Huazheng®

HZCS-3
Automatic Oil Acidity Tester

Huazheng Electric Manufacturing (Baoding) Co., Ltd

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Dear customers：

Thank you for choosing **HZCS-3 transformer oil acid tester**.

We hope that this instrument will make your work more relaxed and happy, So that you can get clear and accurate results in the experimental analysis work.

Please read this User Manual before using the tester, and follow the instructions to operate and maintain it for prolonging its service life.

This instrument is characterized by “Performing the test automatically by a slight click only”.

If you are satisfied with our product, please introduce to other users. Any other problems in using this equipment, please tell us .We are always at your service for giving you every satisfaction.

I. Overview and Technical Index

1. Overview

HZCS-3 transformer oil acid tester is a fully automatic measuring instrument which adopts the extraction method to accurately detect the insulating oil acid value. This instrument can improve the working efficiency and test accuracy, and at the same time ensure the safety of the body by reducing the operator's contact with the samples and reagents.

The instrument will automatically search the samples, inject the extraction, make a blank titration, do an experiment, clean off, display printing results and other operations as long as the operator put the sample cups in the sample cup holes and inject the extraction in the cup. Once started, 1 to 3 samples can be measured, which is convenient and high efficiency.

Because of the preparation of the standard acid for instrument calibration and calibration procedure, the clients can calibrate the instrument and the neutralizing liquid at any time so that the instrument can overcome the defect of changes in concentration of neutralizing liquid during use. At the same time, during the test the instrument will automatically deduct the background value of the extract so that the instrument can ignore the influence from the change of background value on the extraction. All these design make the result more accurate and reliable.

2. Technical index

1) Test range: 0.002～1mg KOH/g
2) Test error: ≤±0.005mg KOH/g
3) Repeatability: ≤0.005mg KOH/g
4) Ambient temperature: 10℃～45℃
5) Relative humidity(RH): ≤85%RH
6) Voltage supply: AC220V/50Hz
7) Power: 50W

II. Structure and Installation

1. Host structure

the positive side

2. Installation

1) After unpacking, put the instrument in a stable laboratory bench. Then check whether the parts are damaged or not, and whether the random accessories are complete.

2) Connect the power supply.

Note：The instrument must be adequately grounded.

III. Preparation Work

1. Preparation solution

Six kinds：Neutralizer(Ethanol—KOH) solution、Extraction、Standard acid solution、BTB aqueous solution、Washing solution、Anhydrous ethanol。

（1）Neutralizer(Ethanol—KOH): The white solid in the glass bottle labeled KOH supplied with the instrument transfer to the glass bottle with the Ethanol-KOH label as much as possible. And then inject about 100 ml of Anhydrous Ethanol in the glass and shake it completely so that it is completely dissolved. At last, set aside for a day and night.

（2）Extraction liquid configuration:

① Prepare a 1500ml container (A) and a 300ml reaction cup (B), pour 500ml isopropyl

alcohol and 500ml petroleum ether into the A container;

② Take 1 bottle of extract medicine block (see above) into reaction cup B, add 10ml isopropanol and 10ml petroleum ether, stir the extract medicine block, isopropanol and petroleum ether in the reaction cup, stir and dissolve into the pre In the prepared A container;

③ Pour 10ml of petroleum ether and 10ml of isopropanol into the B reaction cup. After mixing petroleum ether, isopropanol and the residue, pour it into the A container again and stir evenly;

④Finally, the mixed liquid in container A is poured into empty glass bottles (empty bottles containing isopropyl alcohol and petroleum ether can be used), the cap is screwed tightly and shaken sufficiently to completely dissolve, and the extraction liquid is completed.

（3）Extraction：The essential materials include a container(a clean and dry drinking water bottle is allowed) that more than 1000ml capacity, a reaction cup,500ml Isopropyl Alcohol and 500ml Petroleum Ether. Open the plastic bag with the extract provided with the instrument, put the extract in the reaction cup, and add a small amount of isopropyl alcohol and petroleum ether to dissolve, transfer the solution to the large container prepared in advance, then wash the reaction cup with petroleum ether and isopropyl alcohol several times. The cleaning liquid is poured into the large container together. The remaining petroleum ether and isopropyl alcohol are all poured into the large container and shaken. At last, inject the solution in the blank bottles which contained Isopropyl Alcohol and Petroleum Ether.

（4）Standard acid solution：The solution is the 0.15mol/l Potassium hydrogen phthalate solution，which can access directly in the small glass bottle.

（5）BTB aqueous solution：Open the bag with BTB provided with the instrument and transfers it in the 100ml container as soon as possible. Then inject 100ml Anhydrous Ethanol and shake it completely. Draw 0.5 ml of this solution with the graduated pipette and add 50ml distilled water, and then there is the BTB aqueous solution.

（6）Washing solution：Transfer the white solid in the glass bottle labeled with KOH to the wash gas cylinders as soon as possible. Then inject 50ml water and shake it completely .At last set aside to use.

