Operation Manual

V1.0

AE-NANO400A
Nucleic Acid Analyzer

A & E Lab (UK) Co.,Ltd

Foreword

Thank you for purchasing our product: Nucleic Acid Analyzer. This manual provided as operational and easy troubleshooting guide. Please read this instruction carefully before operation and save for future reference.

Opening Check

Please check the instrument and Appendix with the packing list when you first open the package. If there is anything don't match, please contact with the vendor.

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Safety Warnings and Guidelines

1. Warning

To assure the safe operation, please read carefully this manual before operating.

2. Safety Tips

The operation, maintenance and repair of the instrument should comply with the basic guidelines and the remarked warning below. If you don't comply with them, it will have effect on the scheduled using life of the instrument and the protection provided.

This product is indoor instrument.

Users are not allowed to open or repair the instruments, which will lead injury and loss of warranty, please contact manufacturer for maintenance.

Power off when you finish your work. Pull off the connector plug when there's long time no use of the instrument and cover it with a cloth or plastic paper to prevent from dust.

Pull the connector plug from the jack at once in the following case, and contact the vendor:

- There is some liquid flowing into the instrument;
- Drenched or fire burned;

- Abnormal operation: such as abnormal sound or smell;
- Instrument dropping or outer shell damaged;
- The function has obviously changed.

3. The maintenance of instrument

The pedestal should be cleaned by the cloth stained with pure water.

If there are smutches on the instrument, clean them with cloth stained with alcohol.

CONTENTS

Chapter 1 Introduction

AE-NANO400A Nucleic Acid Analyzer is a spectrophotometer that measures 0.5μL-2μL samples with high accuracy and reproducibility. Sample pedestals apply surface tension to make the sample column, so that hold samples in the pedestal. During measurement, the light goes through the sample column. In addition, Nano-400A Nucleic Acid Analyzer has the capability to measure highly concentrated samples without dilution (100Xhigher concentration than the samples measured by a standard cuvette).

Chapter 2 Specifications

1. The normal operating condition

Ambient temperature: 5℃~35℃

The relative humidity: ≤70%

Power Supply: DC24V 2A

2. The basic parameters and performance

Model		AE-NANO400A
Minimum Sample Size		1-2μL
Path Length		0.5mm
Light Source / Life		UV LED/8000h
Wavelength Range		260nm, 280nm, 365nm(Baseline)
Spectral Bandwidth		8nm
Detector Type		UV Silicon Photocell
Absorbance Precision		0.005Abs
Concentration Accuracy		±5ng [10,500) ±2% [500,2000) ±3% [2000,2500]
Absorbance Range		0.2-50 (10mm equivalent)
Detection Concentration Range		10ng/μL dsDNA～2,500ng/μL dsDNA
Detection Time		6 seconds
OD600	Abs range	0~4.000 Abs
OD600	Abs stability	[0,3）≤0.5%, [3,4）≤2%
OD600	Abs repeatability	[0,3）≤0.5%, [3,4）≤2%
OD600	Abs Precision	[0,2）≤±0.005A,[2,3）≤±1%,[3,4）≤±2%

Voltage input	DC24V 2A
Power	25W
Dimension	208×280×186 mm（W×D×H）
Weight	3.6 kg

Chapter 3 Preparations

1. Structure description

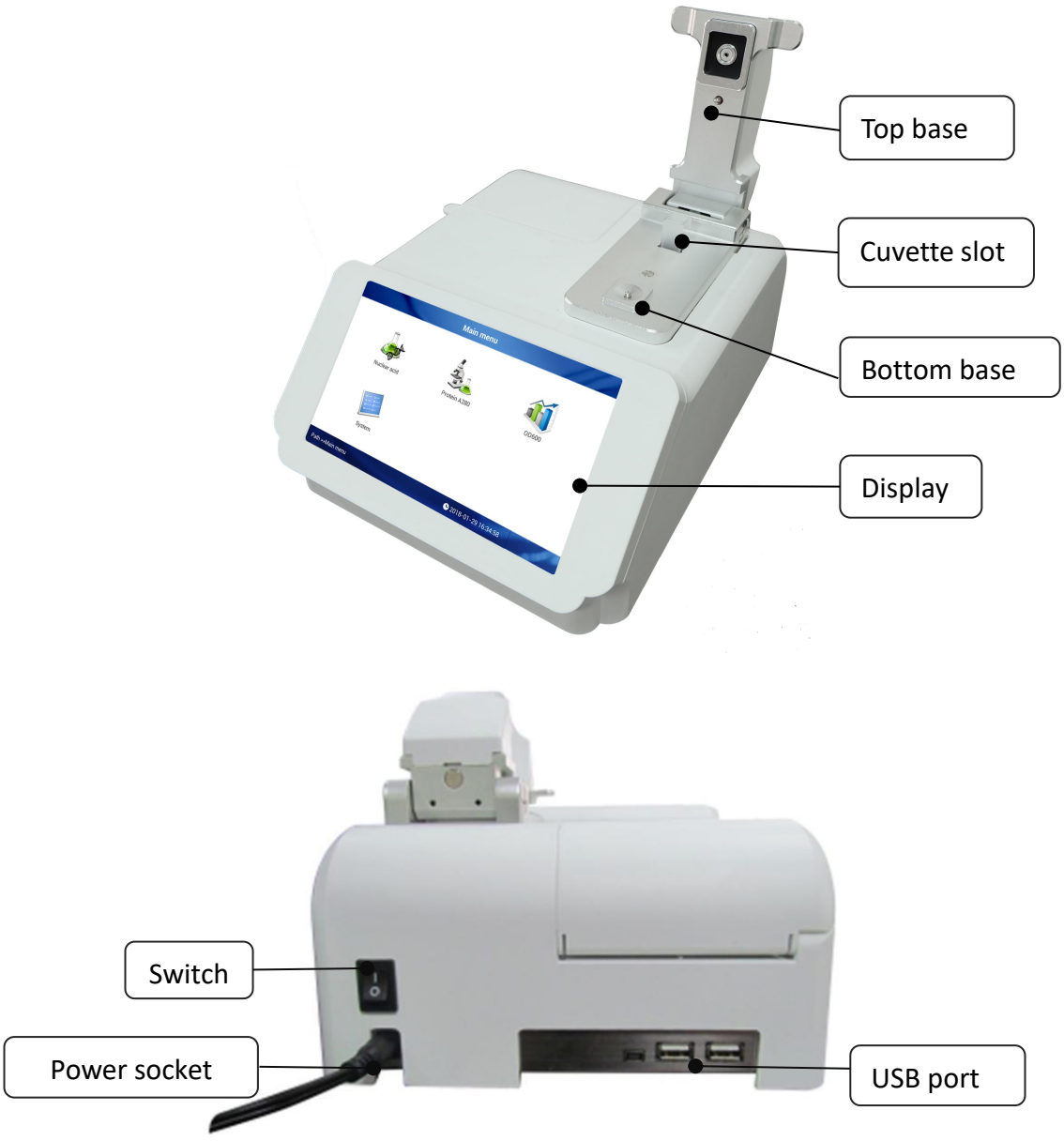


Fig 3.1 Instrument structure

Notes: Make sure the power supply with ground wire.

2. Sample size requirements

Although sample size is not critical, it is essential that the complete liquid column can be formed between the upper measurement pedestal and lower measurement pedestal to make sure the precision of the measurement.

It is best to use a precision pipettor (0-2μL) with precision tips to assure the precision of the sampling. If users are unsure about sample characteristics or pipettor accuracy, a 2μL sample is recommended.

3. Basic use for the pedestal

1. With the upper pedestal open, pipette the sample (2μL onto the lower pedestal.

Fig 3.2 Dropping liquid

2. Lower the sampling arm, the sample column is automatically drawn between the upper and lower measurement pedestals. Then the measurement initiates.

