
Microvolume Spectrophotometer

FastGene[®] NanoView Photometer

User Guide

Basic operation guide



FastGene[®] NanoView

User Guide

2021

Nippon Genetics Europe GmbH
FastGene[®] NanoView
User Guide



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Introduction

Thank you for purchasing FastGene® NanoView, an ultraviolet/visible ray spectrophotometer.

This user guide describes the details of installation and operation, precautions for use, accessories, and other options. Read this user guide carefully before using the equipment, and only use according to the instructions. Also, please keep this guide for future reference when using the equipment.

Important note

Please keep this user guide with the product.

Please read the safety instructions before using the equipment, to operate the equipment safely and smoothly.

If you need to calibrate or install the product again, please contact the Nippon Genetics Europe customer center.

If the user guide is lost or damaged, please contact the Nippon Genetics Europe customer center.

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- Any related material of this manual may not be modified or distributed in any form without prior consent of Nippon Genetics Europe.

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Safety instructions

Please read the safety instructions carefully before using the equipment, to operate the equipment safely

- Comply with all warnings and cautions described in the user guide.


This user guide uses the following rules to describe warnings and cautions:

 **Warning**

This mark indicates a potentially risky situation, and failure to follow the instruction may lead to serious injury or even death.

 **Caution**

This mark indicates a potentially risky situation, and failure to follow the instruction may lead to a light injury or product damage.

 **Note**

This mark indicates additional information provided to ensure proper use of this product.

Precautions

Precautions about the installation site

Warning

Make sure to install a ventilation system at the installation site when using flammable and toxic samples.

Caution

- FastGene® NanoView weighs about 1.4 kg. This should be considered when installing.
- The laboratory table on which the equipment is installed should be able to support the total weight of this device. In addition, use a stable table with a depth of at least 300 mm. If dropped, the equipment may break.
- Avoid installation sites exposed to corrosive gas or excessive dust. These adverse conditions can be detrimental to maintaining the performance of the equipment and can shorten the life span.

Precautions

Installation precaution

 **Warning**

- Take actions to prevent equipment from falling in case of an earthquake or disaster.
- Make sure to check the power supply voltage, power consumption, and frequency of the equipment before supplying power.
- Grounding is essential to prevent electric shock and ensure reliable operation in case of a sudden accident or discharge.
- Do not place heavy objects on the power cord. Keep away from hot objects.
- Do not modify the power cord in any way.

Installation precautions

 **Warning**

- Always wear safety gloves when using a sample that is harmful or biologically infectious.
- Do not use flammable spray near the equipment.

Product warranty

We provide a warranty on the product as specified below.

1. Product warranty period

For more information about the warranty period and range, please contact the Nippon Genetics Europe service center.

2. Product warranty description

If malfunction occurs during the warranty period due to a defect in the equipment (software, hardware), the part will be replaced or repaired, free of charge. The same product, or free repair or replacement, may not be possible for consumables or various accessories with operating life.

3. Exceptions to the product warranty

Product failure caused by the following will not be covered by the warranty, even during the warranty period.

- 1) If the product is modified or used in an inappropriate way
- 2) If a service provider or person other than the company has repaired or modified the product
- 3) Damage to data or device, including basic software, that was caused by computer viruses
- 4) Damage to equipment, caused by electrical power failure or sudden voltage drop
- 5) Error caused by a problem other than the equipment itself
- 6) Failure caused by use in harsh environments such as high temperature, humidity, corrosive gas, or strong vibration
- 7) Failure due to external shock including fire, earthquake, or contamination by harmful substances.

* If the product has documentation such as a warranty, or a separate contract that includes terms of the warranty, the provisions set forth in the document in question shall be applied. For special applications, the product warranty period will be set separately, if the product is manufactured differently from standard specifications.

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Ch. 1

Introduction

- 1-1 Introduction
 - 1-1-1 Product introduction
 - 1-1-2 Measurement principle
- 1-2 Screen description
 - 1-2-1 Favorites screen
 - 1-2-2 Adding/Removing favorites
- 1-3 Menu description
 - 1-3-1 Measurement menu composition

1-1 Introduction

1-1-1 Product introduction

FastGene® NanoView is a compact, ultra-small sample analyzer with a simple yet refined design and easy and convenient user interface (UI). This product can measure a wide range of absorbance, as it uses a slope algorithm, an optical path optimization technology. As three LEDs (260 nm, 280 nm, 600 nm) and a single silicon photodiode are used, the product cost has been greatly reduced, while maintaining essential product functions and performance. Baseline correction can be performed using an additional LED (360 nm).

i Note

Small & Stand-Alone

No additional PC is required for this device, with its compact size of 145 x 190 mm (footprint), 1.4 kg, and main unit control system.

