

Instruction manual

VWR® Microplate Absorbance Reader

Global Cat. no VWR1210-000167 and VWR1210-000169 (with incubation feature)



CE

UK
CA

For Research Use Only

Legal Address of Manufacturer

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Warning



Any improper operation may cause injury. Please read this manual carefully and operate safely according to the guidelines.



The instrument is a normal indoor instrument which conforms to class 1 of GB 4793.1 standard.



This instrument is designed for use in a laboratory environment. The device must be operated by skilled laboratory personnel with appropriate training.



To prevent injury or voiding the warranty, the operator should not attempt to repair the instrument without explicit guidance from VWR. If service is required, please contact VWR service.

Safety Information

Avoiding Electrical Shock

Please follow the guidelines below and read this manual in its entirety to ensure safe operation of the unit.



Before powering on, confirm that the voltage used meets the electrical requirements of the instrument as stated on the rating plate. If the electric cord is damaged, replace it with the same type of cord. Hold the socket firmly before pulling the plug from an outlet. Do not pull the electric cord.



The instrument should be installed in an environment of standard room temperature, low dust, low humidity, and away from direct sunlight, electromagnetic interference, and heat sources. Do not block the vents on the instrument.



Always power off the instrument when you are finished using it. Unplug the power cord and cover the instrument with a cloth or plastic sheet to prevent excessive dust from entering the housing.



Pull the connector plug from the electrical outlet immediately and contact the vendor in the event of:

- Liquid entering the housing.
- Abnormal operation: such as any abnormal sound or smell.
- The instrument is dropped or there is any damage to the housing.
- Any malfunction.

Package Contents

Description	Quantity
VWR Microplate Absorbance Reader, with incubation, 100-240V	1
Power Cord (EU and UK)	1
Logitech Mouse	1
Operation Manual	1
Performance Test Report	1
USB Drive	1

Installation

Required Installation Environment

Environmental Temperature: 5°C ~ 45°C

Relative Humidity: ≤ 70%

Input Voltage: AC100-240V, 50-60Hz, 2A

Intended use

This instrument is intended for reading absorbances of specific wavelengths.

For research use only. Not intended for any animal or human therapeutic or diagnostic use.

Product Specifications

Model	VWRI210-000167 / VWRI210-000169
Light source	6V, 10W, Quartz-Halogen lamp
Light source est. life	300 hours
Wavelength	340~750nm
Optical filter	Four standard filters included: 405,450,492,630nm. Filter wheel holds up to 8 filters.
Detector Type	Silicon photodetector
Read-out range	0.000-4.000 Abs
Resolution	0.001Abs
Linearity	±1% (0~2.000A) , ±2% (2.000~4.000A)
Precision	CV≤0.2% (0-3Abs); CV≤1% (3-4Abs)
Accuracy (450nm)	±0.005Abs (0 ~2.0 Abs), ±1% (2.0~3.0 Abs), ±1.5% (3.0~4.0 Abs)
Channel deviation	<0.01Abs at 450nm
Measurement Speed	Single wavelength <15s/96well plate, double wavelength
Sample Temperature Ramp Time (model VWRI210-000169)	≤50 min from 25 °C to 37 °C (standard 96-well plate, 200 µL water/well)
Temperature Uniformity (model VWRI210-000169)	±0.5 °C @ 37 °C
Temperature Accuracy (model VWRI210-000169)	±0.5 °C @ 37 °C
Dimensions (WxDxH) / Weight	29.5 x 44.0 x 22.5 cm / 10kg

Description of Buttons and Switches

Front View

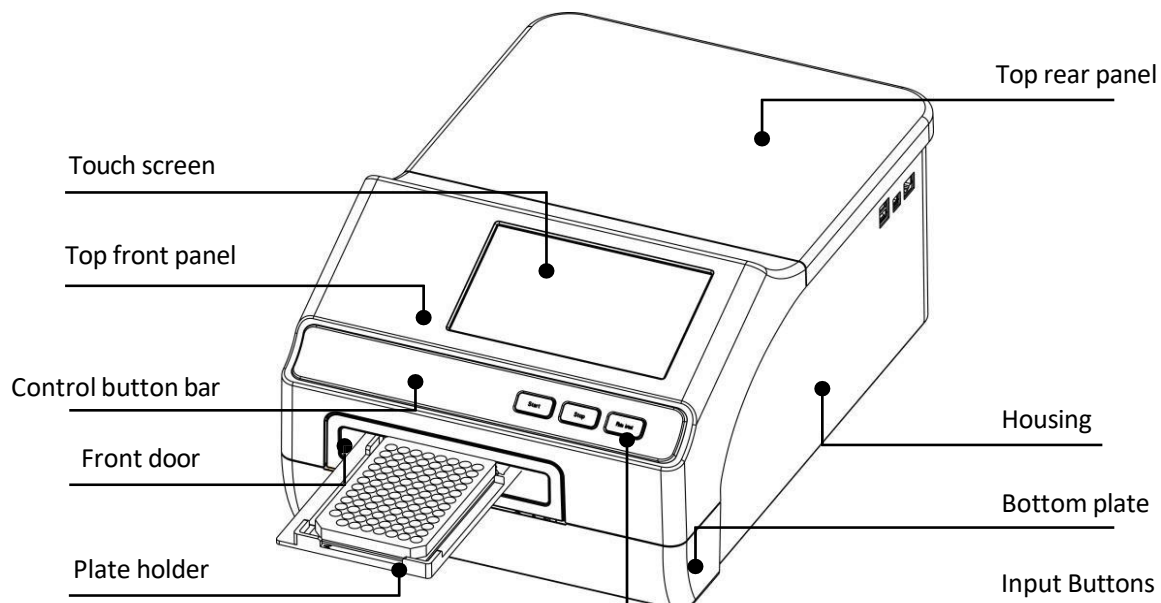


Fig. 1 Front View

Rear View

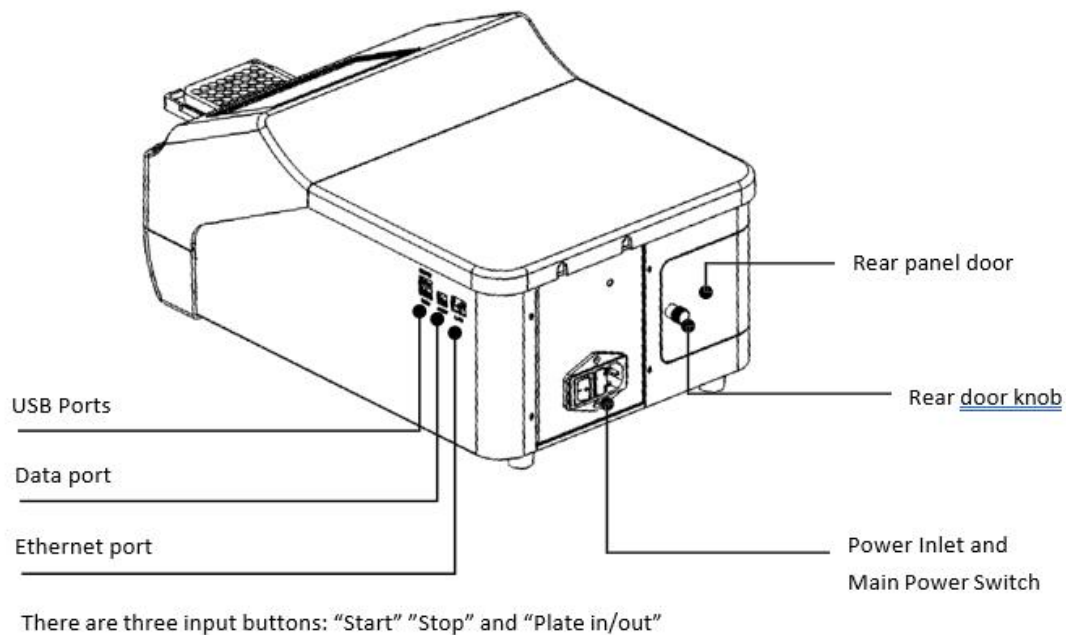


Fig. 2 Rear View

Operation

Start-up Interface

Upon powering on the instrument, it will perform a self-check, and the start-up screen will be displayed (Figure 3).



Fig. 3 Start-up Screen

Main Menu Interface

After the self-check, the software enters the main protocol interface (Figure 4).

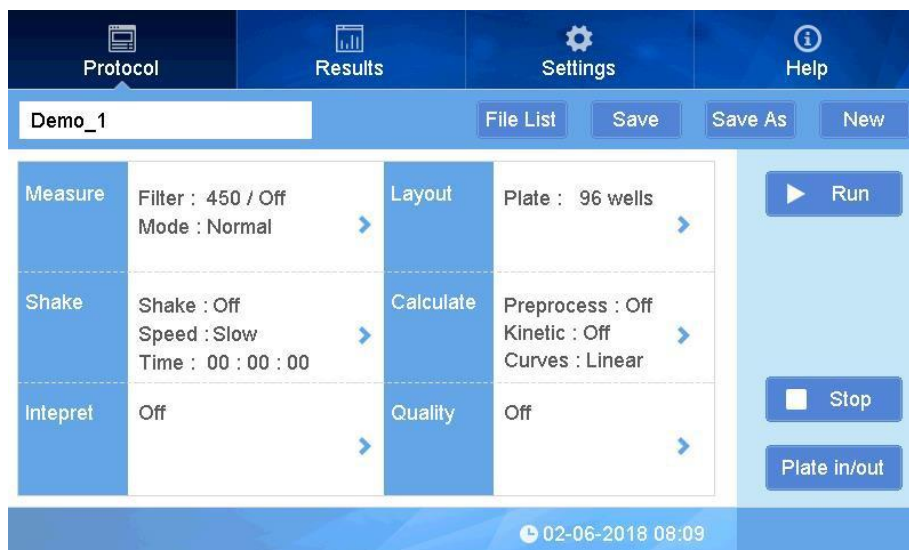


Fig. 4 Main Menu Interface

Keyboard function and operation:

On the Main Display, as shown in Fig 4, the current protocol is default Demo_1.

To create a new protocol, Click on New to create a new protocol (Figure 5). Input a new protocol name, click “Enter” (Figure 5).

To save a protocol to instrument’s memory, after naming and selecting protocol parameters, click “Save”.

Note: If a new protocol is used to read a plate, and data is saved, the main parameters will be grayed out and cannot be changed. If a new protocol is not used, the parameters can be changed.