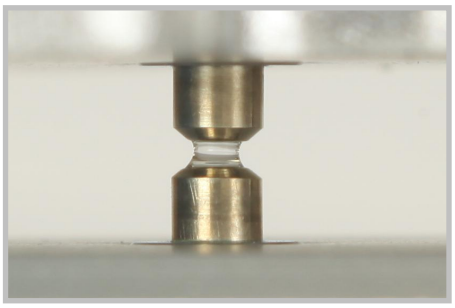


Fig 3.3 Liquid column (reference only)

3. When the measurement is complete, open the upper pedestal and wipe the sample from both the upper and lower pedestals using a soft laboratory wipe. Simple wiping prevents sample carryover in the pedestals.

Fig 3.4 Wipe the sample

Notes: After each measurement, clean the pedestals for 3 times with clean pure water. Upper picture is only for reference which is not the actual photo.

4. OD600 measurement

AE-NANO400A is with measurement of OD600. Lift the upper pedestal, enter into OD600 interface from the touch screen. Make “blank” according to experiments, blank for air, cuvette, or buffer in cuvette. Then add 2~3mL sample into the cuvette, put the cuvette into the slot and start to measure. (As

picture below)

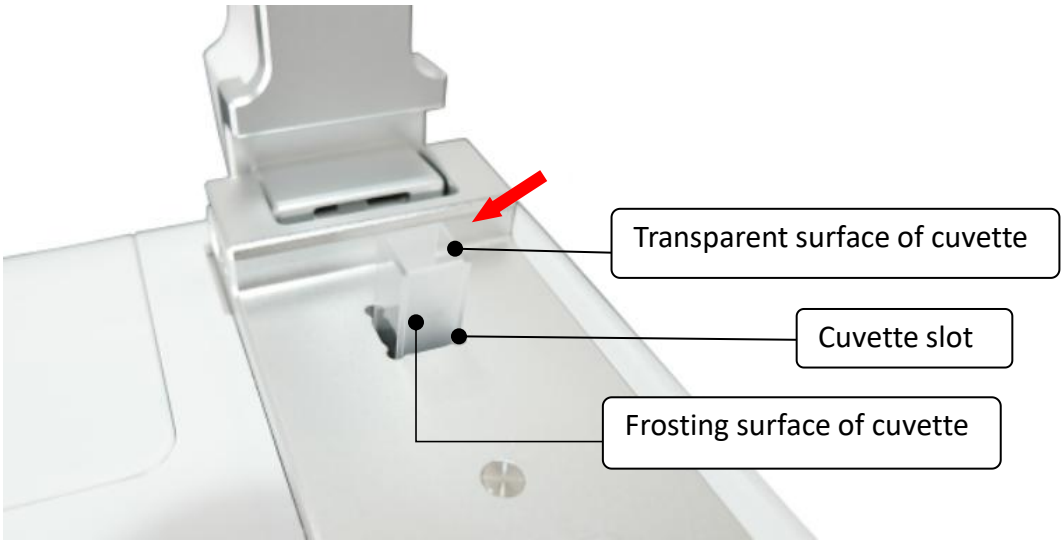


Fig 3.5 Cuvette slot and light path

Notes: The light path direction is showed as the arrow as above picture, please pay attention to the cuvette position when loading.

Chapter 4 Operation

1. Instrument self-testing

Instrument will start self-test once powered on.

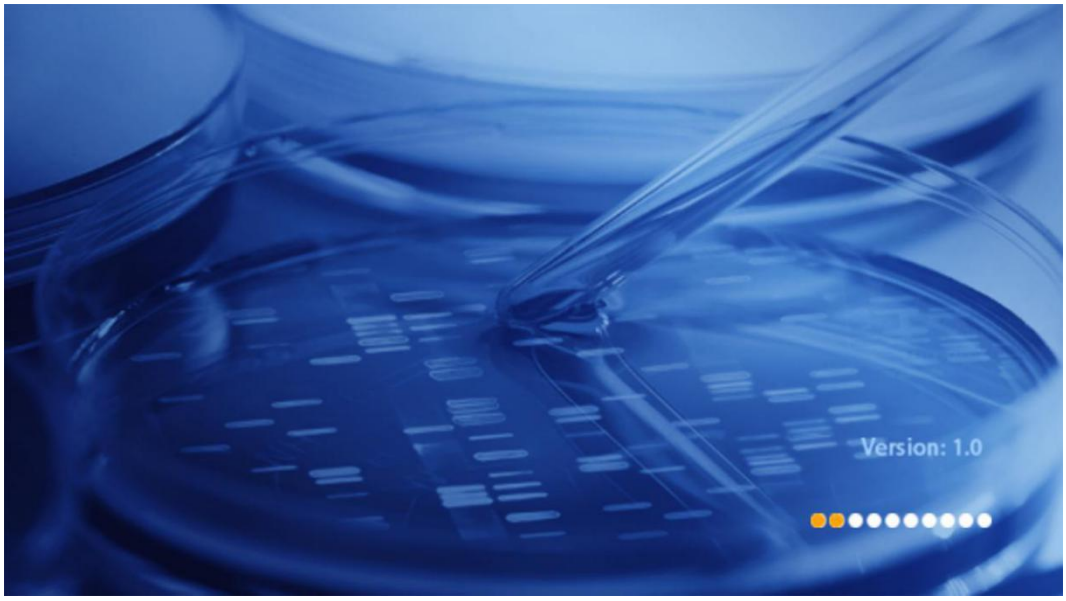


Fig 4.1 POST

2. Main interface

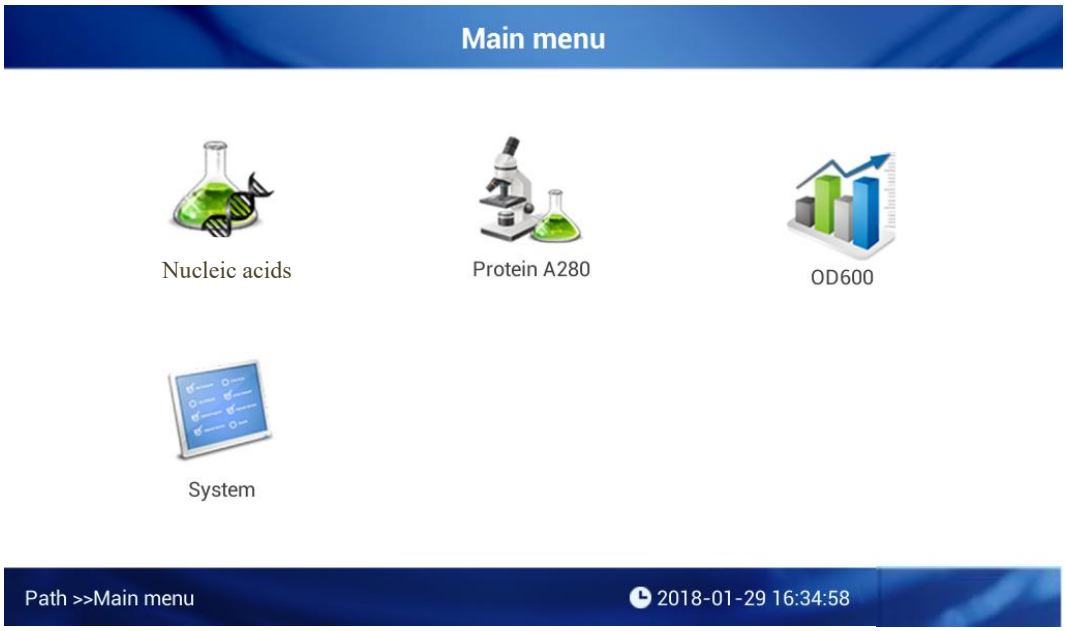


Fig 4.2 Main interface

3. Nucleic acids measurement

3.1 Introduction

Users can measure the concentration of nucleic acid by using the instrument. If want to measure nucleic acids, select Nucleic Acid mode in the "main menu"

The following "Beer－Lambert" equation is used to calculate the nucleic acids concentration:

$$c = (A * \varepsilon)/b$$

C＝DNA concentration, unit: ng/μL

A＝AU absorbance

ε＝extinction coefficient, unit: ng-cm/μL

b＝Path Length, unit: cm

Normally DNA extinction coefficient:

dsDNA: 50ng-cm/μL

ssDNA: 33ng-cm/μL

RNA: 40ng-cm/μL

When selects pedestal mode, the Micro-spectrophotometer can measure high concentration nucleic acid sample without dilution with the 0.5mm path length. The absorbance value of nucleic acid measurement is consistency of the reading value under 1cm path length.