1-2-2 Measurement principle

① Lambert-Beer's law

This law combines Lambert's law and Beer's law related to the absorption of light, and is used for absorbance measurement. When the intensity of incident light projected onto the layer of material with concentration c in the thickness d is I_0 , and the intensity of light transmitted through this layer is, absorbance E is $\log(I_0/I)$ and can be expressed as $E=kcd$. Beer's law states that absorbance is proportional to the thickness of the absorption layer d , and Lambert's law states that absorbance is proportional to the concentration of the absorbing material. The proportional constant k varies according to the unit that indicates density and length of the absorption layer. The value of k when concentration is indicated by $w/v\%$ and the length of the absorption layer is indicated by cm is called the non-absorbance or absorbance coefficient. When concentration is indicated by mol concentration and the length of the absorption layer is indicated by cm , it is called the mol absorbance coefficient. In general, the concentration c of the unknown sample can be determined using this law, by measuring absorbance when the absorption spectrum is at its maximum.

② Slope Algorithm

FastGene NanoView automatically determines a sample concentration range - low, middle, and high concentration - and sets the optimized optical path, using the Slope Algorithm. "Slope Algorithm" is an algorithm based on Beer's Law, which is performance improving technology using information such as absorbance changes caused by the optical path change. Using this algorithm, NanoView provides high measurement performance over a wide concentration range.

③ Low Sample Volume & High Sample Concentration Range

Performs quantitative analysis using up to 2 μl sample volume. Performs quantitative analysis up to 10,000 ng/ μl dsDNA. Accurate values can be automatically measured regardless of the volume error even though path length is not separately adjusted, using the Slope Algorithm.

④ OD600

Refers to the measurement of optical density at 600 nm. It is generally used as a test method to describe the value of bacteria or other cells. OD600 can be measured using a standard Cuvette (10mm path length cell).

1-2 Screen description

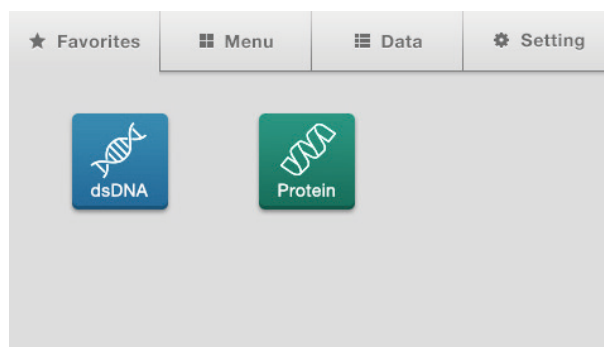


Fig. 1.1

1-2-1 Favorites screen

Preferred measurement modes can be added or deleted in Favorites for convenient use.

Up to 6 favorites can be added. * See 1-2-2 Adding/Removing favorites

i Note



[Favorites]: A measurement mode added by the user can be selected.

[Menu]: Any measurement modes supported by the equipment can be selected.

[Data]: Views, deletes, exports to USB, and prints the measured data.

[Setting]: Equipment language and time selection, system, device check, and PC connection can be performed.



Fig. 1.2

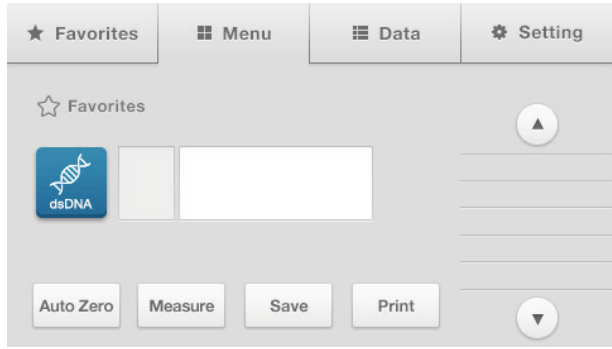


Fig. 1.3

1-2-2 Add/Remove favorite

- 1. [Fig. 1.2] Press ① [Menu] on the screen.
- 2. Select a measurement mode to add to Favorites.
- 3. [Fig. 1.3] Press ② Click [Favorites] on the upper left of the measurement screen to add to Favorites.
- 4. [Fig. 1.3] Press ② [Favorites] in the corresponding measurement mode to delete a favorite.

Note
The icon is displayed in yellow, if the mode is added to Favorites. The icon is displayed in gray, if the mode is not added to Favorites.

1-3 Menu description

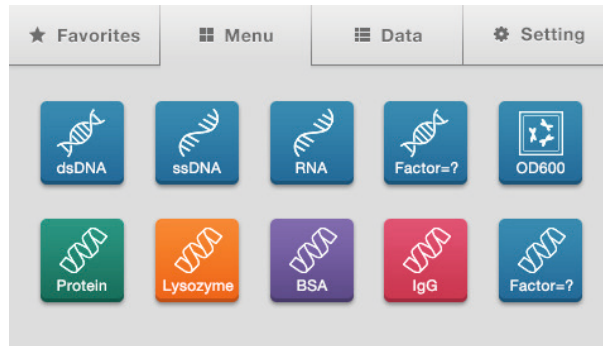


Fig. 1.2

1-3-3 Measurement menu composition

	Menu	Factor
Nucleic Acid	ds DNA	50
	ss DNA	33
	RNA	40
	Other	Input
Protein	Protein	1
	BSA	1.49
	IgG	0.72
	Lysozyme	0.37
	Other	Input
OD600	OD600	1

The factor designated for each mode is set as the default value. The input mode is additionally provided so that the user can designate a factor value. It is designed in such a way to enable the measurement of numerous sample types, besides protein, depending on the tester or experiment environment.