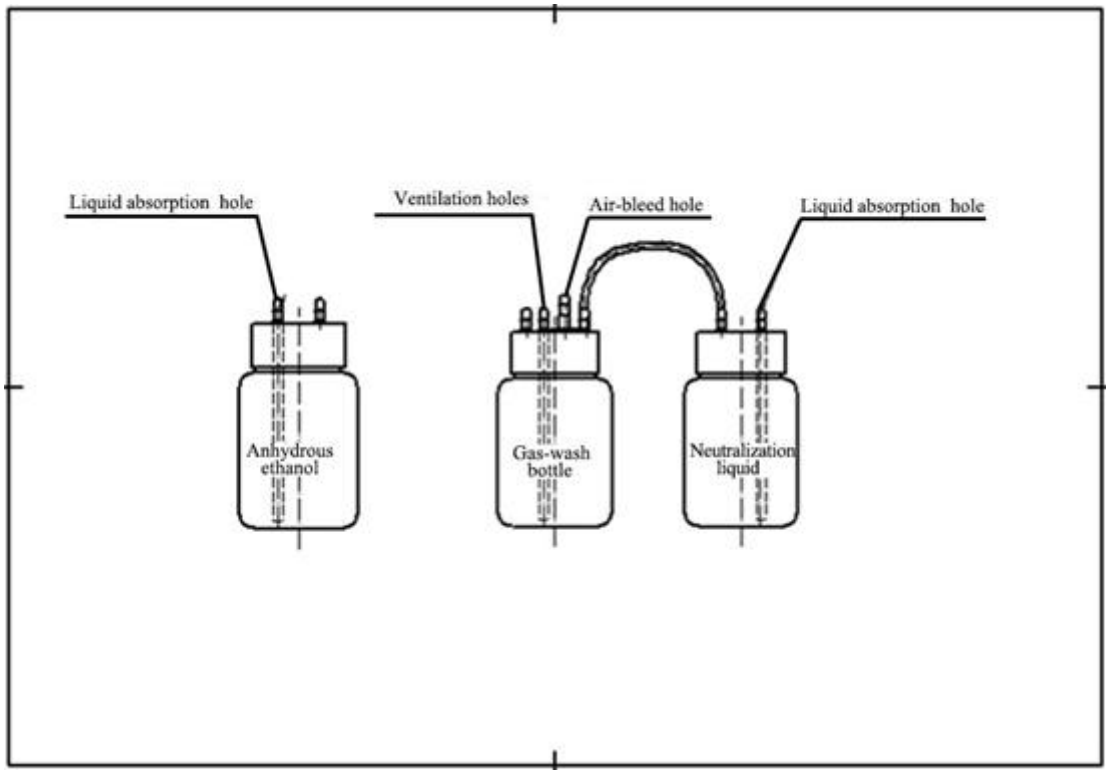
（7）Anhydrous ethanol：Inject Anhydrous Ethanol in the wash bottle provided with the instrument.

2. Pipeline connection

Open the instrument back cover，put in the three plastic bottles of anhydrous ethanol, washing gas cylinders, neutralizing liquid (ethanol-KOH) from left to right.

Connect another port of neutralizing liquid (ethanol-KOH) to the interface affixed with a neutral label with a hose; Inject the extract from the reagent bottle into the extraction cell; Connect the bottle of anhydrous ethanol to the interface affixed with a anhydrous ethanol label with a hose. Press the pressure arm of the peristaltic pump and lock it。After confirming correctness, close the instrument back cover。

As the picture shows：



IV. Instrument Operation

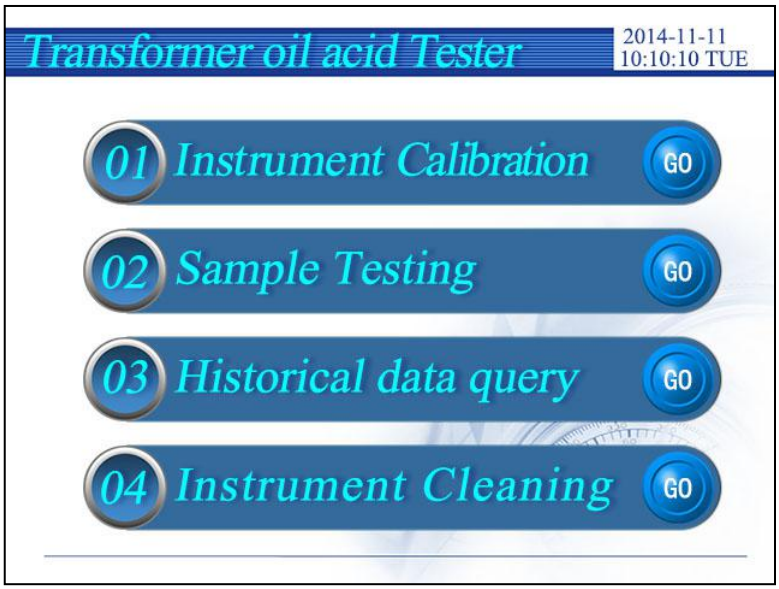
1. Start-up

Turn on the power switch which is on the left side of the instrument, then press the start switch again, the instrument enters the initialization interface.

If there is no sample cup on the sample tray, the instrument enters the following interface:

Open the front cover of the instrument and place it in the sample cup (placed in the second cup position). After the sample cup is detected, the instrument starts to extract the extract. If there is no extract, it will prompt to add the extract. After adding the extract, click the OK button to extract. Start the titration test after the extract:

When there is 20 drops, the instrument enters the main interface：



Click the time shown on the upper right corner, the instrument enters the following interface and time can reset.

Input the date and time in turn and click the "**OK**" button，time can reset successfully.

Note: Stirring should be placed in the cup for calibration and sample testing.

2. Instrument Calibration

If the instrument is used in the first time or the neutralization is being changed , this step is necessary. In other situations this step can be ignored.