AE-NANO400A can accurately measure double-stranded Nucleic Acid

samples up to 2500ng/μL without dilution, it can choose path length automatically.

Nucleic Acids measurement

Click “Nucleic Acids” to enter into the interface as below :

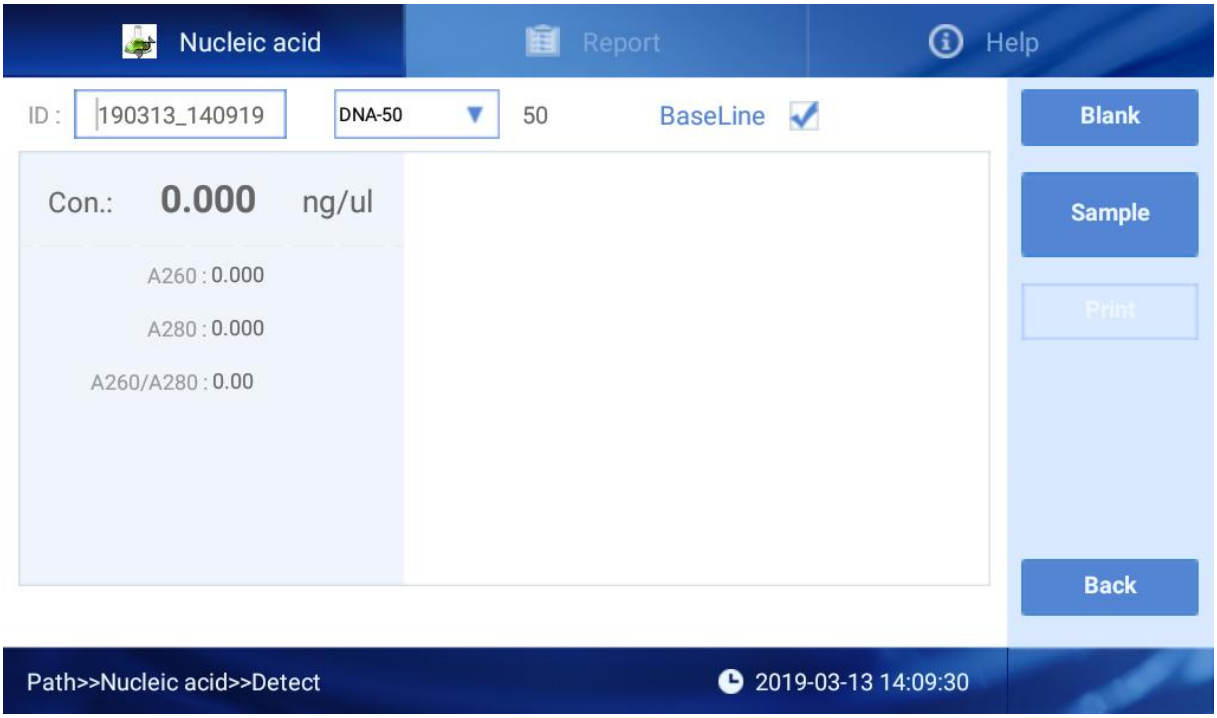


Fig 4.3 Initial interface of Nucleic Acids detection

Fig 4.3, there are three options of Nucleic Acids, Report, Help for different functions.

Interface Fig 4.3, only the light blue area is clickable.

① 

: The sample batch No., default value is the current time, users can also edit ID by self. One ID can include as many as 1000 detection results.

② 

: Click to choose Nucleic Acids type, DNA-50 for dsDNA,

RNA-40 for RNA, ssDNA-33 for ssDNA, when you choose “others” and type in the Nucleic Acids factor the instrument will calculate as you set.

③ 

: Blank the buffer, this step is essential before measurement. Blank absorbance value is during 0.004-0.03 Abs. The validity of blank control is 30 min and after 30 min, the system will automatically remind you to make blank detection.

Operation steps

① Set the batch NO. and Nucleic Acids type;

② Clean the upper and lower pedestals with dust proof paper, input the 2μL buffer solution to make blank;

③ Clean the buffer solution on the lower pedestals with dust proof paper;

④ Measure sample with volume of 2μL. Click “Sample” and then enter the interface as Fig 4.4;

Note: The sample must be the new adding before your measurement.

⑤ After measurement, pedestals must be cleaned before next measurement.

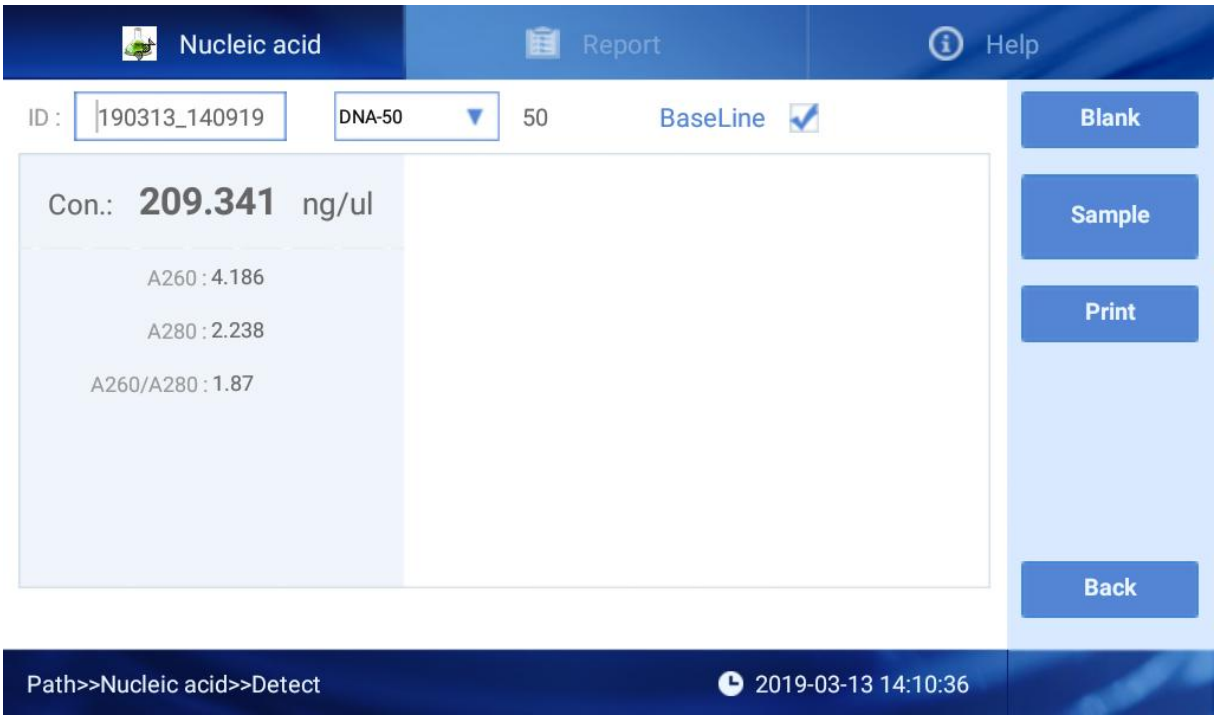


Fig 4.4 Result of Nucleic Acids measurement

1) The detection result data will display as Fig 4.5.