Ch. 2

Basic Measurements

- 2-1 Pedestal Basic Use
- 2-2 Cuvette Basic Use
- 2-3 Baseline ON / OFF

2-1 Pedestal Basic Use

For accurate measurement take a 2 μl (minimum volume - 1 μl) sample using a pipette. Place the pipette used to take the sample on the sampling pedestal and carefully drop the sample, keeping the shape so that the drop does not burst. Close the cell cover.

Ch.2

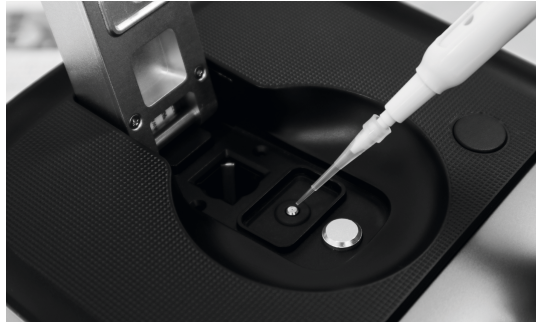


Fig. 2.1

Press the [Measure] button to conduct measurement and display the measured value on the screen. Open the cell cover after completing the measurement. If the sample needs to be collected, extract the sample carefully using a pipette. If sample collection is not needed, softly wipe the sampling pedestal and cover quartz window using a laboratory tissue. For additional washing, drop distilled water onto the sampling pedestal and cover quartz window, softly wipe it off with a laboratory tissue, and repeat washing if contamination is serious.

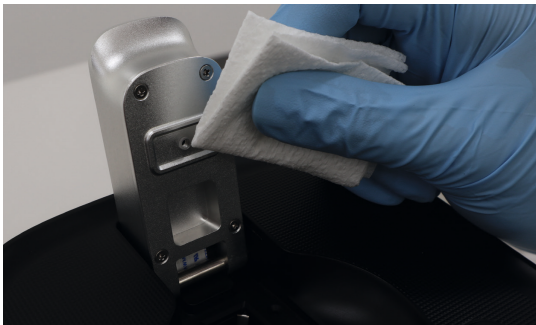


Fig. 2.2



Fig. 2.3

Warning

If the volume of the sample is less than 1.0 μl or more than 2.0 μl , the sample may not be positioned correctly on the sampling pedestal and the measured value may not be correct. If sample concentration is very low (less than 2 ng/ μl , based on dsDNA) or very high (greater than 10,000 ng/ μl , dsDNA), the accuracy of the measured value can decrease. Therefore, measure the sample after concentration or dilution according to the range in question.

2-2 Cuvette Basic Use

FastGene® NanoView provides OD600 mode that measures the OD value at 600 nm using a 10 mm Cuvette. The height of the optical path is 8.5 mm from the bottom, and Cuvette selection and sample size selection require confirmation.

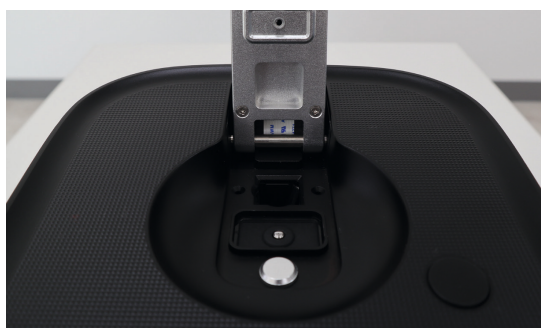


Fig. 2.4

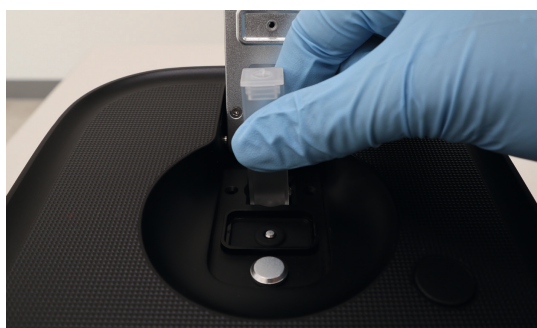


Fig. 2.5

Prepare a Cuvette containing the sample. Select the sample size considering the height of the optical path. Open the Cell Cover and insert the Cuvette into the square cell holder. When inserting the Cuvette, check whether the Cuvette area where light passes is not contaminated. If contaminated, wipe clean using a laboratory tissue. Place the Cuvette on the optical path in such a way that the transparent part of the Cuvette is on the optical path, by checking the direction of passing light. Press the [Measure] button to conduct measurement and display the measured value. Remove the Cuvette when the measurement is complete.

