

DW-F800 Fiber Analyzer User Manual



Please read operating manual before installation and operation.

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Warning: the person in charge should know that if the instrument is not used in accordance with the methods required by the manufacturer, the protection provided by the instrument may be impaired.



Warning: please deal with the various solutions used in the analysis carefully according to the laboratory safety stipulations. Refer to the corresponding safety information list of the materials. Wear the lab gown, eye protector and rubber gloves during the experiment. Be careful not to be scalded when dealing with hot reagents.



Warning: Risk of electrical shock! The cover and panel of the instrument can only be opened by professional qualified personnel.

I. Overview

F800 Fiber Analyzer is appropriate for the content analysis of the Crude Fiber, acid/alkaline detergent fiber (ADF), neutral detergent fiber (NDF), acid detergent lignin (ADL), cellulose and hemicellulose in the raw materials and finished products of food, grain and feed.

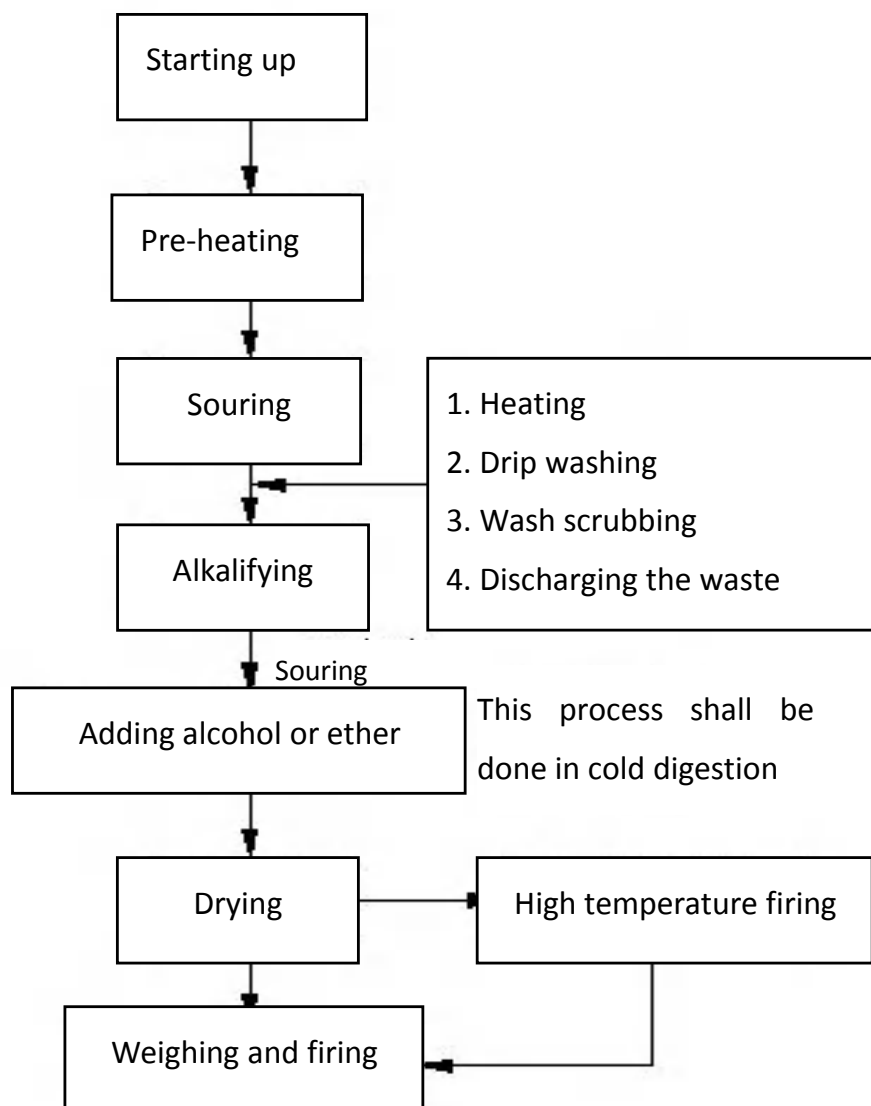
It's specifically designed for fibre determination in accordance with Weende, van Soest and other recognised methods internationally. It's made of high-quality anti-corrosive materials and can deal with six samples simultaneously. Its precise design optimizes the operation, and could conduct operations such as acid-base hydrolyzation, cold/hot digestion, Back washing, automatic evacuation and electronic temperature control safely.

