NanoPhotometer® NP80/N60/N50/C40

User Manual

Version 3.1.3

Software Version 3.1.13220

Declaration of conformity for the NanoPhotometer® (C40/N50/N60/NP80)

This is to certify that the Implen NanoPhotometer® conforms to the requirements of the following directives:

2014/35/EU	Low Voltage Equipment Safety Directive
2014/30/EU	Electromagnetic compatibility (EMC) directive
IEC 60529	Protection class IP20
2011/65/EU	Restrictions on the use of certain Hazardous Substances in Electrical and Electronic Equipment (ROHS)
2012/19/EU	EC Directive on Waste Electrical and Electronic Equipment (WEEE) 2003/108/EC & 2008/34/EC. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

FCC 47 CFR Part15 §15.107 and §15.109

EN 301 489-1 V1.9.2	Radio and ancillary equipment for portable use (portable equipment); EUT Operating frequency range: 2.4 – 2.4835 GHz
EN 300 328 V1.8.1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive
EN 301 489-17 V2.2.1	Electromagnetic compatibility and Radio Spectrum Matters (ERM)
IEC 62133 and UN38.3	Battery certification and transport test

Standards to which conformity is declared, where relevant, are as follows:

IEC/EN 61010-1:2012	Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements.
EN61326-1:2013	Electromagnetic compatibility- generic emission standard electrical equipment for measurement, control, and laboratory use.

Signed:

Dr. Thomas Sahiri
Managing Director
Implen GmbH

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1. NanoPhotometer® at a Glance

NanoPhotometer® Overview

The Implen NanoPhotometer® spectrophotometer is a mobile, simple to use UV/Visible instrument with a CCD array detector with options ranging from nanovolume to standard cuvette and all-in-one solutions. The N50, N60, and NP80 spectrophotometers measure sample volumes ranging from 0.3 - 2 µl. The NP80 model also has the capability to measure samples using a standard cuvette. The C40 is a mobile standard cuvette solution with the option to upgrade to accommodate nanovolume measurements.

The NanoPhotometer® runs on a Linux-based operating system (NPOS) that is designed for the use of pre-programmed and custom applications with a high degree of flexibility and processing power.

Sample Compression Technology™ provides easy sample handling which is independent of surface tension. This technology squeezes the sample between two quartz surfaces allowing for unmatched precision and accuracy without the need for dilutions. Combined with our True Path Technology™ the system offers lifetime accuracy and precision without the need for maintenance or recalibration.

Note: It is recommended to use a properly calibrated pipette with high-quality tips to ensure delivery of appropriate sample volumes for nanovolume sample applications.

Sample Control™ is a quality control technology that identifies air bubbles, sample impurities, turbidity, lint residues and potential contaminations. Sample Control™ monitors handling characteristics and sample quality in real time to ensure that the measured concentrations are reproducible and most precise.

Blank Control™ gives a warning message for blanks with high background. High background absorbance can be caused by a contaminated blank, blank buffer or by residues from previous users. Insuficient blank readings are the main cause for inaccurate measurements. Blank Control™ will protect the user from wasting time and precious sample on inaccurate readings caused by high background blanks or inappropriate cleaning. For more detailed information see also Technical Note #1 Blank Control™.

NANOPHOTOMETER® NP80

Item Number	Touchscreen	Battery Pack
NP80	-	-
NP80-Touch	+	-
NP80-Mobile	+	+

NANOPHOTOMETER® N60

Item Number	Touchscreen	Battery Pack
N60	-	-
N60-Touch	+	-
N60-Mobile	+	+

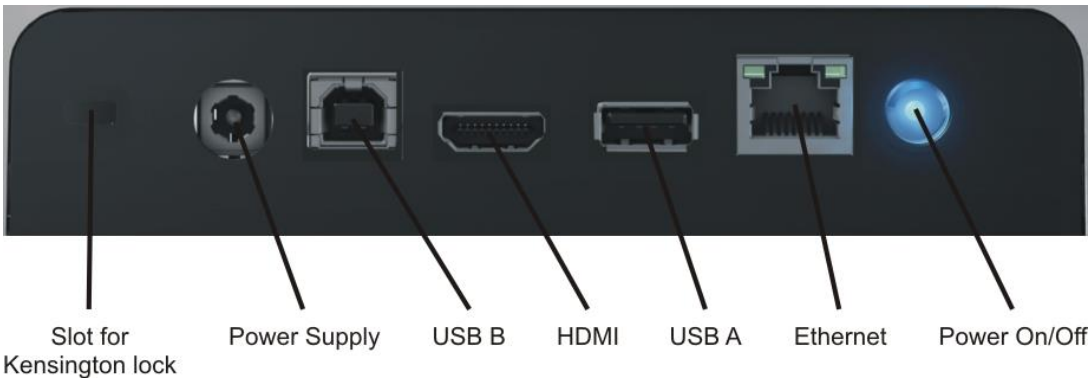
NANOPHOTOMETER® N50

Item Number	Touchscreen	Battery Pack
N50	-	-
N50-Touch	+	-

NANOPHOTOMETER® C40

Item Number	Touchscreen	Battery Pack
C40	-	-
C40-Touch	+	-
C40-Mobile	+	+

Instrument Rear Panel (NP80/N60/N50/C40)



To boot/shut down the NanoPhotometer® click shortly (< 1 second) on the power on/off button.

Note: Long clicks (> 3 seconds) initiate a hard reset. Only activate a hard reset of the unit when necessary. To avoid excess hard reboots, it is recommended to power down the unit from the onboard touch screen by clicking on the power button in the bottom left corner.

Instrument Bottom View (NP80/N60/N50/C40)

Model name, device serial number and FCC ID are located on the identification plate on the bottom of the instrument.

ACCESSORIES

STANDARD ACCESSORIES

- **Connecting Cable**

USB connecting cable to connect the NanoPhotometer® to a computer to control the NanoPhotometer® via computer (please see page 22 Software Installation).

- **NanoPhotometer® Power Adapter**

Power adapter for the NanoPhotometer® and for charging the optional built-in battery pack.

Note: Use only the power adapter supplied with your instrument or a replacement part from the manufacturer or your supplier.

- **Dust Cover**

OPTIONAL ACCESSORIES

- **Didymium Glass Filter (C40/NP80)**

The certified didymium glass filter can be used to verify the wavelength and photometric accuracy of the NanoPhotometer® cuvette applications.

- **Standard Solution (NP80, N60, N50)**

The NanoPhotometer® is recalibration free therefore it is not necessary to review the photometric accuracy on a regular basis. If the SOPs of a laboratory require a routine control of the photometric accuracy standard solutions can be used.

Note: Specifications of the standard solution are guaranteed for at least one year. Please see expiration date. Once a vail is opened it can be used for 30 minutes.
Note: Please read the Material Safety Data Sheet carefully prior to using this product.

- **IQ/OQ documentation (NP80, N60, C40)**

The NanoPhotometer® IQOQ package consists of a Standard Solution and/or a Didymium Glass Filter and a corresponding Excel-based software tool depending on the type of instrument. The Excel-based software produces an automated report displaying all relevant data for an audit.

Note: The IQ/OQ documentation is not available for the NanoPhotometer® N50.

- **Submicroliter Cell (C40 only)**

The submicroliter cell provides the option of upgrading the NanoPhotometer® C40 to a device that handles nanovolume samples as well as cuvette samples. The sample volume range of the submicroliter cell ranges from a minimum of 0.3 µl to 5.0 µl with the path length options including 0.04 mm, 0.1 mm, 0.2 mm, 1 mm and 2 mm which correspond to virtual dilution factors of 1:250, 1:100, 1:50, 1:10, and 1:5 respectively.

- **DiluCell (C40/NP80 only)**

The DiluCell is a disposable cuvette with shortened path length for virtual dilution of cuvette-based samples. Due to the reduced path length the DiluCell provides an automatic dilution without the need of a physical dilution of higher concentration samples. There are two different sizes of DiluCells available DC 10 and DC 20 which allow an automatic 1/10 and 1/20 dilution of the sample respectively. Bypassing manual sample dilutions reduces dilution errors and cross-contamination making DiluCell ideal for GLP. Combined with small sample volume requirements and bubble free filling, the DiluCell allows for convenient spectrophotometric analysis from 340 - 950 nm.

- **Field Kit**

Implen aluminum roller case for safe transportation, designed to fit in most airplane overhead bins; special compartments for all necessary accessories, cleaning tools and samples.

Note: Delivered w/o NanoPhotometer® and accessories
Note: Operate the NanoPhotometer® only in the roller case when cover is open. Ensure that air circulation is possible. Always switch the NanoPhotometer® off for transportation.

- **Barcode Reader**

It is possible to import sample names from 1D and 2D barcodes. Connect a compatible barcode reader to the USB port of the NanoPhotometer® and click on the sample name input window. After scanning a barcode the sample name will be shown in the input window. The imported name can then be edited or replaced completely.

Barcode readers that have been tested and verified compatible:

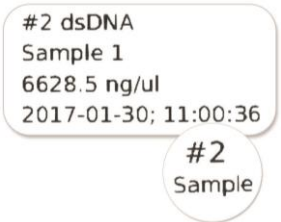
1D: Honeywell Voyager 95X0 Single-Line Laser Scanner
Datalogic Touch65
1D & 2D: AGPtEK SC36
Honeywell Xenon 1900g

- **DYMO Label Printer**

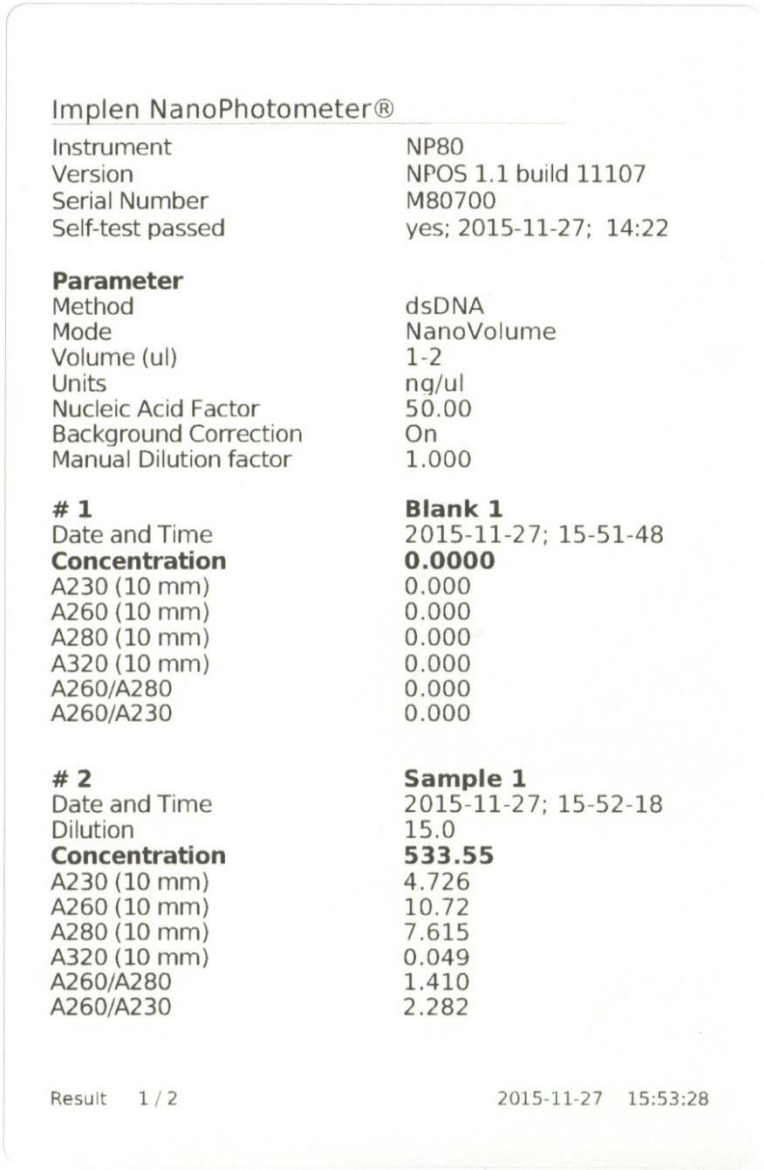
It is possible to connect a DYMO Label printer to the NanoPhotometer® for direct printing on standard or cryo labels. Recommended and tested printers are the DYMO LabelWriter 4XL (label size 10.3 x 15.8 cm) and the DYMO LabelWriter 450 (5.4 x 10 cm). Cryo labels can be printed with both DYMO printers using the following label format: 26 x 12.7 mm and 9.5 mm circle.

Note: After starting the NanoPhotometer, plug in the DYMO printer. The home screen will be shown. Wait at least for 30 seconds for driver installation.

Cryo labels (26 x 12.7 mm and 9.5 mm circle):



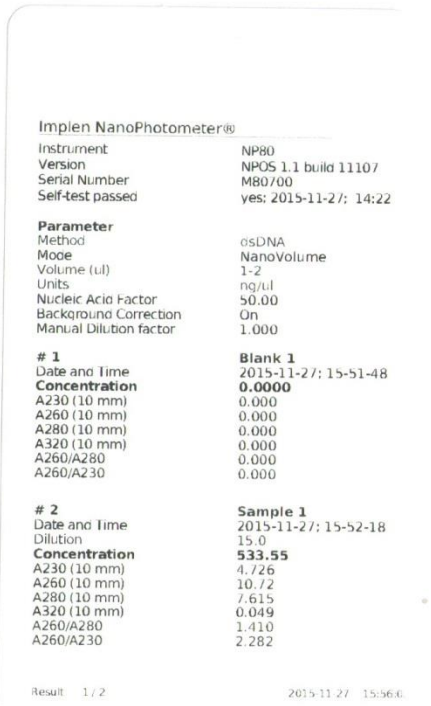
Note: Orientation of cryo labels on carrier foil changed from portrait to landscape. Portrait format was discontinued by the supplier.



Implen NanoPhotometer®

Instrument	NP80
Version	NPOS 1.1 build 11107
Serial Number	M80700
Self-test passed	yes; 2015-11-27; 14:22
Parameter	
Method	dsDNA
Mode	NanoVolume
Volume (ul)	1-2
Units	ng/ul
Nucleic Acid Factor	50.00
Background Correction	On
Manual Dilution factor	1.000
# 1	**Blank 1**
Date and Time	2015-11-27; 15-51-48
Concentration	**0.0000**
A230 (10 mm)	0.000
A260 (10 mm)	0.000
A280 (10 mm)	0.000
A320 (10 mm)	0.000
A260/A280	0.000
A260/A230	0.000
# 2	**Sample 1**
Date and Time	2015-11-27; 15-52-18
Dilution	15.0
Concentration	**533.55**
A230 (10 mm)	4.726
A260 (10 mm)	10.72
A280 (10 mm)	7.615
A320 (10 mm)	0.049
A260/A280	1.410
A260/A230	2.282

Result 1 / 2 2015-11-27 15:53:28



Implen NanoPhotometer®

Instrument	NP80
Version	NPOS 1.1 build 11107
Serial Number	M80700
Self-test passed	yes; 2015-11-27; 14:22
Parameter	
Method	dsDNA
Mode	NanoVolume
Volume (ul)	1-2
Units	ng/ul
Nucleic Acid Factor	50.00
Background Correction	On
Manual Dilution factor	1.000
# 1	**Blank 1**
Date and Time	2015-11-27; 15-51-48
Concentration	**0.0000**
A230 (10 mm)	0.000
A260 (10 mm)	0.000
A280 (10 mm)	0.000
A320 (10 mm)	0.000
A260/A280	0.000
A260/A230	0.000
# 2	**Sample 1**
Date and Time	2015-11-27; 15-52-18
Dilution	15.0
Concentration	**533.55**
A230 (10 mm)	4.726
A260 (10 mm)	10.72
A280 (10 mm)	7.615
A320 (10 mm)	0.049
A260/A280	1.410
A260/A230	2.282

Result 1 / 2 2015-11-27 15:56:0

Printout for DYMO LabelWriter 4XL

Printout for DYMO LabelWriter 450

Note: The printouts are optimized for the label size of the DYMO LabelWriter 4XL. All other DYMO printers can be used. However, the font size will be zoomed to utilized paper size.

Printer

Printing from the NanoPhotometer® is possible via USB and through network connection.
Network printing should be possible with AirPrint® / IPP compatible printers supporting PDF format.
Note: IPP version 2.2 is required and some printer configuration settings might need to be changed in order to allow communication with the NanoPhotometer®

The following HP printers have been tested and deemed compatible to print via USB connection:

- HP LaserJet 3030
- HP LaserJet m1522nf MFP
- HP LaserJet 400 color M451nw
- HP DeskJet 2543
- HP DeskJet 1110

Further HP printers are available upon request.

Note: After starting the NanoPhotometer®, plug in the HP printer. The home screen will be shown. Wait at least for 30 seconds for driver installation.

CONNECTIVITY

USB A

There is a USB A port on the front as well as the rear panel of the NanoPhotometer® which is compatible with standard portable USB 2.0 storage devices for direct data transfer in a variety of formats including Excel. It is also possible to connect a mouse, keyboard, barcode reader, DYMO printer or HP printer directly to the NanoPhotometer®.

Note: We recommend using FAT/FAT32 formatted 2.0 USB flash drives. Encrypted USB flash drives are not compatible with the NanoPhotometer®.
Note: Cordless Bluetooth mice are not supported. Use wired mice only.
Note: Connect mouse and keyboard before starting the NanoPhotometer®.

USB B

There is a USB B port located on the rear panel of the instrument which is compatible with the USB cable provided to connect the NanoPhotometer® to a computer. This USB connection can be used to control the NanoPhotometer® via computer.

LAN

There is an Ethernet (LAN) connection port on the rear panel of the instrument which enables the NanoPhotometer® to connect with computers within close proximity. This Ethernet connection can be used for data transfer from the NanoPhotometer® to a computer or to control the NanoPhotometer® via a Windows computer. To access the directory of the NanoPhotometer® from a Windows computer via LAN enter the serial number or IP (\\serial number / \\IP) of the NanoPhotometer® in the Windows-Explorer and confirm with the enter key. For Mac OS X open the "Connect to Server" dialog in the "Go" menu of the Mac OS X Finder. Enter the instrument serial number or the active NanoPhotometer® IP address in the server address field to connect.

Note: Plug in the LAN cable before starting the NanoPhotometer®.
Note: The maximum LAN cable length is 10 meters. Bit rate is 1 Gbit/s

- **WiFi**

The NanoPhotometer® is equipped with WiFi, which can be used as a WiFi network or as a WiFi Hotspot. The WiFi network allows data transfer and direct printing via AirPrint® / IPP compatible printers supporting PDF format.

Note: IPP version 2.2 is required and some printer configuration settings might need to be changed in order to allow communication with the NanoPhotometer®

The WiFi Hotspot provides the option to control the NanoPhotometer® by other WiFi devices like Windows computer, smartphones or tablets.

WiFi Hotspot connection details:
SSID: NanoPhotometer® serial number
Password: Implenuser

Note: Due to the limitations of some handheld devices saving to a wireless device is limited to 40 measurements per dataset. Larger datasets can be saved on the NanoPhotometer® itself.

- **HDMI**

There is an HDMI port located on the rear panel of the NanoPhotometer® which is compatible with HDMI 1.4 cables (or better) to connect the NanoPhotometer® to HDMI compatible monitors.

Note: The maximum HDMI cable length is 5 meters.

NANOPHOTOMETER® SPECIFICATIONS

NanoVolume Performance

Detection Range dsDNA	1 ng/µl to 16,500 ng/µl (N50: 5 ng/µl to 7,500 ng/µl)
Detection Range BSA	0.03 mg/ml to 478 mg/ml (N50: 0.15 mg/ml to 217 mg/ml)
Minimum Sample Size	0.3 µl
Photometric Range (10 mm equivalent)	0.02 - 330 A (N50: 0.1 – 150A)
Path length	0.67 and 0.07 mm
Dilution Factor	15 and 140
Vortexer	2,800 rpm; tube size up to 2.0 ml

Cuvette Performance

Detection Range dsDNA	0.1 ng / µl to 130 ng / µl
Detection Range BSA	0.003 mg / ml to 3.7 mg / ml
Photometric Range	0 - 2.6 A
Center Height (Z-Height)	8.5 mm
Cell Types	outside dimension 12.5 x 12.5 mm
Heating	37°C ± 0.5°C

Optical Specifications

Wavelength Scan Range	200 – 900 nm (N50: 200 - 650 nm)
Time for Full Scan Range	3.5 – 6.0 seconds
Wavelength Reproducibility	± 0.2 nm (N50: ± 1nm)
Wavelength Accuracy	± 0.75 nm (N50: ± 1.5 nm)
Bandwidth	1.8 nm (N50: 5 nm)
Stray Light	< 0.5% at 240 nm using NaI (N50: < 2%) and < 1% at 280 nm using Acetone (N50: < 2%)
Absorbance Reproducibility	< 0.002 A (0.67 mm path) @ 280 nm (N50: < 0.004 A (0.67 mm path) @ 280 nm)
Absorbance Accuracy	< 1.75 % @ 0.7 A (0.67 mm path) @ 280 nm of the reading
Zero Stability	±0.003 A/hour after 20 min warm up @ 280 nm
Noise	0.002 A rms at 0 A @ 280 nm; 0.002 A (pk to pk) at 0 A @ 280 nm
Optical Arrangement	1 x 3648 CCD Array (N50: 1 x 1024 CCD Array)
Lamp	Xenon flash lamp
Lifetime	10^9 flashes, up to 10 years

Processing Power and Compatibility

Operating System	Linux based OS
Onboard Processor	Quad Core 1 GHz
Internal Storage	32 GB
Control Options	Onboard with built-in touchscreen, computer, smartphone, and tablet
Software Compatibility	Windows 7, Windows 8, Windows 10, OS X, iOS and Android
Min. Requirement Smartphone/Tablet	4 inch screen; Apple: iPad 2, iPhone 5 and iOS 6; Android Phone: OS version 4.4; Android Tablet: OS version 5.0, Quad core 1.2 GHz with 1 GB RAM

General Specifications

Size	200 mm x 200 mm x 140 mm
Weight	3.8 – 5.2 kg depending on configuration
Operating Voltage	90-250 V, 50/60 Hz, 60 W (90 W with battery pack), 18/19 VDC
Display	1024 x 600 pixels; touchscreen glove compatible
Certifications	CE, IEC/EN 61010-1:2012 and EN 61326-1:2013
Battery Pack	optional rechargeable lithium ion battery; 95Wh, 6,6Ah; Operation time: up to 10 h; min. charging cycles: 800
Battery Certification	IEC 62133 and UN38.3 transport test
In- and Output Ports	2x USB A, USB B, HDMI, Ethernet, WLAN
Additional Data Input	Mouse and keyboard options
Security	Slot for Kensington lock

Features and specifications are subject to change without notice.
US Patents 20080204755 and 20080106742
Windows is a trademark of Microsoft. Mac OS & iOS are trademarks of Apple, Inc. Android OS is a trademark of Google. Linux is a trademark of Linus Torvalds.

2. GETTING STARTED

SPECTROPHOTOMETER INSTALLATION

Note: Translations of the Safety Information and Unpacking and Positioning are available in Appendix 1 (Czech), Appendix 2 (Dutch), Appendix 3 (French), Appendix 4 (German), Appendix 5 (Italian), Appendix 6 (Polish), Appendix 7 (Spanish), Appendix 8 (Swedish) and Appendix 9 (Portuguese)

SAFETY INFORMATION

Before commencing installation, please take time to familiarize yourself with warning labels and symbols on your instrument and their meaning. These are to inform you where potential danger exists or particular caution is required. Improper use may cause personal injuries or damage to the instrument. The instrument must only be operated by appropriately trained and experienced personnel. Please read the complete user manual prior to use.

⎓ direct current

Do not open the instrument as this can expose the operator to electrical power, UV light, and delicate fiber optics or damage the instrument.

If the submicroliter cell is used with the NanoPhotometer® C40 make sure that the lid is placed on the measurement head prior to the measurement.
WARNING: UV exposure when measuring without lid.

Do not use damaged power cords, accessories, and other peripherals with your NanoPhotometer®. Use only the delivered and specified power supply/charger.

Do not expose the NanoPhotometer® to strong magnetic, electrical fields, water, chemicals or any type of liquid as heavy rain or moisture.

Do not put the instrument into fire, as it may swell or explode (battery). Do not store at or use near any type of heat source, especially temperatures above 60°C or in an explosive atmosphere.

Do not leave your NanoPhotometer® on your lap or near any part of your body to prevent discomfort or injury from heat exposure.

Do not place objects on top of the NanoPhotometer®.

The NanoPhotometer® with battery pack (mobile version) has to be switched off during transportation. The on/off button has to be protected during transportation from turning on itself caused by shock or vibration.

Biological samples may contain or have the potential to transmit infectious diseases. Be aware of the health hazard presented by such samples and wear appropriate protective equipment. Handle such samples with the greatest of care and according to applicable regulatory and organization requirements before working with such potential infectious materials.
Note: Do not spill any biological samples on instrument components. If spill occurs, disinfect the

instrument immediately following your laboratory protocols and the cleaning instruction of the instrument (see page 109 Maintenance).

The symbol on the product, or on the documents accompanying the product, indicates that this appliance may not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. Disposal must be carried out in accordance with local environmental regulations for waste disposal.

UNPACKING AND POSITIONING

Note: Translations of the Safety Information and Unpacking and Positioning are available in Appendix 1 (Czech), Appendix 2 (Dutch), Appendix 3 (French), Appendix 4 (German), Appendix 5 (Italian), Appendix 6 (Polish), Appendix 7 (Spanish), Appendix 8 (Swedish) and Appendix 9 (Portuguese

Check the contents of the package against the delivery note. If any shortages are discovered, inform your supplier immediately.

Inspect the instrument for any signs of damage caused in transit. If any damage is discovered, inform your supplier immediately.

Ensure your proposed installation site conforms to the environmental conditions for safe operation: indoor use or dry environment.
Note: Do not expose your NanoPhotometer® near liquids, chemicals, rain, moisture or dusty environments.

Temperature range 10-40°C; If the cuvette heating is used the range is 10-30°C.

If the instrument is subjected to extreme temperature changes, it may be necessary to allow the instrument to equilibrate. Turn the instrument off and then on again once thermal equilibrium has been established (~2-3 hours).

Maximum relative humidity (non-condensing) of 80% and up to 31°C decreasing linearly to 50% at 40°C.

The instrument must be placed on a stable, level surface that can support 4-5 kg. Ensure that air can circulate freely around the instrument. Confirm while powered on that no materials reduce air circulation. Avoid direct sunlight as it may bleach parts of the instrument and can cause damage to plastic parts.

The equipment should be positioned such that in the event of an emergency the main plug can be easily located and removed.

Always carry the instrument by holding the main corpus of the instrument and not e.g. on the optional attached display or NanoVolume pedestal.

The equipment must be connected to power with the 60W power supply/cord supplied by Implen (90W with battery pack). The power outlet must have a protective conductor (earth/ground). It can be used on 90-250 V, 50-60 Hz power supply system.

For mobile models please charge the battery pack at least for 3 hours prior to the first use. To avoid deep discharging of the battery pack charge the battery pack at least once a month even if the NanoPhotometer is not in use. Recharging of deep discharged batteries is not possible they need to be replaced by new ones.

Turn the instrument on using the power button on the rear panel after it has been plugged in. The instrument will perform a series of self-diagnostic checks.

Please contact original supplier immediately if technical or sample handling difficulties are experienced.

Note: If this equipment is used in a manner not specified or in environmental condition not suitable for safe operation, the protection provided by the equipment may be impaired and the instrument warranty voided.

SOFTWARE INSTALLATION

NPOS OVERVIEW

NPOS is a Linux-based operating system designed for the NanoPhotometer®.

NPOS can store data either to a common directory or be configured to save to independent directories according to file format and/or instrument.

NPOS can save data in an Implen .IDS format, PDF or as an Excel format file.

Note: PDF and Excel files cannot be opened on the NanoPhotometer®. The files need to be transferred to a computer or device where Excel or a PDF reader is installed.
Note: Please do not connect the instrument to a computer until the NanoPhotometer® NPOS software is installed on the computer.

REQUIREMENTS AND COMPATIBILITY

The NPOS user interface is designed that all features can be operated by using a touchscreen. If the software is installed on a computer without touchscreen, the user interface can be operated by using a keyboard and a mouse. Before starting the installation process ensure the device is compatible with the requirements for installation.

Compatible Control Devices

Computer:
PC: Windows 7 / Windows 8 / Windows 10
Mac: OS X

Tablets (minimum requirements):
iPad 2: iOS6
Android (quad core 1.2 GHz with 1 GB RAM): Android version 4.4

Smartphones (minimum requirements):
iPhone 5: iOS6
Android (quad core 1.2 GHz with 1 GB RAM): Android version 4.4

Windows is a trademark of Microsoft. Mac OS & iOS are trademarks of Apple. Android OS is a trademark of Google. Linux is a trademark of Linus Torvalds.

Note: There are two user interfaces of the software available; one for built-in touchscreen, computer and tablets and one for smartphones.

INSTALLING SOFTWARE ON COMPUTER

The NanoPhotometer® software can be installed on compatible PC and Mac computer systems. Various operating systems and PC hardware may cause the set-up procedure to differ from that described here. This process is given as guidance only; it may need adaptation for other systems.

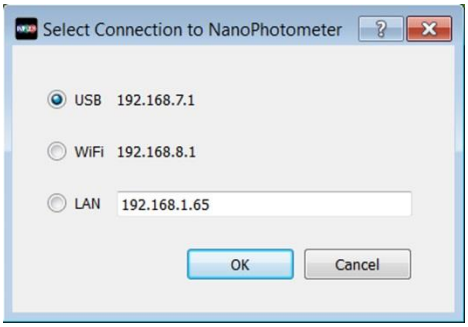
Note: **Do not connect the NanoPhotometer® to the PC/Mac before NPOS installation.**
Note: If a previous version of the NPOS software is already installed on the PC, remove the USB cable and uninstall the NPOS software before installing the new software version.
Note: The Windows and Mac installation file is provided on the Implen USB flash drive which is included with the NanoPhotometer® at time of delivery. The files are always available for free download in the download section of the Implen webpage.

- **NPOS installation for single user on Windows computer**

1. First update the firmware of your NanoPhotometer® (NPOS.bin) before starting the update on your computer.

2. Launch the NPOS installation file (NanoPhotometer®.msi) and follow the installation routine. The installer should be logged in with full administration rights. If you have insufficient privileges, installation may fail. If in doubt consult your PC administrator.

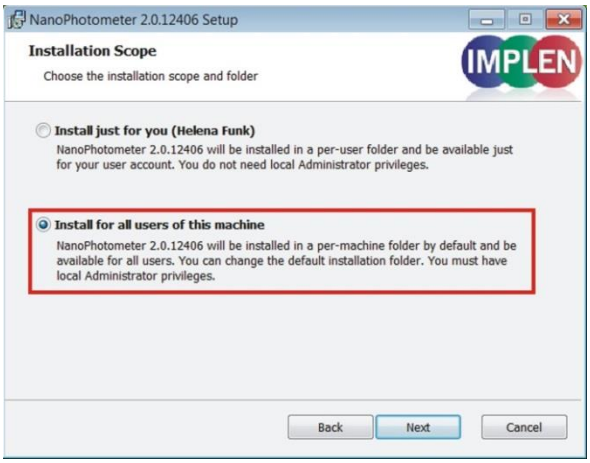
3. Open the NPOS software and choose the preferred connection. For USB, connect the NanoPhotometer® with the provided USB cable to the PC, for WiFi Hotspot connection ensure stable WiFi connection between PC and the NanoPhotometer® WiFi Hotspot (**SSID**: Serial number, **password**: Implenuser) and for LAN connect the NanoPhotometer® to the local network via Ethernet cable or WiFi network.



Note: If there is Avira installed on your computer, it is recommended to switch off the browser safety. This may interfere with the NPOS running on your computer.

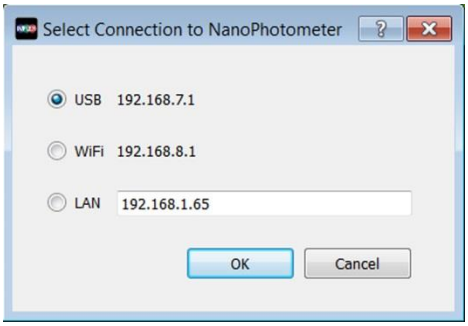
- **NPOS installation for multi-user on Windows computer**

1. Update first the firmware of your NanoPhotometer® (NPOS.bin) before starting the update on your computer.
2. Launch the NPOS installation file (NanoPhotometer®.msi) and follow the installation routine. Choose on the License Agreement dialog the option “Advanced” and on the following dialog “Install for all users of this machine”



The installer should be logged in with full administration rights. If you have insufficient privileges, installation may fail. If in doubt consult your PC administrator.

3. Open the NPOS software and choose the preferred connection. For USB, connect the NanoPhotometer® with the provided USB cable to the PC, for WiFi Hotspot connection ensure stable WiFi connection between PC and NanoPhotometer® (**SSID**: Serial number, **password**: Implenuser) and for LAN connect the NanoPhotometer® to the local network via Ethernet cable or WiFi network.



Note: If there is Avira installed on your computer, it is recommended to switch off the browser safety. This may interfere with the NPOS running on your computer.

INSTALLING NANOPHOTOMETER® APP ON TABLET OR SMARTPHONE

The NanoPhotometer® App can be installed as an application on tablets and smartphones with compatible Android and iOS operating systems. The NanoPhotometer® App is available for free download in the app store (Apple Store and Google Play Store).

1. Download and install the NanoPhotometer® App from the app store
2. Connect the tablet or smartphone via WiFi Hotspot to the NanoPhotometer®.
   SSID: Serial number, **password**: Implenuser
3. Open the NanoPhotometer® App
4. When connected via WiFi Hotspot the NanoPhotometer® will recognize the tablet/smartphone as a remote control device and measurements can be initiated from the tablet or smartphone.
5. Results will be shown on the tablet or smartphone once measurements have been taken

Note: In order to install the NanoPhotometer® App on a tablet or smartphone, the device must have an established internet connection to access the app store for app download.
Note: The version of the app and the software of the NanoPhotometer® should be the same. Different versions may have not full functionality.

FIRST STEPS AND CONFIGURATION WIZARD

When starting the Implen NPOS the first time an Implen configuration wizard is shown. Please accept the End User License Agreement (EULA) and select the country in which the NanoPhotometer® is used and confirm.

PRINTER INSTALLATION

For NanoPhotometer® with software version 1.1.11147 or higher NO driver installation is necessary.

1. Switch NanoPhotometer® on / home screen
2. Connect DYMO/HP printer via USB cable
3. DYMO/HP printer is ready to use after 30 seconds

For NanoPhotometer® with previous software versions printer driver installation is necessary.

1. Switch NanoPhotometer® on / home screen
2. Update to newest firmware version

    Update Process:
    a. Copy NPOS.bin to a USB flash drive into the root folder
    b. Insert the USB flash drive into your NanoPhotometer®
    c. Select: “Assistance / Software Maintenance”
    d. Click on “Update”
    e. Wait until the NanoPhotometer® reboots

Note: Always update the firmware on the NanoPhotometer® first, then update the client software (PC/Mac, tablet, smartphone).

