Water Analysis

MACHEREY-NAGEL

Spectrophotometer *NANOCOLOR*® Advance

Quick start guide

Distributed By:

camlab

Quick start guide

Important information:

This separate quick start guide is delivered together with the spectrophotometer NANOCOLOR® Advance. The quick start guide is not intended to be a comprehensive operating instruction. Further information, including detailed operating procedures, can be found in the complete operating instruction of the device. Read them in addition to this quick start guide. Be sure to read the safety instructions in this quick start guide before operating the unit.

MACHEREY-NAGEL
The *NANOCOLOR*® Advance is a spectrophotometer for mobile and stationary evaluation of MACHEREY-NAGEL test kits. Due to its robust and waterproof design it is suitable for use in the laboratory as well as for analysis directly at the sampling point.

Read this quick start guide carefully before taking a measurement and follow the instructions in this manual.

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 of the device.

Keep this manual in a safe place for future reference.

Follow the safety notes and instructions in the operating manual 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 to the device. Information that clarifies facts in the text and that requires special attention.

Explanation of symbols

This symbol indicates that there is a risk of electric shock.

This symbol indicates that the designated area can become hot and should not be touched without suitable protective measures.

This symbol indicates that the chemicals used have a corrosive effect. Observe the safety measures in the laboratory and wear the prescribed 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.

Explanations to the text. Tips and tricks for better handling.

Technical data

Specification	Description
Type:	Spectrophotometer with reference-detector-technology (RDT)
Light source:	Halogen lamp
Optical system:	Single beam photometer with grating monochromator
Wavelength range:	340 nm–800 nm
Wavelength accuracy:	± 2 nm
Wavelength resolution:	1 nm
Wavelength calibration:	Automatic
Wavelength selection:	Automatic, barcode, manually
Wavelength reproducability:	± 0.1 nm
Scan speed:	1 complete scan < 3 min
Spectral bandwidth:	< 4 nm
Photometric range:	± 3.0 Abs
Photometric accuracy:	0.003 Abs at 0.0–0.5 Abs; 1 % at 0,5–2,0 Abs

Specification	Description
Photometric linearity:	< 0.5 % at 0.5–2.0 Abs; ≤ 1 % at > 2 Abs with neutral glass filters at 546 nm
Stray light:	< 0.5 %
Measurement modes:	More than 200 preprogrammed tests and special methods; 99 free programmable methods; Absorbance; Transmission; Factor; Kinetics, 2 point calibration; scan; nephelometric turbidity measurement
Turbidity measurement:	Nephelometric turbidity measurement (16 mm and 24 mm) 1–1000 NTU
Cuvette slot:	Test tubes 16 mm and 24 mm OD; Rectangular cuvettes 10 mm, 20 mm, 40 mm and 50 mm
Data memory:	1000 measured data sets / spectra; GLP-conform
Display:	Backlit display
Operation:	Barcode technology; icon-based menu guidance; capacitive touch screen
Languages:	DE/EN/FR/ES/PT/PL /NL
External light:	Insensitive; open cuvette slot
Interfaces:	LAN (CAT 6; only use shielded cable of max. 20 m length) 2 × USB (Host), 1 × USB (Function)
Operating conditions:	10–40 °C, up to 80 % rel. humidity (not condensing)
Protections class:	IP67
Update:	Via USB-Stick
Dimensions:	325 × 280 × 130 mm (L × W × H)

Initial operation

Step 1: Power supply

CAUTION

Multiple hazards: Only qualified personnel should carry out instructions described in this step.

WARNING

Risk of electric shock: Make sure that the power cord is not damaged. Check the suitability of the power source for the equipment.

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 device.

NOTICE

The unit is designed for indoor and outdoor use. Do not expose the device to direct sunlight. Protect the interfaces from the effects of moisture and dampness when used outdoors.

WARNING

Fire hazard: 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 that the power source used is suitable 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 of 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.

Fig. 1: Remove the interface cover

The spectrophotometer is equipped with an internal rechargeable battery, which is locked for transport. To deactivate the locking, the instrument must be connected to a power source before it is switched on for the first time. Fully charge the battery afterwards. Remove the interface cover on the left side of the device to connect the power plug (Fig. 1).