2-3 Baseline ON / OFF

A baseline can be applied to the measured value using the Baseline Correction ON/OFF function in the case of nucleic acid and protein. As it is measured by absorbing ultraviolet rays below 320 nm, a baseline value measured at the wavelength of 320 nm or higher can be used as a baseline value. For the FastGene® NanoView, 360 nm has been designated as the baseline wavelength. When a baseline is applied, the calculation equation is $(A_{260} - A_{360}) \times \text{factor}$ for nucleic acid, and $(A_{280} - A_{360}) \times \text{factor}$ for protein, and the ratio value is $(A_{260} - A_{360}) / (A_{280} - A_{360})$.

Baseline Correction ON/OFF Setting Method

The factory setting of the Baseline Correction ON/OFF function is OFF. To change it to ON, take the following steps. If the equipment is turned OFF, ON/OFF setting will be set to OFF again. Therefore, make sure to set the Baseline Correction ON/OFF before starting measurement.

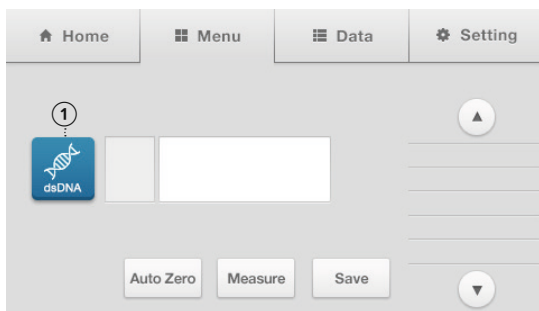


Fig. 2.6

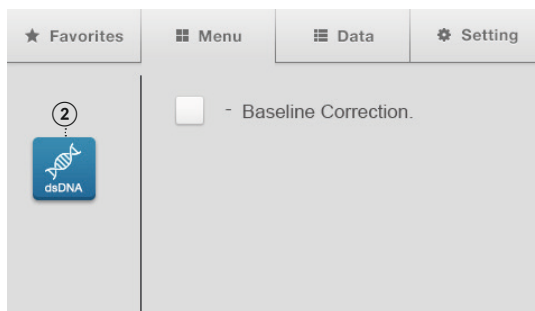
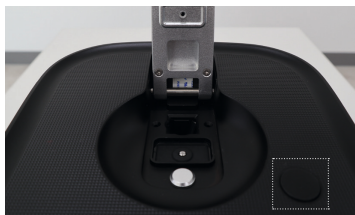


Fig. 2.7

[Fig 2.6] The Setting screen will appear if the ① icon is pressed on the screen after entering measurement mode.

[Fig. 2.2] Select the “Baseline Correction” check box on the Setting screen to set base correction to ON. To set Baseline Correction to OFF, unselect the check box. Press the ② icon on the screen to display the measurement screen.

NanoView Power Saving Mode



Quick button ↗

If the product is not used for a certain period of time (20 minutes) after supplying power to the product, the LCD window will turn off and power saving mode will activate. Only the LCD screen is turned off. The screen shown before power saving mode will be saved. Product power supply can be checked using the quick button LED light. To cancel power saving mode, press the quick button and the device will be ready for measurement. To intentionally activate power saving mode, press the quick button for 3 - 4 seconds. Then, the LCD window will turn off and power saving mode will activate.

*The quick button is also used as the [Measure] button during measurement.

e

Ch. 3

Nucleic acid measurement method

3-1 Measurement description

3-2 A260/A280 ratio

3-2-1 Menu description

3-3 Usage

Ch.3

3-1 Measurement description

As nucleic acid has maximum values at an absorbance of 260 nm, the concentration value of dsDNA, ssDNA, and RNA can be obtained by multiplying the value measured at 260 nm when DNA or RNA is measured with unique values such as 50, 33, or 40.

	Factor
ds DNA	50
ss DNA	33
RNA	40
Other	Input

* The absorbance value is indicated by the value calculated with a path length of 10 mm for the absorbance value at path length.

i Note

Nucleic acid Calculation [ng/μl] = A260 x Factor

Purity Ratio = A260/A280

3-2 A260 / A280 ratio

The A260/A280 ratio is used when measuring the purity of DNA or RNA using absorbance measurement. Purity can be calculated by checking the ratio of impurities such as protein and phenol that shows high absorbance near 280 nm. Purity increases as A260/A280 is close to 1.8 (for DNA) or 2.0 (for RNA). However, depending on the type of sample, it is not necessarily as such, but it is used according to the experimental purpose.