3. Go to “Assistance / Software Maintenance”
4. Start driver installation by a click to the “Install Driver for Printers” button
5. Wait until the following message is shown: “Installed driver for printer successfully.”
6. Go to home screen
7. Connect DYMO/HP printer via USB cable
8. Wait for 30 seconds
9. DYMO/HP printer is ready to use

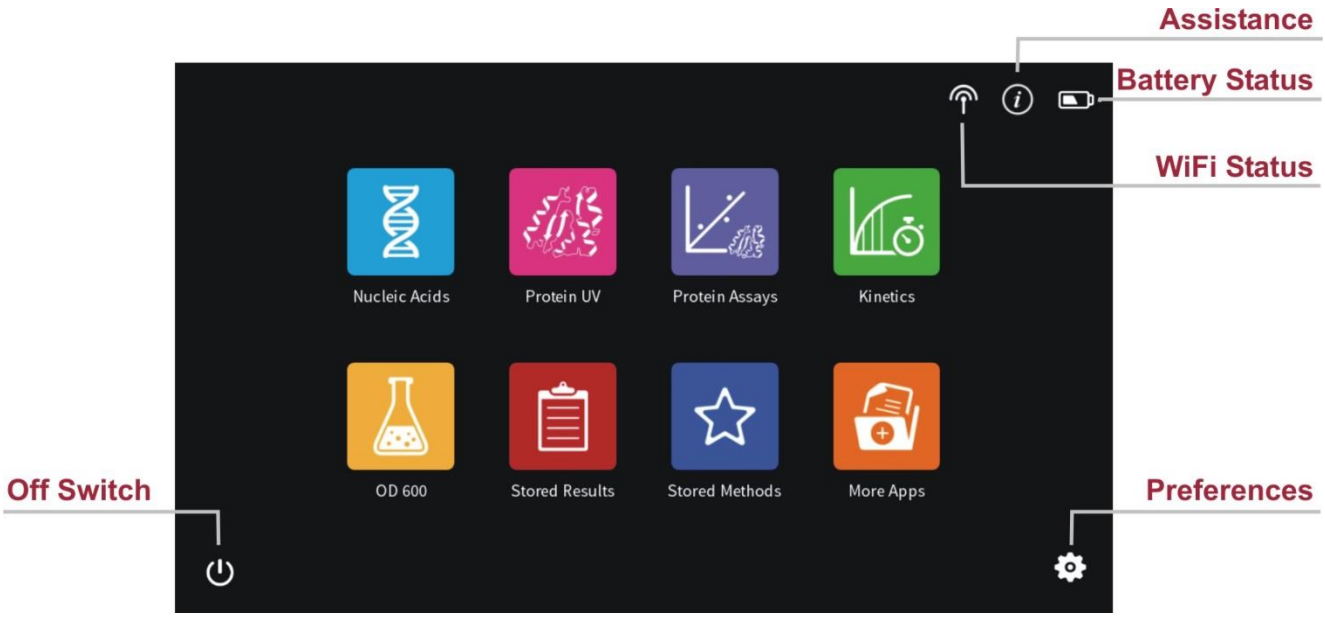
Note: In order to connect a printer to the NanoPhotometer®, please do so from the Home Screen. Printers will not properly function if USB connection of printer is done from within a method. **Always return to the Home Screen before connecting a printer.**

3. NanoPhotometer® Basics

The NanoPhotometer® product line offers a complete solution for Nanovolume (NP80/N60/N50/C40) and standard cuvette (C40/NP80) applications. With the NanoPhotometer® NanoVolume applications, sample volume ranges from a minimum of 0.3 µl to a maximum sample volume of 2.0 µl (5 µl for using the submicroliter cell/C40). Standard cuvette applications can be performed with 10 mm, 5 mm, 2 mm, 1 mm and 0.5 mm path length quartz, glass, or plastic cuvettes with a center height of 8.5 mm.

Applications Overview

The NanoPhotometer® comes with pre-programmed applications as well as the ability to create custom applications. To select a method click/tap on the corresponding icon and the method will open immediately.



Method Icons	Description
Nucleic Acids	Concentration, purity, and dye incorporation for DNA, RNA, Oligo, and other nucleic acids
Protein UV	Protein UV determination at 280 nm (or in a range of 200 - 330 nm), purity and dye incorporation
Kinetics	Time vs. Absorbance readings

Protein Assays	BCA (562 nm), Bradford (595 nm), Lowry (750 nm), and Biuret Assays (546 nm)
OD600	Measures cell density at 600 nm (or in a range of 200 – 900 nm)
Stored Results	Archive of stored results
Stored Methods	Collection of stored custom methods
More Apps	Additional applications found on a secondary method screen

Wavelength	Define one or multiple wavelength between 200 – 900 nm (N50: 200 – 650 nm) for absorbance measurements
Wavescan	Define desired full scan range anywhere between 200 - 900 nm (N50: 200 - 650 nm)
Concentration	Define extinction coefficient for automatic concentration calculations
Absorbance/ Ratio	Define two wavelengths absorbance/ ratio calculation
Standard Curve	Create a standard curve at a defined wavelength
Custom Apps	Optional custom applications for personalized methods tailored to individual spectroscopy needs

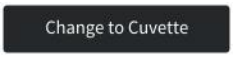
ICONS

Icon	Name	Action
	WiFi Network	WiFi network active; status of WiFi connection
	WiFi Hotspot	WiFi hotspot active
	Assistance	Opens the assistance page
	Battery Status	Shows the actual battery status (only shown with optional battery pack)
	Preferences	Opens the preferences page
	Home Screen	Returns to the home screen with application icons for method selection.
	Leave Method	Returns to the previous application selection
	Back	Returns to the previous page (smartphone only)
	Next/Confirm	Confirms parameter and opens the next screen (smartphone only)
	Delete	Deletes added functions in parameter; empties input windows
	Delete Data	Opens a delete dialog pop up
	Email Data	Opens an email dialog pop up (computer and tablet versions only)
	Save Data	Opens a save dialog pop up
	Print Data	Opens a print dialog pop up (only shown when DYMO/HP printer is successfully installed and connected)
	Add Folder	Adds a new folder to the directory
	Manage Data	Opens a dialog pop up with several action options including delete, rename or import folders/files/data as well as copying or move folders/files/data to defined directories
	Store Method	Opens a dialog pop up with the possibility to store the actual method parameter to a custom method
	Full Scale	Restores graph to original size without zoom
	Cancel	Returns to the previous screen without implementing any changes

BUTTONS

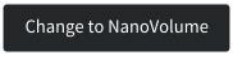
Prior to any sample measurement at the start of a new method a blank measurement of either water or the buffer of the samples is required to give the NanoPhotometer® a reference of what zero should be. It is recommended to re-apply the blank and measure it as a sample to ensure the graph of the blank spectra is a flat line.

To initiate the spectral scan of the sample press the sample button. The data will be temporarily stored until the method is exited; at this time the user needs to define if the samples should be saved or deleted.



The Change to Cuvette button (NP80) is located at the bottom of the parameter window. The change to cuvette/nanovolume button toggles between nanovolume and cuvette applications. Selecting the Change to Cuvette button activates the cuvette compartment (opens the sliding cover and switches the red arrow LED on). Only cuvette measurements are possible when this mode is selected. Selecting the Change to NanoVolumebutton while the cuvette port is activated will deactivate the cuvette compartment (closes the sliding cover and switches the LED off) and only nanovolume measurements are possible.

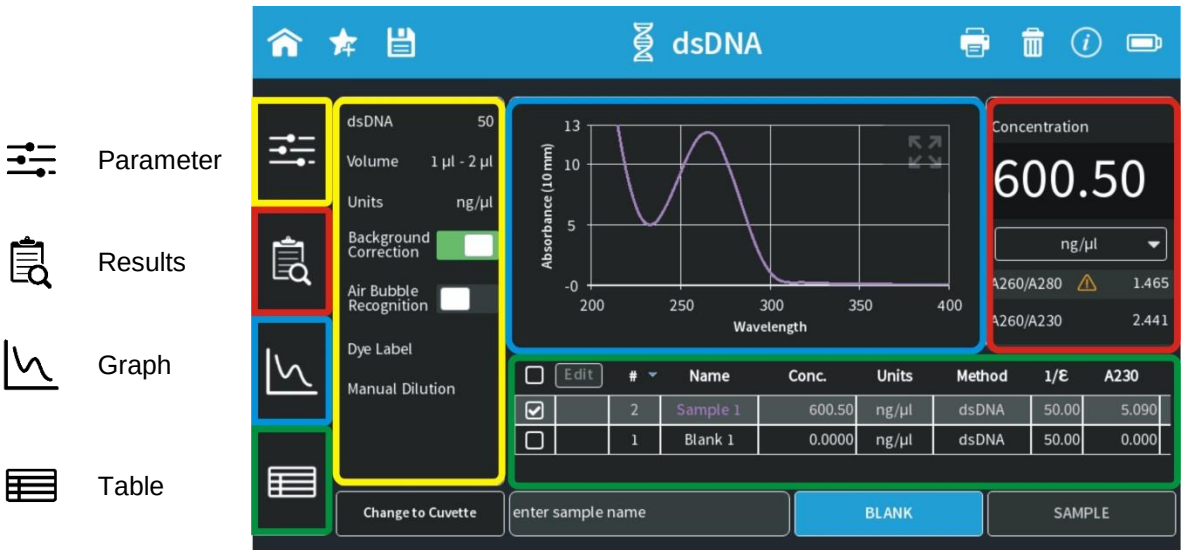
Note: Please make sure that the nanovolume arm is closed during cuvette measurements.



The Change to NanoVolume button (C40) is only shown when submicroliter cell applications are enabled in the preferences. The Change to NanoVolume/Cuvette button toggles between cuvette and submicroliter cell applications. With the NanoVolume submicroliter cell application the parameter of each method shows a list for lid selection (Lid 5, 10, 50, 100 and 250). Choose the correct lid and the results are automatically calculated considering the virtual dilution.

SIDE TAB BAR

On the left side of the measurement screen there is a vertical tab bar that contains four tabs including: parameters, data, graph, and table. The different tabs allow the user to organize the measurement screen. It is possible to show or hide the different areas on the screen. Default screen for computer show all areas, for the built-in screen and tablet version the table is hidden.



Note: There is no tab bar available for smartphone versions. The parameters, results and graph screens are shown full screen. Parameters need to be confirmed (>) to get to the measurement screen. It is possible to toggle between the results and graph area by sliding left and right. There is no table area available on smartphones.

- **Parameter area**

In the parameter area it is possible to define all necessary parameters for a measurement as well as turn on cuvette mode and initiate cuvette heating. The default measurement screen includes the parameter area as open. It is automatically hidden when starting either a blank or sample measurement by clicking on the Blank or Sample button. It is also possible to hide the parameter area by tapping the parameter tab in the vertical side tab bar.

- **Results area**

The results area shows the method specific results of the grey highlighted measurement in the table including concentration, absorbances, and relevant ratios. It is also possible to change the units of the calculated concentrations in the results area with a dropdown selection menu.

- **Table area**

The table area collects the results of all samples in an active method. The first table column shows a tick box. Selecting the samples with the tick box shows the graphs overlaid in the graph area. With the header tick box it is possible to select/unselect all samples (maximum sample

selection is 30). The second column of the table indicates whether the measurement is saved (💾) or not saved (blank field).

With the edit button the sample name of a single sample can be edited.

1. Select one sample in the table (selected sample will be highlighted in grey)
2. Click on Edit button
3. Change sample name
4. Confirm with the “Confirm” button

Note: It is not possible to edit sample names of opened IDS files.

- **Graph area**

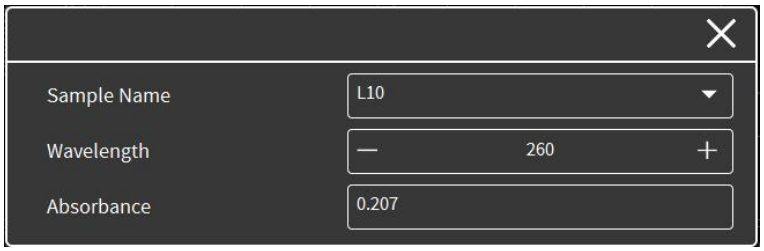
The graph area shows a chart with the graph of the actual measurement or the selected line(s) in the table (tick box selection). There is an overlay toggle switch on the left bottom of the graph area. If the overlay option is enabled the graphs of the measurements will be automatically overlaid. To change the overlaid graphs use the tick boxes in the table.

Note: It is only possible to overlay up to 30 graphs in a chart. If more than 30 data are selected a message will appear that says “More than 30 samples have been selected. Only 30 will be shown in graph.”
Note: The overlay button is not available on the NanoPhotometer® and smartphones, only on tablets and computer versions.

It is possible to zoom in and out any area of the diagram (x- and y-axis). Undo the zoom by clicking the full scale icon (⛶).

Note: Maximum zoom is 20 nm for the x-axis and 0.01A for the y-axis.

As legend option the sample name in the table is colored in the same color as the graph in the chart.
Clicking on the graph opens a pop up which shows the sample name, wavelength and absorbance of the selected wavelength. It is possible to show results of further graphs by changing the sample in the sample name dropdown.

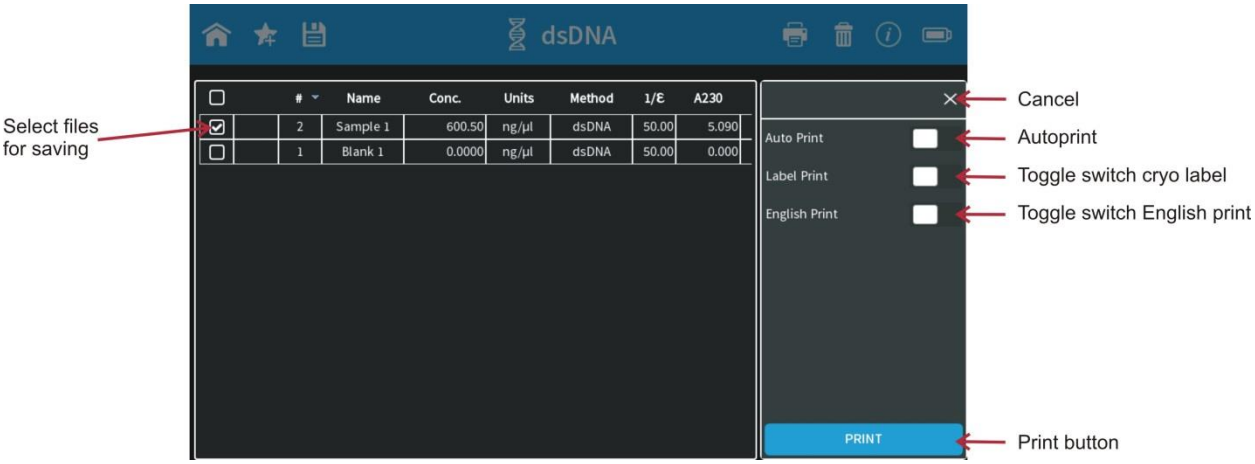


DATA PROCESSING DIALOGS

- **Print**

Selecting the print data icon (🖶) opens a full screen overlay dialog window with various print options. The print icon is only shown if a printer is available.
The print command will always print to a DYMO or HP printer, which is directly connected to the NanoPhotometer® via USB cable. If no USB printer is available the print command will print to a network printer configured in the preferences of the NanoPhotometer®. All ticked samples will be printed.

Note: If a printer is directly connected to the NanoPhotometer® via USB, this printer will have the highest priority and will be the printer used by default when selecting Print on NanoPhotometer®. In order to print utilizing a printer on the network, please disconnect the installed USB printer.



Note: The print icon is only shown, if a printer is available.
Note: It is only possible to operate one printer at a time. Do not connect more than one printer to the NanoPhotometer®.
Note: The print option is not available in the smartphone apps.

Auto Print

If the auto print function is enabled, each measurement will be printed directly after the measurement. Auto print function is available for DYMO printer, HP printer connected via USB cable and network printer of the NanoPhotometer®.

Note: Default setting for auto print is off. If enabled in one method it is set to on as a default for all methods and needs to be switched off if not required.
Note: The auto print function is not available for printing via control device (local computer/network printer) or in the Kinetics method.

Cryo Label Print

To print on cryo labels connect a DYMO printer to the NanoPhotometer® and insert the specified cryo label paper (26 x 12.7 mm and 9.5 mm circle).

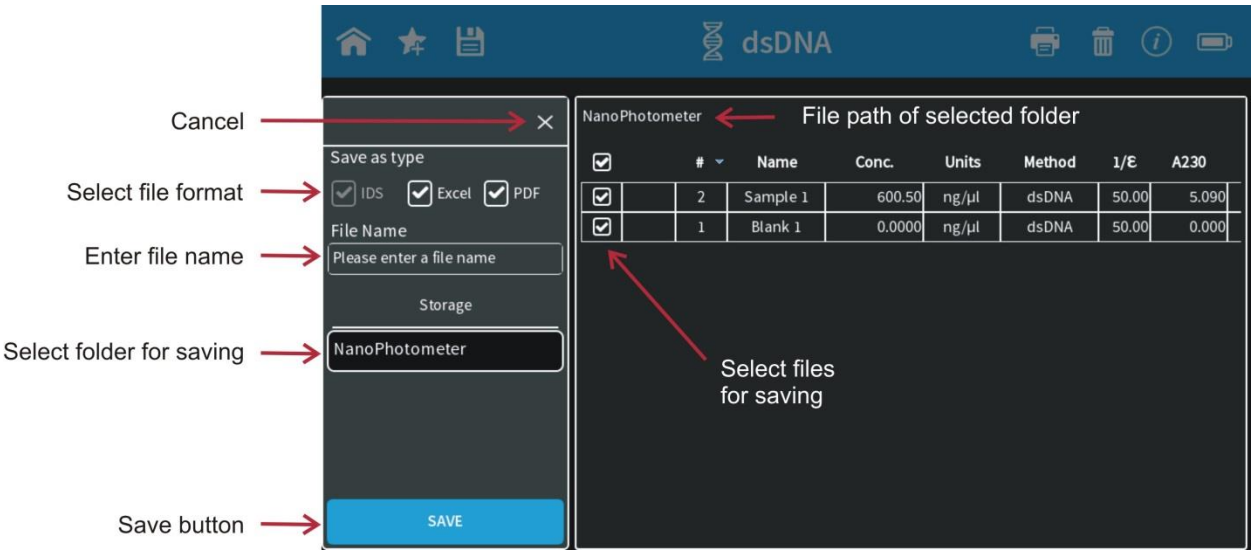
English Print

Option to change the language of the printout from the selected language setting to English.

Note: English Print can also be selected in Preferences. When this setting is enabled in preferences, the toggle switch present in the print dialog has no function.

- **Save**

Selecting the save data icon (💾) opens a full screen overlay dialog window with various save options.



As default all samples are ticked in the first column of the table and will be saved. It is possible to select samples for saving by using the tick boxes. The header tick box selects/deselects all samples.

Note: In the smartphone app there are always all measurements saved, no selection possible.

Save as Type

With the save type option it is possible to specify the file type for saving. File type options include Excel, PDF and Implen Document Source (IDS). It is possible to save different file formats simultaneously.

Note: IDS files can only be saved on the NanoPhotometer® and on a USB flash drive. It is not possible to save IDS files from opened data. In these cases the IDS tick box is greyed out.
Note: PDF and Excel files cannot be opened on the NanoPhotometer®. The files need to be transferred to a computer or device where Excel or a PDF reader is installed.
Note: All data saved on the NanoPhotometer® are saved on an internal micro SD card. We recommend to do data backups on a regularly basis to the hard drive of a computer or network. In the rarely case that the micro SD card crashes data loss cannot be ruled out.

Implen Document Source File

Implen has a custom file format referred to as an Implen Document Source (IDS) file. This is a hardcopy file to which no changes can be made. This file type contains all information including raw data, results, values, and parameters. IDS files can only be opened with the Implen software.

Excel File

Measurement data can be saved as an Excel file. This file format is compatible with Microsoft Excel software versions 2007/2010/2013 and can be edited. This file type contains all information including raw data, results, and parameters. The saved file contains only the selected information at the time the file was saved.

PDF File

Measurement data can be saved as a PDF file. The saved file contains only the selected information at the time the file was saved. It is possible to configure the table columns in preferences.

File Name

Enter the name for the file. Allowed characters are: A…Z a…z 0…9 , . - ( ) @ ! = _ ~ ; [ ] { } ‘

Note: Blank character is not allowed.

Storage

Selection option to choose where you would like the data to be saved. The options include: NanoPhotometer®, USB flash drive (if connected) and Control Device. If Control Device is selected the data will be transferred to the device that is currently connected with the NanoPhotometer®.

Note: It is not possible to save IDS files to a computer (PC/Mac), tablets or smartphones.

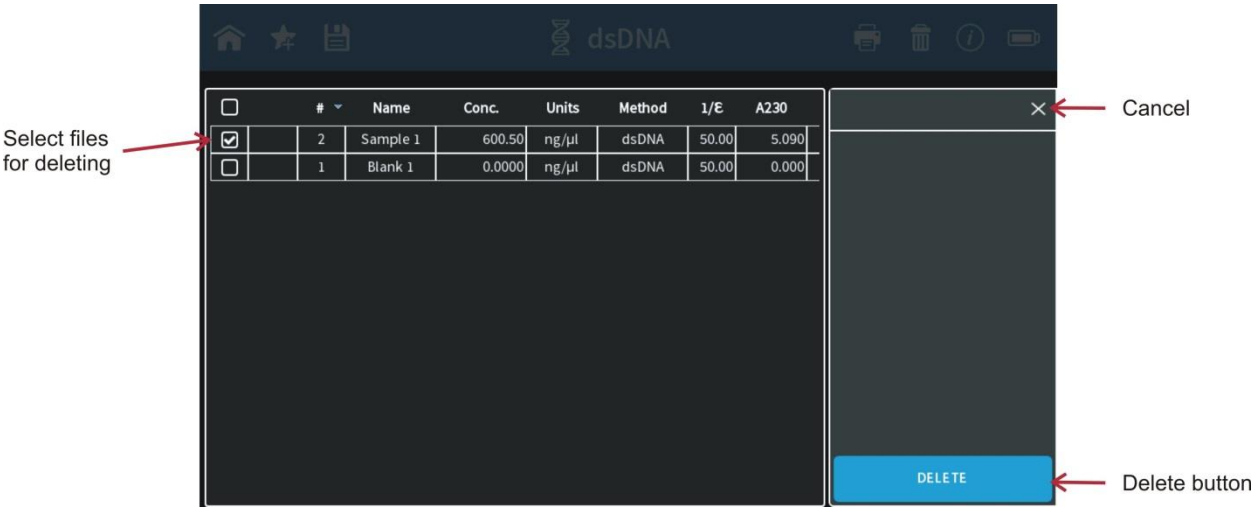
Auto Save

To prevent data loss, all measurements are automatically stored as IDS file on the internal memory of the NanoPhotometer® right after each reading. These backup copies can be found in the Auto Save folder of the NanoPhotometer® (Stored Results/NanoPhotometer®/Autosave) for up to eight days. Files contain the base name Backup, the method name, and a time/date stamp.

- **Delete**

Selecting the delete icon (🗑) opens a full screen overlay dialog window to delete data. All data which are selected (tick) in the first table column will be deleted. The header tick box selects/deselects all samples.
Initiate the deletion with the delete button. Confirm the deletion in the following warning message: “Do you want to delete all/selected files?” selecting cancel (x) will return to the delete menu screen and confirming with delete, deletes the selected data.

Note: The delete function is not available for the software version designed for smartphones.



BASIC OPERATION

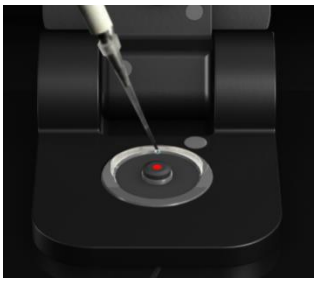
The NanoPhotometer® product line offers a complete solution for nanovolume (N50/N60/NP80/C40) and standard volume (C40/NP80) applications. With the NanoPhotometer® nanovolume applications the sample volume ranges from 0.3 µl to a maximum sample volume of 2.0 µl. Standard Cuvette applications can be performed with 10 mm, 5 mm, 2 mm, 1 mm and 0.5 mm path length quartz, glass, or plastic cuvettes with a center height of 8.5 cm.

Note: NanoVolume application in the NanoPhotometer® C40 is only available with the optional accessory “submicroliter cell” from Implen.

NANOVOLUME MEASUREMENT BASICS (N50/N60/NP80)

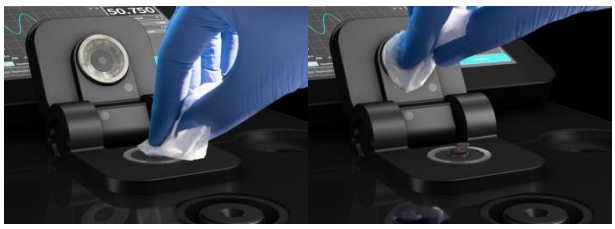
1. Select a method depending on your sample and set the parameters for the measurement.
2. Ensure that the sample window and the mirror in the sample arm are clean.
3. Use the integrated vortexer (N60 and NP80 only) to mix your sample to achieve a homogenous sample

4. Raise the sample arm and pipette the appropriate amount of blank solution onto the illuminated sample window. The Illumination automatically turns off when the arm is lowered.



Note: Do not overfill the well.
Note: The low energy red light (LED) illumination can be switched of in Preferences

5. Lower the sample arm and initiate a blank measurement with the blank button
6. Clean the measurement window and mirror on the sample arm with a slightly wet lint-free tissue. Use water, 70% ethanol or isopropanol if needed.



Note: Make sure that the metal contact face (around the measurement window and the mirror) is clean.

Note: Do not use aggressive solvents such as strong acids or bases or organic solvents at any time (see also page 41 solvent compatibility). If unsure please contact support@implen.de for detailed information about your specific reagent/solvent.

7. It is possible to enter a sample name for each sample in the input window “enter sample name”.

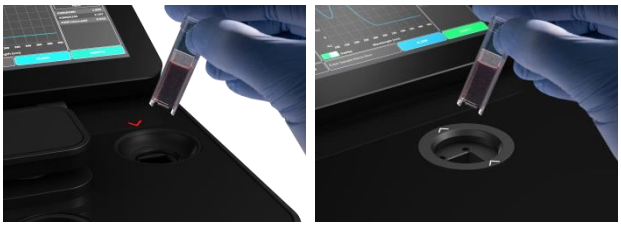
   Note: Allowed characters are: A…Z a…z 0…9 , . - ( ) @ ! = _ ~ ; [ ] { } ‘
   Note: Blank character is not allowed.

8. Raise the sample arm and pipette the appropriate amount of sample solution onto the illuminated sample window. Upon completion of measurement raise sample arm, clean the surfaces and apply the next sample.
   Note: Parameter setting Volume 1 - 2 µl adjusts the path length automatically. The parameter setting Volume 0.3 µl measures only the 0.07 mm path length for higher concentrations (dsDNA > 420 ng/µl / BSA > 12.6 mg/ml).

Note: The sample window must be clean and residual fluff from any cleaning wipe must be removed for optimum performance.

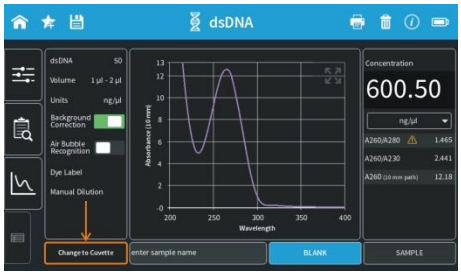
CUVETTE MEASUREMENT BASICS (C40/NP80)

The NanoPhotometer® (NP80 and C40 only) is compatible with standard cuvettes having an 8.5 mm center height. The light path is indicated with a red status LED arrow for the NP80 model and with two white arrows for the C40 model.



Note: For the NP80 the cuvette compartment needs to be activated by the “Change to Cuvette” button in the parameter area. Once the cuvette option is activated the sample compartment door will be opened automatically and a red arrow above the cuvette compartment will appear. The arrow indicates the light path.

1. Select a method depending on your sample and set the parameters for the measurement.
2. Open the automatic cuvette cover by clicking the “Change to Cuvette” button below the parameter area (NP80 only).



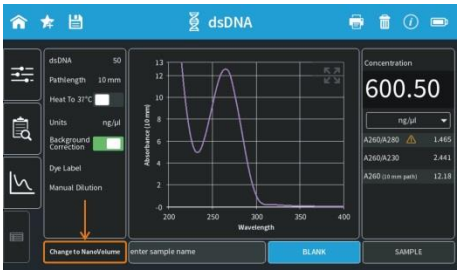
3. Add a blank solution to a cuvette and ensure that the filling volume is sufficient to allow light path to pass through the solution.
4. Insert cuvette into the cell holder.
5. Initiate a blank measurement with the blank button. Upon completion of measurement remove the cuvette.
6. Add sample to a cuvette and ensure that the sample volume is sufficient to allow light to pass through the sample.
7. It is possible to enter a sample name for each sample in the input window “enter sample name”.
   Note: Allowed characters are: A…Z a…z 0…9 , . - ( ) @ ! = _ ~ ; [ ] { } ‘
   Note: Blank character is not allowed.
8. Initiate a sample measurement with the sample button. Upon completion of measurement remove the cuvette.
9. Apply further samples.

SUBMICROLITER CELL MEASUREMENTS BASICS (C40)

The Implen submicroliter cell can be used with the NanoPhotometer® C40. Insert the submicroliter cell to the cell holder with the cell windows facing the light beam. We recommend facing the Implen logo to the right side. The light beam is directed from BACK to FRONT as indicated with the white arrows.

Note: For best performance insert the submicroliter cell always in the same direction.

1. Select a method depending on your sample.
2. Enable the NanoVolume application with the “Change to NanoVolume” button below the parameter area.



Note: If there is no “Change to NanoVolume” button available in the method go to preferences/general and enable the NanoVolume option. We guarantee our submicroliter cell specifications only for Implen submicroliter cells which are aligned to the NanoPhotometer® C40 by Implen.

3. Set the parameter for the measurement. Choose the dilution lid depending on your sample concentration.

Lid	dsDNA (ng/µl)	BSA (mg/ml)	absorbance range 10 mm path
5 (optional)	2 – 375		0.05 – 7.5
10	5 – 750	0.15 – 22	0.10 – 15
50	25 – 3,750	0.70 – 108	0.50 – 150
100 (optional)	50 – 7,500	1.45 – 217	1.00 – 150
250 (optional)	125 – 18,750	3.63 – 543	2.50 – 375

Note: A new Blank is recommended when changing the dilution lid.

4. Ensure that the sample window and the mirror in the dilution lid are clean.
5. Pipette the appropriate sample volume (blank solution) onto the center of the measuring window. The required volumes are also shown in the parameter area of the software.

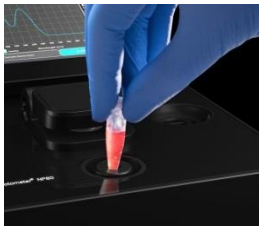
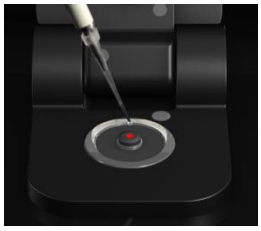
Lid	Sample volume	Path length	Dilution
5 (optional)	3.5 – 5 µl	2 mm	1:5
10	1 – 3 µl	1 mm	1:10
50	0.3 – 2 µl	0.2 mm	1:50
100 (optional)	0.3 – 2 µl	0.1 mm	1:100
250 (optional)	0.3 – 2 µl	0.04 mm	1:250

Note: Do not overfill the well.
Note: A new Blank is recommended when changing the dilution lid.

6. For measurements, ensure that the lid fits exactly onto the positioning supports mounted to the body of the cell and initiate a blank measurement with the blank button.
   Note: Possible UV exposure. Only initiate a measurement when the lid is closed.
7. Clean the measurement window and mirror in the lid with a slightly wet lint-free tissue. Use water, 70% EtOH or isopropanol, if needed.
   Note: Do not use aggressive solvents such as strong acids or bases or organic solvents at any time (see also page 41 solvent compatibility). If unsure please contact support@implen.de for detailed information about your specific reagent/solvent.
8. It is possible to enter a sample name for each sample in the input window “enter sample name”.
   Note: Allowed characters are: A…Z a…z 0…9 , . - ( ) @ ! = _ ~ ; [ ] { } ‘
   Note: Blank character is not allowed.
9. Mix the sample very well to achieve a homogenous sample.
10. Apply the appropriate amount of sample solution onto the measurement window and initiate the sample measurement with the sample button. Upon completion of measurement remove the lid, clean the surfaces and apply the next sample.

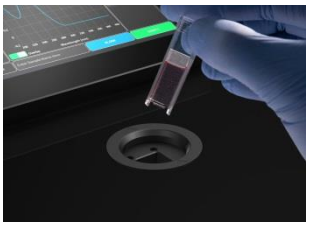
SAMPLE HANDLING TIPS

- **Nanovolume Methods**

- The NanoPhotometer® includes an integrated vortexer (N60/NP80 only) to assure sample homogeneity. It is recommended to vortex every sample right before the measurement.
- The sample window is illuminated (NP80/N60/N50 only) with a low energy red light to assist with accurate sample application. The red light is switched off once the sample arm is closed. It is possible to disable the illumination feature in preferences of the NPOS software.
- The minimum volume that can be used for nanovolume samples is 0.3 µl (NP80/N60/N50 dsDNA > 420 ng/µl and BSA > 12.6 mg/ml and for submicroliter cell in the C40 dsDNA > 25 ng/µl and BSA > 0.7 mg/ml). For automatic path length setting at least 1µl is needed (NP80/N60/N50 only).
- The maximum volume that can be used for nanovolume samples is 2.0 µl (NP80/N60/N50) and 5 µl for the submicroliter cell with lid 5.
- The sample can be fully recovered after measurement with a pipette if desired.
  Note: Minimal cross contamination cannot be avoided on a molecular level.
- Proper cleaning is important to ensure accurate measurements. In most cases a dry lint-free laboratory wipe is sufficient to clean the sample quartz surfaces. In the case of highly concentrated samples or certain proteins, the recommended procedure for cleaning is to use a slightly wet lint-free laboratory wipe (with water or 70% EtOH depending on sample type) to thoroughly clean the sample surface.
- It is mandatory that the metal contact face around the measurement window and the mirror is clean.

- **Cuvette Methods**



- The cuvette holder (NP80/C40 only) is compatible with standard 10 mm path length quartz, glass and plastic cuvettes with an optical height of 8.5 mm.
- It is also possible to use cuvettes with 5 mm, 2 mm, 1 mm or 0.5 mm path lengths, but there may be an adapter necessary. Please ask your cuvette supplier for a suitable adapter.

- The minimum volume for accurate measurements depends on the cuvette type used; it is necessary that the light passes through the sample for accurate measurements. Center height is 8.5 mm.

Note: The cuvette holder is not removable. Do not pour any cleaning solution into the cuvette holder as larger amounts of liquids can get into the instrument and cause damage.

▪ Solvent Compatibility (N50/N60/NP80/C40 with submicroliter cell)

Most solvents typically used in life science laboratories are compatible with the NanoPhotometer® nanovolume sample surfaces. The following solvents are compatible for use with the NanoPhotometer® models N50, N60, and NP80 at room temperature:

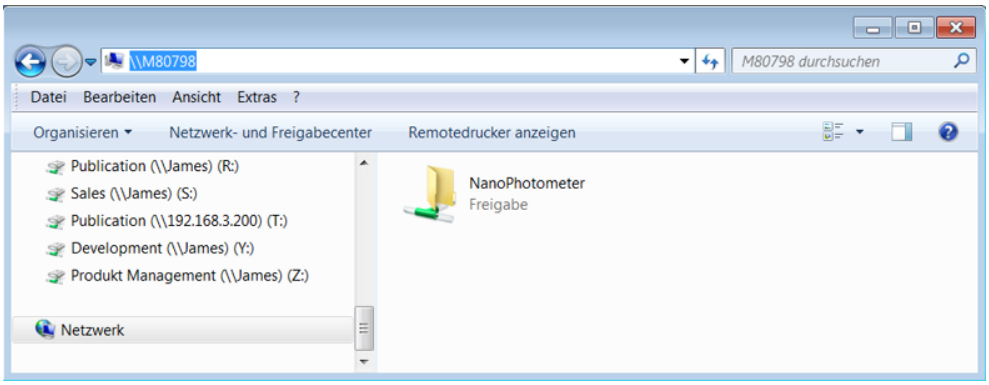
- Acetone (≤ 5%)
- Acetonitrile
- Benzene
- Butanol
- Carbon tetrachloride
- Chloroform
- Ethanol
- Ether
- HEPES
- Hexane
- Isopropanol
- MES
- Methanol
- Methylene chloride
- MOPS
- Phenol (≤1%)
- N-propanol
- Toluene
- Phosphate containing buffers
- PBS (pH 4-10)
- Citrate
- Borate
- Chloride salts
- Acids > pH 2
- Bases < pH 10

Note: Highly concentrated acids and bases are not recommended. It is recommended to wipe the sample surface with a lint-free laboratory wipe immediately upon completion of each measurement. For more information about compatibility of specific solvents not listed above, please contact the Implen support team (support@implen.de) to check the compatibility.

DATA TRANSFER

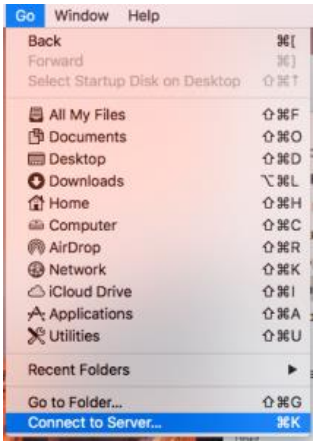
All data saved on the NanoPhotometer® can easily be accessed from and transferred to a computer within the lab through LAN, a USB cable or a password secured WiFi connection.

To access/transfer data from the NanoPhotometer® network drive via LAN connection, the serial number or the NanoPhotometer® IP needs to be entered in the address bar of the Windows Explorer (e.g. \\M80798\ or \\Assigned IP Address\).

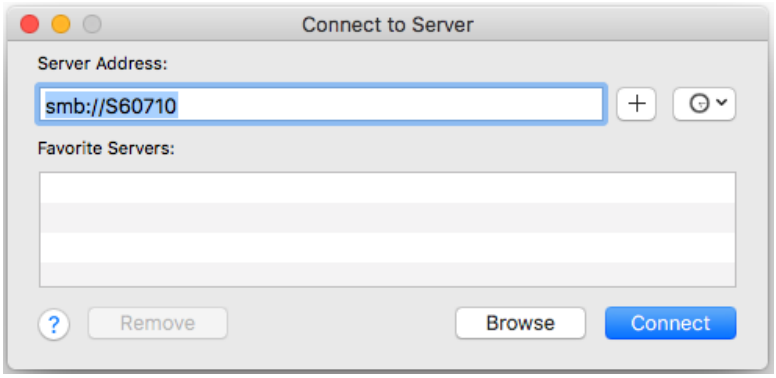


Using a USB cable connection \\192.168.7.1\ will provide access and for password secured WiFi connections \\192.168.8.1\ will need to be entered in the address bar to show the NanoPhotometer® drive within Windows File Explorer.