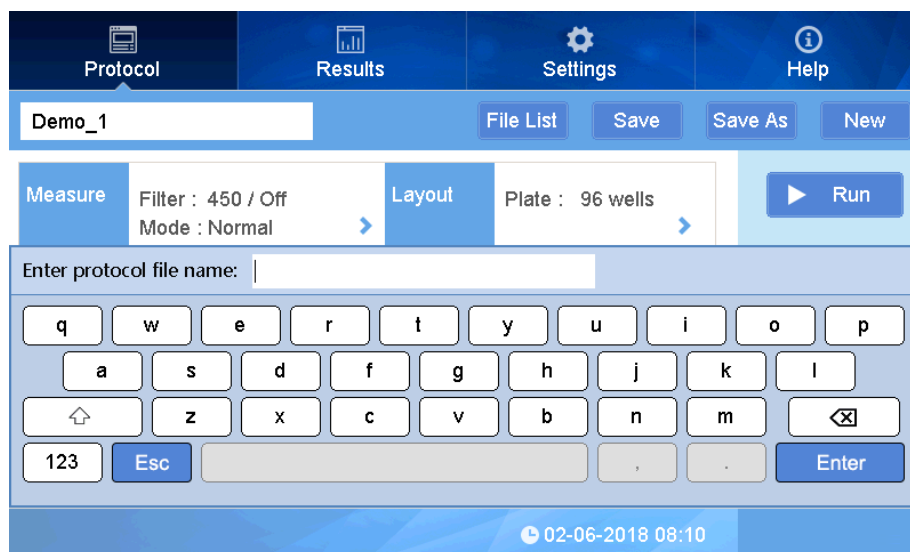


Fig. 5 Entering New Protocol Name

A modification to an existing protocol can be saved as a new protocol by choosing “Save as” and inputting a new protocol name and saving to the instrument’s memory.

To access existing protocols found on the instrument, click on “File List”. To access the specific protocol, choose the protocol file and select “Open” button allowing you to view the specific information of the protocol (Figure 6).

To navigate through the list of protocols, use the following buttons (Figure 6):



To toggle through the pages, click on the following arrowhead buttons (Figure 6):



Fig. 6 Accessing and Navigating through the list of protocols

To delete, import or export multiple files with one command, click on “Batch OP” (Figure 7). Within the “Batch OP”, click on “USB Drive” to exchange the protocol files between internal disk drive and external USB drive (Figure 7). Select “Import” to import files from the external USB drive to internal disk drive. To export protocols or results/reports, select “Export Protocol” or “Export Report”, respectively (Figure 8). To delete the files, chose files to delete and click on delete button – a new prompt will be displayed requesting to confirm file deletion (Fig. 9) The aforementioned operations can be

performed individually or in batches.

Note: Protocol files on the external USB drive cannot be deleted using the instrument.

To go back to the main protocol interface, click on “Back” button.



Fig. 7 Batch Operations Mode

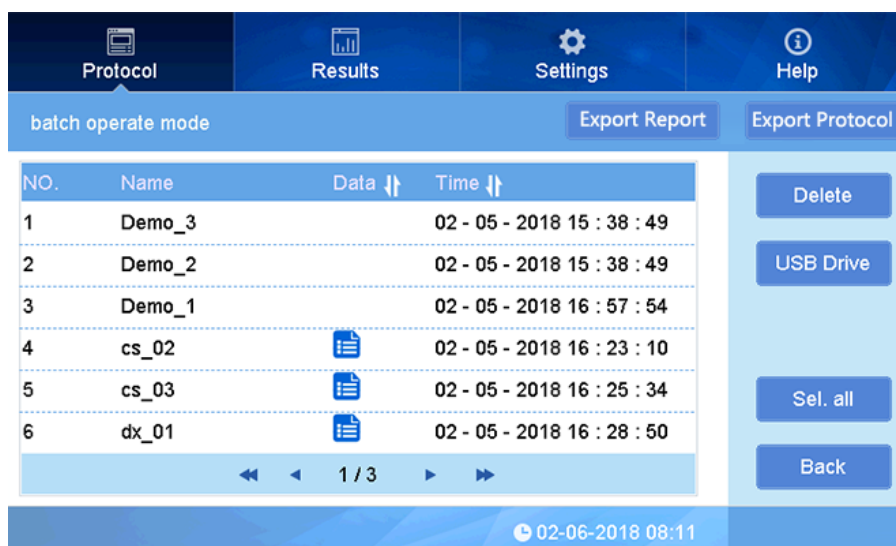


Fig. 8. Performing Operations on Selected Files

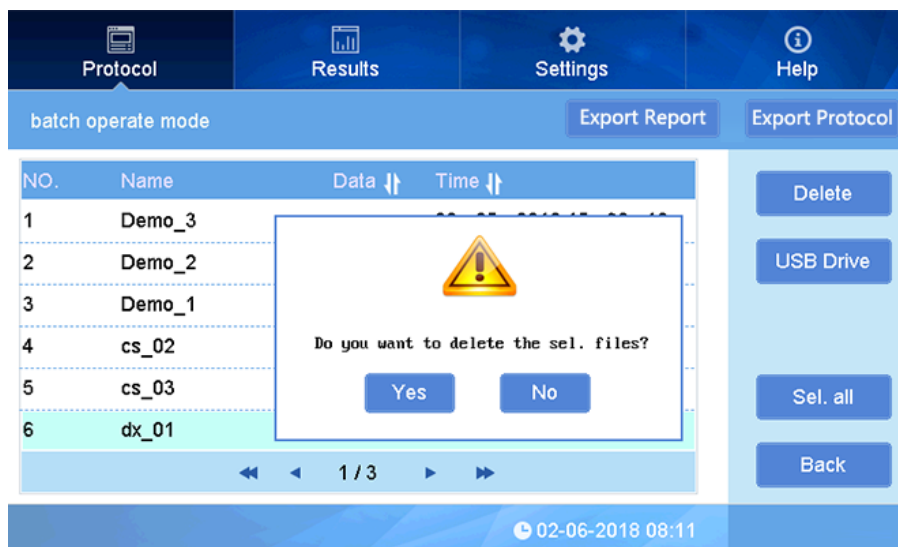


Fig. 9 Deleting Files

To run a protocol, 3 main external buttons are utilized:

-  **Run** Click to run a protocol
-  **Stop** Click to stop a running protocol
-  **Plate in/out** Click to open or close the plate drawer

To open existing protocol, select the protocol within file list and click "Open"; Press New to set up a new protocol. See below for more information on protocol settings.

To insert a plate to be read by the instrument, select "Plate in/out" and place the plate into the plate frame as indicated in figure 10. Make use A1 position on the plate aligns with A1 position of the plate holder.



Fig. 10 Placement of a plate on the plate platform

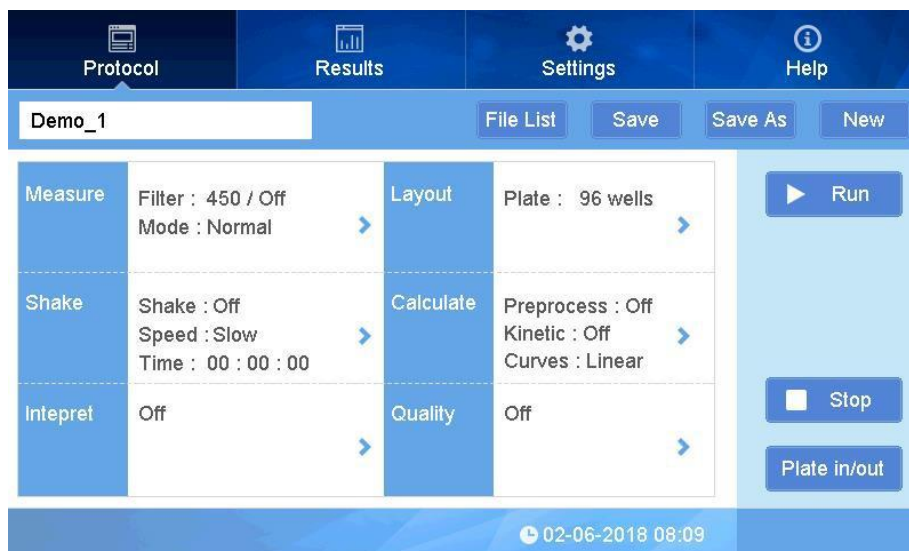


Fig. 11a Running Experiment (Step 1)

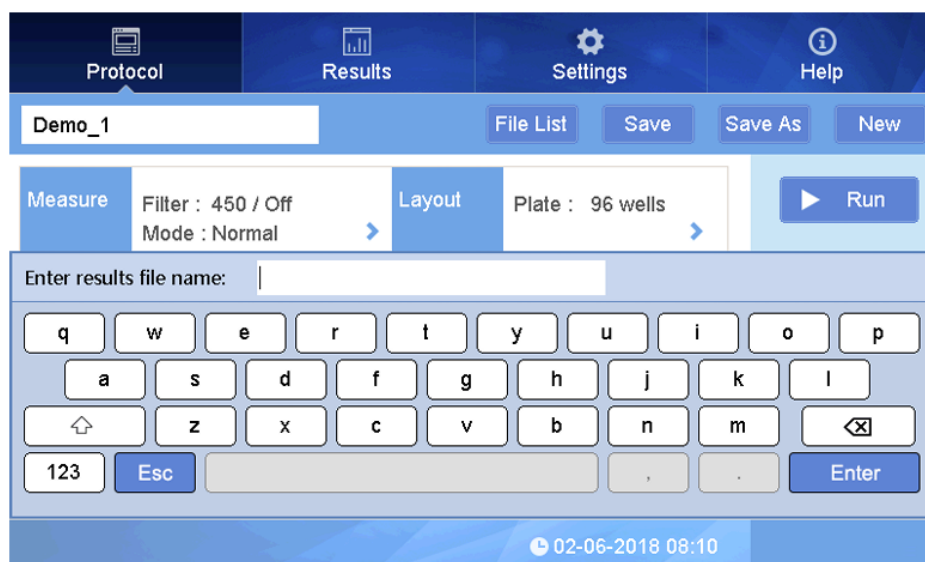


Fig. 11b Running Experiment (Step 2)

To perform the experiment, select “Run” Button (Figure 11a) followed by inputting the name of the chosen experiment from the File List and select “Enter” on the screen (Figure 11b) or “Run” button on the front of the instrument.

Note: During a reading, a dialog box will indicate “measuring now”, and all buttons are disabled, except for “Stop” which can be used to interrupt the measurement.

Measurement will take approximately 15 seconds, and upon completion the display will switch to the “Report” Interface to display the measurement (Figure 12). Result will depend on the parameter set (Discussed below under “Report Interface”).

Protocol

Results

Settings

Help

"cs" raw data

Raw data

Import

Analysis

Curve

CS

	1	2	3	4	5	6	7	8	9	10	11	12
A	2.260	1.515	0.051	0.088	0.049	0.103	0.062	0.059	0.070	0.069	3.759	3.456
B	1.384	0.048	0.070	0.057	0.056	0.055	0.058	0.053	0.056	0.066	0.083	0.066
C	0.050	0.064	0.042	0.089	0.051	3.702	0.053	3.231	0.099	0.050	0.069	0.058
D	0.066	0.066	1.301	3.181	0.055	0.066	0.049	0.081	3.182	0.075	0.065	0.073
E	0.056	1.786	0.073	3.325	0.056	2.014	2.861	0.072	0.057	0.055	0.051	0.075
F	0.049	0.063	2.191	3.558	0.049	0.839	1.597	0.055	0.052	0.054	0.070	0.053
G	0.055	0.081	3.189	0.057	0.091	2.053	0.049	0.094	3.046	0.057	0.050	0.076
H	3.223	0.091	0.054	0.063	0.054	0.136	0.065	0.053	0.128	0.053	0.066	0.058

Filter 1
450nm

Print

Ex Report

02-06-2018 08:14

Fig. 12 Results Window

Protocol setting:

After selecting “New” (Figure 4) or choosing one of the demo protocols, users can create a new protocol by setting the parameters such as wavelength, shaking setting, layout, data calculation, and others. Afterwards, the protocol can be saved as discussed above.