1.1 Determination Principle of Crude Fiber

Under the function of diluted sulphuric acid, the sugar, starch, pectic substance and hemicellulose in the sample are eliminated through hydrolyzation, then protein and fatty acid are eliminated through alkali treatment. Then mineral substance is eliminated through high temperature firing and the remaining substance is crude fiber.

The Crude Fiber determined by this principle is not an exact chemical substance, but a rough element under the compulsory stipulations; it is dominated by cellulose, mixed with a little hemicellulose and lignin.

1.2 Operation Process of the instrument



II. Main Technical Parameters

Including: processes such as scouring, rinsing, alkaline cleaning and filtering

Volume of the sample: 0.5 - 3.0 g

Measuring scope: 0.1-100 %

Repeatability error:

Crude fiber content of below 10%, ≤ 0.4 %

Crude fiber content of over 10%, ≤ 1 %

Simultaneous handling capacity: 6 samples

Crucible: the sand core aperture of F800 standard crucible is 40-100 micron. 16-40 micron, 100-160 micron and 160-250 micron are optional.

Measuring time: around 90 min on the instrument (including 30 min for acid boiling, 30 min for alkali boiling and 30 min for waste discharging and washing)

Built-in air pump: Back washing pressure > 4 bar

Waste discharging mode: negative pressure vacuum waste discharging.

Heating: infrared radiation heating

Heating power is continuously adjustable

Power source: 220 VAC $\pm 10\%$ 50Hz

Rated power: 2.2KW

Volume: 776 mm×530 mm×645 mm

Net weight: 75kg

Attention

Do not lift the lifting bar in the process of digestion.

If the sample easily bubbles, please boil it slightly.

After the experiment, drain off the water in pre-heating module water tank, so as to prolong the service life of the machine.

III. Structure of the instrument



Fig. 1. Front View

1. Manual water valve; 2. Tube; 3. Lifting bar;
4. Heating area; 5. Reflector; 6. Lifting module;
5. 7. Touch screen; 8. Power regulation knob; 9. Solution 1;
10. Solution 2;