For Mac OS X open the "Connect to Server" dialog in the "Go" menu of the Mac OS X Finder.



With a LAN connection enter the instrument serial number or the active NanoPhotometer® IP address in the server address field to connect. For USB cable or WiFi connection use 192.168.7.1 or 192.168.8.1, respectively.



BATTERY OPERATION

The optional battery operation is only available for the NanoPhotometer® NP80/N60/C40 models (NP80-Mobile, N60-Mobile and C40-Mobile). A full battery pack can be operated for approximately 10 hours within normal usage, i.e. 20-30 measurements per hour. When the battery gets low there will be a first warning message “Battery low” and a beep is sounded. At this status it is possible to use the instrument under standard conditions for at least one hour. It is recommended to charge the battery at this status. If the battery is not charged there will be a second warning message when the battery is empty and several beep sounds before the instrument is automatically shutting down within 10 to 15 seconds.

Note: Unsaved data can be found in the auto save folder in Stored Methods. If the NanoPhotometer® is shut down during a measurement process the data of this measurement are lost.

The battery pack is designed for 800 full charging cycles. Afterwards the capacity and operation time of the battery may vary. A fully charged battery pack will self-discharge (switched off NanoPhotometer®) over a time of 10 – 14 days. To avoid deep discharging of the battery pack charge the battery pack at least once a month even if the NanoPhotometer is not in use.

Note: Recharging of deep discharged batteries is not possible they need to be replaced by new ones.

Charging time for an empty battery pack is 3 hours.

4. NanoPhotometer® Applications

The NanoPhotometer® comes with pre-programmed applications as well as the ability to create custom applications. Any application method can be selected by tapping the icon once or clicking on the icon (computer based software).

Note: Within each method selection of nanovolume or cuvette mode (NP80/C40) is possible. The “Change to Cuvette” or “Change to NanoVolume” button is located at the bottom of the parameter area.

Nucleic Acids

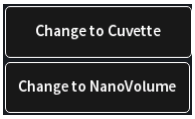
Method Overview

Nucleic acids in solution absorb light with a peak in the ultraviolet region of 260 nm. For determination of nucleic acid concentration in solution the absorbance at wavelength 260 nm is used along with the Beer-Lambert law. In addition to calculating concentrations of nucleic acids, absorbance measurements are also useful for estimating purity of nucleic acids by calculating the 260/280 nm and 260/230 nm ratios. Further, it is possible to determine the degree of labeling of nucleic acids with probes including fluorescent dyes.
Sample Control™ gives useful information about sample conditions. It recognizes air bubbles, sample impurities, turbidity, lint residues and potential contaminations. If Sample Control™ detects any inconstancy an alert icon ⚠ is shown in the result/table area. A click on the alert icon shows additional information about the inconstancy.

Measurement Protocol

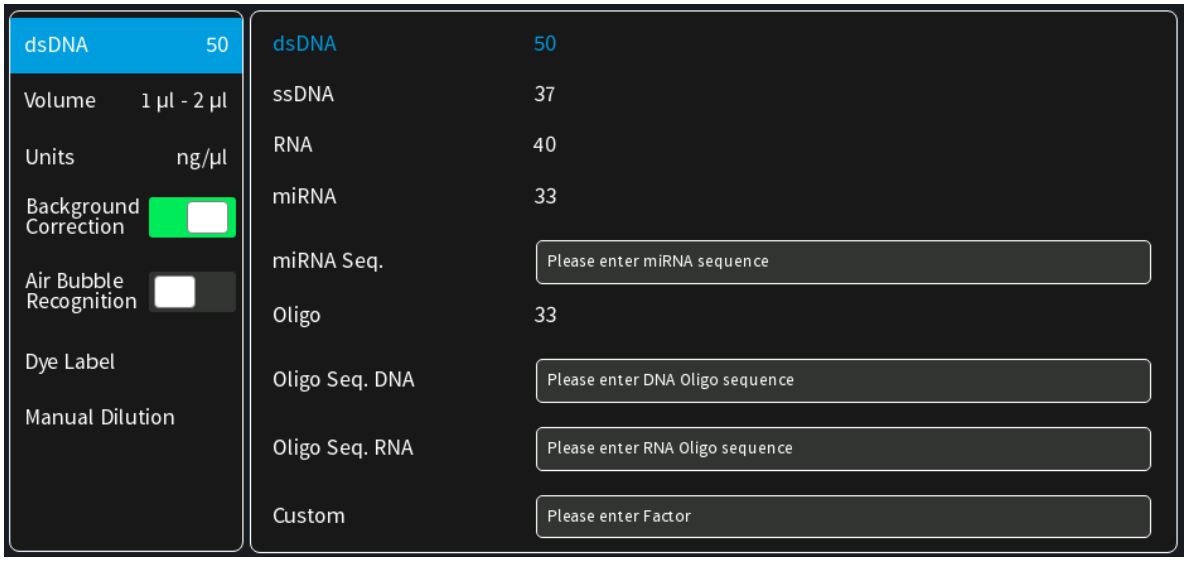
1. Select the Nucleic Acids icon on the home screen.

2. To change between NanoVolume and cuvette application (NP80/C40 only) use the Change to Cuvette/NanoVolume button below the parameter area.

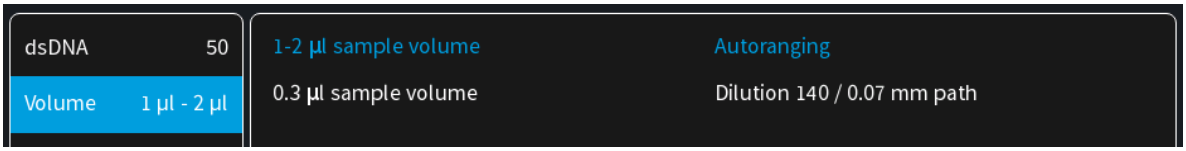


3. To change the nucleic acid type click on dsDNA and a list with available options opens on the right side.
   Options are: dsDNA, ssDNA, RNA miRNA, miRNA Sequence, Oligo, Oligo Sequence and Custom (see Table 1).
   - The miRNA sequence and Oligo sequence options allow the sequence to be entered and the extinction coefficient will be automatically calculated. A minimum of 4 bases is required.
   - Custom is set to 50 as default and allows the extinction coefficient (1/Ɛ) to be manually

entered from the range of 15 - 150.

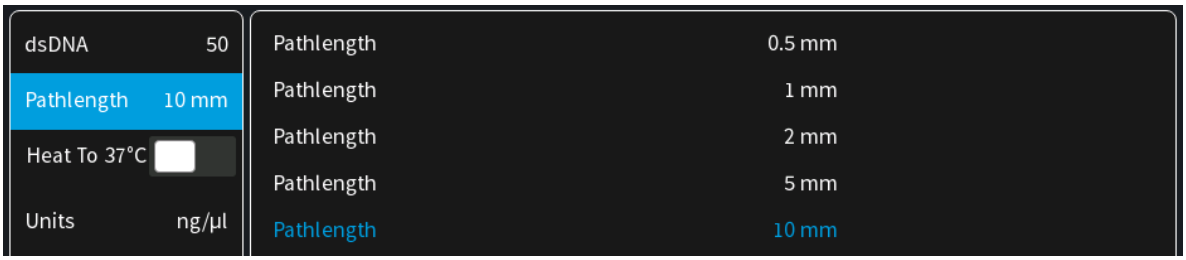


4. **For NanoVolume application:**
Select the volume of sample to be applied.

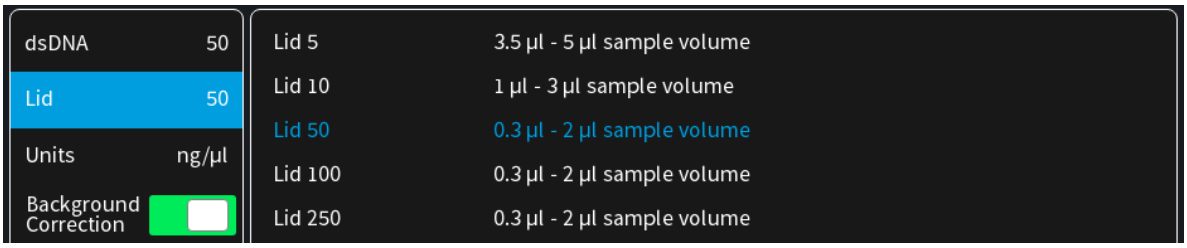


Note: 1 - 2 µl (default): automatic path length setting; 0.3 µl measures only the 0.07 mm path length (for samples with concentrations > 420 ng/µl dsDNA)

For cuvette application:
Select the path length depending on the used cuvette.
Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm

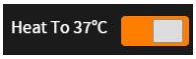


For NanoVolume application with submicroliter cell (C40 only):
Select a Lid depending on your sample concentration for concentration ranges of different lids (see also page 38 Submicroliter Cell Measurements Basics).
Required sample volume for each lid is shown.

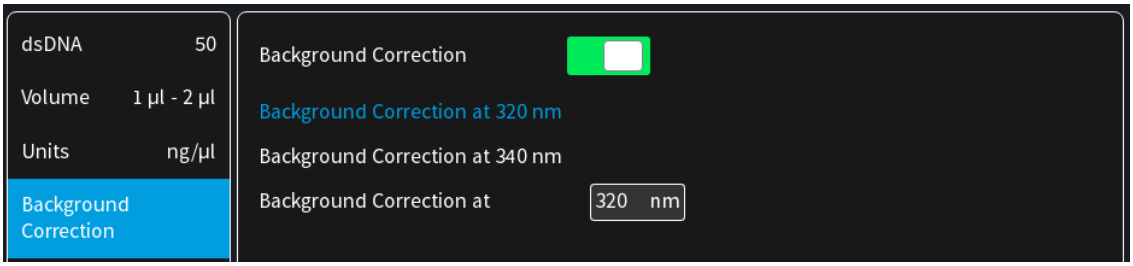


Note: A new Blank is recommended when changing the dilution lid.

5. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).

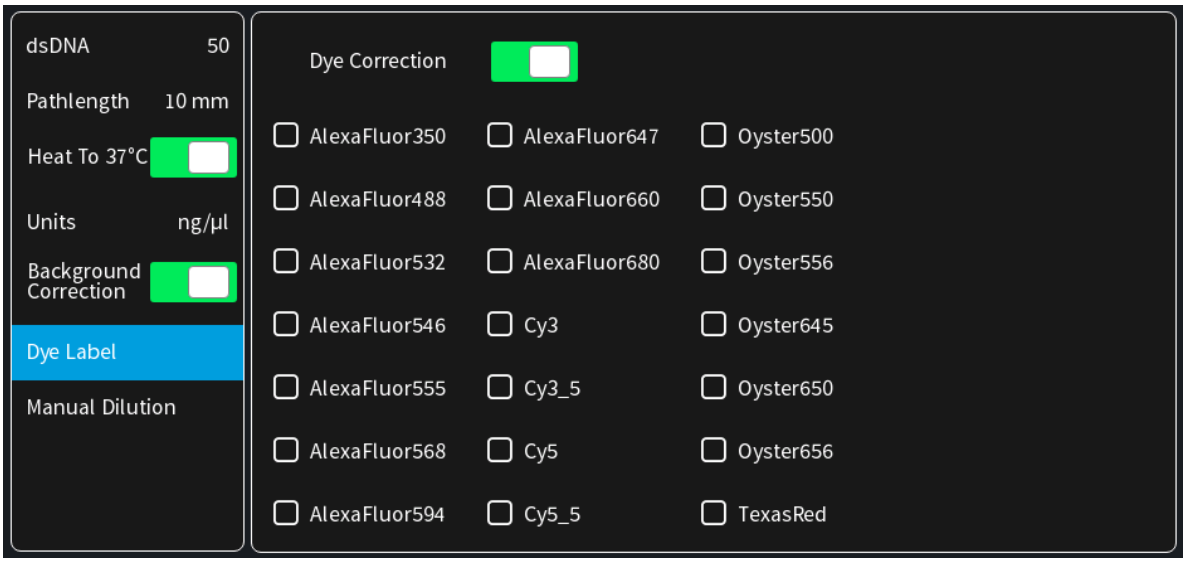


6. The background correction is enabled at 320 nm as a default. It is possible to disable the background correction with the toggle switch. Selection options are 320 nm, 340 nm. It is also possible to add any wavelength in the range of 220 – 350 nm

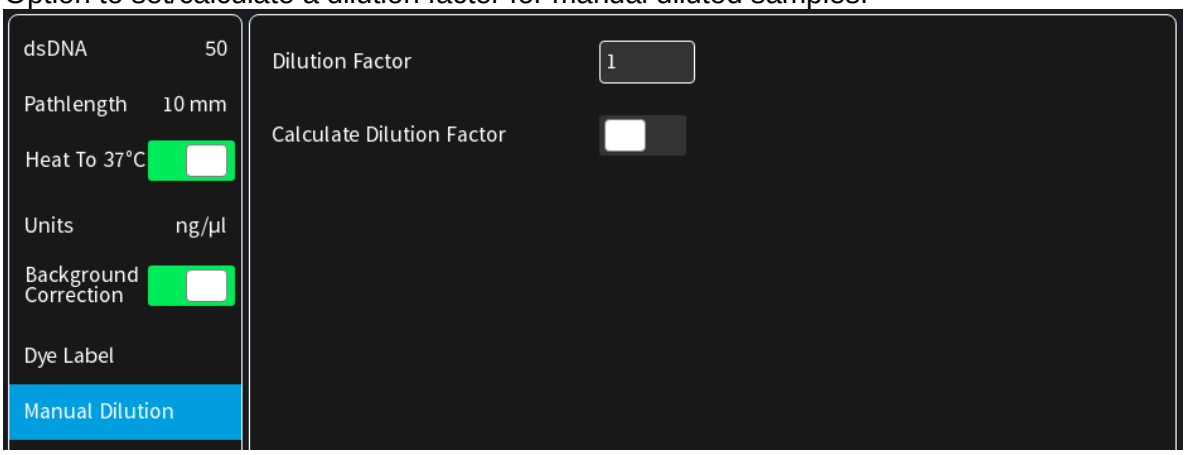
7. 

8. Air bubble recognition is disabled as a default. Set to on it detects air bubbles, lint residues and bad sample conditions of the sample.
   Note: Lint residues and bad sample conditions are detected even if the air bubble recognition is set to off.

9. For dye labelled samples tick the dye labels in the list, which should be used for result calculation.
   Note: If the used dye is not available in the list, please go to preferences and add a custom dye to the dye list.
   There is an option for dye correction which can be enabled/disabled with a toggle switch.
   Note: Dye correction is only available for single dye selection.



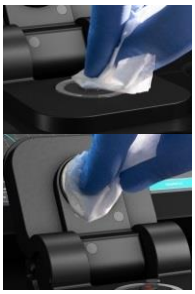
10. Option to set/calculate a dilution factor for manual diluted samples.



11. Apply the blank dd$H_2$0 or buffer to the illuminated sample window for the reference measurement and select blank to initiate the reading.
    Note: The illumination of the sample window can be switched off in the preferences.

12. Use a lint-free laboratory wipe to clean both the sample window and mirror prior to applying the next sample.

    Note: It could be helpful to apply the blank a second time and read it as a sample to ensure a proper blank.



13. Apply sample to the sample window and press the sample button to initiate the measurement.

CALCULATIONS

▪ Nucleic Acid Concentration

To determine the concentration of nucleic acids in solution, the absorbance as measured at the wavelength of 260 nm is used. The function describing the relationship between concentration and absorbance is a modification of the Beer-Lambert law equation. The concentration of the nucleic acid samples can be calculated with or without background correction depending on enabled/disabled background correction option.

Without background correction:

$C = A_{260} * \varepsilon_{nuc} * Đ$

With background correction:

$C = (A_{260} - A_{BKG}) * \varepsilon_{nuc} * Đ$

C	Concentration in ng/µl
A_{260}	Absorbance at 260 nm (10 mm path)
A_{BKG}	Absorbance at selected background wavelength (10 mm path)
Đ	Manual dilution factor
ε_{nuc}	Extinction coefficient/nucleic acid factor in ng*cm/µl

Table 1. Nucleic acids extinction coefficients (ε_{nuc})

Type	ε_{nuc}
dsDNA	50 ng*cm/µl
ssDNA	37 ng*cm/µl
RNA	40 ng*cm/µl
miRNA	33 ng*cm/µl
Oligo	33 ng*cm/µl
miRNA Seq.	calculated via extinction coefficient of constituent nucleotides entered
Oligo Seq.	calculated via extinction coefficient of constituent nucleotides entered
Custom	Option to enter any factor between 15 and 150 ng*cm/µl

▪ Dye-labeled Nucleic Acid Concentration

For dye-labeled nucleic acids, the concentration of the nucleic acid is calculated using a modified form of the Beer-Lambert equation. For these calculations, the instrument considers the absorption maximum of the dye and a certain dye-specific correction factor at 260 nm (see

Table 2). The concentration of a dye-labeled nucleic acid is calculated with or without background/dye correction as follows:

With background and with dye correction:

$$C = \left[(A_{260} - A_{BKG}) - \left(cf_{dye} * (A_{max,dye} - A_{BKG})\right)\right] * \varepsilon_{nuc} * Đ$$

With background and without dye correction:

$$C = (A_{260} - A_{BKG}) * \varepsilon_{nuc} * Đ$$

Without background and with dye correction:

$$C = \left[A_{260} - cf_{dye} * A_{max,dye}\right] * \varepsilon_{nuc} * Đ$$

Without background and without dye correction:

$$C = A_{260} * \varepsilon_{nuc} * Đ$$

C	Concentration in ng/µl
A_{260}	Absorbance at 260 nm (10 mm path)
A_{BKG}	Absorbance at selected background wavelength (10 mm path)
$A_{max,dye}$	Absorbance value at the absorbance maximum of the dye (10 mm path)
ε_{nuc}	Extinction coefficient/nucleic acid factor in ng*cm/µl
cf_{dye}	Dye-dependent correction factor at 260 nm
Đ	Manual dilution factor

Note: Dye correction is only available for single dye selection.

- **Dye Concentration**

For dye-labeled nucleic acids, the concentration of the dye is calculated using a modified form of the Beer-Lambert equation. For these calculations, the instrument considers the absorption maximum of the dye, the dye-specific extinction coefficient (see

Table 2). The dye concentration is calculated with or without background correction as follows:

With background correction:

$$C = \frac{(A_{max,dye} - A_{BKG}) * Đ}{\varepsilon_{dye} * 10^6}$$

Without background correction:

$$C = \frac{A_{max,dye} * Đ}{\varepsilon_{dye} * 10^6}$$

C	Concentration in ng/µl
$A_{max,dye}$	Absorbance value at the absorbance maximum of the dye (10 mm path)
A_{BKG}	Absorbance at 320 nm (10 mm path)
ε_{dye}	Extinction coefficient of dye in $M^{-1}*cm^{-1}$
Đ	Manual dilution factor

- **Frequency of Incorporation (FOI)**

FOI is the degree of labeling based on dye incorporation in a labeled nucleic acid sample. It is generally expressed as the number of dye molecules incorporated per 1000 nucleotides. FOI can be calculated with or without background/dye correction as follows:

With background correction with dye correction:

$$FOI = \frac{324.5 * (A_{max,\,dye} - A_{BKG})}{\varepsilon_{dye} * 10^6 * \left(A_{260} - A_{BKG} - cf_{dye} * (A_{max,dye} - A_{BKG})\right)}$$

With background correction without dye correction:

$$FOI = \frac{324.5 * (A_{max,\,dye} - A_{BKG})}{\varepsilon_{dye} * 10^6 * (A_{260} - A_{BKG}) * \varepsilon_{nuc}}$$

Without background correction and with dye correction:

$$FOI = \frac{324.5 * A_{max,\,dye}}{\varepsilon_{dye} * 10^6 * (A_{260} - cf_{dye} * A_{max,dye}) * \varepsilon_{nuc}}$$

Without background correction and without dye correction:

$$FOI = \frac{324.5 * A_{max,\,dye}}{\varepsilon_{dye} * 10^6 * A_{260} * \varepsilon_{nuc}}$$

FOI	Frequency of Incorporation (dye per 1,000 bases)
A_{260}	Absorbance at 260 nm (10 mm path)
A_{BKG}	Absorbance at selected background wavelength (10 mm path)
$A_{max,dye}$	Absorbance value at the absorbance maximum of the dye (10 mm path)
ε_{dye}	Extinction coefficient of dye in $M^{-1}*cm^{-1}$
ε_{nuc}	Extinction coefficient/nucleic acid factor in ng*cm/µl
cf_{dye}	Dye-dependent correction factor at 260 nm

Table 2. Dye Types, Absorbance Max, Extinction coefficient, and dye-dependent correction factors

NanoPhotometer® Model	Dye Type	Absorbance maximum of Dye (nm)	Dye-dependent ext. coeff. ε_{dye} in $M^{-1}*cm^{-1}$	Dye-dependent correction factor at 260 nm cf_{dye}
NP80/N60/N50/C40	Alexa Fluor 350	345	18,400	0.25
NP80/N60/N50/C40	Alexa Fluor 488	492	62,000	0.30
NP80/N60/N50/C40	Alexa Fluor 532	525	82,300	0.24
NP80/N60/N50/C40	Alexa Fluor 546	555	104,000	0.21
NP80/N60/N50/C40	Alexa Fluor 555	555	150,000	0.04
NP80/N60/N50/C40	Alexa Fluor 568	576	93,000	0.45
NP80/N60/N50/C40	Alexa Fluor 594	588	80,400	0.43
NP80/N60/C40	Alexa Fluor 647	650	239,000	0.00
NP80/N60/C40	Alexa Fluor 660	660	107,000	0.00
NP80/N60/C40	Alexa Fluor 680	680	164,000	0.00
NP80/N60/N50/C40	Cy3	550	150,000	0.08
NP80/N60/N50/C40	Cy3.5	581	150,000	0.08
NP80/N60/C40	Cy5	649	250,000	0.05
NP80/N60/C40	Cy5.5	675	250,000	0.05
NP80/N60/N50/C40	Oyster-500	503	78,000	0.29
NP80/N60/N50/C40	Oyster-550	553	150,000	0.05
NP80/N60/N50/C40	Oyster-556	560	155,000	0.03
NP80/N60/C40	Oyster-645	649	220,000	0.05
NP80/N60/C40	Oyster-650	653	200,000	0.04
NP80/N60/C40	Oyster-656	660	200,000	0.04
NP80/N60/N50/C40	Texas Red	593	85,000	0.23

- **Ratios**

Reactions utilizing nucleic acids often require minimum purity standards. Common contaminants of nucleic acid samples include: proteins, organic compounds, and other. Based on the common contaminants of nucleic acid samples, the 260/280 and 260/230 ratios are calculated for nucleic acids to give an indication of the purity of the samples. Pure DNA and RNA preparations have expected 260/280 ratios of ≥ 1.8 and ≥ 2.0 respectively. An elevated absorbance at 230 nm can indicate the presence of impurities as well; 230 nm is near the absorbance maximum of peptide bonds and also indicates buffer contamination since TRIS, EDTA and other buffer salts absorb

at 230nm. When measuring RNA samples, the 260/230 ratio should be > 2.0; a ratio lower than this is generally indicative of contamination with guanidinium thiocyanate, a reagent commonly used in RNA purification and which absorbs over the 230-260 nm range. If a ratio is detected out of the acceptable range an alert icon ⚠ is shown in the results/table area. A click on the alert icon shows additional information. The ranges for acceptable ratio values can be defined in preferences.
The ratios are calculated with or without background correction according to if the background correction is activated during the measurements or not as follows:

Without background correction:

$$260/280 \text{ ratio} = \frac{A_{260}}{A_{280}}$$

$$260/230 \text{ ratio} = \frac{A_{260}}{A_{230}}$$

With background correction:

$$260/280 \text{ ratio} = \frac{A_{260} - A_{BKG}}{A_{280} - A_{BKG}}$$

$$260/230 \text{ ratio} = \frac{A_{260} - A_{BKG}}{A_{230} - A_{BKG}}$$

PROTEIN UV

METHOD OVERVIEW

The Protein UV method exploits the inherent absorbance of proteins at 280 nm in combination with the Beer-Lambert Law, where each protein is characterized by a protein specific extinction coefficient (ε) which can be used to determine total protein concentration of a solution. The intrinsic absorbance of proteins is due to the presence of aromatic amino acids in their structure, primarily tryptophan and tyrosine, as well as cysteine (oxidized cysteine residues in a disulphide bond). The aromatic amino acid residues in a protein containing tryptophan and tyrosine exhibit strong intrinsic absorbance at 280 nm, with a lesser contribution by phenylalanine. Therefore, it is the aromatic amino acid residues which dictate the extinction coefficient at 280 nm for a protein.

The most straightforward method to determine concentration of a purified, homogenous protein with a known extinction coefficient (ε) is by direct measurement of UV280 provided as long as the protein contains no prosthetic groups with strong absorption in the same region. However, for unknown proteins including homogenous protein mixtures, it is possible to make direct A_{280} measurements using a composite ε value derived from comparison of many proteins, although this will only provide an approximate but close estimate of the true protein concentration.

The NanoPhotometer® determines protein concentration by performing calculations based on specific ε values, either pre-programmed in the instrument or entered manually by the user. Extinction coefficient (ε) values at 280 nm vary greatly for different proteins due to their particular aromatic amino acid content. Fixed ε values are pre-programmed in the software for certain proteins (see Table 3). However, if the protein of interest is not included in the pre-programed methods it is also possible to manually enter the specific ε for the protein of interest using the Mol. Ext. Coefficient or Ext. Coefficient protein option. For correct calculation, it is necessary to supply either: a) the mass extinction coefficient (ε in l/g*cm); or b) the molar extinction coefficient (ε_M in $M^{-1}*cm^{-1}$), and the molecular weight of the protein expressed in molar mass units (g/mol).

To determine the degree of dye labelling of a protein, the absorbance measured at the wavelength corresponding to the absorbance maximum of the fluorescence dye is used (see Table 3). The corresponding extinction coefficient of the dye is used along with the Beer-Lambert Law to determine the dye concentration.

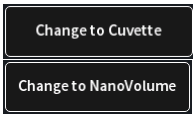
Note: It is important to ensure the extinction coefficient and units entered are correct in order to ensure that calculations are performed properly for accurate concentration values.

Sample Control™ gives useful information about air bubbles, sample impurities, turbidity, lint residues and potential contaminations. If the Sample Control™ detects any inconstancy an alert icon ⚠ is shown in the result/table area. A click on the alert icon shows additional information about the inconstancy.

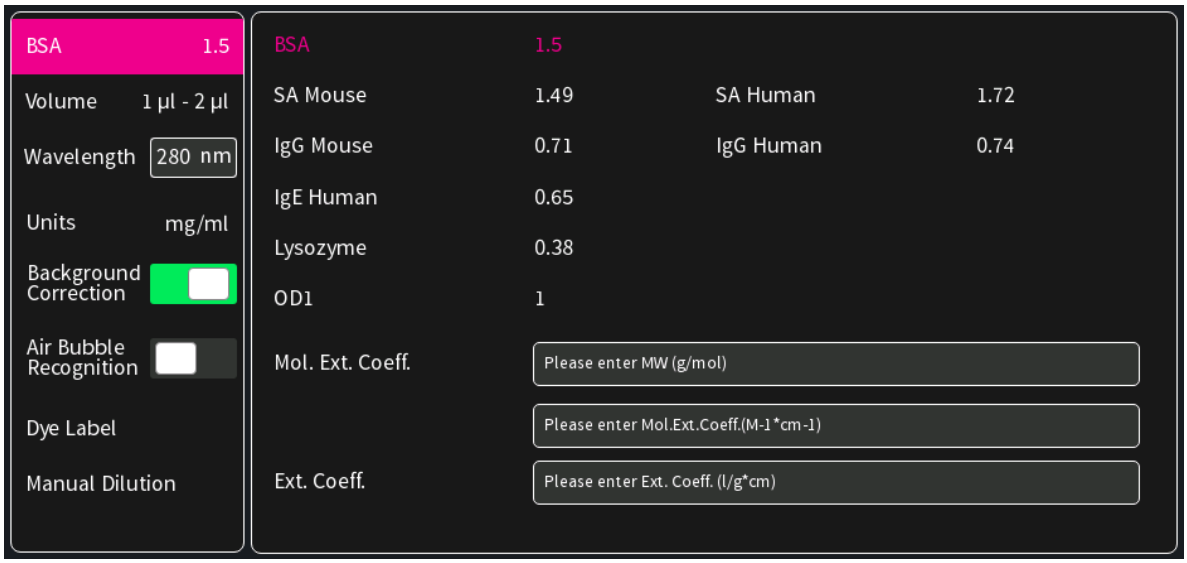
MEASUREMENT PROTOCOL

1. Select the Protein UV icon on the home screen.

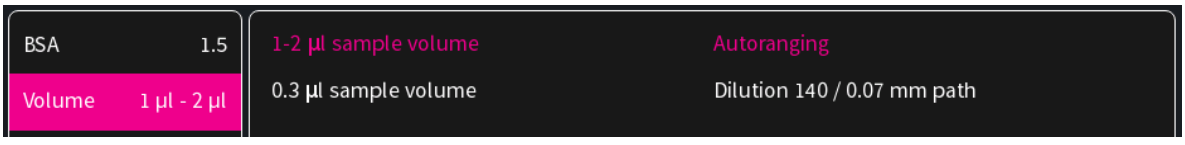
2. To change between NanoVolume and Cuvette application (NP80/C40 only) use the Change to Cuvette/NanoVolume button below the parameter area.



3. To change the protein type click on BSA and a list with available options opens on the right side.
   Options are: BSA, SA Mouse, SA Human, IgG Mouse, IgG Human, IgE Human, Lysozyme, OD1, Molar Extinction Coefficient, and Extinction Coefficient.
   - For Mol. Ext. Coefficient enter Molecular Weight (default 66,400 g/mol) and Mol. Ext. Coefficient (default 44,289 $M^{-1}*cm^{-1}$)
   - For Ext. Coefficient enter Ext. Coefficient (default 0.69 l/g*cm)



4. **For NanoVolume application:**
   Select the volume of sample to be applied.



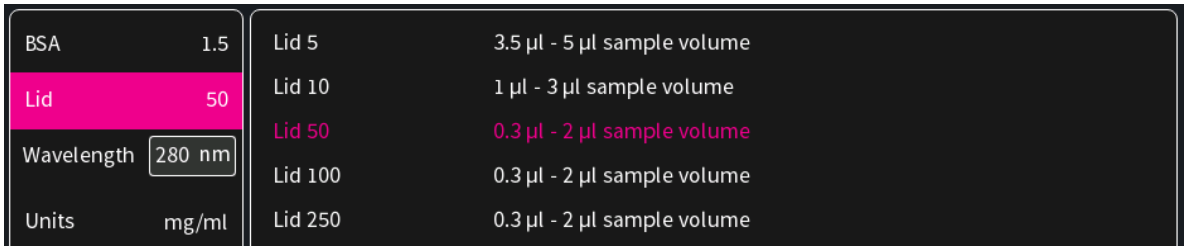
Note: 1-2 µl (default): automatic path length change; 0.3 µl measures only the 0.07 mm path length (possible for samples with concentrations e.g. BSA > 12.6 mg/ml)

For cuvette application:

Select the path length depending on the used cuvette.
Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm

For NanoVolume application with submicroliter cell (C40 only):

Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics).
Required sample volume for each lid is shown.



Note: A new Blank is recommended when changing the dilution lid.

5. The background correction is enabled at 320 nm as a default. It is possible to disable the background correction with the toggle switch. Selection options are 320 nm, 340 nm. It is also possible to add any wavelength in the range of 220 – 350 nm

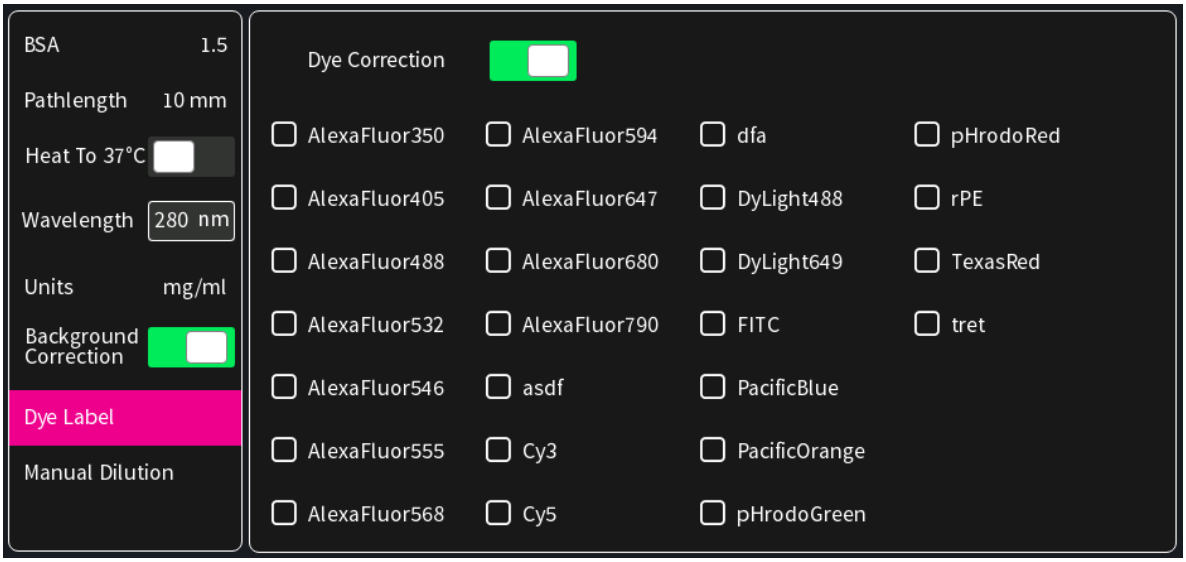
6. Air bubble recognition is disabled as a default. When enabled it detects air bubbles, lint residues and poor conditions of the sample.
Note: Lint residues and bad sample conditions are detected even if the air bubble recognition is set to off.

7. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.

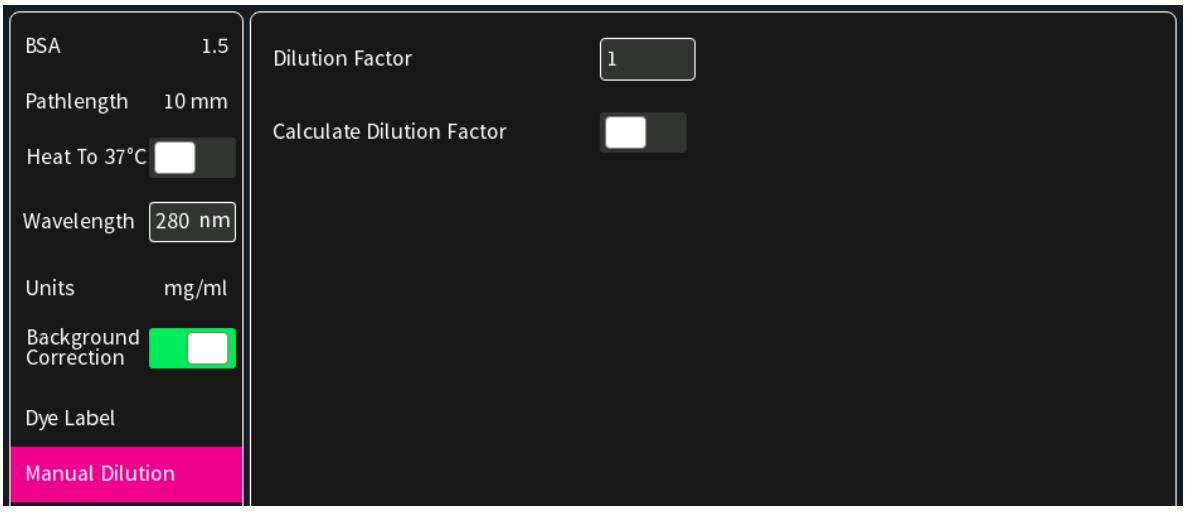
Note: Only available for cuvette applications (NP80 and C40).

8. For dye labelled samples, tick the dye labels in the list which should be used for result calculation.
   Note: If the used dye is not available in the list, please go to preferences and add a custom dye to the dye list.

   There is an option for dye correction which can be enabled/disabled with a toggle switch.
   Note: Dye correction is only available for single dye selection.



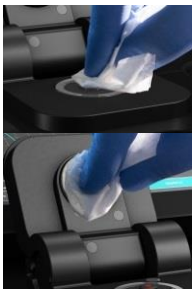
9. Option to set/calculate a dilution factor for manual diluted samples.