3-2-1 Menu description

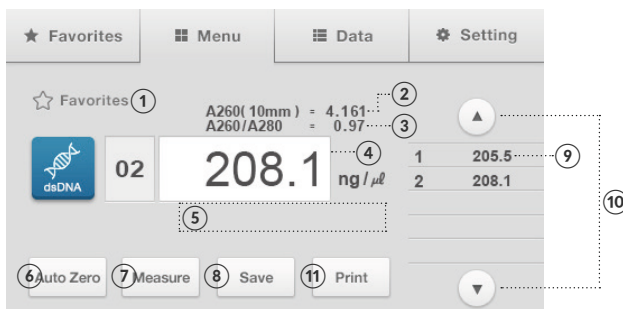


Fig. 3.1

Name	Description	Additional Description
①	Favorites	* See 1-2-2 Adding/Removing favorites
②	10 mm ABS value	
③	Ratio value	
④	Measurement concentration value	
⑤	Message location	
⑥	Auto Zero	
⑦	Measure	
⑧	Save	
⑨	Measured value table	Up to 99 data can be measured
⑩	Scroll table movement	
⑪	Print	Thermal printers are supported.

3-3 Usage

Ch.3

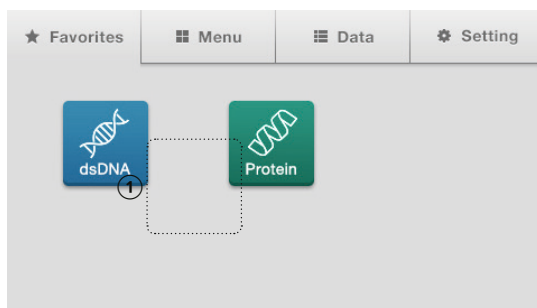


Fig. 3.2

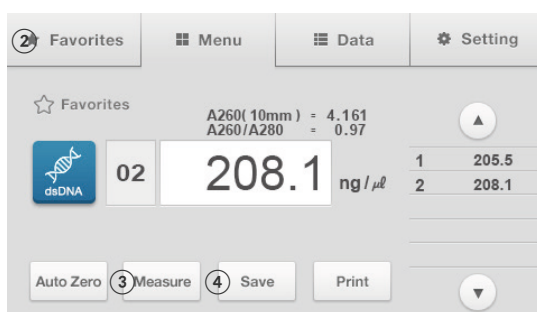


Fig. 3.3

1. [Fig. 3.2] Press ① [dsDNA] on the Favorites screen.
2. Drop a 1-2 μl sample to measure on the sampling pedestal after checking the measurement screen. Check whether the sample is dropped normally, and close the cell cover and press the [Measure] button.
3. [Figure 3.3] The measurement result will be displayed.
4. To continue measurement, softly wipe the sampling pedestal and cover quartz window with a laboratory tissue and repeat Step 2.
5. [Fig. 3.3] To continue measurement, repeat the operation. To finish measurement and save the data, press the [Save] button.
6. [Figure 3.3] To conduct new measurement, press the ② [Favorites] icon to open the Favorites screen.

i Note

For ssDNA, RNA, and Other Nucleic acid, select the corresponding menu on the menu screen and proceed in the same way as dsDNA. Measure Other Nucleic acid by entering the factor to apply to the formula using the up/down arrow icon.

How to apply a Factor to Other Nucleic acid

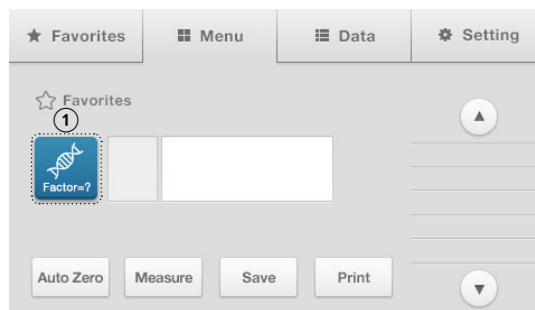


Fig. 3.4

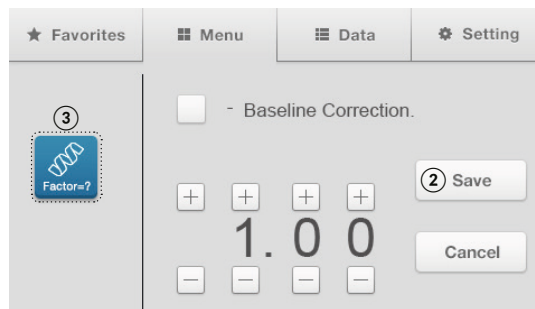


Fig. 3.5

1. [Figure 3.4] Press the ① [Factor =?] icon on the measurement mode screen to display the [Figure 3.5] screen.
2. [Figure 3.5] Select a factor to input using the + and - buttons and press the ② [Save] button to save (0.01 ~ 99.99). If [Cancel] is pressed, the previous value will be restored. Press the ③ [Factor=?] icon on the screen after setting is complete to display the measurement screen.