Measure Settings:

To change the Filter (wavelength detection) and Mode (sample reading speed), select “Measure” under “Protocol” (Figure 11a) and input desired options (Figure 13).

Protocol	Results	Settings	Help
Measurement parameters			
Filter 1 405nm			Ok Back
Filter 2 Off			
Mode Normal			
02-06-2018 08:14			

Fig. 13 Adjusting wavelength detection and speed of sample reading

Selecting Filters

Filter 1: Click on “Filter 1” and select a desired filter 1 wavelength (Figure 14).

Filter 2: Click on “Filter 1” and select a desired filter 2 wavelength (Figure 15). The instrument allows users to measure samples at two different wavelengths.

Note: For a single wavelength measurement, choose “Off” for filter 2.

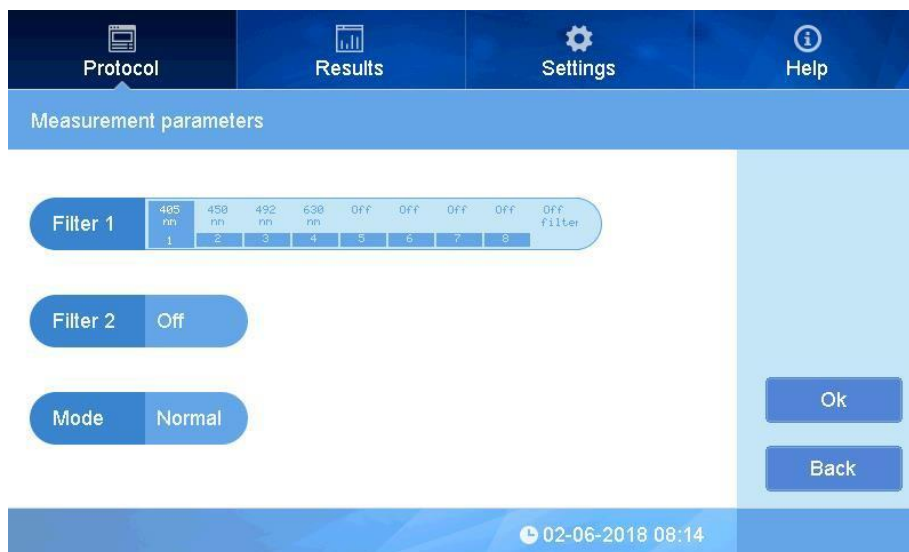


Fig. 14 Selecting Filter 1

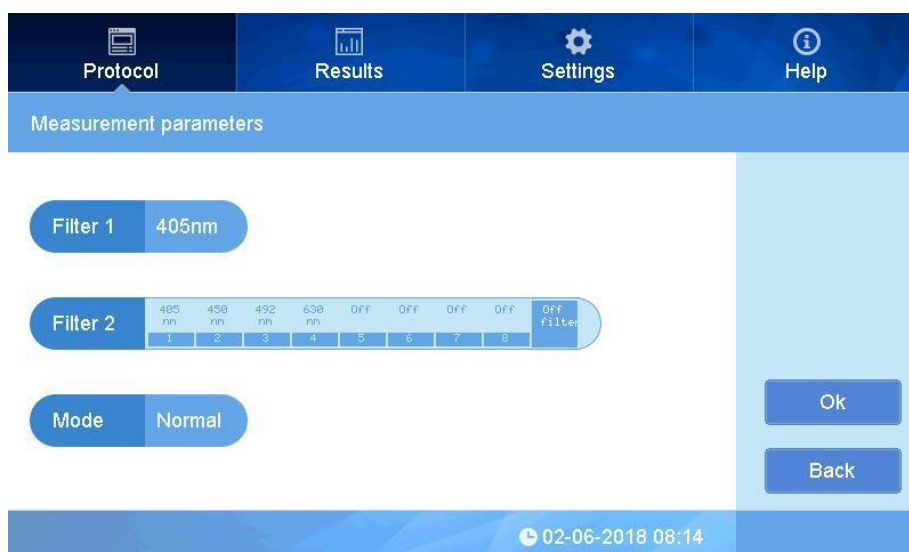


Fig. 15 Selecting Filter 2

Measurement Speed Setting

Instrument has two reading speeds: Fast and Normal. Click on the “Mode” to choose the speed of reading (Figure 16).

Note: “Normal” mode is recommended.

Press “Ok” to finish setting the Filters/Mode Parameters and return to main interface.

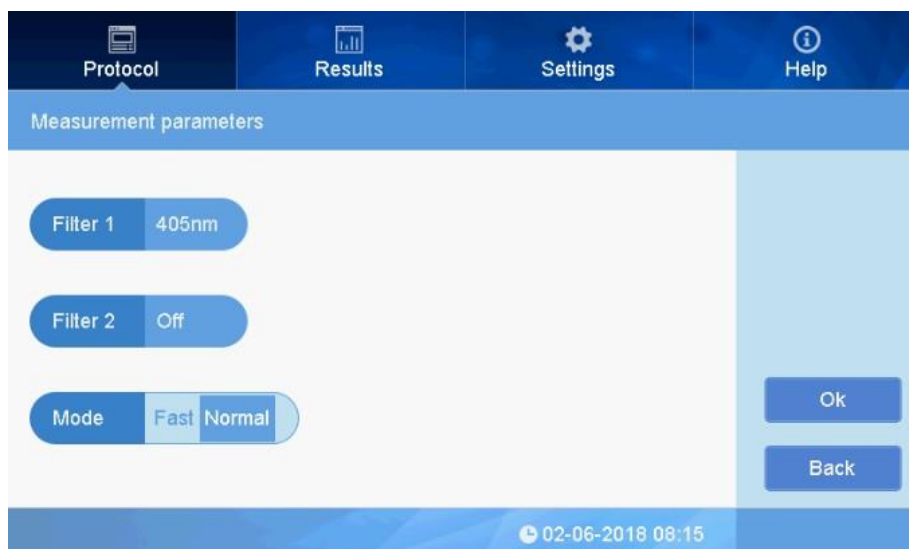


Fig. 15 Selecting Reading Speed

Layout

To set up the experiment, select Layout (Figure 11a) and a new layout window will open (Figure 16).

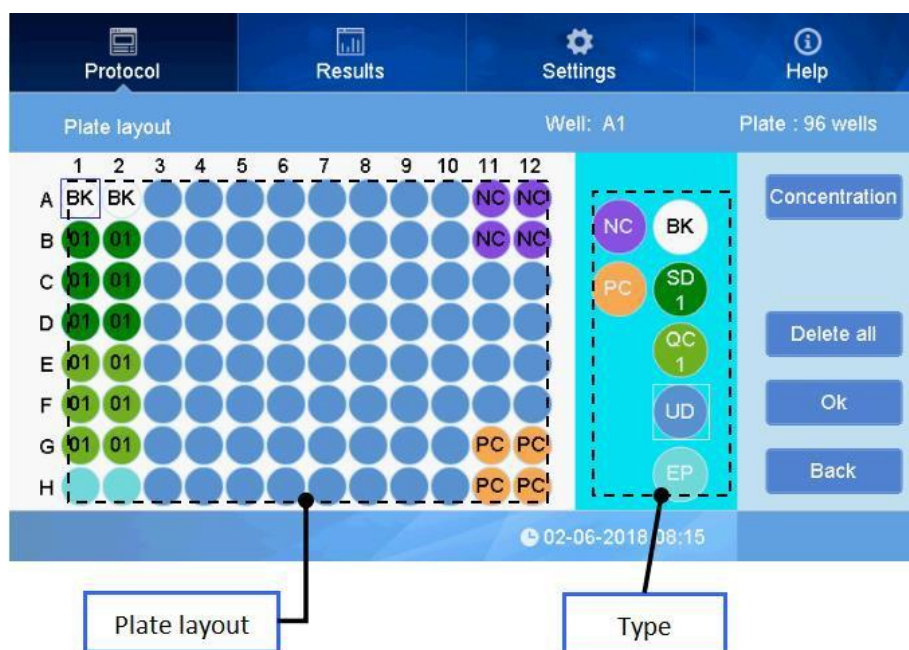


Fig. 16 Layout window

Within the plate layout interface several types of samples can be inputted, including:

- **BK** – Blank
- **SD** – Standard Sample (required for generation of standard curve).
- **NC** – Negative Control
- **PC** – Positive Control

- **QC** – Quality Control Well
- **UD** – Unknown Sample
- **EP** – Empty Position

Setting the Layout:

1. Select a type of sample to input for a specific well (on the screen under “type” – see figure 16).
Note: Standard (SD) and Quality Control (QC) samples can be numbered from 12 and 9 respectively (Figure 17). The numbers can repeat.
2. Within a Plate Layout select position where to add the desired sample type.
3. Press on “Concentration” to enter the concentrations for the standard sample (if included in the layout).



Fig. 17 Selecting Standard (SD) and Quality Control (QC) Samples

Standard Concentration

On the “Plate Layout” interface, press “Concentration” at the top right, and this will open the interface for “Set standard concentration.” (Figure 18) By default, 12 standard values will be shown on this interface. It is only necessary to set the concentration for the standard positions that have been set in the layout. The SD samples which have not been set in the layout will not be considered.

To input the concentration value, click on the concentration number twice (Figure 19).



Fig. 18 Set standard concentration interface



Fig. 19 Adding Standard sample Concentrations



Fig. 20 Changing Standard sample Concentration Units

To change the concentration units for the standard samples, press on "Unit" button at the top right side of the screen (Figure 20).

Shake Setting

This instrument can shake the sample plate to help settle the sample at the bottom of the surface of the well as well as mix the sample.

Under the Protocol Interface, click on "Shake" to enter the "Shaking Parameters" interface (Figure 21).

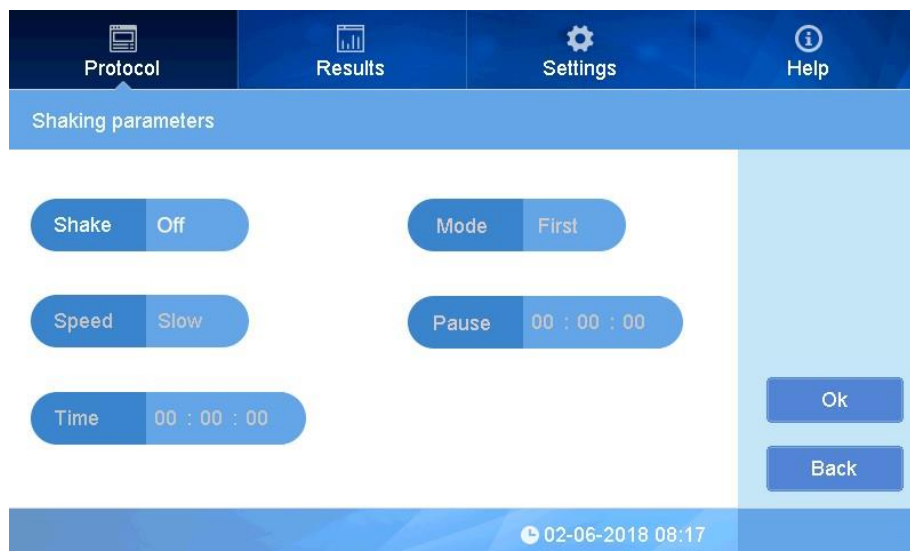


Fig. 21 Changing the Shaking Parameters

Click on Shake to choose or not the shaking of the plate (Figure 22).