10. Apply the blank dd$H_2$0 or buffer to the illuminated sample window for the reference measurement and select blank to initiate the reading.
    Note: The illumination of the sample window can be switched off in the preferences.

11. Use a lint-free laboratory wipe to clean both the sample window and mirror prior to applying the next sample.

    Note: It can be helpful to apply the blank a second time and read it as a sample to ensure a proper blank.



12. Apply sample to the sample window and press the sample button to initiate the measurement.

CALCULATIONS

- **Protein UV280 Concentration**

The protein concentration in the Protein UV method is calculated with the absorbance value of the sample at 280 nm along with the extinction coefficient defined by the user. The protein concentration is calculated with or without background correction as follows:

With background correction:

$C = (A_{280} - A_{BKG}) * \varepsilon_{prot} * Đ$

Without background correction:

$C = A_{280} * \varepsilon_{prot} * Đ$

C	Concentration (mg/ml)
A_{280}	Absorbance at 280 nm (10 mm path)
A_{BKG}	Absorbance at selected background wavelength (10 mm path)
ε_{prot}	Extinction coefficient/protein factor in g*cm/l
Đ	Dilution factor

Table 3. Protein extinction coefficients (ε_{prot})

Type	ε_{prot} [g* cm/l]	Ext. Coeff. [l/g*cm]	Mol. Ext. Coeff. [M^{-1}*cm^{-1}]	MW [g/mol]
BSA	1.50	0.667	44,289	66,400
SA Mouse	1.49	0.670	44,220	66,000
SA Human	1.72	0.582	40,370	69,365
IgG Mouse	0.71	1.400	224,000	160,000
IgG Human	0.74	1.360	204,000	150,000
IgE Human	0.65	1.530	290,700	190,000
Lysozyme	0.38	2.640	37,984	37,984
OD1	1.00	N/A	N/A	N/A

- **Dye-labeled Protein UV280 Concentration**

For dye-labeled proteins, the concentration of the protein is calculated using a modified form of the Beer-Lambert equation. For these calculations, the instrument considers the absorption maximum of the dye, and a certain dye-specific correction factor at 280 nm
(see

Table 4). The dye concentration is calculated with or without background/dye correction for are as follows:

With background and with dye correction:

$$C = [A_{280} - A_{BKG} - cf_{dye} * (A_{max,dye} - A_{BKG})] * \varepsilon_{prot} * Đ$$

With background and without dye correction:

$$C = (A_{280} - A_{BKG}) * \varepsilon_{prot} * Đ$$

Without background and with dye correction:

$$C = (A_{280} - cf_{dye} * A_{max,dye}) * \varepsilon_{prot} * Đ$$

Without background and without dye correction:

$$C = A_{280} * \varepsilon_{prot} * Đ$$

C	Concentration in mg/ml
A_{280}	Absorbance at 280 nm (10 mm path)
A_{BKG}	Absorbance at selected background wavelength (10 mm path)
$A_{max,dye}$	Absorbance value at the absorbance maximum of the dye (10 mm path)
ε_{prot}	Extinction coefficient/protein factor in g*cm/l
cf_{dye}	Dye-dependent correction factor at 280 nm
Đ	Dilution factor

- **Dye Concentration**

For dye-labeled proteins, the concentration of the dye is calculated using a modified form of the Beer-Lambert equation. For these calculations, the instrument considers the absorption maximum of the dye, and a dye-specific extinction coefficient (see

Table 4). The dye concentration is calculated with or without background correction for are as follows:

With background correction:

$$C = \frac{((A_{max,dye} - A_{BKG}) * Đ)}{\varepsilon_{dye} * 10^6}$$

Without background correction:

$$C = \frac{(A_{max,dye} * Đ)}{\varepsilon_{dye} * 10^6}$$

C	Concentration
$A_{max,\ dye}$	Absorbance at the max dye absorbance value (10 mm path)
A_{BKG}	Absorbance at selected background wavelength (10 mm path)
ε_{dye}	Extinction coefficient of dye in $M^{-1}*cm^{-1}$
Đ	Dilution factor

- **Degree of Labeling (DOL)**

DOL is the degree of labeling based on the average number of dye molecules coupled to a protein molecule. The degree of labeling can be determined from the absorption spectrum of the labeled antibody with or without background/dye correction as follows:

With background and with dye correction:

$$DOL = \frac{(A_{max,\ dye} - A_{BKG}) * \varepsilon_{prot}}{\left(A_{280} - A_{BKG} - cf_{dye} * (A_{max,\ dye} - A_{BKG})\right) * \varepsilon_{dye}}$$

With background and w/o dye correction:

$$DOL = \frac{(A_{max,\ dye} - A_{BKG} * \varepsilon_{prot}}{(A_{280} - A_{BKG}) * \varepsilon_{dye}}$$

W/o background and with dye correction:

$$DOL = \frac{A_{max,\ dye} * \varepsilon_{prot}}{\left(A_{280} - cf_{dye} * A_{max,\ dye}\right) * \varepsilon_{dye}}$$

W/o background and w/o dye correction:

$$DOL = \frac{A_{max,\ dye} * \varepsilon_{prot}}{A_{280} * \varepsilon_{dye}}$$

DOL	Degree of labeling/dye per protein ratio
$A_{max,dye}$	Absorbance value at the absorbance maximum of the dye (10 mm path)
A_{280}	Absorbance at 280 nm (10 mm path)
A_{BKG}	Absorbance at selected background wavelength (10 mm path)

ε_{dye}	Extinction coefficient of dye in $M^{-1}*cm^{-1}$
ε_{prot}	Extinction coefficient/protein factor in g*cm/l
cf_{dye}	Dye-dependent correction factor at 280 nm

Table 4. Dye Types, Absorbance Max, Extinction coefficients, and dye-dependent correction factors

NanoPhotometer® Models	Dye Type	Absorbance maximum of Dye (nm)	Dye-dependent ext. coeff. ε_{dye} in $M^{-1}*cm^{-1}$	Dye-dependent correction factor at 280 nm cf_{dye}
NP80/N60/N50/C40	Alexa Fluor 350	346	19,000	0.19
NP80/N60/N50/C40	Alexa Fluor 405	401	34,500	0.70
NP80/N60/N50/C40	Alexa Fluor 488	494	71,000	0.11
NP80/N60/N50/C40	Alexa Fluor 532	530	81,000	0.09
NP80/N60/N50/C40	Alexa Fluor 546	554	104,000	0.12
NP80/N60/N50/C40	Alexa Fluor 555	555	150,000	0.08
NP80/N60/N50/C40	Alexa Fluor 568	577	91,300	0.46
NP80/N60/N50/C40	Alexa Fluor 594	590	73,000	0.56
NP80/N60/C40	Alexa Fluor 647	650	239,000	0.03
NP80/N60/C40	Alexa Fluor 680	679	184,000	0.05
NP80/N60/C40	Alexa Fluor 790	785	260,000	0.08
NP80/N60/N50/C40	Cy3	550	150,000	0.05
NP80/N60/C40	Cy5	649	250,000	0.05
NP80/N60/C40	DyLight 649	654	250,000	0.04
NP80/N60/N50/C40	DyLight 488	493	70,000	0.15
NP80/N60/N50/C40	FITC	495	68,000	0.30
NP80/N60/N50/C40	Pacific Blue	409	30,000	0.20
NP80/N60/N50/C40	Pacific Orange	397	24,500	0.60
NP80/N60/N50/C40	pHrodo Green	505	75,000	0.20
NP80/N60/N50/C40	pHrodo Red	560	65,000	0.12
NP80/N60/N50/C40	r-PE	566	200,000	0.18
NP80/N60/N50/C40	Texas Red	595	80,000	0.18

- **Ratios**

Protein samples e.g. from whole cell lysates may contain nucleic acids. To check the purity of the isolated protein, the 260/280 ratio is calculated to give an indication of the nucleic acid contamination. A pure protein preparation has an expected 260/280 ratios of ~ 0.57. If a ratio is detected out of the acceptable range an alert icon ⚠ is shown in the results/table area. A click on the alert icon shows additional information. The ranges for acceptable ratio values can be defined in preferences.
The ratio is calculated with or without background correction according to if the background correction is activated during the measurements or not as follows:

Without background correction:

$$260/280 \text{ ratio} = \frac{A_{260}}{A_{280}}$$

With background correction:

$$260/280 \text{ ratio} = \frac{A_{260} - A_{BKG}}{A_{280} - A_{BKG}}$$

PROTEIN ASSAYS

METHOD OVERVIEW

Protein concentration may be measured using colorimetric assays, in which certain reagents are added to the protein solution to generate a colored product; either a protein-cupric ion chelate as in the Biuret, Lowry, BCA assays or a protein-dye complex as in the Bradford assay. In these colorimetric assays, the absorbance is measured in the visible range at the appropriate wavelength for each assay and compared against a standard curve prepared by serial dilution of a protein standard of known concentration. A linear, linear zero or 2nd order regression analysis of the calibration standard data points is calculated by the NanoPhotometer®. A correlation coefficient (R^2) in the range of 0.95 to 1.00 indicates a good fit to a straight line.

- **Bradford Assay**

Method depends on quantifying the binding of a dye, Coomassie Brilliant Blue, to an unknown protein and comparing this binding to that of a standard curve prepared from a set of known protein of known concentrations at 595 nm. This standard is usually BSA (bovine serum albumin).

- **Biuret Assay**

Method depends on a reaction between cupric ions and peptide bonds in an alkali solution, resulting in the formation of a complex absorbing at 546 nm.

- **BCA Assay**

Method depends on a reaction between cupric ions and peptide bonds coupled with the detection of cuprous ions using bicinchoninic acid (BCA), giving an absorbance maximum at 562 nm. The BCA process is less sensitive to the presence of detergents used to solubilize membranes.

- **Lowry Assay**

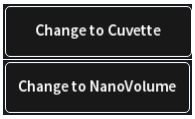
Method is based on the Biuret reaction. Under alkaline conditions the divalent copper ion forms a complex with peptide bonds in which it is reduced to a monovalent ion. Monovalent copper ion and the radical groups of tyrosine, tryptophan, and cysteine react with Folin reagent to produce an unstable product that becomes reduced to molybdenum/tungsten blue. The bound reagent changes color from yellow to blue. This binding is compared with that obtained with a standard protein at 750 nm; this is usually BSA (bovine serum albumin).

Note: Detailed protocols are customarily supplied with these assay kits, and must be closely followed to ensure that accurate results are obtained.

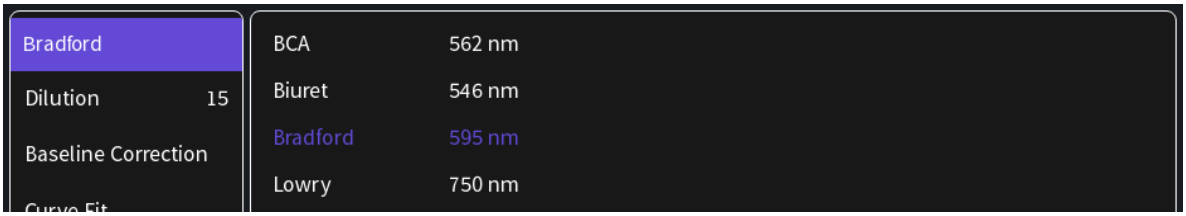
MEASUREMENT PROTOCOL

1. Select protein assays icon from home screen.

2. To change between NanoVolume and cuvette application, use the Change to Cuvette/NanoVolume button below the parameter area (NP80/C40 only).

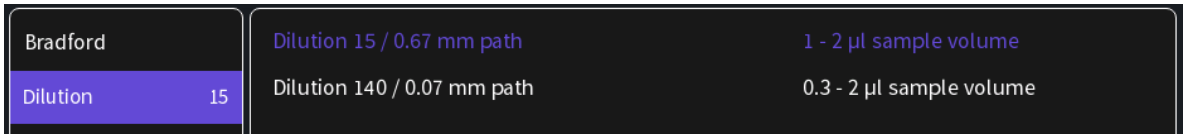


3. To change the assay type click on Bradford and a list with available options opens on the right side.
   Options are: BCA Assay, Biuret Assay, Bradford Assay, Lowry Assay (not for N50)



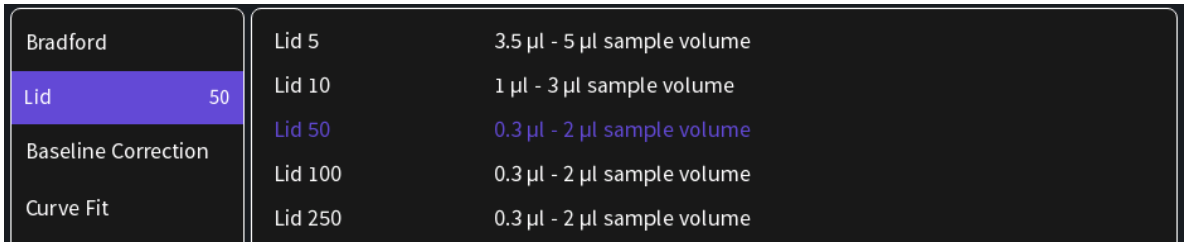
4. **For Cuvette Application:**
   Select the path length depending on the used cuvette.
   Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm

For NanoVolume Application:
Select the dilution depending on the sample concentration



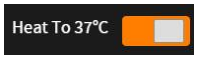
Note: There is no automatic path length setting available in this method. Select either a virtual dilution of 15 (path length 0.67 mm) or of 140 (path length 0.07 mm) depending on your sample concentration.

For NanoVolume application with submicroliter cell (C40 only):
Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics).
Required sample volume for each lid is shown.

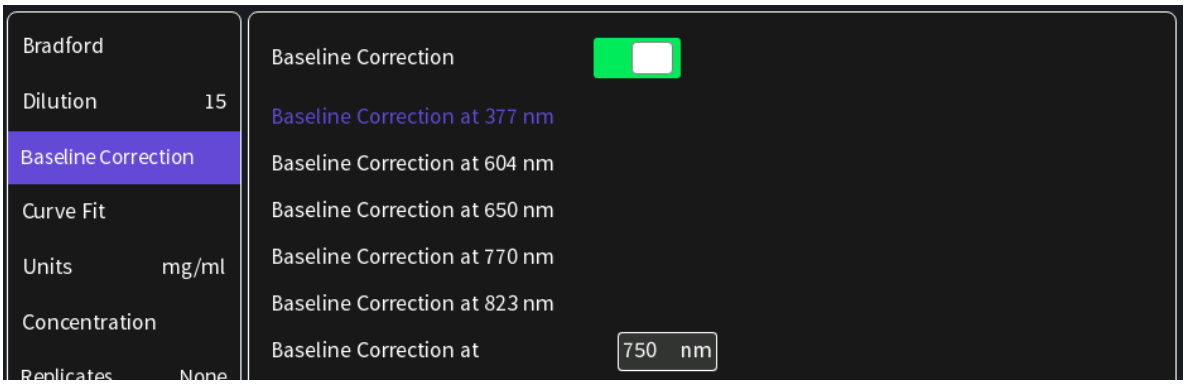


Note: A new Blank is recommended when changing the dilution lid.

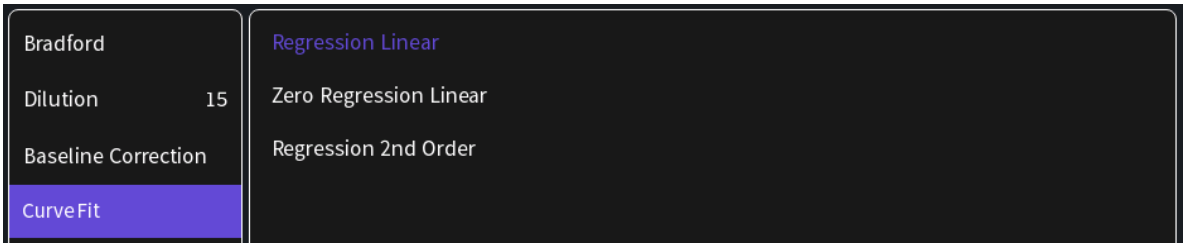
5. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).



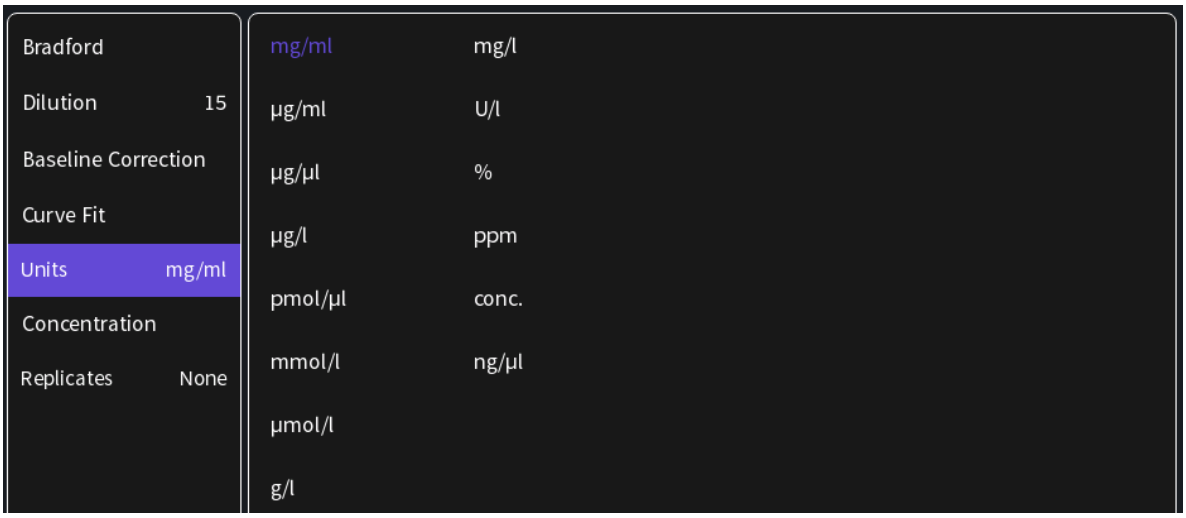
6. The baseline correction is disabled as default. It is possible to choose between different wavelengths for the baseline correction.
   Options are: 377 nm, 604 nm, 650 nm, 770 nm (not N50) and 823 nm (not N50)
   Option to enter any wavelength between 200 nm and 900 nm (N50: 650 nm)



7. Select curve fit type: Options are linear regression, zero regression (forces the straight line through the origin) and 2nd order regression

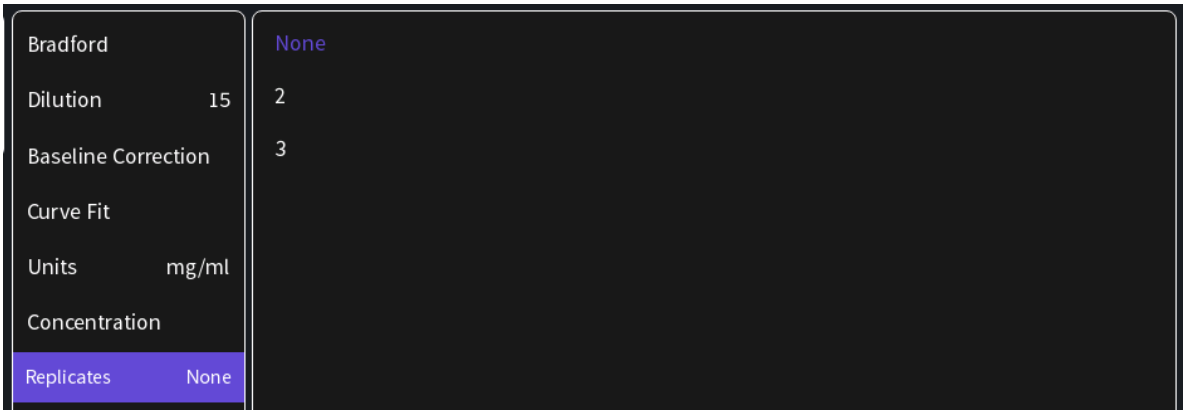


8. Select Unit



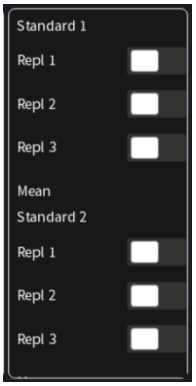
9. Add up to 20 Concentrations by clicking on the Add Concentration button. Added concentrations can be deleted with ⊗
   Enter the concentrations of the standard curve.

10. Select Replicates none, 2 or 3



11. Measure a blank and depending on the replicate selection, all required concentrations. Absorbances of the replicates will be shown in the results area and if replicates are selected a mean value for each standard. It is possible to exclude single measurements from the curve calculation by switching the toggle switch off.

    Note: After the first sample measurement the standard curve can no longer be altered.



12. Once a Standard curve is created or loaded it will be used for concentration calculations of measured samples. It may be necessary to do a blank measurement.

13. Apply sample and press the sample button to initiate the sample measurement.

    Note: Once the sample measurement is initiated it is no longer possible to change the standard curve.

CALCULATIONS

Protein concentration is determined using the standard curve by correlating absorbance values of samples with known concentration to calculate the concentration of the unknown sample. In order to maintain accuracy and precision please ensure that the R^2 value of the standard curve is 0.95 or greater.

KINETICS

METHOD OVERVIEW

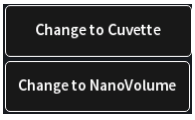
The Kinetics application is useful for: measuring initial rates of enzyme-catalyzed reactions, performing progress-curve analysis for complete reactions, calculating basic Michaelis-Menten parameters for single-substrate reactions, and measuring enzyme inhibition. Simple kinetics studies, where the change in absorbance is followed as a function of time at a fixed wavelength, can be readily performed with the NanoPhotometer®. The rate of a chemical reaction can be measured using spectrophotometric methods by studying the change in absorbance at a fixed wavelength as a function of time. These changes in absorbance reflect corresponding changes in the concentration of reactants or products as the reaction progresses. The rate of many chemical reactions can be markedly accelerated by the presence of catalysts, which remain chemically intact during the reaction. Catalysts in the case of biochemical reactions are generally represented by enzymes, which are specialized protein catalysts. However, a few examples of special reactions catalyzed by RNA molecules also exist. Studying the kinetics of a reaction can reveal important details of the catalytic mechanism involved in terms of sequence steps, transition state of reactants or nature of enzyme inhibitors.

MEASUREMENT PROTOCOL

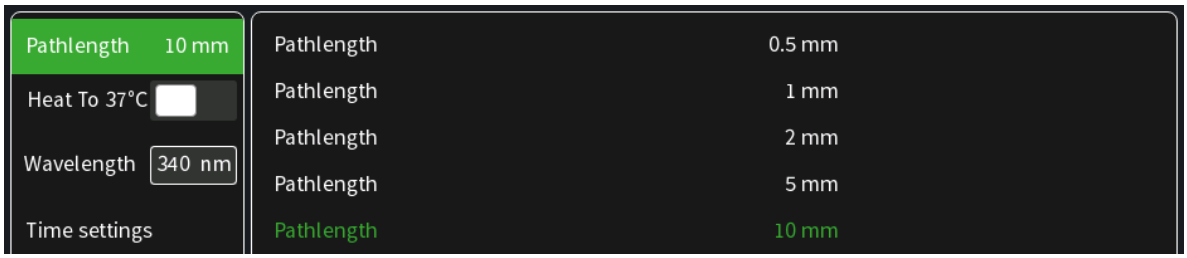
Note: If a kinetic is started from a control device via WiFi connection (tablet or smartphone) set the auto lock of the tablet or smartphone to never. Otherwise the kinetics will be interrupted when the smartphone or tablet is locked, because of losing the WiFi connection.

1. Select the Kinetics icon on the home screen

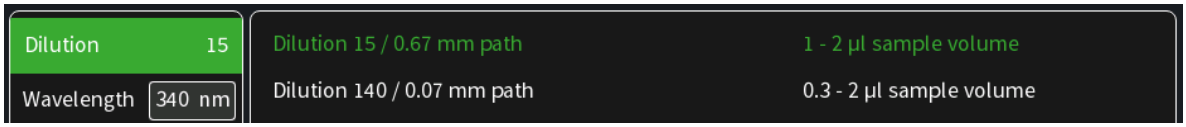
2. To change between NanoVolume and cuvette application, use the Change to Cuvette/NanoVolume button below the parameter area (NP80/C40 only).



3. **For Cuvette Application:**
   Select the path length depending on the used cuvette.
   Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm

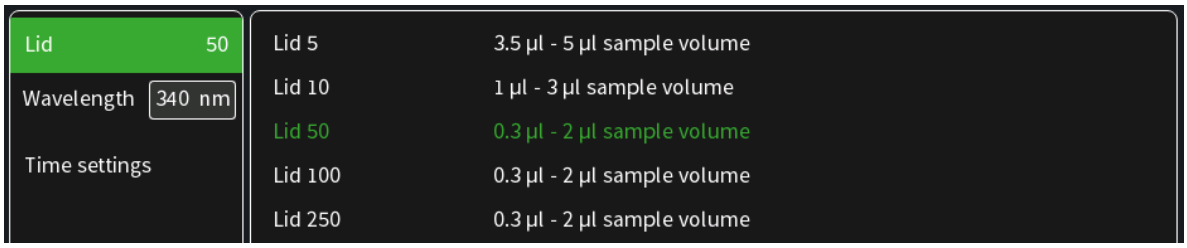


For NanoVolume Application:
Select the dilution depending on the sample concentration.



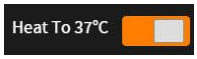
Note: There is no automatic path length setting available in this method. Select either a virtual dilution of 15 (path length 0.67 mm) or of 140 (path length 0.07 mm).

For NanoVolume application with submicroliter cell (C40 only):
Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics).
Required sample volume for each lid is listed to the right.



Note: A new Blank is recommended when changing the dilution lid.

4. If it is desired to heat the sample to 37°C use the toggle switch to turn on the cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).

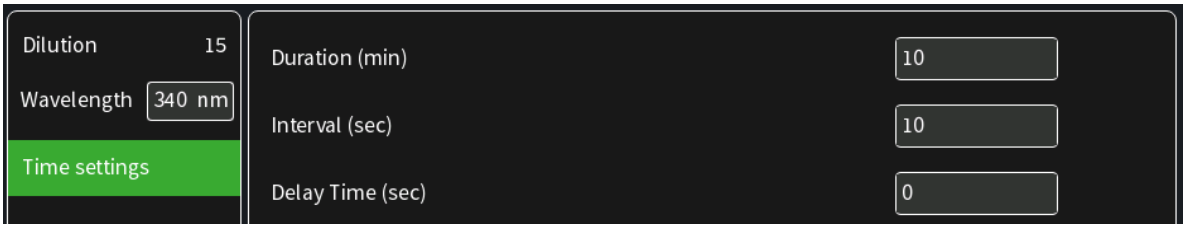


5. Default wavelength (λ) is 340 nm but can be changed in the range of 200–900 nm (N50: 200–650 nm), depending on the application.

6. Time settings:
   - Enter the duration time in minutes over which measurements are to be taken. Possible range is 1–3000 minutes.
   - Enter the interval time between measurements in seconds. Possible interval times are 5-

3,600 seconds (N50: 10–3,600 sec.), depending on the duration time.

- Enter the delay time in seconds before the first measurement is taken. Possible delay time is between 0–3,600 seconds, depending on the duration time.



Note: A maximum of 500 samples is possible. Please consider this when choosing the duration and interval time.

7. Insert cuvette with the reference sample and select blank button to initiate the measurement.

8. Insert cuvette with the sample and select the sample button to initiate the measurements. Once the kinetic is started the Blank button turns to a Pause/Continue button and the Sample button to a Stop button.

Note: While the kinetics is running it is not possible to change the parameters, save data or delete data. Change of parameters is only possible before starting the kinetic readings. Save and delete data is only available after the kinetic session is stopped.
Note: Auto print and cryo label print is not available in Kinetics.

CALCULATIONS

All absorbance values are normalized to a 10 mm path.

A_0 = absorbance of start value (10 mm path)
A_n = absorbance of actual value time n (10 mm path)
dA = absorbance of actual value – absorbance of start value
Slope = linear regression fit of all actual measurement points
Final A = absorbance of final value
R^2 = $R^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$ [O_i = observed slope value; E_i = expected slope value]

OD600

Method Overview

The growth of bacteria in liquid culture media is commonly monitored by measuring the optical density at 600 nm (OD600) in small samples taken from the cultures. OD600 measurements are typically used to determine the stage of growth of the bacterial culture, thereby ensuring that cells are harvested at an optimum point that corresponds to an appropriate density of live cells. Growth of bacterial cells typically progresses through a series of consecutive phases including: lag, log, stationary and decline (see Figure 1). In general, cells should be harvested towards the end of the log phase using the optical density of the samples to determine when this point has been reached. Since optical density in the case of OD600 measurements results from light scattering rather than light absorption, this value varies depending on the type of bacterial cells in the culture in terms of size and shape. Cells are routinely grown until the absorbance at 600 nm (known as OD 600) reaches approximately 0.4 prior to induction or harvesting. A linear relationship exists between cell number (density) and OD 600 up to an absorbance value of 0.6, approximately.

As mentioned above, for turbid samples such as cell cultures, the absorbance measured is due to light scattering, and not the result of molecular absorption. Since the extent of scattering is affected by the optics of the system (distance between the cell holder and instrument exit slit, monochromator optics, slit geometry, etc.), different spectrophotometer types will tend to give different OD 600 readings for the same turbid sample. Therefore, if results from different spectrophotometers are to be compared, they must be normalized first using appropriate calibration curves.

A calibration curve can be constructed by comparing measured OD 600 to expected OD 600. Expected OD 600 is determined by counting cell number using an alternative technique (for example microscope slide method) and converting to OD 600 using the rule of thumb that 1 OD 600 = 5 x 10^8 cells/ml for *E. coli*.

The NanoPhotometer® comes with a correction factor of 1 as default. To compare OD 600 values between different spectrophotometers, it is necessary to determine the constant deviation or ratio between the absorbance values for the same sample from each instrument and use this factor within the setting “correction factor” of your NanoPhotometer® Software.

Note: The use of 10 mm path length disposable cuvettes is recommended for optical density measurements of cell culture solutions. The amount of cells is reflected in the reading and the likelihood of fluctuating amount of cells in a drop from sample to sample can be considered as extremely significant. It is therefore recommended to use cuvettes since the amount of error in a bigger volume is not as significant. The cuvette measurements provide a bigger average and therefore more reproducible readings. Also, to prevent the suspension settling too quickly and giving an OD reading that changes with time, glycerol should be added to the sample.

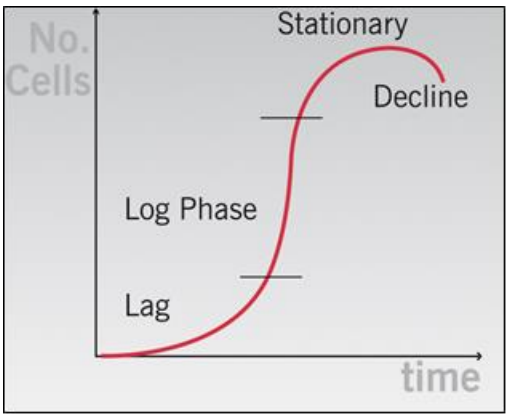
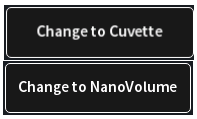


Figure 1 Bacterial growth curve

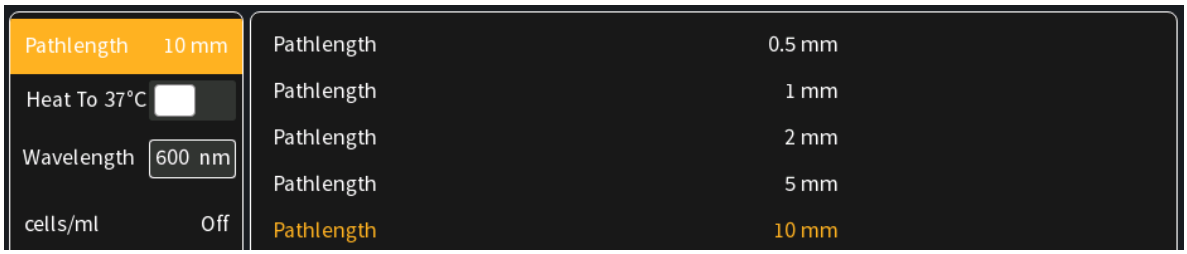
MEASUREMENT PROTOCOL

1. Select the OD600 icon on the home screen

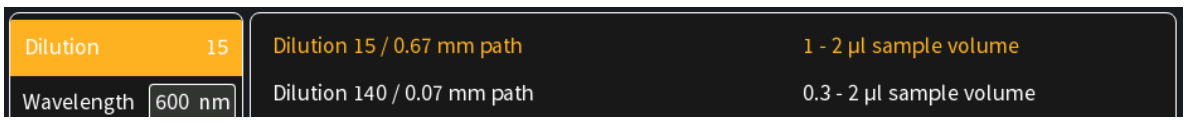
2. To change between NanoVolume and cuvette application, use the Change to Cuvette/NanoVolume button below the parameter area (NP80/C40 only).



3. For **Cuvette Application**:
   Select the path length depending on the used cuvette.
   Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm

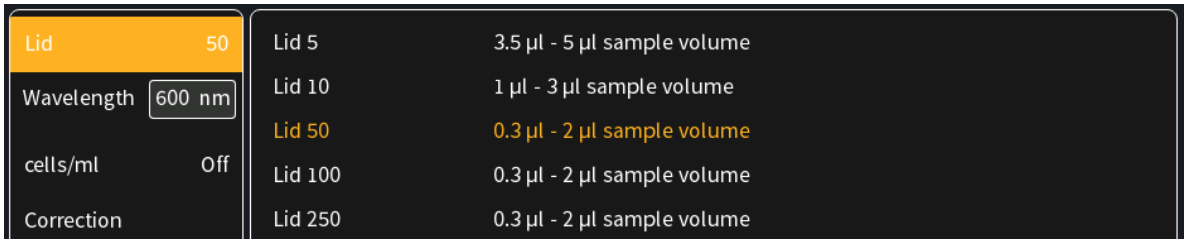


For **NanoVolume Application:**
Select the dilution depending on the sample concentration



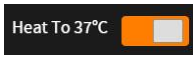
Note: There is no automatic path length setting in this method. Select either a virtual dilution of 15 (path length 0.67 mm) or of 140 (path length 0.07 mm)

For **NanoVolume application with submicroliter cell** (C40 only):
Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics).
Required sample volume for each lid is shown.



Note: A new Blank is recommended when changing the dilution lid.

4. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).

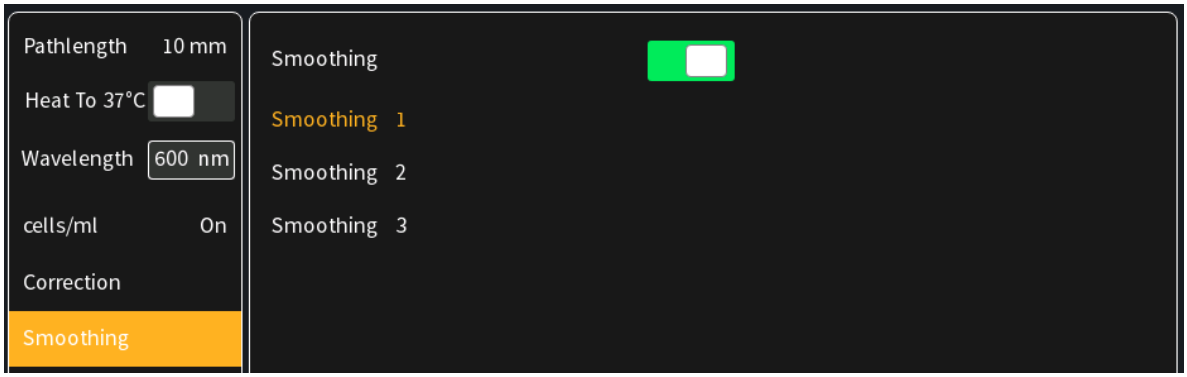


5. Default wavelength is 600 nm but the wavelength can be changed in the range of 200–900 nm (N50: 200–650 nm), depending on the application.

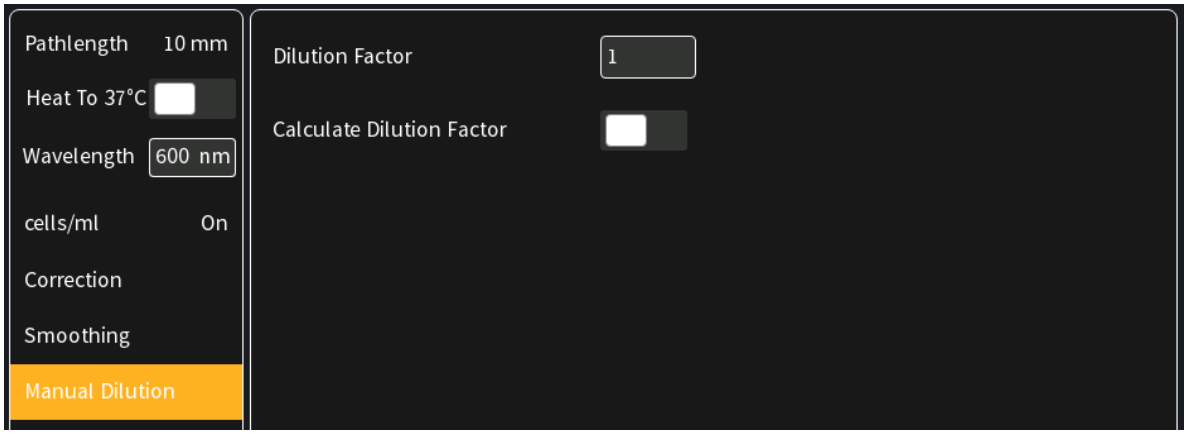
6. Toggle switch cells/ml is disabled as default. Enable cells/ml to get the cells/ml calculated. Enter the cell specific factor and multiplier (e.g. 1 OD600 = 5 x 10^8 cells/ml)

7. Enter the correction factor to compensate for different optical configurations between the NanoPhotometer® and other instruments.