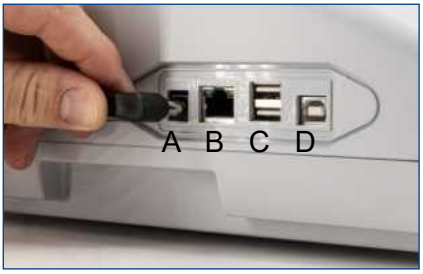

Fig. 2: Interfaces

Insert the hollow plug of the power supply unit into the charging socket of the device. (Fig. 2). Attach the adapter corresponding to your power connection to the supplied power supply unit. Connect it to a power source.

A Chargingsocket
B LAN connection
C USB A interfaces
D USB B interface

Step 2: Choose language

Fig. 3: Setting the language

Switch the device on using the on/off button below the display.

After a few seconds, the self-test of the device starts. The first time the unit is switched on, it will automatically request the language and region settings (Fig. 3). Select the desired language and then the desired region from the list displayed.

The language can also be changed after switching on the device via the menu *Settings* > *Instrument settings* > *Language*.

Step 3: Change the cuvette adapter

WARNING

Danger from contact with chemicals: The cell adapters may be contaminated after regular use. Use gloves when removing the adapters.

NOTICE

The cuvette slot cover ensures tightness according to IP67. A corresponding tightness is therefore only ensured if the cell slot cover is placed correctly.

Fig. 4: Remove cuvette slot cover

The device has a cuvette slot in which different types of cuvettes can be inserted by using adapters. The cuvette adapter for 16 mm test tubes and rectangular cuvettes (adapter A) is installed on delivery. The cuvette slot cover is also attached. Before using the device, grab the cuvette slot cover at the back and pull it to the front for removal. (Fig. 4).

Fig. 5: Remove cuvette adapter

To change the adapter, first remove the pre-installed adapter. You can remove the adapter by pressing lightly on the inner surace of the adapter and pulling it out at the same time. Then insert the desired adapter into the cuvette slot until it clicks into place.

Adapter A: 16 mm test tubes,
10, 20, 40, 50 mm rectangular cuvettes

Adapter B: 24 mm test tubes

Step 4: Run a test

WARNING

Possible dangers of contact with chemical and biological 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.

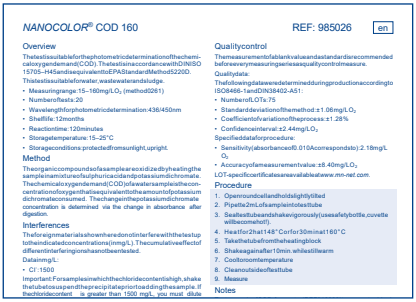

Fig. 6: Test kit instruction

Perform the test according to the instructions of the respective test kit (Fig. 6). Read them carefully to obtain accurate and reliable results. Prepare the sample according to the instructions.

Note: Clean all cuvettes with a lint-free cloth before insertion to remove any impurities or moisture from the cuvette and to prevent soiling of the cuvette slot.

Step 5: Run a measurement

NOTICE

Contaminated cuvettes can contaminate the cuvette slot and lead to incorrect measurement results.

Fig. 7: Measurement of tube tests

Test tubes: Insert the barcoded tube into the cuvette slot. The barcode is recognized and the barcode is read automatically (Fig. 7). For test kits without zero measurement the result is displayed automatically after a few seconds.

When using a test kit with zero measurement the device first prompts you to measure the zero solution. The zero measurement is triggered by pressing 0. Then the sample is inserted and the sample is measured by pressing ▶.

Alternatively, the desired method can be called up by selecting from the lists in the *MN-Tests* menu or by entering the test number in the corresponding menu.

Note: The first time a method is called up, it is automatically started in sub-method 1. The sub-method (chemical form) can be changed by clicking on the entry "sub-method" in the result screen.

Step 6: Result screen

Fig. 8: Display of result

The end of the measurement is announced by an acoustic signal. The measurement result is shown on the display (Fig. 8). In addition to the measurement result, information on wavelength, absorbance and interfering turbidity is also given, depending on the settings.

If several results are available for one method, they are displayed next to each other in the form of tabs.

Note: If the result of the measurement is outside the measuring range of the used test kit, the result is displayed with "< measuring range" or "> measuring range". Below the result an estimated value is displayed in square brackets.

Step 7: Enter sample information

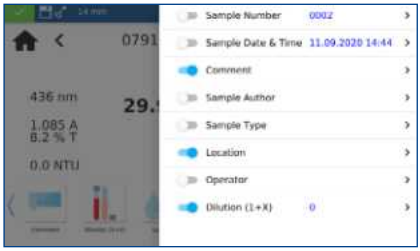

Fig. 9: Sample information

Below the measurement result are the icons for entering the sample information. The information comment, sample location and dilution are set here ex works.