Fig 4.5 The detection result data

Concentration: Nucleic acid concentration.

A260: The absorbance of 10mm wavelength under 260nm.

A280: The absorbance of 10mm wavelength under 280nm.

A260/A280: The ratio of absorbance 260nm, 280nm can be used to judge the purity of DNA or RNA. Pure DNA ratio can reach around 1.8, pure RNA

ratio can reach about 2.0. If the ratio value is lower, it means the sample contains some protein, phenol or other contaminants.

A260/A230: The ratio of absorbance 260nm,230nm, usually is in the range of 1.8-2.2, If the ratio value is lower, it means the sample contains some contaminants.

2) The function of buttons:

① 

: Click it to measure the sample.

② 

: Click it to print the data as Fig 4.5 with the equipped printer.

③ 

: Click it back to the main interface.

3.2 Nucleic acids detection report

Fig 4.6 Report interface

Click “Report” to check results, choose one ID No. You can read all the results of this ID.

As Fig 4.7, select results by clicking the file name, or can select one or all of the results as showed on Fig 7, users also can operate by buttons on the right:

① 

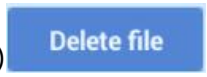
: Click it to print the data as Fig 4.5 with the equipped printer.

② 

: Export the result to U disk (Insert the U disk into the USB port at back of instrument).

③ 

: Delete the selected results.

④ 

: Delete all the files by click “File Name” and click “Delete file”.

3.3 Nucleic acids Help Center

We are sorry to inform you the “Help” has not been finished yet.

4. Protein A280

4.1 Introduction

Proteins, unlike nucleic acids, can exhibit considerable diversity. Protein A280 method is applicable to purified proteins (includes Trp, Tyr residues or Cys-Cys disulfide) exhibiting absorbance at 280nm. It does not require generation of a standard curve. The software calculates the protein concentration directly after measure the absorbance value.

The Protein A280 displays UV spectrum, measures the protein’s absorbance at 280nm and calculate the concentration (mg/mL). Like the

Nucleic Acids mode, it displays and records 10mm equivalent data.

The Spectrophotometer will accurately measure protein samples up to 90mg/mL BSA) without dilution. When the optical intensity (after measurement sample extinction) is lower than 200(under 10mm path length), software will inform the customer to choose shorter path length to make sure the precision of the measurement. Unique screen is shown as below.

The hydrophobic between the water molecules is the main factor of surface tension. In general, the presence solute of liquids (（including protein, DNA, RNA, salt ion, detergent molecule) can significantly reduce surface tension. Although, for most samples, 1μL sample size is enough, 2μL sample size is recommended for protein measurements that the liquid column be formed.

4.2 Protein A280 measurement

Click “Protein A280” enter the interface Fig 4.7.

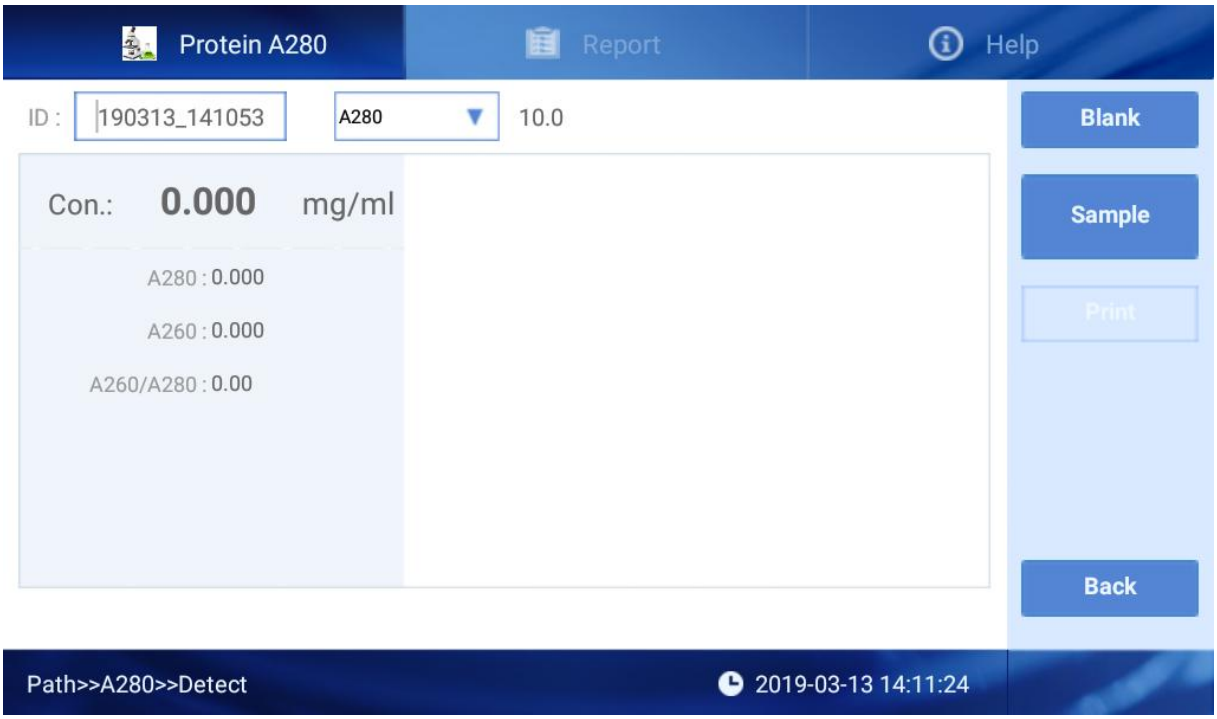


Fig 4.7 Protein detection interface

As Fig 4.7, there are three options at the top of the screen, Protein A280, Report, Help.

1) Interface Fig 4.7, only the light blue area is clickable.

① 

: The sample batch No., default value is the current time, users can also edit ID by themselves. One ID can include as many as 1000 detection results.

② 

: Click to choose Protein type。

③ 

: Blank the buffer, this step is essential before measurement. Blank absorbance value is during 0.004-0.04 Abs. The validity of blank control is 30 min and after 30 min, the system will automatically remind you to make blank detection.

2) Operation steps

① Set the batch NO. and Nucleic Acids type;

② Clean the upper and lower pedestals with dust proof paper, input the 2μL buffer solution to make blank;

③ Clean the buffer solution on the ower pedestals with dust proof paper;

④ Measure sample with volume of 2μL. Click “Sample” and then enter the interface as Fig 4.8;

Note: The sample must be the new adding before your measurement.

⑤ After measurement, pedestals must be cleaned before next measurement.