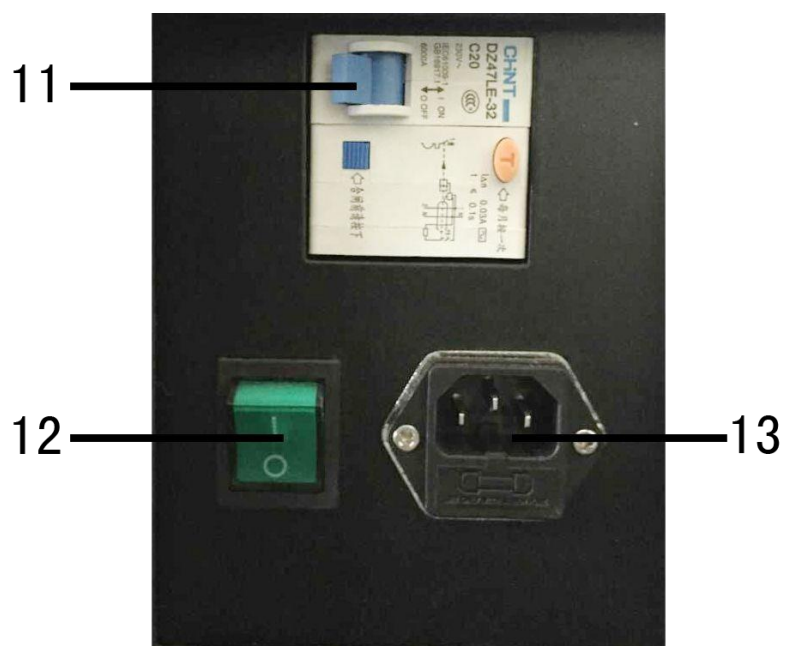


Fig. 2 Right Side

11. RCD; 12. Power switch; 13. Power socket;

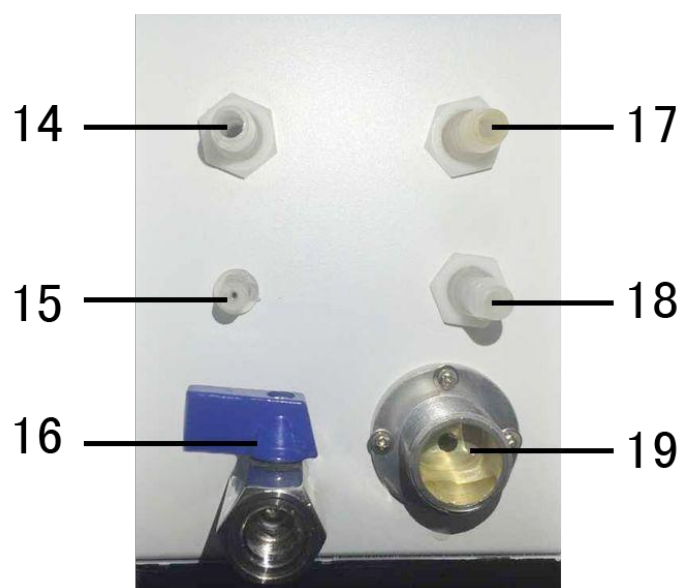


Fig.3 Left Side

14. Overflow of the water tank; 15. Inlet of distilled water;
16. Evacuation gate of the water tank
17. Water-outlet of condensed water;

- 18. Fluid-discharge outlet of waste fluid;
- 19. Water-inlet of condensed water

IV. Installation

4.1. Installation Requirement

Input voltage: 220VAC \pm 10% 50Hz; air switch, earth leakage circuit-breaker and reliable earth wire need to be equipped.

This instrument should be installed at the place close to the water source and water sink. It should also be installed at the place with power socket and the operating floor should be able to bear the weight of 100KG.

The power configuration should accord with the power supply requirements and electric overload should be avoided. Earth wire, independent power supply switch and fail-safe should be equipped so as to guarantee the safety of operators.

This instrument should be installed at the place far from large-scale power-driven devices and far from electromagnetic field interruption.

4.2. Installation Procedures

Put the instrument steadily on the test-bed and the back side of the instrument should be at least 20cm away from the wall. The distance between power socket and the instrument shall be within one meter. In addition, air switch and reliable earth wire should be equipped. The location of water and power is shown in Fig.2 and 3.

V. Usage of the instrument

F800 Fiber Analyzer mainly digests the sample according to the common acid-alkali digestion method at present and gets the content of Crude Fiber of the sample by determining the quality difference before and after incinerating.

The principal machine of F800 is composed of pre-heating system, liquid adding system, digestion and heating system, waste discharge and Back washing system and manual lifting machine.

The functions of this instrument include: preheating, acid digestion, alkali digestion, waste discharge and Back washing.

5.1. Starting up and Preheating

After turn on the power of the instrument, the start-up interface is shown in Fig.4

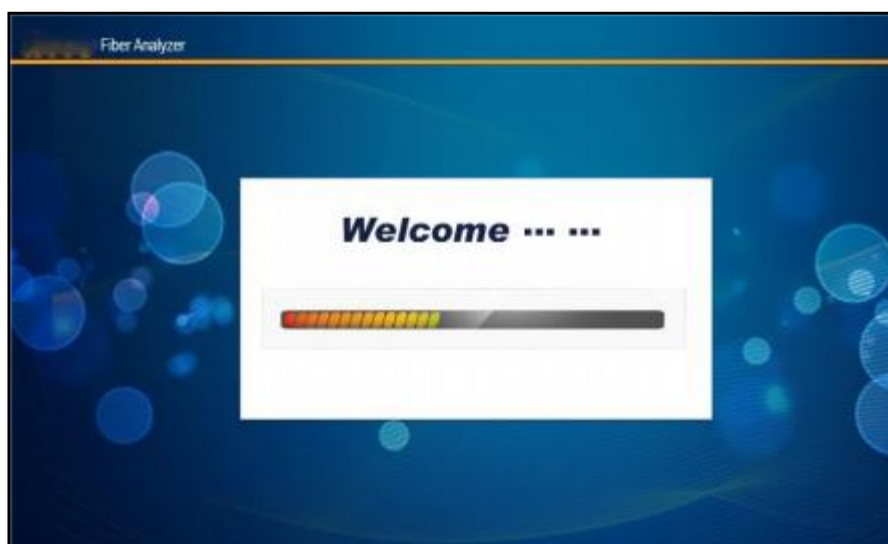


Fig.4

Then the instrument automatically enters pre-heating interface, above which is the slogan of the company and the instrument name. The interface displays four state icons: 【water level】 , 【Temperature】 , 【Solution 1】 and 【Solution 2】 as well as an operating button 【preheating】 . Fig.5 is the initial state after starting up.