In the main interface click "**Instrument Calibration**", the instrument enters the following interface:

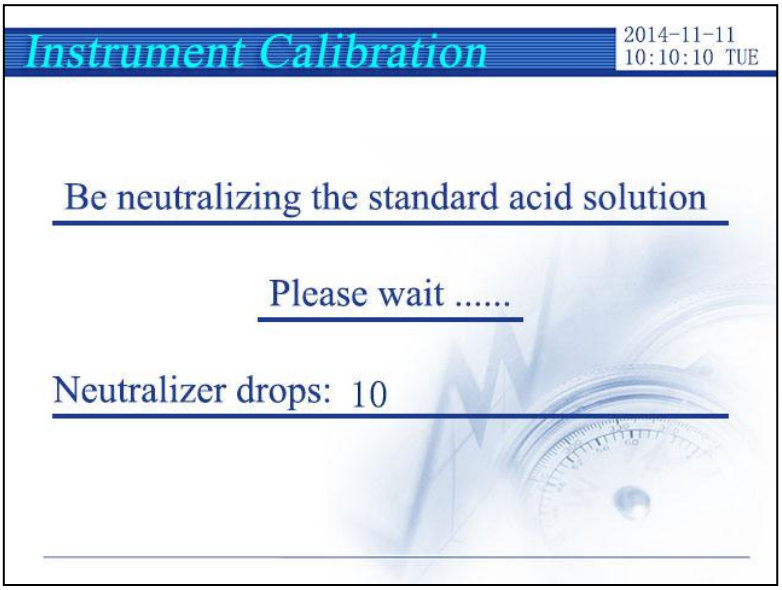
In this interface there are history dates. If the instrument needs re-calibration or verification, click the "**Recalibration**" or "**Verification**" button and start a calibration. The instrument enters the following interface:

According the prompt, inject 20ml BTB aqueous solution accurately in a sample cup (see details in the chapter 3 BTB aqueous solution) and put the cup in the sample tray. Click the "**Start**" button and a blank titration is beginning. The instrument enters the following interface:

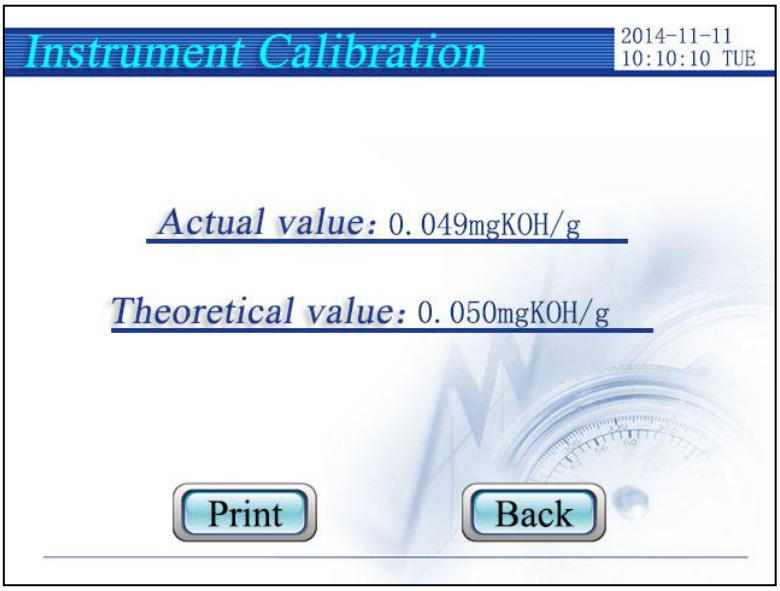
When the blank titration is finished, if a re-calibration is in progress, the instrument enters the following interface:

If verification is in progress, the instrument enters the following interface:

Input the volume of the standard acid solution; inject corresponding 0.15mol/L standard acid solution with micro injector (see details in the chapter 3 “Standard acid solution”) in the cup. Click the “**Start**” button, the neutralization is in progress, the instrument enters the following interface:



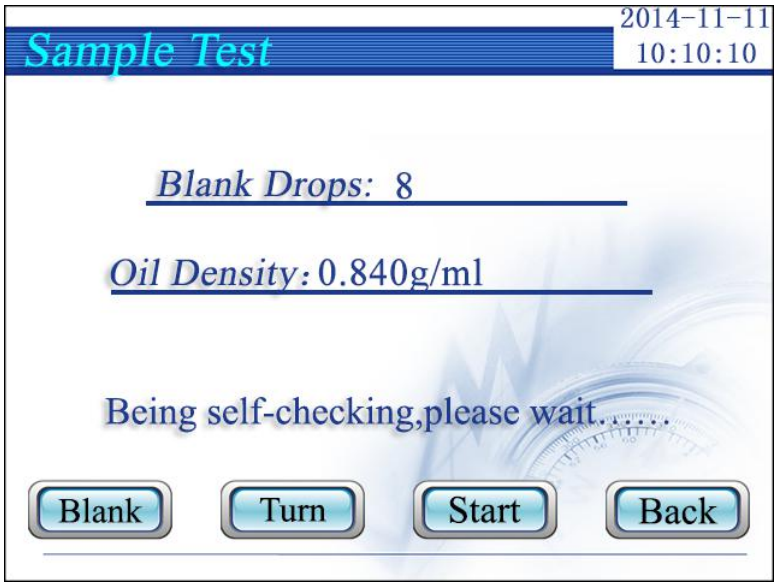
When the neutralization is finished, if a re-calibration is in progress, the instruments update the calibration value and enter the main calibration interface. If verification is in progress the instrument enters the following interface:



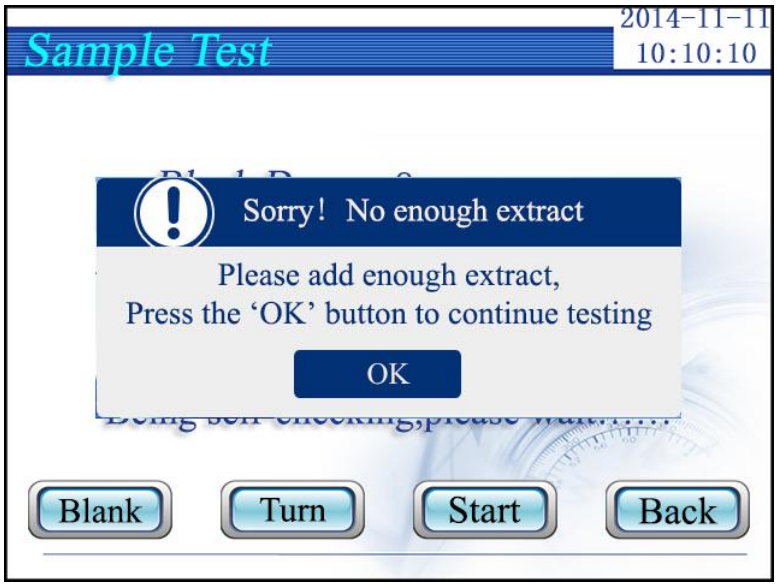
Click the "**Print**" button to print the result of verification or go back the main calibration interface.

3. Sample test

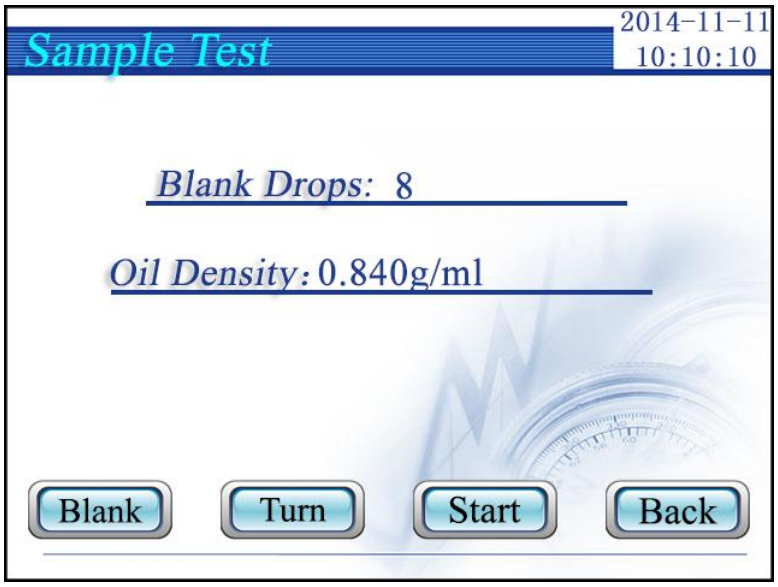
In the main interface, click the "**Sample Testing**" button, the instrument enters the following interface:



If there is no enough extract, the instrument warns like the following interface:

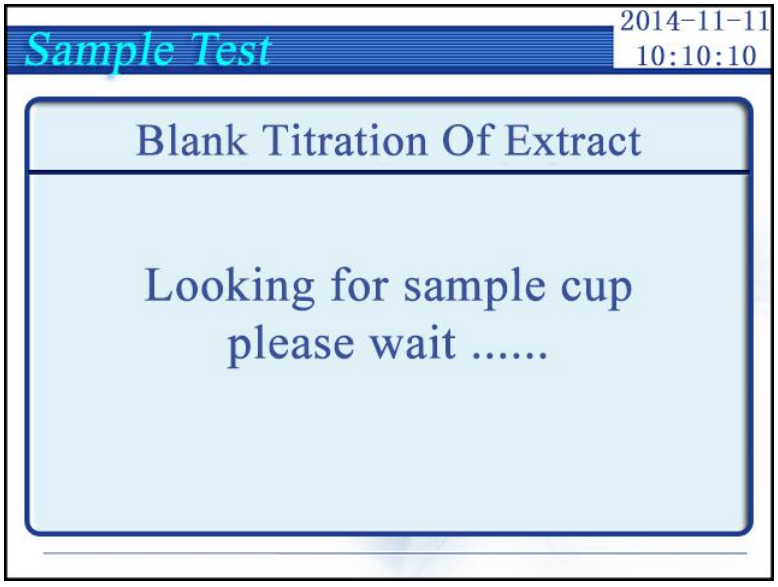


Add enough extract and press "**OK**", after the self-inspected the instrument enters the following interface:

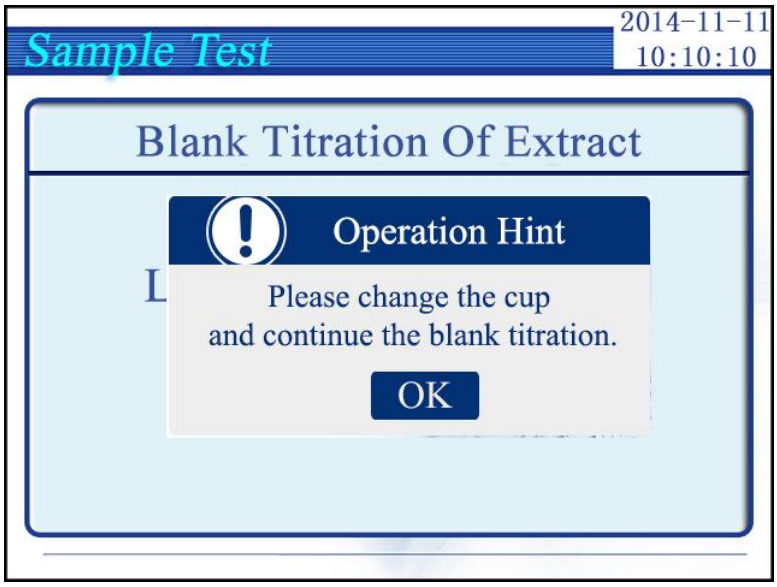


It should be noted that the extract is subjected to blank titration after the addition of the extract. The specific steps are to put a clean sample cup into the sample tray.