8. Option to smooth the graph with different boxcars. Options: Off, 1 = boxcar 11 (default), 2 = boxcar 21 and 3 = boxcar 61



9. Option to set/calculate a dilution factor for manual diluted samples.



10. Insert cuvette with the reference sample and select blank button to initiate the measurement

11. Insert cuvette with the sample and select the sample button to initiate the measurement

CALCULATIONS

$OD600 = A_{600} * Đ * cf$

OD600	Optical density at 600 nm
A_{600}	Absorbance at 600 nm (10 mm path)
Đ	Dilution factor
cf	Correction factor for spectrophotometer

$Cells/ml = A_{600} * Đ * cf * multiplier$

A_{600}	Absorbance at 600 nm (10 mm path)
Đ	Dilution factor
cf	Correction factor for spectrophotometer
multiplier	Multiplier of sample

More Apps

The More Apps icon located on the home screen opens another menu screen with access to icons for additional applications available on the NanoPhotometer®. The applications featured in this menu include: wavelength, concentration, wavescan, absorbance/ratio, standard curve and custom applications.

More Apps: Wavelength

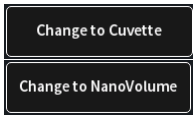
Method Overview

In the wavelength application it is possible to measure simple absorbance (A) and % transmittance (%Trans. / only in cuvette mode) of a sample at specific wavelengths. It is possible to add up to 20 different wavelengths.

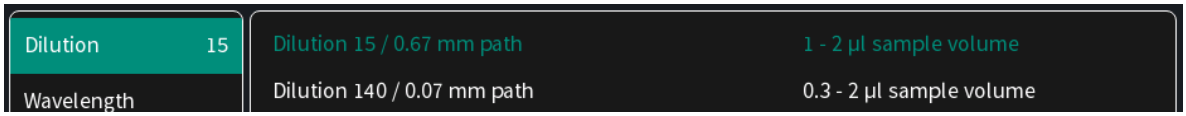
Measurement Protocol

1. Select the More Apps icon from the home screen and the Wavelength icon from the More Apps screen.

2. To change between NanoVolume and Cuvette application, use the Change to Cuvette/NanoVolume button below the parameter area (NP80/C40 only).

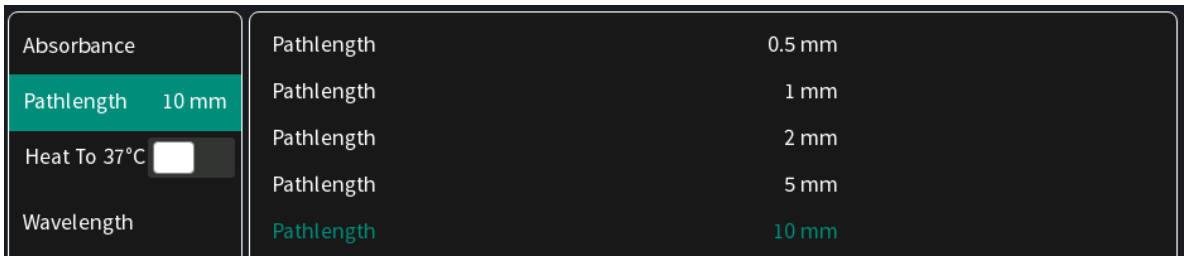


3. **For NanoVolume application:**
   Select the dilution depending on the sample concentration.

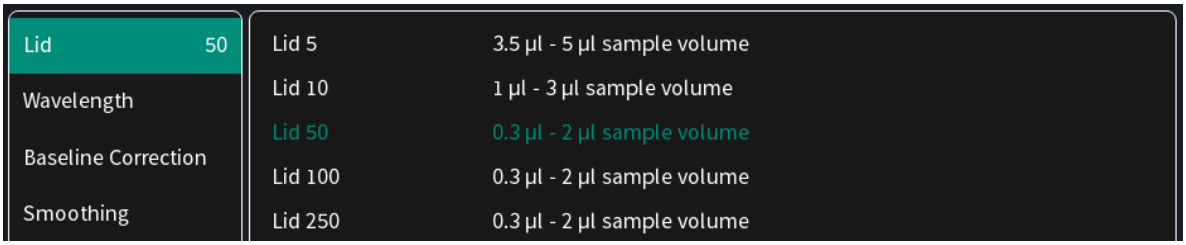


Note: There is no automatic path length setting in this method. Select either a virtual dilution of 15 (path length 0.67 mm) or of 140 (path length 0.07 mm).

For cuvette application:
Select the path length depending on the used cuvette.
Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm

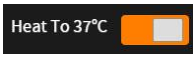


For NanoVolume application with submicroliter cell (C40 only):
Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics).
Required sample volume for each lid is shown.

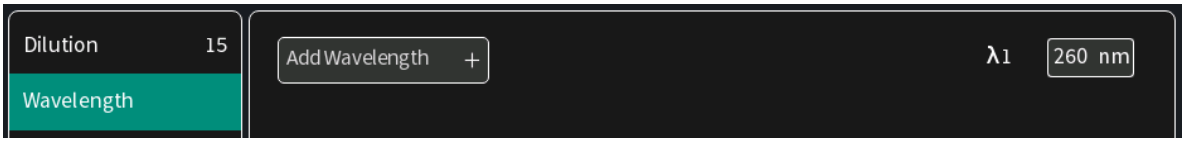


Note: A new Blank is recommended when changing the dilution lid.

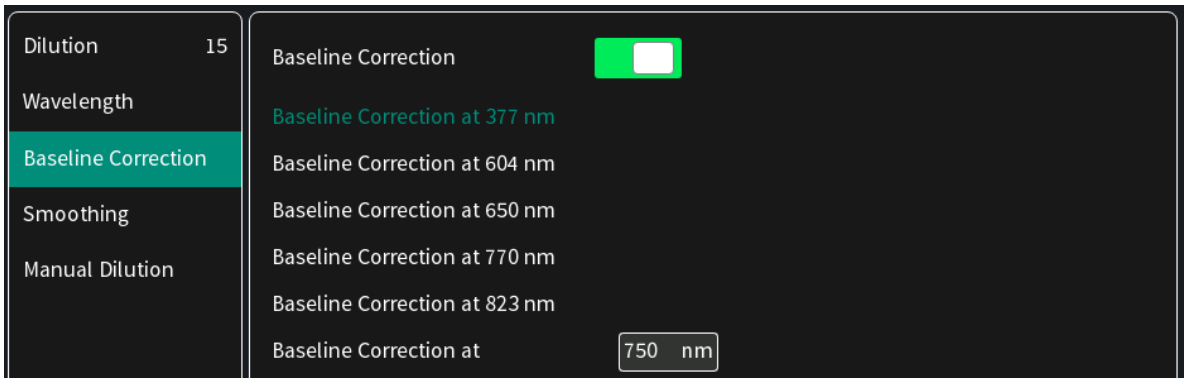
4. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).



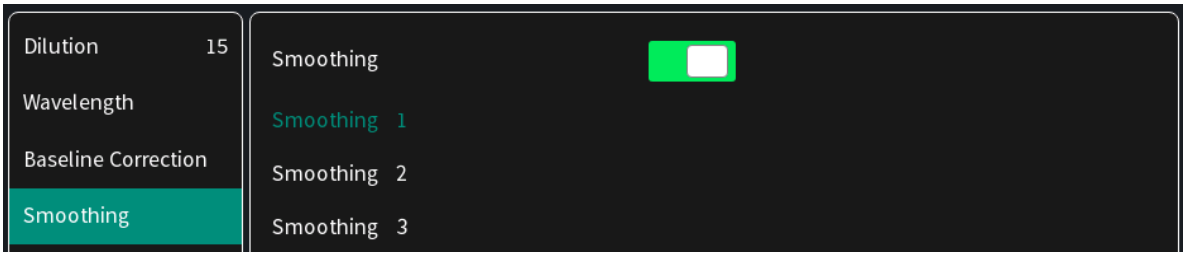
5. Enter desired wavelength (λ) to be measured. It is possible to measure up to 20 wavelengths simultaneously. More wavelength (λ) options can be added by selecting the Add Wavelength button. Added wavelength can be deleted with ⊗



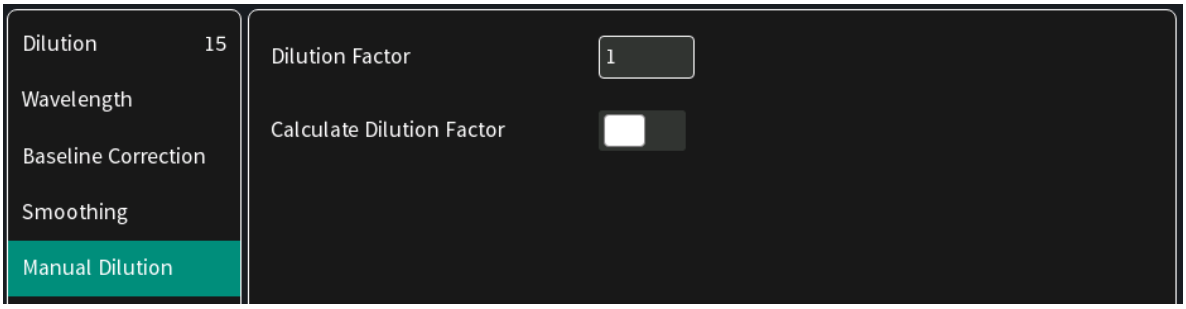
6. Baseline correction is set to off as default. Enabling the baseline corrections shows a list with different wavelength options: 377 nm, 604 nm, 650 nm, 770 nm (N/A N50) and 823 nm (N/A N50). Option to enter any wavelength between 200 nm and 900 nm (N50: 650 nm).



7. Option to smooth the graph with different boxcars. Options: Off, 1 = boxcar 11 (default), 2 = boxcar 21 and 3 = boxcar 61



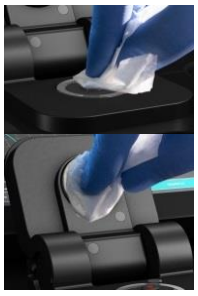
8. Option to set/calculate a dilution factor for manual diluted samples.



9. Apply the blank ddH_20 or buffer to the illuminated sample window for the reference measurement and select blank to initiate the reading.

Note: The illumination of the sample window can be switched off in preferences.

10. Use a lint-free laboratory wipe to clean both the sample window and mirror prior to applying the next sample.



Note: It can be helpful to apply the blank a second time and read it as a sample to ensure a proper blank.

11. Apply sample to the sample window and press the sample button to initiate the measurement.

CALCULATIONS

- **Absorbance Calculation:**

Absorbance is formally defined as the decimal logarithm (base 10) of the reciprocal of transmittance:

$$A = \log\left(\frac{1}{T}\right) = -\log T$$

$$T = 10^{(-A)}$$

Note: Corresponding absorbance value e.g. Absorbance value (λ = 230) etc. normalized to 10 mm path length

- **%Transmittance Calculations (cuvette mode only)**

In the wavelength application it is possible to measure the absorbance (A) and % transmittance (%T) of a sample with respect to a reference at a specific wavelength. Transmittance is the ratio of light intensity remaining after it has passed through the sample (*I*) to the initial incident light intensity (I_0):

$$T = \frac{I}{I_0}$$

$$\%T = \frac{I}{I_0} \times 100$$

MORE APPS: WAVESCAN

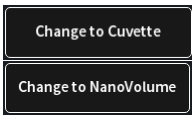
METHOD OVERVIEW

Using the wavescan application it is possible to obtain the complete spectral scan for a defined wavelength range between 200-900 nm (NP80/N60/C40) or from 200-650 nm (N50).

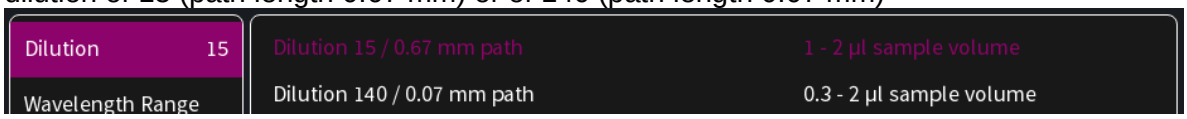
MEASUREMENT PROTOCOL

1. Select the More Apps icon from the Home screen and the Wavescan icon from the More Apps screen

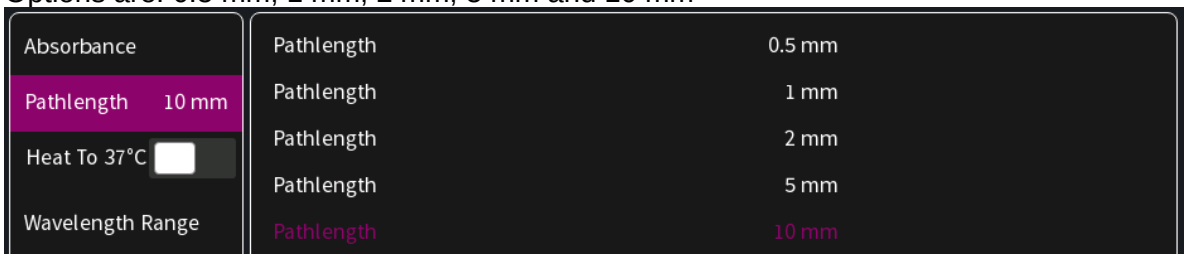
2. To change between NanoVolume and Cuvette application, use the Change to Cuvette/NanoVolume button below the parameter area (NP80/C40 only).



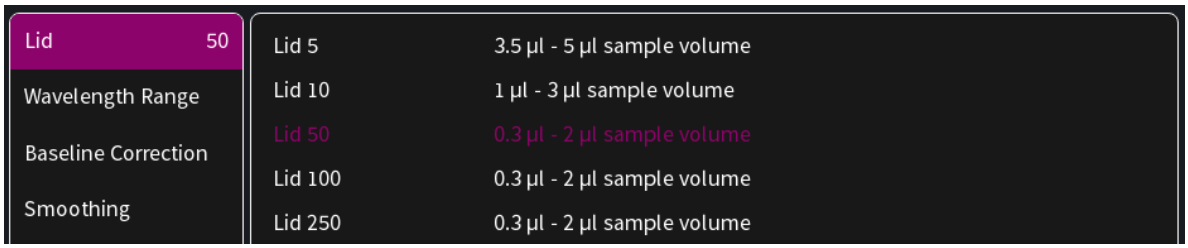
3. **For NanoVolume application:**
   Select the dilution depending on the sample concentration
   Note: There is no automatic path length setting in this method. Select either a virtual dilution of 15 (path length 0.67 mm) or of 140 (path length 0.07 mm)



   For cuvette application:
   Select the path length depending on the used cuvette.
   Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm

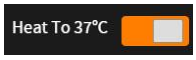


   For NanoVolume application with submicroliter cell (C40 only):
   Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics).
   Required sample volume for each lid is shown.

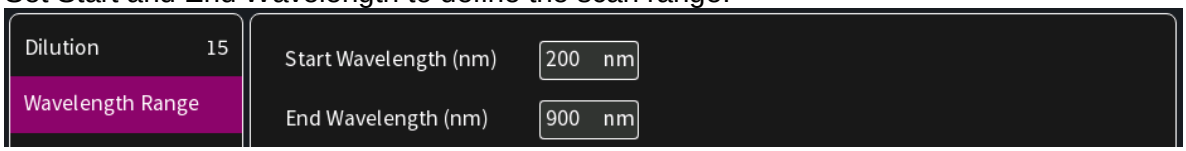


Note: A new Blank is recommended when changing the dilution lid.

4. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).

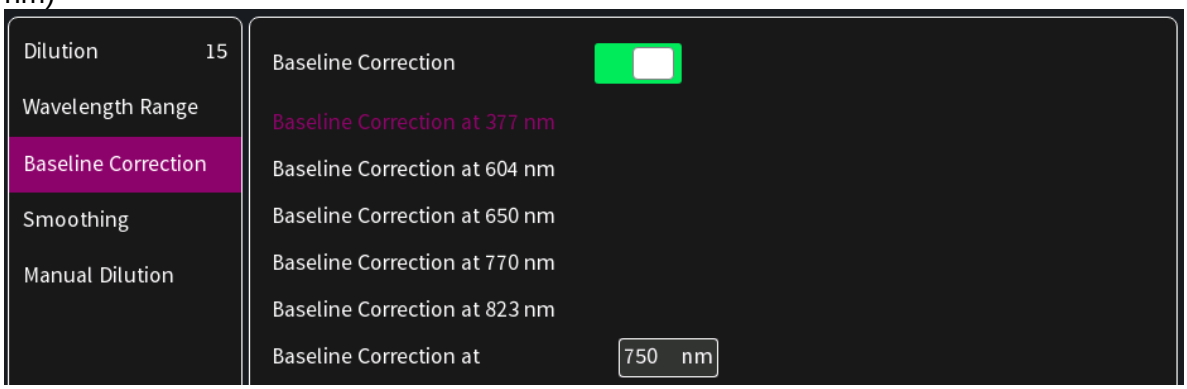


5. Set Start and End Wavelength to define the scan range.

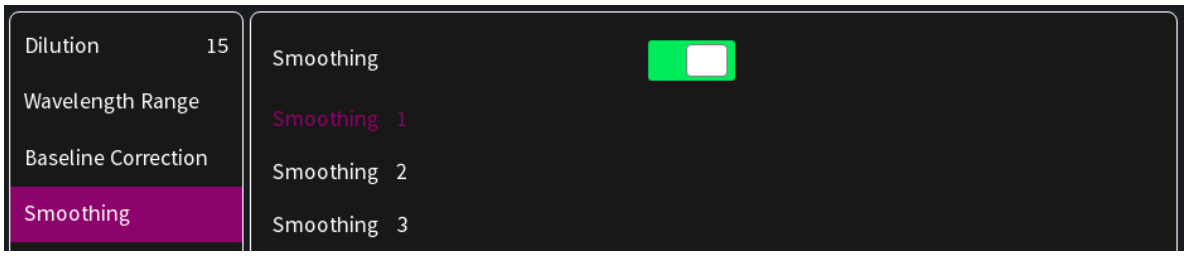


Note: If samples with a different wavelength range are selected, the graphs are shown on full scan range of 200–900 nm (N50: 200-650 nm).

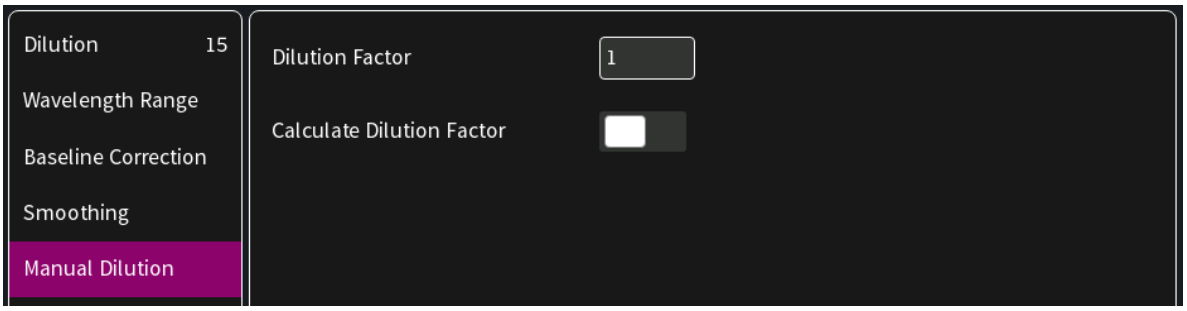
6. Baseline correction is set to off as default. Enabling the baseline corrections shows a list with different wavelength options: 377 nm, 604 nm, 650 nm, 770 nm (N/A N50) and 823 nm (N/A N50). Option to enter any wavelength between 200 nm and 900 nm (N50: 650 nm)



7. Option to smooth the graph with different boxcars. Options: Off, 1 = boxcar 11 (default), 2 = boxcar 21 and 3 = boxcar 61



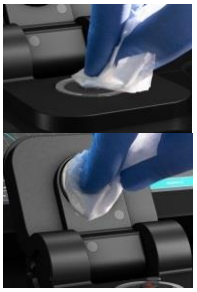
8. Option to set/calculate a dilution factor for manual diluted samples.



9. Apply the blank ddH_20 or buffer to the illuminated sample window for the reference measurement and select blank to initiate the reading.

Note: The illumination of the sample window can be switched off in the preferences.

10. Use a lint-free laboratory wipe to clean both the sample window and mirror prior to applying the next sample.

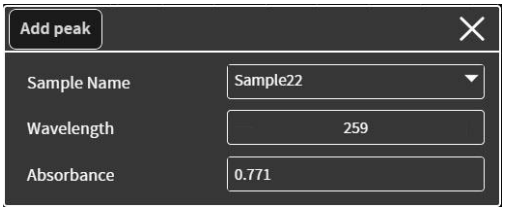


Note: It can be helpful to apply the blank a second time and read it as a sample to ensure a proper blank.

11. Apply sample to the sample window and press the sample button to initiate the measurement.

CALCULATIONS

No calculations necessary: values are reported based on 10 mm path length.
The results show prominent peaks with wavelength and absorbance values. For cuvette measurements it is possible to change to the %Transmittance mode. If a peak of interest is not shown in the results the peak can be selected by clicking on the graph. The peak can then be added to the results by tapping on the Add Peak button in the pop-up window.



MORE APPS: ABSORBANCE RATIO

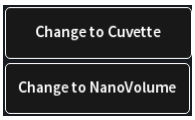
METHOD OVERVIEW

In this mode, it is possible to determine simple absorbance ratios for a given sample by measuring the absorbance at two wavelengths specified in the parameters of the method relative to a blank.

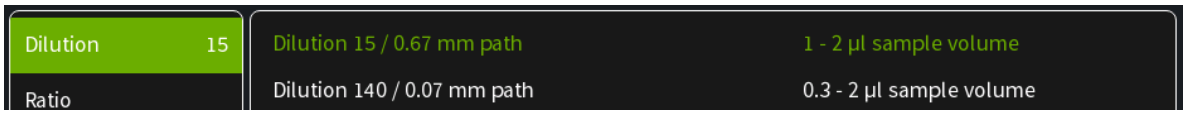
MEASUREMENT PROTOCOL

1. Select the More Apps icon from the home screen and the Absorbance/Ratio icon from the More Apps screen

2. To change between NanoVolume and Cuvette application, use the Change to Cuvette/NanoVolume button below the parameter area (NP80/C40 only).

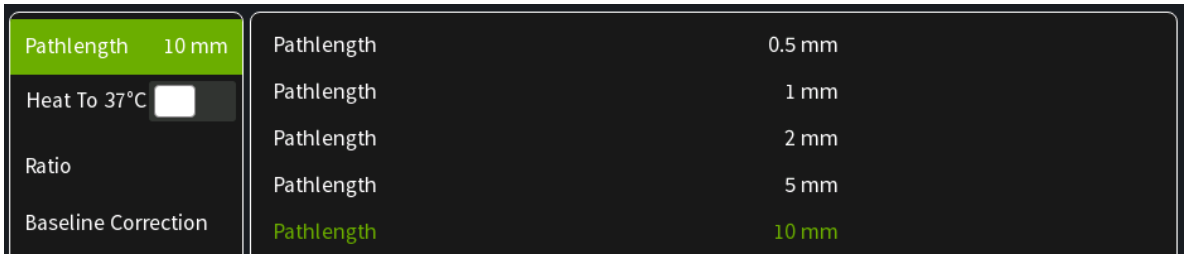


3. **For NanoVolume application**:
   Select the dilution depending on the sample concentration

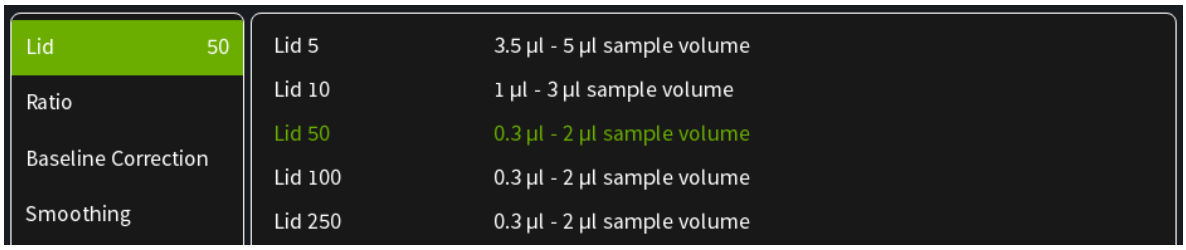


   Note: There is no automatic path length setting in this method. Select either a virtual dilution of 15 (path length 0.67 mm) or of 140 (path length 0.07 mm).

   For cuvette application:
   Select the path length depending on the used cuvette.
   Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm



   For NanoVolume application with submicroliter cell (C40 only):
   Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics). Required sample volume for each lid is shown.

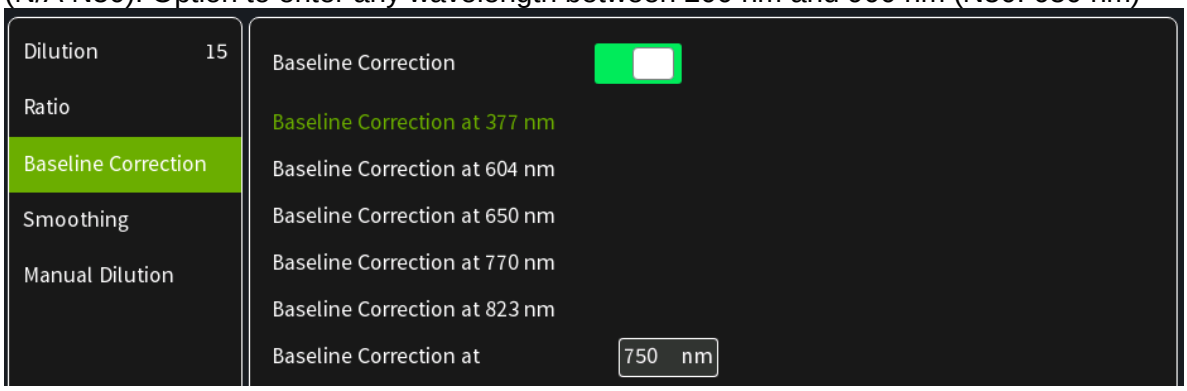


Note: A new Blank is recommended when changing the dilution lid.

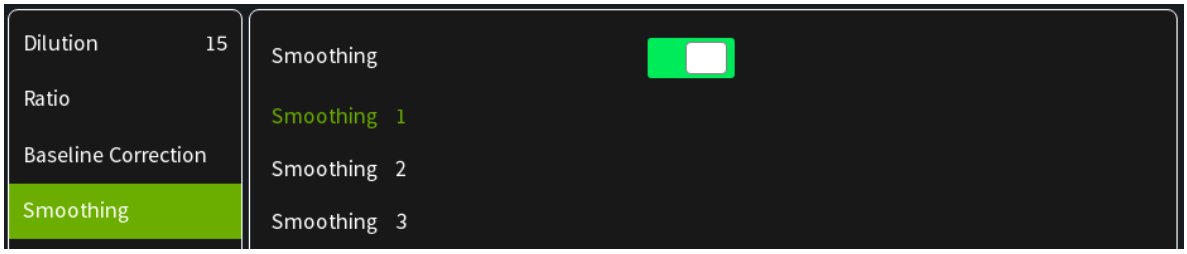
4. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).

5. Enter desired wavelengths (λ 1-1 and λ 1-2) for ratio calculation. It is possible to measure up to 20 absorbance/ratios simultaneously. More wavelengths for ratio calculation can be added by selecting the Add Ratio button. Added ratios can be deleted with ⊗.

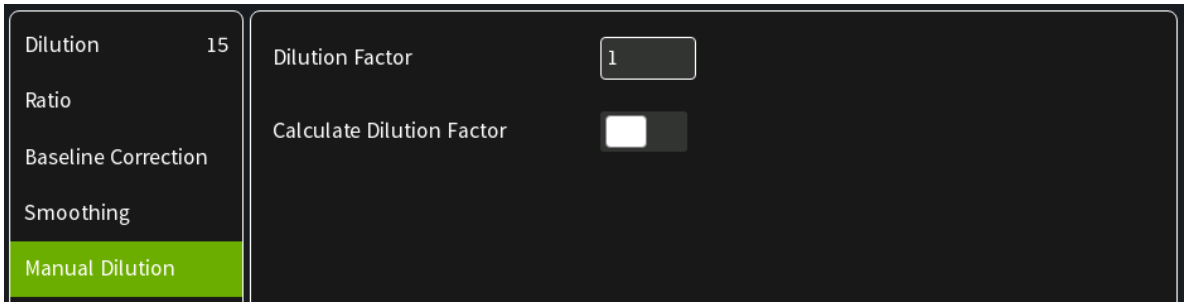
6. Baseline correction is set to off as default. Enabling the baseline corrections shows a list with different wavelength options: 377 nm, 604 nm, 650 nm, 770 nm (N/A N50) and 823 nm (N/A N50). Option to enter any wavelength between 200 nm and 900 nm (N50: 650 nm)



7. Option to smooth the graph with different boxcars. Options: Off, 1 = boxcar 11 (default), 2 = boxcar 21 and 3 = boxcar 61



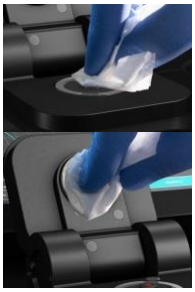
8. Option to set/calculate a dilution factor for manual diluted samples.



9. Apply the blank ddH20 or buffer to the illuminated sample window for the reference measurement and select blank to initiate the reading.

Note: The illumination of the sample window can be switched off in the preferences.

10. Use a lint-free laboratory wipe to clean both the sample window and mirror prior to applying the next sample.



Note: It can be helpful to apply the blank a second time and read it as a sample to ensure a proper blank.

11. Apply sample to the sample window and press the sample button to initiate the measurement.

CALCULATIONS

The absorbance ratio is calculated from the two path lengths specified by the user in the parameters.

$$\lambda_1 : \lambda_2 = \frac{\lambda_1}{\lambda_2}$$

$\lambda_1 : \lambda_2$ = Absorbance Ratio
λ_1 = Absorbance 1 corresponding absorbance value 1 selected normalized to 10 mm path
λ_2 = Absorbance 2 corresponding absorbance value 2 selected normalized to 10 mm path

MORE APPS: CONCENTRATION

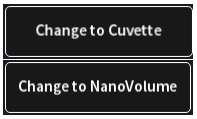
METHOD OVERVIEW

In this mode, concentration can be calculated for a sample by determining the absorbance at a specific wavelength relative to a reference. The concentration is then obtained by multiplying the measured absorbance by a specific factor. This factor may be known in advance and entered by the user, or it may be calculated by the instrument by measuring a set of standard (standard curve method) with known concentrations to create a standard curve.

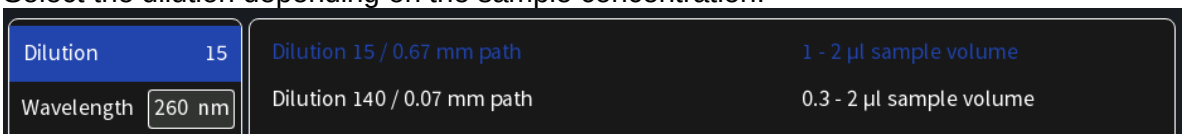
MEASUREMENTS PROTOCOL

1. Select the More Apps icon from the home screen and the Concentration icon from the More Apps screen.

2. To change between NanoVolume and Cuvette application, use the Change to Cuvette/NanoVolume button below the parameter area (NP80/C40 only).

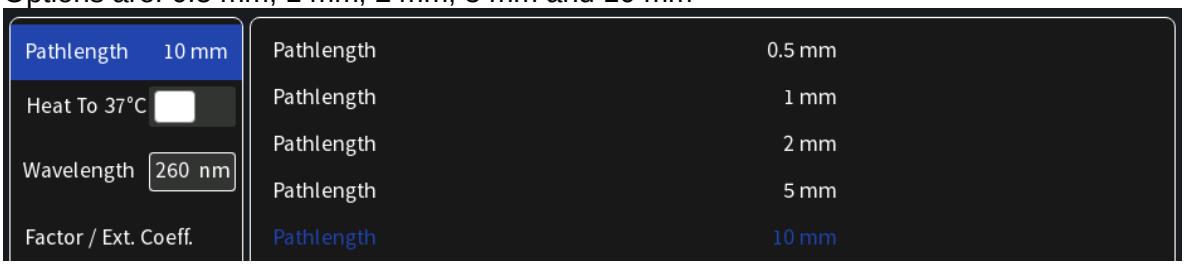


3. **For NanoVolume application:**
   Select the dilution depending on the sample concentration.

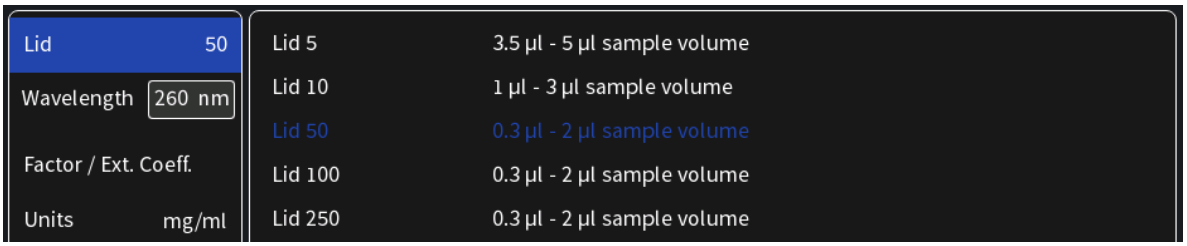


   Note: There is no automatic path length setting in this method. Select either a virtual dilution of 15 (path length 0.67 mm) or of 140 (path length 0.07 mm).

   For cuvette application:
   Select the path length depending on the used cuvette.
   Options are: 0.5 mm, 1 mm, 2 mm, 5 mm and 10 mm

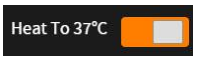


   For NanoVolume application with submicroliter cell (C40 only):
   Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics). Required sample volume for each lid is shown.



Note: A new Blank is recommended when changing the dilution lid.

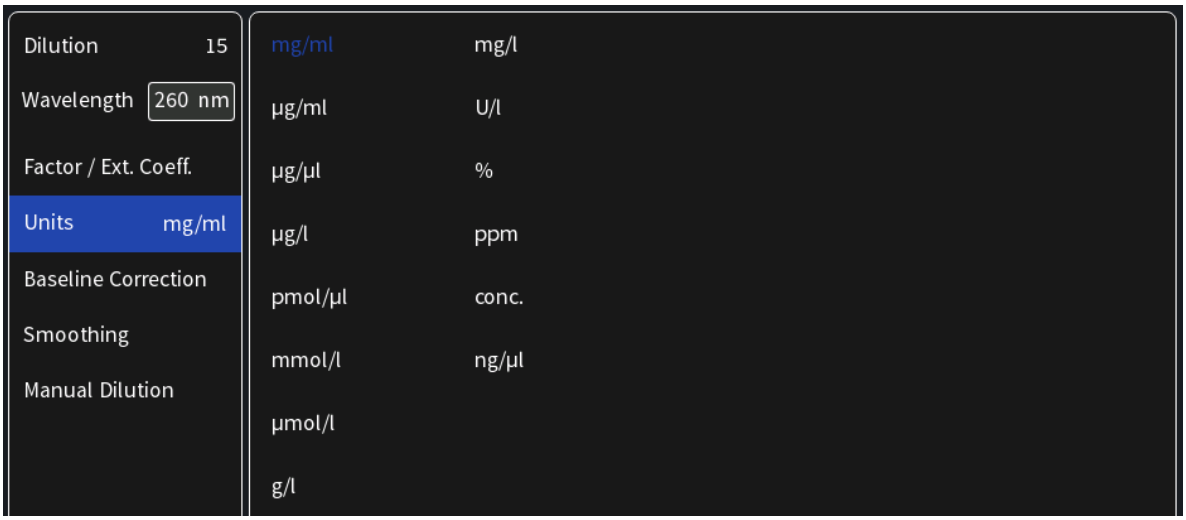
4. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).



