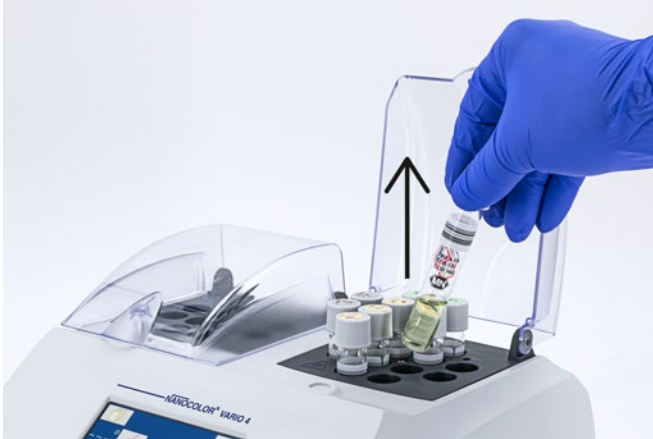


Figure 17: Removing the cuvettes from the heating block

NOTICE






The internal fan of the device runs parallel to the sample digestion and, if necessary, even beyond.



14. Quality Control

Each institution must establish its own QC policy.

To check the performance of the device, we recommend measuring the temperature with a thermocouple. The temperature accuracy can be checked with the *NANOCOLOR*[®] USB T Set (REF 919921) or *NANOCOLOR*[®] T Set (REF 919917) provided by MACHEREY-NAGEL. These temperature probes are suitable for checking the device in case of a deviation and for adjusting the device.

Pressing  in Settings  takes you to test equipment monitoring with (USB) T-Set.

Press the  key to open the test menu. In the test menu all programmed temperatures are checked. In this menu the calibration of the device is not changed.

Press the  button to open the calibration menu (Figure 18). In the calibration menu, all programmed temperatures are readjusted using the base calibration stored in the (USB) T-Set. After finishing a calibration, the acceptance of the new values must be confirmed with .

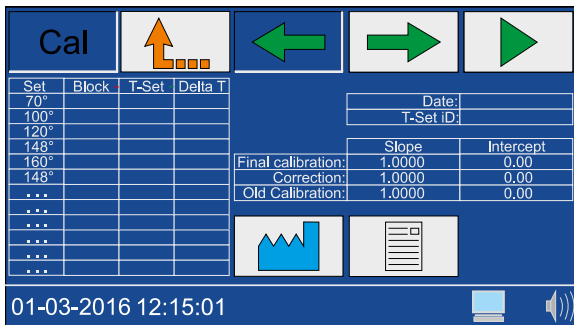








Figure 18: Menu for device adjustment

Pressing the  button in the calibration menu will restore the device calibration to factory default. With the heating block *NANOCOLOR*[®] VARIO 4, the block to be tested (left or right) can be selected in the two menus  and  with the keys  and .

Press the  key to start the selected program. The determined temperature deviations are displayed in different colors depending on the deviation.

Deviation	Color
< 1 °C	Green
1 < x < 2 °C	Yellow
> 2 °C	Red

A report is stored in the device for both temperature testing and calibration. This report can be output using the software supplied (see Data Export).

15. Data export

The data generated in the course of quality control can be output to a PC using the “Kalib-Software” program supplied. Proceed as follows:

1. Connect the heating block to a computer using the USB-A/B cable provided (see scope of delivery) and check the connection (device manager).
2. Start the “Kalib-Software” from the supplied DVD. The connected heating block is automatically searched and the data is read in the background.
3. Click on “Testing” in the software to generate a certificate of temperature verification. Click on “Calibration” to generate a certificate of heating block adjustment.
4. Then disconnect the device from the computer.

16. Update

NOTICE

We recommend to make a data backup before the update (see chapter “Data export”).

MACHEREY-NAGEL offers updates for the heating blocks on its website. Download the folder with the update files from the MACHEREY-NAGEL website. Unzip the folder and follow the instructions in the update guide.

17. Maintenance and cleaning of the device

17.1 Cleaning of the device

NOTICE



For all cleaning work, the unit must be switched off and disconnected from the power supply.



WARNING



Fire hazard: Do not use flammable cleaning agents or organic solvents to clean the unit.



WARNING



Danger of burns: Do not clean the device while it is still hot.