Fig.5

After clicking pre-heating button, the instrument will automatically heat the reagent and distilled water.



Fig.6

The state after completing preheating:



Fig.7

5.2. Test

Click **【Test】** in menu bar and enter test interface, as shown in Fig.8.



Fig.8

5.2.1 Adding Reagent

First choose reagent bucket I or reagent bucket II, then click **【Adding solution】**, as shown in Fig.9.

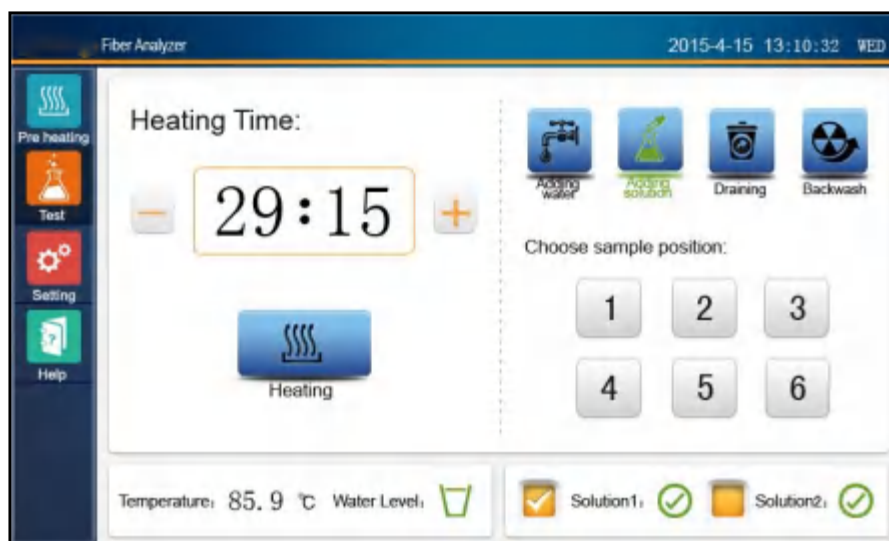


Fig.9

In this interface, click the corresponding number of the crucible to add reagent, as shown in Fig.10. Add 150mL reagent (lower limit: 120mL / upper limit: 170mL). Click again the button of the crucible number, stop adding liquid, or directly click the button of the next crucible number to stop adding liquid and automatically switch to the next crucible for adding liquid.

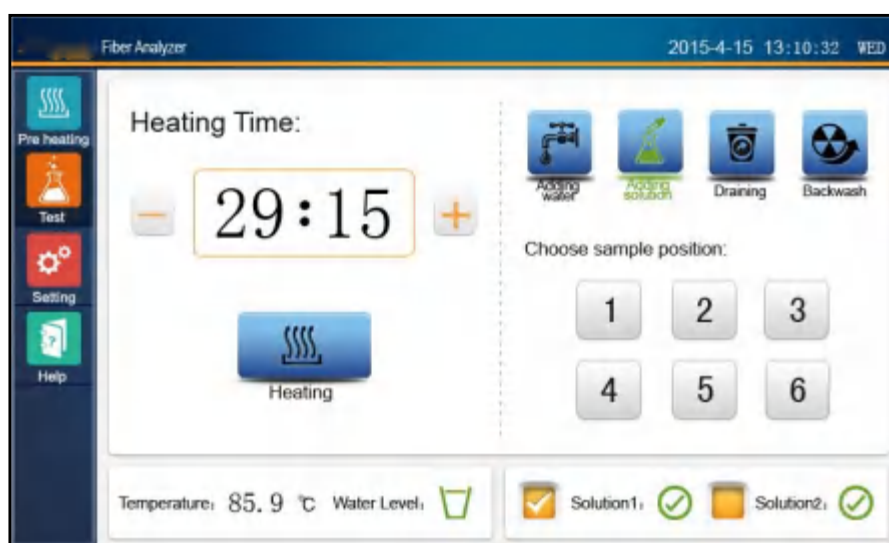


Fig. 10

5.2.2 Heating

Heating is controlled by **【Heating】** button and the “power regulation knob” in the right lower side of the screen. Before heating, set the heating, and then click **【Heating】**; the **【Heating】** turns green.