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Ch. 4

Protein measurement method

4-1 Measurement description

4-1-1 Menu description

4-2 Usage

Ch.4

4-1 MeasureDescription

The quantitative analysis of protein is a quantitative analysis method using the UV absorption and wavelength of aromatic amino acid, and is proportional to absorbance at 280 nm. There are, of course, exceptions, but in general protein has a concentration of 1.0 at 280 nm when protein density is 1mg/ml and the path of ultraviolet rays is 1 cm. Most pure protein density can be checked by measuring absorbance at 280 nm. However, it is better to avoid this method if the protein has a low proportion of low-molecular protein, which is close to polypeptide, or aromatic amino acid (usually 3 to 5%).

Ch.4

	Factor
Protein	1
BSA	1.49
IgG	0.72
Lysozyme	0.37
Other	Input

* The absorbance value is indicated by the value calculated with a path length of 10 mm for the absorbance value at path length.

i Note

Protein Calculation [mg/ml] = $A_{280} \times \text{Factor}$

4-1-1 Menu description

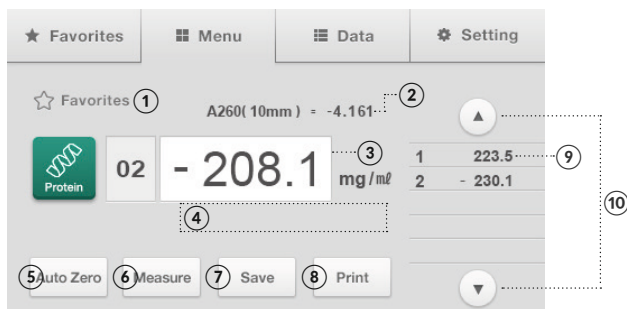


Fig. 4.1

Name	Description	Additional Description
①	Favorites	* See 1-2-2 Adding/Removing favorites
②	10 mm ABS value	
③	Measurement concentration value	
④	Message location	
⑤	Auto Zero	
⑥	Measure	
⑦	Save	
⑧	Print	Thermal printers are supported.
⑨	Measured value table	Up to 99 data can be measured
⑩	Scroll table movement	

4-2 Usage

Ch.4

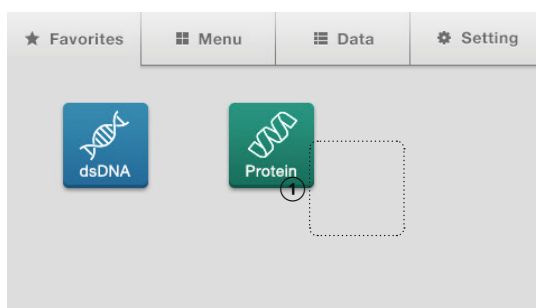


Fig. 4.2

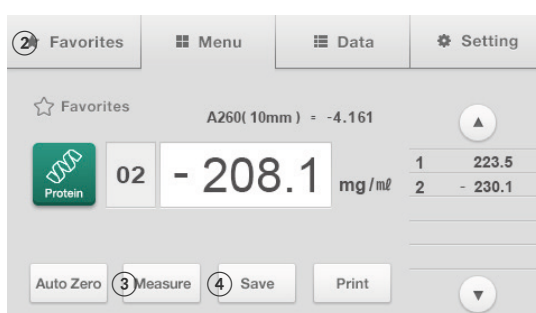


Fig. 4.3

1. [Fig. 4.2] Press ① [Protein] on the Favorites screen.
2. Drop a 1-2 μl sample to measure on the sampling pedestal after checking the measurement screen. Check whether the sample is dropped normally, and close the cell cover and press the [Measure] button.
3. [Figure 4.3] The measurement result will be displayed.
4. To continue measurement, softly wipe the sampling pedestal and cover quartz window with a laboratory tissue and repeat Step 2.
5. [Fig. 4.3] To continue measurement, repeat the operation. To finish measurement and save the data, press the [Save] button.
6. [Figure 4.3] To conduct new measurement, press the ② [Favorites] icon in the upper-side menu to open the main menu.

Note

For BSA, IgG, Lysozyme, and Other Protein, select the corresponding menu on the menu screen and proceed in the same way as Protein. Measure Other Nucleic acid by entering the factor to apply to the formula using the up/down arrow icon.

How to apply a Factor to Other Nucleic acid

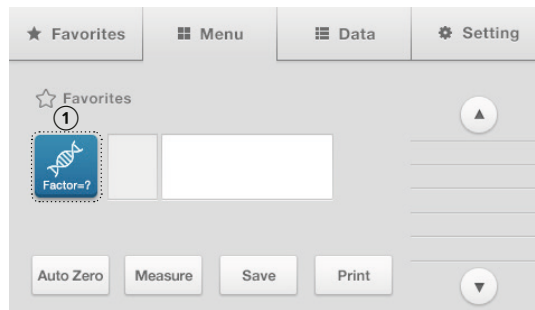


Fig. 4.4

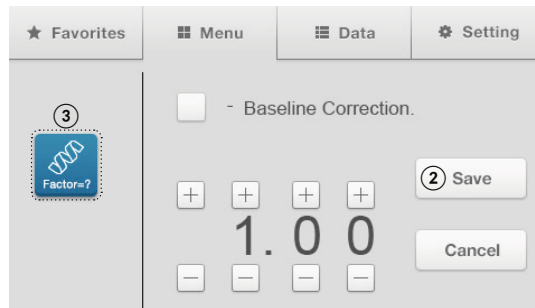


Fig. 4.5

1. [Figure 3.4] Press the ① [Factor =?] icon on the measurement mode screen to display the [Figure 3.5] screen.
2. [Figure 3.5] Select a factor to input using the + and - button and press the ② [Save] button to save (0.01 ~ 99.99). If [Cancel] is pressed, the previous value will be restored. Press the ③ [Factor=?] icon on the screen after setting is complete to display the measurement screen.