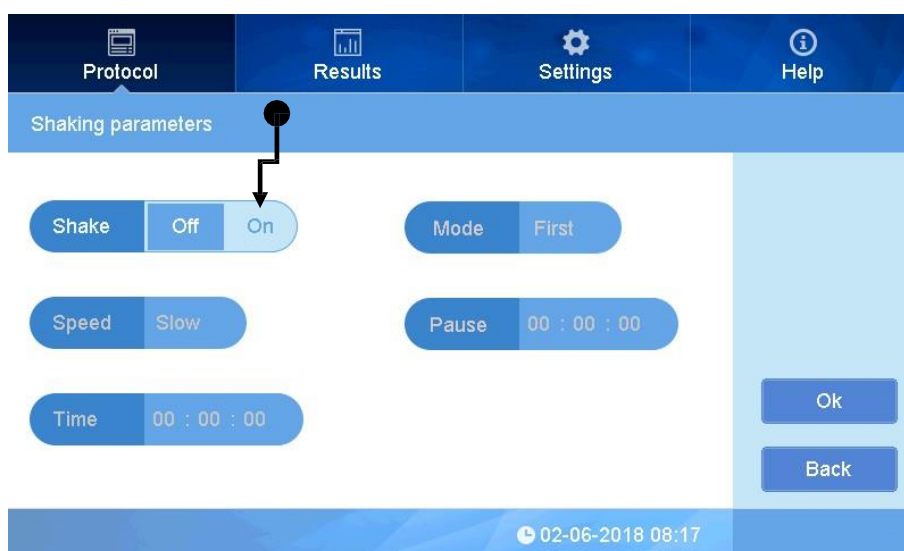


Fig. 22 Setting On or Off Shaking

To change the speed of shaking, click on "Speed" and choose from Slow, Normal, or Fast (Figure 23).



Fig. 23 Changing Shaking Speed

To change the length of shaking time, input numbers to set HH/MM/SS, as shown in Figure 24.

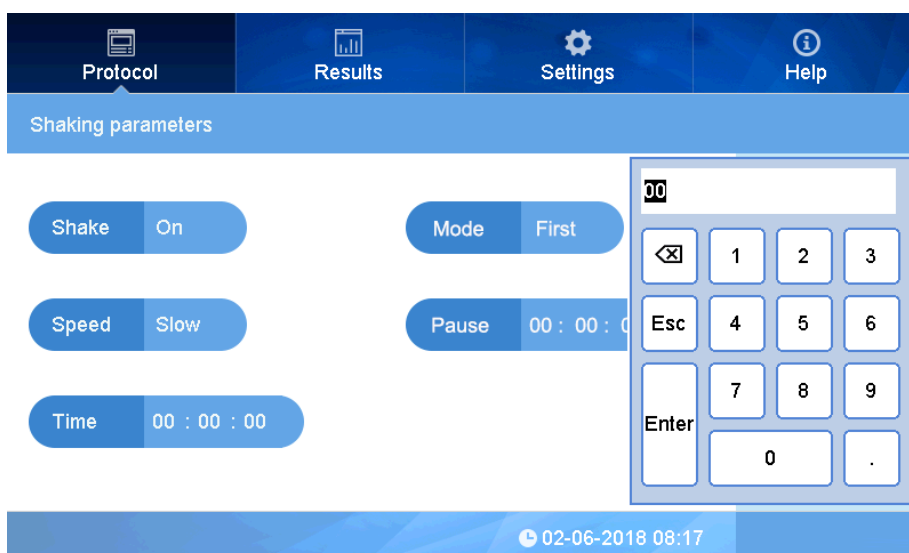


Fig. 24 Changing Shaking Time

Two modes, "First" and "Each" are available to change the frequency of shaking. "First" mode will ensure that shaking occurs only before the first reading during a multi-reading experiment, while "Each" mode will ensure shaking occurs before every reading in a kinetic assay.

To set the pause time between shaking and reading absorbance, click on the pause button to input the values. Press "OK" to complete the settings and return to the "Protocol" interface.

Calculate

The Calculate interface allows for three distinct sample processing methods: Kinetic, Preprocess, and Curves.

Kinetic Settings:

On the “Protocol” interface, click “Calculate” to enter “Calculation parameters”. Click “Kinetic” to either turn ON or OFF this interface. When Kinetic is “On”, you may click “Readings” and input the number of desired measurement readings. If one reading is used, the maximum reading is used, the maximum number of kinetic readings to be recorded will be 219. If 2 filters are used the maximum number of readings is 99.

Click on “Interval” to select time duration between each reading. The time format is: HH/MM/SS

Fig. 25 Calculation Parameters

To change the type of kinetic reading, select “Para” on the right hand-side of the instrument screen and a new window will appear (Figure 26).

Fig. 26 Kinetic Parameters

Selecting Type allows users to pick a different type of calculation including average rate, max rate, time to change, max absorbance of the well, and time to max absorbance. For example, “average rate” computes the change in the average rate of absorbance in each of the wells.

Additionally (Figure 27), changing the “Type” to “Time to change” allows users to define three additional parameters: baseline select, baseline points, and change.

Baseline select: “End” and “Begin” options are available.

Baseline points: allows to set baseline point.

Change: set the change value (Note: if the absorbance change is less than setting one, it will not be recorded).

First Reading: Beginning reading point of data record.

Last Reading: End reading point of data record.

Protocol Results Settings Help

Kinetic parameters

Type Time to change Baseline select End Begin

First 1 Baseline points 1

Last 1 Change 0.000

Ok Back

02-06-2018 08:18

Fig. 27 Adjusting Kinetic Parameters

Preprocess Setting (double wavelength):

In the “Calculate parameters” interface, Click the right side of the “Preprocess” button, and a menu will appear as shown in Figure 28.

Protocol Results Settings Help

Calculation parameters

Kinetic Off Readings 2

Preprocess No M1-M2 M1/M2 M1+M2 M1*M2 M2-M1 M2/M1

Curves No

Ok Back

02-06-2018 08:18

Fig. 28 Preprocess Calculation

Choose the preprocess calculation, when testing two wavelengths simultaneously.

Choices include: $M1-M2$, $M1/M2$, $M1+M2$, $M1*M2$, $M2-M1$, $M2/M1$ ($M1$ and $M2$ represent the measurement values for the first and second wavelength).

Curve Fitting

In the “Calculation Parameters” interface, click “Curve” to choose the curve fitting option.

Options include No (Off), Linear, Logistic, Cubic Spline, Point to Point, and Factor.

After this measurement, the software will produce a curve fitting using the sample absorbance value data and the standard concentration values.

Fig. 29 Curve Parameter

Interpretation

The interpretation functionality (qualitative analysis) is relative to Positive and Negative Controls.

Under the protocol interface, click “Interpret” and choose “ON” (Figure 30).

Fig. 30 Interpretation Function

Click “Source”, choose “ABS” (absorbance) or “conc.” (concentration) as desired. Formular for the threshold value “cutoff”:

$A \times NC + b \times PC + c$, where

“a,b,b” are reagent control coefficients (set as needed)

“NC” is the negative control average value.

“PC” is the positive control average value.

Select “a” to enter the coefficient value needed to multiply NC by, and confirm by pressing “OK”
Select “b” and “c” to enter other coefficients as needed.

If “cutoff” does not require a coefficient calculation with “PC” or “NC” then “b” and “c” can be left as zero.

Weak P: (+/- Cutoff%) **0.00** is the value representation a limitation/cut-off to start detecting positive value and therefore this value is considered to be a “weak positive”.

Click “>” symbol to toggle between “>” and “<” comparing positive interpretation to “Cutoff”, set it according to the reagent user manual.

Click “OK” to complete and return to main interface.

Quality Control

To open the quality controls interface on the instrument, click on “Quality” with the “Protocol” interface (Figure 31).

NO.	Target	SD	CV	Upper limit	Lower limit
-----	--------	----	----	-------------	-------------

Fig. 31 Quality Control Interface

NO.	Target	SD	CV	Upper limit	Lower limit
1	0.000	0.000	N.A.	0.000	0.000
2	0.000	0.000	N.A.	0.000	0.000
3	0.000	0.000	N.A.	0.000	0.000
4	0.000	0.000	N.A.	0.000	0.000
5	0.000	0.000	N.A.	0.000	0.000

Fig. 32 Inputting Quality Control Parameters

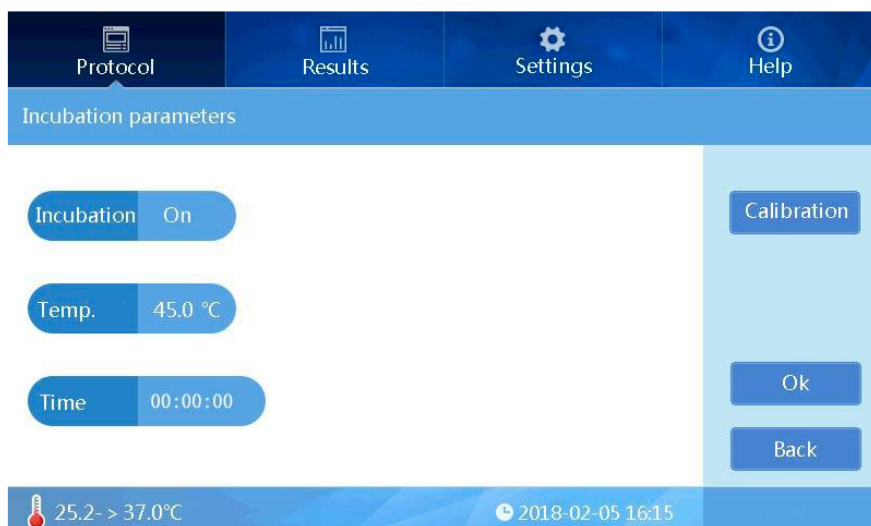
Click on “ABS” to choose absorbance or concentration as a quality control variables.

Click the button “ON”/”OFF” to turn on or off the quality control (Figure 32).

Click the values in the “Target” to set Quality control concentrations or ABS values; click values on the SD column to set the standard deviation for QC concentration or ABS. Set concentration values, ABS, and SD according to the reagent kit user manual. When using Quality controls, set the QC samples in the Layout interface, refer to the section of the manual on setting up the plate “Layouts”.

Incubator Settings (model VWRI210-000169)

Click the “Off” button on the left corner of “Protocol” interface to enter the incubator setting interface and set the incubation temperature and time as in figure below:



Click “Temp.” to set the incubation target temperature you need. The incubation temperature ranges between +4 °C to 50 °C.