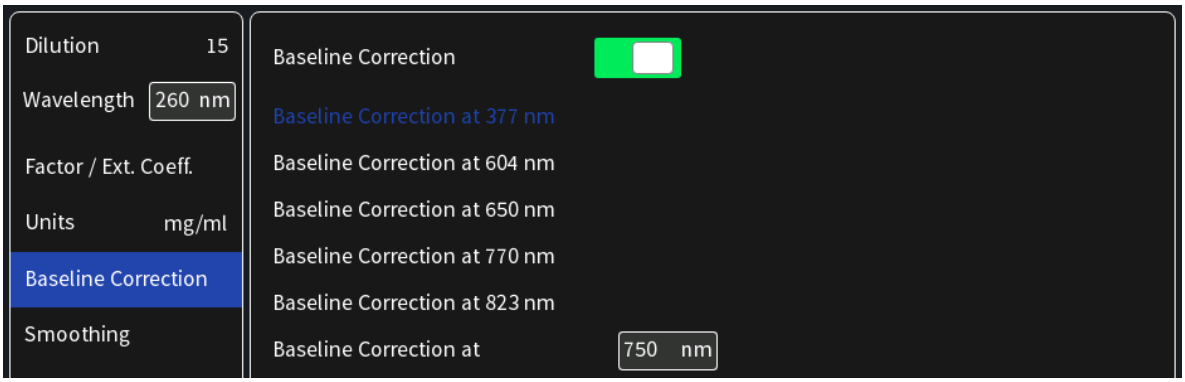
5. Default wavelength is 260 nm but can be changed in the range of 200-900 nm (N50: 200–650 nm), depending on the sample/application.

6. Enter a factor for concentration calculation.

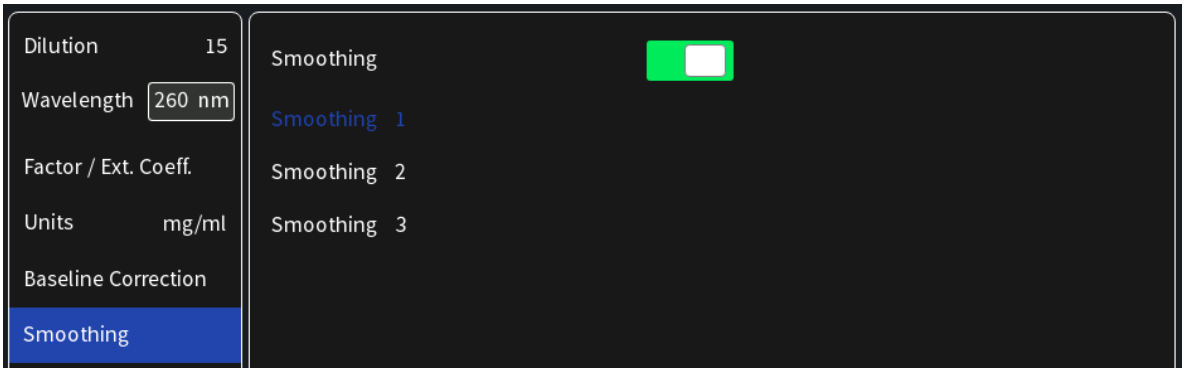
7. Unit selection



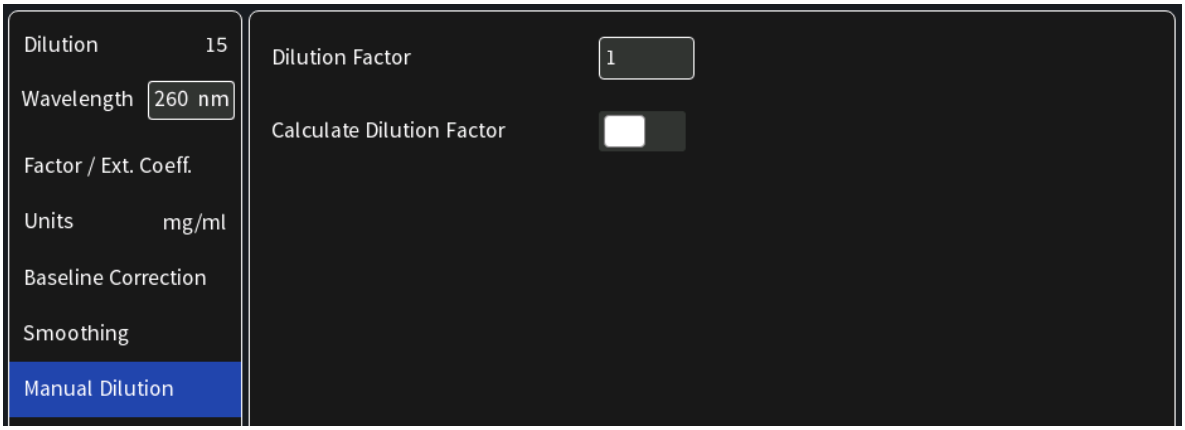
8. Baseline correction is set to off as default. Enabling the baseline corrections shows a list with different wavelength options: 377 nm, 604 nm, 650 nm, 770 nm (N/A N50) and 823 nm (N/A N50). Option to enter any wavelength between 200 nm and 900 nm (N50: 650 nm)



9. Option to smooth the graph with different boxcars. Options: Off, 1 = boxcar 11 (default), 2 = boxcar 21 and 3 = boxcar 61



10. Option to set/calculate a dilution factor for manual diluted samples.

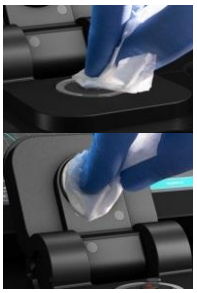


11. Apply the blank dd$H_2$0 or buffer to the illuminated sample window for the reference measurement and select blank to initiate the reading.

Note: The illumination of the sample window can be switched off in the preferences.

12. Use a lint-free laboratory wipe to clean both the sample window and mirror prior to applying the next sample.

    Note: It can be helpful to apply the blank a second time and read it as a sample to ensure a proper blank.



13. Apply sample to the sample window and press the sample button to initiate the measurement.

CALCULATIONS

In this method, the concentration of the sample is calculated based on the Beer-Lambert law given the user specified wavelength of interest and user defined extinction coefficient. The equations for calculating concentration without background correction are as follows:

Without background correction:

$C = A_n * \varepsilon * Đ$

C	Concentration (ng/µl)
A_n	Absorbance at user specified path length n (10 mm path)
Đ	Dilution factor
ε	extinction coefficient/factor

MORE APPS: STANDARD CURVE

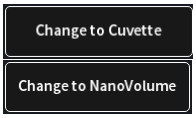
METHOD OVERVIEW

The construction of a calibration curve from multiple standards of known concentrations can be created and stored on the NanoPhotometer®. The standard curve can be used to quantify samples of the same type with unknown concentrations. This application provides an extremely useful tool with which to integrate, expedite and simplify the measurement and calculations involved in determining the concentration of analytes in unknown samples. If a zero concentration standard is required, include it in the number of standards to be entered using a reagent blank and entering 0.00 for concentration.

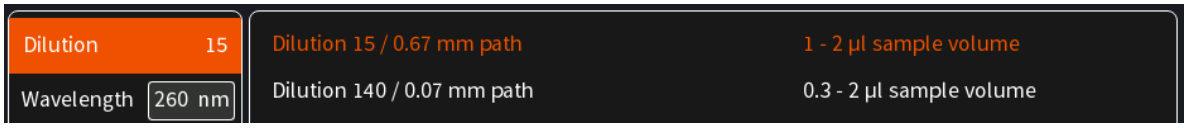
MEASUREMENTS PROTOCOL

1. Select the More Apps icon from the home screen and the Standard Curve icon from the More Apps screen.

2. To change between NanoVolume and Cuvette application, use the Change to Cuvette/NanoVolume button below the parameter area (NP80/C40 only).

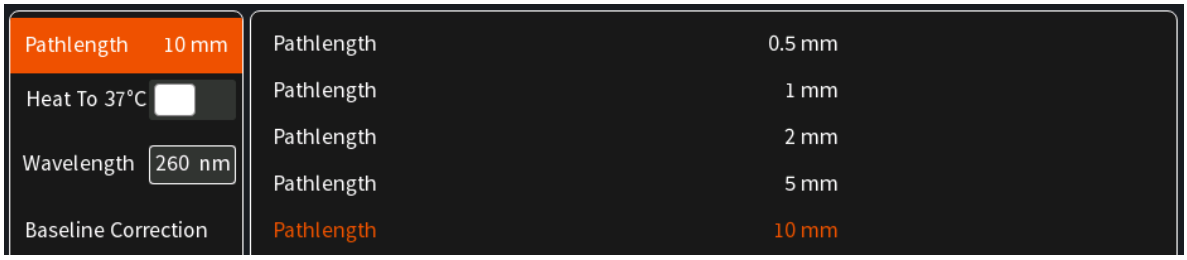


3. **For NanoVolume application:**
   Select the dilution depending on the sample concentration

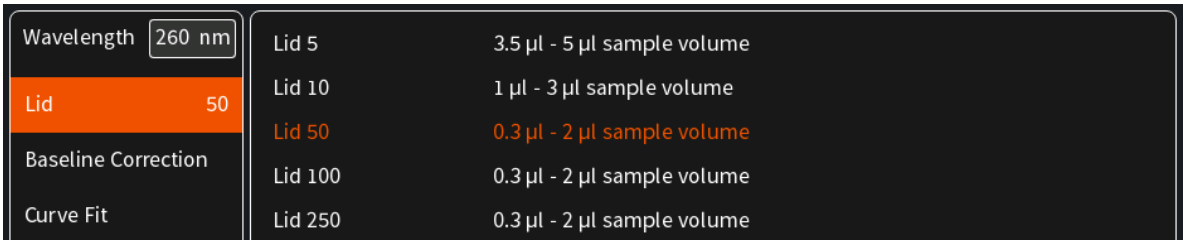


Note: There is no automatic path length setting in this method. Select either a virtual dilution of 15 (path length 0.67 mm) or of 140 (path length 0.07 mm).

For cuvette application:
Select the path length depending on the used cuvette.



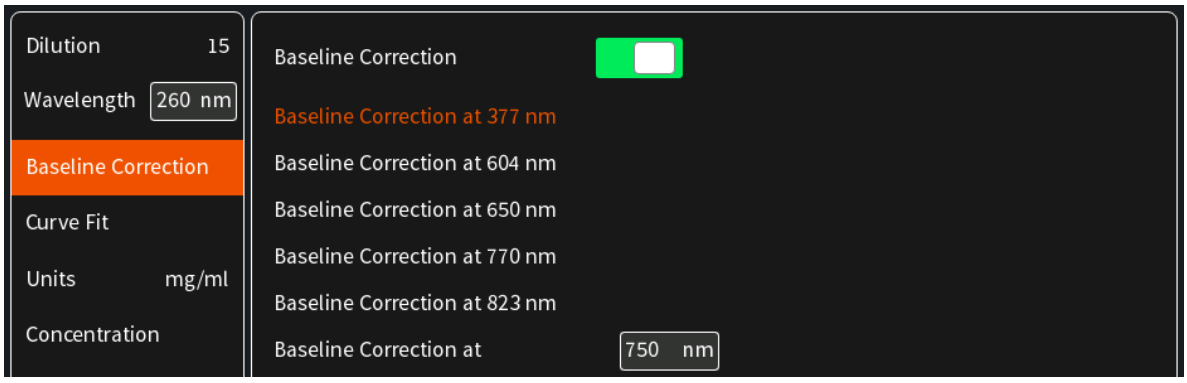
For NanoVolume application with submicroliter cell (C40 only):
Select Lid depending on your sample concentration (for concentration ranges of different lids see page 38 Submicroliter Cell Measurements Basics).
Required sample volume for each lid is shown.



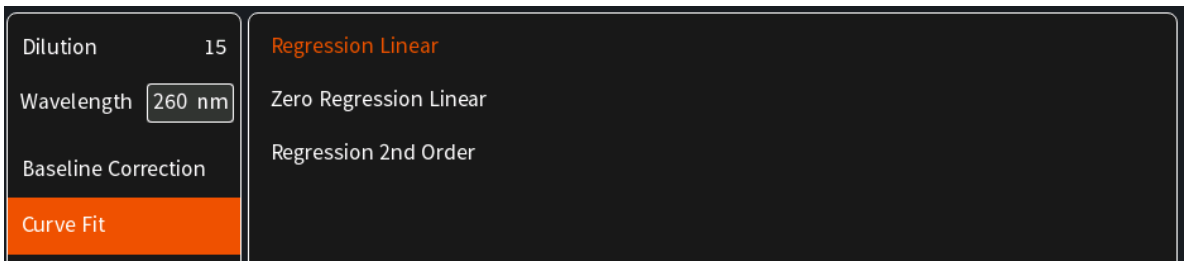
Note: A new Blank is recommended when changing the dilution lid.

4. If it is desired to heat the sample to 37°C use the toggle switch to turn on cell holder heater. When the cuvette holder has reached 37°C the toggle color changes to green.
   Note: Only available for cuvette applications (NP80 and C40).

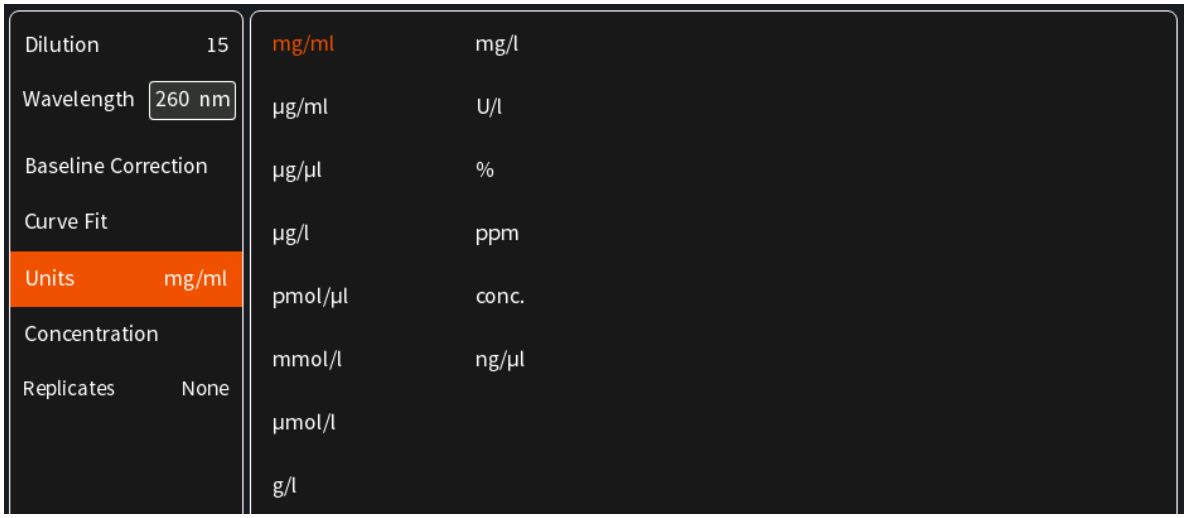
5. Baseline correction is set to off as default. Enabling the baseline corrections shows a list with different wavelength options: 377 nm, 604 nm, 650 nm, 770 nm (N/A N50) and 823 nm (N/A N50). Option to enter any wavelength between 200 nm and 900 nm (N50: 650 nm)



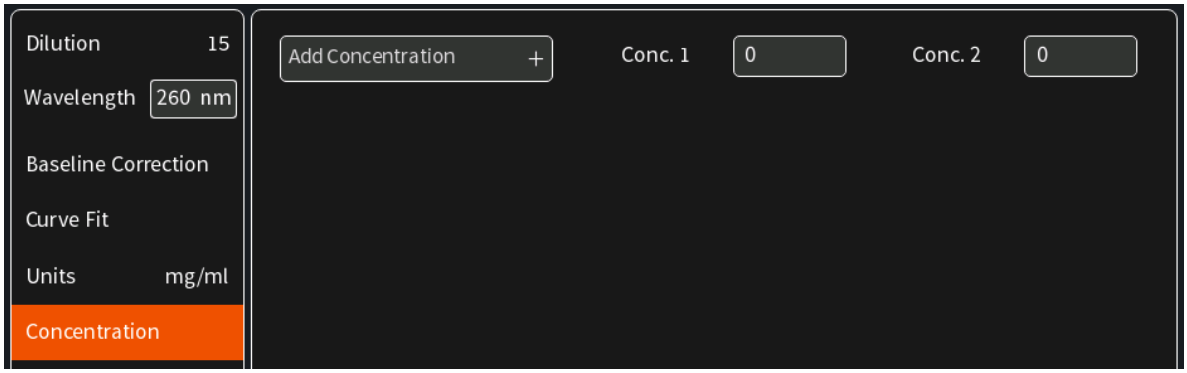
6. Select the curve fit type: Options are linear regression, zero regression (forces the straight line through the origin) and 2nd order regression.



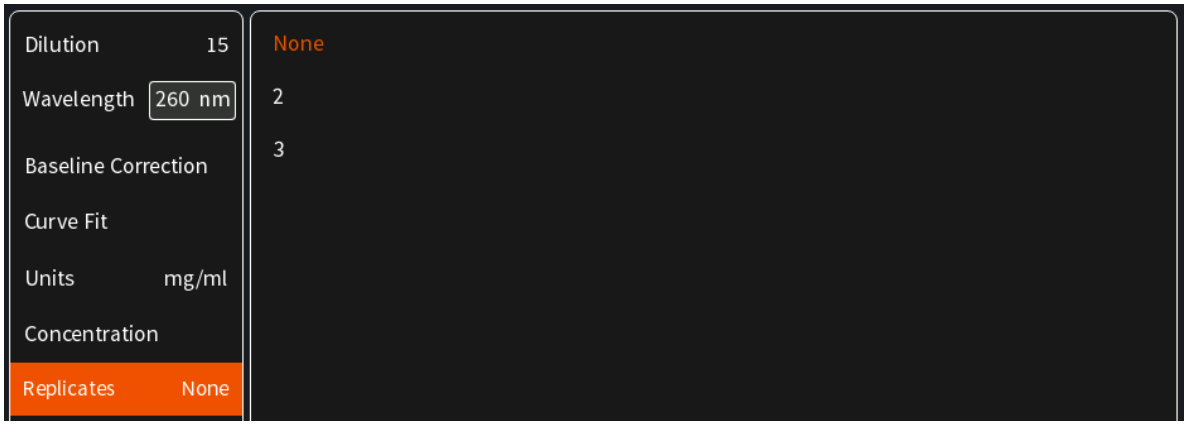
7. Select Unit



8. Add up to 20 Concentrations by clicking on the Add Concentration button. Added concentrations can be deleted with ⊗
   Enter the concentrations of the standard curve.



9. Select Replicates none, 2 or 3



10. Once Standard curve is created or loaded it will be used for concentration calculations in the method. It might be necessary to do a blank measurement.

11. Apply sample and press the sample button to initiate the measurement. **Note**: Once the sample measurement is initiated it is not possible to make changes to the standard curve.

CALCULATIONS

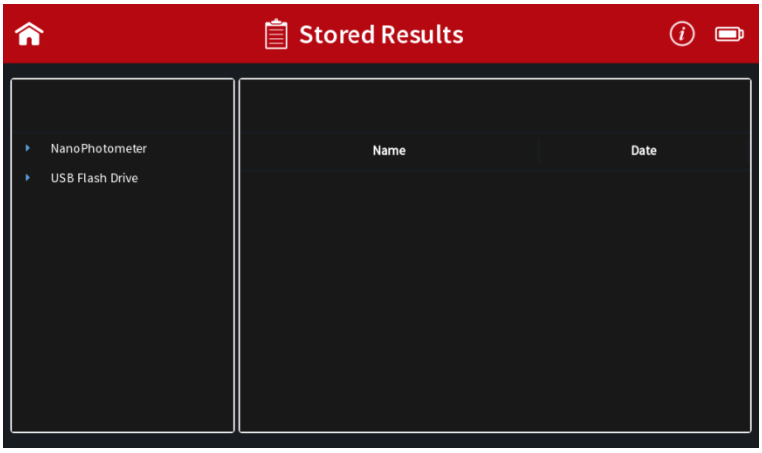
Concentration is determined via the absorbance values provided by the standard curve based on the curve fit selection including the following options: linear regression, zero regression and 2nd order regression.

CUSTOM APPS

There is an option for designing customer specific Custom Apps which can be loaded to the NanoPhotometer®. For more information about designing custom applications to suit individual research needs please contact Implen directly for assistance.

STORED RESULTS

The Stored Results icon opens a directory of folders containing files of results that have been previously saved.



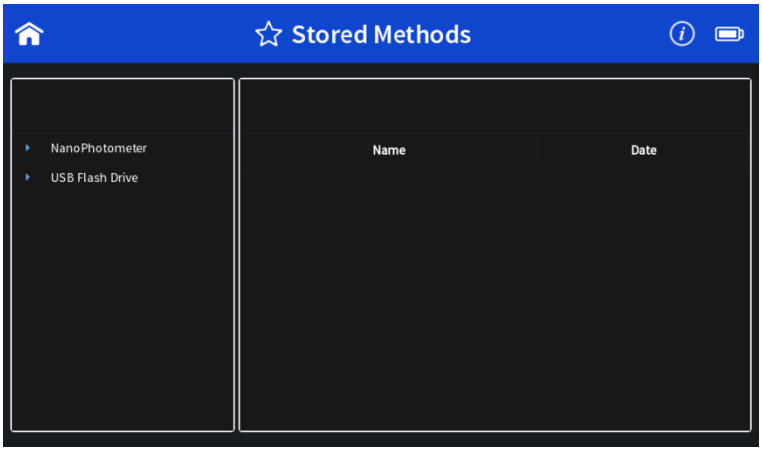
On the left side of the screen all available directories/storages are shown: NanoPhotometer®, Control Device and/or USB flash drive. A click on a storage folder shows on the left side the subfolders of that storage folder and on the right side the individual files. On the right side of the screen all saved result files of the selected folder are shown and can be opened by a long or double click.
Folders can be deleted, renamed, moved or copied by clicking on the ⍐ icon. It is also possible to delete, rename, move or copy files by clicking on the ⍐ icon.
The file path of the selected folder is shown on the top of the right file area.

Note: PDF and Excel files cannot be opened on the NanoPhotometer®. Files need to be transferred to a computer or device where Excel or a PDF reader is installed.
Note: Control device is only available on computer, tablets and smartphones not on the NanoPhotometer® version of the software.

For data transfer via Ethernet or WiFi see page 41 Data Transfer.

STORED METHODS

The stored methods icon opens the directories of folders containing methods stored by the user.



On the left side of the screen all available directories/storages are shown: NanoPhotometer® and/or USB flash drive. A click on a storage folder shows on the left side the subfolders of the storage folder and on the right side the method files. On the right side of the screen all saved method files of the selected folder are shown and can be opened by a long or double click. On the top of the right area the file path of the selected folder is shown.

New folders can be created by clicking on +. Folders can be deleted, renamed, moved or copied by clicking on the ⍐ icon. It is also possible to delete, rename, move or copy methods by clicking on the ⍐ icon.

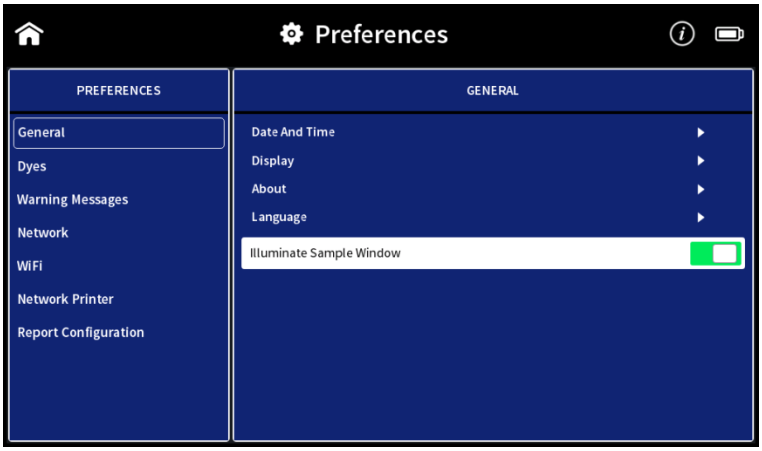
5. PREFERENCES

System preferences can be set by selecting preferences on the home screen. The preferences menu includes: General, Dyes, Warning Messages, Network, WiFi, Network Printer and Report Configuration. The menu item which is selected will have its preference options listed in the window to the right.

Note: Preferences are not available on smartphones with screen sizes less than 7 inches.

GENERAL

Selecting General in the Preferences menu opens a window to the right of the preferences menu with the following options: Display (built-in display only), About, WiFi Access Point and Illumination Sample Window (NP80/N60/N50) or Enable NanoVolume (C40).

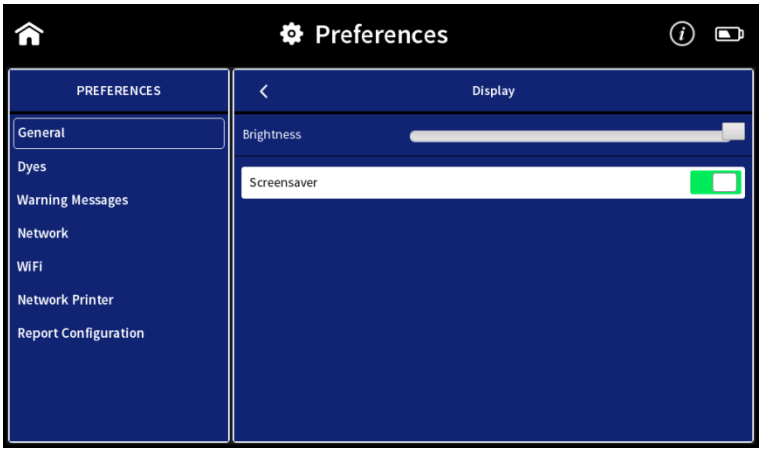


DATE AND TIME

Within the Date and Time it is possible to set the actual date and time. Change the date and/or time by clicking on the date/time field. The selected time is shown below the date and time field. To change the time it is necessary to reboot the NanoPhotometer® by clicking on the Set and Reboot button.

DISPLAY

Brightness: adjustion of the built-in screen brightness
Screensaver: default ON (screensaver active after 20 min) or OFF



ABOUT

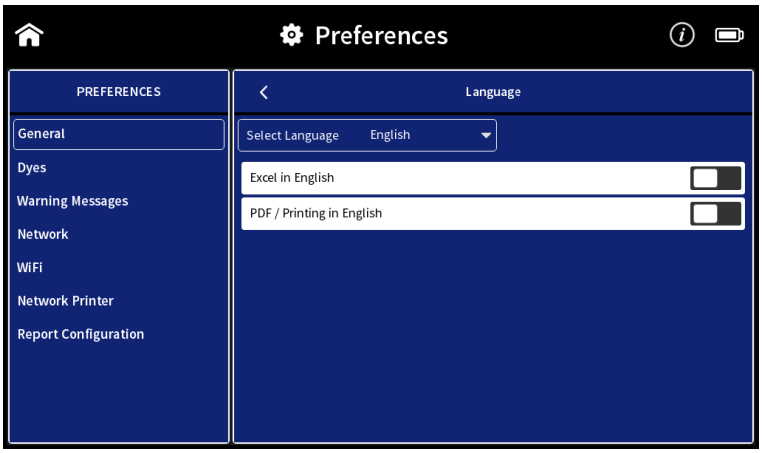
In About the following information of the NanoPhotometer® are shown: NanoPhotometer® Version, Serial Number, IP Address, Hardware Version, Firmware Version, Software Version, Time & Date of Initialization Test and Status of Self-test.

LANGUAGE

In language settings, the user has the option to change the language of the NanoPhotometer® to the following languages: English, Chinese, French, German, Japanese, Portuguese, Russian or Spanish. The language is changed for the user interface, printouts and saved Excel and PDF files.

Note: The change will affect all methods.

Note: It is possible to work in users' desired language and change the selected language for Excel and PDF Printouts to English. This option can be selected with the toggle switches Excel in English and PDF/Printing in English. This is a global change for all methods. All Excel/PDF files and printouts will be in English. Independent from the language setting utilized in the method.



Illumination Sample Window

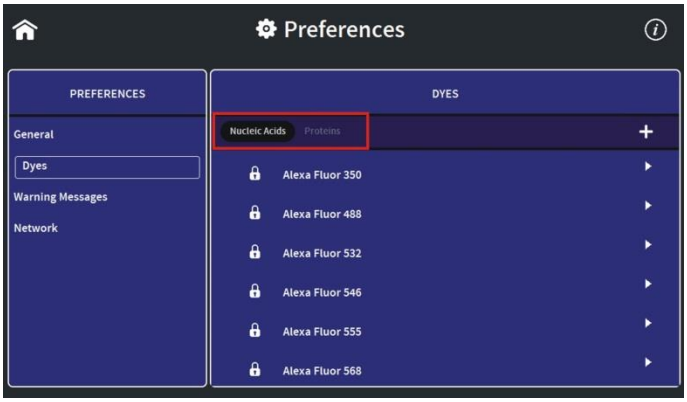
Toggle switch to switch on/off the illumination of the sample window (for NP80/N60/N50 only)
Note: Only available for NP80/N60/N50 models.

Enable NanoVolume

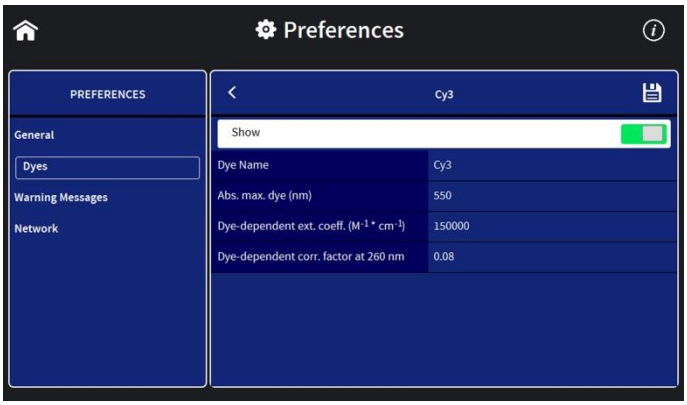
Toggle switch to enable the submicroliter cell option in the NanoPhotometer® C40.

Dyes

There is a list of preprogrammed dye-labels for both nucleic acid dyes and protein dyes. To toggle between the nucleic acid and protein list click on the Nucleic Acid/Protein buttons in the header.

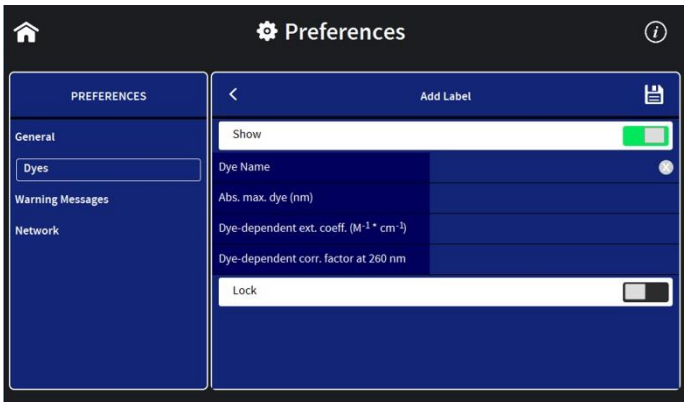


Each dye has either a lock icon (🔒) in front of the dye name indicating that the dye is locked and cannot be changed or a delete symbol (🗑). The delete option is only available for unlocked and not preprogrammed dyes.
Selecting a dye name opens a new screen with the dye information: dye name, absorbance maximum dye (nm), dye-dependent extinction coefficient ε_{dye} ($M^{-1} * cm^{-1}$), and dye-dependent correction factor as well as the option to show the dye in the parameter list of the application (Nucleic Acid or Protein UV).



Note: It is not possible to delete a dye from the default factory list; custom dyes can be deleted if they are not locked.

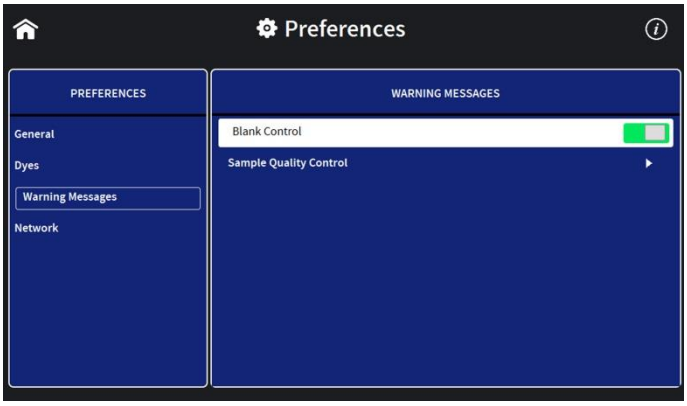
It is possible to add a new dye to the list by selecting the + button to add a new dye. A window will open where it is possible to enter the: dye name, dye absorbance maximum (nm), dye-dependent extinction coefficient ε_{dye} ($M^{-1} * cm^{-1}$), and dye-dependent correction factor. There is a toggle switch available to lock the dye to prevent deleting a dye from the dye list accidentally.



WARNING MESSAGES

BLANK CONTROL

Toggle switch to switch on/off the Blank Control™ of the NanoPhotometer®.
Note: Blank Control™ is available for all NanoVolume methods (for NP80/N60/N50).



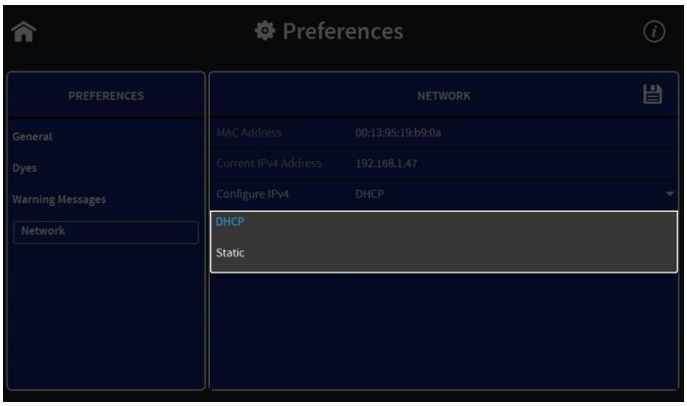
SAMPLE QUALITY CONTROL

It is possible to change the upper and the lower limit of the ratio alert warning messages.
Default values for nucleic acid ratios are:
260/230 ratio 1.8 A - 3 A and 260/280 ratio 1.65 A - 2.5 A.

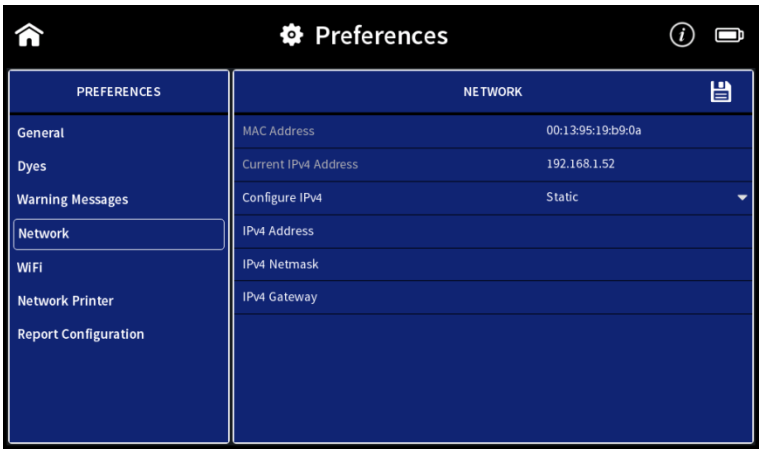
Default value for Protein UV ratio is:
260/280 ratio is 0.7 A.

NETWORK

In Network preferences it is possible to choose between a Dynamic Host Configuration Protocol (DHCP) and a static network configuration. As default the DHCP protocol is selected. Connect the NanoPhotometer® with the Ethernet and the IP is automatically set during the startup of the NanoPhotometer®. If no IP Address is listed for Current IPv4, click on the save button to search for an available IP address.



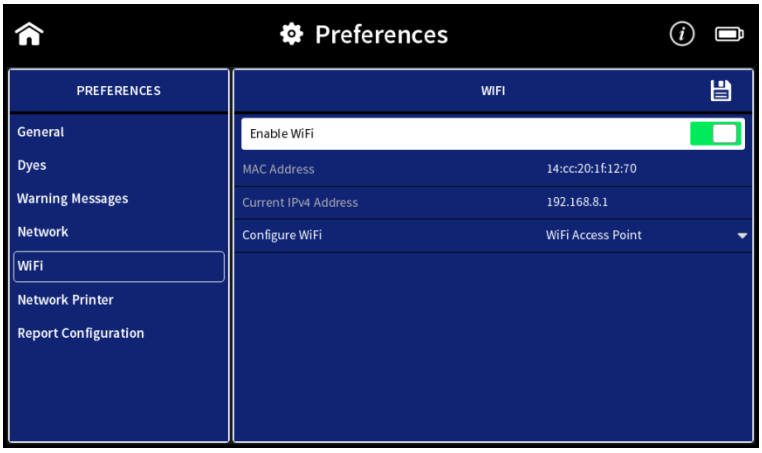
For static IP configuration select Static in the Configure IPv4 dropdown and enter the IPv4 address, netmask and gateway then confirm with the save button.