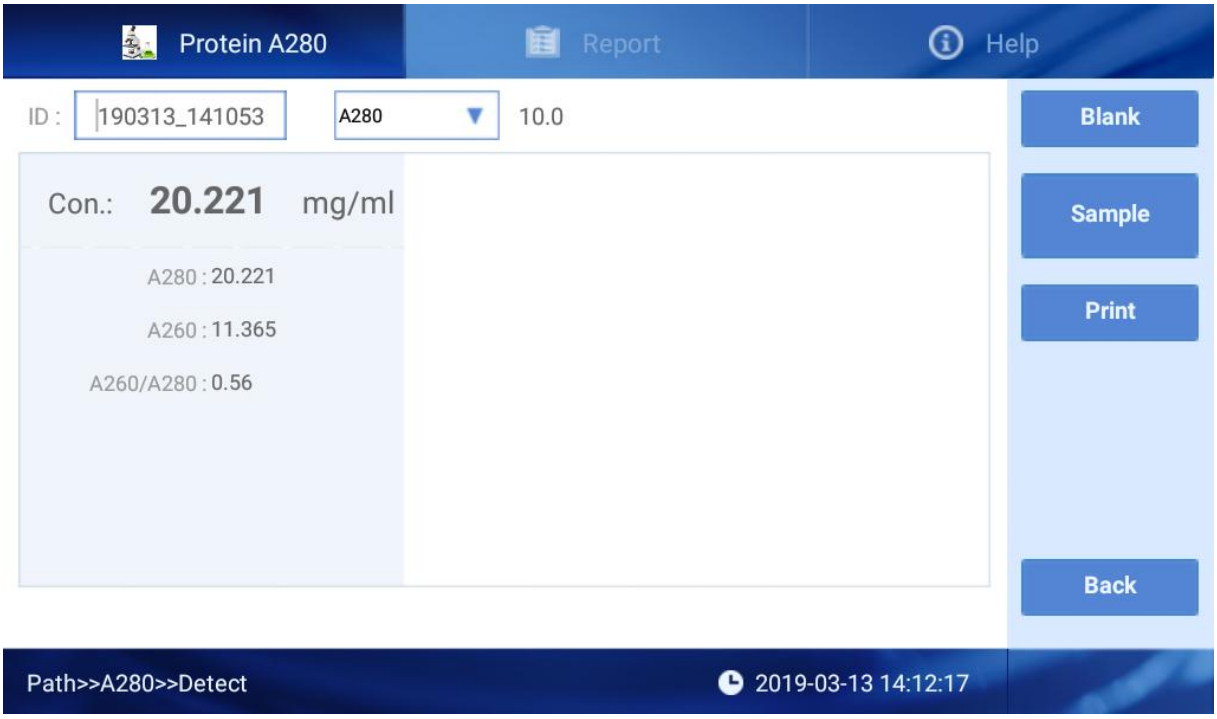


Fig 4.8 Result of Protein measurement

3) The detection result data can be displayed as Fig 4.9.

Fig 4.9 Protein measurement data

Notes: The mass extinction coefficient can be any value if user choose other types, instrument will calculate the concentration according to the mass extinction coefficient.

Concentration: Protein concentration;

A260: The absorbance of 10mm wavelength under 260nm；

A280: The absorbance of 10mm wavelength under 280nm；

A260/A280: Ratio absorbance of 260nm and 280nm.

4.3 Protein A280 detection report

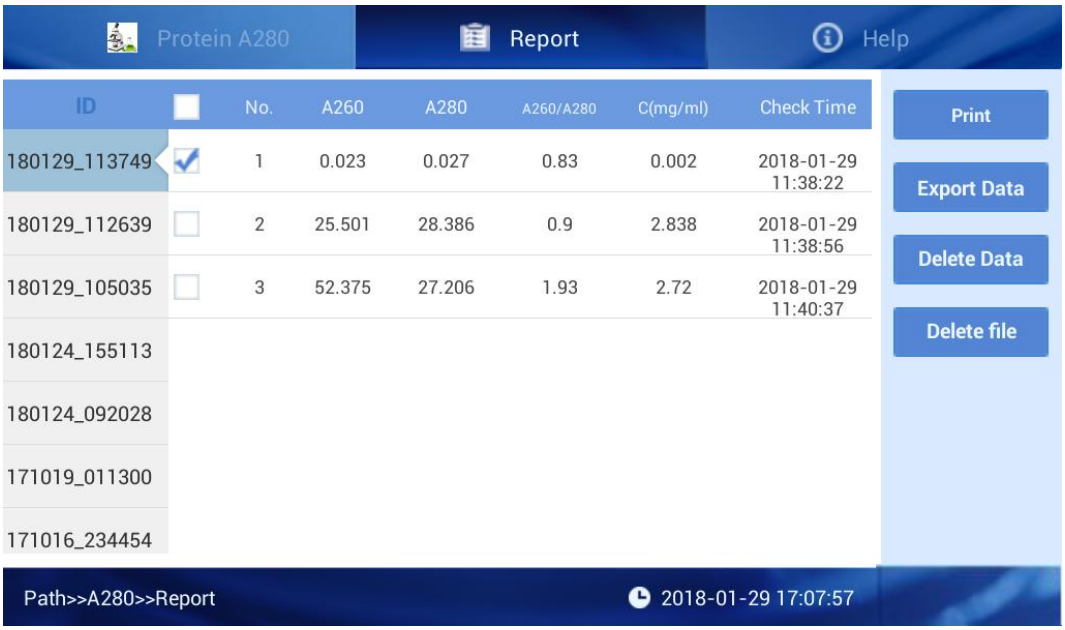


Fig 4.10 Protein detection report interface

Notes: The interface is the same as Nucleic Acids detection report, please refer to 3.3. Nucleic Acids detection report.

4.4 Help

We are sorry to inform you the “Help” has not been finished yet.

5. OD600

5.1 Introduction

OD600 mean a solution absorbance value at under wavelength of 600nm .

An important application is to measure bacterial density, which tests the culture solution concentration by the bacterial ABS.

5.2 OD600 measurement

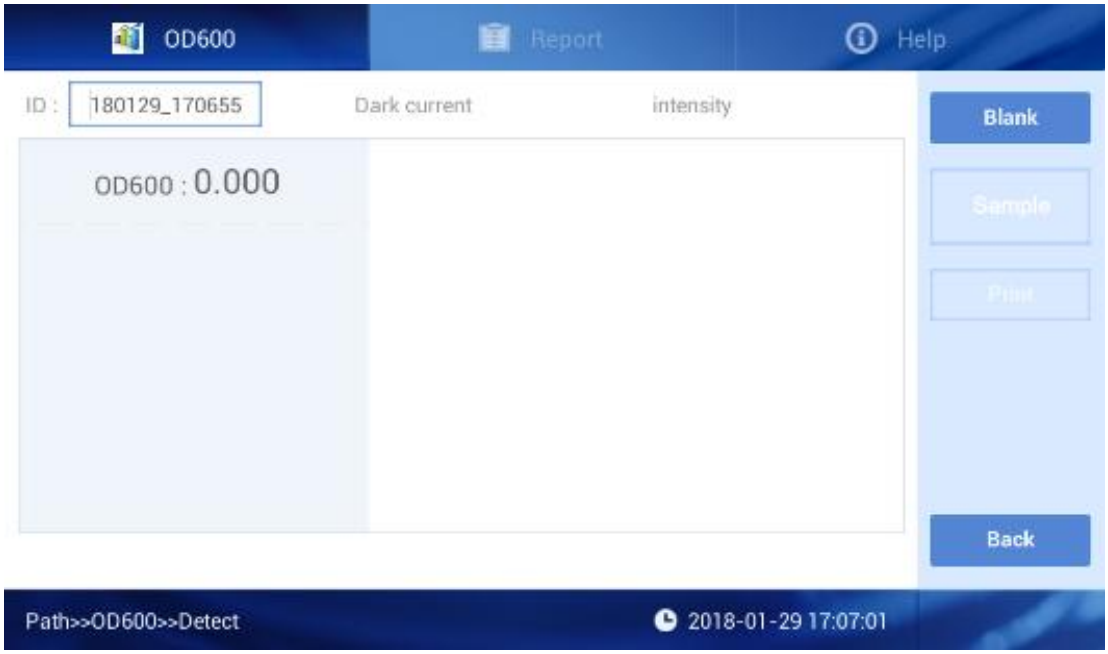


Fig 4.11 OD600 detection interface

Operation steps

① Set the batch NO.

② Blank before each measurement. Users can make blank without anything, blank with empty cuvette, or buffer in cuvette.

③ Add 2mL~3mL sample(the same as blank volume) into the cuvette after blank.