Click “Time” to set the incubation time and set the specific incubation time required. The incubation time is completed when the countdown is over.

Click “Calibration” to set the calibration temperature.

Note: After each setup, click “OK” to return to the main program interface.

Results

The “Results” interface shows measurement results as well as the history data of the latest measurements. After a measurement in the Protocol interface, the display will switch to the “Results” screen automatically, showing the current protocol measurement result. You can also view results by clicking the “Results” tab at the top of the screen.

In the “Results” interface, you may choose to view different calculated values from the measurements: Raw data, Interpret, Analysis, Curve, QC.

Interpret, Analysis, Curve, and QC value will be available if these processes have been set to “On” in the “Protocol” interface. If they have been set to “Off”, there will be no results.

Result Interface

Raw Data

Click on the  button to display the raw ABS (absorbance reading) values. As in Figure 33, if the measurement was set to use and calculate with 2 wavelengths, click  to choose the wavelength filter (absorbance) data to view.

Protocol

Results

Settings

Help

"cs" raw data

Raw data

Interpret

Analysis

Curve

QC

	1	2	3	4	5	6	7	8	9	10	11	12
A	2.260	1.515	0.051	0.088	0.049	0.103	0.062	0.059	0.070	0.069	3.759	3.456
B	1.384	0.048	0.070	0.057	0.056	0.055	0.058	0.053	0.056	0.066	0.083	0.066
C	0.050	0.064	0.042	0.089	0.051	3.702	0.053	3.231	0.099	0.050	0.069	0.058
D	0.066	0.066	1.301	3.181	0.055	0.066	0.049	0.081	3.182	0.075	0.065	0.073
E	0.056	1.786	0.073	3.325	0.056	2.014	2.861	0.072	0.057	0.055	0.051	0.075
F	0.049	0.063	2.191	3.558	0.049	0.839	1.597	0.055	0.052	0.054	0.070	0.053
G	0.055	0.081	3.189	0.057	0.091	2.053	0.049	0.094	3.046	0.057	0.050	0.076
H	3.223	0.091	0.054	0.063	0.054	0.136	0.065	0.053	0.128	0.053	0.066	0.058

Filter 1
450nm

Print

Ex Report

02-06-2018 08:20

Fig. 33 Results

Click on **Ex Report** button to enter the Export Report interface (See Figure 34 and 35), then click **Export** to export the Raw data and/or the Analysis data to a USB drive (connect the USB drive into the port on the right side of the instrument).

Export interface for a typical "end point" reading:

Protocol		Results		Settings		Help	
Setting for export report							
Protocol	☐	Raw data	☒	Analysis	☐	Interpret	
	☐	QC					
						Export	
						Back	
02-06-2018 08:20							

Fig. 34 Export interface for a typical "end-point" readings

Export Interface for Kinetic Reading Data

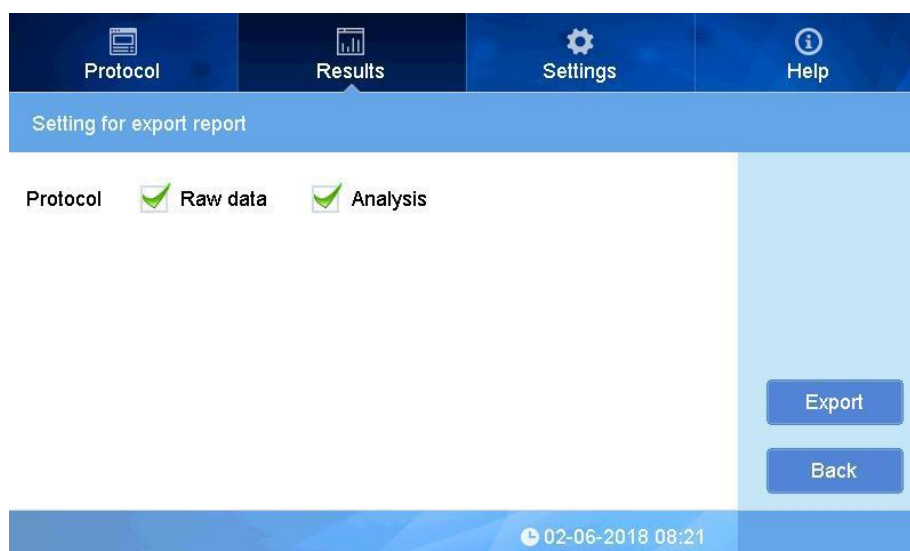


Fig. 35 Export interface for a typical “kinetic” reading data

Kinetic Reading data is exported in a .csv format with individual rows including the full set of data of all 96 wells. This allows the users to select rows of data and create graphs of the kinetic results.

Click [Print](#) to print data if connected to thermal printer (Optional).

Interpret Results

Click [Interpret](#) to show the current interpreted measurement results.

	Protocol Results Settings Help											
	"dx_03" Inter. result Raw data Interpret Analysis Curve QC											
	1	2	3	4	5	6	7	8	9	10	11	12
A	2.325	1.307	0.057	0.097	0.055	0.113	0.069	0.065	0.078	0.077	3.642	3.397
B	0.666	0.055	0.078	0.064	0.064	0.062	0.065	0.060	0.063	0.074	0.093	0.074
C	0.055	0.072	0.048	0.104	0.057	3.757	0.060	2.585	0.110	0.056	0.077	0.065
D	0.075	0.074	1.317	3.176	0.063	0.073	0.055	0.089	3.241	0.084	0.074	0.081
E	0.062	1.965	0.081	3.394	0.063	1.916	2.672	0.080	0.066	0.062	0.058	0.084
F	0.055	0.070	3.258	3.529	0.055	2.309	1.647	0.061	0.059	0.060	0.079	0.059
G	0.062	0.089	3.197	0.064	0.101	2.182	0.056	0.103	3.153	0.064	0.056	0.084
H	3.263	0.100	0.060	0.070	0.061	0.147	0.073	0.060	0.137	0.060	0.074	0.065

Filter 1
405nm

Cutoff
> 0.376

Print

Ex Report

02-06-2018 08:21

Fig. 36 Interpret Results

Symbol “+” and “++” above each ABS means positive.

“+” in blue = weak positive

“++” in red = standard positive

On the right side of the threshold value “Cutoff” is displayed, refer to figure 30 for details.

Note: On the print results, “P” indicates positive and “+” is weak positive which is different from the display on the screen.

Analysis

Click on [Analysis](#) to display the quantitative analysis results (Figure 37).

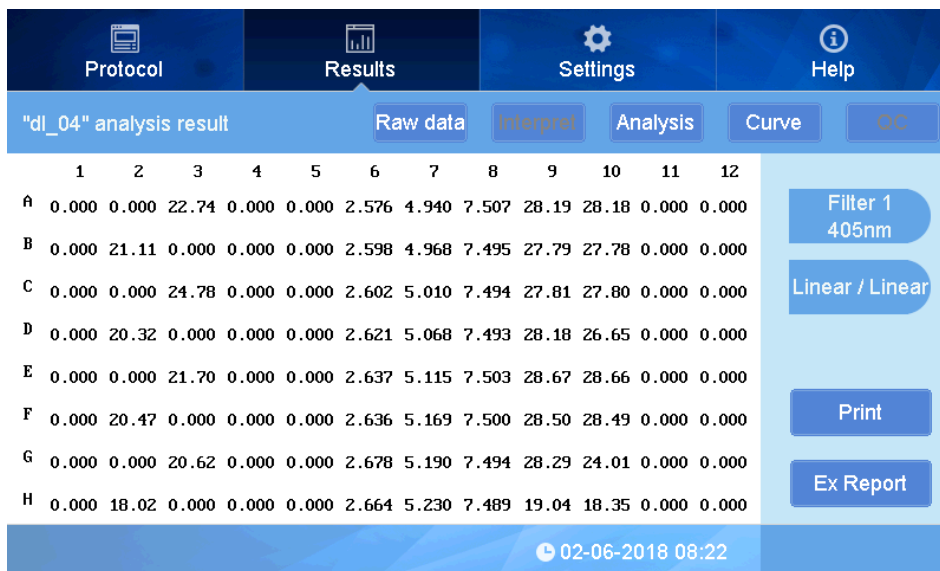


Fig. 37 Quantitative Analysis Results

Curve

Press “Curve” to view the curve of the concentration value vs. ABS reading value. Figure 38 shows a curve fitting with the Linear/Linear Setting (Linear Scale for Absorbance on the y-axis, linear scale for concentration on the x-axis). If the fitting of the curve is not optimal, it is possible to adjust the curve fitting setting. The choices for curve fitting are Linear/Linear, Linear/Log, Log/Linear, Log/Log.

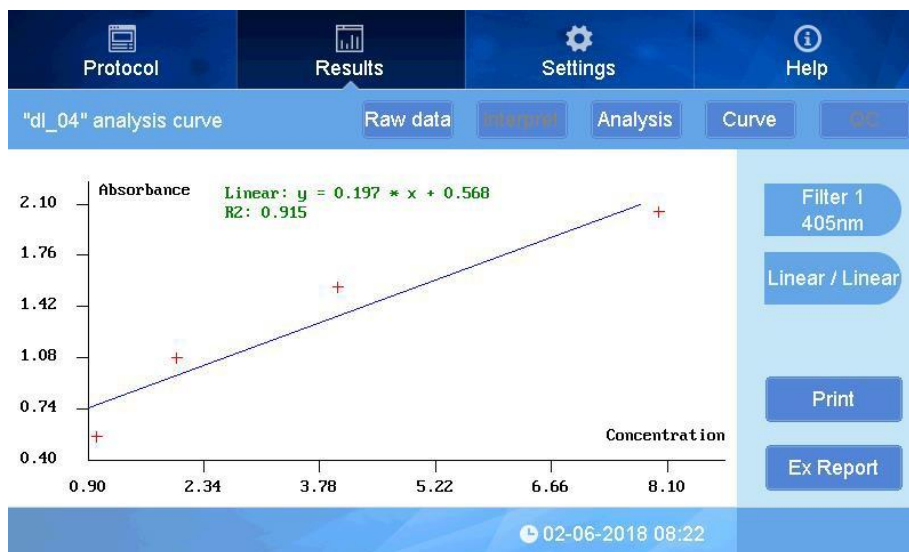


Fig. 38 Result: Curves

QC Results

When a protocol is set with QC measurement the results of QC samples on the plate will be interpreted as “Passed” or “Failed” (See Figure 39).



Fig. 39 Result: Failed

Kinetic Result Interface

Kinetic Raw Data



Fig. 40 Results: Raw Data

The picture above shows the ABS values for measurement Cycle 1. Use   to scroll through the cycles.

 Indicates the cycle No. Click this button and input cycle No. to jump to a specific cycle number. Numbers in red indicate absorbance outside of the range of the instrument.