Fig. 11

Revolve “power regulation knob” clockwise to the maximum, and the instrument is heating with its full power until the solution is boiling. Then revolve “power regulation knob” to make the solution maintain keep slightly boiling state. When heating to the set time, the instrument automatically stops heating and alarm.



Fig. 12

If heating needs to pause in the mid of the test, please directly click 【Heating】 button. Click it again to continue.

5.2.3 Waste Discharge

In the current interface, click 【Draining】 to choose the crucible that needs discharge waste and the instrument will automatically finish waste discharge.



Fig.13

5.2.4 Back washing

This function is mainly used to prevent the blockage of glass sand core in waste discharge process. Click **【Back washing】** to choose the crucible that needs Back washing.



Fig. 14

5.2.5 Washing

Click **【Adding Water】** and the pump start working. Open the manual water valve above the tube. After adding water, please remember to close manual valve, click **【Adding Water】** on touchscreen to close the water adding pump.



Fig. 15

5.3. Setting

Click **【Setting】** button on the menu bar and enter setting interface. On this interface, you can set up the waste discharge time, Alarm, heating timing mode and instrument time according to the needs of the experiment.

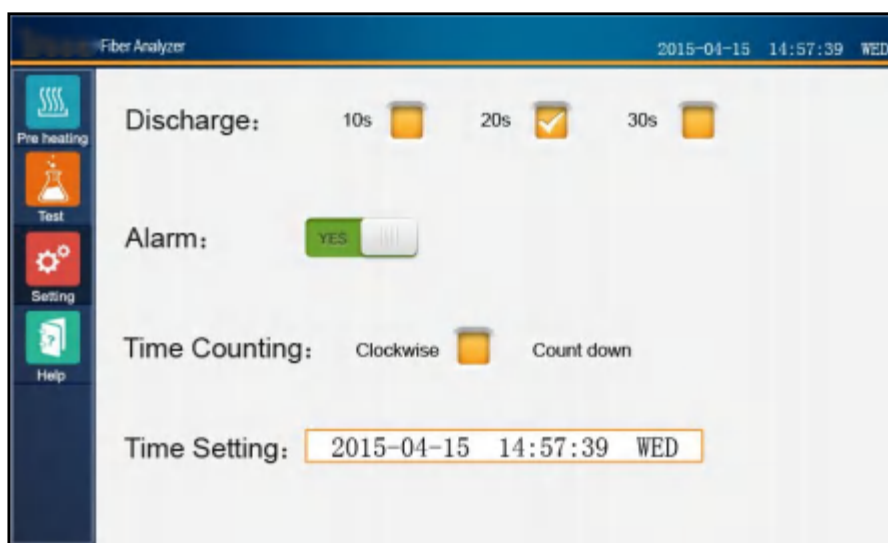


Fig. 16

The setting method of time is as shown in Fig. 17.