④ Click “Sample”, the OD600 value will show at the left.

5.3 OD600 Report

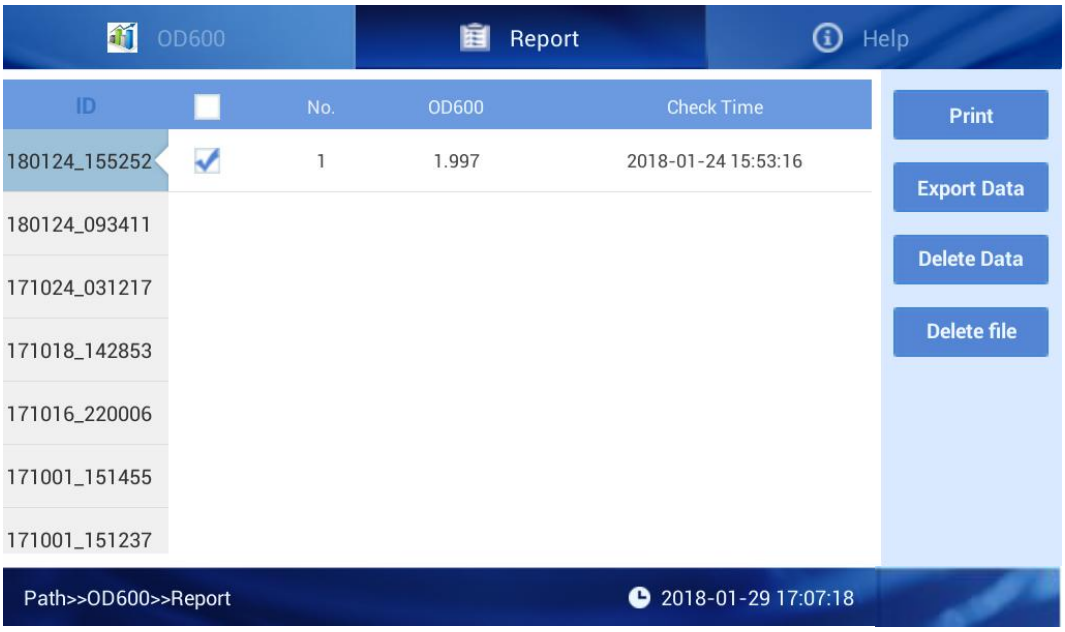


Fig 4.12 OD600 detection report interface

5.4 OD600 Help

We are sorry to inform you the “Help” has not been finished yet.

6. System

Click “System” on the main interface, as Fig 4.13:

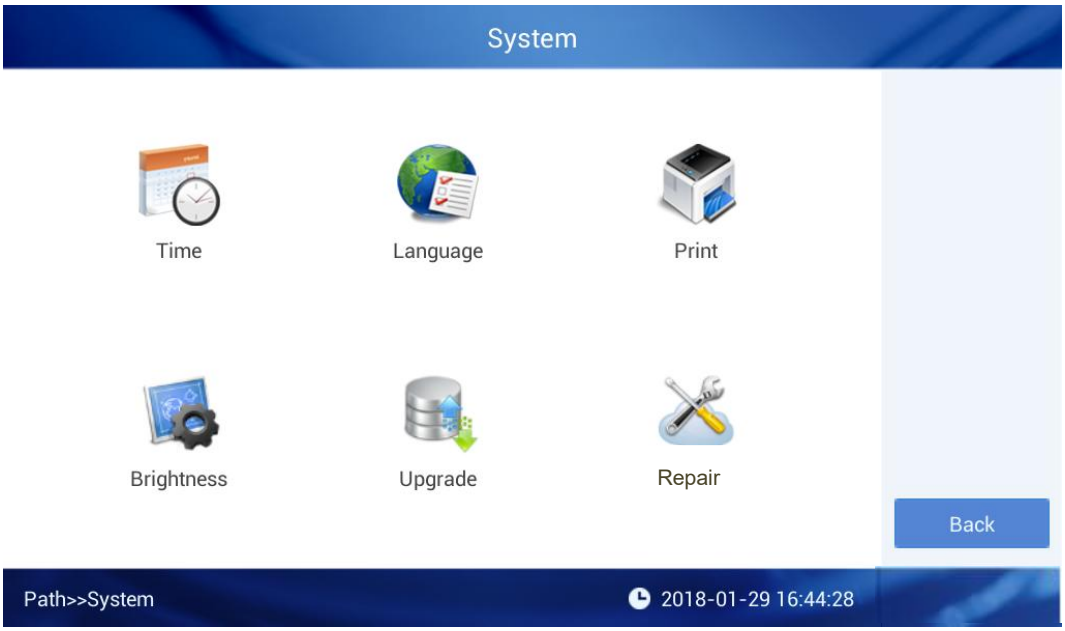


Fig 4.13 System setting

6.1 Time setting

Click “Time” to start setting, as Fig 4.14.

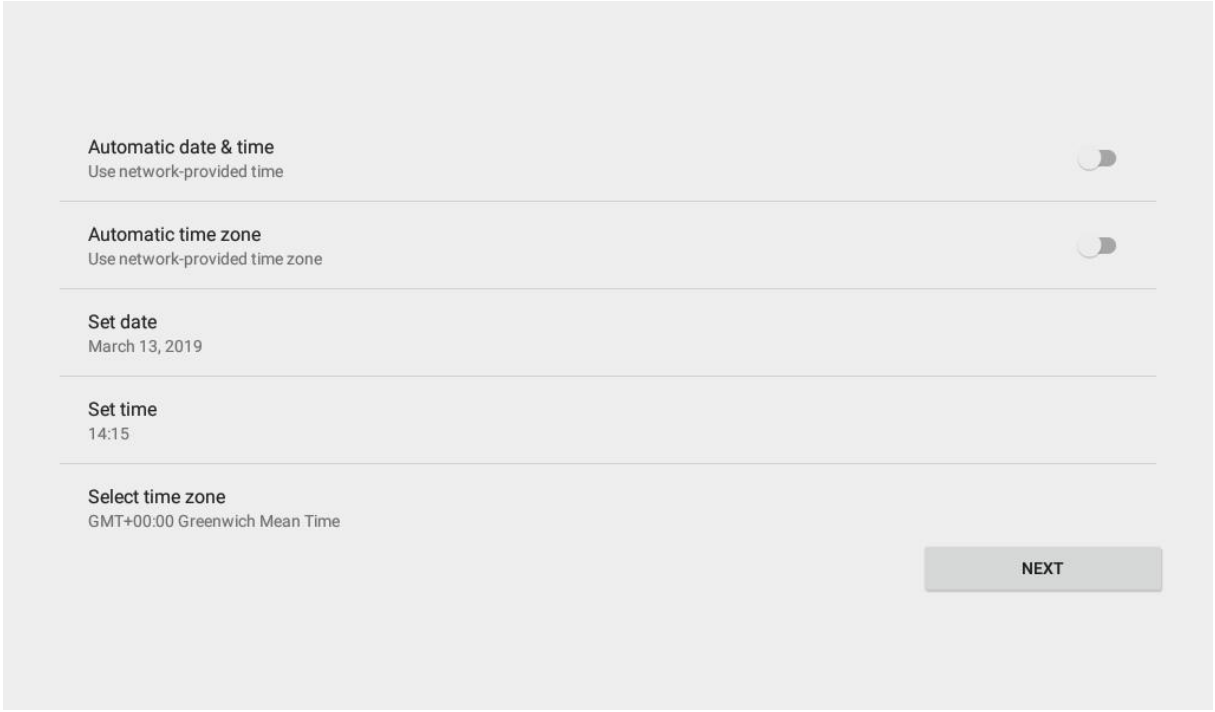


Fig 4.14 Time setting interface

① Click “Set date” to enter the interface as Fig 4.15, click the time button to unlock the date setting area, sliding setting the date.