You can change this selection and enter the sample information by clicking on the ✎-icon. Use the sliders to set whether the corresponding sample information is displayed (Fig. 9).

The entered information is saved together with the measurement result.

Absorbance measurement

Fig. 10: Enter wavelengths

An absorbance measurement can be performed within the wavelength range of 340–800 nm for up to 20 different wavelengths simultaneously. By selecting *Basic functions* > *Absorbance*, the desired wavelengths can be entered via λ (Fig. 10). Confirm the entry with clicking on "Enter". The entered value is accepted in the list. Press ✓ to start the measurement process.

Insert the cuvette with the zero solution and press 0. Insert the sample cuvette and press ▶.

NTU-Check

Fig. 11: NTU-Check

The *NANOCOLOR*® Advance provides a warning of interfering turbidity when measuring a test in the 16 mm and 24 mm test tube.

The NTU-Check is activated ex works. Parallel to the measurement, the nephelometric turbidity is determined by measuring at 860 nm at a 90° angle. The NTU value is displayed together with the result (Fig. 11). If the preset warning limit of 10 NTU is exceeded, a warning is issued and the result is displayed in red. The measured turbidity value is stored together with the result.

Cleaning

NOTICE

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

⚠ WARNING

Fire hazard. Do not use flammable detergents or organic solvents to clean the unit.

NOTICE

Do not clean the device with acetone or similar products.

NOTICE

Make sure that there is no cuvette and no cuvette adapter in the cuvette slot.

1. Wipe the outside of the device with a damp cloth. Use water or a mild detergent. Then dry the unit with a soft cloth.
2. If necessary, clean or dry the touch screen with a soft, lint-free cotton cloth.
3. If necessary, clean or dry the cuvette slot and adapters with a soft, lint-free cotton cloth.

For details on cleaning and maintenance of the device, refer to the complete operating instruction of the device.

Quality control

Each laboratory or facility must establish its own QC policy.

To check the performance of the test kits and the device used, we recommend measuring standard solutions of known concentration within the measuring range.

The photometric accuracy of the *NANOCOLOR*® Advance can be checked with the *NANOCONTROL* NANOCHECK 2.0 color solutions (REF 925703) offered by MACHEREY-NAGEL. The halogen lamp can be checked by the internal lamp check (see detailed operating instructions of the device). The wavelength accuracy can be checked with the integrated holmium oxide filter (see detailed operating instructions of the device).

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

Incorrect measurements: A dirty cuvette slot can lead to contamination of the inserted cuvettes and false results. Check the cleanliness of the cuvette slot and the adapters at regular intervals and during maintenance. Clean the cuvette slot and the adapters if they are dirty (see chapter “Cleaning”).

For further maintenance information, follow the instructions in the complete operating instructions of the device or contact MACHEREY-NAGEL.

Accessories and spare parts

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 become void.

For information on accessories and spare parts, refer to the complete operating instruction of the device or contact MACHEREY-NAGEL.

Troubleshooting

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.

In case of recurring errors, contact MACHEREY-NAGEL.

Error	Cause	Solution
The device does not start	The battery is empty or the device is not connected to a power source.	Connect the device to a power source. Charge the battery of the device.
Wavelength is outside the permitted range (340–800 nm)	The wavelength range of the device extends from 340–800 nm.	Enter a wavelength within the range of 340–800 nm.
Data cannot be exported	The connected data carrier is damaged.	Reconnect the data carrier and repeat the data export.
Initialization error	The device was not successfully initialized.	Restart the device. Contact the technical customer service.
Absorbance > 3.5 E	The measured absorbance is higher than 3.5.	Dilute the sample and repeat the measurement. Check the use of a cuvette with a shorter path length.

Shipping the device

NOTICE

If the battery is damaged, the device must not be shipped. Contact MACHEREY-NAGEL.

NOTICE

When the equipment is shipped, the outer carton must be marked to indicate lithium ion batteries in equipment (UN 3481).

If you have any questions about shipping the unit, follow the instructions in the complete manual of the unit or contact MACHEREY-NAGEL.

Disposal

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-NAGELtakes back the old device and disposes it free of charge.

MACHEREY-NAGEL GmbH & Co. KG

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

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