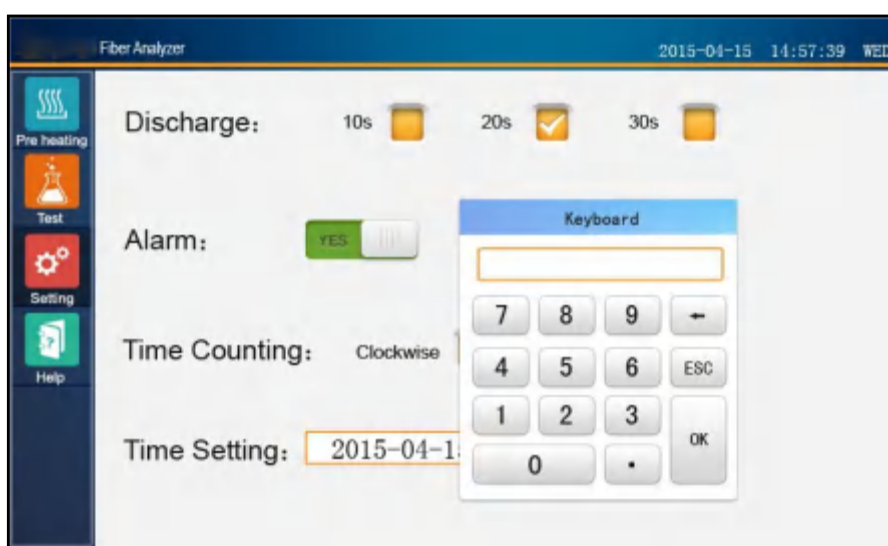


Fig. 17

5.4. Help

Click **【Help】** in the menu bar to enter help interface



Fig. 18

VI. Experimental Operation

6.1. Instrument and Tools

- (1) Grinder or mortar
- (2) Sample griddle: aperture 0.45mm (40 meshes) (according to the concrete determination standard)
- (3) Analytical balance: sensibility 0.0001g
- (4) Dry Oven: control the temperature at 130℃.
- (5) Furnace: temperature is adjustable between 200℃ and 800℃.
- (6) Dryer: taking allochroic silicagel as the desiccating agent.

6.2. Reagent (for reference)

- (1) H₂SO₄ solution: 0.127±0.005 mol/L , use NaOH standard solution demarcate it.
- (2) NaOH solution: 0.313±0.005 mol/L use potassium acid phthalate method demarcate it
- (3) 95% alcohol
- (4) Acetone
- (5) Octanol (defoamer);
- (6) pH test paper.

6.3. Experimental Procedures

- (1) Take 0.5-3g processed sample and put it in the weighed&dried crucible.
- (2) Turn on the instrument; click 【 Pre heating 】 after entering the operation interface;
- (3) Put the crucible with sample into the instrument. Slowly press lifting bar to make the lifting assembly press the crucible tightly. Then open cooling water switch.
- (4) Add solution 1→ Heating→ Draining→ Adding water→ Draining (if the sample is too tight when filtering, back washing first and then

filtrate it);

- (5) Add reagent 2→ Heating→ Draining→ Adding water→ Draining (if the sample is too tight when filtering, back-flush first and then filtrate it);
- (6) Add alcohol or acetone and filtrate (conduct this process in cold digestion);
- (7) Put it into oven to dry, weigh and calculate (if there are more insoluble residues in the sample to go through ashing, weigh and calculating).

VII. Attention

7.1. Attention for the Sample

- (1) The particle size of the sample will influence the analysis results. After shattering or grinding, it should be griddled according to the related standards.
- (2) If the fat content of the sample is over 10%, first degrease. If it is not totally degreased, the analyzed result will be higher.

7.2. Attention in Operation Process

- (1) In second and following procedures, when adding liquid to the instrument, the liquid should be guaranteed to be hot in order to avoid breaking of the digestion tube due to temperature differences.
- (2) In the experimental process, the sample is forbidden the residual on the wall. After acidolysis (or alkaline hydrolysis) is done, fluid discharge should be slowly made so as to prevent the floating sample from sticking to the wall of digestion tube. If the sample is stuck and cannot be cleaned by water, it can be brushed off from the bottom by pappus brush.
- (3) Crucible should be handled carefully and avoid bumping, breaking, crushing, etc.

VIII. Repair and Maintenance

8.1. Daily Maintenance

- (1) The instrument should be cleaned with hot water and should not be cleaned with solution like washing powder or dishwashing liquid. If it cannot be cleaned totally, a small amount of solution can be used to clean.
- (2) If the crucible is used for a long time and there is obvious blockage, after being dry, put it in muffle furnace to be fired at 500 degree for 1-2 hours, and clean it after cooling.

8.2. Repair of Simple Breakdown

S/N	Breakdown	Reasons for Breakdown	Solutions
1	Power-off	a. Tipping of leakage protector b. The power line is not tightly plugged. c. The fuse is burned out d. There is breakdown in the internal switching power supply	a. Switch on leakage protector b. Re-plug the power line c. Replace the fuse of power socket d. Report to After-sale Service Department of Drawell Instruments
2	The heater does not work	a. Circuit goes wrong b. The heater breaks down.	Report to After-sale Service Department of Drawell Instruments
3	The elevation of temperature is abnormal.	The temperature control knob or heating line goes wrong	Report to After-sale Service Department of

			Drawell Instruments
4	No display of the screen	a. The display screen is broken b. The internal circuit goes wrong	Report to After-sale Service Department of Drawell Instruments
5	The electromagnetic valve is abnormally opened or closed	a. Program damage b. The electromagnetic valve goes wrong.	a. Switch off the power of the instrument and then restart. b. Report to After-sale Service Department of Drawell Instruments

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