WARNING



Risk of chemical burns: If a cuvette breaks, make sure that the liquid does not come into contact with the skin. If necessary, use an exhaust system to remove chemical vapors.



WARNING



Dispose of chemicals, waste and used cuvettes according to national, regional and local regulations.

 **WARNING**

Danger of boiling delay: Always keep the bores of the heating block dry.

NOTICE

Do not clean the device with acetone or similar products.

Clean the unit regularly to ensure continuous and correct operation.

Turn off the unit by disconnecting it from the power source.

Wipe the outside of the device with a damp cloth or a mild detergent and then dry the device with a soft cloth. Remove splashes on the unit immediately. If necessary, clean or dry the touch screen with a soft, lint-free cotton cloth. Light dirt in the holes can be removed with a soft brush.

If the inside of the device is contaminated by a cuvette leak, contact the manufacturer or local distributor and arrange for the following measures to be taken:

- a) Switch off the device and disconnect it from the power source.
- b) Wait until the temperature of the heating block has dropped to room temperature.
- c) Use a pipette to remove any remaining liquid in the holes and dispose it of according to the applicable regulations.
- d) Remove glass splinters with tweezers and remove any remaining liquid on the device. Avoid contact of the liquid with the skin.

17.2 Maintenance

NOTICE

Malfunction or damage of the device due to incorrect maintenance. Maintenance of the device may only be carried out by qualified personnel.

 **WARNING**

Contaminated bores can damage the cuvettes used. Check the cleanliness of the holes at regular intervals and as part of maintenance. Contaminated wells must not be used for sample digestion. Clean the dirty wells.





Establish maintenance intervals according to the regulations that apply to you. Regardless, MACHEREY-NAGEL recommends at least one annual maintenance of the unit. The following points should be part of a maintenance of the unit:

- Check the power supply
- Check the function of the display and touch screen
- Check the cleanliness of the unit and the bores
- Check the individual temperatures (see chapter Quality Control)
- Check the heating time (against stopwatch)
- Check time and date
- Check the automatic switch-off after the time has expired

If you have any questions about maintenance of the unit, contact MACHEREY-NAGEL or your local representative.

18. Errors, sources and solutions

Depending on the operating status, different messages can be displayed. The source of the error can be either an operating error or a malfunction of the device.

Error	Source	Solution
Current temperature is too high to start the selected program	The actual temperature of the heating block is warmer than the selected temperature	Wait until the heating block has cooled down and start the program again. The current temperature of the block can be displayed by pressing  .
Digestion aborted	The temperature has deviated from the setpoint by more than 4°C during digestion. The digestion was automatically interrupted.	Do not insert cuvettes into the holes of the heating block during digestion.
The entered temperature/time is already in the memory.	The newly entered temperature/time already exists.	Use the temperature/time already programmed.
The entered temperature is outside the possible range.	The entered temperature does not correspond to the possible temperature limits.	Enter a temperature in the range 40–160 °C.
Critical hardware error.	There's a hardware problem.	Contact MACHEREY-NAGEL.
The unit does not start correctly after being switched on.	The fuse is defective. The power supply is defective.	Check the power supply to the unit and check the fuses on the back of the unit.
Only one T-set can be used. If you want to use the (USB) T-set, disconnect the (USB) T-set first.	Two T-sets are connected for temperature testing.	Disconnect the connection to the T-set that you do not want to use.
The device connected to the USB port is not supported	The used device is not recognized because it is unknown or defective.	Connect the device again. Check the function of the unit on another instance (e.g. PC).
The last test data will be lost if you leave the test now. Press  to continue.	The data of the current test (see chapter Quality Control) has not yet been saved.	Wait until the test is finished before leaving the menu.
The last calibration data will be lost if you leave the calibration now. Press  to continue.	The data of the current calibration (see chapter Quality Control) have not yet been saved.	Wait until the calibration is finished before leaving the menu.
The T-set must be connected to finish the calibration/test. Press  to stop the process.	The (USB) T-Set was removed during calibration/test.	Reconnect the (USB) T-Set to the device to finish the calibration.
The T-Set must be connected to start the calibration/test.	No (USB) T-Set is connected.	Connect a (USB) T-Set to the heating block and repeat the procedure.
The difference between the heating block and T-set temperature is outside the permissible range. Check whether the T-set is connected correctly.	The (USB) T-set is not properly connected. The temperature sensor is not inserted correctly in the bore hole. The temperature sensor is inserted on the wrong side (VARIO 4 only).	Check that the (USB) T-set is properly plugged in. Check that the temperature sensor is inserted correctly. Check that the temperature sensor is inserted on the correct side (VARIO 4 only).