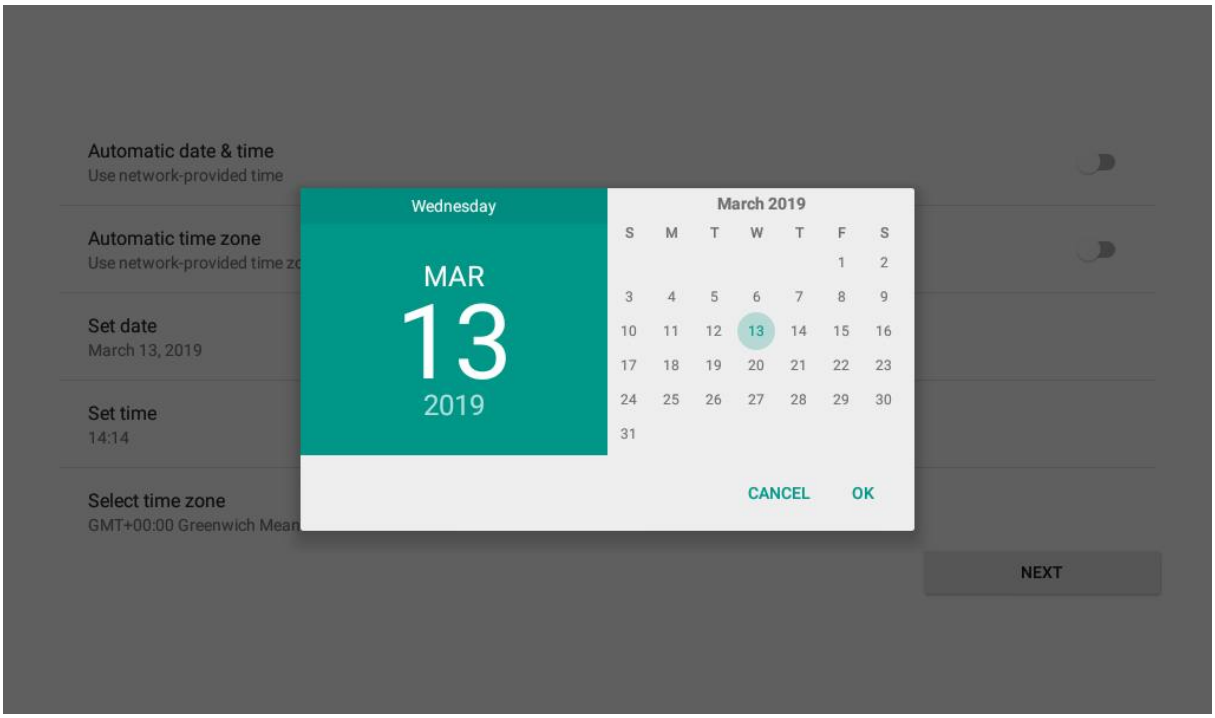


Fig 4.15 Date setting

② Click “Set time” to enter the interface as Fig 4.16, sliding to set the time.

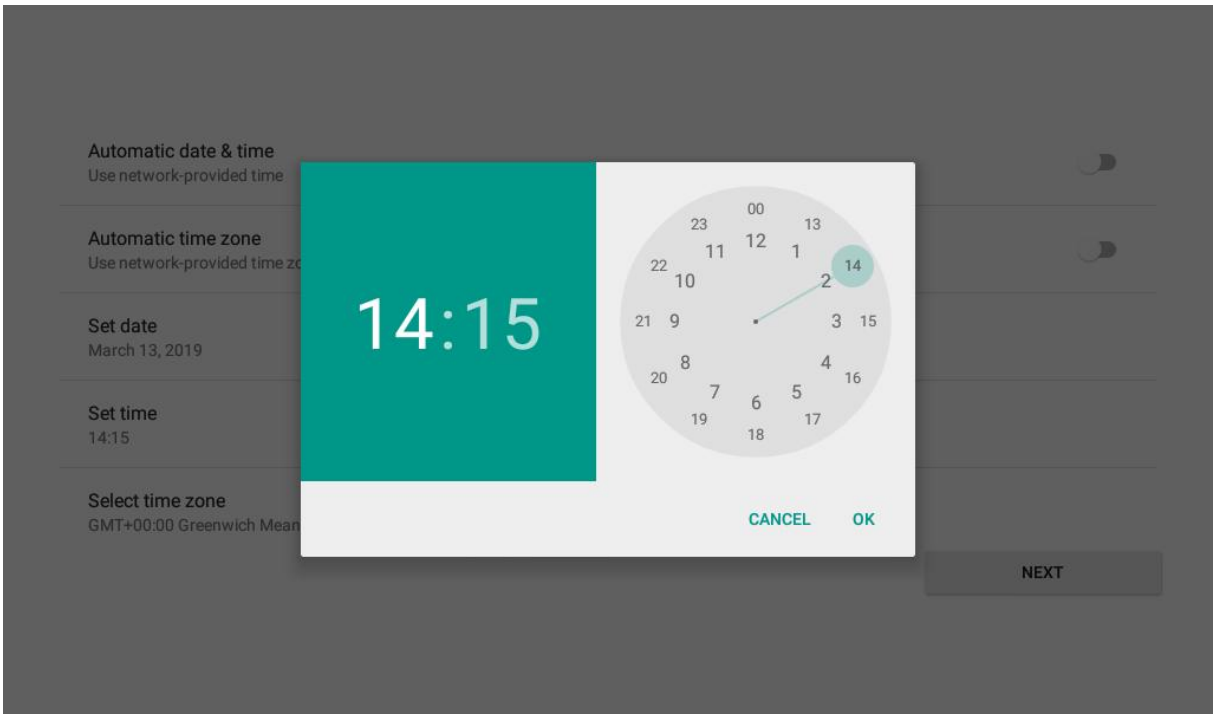


Fig 4.16 Time setting

6.2 Language setting

Click the “Language” icon, set language at the dialog window. As Fig 4.17.

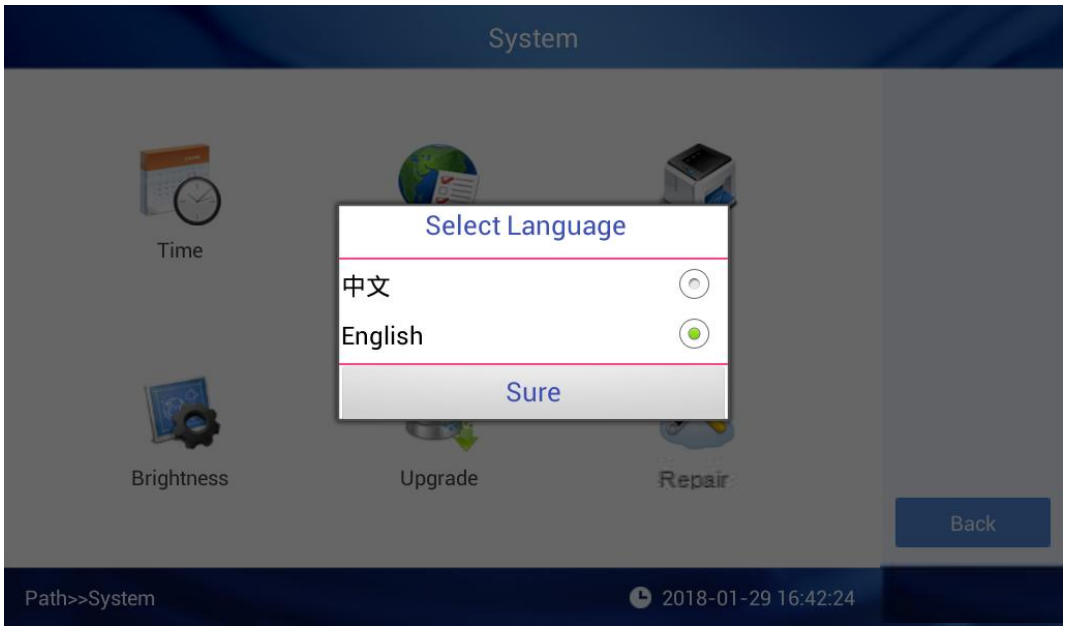


Fig 4.17 Language setting

6.3 Print

Click “Print” icon, set the print mode on the dialog window. As Fig 4.18.