Kinetic Analysis

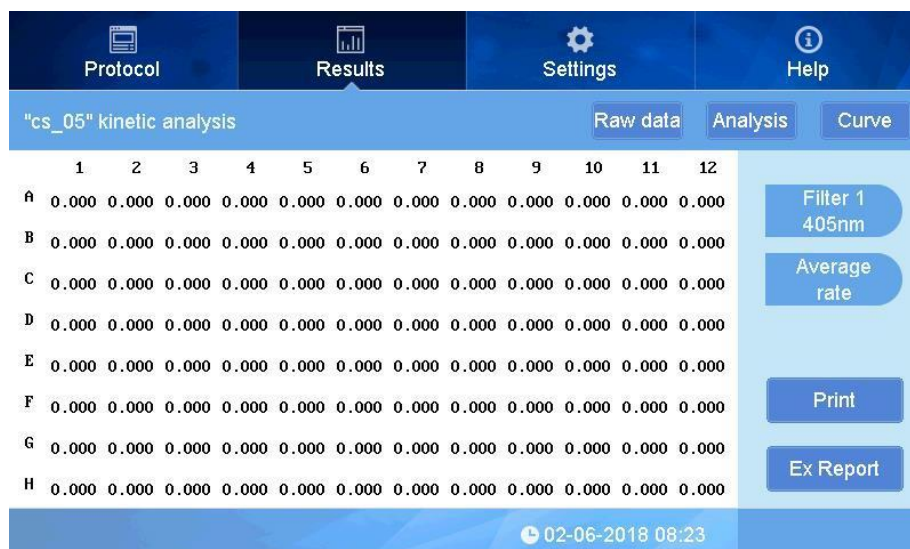


Fig. 41 Results: kinetic data



Indicates the data processing method of kinetics measurements. (see section 2, 2.4.1 Kinetics setting).

Kinetic Curve

The kinetic curve (Figure 42) can be displayed for each sample position, showing ABS detection value vs. cycle number.

Press   to shift sample position on microplate, (ie, A1, A2, A3, etc) when at A1, click on  to view the absorbance curve for all sample position simultaneously (Figure 43).

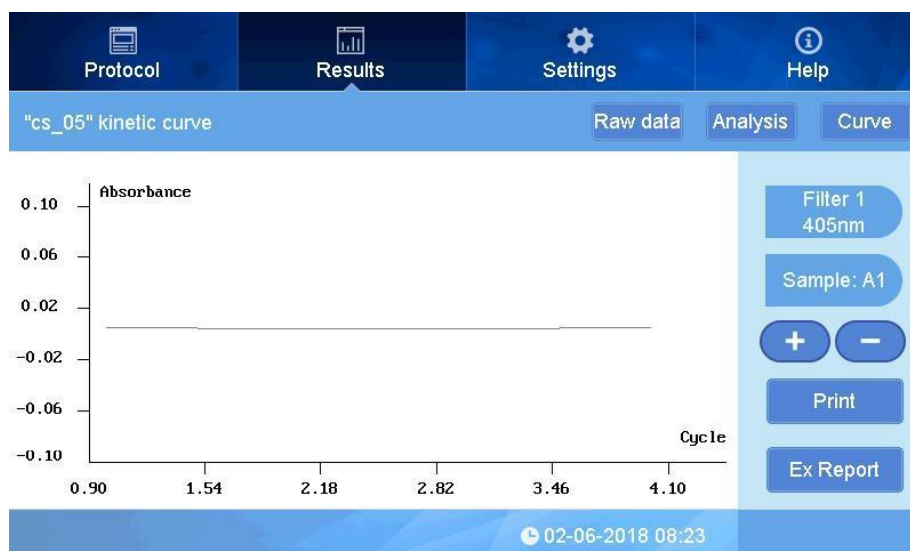


Fig. 42 Results: kinetic curve

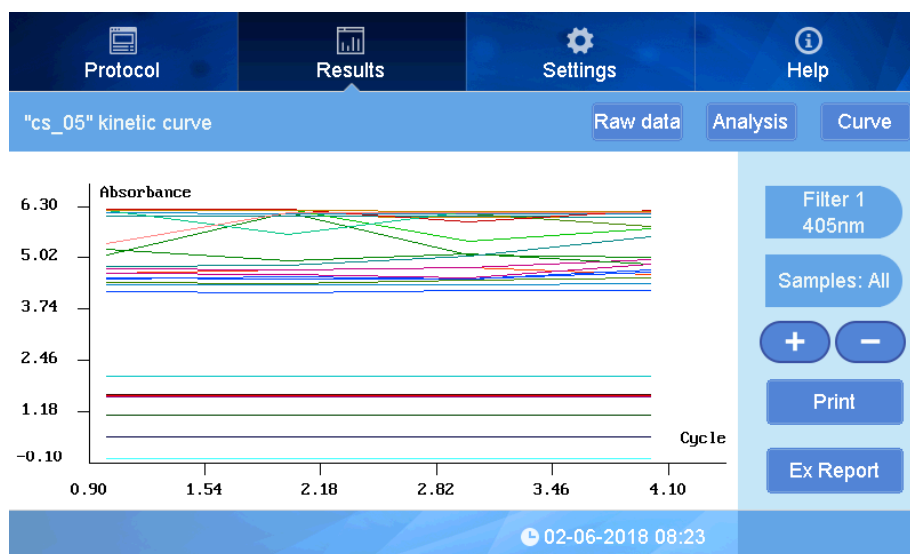


Fig. 43 Results: kinetic curve for multiple samples

Settings

The Settings interface allows changing the Language, setting filter values (if a filter is added or removed), maintenance, printer settings, quality control, screen calibration, and date and time setting.

Click “Settings” at the upper area of the main interface:

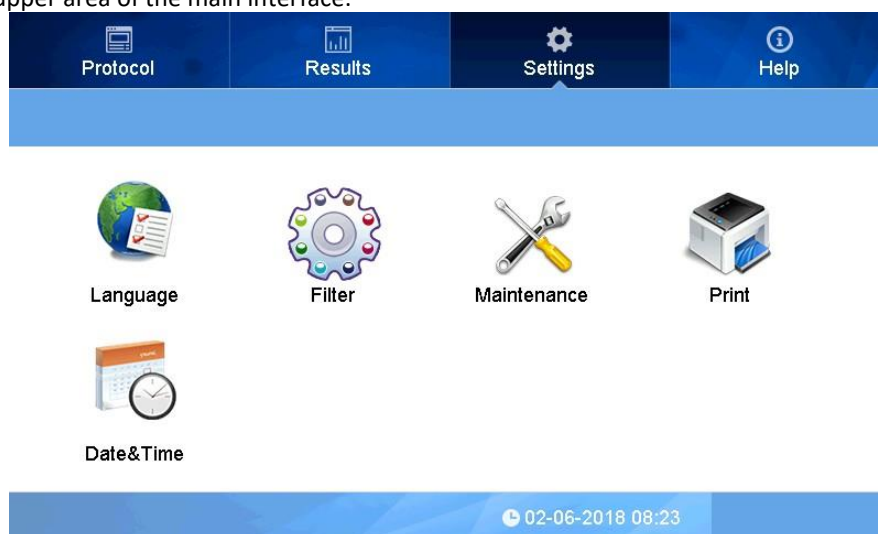


Fig. 44 Settings

Language

Steps:

1. Press the “Language” icon in the Settings interface:

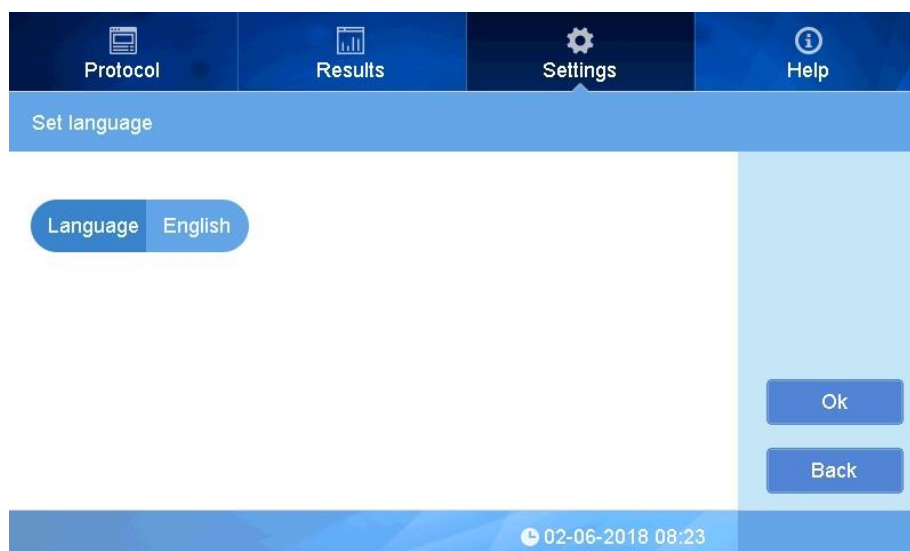


Fig. 45 Settings: Language

2. Click to the right side of Language, see picture 46: select language and press OK.

Filters

This instrument is equipped with four standard filters which have positions on the filter wheel from 1-4. Up to 8 filters can be installed (purchased with the instrument, or added later). When additional filters are purchased together with instrument, the filter may be installed prior to shipping and the filter wheel settings already adjusted. If additional filters are purchased later, the customer will need to update the filter wheel settings.

Note: Install new filters in the instrument prior to adjusting the filter wheel setting in the software. Please refer to Chapter 6, Maintenance for details.