Error	Source	Solution
Overtemperature sensor was activated (185°C). Take the heating block out of operation.	The temperature sensor is defective and the block is overheated	Contact your distributor or MACHEREY-NAGEL to request repair of your unit.

19. Service

19.1 Spare parts, accessories and consumables

NOTICE

Only use accessories and spare parts approved by the manufacturer. If parts not approved by the manufacturer are used, the operator is responsible for the conformity of the device and the warranty will be voided.

WARNING

Risk of injury: Injury to persons and damage or malfunction of the device or equipment when using parts not approved by the manufacturer. The replacement parts in this section are approved by the manufacturer.

Description	REF
<i>NANOCOLOR®</i> USB T-Set for electronic temperature control and calibration for heating blocks <i>NANOCOLOR®</i> VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC / VARIO Mini	919921
<i>NANOCOLOR®</i> T-Set for electronic temperature control and calibration for heating blocks <i>NANOCOLOR®</i> VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC / VARIO 3 / VARIO compact	919917
T-Set Adapter 16 mm	919924
Protective cover for <i>NANOCOLOR®</i> VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC, transparent	919310
Protective cover with bores for TOC tests for <i>NANOCOLOR®</i> VARIO 4 / VARIO C2 / VARIO C2 M / VARIO HC, transparent	919309
Safety cover sheet for <i>NANOCOLOR®</i> VARIO 4 / VARIO C2 / VARIO HC / VARIO 3 / VARIO compact	916598
Reducing adaptors 16 → 13 mm for <i>NANOCOLOR®</i> heating blocks (8 pieces)	916910
Reducing adaptors 22 → 16 mm for <i>NANOCOLOR®</i> heating blocks (2 pieces)	919916
Tube for sample decomposition 22 mm Ø, NS 19/26 with glass stopper for <i>NANOCOLOR®</i> VARIO C2 M (2 pieces)	91666
Empty reaction tubes with 16 mm outer diameter (20 pieces)	91680
Empty reaction tubes with 22 mm outer diameter for <i>NANOCOLOR®</i> VARIO C2 M (2 pieces)	91622
USB-serial-adaptor for <i>NANOCOLOR®</i> VARIO 4 / VARIO C2 / VARIO C2 M and <i>NANOCOLOR®</i> T-Set	919926
USB-cable A/B for <i>NANOCOLOR®</i> VARIO 4 / VARIO C2 / VARIO C2 M	919687
Transport case for <i>NANOCOLOR®</i> heating blocks VARIO 4 / VARIO C2 / VARIO C2 M	91938

NOTICE



Disposal via public disposal systems is not permitted. Contact your local MACHEREY-NAGEL representative.



Disposal according to EU Directive 2012/19/EU. In accordance with the EU Directive 2012/19/EU MACHEREY-NAGEL takes back the old device and disposes it free of charge.

19.3 Warranty, liability and complaints

The warranty for this device is 24 months from date of purchase. The original invoice serves as proof and must be presented when making a claim. In case of improper handling and/or maintenance of the device, the warranty expires. It does not cover defects that are due to a power supply other than the external power supply included in the delivery.

The warranty is limited to the repair of defective parts or -at MACHEREY-NAGEL's discretion - the delivery of a faultless replacement unit. The warranty period of 24 months shall not be affected by any warranty claim. There is no right of withdrawal. Further claims are excluded. These include in particular all claims for damages resulting from consequential or indirect damages. In addition, our general terms and conditions of sale and delivery apply in the currently valid version as printed on all price lists.

19.4 Contact

MACHEREY-NAGEL GmbH & Co. KG

If you still have questions or need technical assistance after reading the operating instruction, contact:

MACHEREY-NAGEL GmbH & Co. KG

Valenciennner Str. 11 · 52355 Düren · Germany

Phone: +49 2421 969-0

E-Mail: info@mn-net.com

www.mn-net.com

19.5 Version history

Manual Heating block *NANOCOLOR VARIO C2 / VARIO 4* EN, V1.00 / 03.2008, March 2008

Manual Heating block *NANOCOLOR VARIO C2 / VARIO 4* EN, V2.00 / 08.2021, August 2021