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Ch. 5

OD600 measurement method

5-1 Measurement description

5-1-1 Menu description

5-2 Usage

Ch.5

5-1 MeasureDescription

Refers to the measurement of optical density at 600 nm. It is generally used as a test method to describe the value of bacteria or other cells. FastGene® NanoView provides OD600 mode that measures the OD value at 600 nm using a 10 mm Cuvette. The height of the optical path is 8.5 mm from the bottom, and Cuvette selection and sample size selection require confirmation.

5-1-1 Menu description

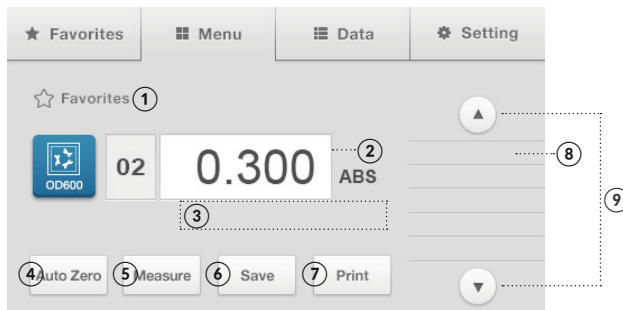


Fig. 5.1

Name	Description	Additional Description
①	Favorites	* See 1-2-2 Adding/Removing favorites
②	Measurement concentration value	
③	Message location	
④	Auto Zero	
⑤	Measure	
⑥	Save	
⑧	Print	Thermal printers are supported.
⑨	Measured value table	Up to 99 data can be measured
⑩	Scroll table movement	

5-2 Usage

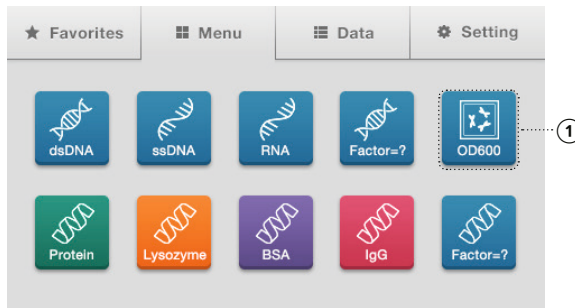


Fig. 5.2

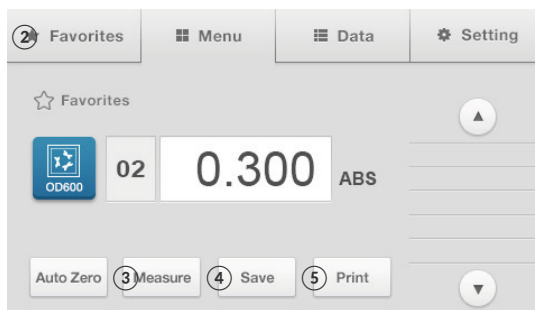


Fig. 5.3

1. [Figure 5.2] Press the ① [OD600] icon after selecting an additional menu on the screen.
2. Insert a blank sample into a 10 mm Standard Cuvette. Insert the Cuvette into the square cell holder. When inserting the Cuvette, check whether the Cuvette area where light passes is not contaminated. If contaminated, wipe clean using a laboratory tissue.
3. Close the cell cover and press ③ [Auto Zero] to measure. Remove the Cuvette when the measurement is complete.
4. Put the sample into a 10 mm Standard Cuvette and insert the Cuvette into the square cell holder. ④ Press the [Measure] button to measure. Remove the Cuvette when the measurement is completed.
5. [Fig. 5.3] To continue measurement, repeat the operation. To finish measurement and save the data, press the [Save] button.
6. [Figure 5.3] To conduct new measurement, press the ② [Favorites] icon in the upper-side menu to open the main menu.

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Ch. 6

Other

6-1 Data (View/Delete data)

6-2 Settings

6-3 Product management

6-1 Data (View/Delete data)

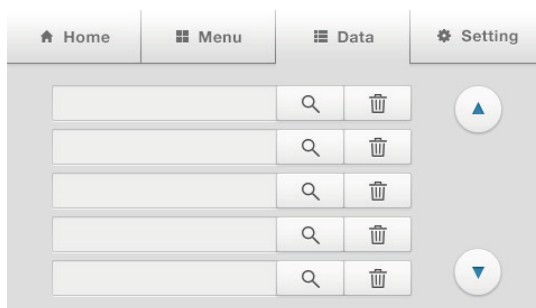


Fig. 6.1

Press the [Data] button to check or delete the saved data.