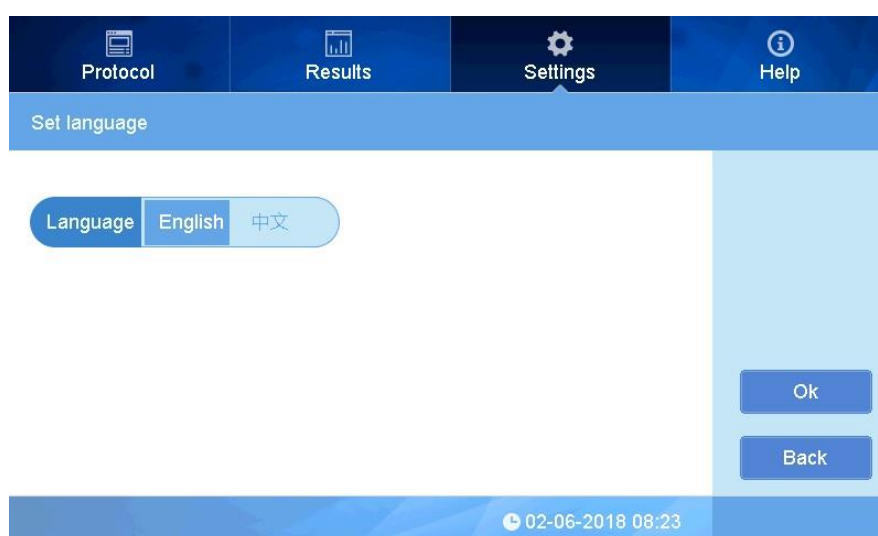


Fig. 46 Settings: Choosing Language

1. Click Filter icon in the interface of setting, See Figure 47.

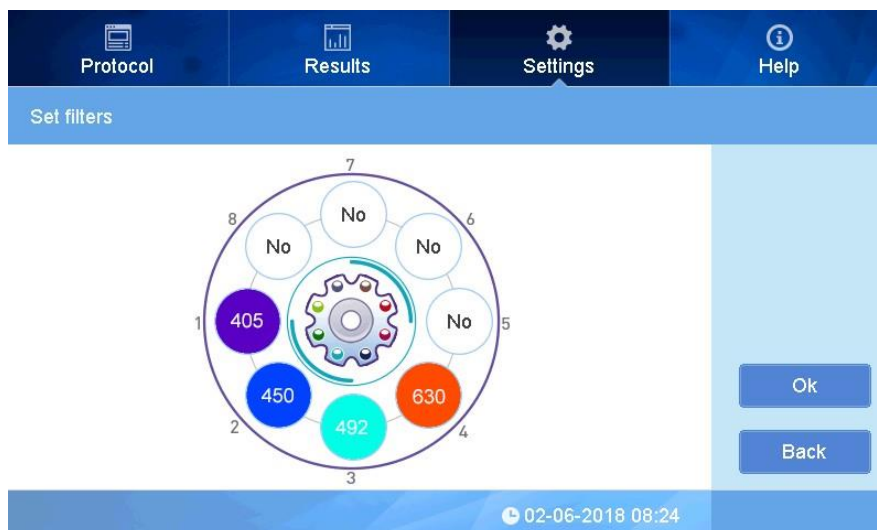


Fig. 47 Settings: Filters

2. Click the blank position No., input the wavelength using the pop up window (Fig 49).

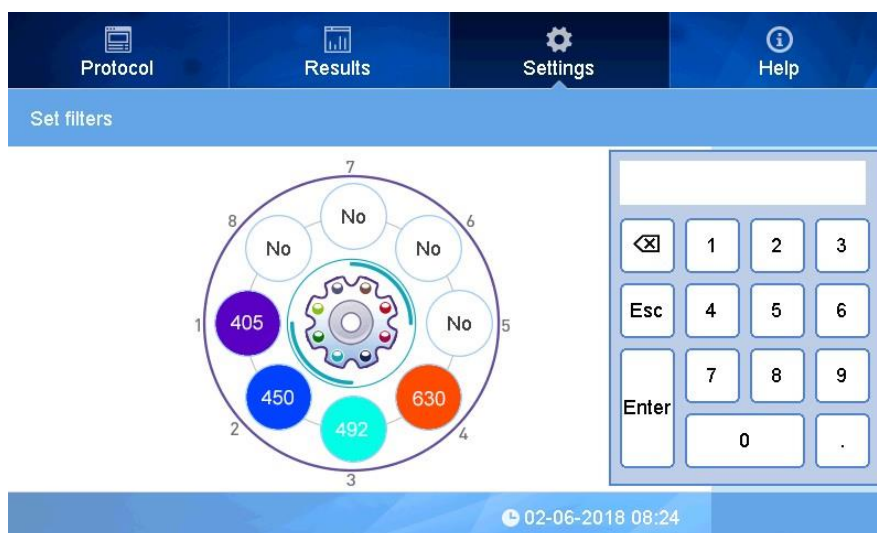


Fig. 48 Settings: Changing Filters

In case of a wrong input, double click to input again.

The instrument is equipped standard with 1-4 filters installed, and the wavelength are as seen in the picture above.

Note: The position No in the software and filter wheel must be the same, or it will lead to incorrect readings.

Click OK to complete, after setting.

Maintenance Settings

Here you can adjust the microplate drawer options, and authorized service personnel can adjust factory settings (password protected).

1. Click “Maintenance” to enter the interface

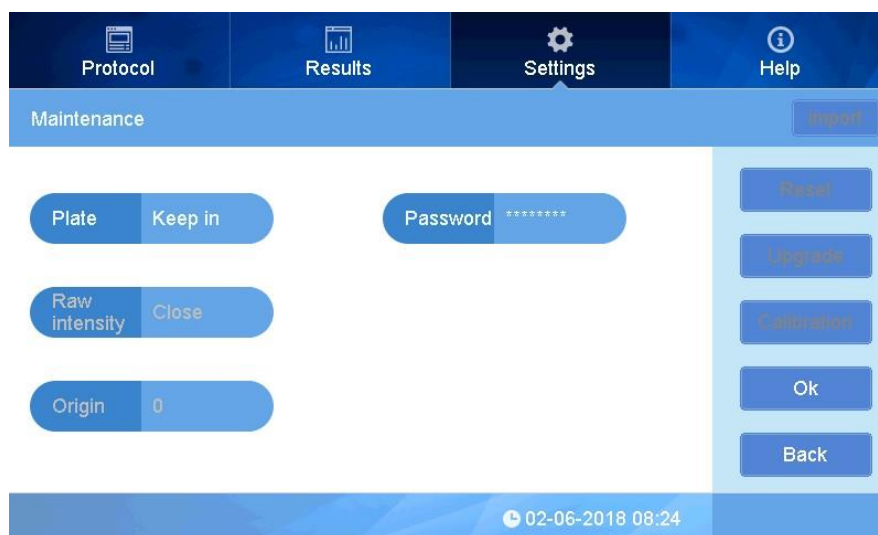


Fig. 49 Maintenance

Plate **Keep in** This setting is used to adjust how the microplate drawer is controlled, and it can be set as “Keep in” or “Keep out”. “Keep in” means the microplate drawer will stay closed after a measurement, while “Keep out” means microplate drawer will open after a measurement. If other maintenance setting need to be adjusted, contact Benchmark Scientific.

Date and Time

Click “Data&time” in the Settings main menu to set the Time and Date. The format of Date: month/date/Year, Time: Hours:minutes:seconds (Figure 50).

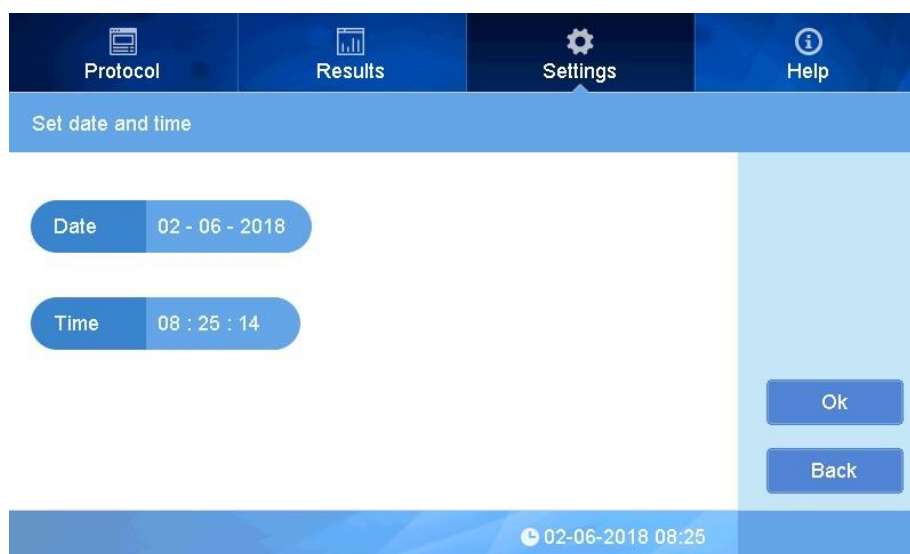


Fig. 50 Date and Time

In order to change the date and time, click the area to set, (Figure 51).

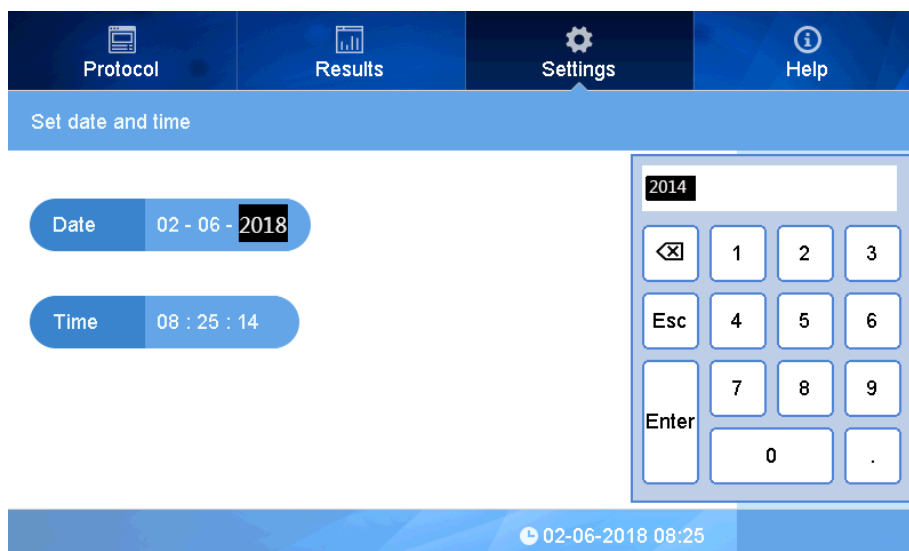


Fig. 51 Changing data and time

Click “OK” to complete the setting.

Help

This area provides a brief introduction and overview of every function button as in Figure 52.

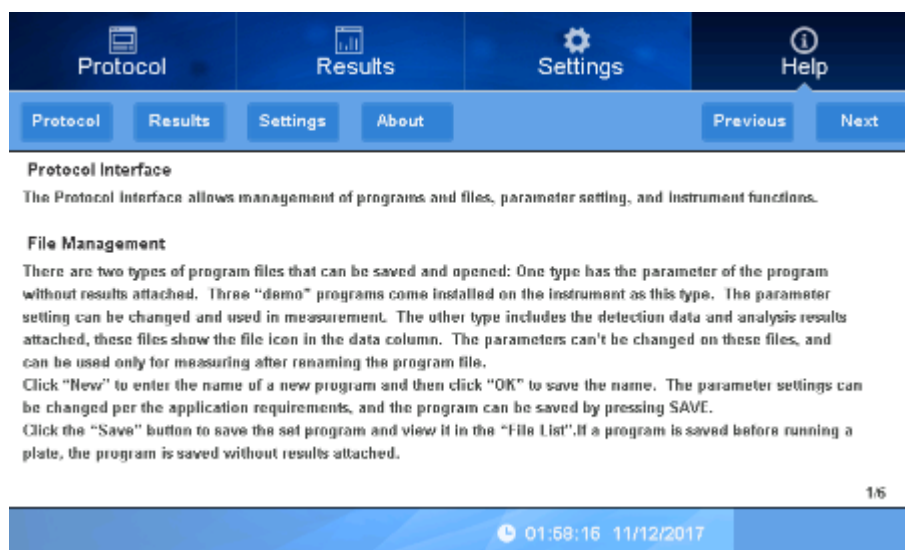


Fig. 52 Introduction to buttons functionality

1. Click “Protocol”, “Results”, “Settings” to review a summary of each function.
2. Click “About” to see the current firmware version.

Maintenance

- Avoid moisture to prevent corrosion.
- Keep the instrument away from strong electromagnetic interference sources.
- The Instrument has been calibrated at the factory, so calibration should not be required. If there are any issues with operation or performance, please contact Benchmark Scientific or your distributor.
- Do not turn off the power to instrument in the middle of a reading or when the drawer is opening or closing.