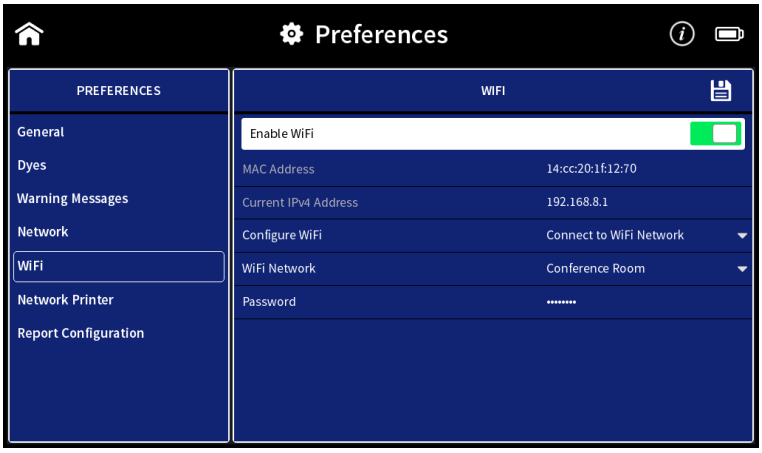
WiFi

The WiFi preferences allow the user to switch off the WiFi or to set up a WiFi Hotspot (WiFi Access Point) or a WiFi network.

To set up a WiFi Hotspot select “WiFi Access Point” in the dropdown and click on the save icon. The WiFi Hotspot is needed to connect a computer via WiFi, an Android smartphone/tablet, an iPad or iPhone to the NanoPhotometer®.



To set up a WiFi network select “Connect to WiFi Network” in the dropdown. Select an available WiFi network from the dropdown list or choose other for hidden networks and enter the password. Confirm with the save icon.



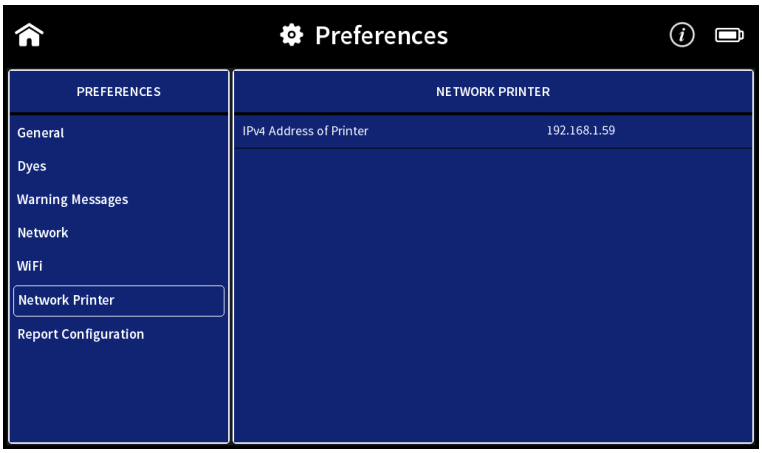
Network Printer

It is possible to print via Airprint® / IPP compatible printers supporting PDF format, in the network.

Note: IPP version 2.2 is required and some printer configuration settings might need to be changed in order to allow communication with the NanoPhotometer®.

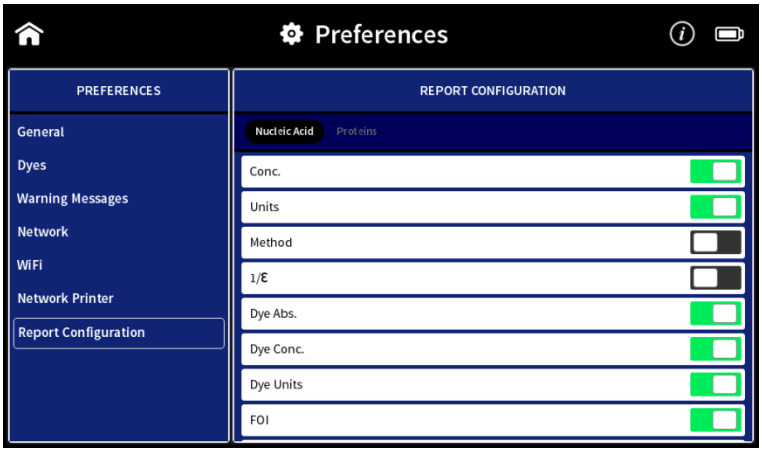
Enter the IP of the network printer to the input window.

Note: For printing on network printer the NanoPhotometer® needs to be connected to the network either via Ethernet (LAN cable) or WiFi network.
Note: If a printer is directly connected to the NanoPhotometer® via USB, this printer will have the highest priority and will be the printer used by default when selecting Print on NanoPhotometer. In order to print utilizing a printer on the network, please disconnect the installed USB printer.



REPORT CONFIGURATION

In report configuration it is possible to define the table columns of PDF files and A4 printouts. This feature is available for the methods Nucleic Acids and Protein UV. To toggle between the nucleic acid and protein list click on the Nucleic Acid/Protein buttons in the header.



6. TROUBLESHOOTING

SELF-CALIBRATION TEST

The NanoPhotometer® self-calibration test is performed automatically every time the instrument is powered on. If the instrument passes the self-calibration test the home screen is shown. If the instrument does not pass the test, a message window will appear explaining the reason for the failed test along with the recommended solution. If the ok button is selected, the window is closed and the home screen will be shown with an error message at the top. This error message will be displayed on top of all other screens and all performed measurements including the saved files of those measurements. If the self-calibration test fails please contact the Implen Support Team.

MESSAGES

The software gives three different kind of messages confirmation (green), warning (yellow) and alert (red) messages.
Confirmation messages are shown e.g. after the initialization test has passed successfully or if files or folders are copied or moved successfully. These messages are self-explaining and not listed in the user manual.

IMPORTANT WARNING MESSAGES:

Message Text	Explanation/Solution
Air bubble, lint residue or bad sample. Please reapply sample.	Air bubble recognition is on and has detected either an air bubble, lint residue or a bad sample like e.g. a turbid sample. Check sample, clean the pedestal and mirror in the lid thoroughly and reapply sample carefully. To avoid air bubbles apply sample by reverse pipetting.
Another control device is currently connected.	Message is shown on a control device when another control device is currently connected with an open measurement session. Please close method on control device.
Battery is low. Please connect to power!	This message pops up twice. Between the first and second warning message, there is at least one hour battery power left for use of the NanoPhotometer® under standard conditions. After the second warning the instrument will automatically begin shutting down within 10 to 15 seconds.
Concentration too high. Change to lid10/lid50/lid100/lid250	The concentration of the sample used is too high for submicroliter cell measurements with the utilized lid. Change to the recommended lid. A new blank is recommended when changing the dilution lid.
Concentration too high. Dilute sample.	The concentration of the sample is too high for submicroliter cell measurements using Lid 250 with the C40. Sample concentration is above the detection limit of the instrument. Dilute sample manually to measure within the detection range of the instrument.

Concentration too low.	The concentration of the sample used is too low for submicroliter cell measurements using Lid 5 with the C40. Sample is below the detection limit of the instrument. Only cuvette measurement may be possible
Concentration too low. Change to lid5/lid10/lid50/lid100	The concentration of the sample used is too low for submicroliter cell measurements with the used lid. Change to the recommended lid. A new blank is recommended when changing the dilution lid.
High absorbance at 250-280nm, 280-340nm, 340-400nm, 400-475nm,475-550nm, 550-625nm, 625-700nm. Bad Blank or insufficient cleaning.	The warning message is shown when a blank measurement (NanoVolume) detects an absorbance greater than 2.3 (10 mm path). The warning message shows the wavelength range where the absorbance is appearing. Two things can cause high absorbance in a blank measurement: either the blank solution/buffer has an absorbance in this wavelength range or the pedestal was not cleaned properly after the last reading. Clean the pedestal and the mirror in the lid thoroughly and check the blank solution for absorbance (Use water for blank and measure the blank buffer as sample).
Implen Folder is Empty	This message is shown on control devices like tablets and smartphones when no data has been saved in the control device folder. For Android tablets and smartphones this folder is always empty. Files are saved in the Download Folder of the Android tablet/smartphone directory.
Instrument connected to control device! Do you really want to intercept?	This message is shown on the NanoPhotometer® when a method is open on another control device. Click on OK and the measurements session is interrupted and the data are saved in the auto save folder.
Lint residue or bad sample. Please reapply sample.	Displayed when Air Bubble Recognition is off. Software has detected either a lint residue or a bad sample like e.g. a turbid sample. Check sample, clean the pedestal and mirror in the lid thoroughly and reapply sample carefully.
Maximum absorbance level at specified wavelength reached. Calculations may lead to low/wrong results.	The concentration of the sample used is too high and exceeds the specified absorbance range. Maximum absorbance is 330 A (10 mm path) for nanovolume and 2.65 A for cuvette measurements. Dilute sample and measure again.
Maximum level exceeded.	This message is shown when for example, too many dyes or wavelength are added with the Add + button. It is possible to add up to 20 dyes or wavelengths.
Measurement currently in progress. Please close method on device.	Displayed when there is an open measurement session on the NanoPhotometer® and the user is trying to connect via a control device (phone, tablet or computer). In order to move forward with connection of control device, please close method on NanoPhotometer®.
No printer present.	Printer connection is lost. Please check printer connection. If it is still not working go back to home screen reconnect the printer and wait for 30

	seconds. If the message still appears please create a log file and send it to Implen customer support.
Sample concentration too low for 0.3µl - change volume and parameter settings to 1µl	The measurement parameters for 0.3 µl NanoVolume samples read only the 0.07 mm path length (dilution 140). The utilized sample concentration is too low. Please use 1 µl of the sample and change the volume setting to 1-2 µl. Minimum concentrations for the 0.07 mm path length for dsDNA 420 ng/µl and for BSA 12.6 mg/ml.

IMPORTANT ALERT MESSAGES:

Cuvette port blocked - please check.	The automatic sliding cover of the NanoPhotometer® NP80 could not close properly. Please check if the cuvette port is empty. If message still appears please contact Implen Customer Support.
ERROR: Lid open - please close lid.	Lid is open during initialization test. Close lid and confirm with OK.
Firmware not found - NPOS.bin must be in root folder of USB flash drive	Make sure that the sample name is NPOS.bin without any additions or extensions like from multiple downloads, otherwise rename file NPOS.bin exactly. NPOS.bin file must be in the root folder of the USB flash drive. Make sure that the NPOS.bin file for installation has a higher software version than the installed one. NPOS software is not downward compatible.
Initialization failed – problem with optical path. Please contact Implen customer support.	Check if the cuvette port is empty and/or clean the nanovolume pedestal and the mirror in the head with 70% EtOH and distilled water then reboot the NanoPhotometer®. If the message still appears please create a log file and send it to Implen Customer Support.
Initialization failed 51/52/53/54/55. Please contact Implen customer support.	Possible hardware failure. Please create a log file and send it to Implen Customer Support.
Initialization failed. Please contact Implen customer support.	Clean the nanovolume pedestal and the mirror in the head with 70% EtOH and distilled water and then reboot the NanoPhotometer®. If the message still appears please create a log file and send it to Implen Customer Support.
Light path blocked – please remove cuvettes from port.	Make sure that the cuvette port is empty during initialization test. Restart the NanoPhotometer® with the cuvette port empty. If the message still appears please create a log file and send it to Implen Customer Support.
Measurement head not clean - please wipe pedestal and lid.	Clean the nanovolume pedestal and the mirror in the pedestal head with 70% EtOH and distilled water and then reboot the NanoPhotometer®. If the message still appears please create a log file and send it to Implen Customer Support.

No connection possible	Connection is lost between control devices and NanoPhotometer®. Check the connection. If the message still appears please create a log file and send it to Implen Customer Support.
Server Not Available	Internal software communication problem during an open measurement session. Reboot the NanoPhotometer®. If the message still appears please create a log file and send it to Implen Customer Support.
Server Side Failure	Internal software communication problem during an open measurement session. Reboot the NanoPhotometer®. If the message still appears please create a log file and send it to Implen Customer Support.
Software update failed. Please contact Implen customer support.	Make sure that the sample name is NPOS.bin without any additions or extensions like from multiple downloads, otherwise rename file to be NPOS.bin exactly. NPOS.bin file must be in the root folder of the USB flash drive. Try the update a second time, if it still fails please create a log file and send it to Implen Customer Support.
Stored method/result was created for unavailable mode NanoVolume/Cuvette/Submicroliter Cell!	Message appears if stored results or a stored method made on another NanoPhotometer® type is opened with an unavailable mode like Cuvette or NanoVolume e.g. data or methods made in cuvette mode and opened on a N60 (NanoVolume only).
Cuvette port blocked - please check.	The automatic sliding cover of the NanoPhotometer® NP80 could not close properly. Please check if the cuvette port is empty. If message still appears please contact Implen Customer Support.

SYSTEM FREEZE

In case of harsh ESD impulses it could happen that the device does freeze or switch-off. Please wait first about 30sec to see if the system recovers automatically itself. If there is no reaction please press the power key at the instrument rear 4sec to switch-off and then again shortly to restart the system.

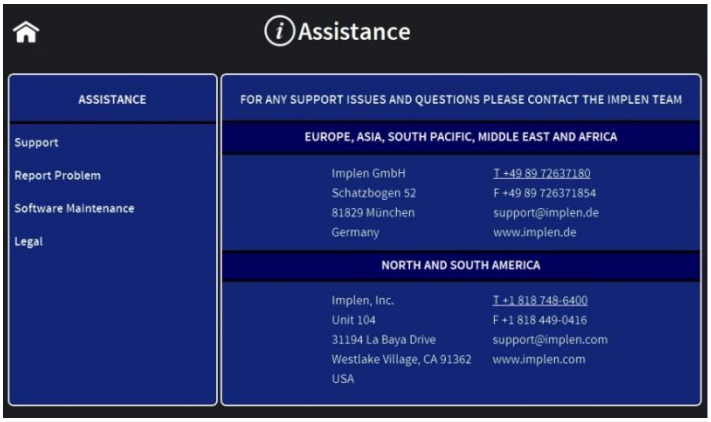
7. ASSISTANCE

The Assistance menu includes: support, report a problem (only available for tablet and computer versions), software maintenance and legal as functions to help with any technical issues or questions that may arise with the NanoPhotometer®.

Note: Assistance is not available on smartphones with screen sizes less than 7 inches.

SUPPORT

Selecting support on the left side assistance menu will show the available options for contacting Implen.



REPORT PROBLEM

The function to report a problem is available on computer and tablet versions only. When report a problem is highlighted in the left side assistance menu, the right side will have a form to fill out with information including: first name, last name, phone number, email, and country. A dropdown menu provides the option to select the problem type and includes the following selections: error message, software, firmware, measurements, and other. It is also possible to enter a question or comment at the end of the form. Once the form is completed and the send button is selected a message will be sent directly to Implen and the appropriate support person will contact the end user as soon as possible to provide further support.

Note: The report a problem function is only available for computer and tablet versions.

SOFTWARE MAINTENANCE

RESET

There is an option to reset the instrument to factory settings. By selecting the reset button a window will open that says “Reset the NanoPhotometer®?” Selecting the cancel button will close the window without changing the settings and selecting reset will open a window that will ask again ”Reset the NanoPhotometer® to factory settings? All data, stored methods and settings will be lost.” If it is confirmed the factory settings will be restored.

Note: All stored methods, settings and data on the NanoPhotometer® will be deleted if the reset option is executed.

SOFTWARE UPDATE

Download the software update file from the Implen homepage: www.implen.de/downloads/ and copy it to a USB flash drive.

Note: Make sure that the sample name is NPOS.bin without any additions or extensions like from multiple downloads, otherwise rename file to be NPOS.bin exactly.
Note: Save all data on the NanoPhotometer® before updating.
Note: Make sure that the NanoPhotometer® is connected to power and that the power connection is not interrupted during the update**.**

It is recommended to do the update via the built-in touchscreen. If the touchscreen is not available it is also possible to do the update via computer or tablet. In this case it is necessary to relaunch the NanoPhotometer® software after the reboot of the NanoPhotometer®. For tablets the WiFi connection needs to be reconnected.

Note: Always update the firmware of the NanoPhotometer® first and then update the client software (PC/Mac, smartphone, tablet).

Update procedure:
1. Copy the NPOS.bin file to a USB flash drive into the root folder
2. Insert in the USB flash drive to the USB port of the NanoPhotometer®
3. Select Assistance/Software Maintenance
4. Click on “Update” and wait until the NanoPhotometer® reboots

Note: Once you have updated the firmware of the NanoPhotometer®, please update the client software (PC/Mac, tablet, smartphone).

CREATE LOG FILE

To create a log file insert a USB flash drive to the USB port of the NanoPhotometer®. Click on “Create Log File”. The log (NPOS.log) file will be saved on the root folder of the USB flash drive.

INSTALL PRINTER DRIVER

Printer driver installation is only necessary if the NanoPhotometer® runs with a software version lower than 1.1.11147.

1. Switch NanoPhotometer® on / home screen
2. Update to newest firmware version

   Update Process:
   a. Copy NPOS.bin to a USB flash drive into the root folder
   b. Insert the USB flash drive into your NanoPhotometer®
   c. Select: “Assistance / Software Maintenance”
   d. Click on “Update”
   e. Wait until the NanoPhotometer® reboots

Note: Always update the firmware of the NanoPhotometer® first and then update the client software (PC/Mac, smartphone, tablet).

3. Go to “Assistance / Software Maintenance”
4. Start driver installation by a click to the “Install Driver for Printers” button
5. Wait until the following message is shown: “Installed driver for printer successfully.”
6. Go to home screen
7. Connect DYMO/HP printer via USB cable
8. Wait for 30 seconds
9. DYMO/HP printer is ready to use

Note: In order to connect a printer to the NanoPhotometer®, please do so from the Home Screen. Printers will not properly function if USB connection of printer is done from within a method. **Always return to the Home Screen before connecting a printer.**

Note: It is not possible to operate more than one printer at a time.

LEGAL

The NPOS software is Copyright of Implen and its affiliates. The NPOS software includes some open source software components under the licenses listed in “Legal”.

TRADEMARKS

Windows is a trademark of Microsoft. Airprint, Mac OS, OS X, iOS, iPhone and iPad are trademarks of Apple. Android OS is a trademark of Google. Linux is a trademark of Linus Torvalds.

CONTACT IMPLEN

There is an option to contact Implen for instruments connected to the internet. For any support issues and questions please contact the Implen team directly:

Europe, Asia, South Pacific, Middle East and Africa
Implen GmbH
Schatzbogen 52
81829 München
Germany

Phone: +49 89 72637180
Fax +49 89 726371854
Email: support@implen.de
www.implen.de

North and South America
Implen, Inc.
Unit 104
31194 La Baya Drive
Westlake Village, CA 91362
USA

Phone +1 818 748-6400
Telefax +1 818 449-0416
Email: support@implen.com
Website www.implen.com

8. MAINTENANCE

MAINTENANCE FREE TECHNOLOGY

The NanoPhotometer® technology is maintenance free. Regular maintenance and calibration is not necessary.

For facilities that are working according to national as well as international guidelines and standards including: Good Laboratory Practice (GLP), Good Manufacturing Practice (GMP), or ISO9000-9004; the proper performance of the spectrophotometer has to be tested and proven on a regular basis with individually set intervals. Implen provides certified NanoPhotometer® secondary standards as an optional accessory. These NanoPhotometer® Didymium glass filters and standard solution sets are suitable for the control and documentation of the wavelength accuracy and the photometric accuracy of your system. IQ/OQ documentation is also available. Please contact your local Implen office or an authorized Implen partner for further information.

Support agreements that help to fulfill the demands of regulatory guidelines concerning GLP/GMP include: calibration certification using filters traceable to international standards (during production and quality control), certified engineers and calibrated test equipment, approved to ISO 9001 standard, automatic self-diagnostic calibration test during start of the NanoPhotometer®, result is documented in each data output file, and possibility to save a Implen Document Source (IDS) file (no data manipulation possible).

REPLACEMENT PARTS

- **Lamp Replacement**

The NanoPhotometer® is equipped with a xenon flash lamp with a lifetime of 10^9 flashes (up to 10 years). This lamp should not need replacement for several years. In the unlikely event the lamp does need to be replaced, this should be done by the manufacturer or a certified service engineer from your supplier.

- **Battery Replacement**

The optional battery pack can only be assembled or replaced by the manufacturer or a certified service engineer from your supplier.
Note: Danger of explosion if battery is incorrectly replaced. Replacement only with the same or equivalent type recommended by the manufacturer: Replacement needs to be done by a certified service engineer

- **Touchscreen Replacement**

The optional touchscreen can only be assembled or replaced by the manufacturer or a certified service engineer from your supplier.

CLEANING AND GENERAL CARE

Switch off the NanoPhotometer® and disconnect the power cord prior to external cleaning. Use a soft wet cloth or dry microfiber cloth to clean all external surfaces. A mild liquid detergent may be used to remove stubborn marks.

Approved disinfectant solutions include: Apesin disinfection spray (Tana Chemi GmbH), Incidin Liquid & Inciddin Foam (Ecolab), and Lysoformin Spezial (Lysoform Dr. Hans Roseman GmbH).

Note: Observe all necessary precautions if dealing with hazardous samples or solvents.

9. WARRANTY

Implen guarantees that the product supplied has been thoroughly tested to ensure that it meets its published specification. The warranty included in the conditions of supply is valid for 12 months and is valid only if the product has been used according to the instructions supplied. Implen or your supplier can accept no liability of loss or damage arising from the faulty or incorrect use of this product

10. APPENDIX 1- INSTALACE SPEKTROFOTOMETRU

BEZPEČNOSTNÍ INFORMACE

Před zahájením instalace se prosím důkladně seznamte s výstražnými štítky a symboly na vašem přístroji a s jejich významem. Obsahují informace o tom, kde hrozí potenciální riziko a kde musíte být velmi obezřetní. Nevhodné používání může vést k poranění osob nebo poškození přístroje. Přístroj může obsluhovat pouze příslušným způsobem vyškolený a zkušený personál. Před používáním si prosím přečtěte kompletní uživatelskou příručku.

⎓ přímý proud

Přístroj neotevírejte, jinak bude obsluha vystavena nebezpečí elektrické energie, UV záření a jemné vláknové optiky, nebo může dojít k poškození přístroje.

Pokud používáte s přístrojem NanoPhotometer® C40 buňku na submikrolitry, nezapomeňte před zahájením měření zakrýt měřicí hlavici víkem.
VAROVÁNÍ: Nebezpečí UV záření při měření bez krytu.

Nepoužívejte u přístroje NanoPhotometer® poškozené napájecí kabely, příslušenství ani další periferní součásti. Používejte pouze dodaný a stanovený napájecí / dobíjecí zdroj.

Nevystavujte přístroj NanoPhotometer® silnému magnetickému a elektrickému poli, vodě, chemikáliím ani jakýmkoli typům kapalin, jako je například silný déšť nebo vlhkost.

Nevhazujte přístroj do ohně, protože se může zdeformovat nebo explodovat (baterie). Neskladujte ani nepoužívejte přístroj v blízkosti jakéhokoli tepelného zdroje, především při teplotách nad 60°C nebo ve výbušné atmosféře.

Nenechávejte přístroj NanoPhotometer® na klíně nebo jakékoli části těla: zabráníte tak nepohodlí nebo poranění vlivem působení žáru.

Nepokládejte na přístroj NanoPhotometer® žádné předměty.

Přístroj NanoPhotometer® se sadou baterií (mobilní verze) je nutné před přepravou vypnout. Tlačítko zapínání / vypínání je nutné během přepravy zabezpečit, aby nedošlo k samovolnému sepnutí vlivem nárazu nebo vibracemi.

Biologické vzorky mohou obsahovat nebo přenášet nakažlivé nemoci. Mějte na paměti zdravotní rizika těchto vzorků a používejte odpovídající ochranné pomůcky. Dříve než začnete s takovým potenciálně nakažlivým materiálem pracovat, zacházejte s těmito vzorky s maximální opatrností v souladu s platnými požadavky orgánů a organizace.
Poznámka: Nelijte na součásti přístroje žádné biologické vzorky. Pokud k rozlití dojde, přístroj neprodleně dezinfikujte podle laboratorního protokolu a pokynů k čistění přístroje (viz kapitola 8 Maintenance).

Symbol umístěný na přístroji nebo v dokumentech přiložených k přístroji znamená, že tento přístroj nelze považovat za domovní odpad. Namísto toho je nutné jej odevzdat na příslušném

sběrném místě, které zajišťuje recyklaci elektrických a elektronických zařízení. Likvidaci je nutné provést v souladu s místními ekologickými předpisy pro odstraňování odpadů.

VYBALENÍ A UMÍSTĚNÍ

Ověřte obsah balení podle dodacího listu. Pokud zjistíte jakékoli nedostatky, neprodleně informujte svého dodavatele.

Zkontrolujte u přístroje jakékoli známky poškození z přepravy. Pokud zjistíte jakákoli poškození, neprodleně informujte svého dodavatele.

Zajistěte, aby předpokládané stanoviště pro instalaci splňovalo podmínky prostředí pro bezpečný provoz: vnitřní prostory nebo suché prostředí.
Poznámka: Nevystavujte přístroj NanoPhotometer® do blízkosti kapalin, chemikálií, deště, vlhkosti nebo prašného prostředí.

Rozsah teplot 10-40°C; v případě zahřívání pomocí kyvety je rozsah teplot 10-30°C.

Pokud je přístroj vystaven extrémním změnám teplot, bude pravděpodobně nutné zajistit rovnováhu přístroje. Přístroj vypněte a poté znovu zapněte, jakmile bude dosaženo tepelné rovnováhy (asi 2 až 3 hodiny).

Maximální relativní vlhkost (bez kondenzace) 80 % a až 31°C s lineární sestupností k 50% při 40°C.

Přístroj musí být umístěn na stabilním, rovném povrchu s nosností 4 až 5 kg a musí být zajištěná volná cirkulace vzduchu okolo přístroje. Zajistěte, aby po zapnutí přístroje žádné materiály nebránily cirkulaci vzduchu. Vyhněte se přímému slunečnímu záření, protože může docházet k vyblednutí částí přístroje a poškození plastových dílů.

Přístroj byste měli umístit tak, aby v případě nouze bylo možné snadno vyhledat a odpojit hlavní přívod.

Přístroj přenášejte vždy tak, že jej budete držet za hlavní část a nikoli např. za volitelný připojený displej nebo podstavec NanoVolume.

Zařízení musí být zapojeno do sítě pomocí napájecího zdroje / kabelu 60 W od společnosti Implen (se sadou baterií 90 W). Síťová zásuvka musí být vybavena ochranným vodičem (uzemněním). Lze používat se systémy napájecích zdrojů 90-250 V, 50-60 Hz.

U mobilních modelů nabijte baterii nejméně 3 hodiny před použitím přístroje.

Po zapojení zapněte přístroj pomocí tlačítka napájení na zadním panelu. Přístroj spustí několik kontrol vlastní diagnostiky.

Pokud zaznamenáte technické problémy nebo potíže s manipulací se vzorky, ihned kontaktujte původního dodavatele.

Poznámka: Pokud se zařízení používá způsobem, který nebyl stanoven, nebo v podmínkách prostředí, které nejsou vhodné pro bezpečný provoz, může dojít k poškození ochrany zařízení a ukončení platnosti záruky.

11. APPENDIX 2 - INSTALLATIE SPECTROFOTOMETER

VEILIGHEIDSINFORMATIE

Voordat u begint met de installatie, moet u de tijd nemen om de waarschuwingslabels en symbolen op het instrument te bekijken en te leren wat deze betekenen. Deze zijn aangebracht om u te informeren indien er een gevaar is of indien u specifieke voorzorgen moet nemen. Onjuist gebruik kan persoonlijk letsel of schade aan het instrument veroorzaken. Het instrument mag alleen worden bediend door geschoold en ervaren personeel. Lees de volledige gebruikershandleiding voordat u het instrument gebruikt.

⎓ gelijkstroom

Open het instrument niet. Dit kan de gebruiker blootstellen aan elektrische stroom, UV-licht en gevoelige glasvezels en kan het instrument beschadigen.

Indien de submicrolitercel wordt gebruikt met de NanoPhotometer® C40 moet u voor de meting nagaan of het deksel op de meetkop is geplaatst.
WAARSCHUWING: UV-blootstelling wanneer u meet zonder deksel.

Gebruik geen beschadigde stroomsnoeren, accessoires en andere randapparatuur in combinatie met uw NanoPhotometer®. Gebruik alleen de meegeleverde en vermelde voeding/lader.

Stel de NanoPhotometer® niet bloot aan sterke magnetische, elektrische velden, water, chemische stoffen of andere vloeistoffen zoals zware regen of vocht.

Plaats het instrument niet in vuur. Dit kan opzwellen of ontploffen (batterij). Gebruik niet op of nabij een warmtebron, in het bijzonder temperaturen boven 60°C of in een explosieve omgeving.

Plaats uw NanoPhotometer® niet op uw schoot of een ander lichaamsdeel om ongemak of letsel door warmte te voorkomen.

Plaats geen voorwerpen bovenop de NanoPhotometer®.

De NanoPhotometer® met batterijpack (mobiele versie) moet tijdens het vervoer worden uitgeschakeld. De aan/uit-knop moet tijdens het vervoer worden beschermd zodat deze niet door schokken of trillingen wordt ingeschakeld.

Biologische monsters kunnen infectieziekten bevatten of overdragen. Let op het gezondheidsgevaar die dergelijks monsters vormen en draag aangepaste beschermende kledij. Behandel deze monsters met de grootst mogelijke zorg overeenkomstig de geldende regelgeving en organisationele vereisten voordat u met dergelijke risicohoudende materialen werkt.
Opmerking: Mors geen biologische monsters op onderdelen van het instrument. Indien dit gebeurt, moet u het instrument onmiddellijk desinfecteren volgens uw laboratoriumprotocols en de reinigingsinstructies van het instrument (zie 8 Maintenance).

Het symbool op het product of op de documenten die bij het product werden meegeleverd, geeft aan dat dit apparaat niet als huishoudelijk afval mag worden behandeld. U moet dit naar een geschikt inzamelpunt brengen voor het recyclen van elektrische en elektronische apparatuur. Het apparaat moet worden afgevoerd overeenkomstig lokale milieuregelgeving voor afvalverwerking.

UITPAKKEN EN PLAATSEN

Controleer de inhoud van de verpakking volgens de leveringsbon. Indien u ontbrekende items vaststelt, moet u uw leverancier onmiddellijk op de hoogte brengen.

Inspecteer het instrument op tekenen van schade die is ontstaan tijdens vervoer. Indien u schade vaststelt, moet u uw leverancier onmiddellijk op de hoogte brengen.

Ga na of uw gewenste installatielocatie voldoet aan de omgevingsvereisten voor een veilig gebruik: alleen binnen en in droge omgevingen te gebruiken.
Opmerking: Plaats uw NanoPhotometer® niet in de buurt van vloeistoffen, chemische stoffen, regen, vocht of stoffige omgevingen.

Temperatuurbereik 10-40°C: indien een cuvetverwarmer wordt gebruikt, is het bereik 10-30°C.

Indien het instrument wordt blootgesteld aan extreme temperatuurschommelingen, moet u het instrument mogelijk even laten acclimatiseren. Schakel het instrument uit en schakel het opnieuw in nadat het de omgevingstemperatuur heeft bereikt (2 tot 3 uur).

Maximale relatieve luchtvochtigheid (niet-condenserend) 80% en tot 31°C, lineair afnemend tot 50% bij 40°C.

Het instrument moet op een stabiel, vlak oppervlak worden geplaatst dat 4-5 kg kan dragen en moet zo worden geplaatst dat lucht vrij rond het instrument kan stromen. Zorg ervoor dat de luchtcirculatie niet wordt geblokkeerd wanneer het instrument is ingeschakeld. Voorkom rechtstreeks zonlicht omdat dit delen van het instrument kan laten verbleken en plastic onderdelen kan beschadigen.

De apparatuur moet zo geplaatst worden dat in een noodgeval de stekker snel kan worden gevonden en losgekoppeld.

Draag het instrument steeds door het hoofdgedeelte van het instrument vast te nemen en niet door bijvoorbeeld het optionele scherm of de NanoVolume-steun vast te nemen.

De apparatuur moet zijn aangesloten met het 60W-netsnoer/voedingskabel door Implen meegeleverd (90W met batterijpack). Het stopcontact moet een aarding hebben. Het instrument is geschikt voor voedingen van 90-250 V, 50-60 Hz.

Bij mobiele modellen moet u het batterijpack vóór het eerste gebruik ten minste 3 uur laden.

Schakel het instrument in met de aan/uit-knop op het achterpaneel nadat het netsnoer is aangesloten. Het systeem zal een aantal zelftests uitvoeren.

Neem onmiddellijk contact op met de originele leverancier indien u technische problemen ervaart of problemen merkt met het verwerken van monsters

Opmerking: Indien deze apparatuur wordt gebruikt op een andere manier dan hierboven vermeld of in een omgeving die niet geschikt is voor veilig gebruik, kan de voorziene bescherming van de apparatuur beschadigd raken en vervalt de garantie van het instrument.

12. APPENDIX 3 - INSTALLATION DU SPECTROPHOTOMÈTRE

INFORMATIONS DE SÉCURITÉ

Avant de commencer l'installation, veuillez prendre le temps de vous familiariser avec les étiquettes et symboles de mise en garde de votre instrument, ainsi qu'avec leur signification. Ces étiquettes et symboles vous indiquent les situations dans lesquelles un risque potentiel existe, ou les cas où des précautions particulières sont nécessaires. Vous pourriez vous blesser ou endommager l'instrument si vous ne l'utilisez pas correctement. L'instrument ne doit être utilisé que par du personnel expérimenté et formé de manière appropriée. Veuillez lire l'intégralité du manuel d'utilisation avant d'employer l'équipement.

⎓ Courant direct

N'ouvrez pas l'équipement car vous pourriez vous exposer à un courant électrique, de la lumière UV ou aux délicates fibres, ou encore endommager l'équipement.

Si vous utilisez la cellule Sous-microlitre avec le NanoPhotometer® C40, assurez-vous que le couvercle est bien en place sur la tête de mesure avant de mesurer.
AVERTISSEMENT: exposition aux UV lorsque vous mesurez sans le couvercle.

N'utilisez pas de cordons d'alimentation, d'accessoires ou autres périphériques endommagés avec votre NanoPhotometer®. N'utilisez que le bloc d'alimentation/chargeur fourni.

N'exposez pas le NanoPhotometer® à de puissants champs magnétiques/électriques, à de l'eau, à des produits chimiques, ou à d'autres types de liquide, par exemple, à de fortes précipitations ou à de l'humidité.

N'exposez pas l'instrument au feu, car il pourrait gonfler ou exploser (batterie). Ne stockez pas et n'utilisez pas l'instrument à proximité d'une source de chaleur, tout particulièrement à des températures supérieures à 60°C ou dans une atmosphère explosive.

Ne laissez pas votre NanoPhotometer® sur vos genoux ou à proximité d'une autre partie de votre corps pour éviter les inconforts ou de vous brûler avec la chaleur dégagée par l'équipement.

Ne placez pas d'objets sur le dessus du NanoPhotometer®.

Le NanoPhotometer® à batterie (version mobile) doit être mis hors tension durant le transport. Le bouton On/Off doit être protégé durant le transport pour éviter les mises sous tension accidentelles liées à un choc ou à des vibrations.

Les échantillons biologiques peuvent contenir ou ont le potentiel de transmettre des maladies infectieuses. Soyez conscient des risques sanitaires que présentent ces échantillons et portez les équipements de protection appropriés. Manipulez lesdits échantillons avec le plus de précautions possibles, en respectant les exigences réglementaires et professionnelles applicables avant de travailler avec ces matériaux potentiellement infectieux.
Remarque: ne renversez aucun échantillon biologique sur les composants de l'instrument. Si

cela se produit, désinfectez immédiatement l'instrument conformément aux protocoles de votre laboratoire et aux consignes de nettoyage de votre instrument (voir 8 Maintenance).

Le symbole figurant sur le produit et dans les documents qui l'accompagnent indique que cet appareil ne peut pas être traité comme un déchet ménager. Au lieu de cela, il doit être remis au point de collecte applicable, afin que ses composants électriques et électroniques puissent être recyclés. La mise au rebut doit être exécutée conformément aux réglementations environnementales locales applicables à la mise au rebut de déchets.

DÉBALLAGE ET POSITIONNEMENT

Vérifiez le contenu de l'emballage en le comparant au bon de livraison. Si des éléments sont manquants, informez-en immédiatement votre fournisseur.

Inspectez l'instrument pour vérifier qu'il ne présente pas de signes d'endommagement liés au transport. Si vous constatez la présence de tels signes d'endommagement, informez-en immédiatement votre fournisseur.