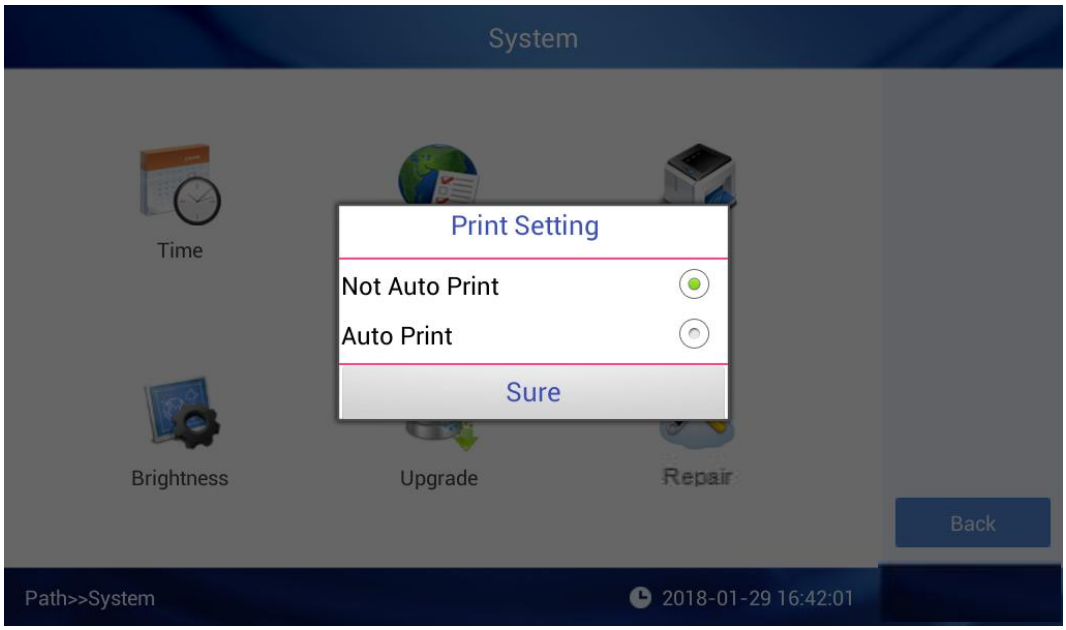


Fig 4.18 Print setting

6.4 Brightness

Click “Brightness” icon, slide to set the brightness to a suitable one. As Fig 4.19.

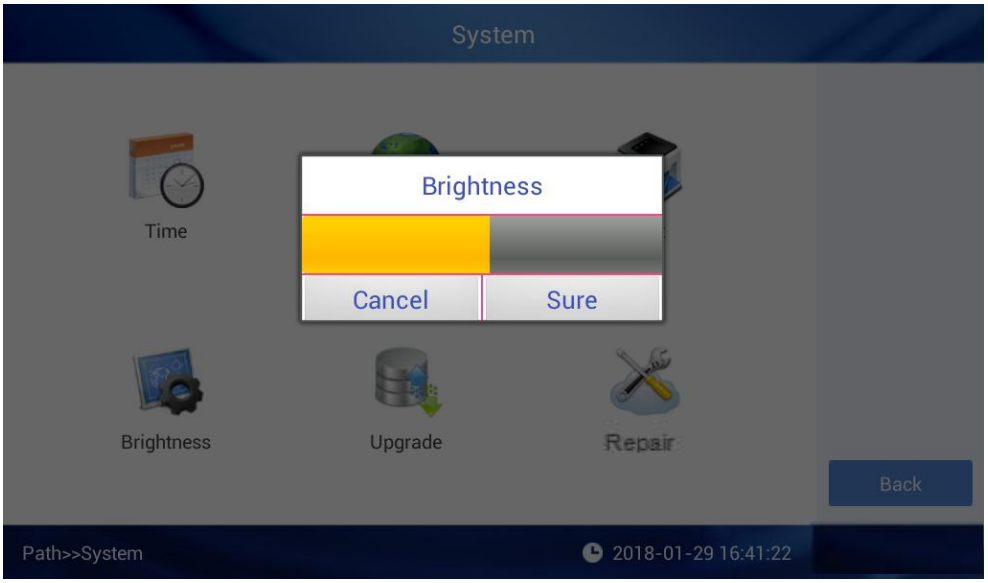


Fig 4.19 Brightness setting

6.5 Upgrade

Put the upgrading software on the root directory of mobile hard disk drive and insert it into the instrument, then click “upgrade” icon to install the software. As Fig.4.20, select the one need upgraded, then install it.

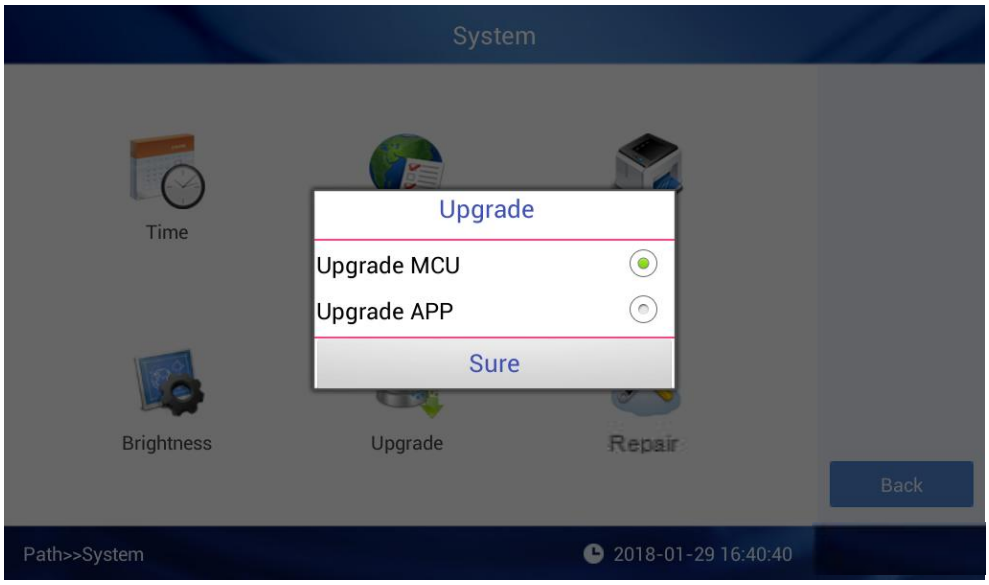


Fig 4.20 Upgrade

6.6 Repair

This part is for production and maintenance , which is not allowed to enter into.

Chapter 5 Trouble and shootings

No.	Fault phenomenon	Cause analysis	Shootings
1	Instrument can not turn on.	No power supply, Switch defective, Power adapter defective.	Check the power supply, Replace the switch, Contact the vendor.
2	Measurement result not precise	Liquid column unformed, Pedestal contaminated, others.	Add sample again, make sure the liquid column formed well, Clean the pedestals, Contact supplier or manufacturer.
3	OD600 module failure	Poor connection between cable and board.	Contact supplier or manufacturer.
4	Insufficient light intensity error	Inspection Moduledefective, optical fiber broken.	Contact supplier or manufacturer.
5	Touch screen hops	Power supply without grounding.	Provide effective grounding power supply.
6			
7			
8			