- **Parts replacement:**

All of the components of this instrument have been designed, manufactured and tested to ensure quality and long life. If used properly, according to this instruction manual, the main electronic and mechanical parts will not need regular maintenance.

- **Light source replacement:**

Contact VWR Service for information on ordering a new Halogen Lamp if replacement is required.

- Replacement steps: (make sure to switch off power, and unplug the instrument before starting)
 - a. Open the back door of the instrument, locate the light source (see Figure 53), loosen the screws on light source connector using a small screwdriver, remove this connector by gently pulling it upwards.
 - b. Loosen the light source fixing plate and remove it, disconnect the light source by pulling upward and remove it from the instrument. (Caution: if used recently, the light source may be hot)
 - c. Replace the new light source by reversing the above steps, pay attention to the position of the light on the light source part, then connect the fixing plate. See Figure 53

Note : Do not touch the glass surface of the lamp, always hold it at the base. Do not use excessive force to prevent damage.

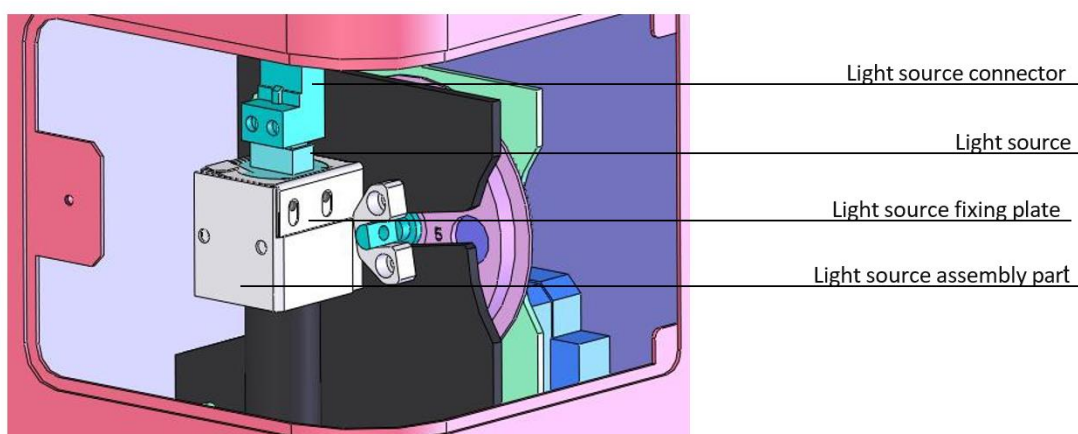


Fig. 53 Light Source

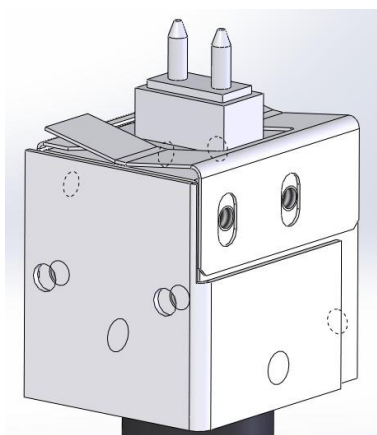


Fig. 54 Light Source fixing plate and assembly part

Adding Optical Filter

The VWR Microplate Absorbance Reader is equipped with four standard filters inside: 405 nm, 450 nm, 492 nm, and 630 nm. If other wavelengths are needed, additional filters can be installed. Always turn off the instrument before changing the filters and follow the instructions below. It is recommended to wear laboratory gloves to prevent touching the optical filter glass.

- Loosen the knob to open the back door and remove the optical filter wheel using the included Allen key, (see Figure 55).
- Remove the fixing plate by removing the screws, then place any new filters in open positions. Arrows on filters should be same as light incident direction (See Figure 56). Replace the fixing plate and screws.
- Load the wheel back into the slot with the number marks facing the rear of the instrument and re-fasten it with the Allen screw.

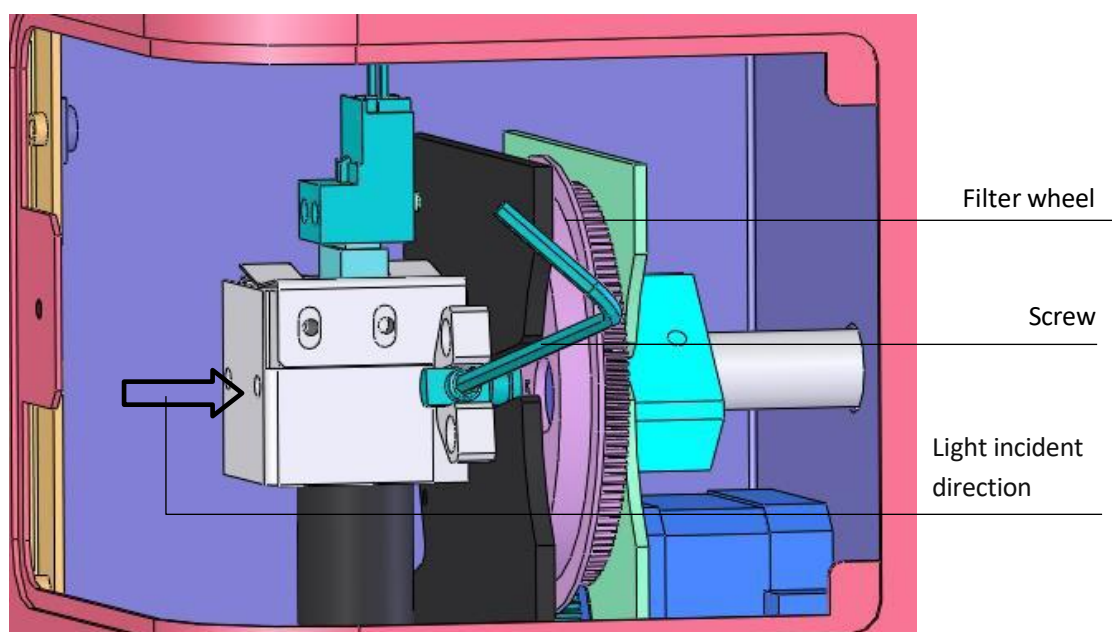


Fig. 55 Adding/Changing Optical Filter

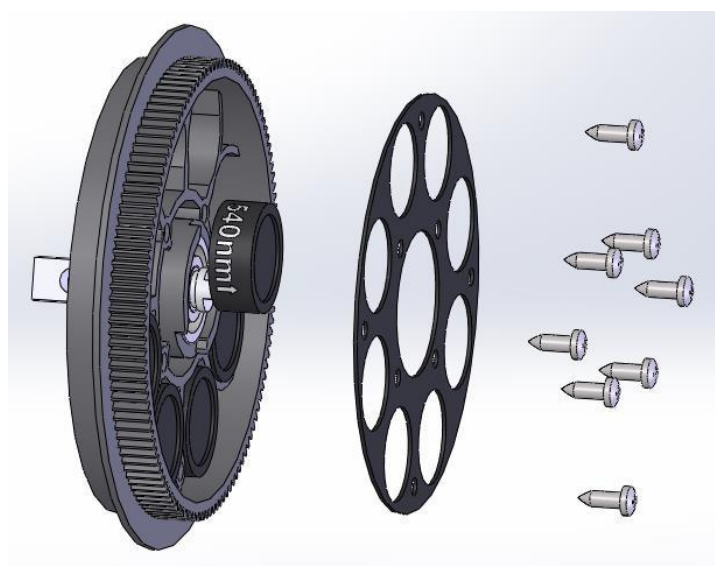


Fig. 56 Adding/Changing Optical Filter

Note:

- The VWR Microplate Absorbance Reader is equipped with four standard filters inside, please ignore these steps if additional filters are not needed.
- Do not touch the filters with bare hands to avoid fingerprints or smudging which can lead to inaccurate readings.
- Be careful not to touch any other mechanical or electrical parts inside the instrument when installing the filter wheel.

Storage and transportation

1. This instrument should stored and operated in an environment with temperature $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$, relative humidity less than 80%, in a well ventilated area free of any corrosive gasses.
2. Avoid heavy shocks, vibration, and humidity during transportation.

Troubleshooting

Review the information in the table below to troubleshoot operating problems.

Trouble	Analysis	Trouble shooting
Instrument will not start	Problem with power input	Check power supply, Check cable plug status, Check fuse, Check voltage of outlet
Lamp will not turn on	Power to lamp failure, Lamp defective	Check power before replacement, Replace the lamp
Weak light	Lamp defective	Replace lamp
No reset signal of microplate	Photoelectric switch defective	Replace photoelectric switch. Contact VWR Service.
Measurement result with big deviation or no result. Filter wheel does not work, or turn too much before stopping.	Filter wheel photoelectric switch defective	Replace Filter wheel photoelectric switch. Contact VWR Service.
Microplate does not move forward or no backward.	There is something obstructing the movement	Check microplate holder
Measurement result not precise	Microplate is not placed correctly in the drawer.	Check if microplate is properly fitting the holder.
Start measurement is interrupted	Communication interrupted.	Press “stop”, restart to measure.
“Strong light”	New filter added using software, but without filter on wheel.	Delete the filter setting which is not needed. Make sure new filters are in correct slot number.

Repair and Maintenance

Encountering problems

For inquiries on the repair and maintenance of the instrument, please contact your local VWR service center for assistance.

Accessories and Spare Parts

Decription	VWR Cat No.
PC SOFTWARE, MICROPLATE READER	VWRI210-000135
THERMAL PRINTER FOR MICROPLATE READER 115V-240V	VWRI210-000136
PAPER ROLLS FOR THERMAL PRINTER MR9600	VWRI210-000138
CALIBRATION PLATE KIT	VWRI210-000139
590NM FILTER FOR MICROPLATE READER	VWRI210-000140
520NM FILTER FOR MICROPLATE READER	VWRI210-000141
560NM FILTER FOR MICROPLATE READER	VWRI210-000142
750NM FILTER FOR MICROPLATE READER	VWRI210-000143
650NM FILTER FOR MICROPLATE READER	VWRI210-000144
540NM FILTER FOR MICROPLATE READER	VWRI210-000145
340NM FILTER FOR MICROPLATE READER	VWRI210-000146
600NM FILTER FOR MICROPLATE READER	VWRI210-000147
562NM FILTER FOR MICROPLATE READER	VWRI210-000148
595NM FILTER FOR MICROPLATE READER	VWRI210-000149
570NM FILTER FOR MICROPLATE READER	VWRI210-000150

Additional filters are available, contact your VWR representative for more information.

Technical service

Web Resources

Visit the VWR website at www.vwr.com for:

- Complete technical service contact information
- Access to the VWR Online Catalogue, and information about accessories and related products
- Additional product information and special offers

Contact us For information or technical assistance contact your local VWR representative or visit. www.vwr.com.

Warranty

VWR warrants that this product will be free from defects in material and workmanship for a period of two (2) years from date of delivery. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorizations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorization, unless any refusal is due to a defect of the product.

Equipment Disposal



This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

Instead it's your responsibility to correctly dispose of your equipment at lifecycle -end by handing it over to an authorized facility for separate collection and recycling. It's also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste of equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

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