Select a file and click the [🔍] button to check the data or press the [🗑️] button to delete.

6-2 Settings

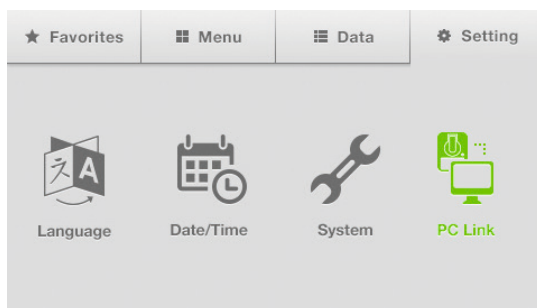


Fig. 6.2

Press the [Setting] button to check the settings menu. (Language selection/Time selection/System/PC connection)

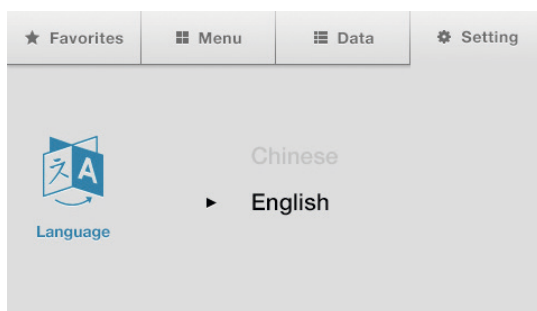


Fig. 6.3

Select the language of the product.

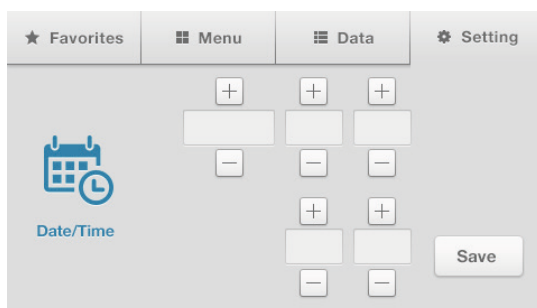


Fig. 6.4

Set the date and time of the product using the +/- buttons.

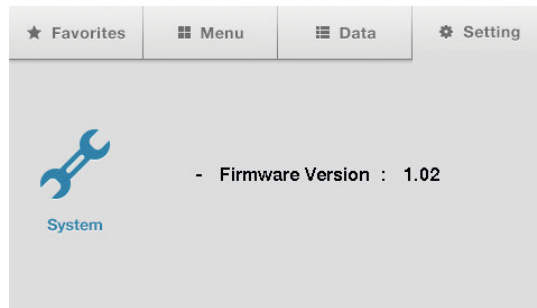


Fig. 6.5

The system information of the equipment can be checked.

* [Device Check] is a function that can check for product malfunction by checking the basic condition of the equipment. If you find something wrong during data measurement and want to apply for inspection or repair, please include the device check results displayed on the system page and information on the equipment firmware version to receive a quick response.

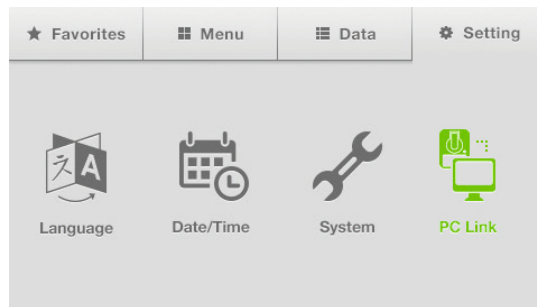


Fig. 6.6

The data saved in the device can be transferred to the PC.

1. Connect the PC and FastGene[®] NanoView using the USB cable for PC connection.
2. Activate connection between the PC and FastGene[®] NanoView by pressing the [PC Link] button.

6-3 Product management

Keep the sampling pedestal and cover quartz window clean by cleaning the product using distilled water each time a sample is measured.

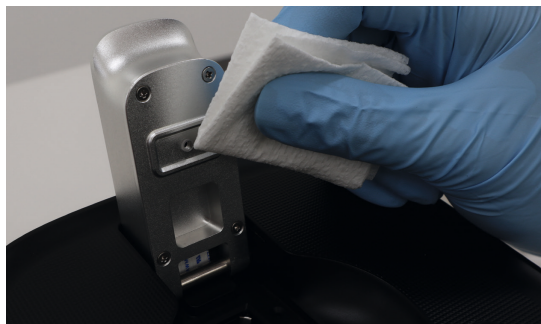


Fig. 6.7



Fig. 6.8

If all measurements have been completed or a sample of high concentration has been measured, drop 2 μ l distilled water on the sampling pedestal and cover quartz window. Let it sit for 2 - 3 minutes, then wipe it off with a laboratory tissue, to prevent measurement errors such as carryover and sample mixing among testers.

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