Assurez-vous que le site d'installation que vous avez prévu est conforme aux conditions environnementales nécessaires au fonctionnement sécurisé de l'équipement : utilisation en intérieur ou dans un environnement sec.
Remarque : ne placez pas votre NanoPhotometer® à proximité de liquides, de produits chimiques, de précipitations, d'humidité ou d'environnements poussiéreux.

Plage de températures de 10-40°C ; si vous utilisez le chauffage de la cuvette, la plage de températures est de 10-30°C.

Si l'instrument est soumis à des changements de température extrêmes, il peut s'avérer nécessaire de le laisser s'équilibrer. Mettez l'instrument hors tension puis remettez-le sous tension une fois que l'équilibre thermique est atteint (environ 2 à 3 heures).

Humidité relative maximale (sans condensation) de 80 % à une température maximale de 31°C, puis réduction linéaire jusqu'à 50 % à 40°C.

L'instrument doit être placé sur une surface stable et à niveau pouvant supporter 4 à 5 kg. L'air doit en outre pouvoir circuler librement autour de l'instrument. Lorsque l'équipement est sous tension, assurez-vous qu'aucun matériau ne réduit la circulation d'air. Évitez d'exposer l'équipement à la lumière directe du soleil, car cela pourrait décolorer certaines de ses pièces ou endommager certaines de ses parties en plastique.

L'équipement doit être positionné de manière à ce qu'en cas d'urgence, la fiche de son câble d'alimentation soit facilement accessible et débranchable.

Transportez toujours l'instrument en maintenant sa structure, et non, par exemple, en le tenant par l'écran optionnel qui y est connecté ou par le support NanoVolume.

L'équipement doit être relié à l'alimentation secteur à l'aide du câble/bloc d'alimentation 60 W fourni par Implen (90 W pour les modèles à batterie). La prise électrique doit être équipée d'un conducteur protecteur (mise à la terre). L'équipement peut être utilisé avec un système d'alimentation 90–250 V, 50–60 Hz.

Pour les modèles mobiles, veuillez recharger leur batterie pendant au moins 3 heures avant la première utilisation.

Mettez l'équipement sous tension à l'aide du bouton marche/arrêt qui se trouve sur son panneau arrière une fois que vous l'avez branché. L'instrument procédera à une série de vérifications d'autodiagnostic.

Veuillez contacter immédiatement le fournisseur d'origine si vous rencontrez des difficultés techniques ou de manipulation d'échantillons.

Remarque: si cet équipement est utilisé d'une manière non conforme à ce qui est spécifié ou dans des conditions environnementales inadaptées à son fonctionnement sécurisé, la protection qu'il offre peut s'en trouver impactée, ce qui annulerait sa garantie.

13. APPENDIX 4 – INSTALLATION SPECTROPHOTOMETER

SICHERHEITSINFORMATIONEN

Vor Beginn der Installation nehmen Sie sich bitte die Zeit sich mit den Beschriftungen und Warnsymbolen auf Ihrem Instrument vertraut zu machen. Diese dienen als Information wo potenzielle Gefahren auftreten können bzw. wo besondere Vorsicht geboten ist.

⎓ Gleichstrom

Öffnen Sie auf keinen Fall das Gerät. Es besteht die Gefahr eines elektrischen Schlags, UV-Licht Freisetzung und Beschädigung der empfindlichen Faseroptik.

Bei Verwendung der Submikroliter Messzelle in Verbindung mit dem NanoPhotometer® C40 ist sicher zu stellen, dass vor jeder Messung der Deckel auf der eingesteckten Submikrolitermesszelle liegt.

ACHTUNG: Potentiell schädliche UV- Strahlung tritt aus dem Messkopffenster aus, wenn ohne Deckel gemessen wird.

Verwenden Sie keine beschädigten Netzkabel, Zubehör und andere Peripheriegeräte in Verbindung mit dem NanoPhotometer®. Verwenden Sie nur mitgelieferte und spezifizierte Netzteile / Ladegeräte.

Setzen sie das NanoPhotometer® keinen starken magnetischen, elektrischen Feldern, Wasser oder jeglicher Art von Flüssigkeit wie Regen oder Feuchtigkeit aus.

Das Instrument nicht in der Nähe von Brandquellen bringen bzw. nicht verbrennen, da die integrierte Batterie explodieren kann. Nicht in der Nähe von Wärmequellen aufstellen bzw. verwenden, insbesondere keinen Temperaturen über 60° C aussetzten.

Betreiben sie das NanoPhotometer® nicht auf Ihrem Schoß oder in der Nähe eines Körperteils, um Unannehmlichkeiten oder Verletzungen durch Hitzeeinwirkung zu verhindern.

Stellen Sie keine Gegenstände auf dem NanoPhotometer® ab.

NanoPhotometer® mit Akku-Pack (mobile Version) müssen während des Transports ausgeschaltet werden. Der Ein- / Ausschalter muss während des Transports gegen Stöße und Vibrationen geschützt werden, um ein selbständiges Einschalten zu verhindern (siehe auch 8 Maintenance).

Das Symbol auf dem Produkt bzw. auf dem Gerät beiliegenden Dokumenten, gibt an, dass dieses Gerät nicht als Hausmüll entsorgt werden darf. Stattdessen muss es an einem Sammelpunkt für das Recycling von elektrischen und elektronischen Geräten abgegeben werden. Die Entsorgung muss gemäß den örtlichen Bestimmungen zur Abfallentsorgung erfolgen.

AUSPACKEN UND PLATZIEREN

Überprüfen Sie den Inhalt des Pakets anhand des Lieferscheins. Falls der Lieferumfang nicht vollständig ist, informieren Sie unverzüglich Ihren Lieferanten.

Überprüfen Sie das Gerät auf Anzeichen von Transportschäden. Falls ein Transportschaden aufgetreten ist, informieren Sie bitte unverzüglich Ihren Lieferanten.

Stellen Sie sicher, dass der Installationsort die Umgebungsbedingungen für den sicheren Betrieb erfüllt: Gebrauch nur in geschlossenen Räumen bzw. trockener Umgebung.

Hinweis: Das NanoPhotometer® keinen großen Mengen an Flüssigkeiten, Regen, Feuchtigkeit oder staubiger Umgebung aussetzen.

Temperaturbereich 10 - 40° C; Bei Verwendung der Küvettenheizung ist der Temperaturbereich 10 bis 30° C.

Wenn das Gerät extremen Temperaturschwankungen ausgesetzt ist (z.B. Transport bei niedrigen Außentemperaturen), kann es notwendig sein das Gerät der Raumtemperatur anzugleichen. Schalten sie das Gerät für ca. 2-3 Stunden aus und nach Erreichen der Raumtemperatur wieder ein.

Maximale relative Luftfeuchtigkeit (nicht kondensierend) von 80% und bis zu 31°C bei einer abnehmenden Linearität von 50% bei 40°C.

Das Gerät muss auf einer stabilen, ebenen Fläche aufgestellt werden, die für 4 - 5 kg ausgelegt ist. Weiterhin sollte die Luft frei um das Gerät zirkulieren können. Stellen Sie sicher, dass während des Betriebs keine Gegenstände die Luftzirkulation behindern.

Das Gerät sollte so positioniert sein, dass im Falle eines Notfalls der Stromstecker leicht identifiziert und entfernt werden kann.

Beim Transport des Gerätes nicht am optionalen Display oder Hebelarm tragen, sondern immer am Hauptgehäuse.

Für den Betrieb des NanoPhotometers darf ausschließlich das 60W Netzteil / Kabel welches von Implen geliefert wurde verwendet werden (90 W mit Akku-Pack).
Stromversorgung: 90 - 250 V, 50 - 60 Hz

Für Mobile Versionen bitte den Akku vor dem ersten Gebrauch für mindestens 3 Stunden laden.

Schalten Sie das Gerät mit der Power-Taste auf der Rückseite des Gerätes ein, nachdem es eingesteckt ist. Das Instrument führt automatisch eine Reihe von Selbstdiagnoseprüfungen durch.

Bitte lesen Sie die vollständige Bedienungsanleitung vor dem Gebrauch.

Bitte kontaktieren Sie die ursprünglichen Lieferanten sofort, falls technische oder Handhabungs-Probleme auftreten.

Hinweis: Wenn dieses Gerät in einer Art und Weise verwendet wird, die nicht spezifiziert ist oder in für einen sicheren Betrieb nicht geeigneten Umgebungsbedingungen, können die Schutzfunktionen des Geräts beeinträchtigt werden und die Gerätegarantie verfällt.

14. APPENDIX 5 – INSTALLAZIONE DELLO SPETTROFOTOMETRO

INFORMAZIONI DI SICUREZZA

Prima di cominciare l'installazione, acquisire familiarità con i simboli e le etichette di avvertenza presenti sullo strumento e il loro significato. Simboli ed etichette segnalano potenziali pericoli oppure se occorre esercitare particolare cautela. Un utilizzo scorretto può causare lesioni personali o danni allo strumento. Lo strumento deve essere utilizzato esclusivamente da personale esperto e specificamente addestrato. Leggere per intero il manuale dell'utente prima dell'uso.

⎓ corrente continua

Non aprire lo strumento per non esporre l'operatore al rischio di scossa elettrica o ai raggi UV e per evitare di danneggiare le delicate fibre ottiche o lo strumento.

Se con il NanoPhotometer® C40 si utilizza una cuvetta Submicroliter, verificare che il coperchio venga collocato sulla testa di misurazione prima di effettuare la misurazione.
AVVISO: la misurazione senza coperchio espone ai raggi UV.

Non utilizzare con il NanoPhotometer® cavi di alimentazione, accessori e/o altre periferiche danneggiati. Utilizzare solo il caricabatteria/l'alimentatore specifico in dotazione.

Non esporre il NanoPhotometer® a forti campi elettrici e/o magnetici, acqua, sostanze chimiche o qualsiasi tipo di liquido, ad esempio pioggia fitta o umidità.

Non porre lo strumento sul fuoco poiché può gonfiarsi o esplodere (la batteria). Non conservarlo e non utilizzarlo in prossimità di fonti di calore, specificamente a temperature maggiori di 60°C o in un'atmosfera esplosiva.

Il NanoPhotometer® non deve essere poggiato sulle gambe o stare in prossimità di altre parti del corpo poiché l'esposizione al calore può causare disagi o lesioni.

Non poggiare oggetti in cima al NanoPhotometer®.

Il NanoPhotometer® con il gruppo batteria (versione portatile) deve essere spento durante il trasporto. Durante il trasporto, Il pulsante di accensione/spegnimento deve essere bloccato in modo da impedire che urti o vibrazioni provochino un'accensione accidentale.

I campioni biologici possono contenere patogeni infettivi o essere potenzialmente infettivi. Attenzione al rischio sanitario presentato dai campioni biologici e indossare l'equipaggiamento di protezione appropriato. Tali campioni vanno maneggiati con la massima cautela e conformemente ai requisiti aziendali e di legge che si applicano per queste sostanze potenzialmente infettive.
Nota: attenzione a non versare i campioni biologici sui componenti della strumentazione. In caso di versamenti, disinfettare immediatamente lo strumento osservando i protocolli di laboratorio e le istruzioni per la pulizia dello strumento (v. 8 Maintenance).

Il simbolo che si trova sul prodotto oppure nella documentazione che accompagna il prodotto indica che questo dispositivo non può essere gettato con i rifiuti domestici. Deve, invece, essere portato presso il punto di raccolta idoneo per il riciclaggio di apparecchiature elettriche ed elettroniche. Lo smaltimento va eseguito in conformità delle normative ambientali locali per lo smaltimento dei rifiuti.

DISIMBALLAGGIO E COLLOCAZIONE

Controllare i contenuti della confezione confrontandoli con la bolla di consegna. Ove il prodotto non sia completo, informarne immediatamente il fornitore.

Ispezionare lo strumento per rilevare eventuali segni di danneggiamento subiti durante il trasporto. In caso si rilevino dei danni, informarne immediatamente il fornitore.

Accertare che il sito d'installazione proposto sia conforme ai requisiti ambientali per un utilizzo sicuro: ambiente chiuso o asciutto.
Nota: non esporre il NanoPhotometer® a liquidi, sostanze chimiche, pioggia, umidità o polvere.

Intervallo di temperatura 10-40°C; se il riscaldamento avviene tramite la cuvetta, l'intervallo è di 10-30°C.

Se lo strumento subisce variazioni repentine della temperatura, può essere necessario attendere che si stabilizzi. Spegnere e riaccendere lo strumento una volta che ha raggiunto la stabilità termica (~2-3 ore).

Umidità relativa massima (non condensante) dell'80% e fino a 31°C con riduzione fino al 50% a 40°C.

Lo strumento va collocato su una superficie stabile e orizzontale in grado di sostenere un peso di 4-5 kg e tale da consentire la libera circolazione dell'aria intorno allo strumento. Assicurarsi che, quando lo strumento è acceso, non vi siano materiali a ostruire la circolazione dell'aria. Non esporre ai raggi solari diretti per evitare lo scolorimenti di parti dello strumento e/o danni alle parti in plastica.

L'apparecchiatura deve essere posizionata in modo che, in caso di emergenza, la spina principale possa essere individuata ed estratta facilmente.

Lo strumento deve essere trasportato sempre afferrandone il corpo principale e non, ad esempio, il display opzionale attaccato o il piedistallo NanoVolume.

L'apparecchio deve essere collegato all'alimentazione utilizzando il cavo di alimentazione/l'alimentatore da 60 watt fornito da Implen (90 watt con il gruppo batteria). La presa di alimentazione deve essere provvista di conduttore di protezione (terra/massa). Può essere utilizzata con sistemi di alimentazione a 90-250 V e 50-60 Hz.

Per i modelli portatili, il gruppo batteria deve essere caricato per almeno 3 ore prima del primo utilizzo.

Dopo averlo collegato, accendere lo strumento utilizzando il pulsante di accensione sul pannello posteriore. Lo strumento esegue una serie di test di autodiagnostica.

In caso di difficoltà di natura tecnica o con la manipolazione dei campioni, contattare immediatamente il fornitore originale.

Nota: se questa apparecchiatura viene utilizzata secondo modalità diverse da quelle specificate oppure in condizioni ambientali non idonee a un utilizzo sicuro, la protezione di cui è dotata potrebbe risultare compromessa, invalidando così la garanzia sullo strumento.

15. APPENDIX 6 – INSTALACJA SPEKTROFOTOMETRU

INFORMACJE DOTYCZĄCE BEZPIECZEŃSTWA

Przed rozpoczęciem instalacji należy zapoznać się z etykietami ostrzegawczymi i symbolami umieszczonymi na urządzeniu oraz z ich znaczeniem. Informują one o możliwym zagrożeniu lub o konieczności zachowania szczególnej uwagi. Niewłaściwe użytkowanie może doprowadzić do obrażeń ciała lub uszkodzenia urządzenia. Urządzenie powinno być obsługiwane wyłącznie przez przeszkolony i doświadczony personel. Przed użyciem należy zapoznać się z całą instrukcją obsługi.

⎓ prąd stały

Nie wolno otwierać urządzenia, ponieważ może to narazić użytkownika na kontakt z energią elektryczną i światłem ultrafioletowym, odsłonić delikatne obwody światłowodowe lub spowodować uszkodzenie urządzenia.

Przed pomiarem komórek o pojemności ułamka mikrolitra przy użyciu modelu NanoPhotometer® C40 należy nałożyć pokrywę na głowicę pomiarową.
OSTRZEŻENIE: pomiar bez pokrywy naraża na kontakt ze światłem ultrafioletowym.

Z urządzeniem NanoPhotometer® nie wolno używać uszkodzonych przewodów zasilających, akcesoriów i innych urządzeń peryferyjnych. Używać należy wyłącznie dostarczonego w zestawie i zgodnego ze specyfikacją zasilacza lub ładowarki.

Nie wolno narażać urządzenia NanoPhotometer® na działanie mocnych pól magnetycznych i elektrycznych, wody, chemikaliów ani jakichkolwiek płynów, takich jak mocne opady atmosferyczne lub wilgoć.

Urządzenia nie wolno wrzucać do ognia, ponieważ może napęcznieć lub eksplodować (akumulator). Urządzenia nie wolno przechowywać ani używać w pobliżu jakichkolwiek źródeł ciepła, szczególnie o temperaturze powyżej 60°C, ani w atmosferze grożącej wybuchem.

Nie wolno pozostawiać urządzenia NanoPhotometer® na kolanach ani w pobliżu innych części ciała, aby zapobiec poczuciu dyskomfortu oraz obrażeniom ciała wskutek oddziaływania wysokiej temperatury.

Nie wolno umieszczać żadnych przedmiotów na urządzeniu NanoPhotometer®.

Przed przeniesieniem urządzenia NanoPhotometer® z akumulatorem (wersji mobilnej) należy je wyłączyć. Przycisk zasilania należy chronić podczas transportu, aby uniknąć samoczynnego włączenia wskutek wstrząsu lub wibracji.

Próbki biologiczne mogą zawierać mikroorganizmy zakaźne lub przenosić choroby. Należy zdawać sobie sprawę z zagrożenia dla zdrowia powodowanego przez takie próbki i stosować odpowiednie wyposażenie ochronne. Z próbkami zawierającymi materiały potencjalnie zakaźne należy się obchodzić z największą ostrożnością oraz zgodnie z obowiązującymi wymaganiami prawnymi i procedurami organizacyjnymi.

Uwaga: Należy unikać rozlewania próbek biologicznych na elementach urządzenia. Jeżeli dojdzie do rozlania, należy niezwłocznie zdezynfekować urządzenie zgodnie z procedurami laboratoryjnymi oraz instrukcją czyszczenia urządzenia (zob. 8 Maintenance).

Symbol umieszczony na produkcie lub na dokumentach dodanych do produktu oznacza, że urządzenia nie wolno traktować jako odpadu komunalnego. Urządzenie należy przekazać do odpowiedniego punktu odbiorczego, zajmującego się utylizacją urządzeń elektrycznych i elektronicznych. Utylizacji należy dokonać zgodnie z lokalnymi przepisami środowiskowymi odnoszącymi się do utylizacji odpadów.

ROZPAKOWYWANIE I UMIEJSCOWIENIE

Sprawdź zawartość zestawu pod kątem zgodności z dowodem dostawy. W przypadku jakichkolwiek braków niezwłocznie poinformuj dostawcę.

Sprawdź, czy na urządzeniu nie ma żadnych śladów uszkodzeń powstałych podczas transportu. W przypadku jakichkolwiek uszkodzeń niezwłocznie poinformuj dostawcę.

Sprawdź, czy zamierzone miejsce instalacji jest zgodne ze środowiskowymi warunkami bezpiecznej obsługi: eksploatacja w pomieszczeniu lub w suchym otoczeniu.
Uwaga: NanoPhotometer® należy trzymać z daleka od płynów, chemikaliów, deszczu, wilgoci oraz zapylonego otoczenia.

Zakres temperatury: 10–40°C. Jeżeli jest stosowane podgrzewanie kuwety, zakres ten wynosi 10–30°C.

W przypadku ekstremalnych zmian temperatury może być konieczne zrównoważenie temperatury urządzenia. W tym celu należy je wyłączyć i włączyć ponownie po osiągnięciu równowagi termicznej (po około 2–3 godzinach).

Maksymalna wilgotność względna (bez kondensacji) wynosi 80% w temperaturze do 31°C i zmniejsza się liniowo do 50% w temperaturze 40°C.

Urządzenie należy umieścić na stabilnej i równej powierzchni, która utrzyma 4–5 kg, w taki sposób, by zapewnić swobodny obieg powietrza wokół urządzenia. Kiedy urządzenie jest włączone, żadne materiały nie powinny ograniczać obiegu powietrza. Należy unikać bezpośredniego wystawienia urządzenia na działanie światła słonecznego, ponieważ może to powodować płowienie jego części i uszkodzenie elementów plastikowych.

Urządzenie należy ustawić tak, by w sytuacji awaryjnej można było łatwo odnaleźć i odłączyć jego wtyk przewodu zasilania.

Urządzenie należy przenosić, trzymając je zawsze za główny korpus, a nie np. za opcjonalny dołączany wyświetlacz lub podstawę NanoVolume.

Urządzenie należy połączyć ze źródłem zasilania przewodem zasilania o mocy 60 W dostarczonym przez firmę Implen (90 W z akumulatorem). Gniazdo zasilania musi być uziemione. Urządzenie można stosować z systemami zasilania o napięciu 90–250 V, 50/60 Hz.

Akumulator modeli mobilnych należy naładować przez co najmniej 3 godziny przed pierwszym użyciem.

Po połączeniu urządzenia ze źródłem zasilania należy je włączyć przyciskiem zasilania na panelu tylnym. Urządzenie wykona serię testów diagnostycznych.

W przypadku wystąpienia problemów technicznych lub z próbką należy niezwłocznie skontaktować się z pierwotnym dostawcą urządzenia.

Uwaga: Eksploatacja urządzenia w sposób niezgodny ze specyfikacją lub w warunkach niesprzyjających bezpiecznemu działaniu może zmniejszyć skuteczność jego zabezpieczeń i doprowadzić do unieważnienia gwarancji.

16. APPENDIX 7 – INSTALACIÓN DEL ESPECTROFOTÓMETRO

INFORMACIÓN DE SEGURIDAD

Antes de comenzar con la instalación, dedique un tiempo a familiarizarse con las etiquetas y símbolos de advertencia del instrumento y con su significado. Son para informarle cuando existan daños potenciales o se requiera una precaución particular. El uso incorrecto podría causar lesiones personales o daños en el instrumento. El instrumento solo debe ser usado por personal debidamente formado y con experiencia. Lea el manual del usuario en su totalidad antes de usar la unidad.

⎓ corriente continua

No abra el instrumento, pues ello podría exponer al operario a corriente eléctrica, luz UV y fibra óptica sensible, o dañar el instrumento

Si se usa la celda submicrolitro con el NanoPhotometer® C40, asegúrese de que la tapa está colocada en el cabezal de medición antes de tomar la medida.
ADVERTENCIA: Exposición a UV si se mide sin tapa.

No utilice cables eléctricos, accesorios u otros periféricos deteriorados con el NanoPhotometer®. Utilice únicamente la fuente de alimentación/cargador suministrados y especificados.

No exponga el NanoPhotometer® acampos magnéticos o eléctricos intensos ni tampoco a agua, productos químicos o ningún otro tipo de líquido, como lluvia o humedad elevada.

No arroje el instrumento al fuego, pues podría inflamarse o explotar (la batería). No lo guarde ni lo utilice en las proximidades de fuentes de calor, en especial a temperaturas superiores a 60°C o en una atmósfera explosiva.

No se apoye el NanoPhotometer® en el regazo ni cerca de ninguna parte de su cuerpo para evitar molestias o lesiones debidas a la exposición al calor.

No coloque objetos encima del NanoPhotometer®.

El NanoPhotometer® con batería (versión portátil) deberá apagarse durante su transporte. El botón de encendido/apagado deberá protegerse durante el transporte para evitar su encendido accidental debido a golpes o vibraciones.

Las muestras biológicas podrían contener o tener el potencial de transmitir enfermedades infecciosas. Tenga en cuenta los riesgos para la salud que suponen dichas muestras y lleve un equipo protector adecuado. Manipule estas muestras con el máximo cuidado y siguiendo los requisitos normativos y de su organización aplicables antes de trabajar con dichos materiales potencialmente infecciosos.
Nota: No vierta muestras biológicas sobre los componentes del instrumento. Si se produjeran vertidos accidentales, desinfecte de inmediato el instrumento siguiendo los protocolos de su laboratorio y las instrucciones de limpieza del instrumento (consulte 8 Maintenance).

El símbolo situado sobre el producto, o en la documentación que acompaña al producto, indica que este dispositivo no debe ser tratado como residuo doméstico. Deberá llevarse al punto de recogida correspondiente para el reciclaje de equipos eléctricos y electrónicos. El desecho deberá llevarse a cabo siguiendo las normativas medioambientales locales sobre el desecho de residuos.

DESEMBALAJE E INSTALACIÓN

Compruebe que el contenido del embalaje coincide con la nota de entrega. Si observa que falta algún componente, informe a su distribuidor de inmediato.

Inspeccione el instrumento por si hubiera signos de daños producidos durante el transporte. Si se observan daños, informe de inmediato a su distribuidor.

Asegúrese de que el lugar donde desea instalar la unidad cumple las condiciones ambientales sobre funcionamiento seguro: uso en interiores o en un ambiente seco.
Nota: No coloque el NanoPhotometer® cerca de líquidos o productos químicos, ni en entornos con lluvia, humedad o polvo.

Rango de temperatura 10-40°C; si se usa la calefacción de la cubeta, el rango es de 10-30°C.

Si se somete el instrumento a cambios de temperatura extremos, podría ser necesario dejar que se equilibre el instrumento. Apague el instrumento y vuelva a encenderlo una vez alcanzado el equilibrio térmico (~2-3 horas).

Humedad relativa máxima (sin condensación) del 80% y hasta 31°C con reducción lineal hasta 50% a 40°C.

El instrumento debe colocarse sobre una superficie estable y plana que pueda soportar 4-5 kg y que permita que el aire circule con libertad alrededor del instrumento. Asegúrese de que ningún material reduzca la circulación del aire con la unidad encendida. Evite la luz solar directa, pues podría decolorar algunas partes del instrumento y dañar las piezas de plástico.

El equipo deberá colocarse de modo que, en caso de emergencia, el enchufe principal pueda localizarse y desenchufarse con facilidad.

Sujete el instrumento en todo momento por su cuerpo principal y no por la pantalla opcional acoplada o por el pedestal NanoVolume.

El equipo deberá conectarse a la corriente con la fuente de alimentación/cable de 60 W suministrada por (90 W con batería). La toma de corriente deberá tener protección con toma de tierra. Puede usarse con fuentes de alimentación de 90-250 V, 50-60 Hz.

Para el caso de modelos portátiles, la batería deberá cargarse durante al menos 3 horas antes de su primer uso.

Encienda el instrumento con el botón de encendido situado en el panel posterior una vez enchufado. El instrumento llevará a cabo una serie de pruebas de autodiagnóstico.

Contacte con el distribuidor original de inmediato si experimenta dificultades técnicas o de manipulación de muestras.

Nota: Si se usara este equipo de un modo no especificado o en condiciones ambientales no adecuadas para un funcionamiento seguro, la protección proporcionada por el equipo podría verse afectada y se anularía la garantía del instrumento.

17. APPENDIX 8 – SPEKTROFOTOMETERINSTALLATION

SÄKERHETSINFORMATION

Innan installationen påbörjas, var vänlig ägna tid åt att bekanta dig med ditt instruments varningsetiketter och symboler samt deras innebörd. De finns där för att informera dig om var det föreligger en risk eller särskild försiktighet krävs. Felaktig användning kan orsaka personskador eller skada instrumentet. Instrumentet får endast användas av personal som har lämplig utbildning och erfarenhet. Var vänlig och läs hela användarhandboken innan första användningen.

⎓ likström

Öppna inte det här instrumentet eftersom det kan exponera operatören för elektrisk ström, UV-ljus och känslig fiberoptik eller skada instrumentet.

Om submikrolitercellen används med NanoPhotometer® C40, var noga med att sätta på locket på mäthuvudet innan mätningen.
VARNING: UV-exponering vid mätning utan lock.

Använd inte skadade elkablar, tillbehör eller annan kringutrustning med din NanoPhotometer®. Använd bara den medföljande och föreskrivna strömförsörjningen/laddaren.

Exponera inte NanoPhotometer® för starka magneter, elektriska fält, vatten, kemikalier eller någon typ av vätska som kraftigt regn eller fukt.

Lägg inte instrumentet i eld, det kan då svälla och explodera (batteriet). Förvara inte och använd inte heller i närheten av någon typ av värmekälla, särskilt inte temperaturer över 60°C, eller i en explosiv atmosfär.

För att förhindra obehag av eller skada från värmeexponering ska din NanoPhotometer® inte läggas i ditt knä eller i närheten av någon kroppsdel.

Placera inte föremål ovanpå NanoPhotometer®.

NanoPhotometer® med batteripaket (mobil version) måste stängas av under transport. Knappen för att slå på/av måste skyddas under transport, så att den inte slås på av sig själv på grund av stöt eller vibration.

Biologiska prover kan innehålla eller har potential att överföra smittsamma sjukdomar. Var medveten om hälsorisken som sådana prover innebär och använd lämplig skyddsutrustning. Hantera sådana prover med största aktsamhet och i enlighet med tillämpliga reglerande och organisatoriska bestämmelser innan arbete med sådant potentiellt infektiöst material utförs.
Obs: Spill inte några biologiska prover på instrumentkomponenter. Om något spills, desinficera instrumentet omedelbart i enlighet med laboratorieregler och rengöringsanvisningarna för instrumentet (se 8 Maintenance).

Symbolen på produkten eller på dokumenten som medföljer produkten visar på att den här apparaten inte får hanteras som hushållsavfall. Den ska istället lämnas in på lämplig insamlingsplats för återvinning av elektrisk och elektronisk utrustning. Kassering måste göras i enlighet med lokala miljöbestämmelsers föreskrifter för avfallshantering.

UPPACKNING OCH PLACERING

Kontrollera innehållet i förpackningen mot följesedeln. Om det saknas något ska din leverantör omedelbart informeras.

Inspektera instrumenten för alla tecken på skador uppkomna under transport. Om någon skada upptäcks ska din leverantör omedelbart informeras.

Kontrollera att din föreslagna installationsplats överensstämmer med de miljömässiga villkoren för säker användning: inomhusanvändning eller torr miljö.
Obs: Låt inte din NanoPhotometer® komma nära vätskor, kemikalier, regn, fukt eller dammiga miljöer.

Temperaturområde 10-40°C; Om kuvettuppvärmning används är området 10-30°C.

Om instrumentet utsätts för extrema temperaturförändringar kan det bli nödvändigt att låta instrumentet utbalanseras. Stäng av instrumentet för att sedan slå på det igen när termisk jämvikt har uppnåtts (ca 2-3 timmar).

Maximal relativ luftfuktighet (icke-kondenserande) 80% och upp till 31°C linjärt minskande till 50 % vid 40°C.

Instrumentet måste placeras på en stabil, jämn yta som kan bära 4-5 kg och tillåter att luft fritt kan cirkulera runt instrumentet. Kontrollera när den är påslagen att inget material minskar luftcirkulationen. Undvik direkt solljus eftersom det kan bleka delar av instrumentet och orsaka skada på delar som är tillverkade av plast.

Utrustningen ska placeras på så sätt att det, i händelse av en nödsituation, är enkelt att hitta och dra ur elkontakten.

Bär alltid instrumentet genom att hålla i instrumentets huvudkropp och inte i t.ex. den display som finns ansluten som tillval eller NanoVolume-pelaren.

Utrustningen måste vara ansluten till ström med 60 W strömförsörjning/sladd som levererats av Implen (90 W med batteripaket). Strömuttaget måste ha en skyddsledare (jord). Den kan användas med strömförsörjningssystem med 90-250 V, 50-60 Hz.

För mobila modeller, var vänlig ladda batteripaketet minst 3 timmar innan första användning.

Slå på instrumenten med strömknappen på den bakre panelen, efter att det har anslutits. Instrumentet utför då en serie självdiagnostiska kontroller.

Var vänlig kontakta genast ursprungsleverantören vid svårigheter av teknisk art eller med att hantera prov.

Obs: Om den här utrustningen används på ett sätt som inte är föreskrivet eller i miljöförhållanden som inte är lämpliga för säker drift kan skyddet som utrustningen tillhandahåller försämras och instrumentets garanti förverkas.

18. APPENDIX 9 – INSTALAÇÃO DE ESPECTROFOTÓMETRO

INFORMAÇÕES DE SEGURANÇA

Antes de começar a instalação, procure familiarizar-se com os símbolos e as etiquetas de aviso no instrumento e o respetivo significado. Destinam-se a informá-lo sobre onde se encontram os potenciais perigos ou onde é necessário aplicar um cuidado especial. A utilização inadequada pode provocar ferimentos pessoais ou danificar o instrumento. O instrumento apenas deve ser operado por pessoal experiente e com a devida formação. Antes de usar, leia integralmente o manual de utilizador.

⎓ corrente contínua

Não abra o instrumento, dado que pode expor o operador à corrente elétrica, a luz UV e a delicadas fibras óticas, além do risco de o danificar.

Se for usado o alvéolo submicroliter com o NanoPhotometer® C40, certifique-se de que a tampa está colocada no ponto de medição, antes de proceder à medição.
AVISO: Exposição a UV se a medição for realizada sem a tampa.

Não utilize cabos de corrente, acessórios ou outros instrumentos periféricos danificados com o seu NanoPhotometer®. Utilize apenas a bateria/carregador especificado fornecido.

Não exponha o NanoPhotometer® a campos magnéticos potentes, cargas elétricas excessivas, água, produtos químicos ou qualquer outro tipo de líquido, como a chuva forte ou a humidade.

Não submeta o instrumento a fogo, dado que pode dilatar ou explodir (bateria). Não guarde nem use o instrumento na proximidade de qualquer tipo de fonte de calor, especialmente a temperaturas superiores a 60°C ou em ambientes explosivos.

Não use o NanoPhotometer® sobre o seu colo ou regaço nem junto a qualquer parte do seu corpo, para evitar o desconforto ou ferimentos provocados pela exposição ao calor.

Não coloque quaisquer objetos sobre o NanoPhotometer®.

O NanoPhotometer® com bateria (versão portátil) deve estar desligado durante o transporte. O botão on/off (ligar/desligar) deve estar protegido durante o transporte, para não se ligar acidentalmente devido aos choques ou vibrações.

As amostras biológicas podem conter ou ter o potencial para transmitir doenças infeciosas. Tome consciência do perigo para a saúde decorrente dessas amostras e use o equipamento de proteção adequado. Manuseie essas amostras com o maior cuidado e em conformidade com a regulamentação e os requisitos de organização aplicáveis antes de trabalhar com esses potenciais materiais infeciosos.
Nota: Tenha o cuidado de não derramar amostras biológicas sobre os componentes do instrumento. Se ocorrer um derrame, desinfete imediatamente o instrumento, seguindo os protocolos do seu laboratório e as instruções para limpeza do aparelho (consulte 8 Maintenance).

O símbolo no instrumento, ou nos documentos que o acompanham, indica que o aparelho não pode ser tratado como resíduo doméstico. Pelo contrário, deverá ser encaminhado para um ponto de recolha adequado para a reciclagem de equipamentos elétricos e eletrónicos. A eliminação deverá ser realizada em conformidade com as regulamentações ambientais locais para a eliminação de resíduos.

DESEMBALAMENTO E POSICIONAMENTO

Confirme se o conteúdo da embalagem corresponde à nota de entrega. Se detetar a falta de algum componente, informe imediatamente o fornecedor.

Examine se o instrumento apresenta alguns sinais de danos provocados pelo transporte. Se detetar a existência de algum dano, informe imediatamente o fornecedor.

Certifique-se de que o local onde pretende instalar o instrumento cumpre as condições ambientais para o funcionamento em segurança: utilização em espaços interiores ou ambiente seco.
Nota: Não instale o NanoPhotometer® na proximidade de líquidos ou produtos químicos, nem à chuva ou em ambientes húmidos ou com poeiras.

A amplitude da temperatura é de 10-40°C. Se for utilizada a cubeta de aquecimento, a amplitude é de 10-30°C.

Se o instrumento for submetido a alterações extremas de temperatura, pode ser necessário permitir o respetivo equilíbrio. Desligue o instrumento e volte a ligar depois de alcançar o equilíbrio térmico (~2-3 horas).

A humidade relativa máxima (não condensação) é de 80% e até 31°C, reduzindo progressivamente até 50% a 40°C.

O instrumento deve ficar posicionado numa superfície nivelada e estável e que suporte 4 - 5 kg e que permita que o ar circule livremente em redor do instrumento. Ao ligar o instrumento, certifique-se de que não existem materiais que reduzam a circulação do ar. Evite a luz solar direta, dado que pode descolorar e danificar as peças plásticas do instrumento.

O equipamento deve estar posicionado de forma a permitir que, em caso de emergência, a ficha elétrica possa ser facilmente localizada e removida da tomada de corrente.

Para transportar o instrumento, segure sempre pelo corpo principal e não pelos acessórios opcionais, por exemplo, pelo visor ou pela base do NanoVolume.

O equipamento deve ser ligado à corrente através do cabo elétrico de 60W fornecido pela Implen (90W no caso da bateria). A tomada de corrente deve dispor de um condutor de proteção (ligação à terra). Pode ser usado num sistema de alimentação elétrica de 90-250 V, 50-60 Hz.

Para modelos Portáteis, carregue a bateria pelo menos durante 3 horas antes de usar pela primeira vez.

Ligue o instrumento no botão de energia situado no painel traseiro, depois de ligado na tomada de corrente. O instrumento realiza um conjunto de verificações em auto-diagnóstico.

Contacte imediatamente o fornecedor original se ocorrerem dificuldades técnicas ou no manuseamento de amostras.

Nota: Se este equipamento for utilizado de forma não especificada ou em condições ambientais não adequadas para o funcionamento em segurança, a proteção proporcionada pelo equipamento pode ficar comprometida e a garantia do instrumento pode ser anulada.

19. ALPHABETICAL APPENDIX

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