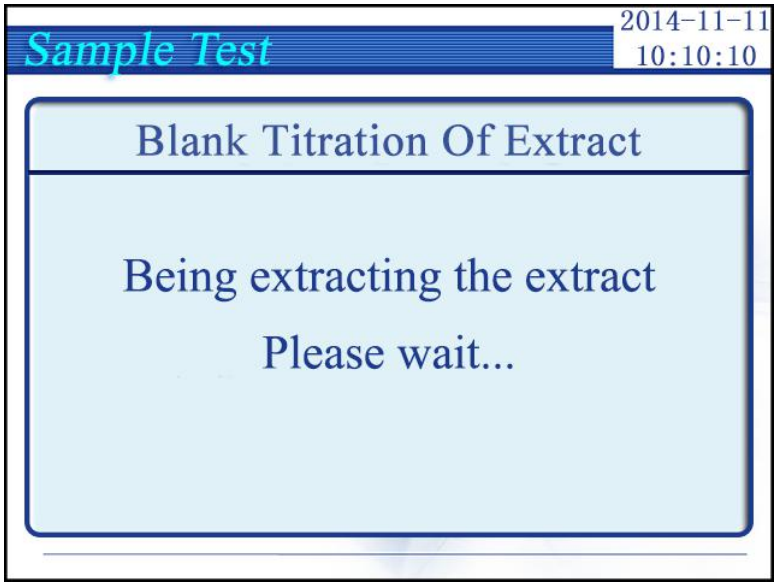
Click the "**Blank**" button to start blank titration of the extract. The instrument enters the following interface:



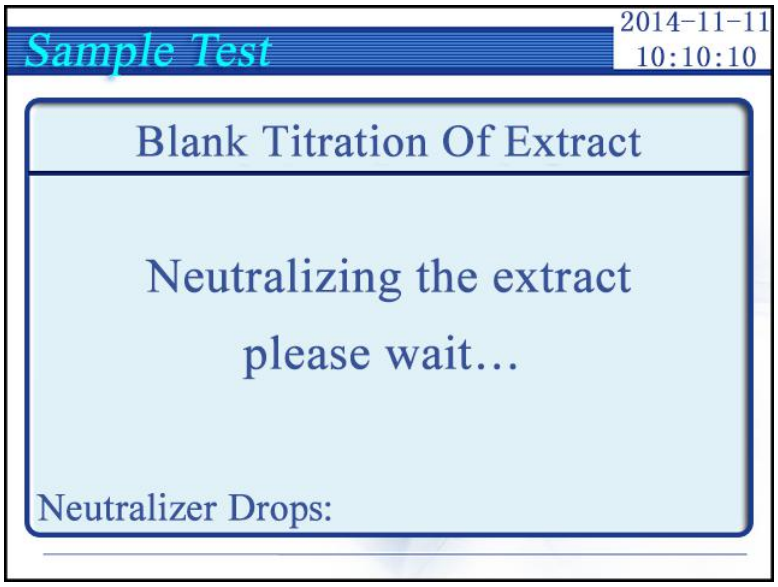
Looking for the sample cup, after this progress the interface will prompt to change the cup, the interface is as following:



Replace the sample cup with a clean sample cup. Click OK to start extracting 20ml of extract.



Then blank titration of the extract is in progress, the interface is as following:

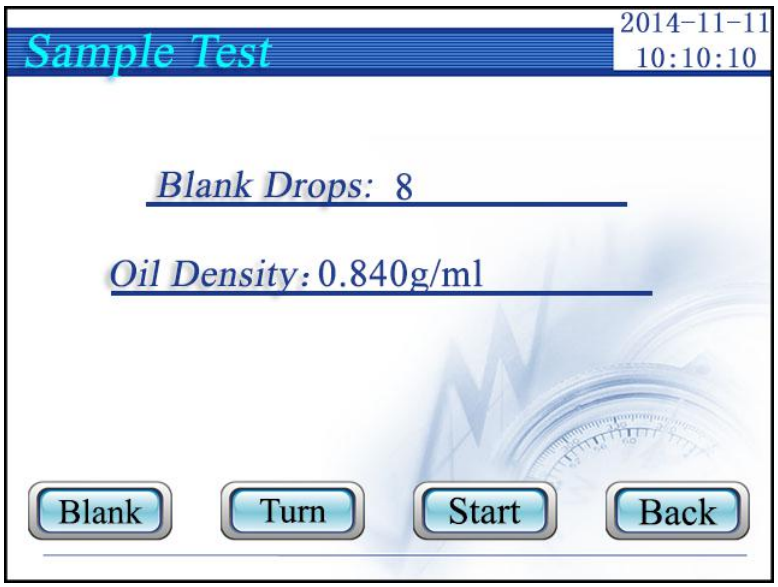


The number of blank titration drops is automatically saved after the titration is completed. The extract should be blank calibrated in the following cases:

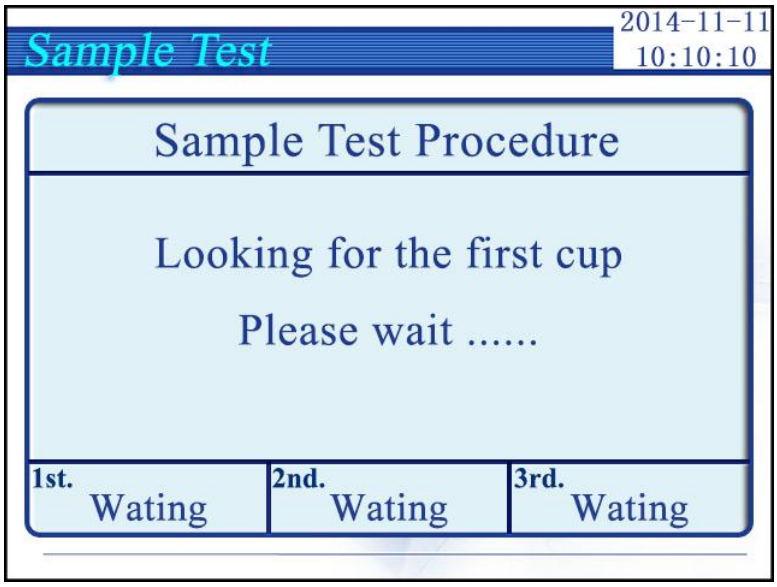
1) replace the extract;

2) Replace the neutralizing solution.

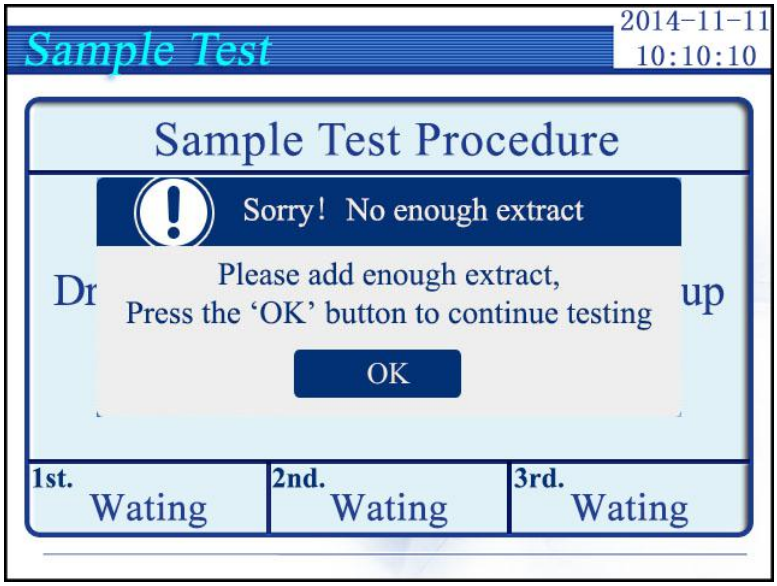
Then the instrument enters the following interface:



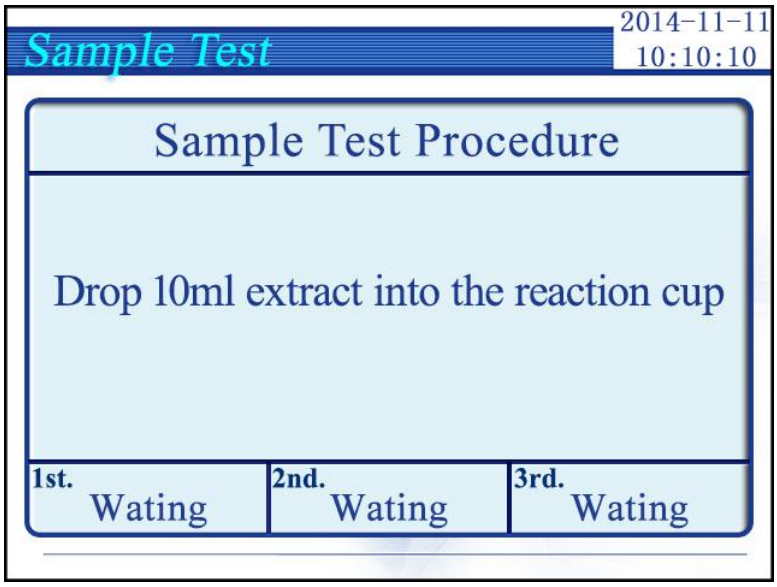
Input the oil density, click the "**Turn**" button and put cups in turn, click the "**Start"** button and the instrument enters the following interface:



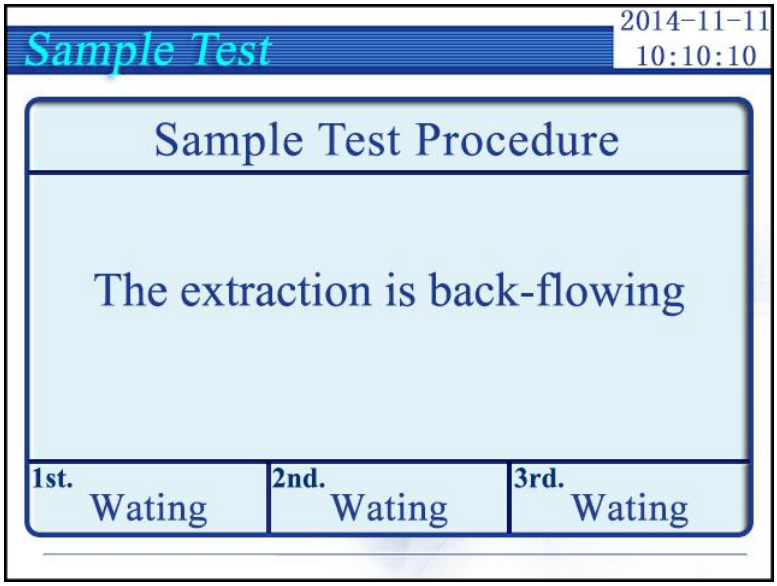
The instrument starts looking for the first cup, when the first cup is founded and the cup is founded, if there is no enough extract the instrument enters the following interface:



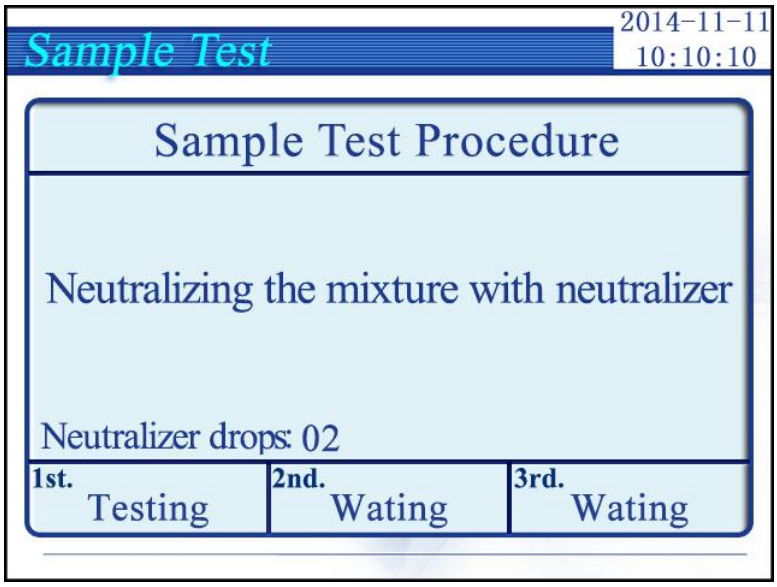
After add enough extract, press the "**OK**"button to continue testing. The instrument enters the following interface:



When this step finished the extraction is back-flowing, the instrument enters the following interface:



When this step finished the neutralization starts, the instrument enters the following interface:



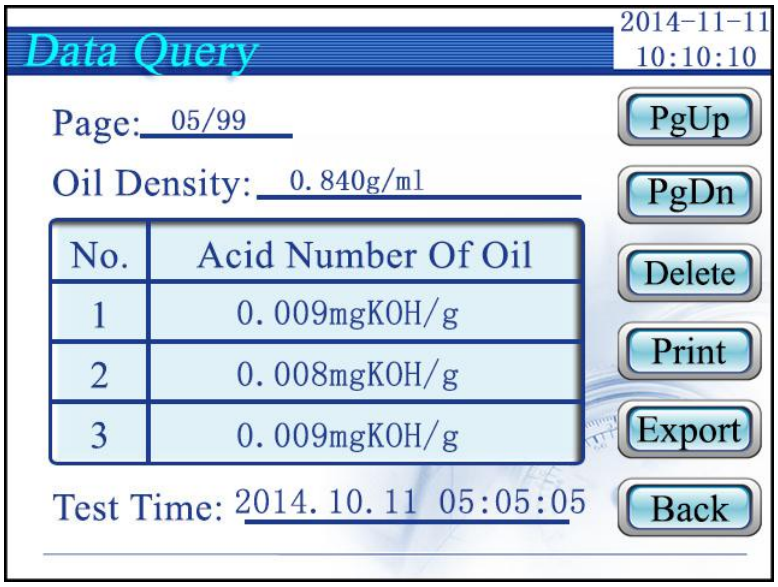
When this step finished the result is shown and the instrument is looking for the next cup, the instrument enters the following interface:

If there is no sample cup, the instrument is looking for the next cup and shows as the following interface:

When this test is finished, the instrument enters the “History data query” interface (see details in the part below) and the operator shall take out all cups and clean up it before the next test or closing the instrument.

4. History data query

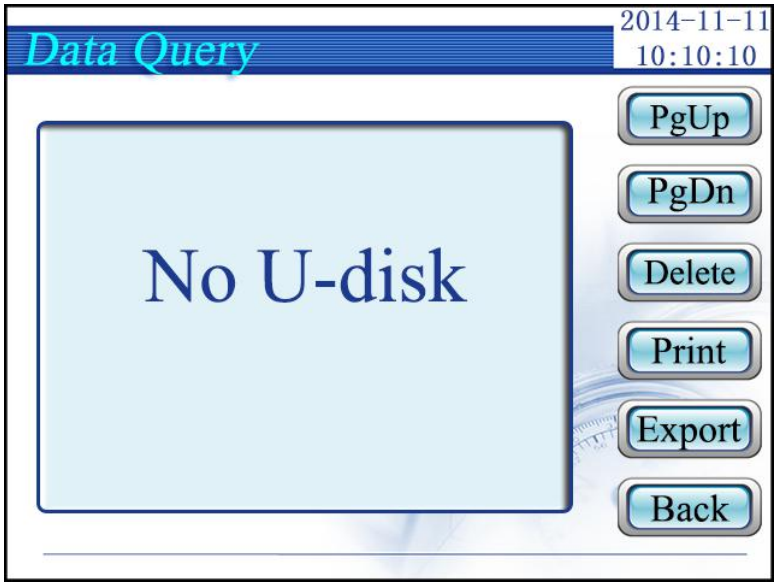
In the main interface click the “**History Data Query**” button, the instrument enters the following interface:



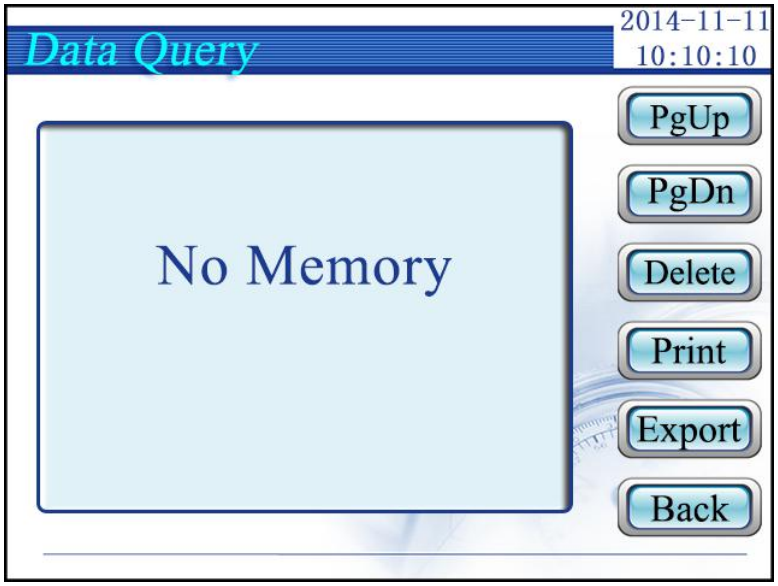
Press the “**PgUp**” and “**PgDn**” button, history data can be founded. press the “**Delete**” button, delete data shown on the screen; press “**Print**” button, print data shown on the screen; press “**Back**”, return to the main interface.

Click on the "**Export**" button, the instrument will transfer the stored data to storage devices such as U disk. If no USB storage device is connected, the instrument will prompt

the following interface.



If there is no history data, the instrument enters the following interface:



5. Instrument cleaning

Put in a sample cup and press the "**Instrument Cleaning**" button in the main interface, the instrument starts cleaning up and enters the following interface:

Turn off the power of the instrument. Take out the cup and clean up it. Open the back cover of the instrument then loosen the hose arm of the upper part of the peristaltic pump, then close the back cover.

V. Maintenance

1. Replace the reagent

1) Replace a bottle of anhydrous ethanol when it run out ;

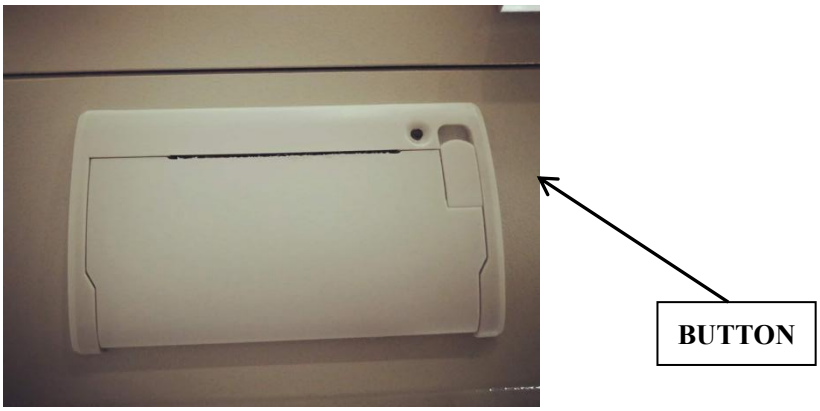
2) Configure a bottle of extraction when it run out and inject it into the cell;

3) Configure a bottle of neutralization when it run out and take out the bottle labeled with neutralization, inject the neutralization into the bottle labeled with neutralization and put it back. In this situation the instrument need re-calibration.

2. Replace the peristaltic pump tube

Open the upper cover of the instrument and turn the handle of the peristaltic pump to the right. Replace the old pump tubing with new pump tubing, then turn the handle of the peristaltic pump to the old position.

3. Replace the printer paper



Open the button shown on the picture above, and put in a new printer paper and close the cover of printer.

If there is no word, check whether the printing paper is reversed。

Shut down the power and press the “LF” button continuously, at the same time turn on the power, after 5s release the “LF” button and the printer enters the setup step, adjust the printer following the prompts。

In the open state, press the “SEL” button at a long time, the printer will self-tested print the font.

VI. Operation Notice

1. The peristaltic pump hose is easy to wear. Please check whether the hose is damaged or adhesion carefully to reduce the impact on the instrument。 If there is any abnormal, replace the hose. After the instrument finished, please release the squeeze arm of the peristaltic pump to prevent the peristaltic pump hose from being damaged by the arm.
2. It is recommended to re-calibrate with standard acid if the instrument is not used for more than three months.
3. When preparing the extract, the container must be dry and cannot have water. The extract is sealed and stored.
4. When the test is continuous, it is allowed that the cup cannot be cleaned. If not, the cup must be cleaned and the sample cups should be completely dry before use.
5. After the test must be cleaned off.

VII.Packing List

No.	Item	Qty
1	Main engine	1
2	Neutralization liquid medicine	2
3	Extracted liquid medicine	2
4	Gas washing bottle medicine	1
5	Indicator	1
6	Standard acid	1
7	Microsyringe	1
8	Sample cup	4
9	Stirrer	5
10	Glass bottle	3
11	Glass bottle cap	3
12	Tubing for Peristaltic Pumps	1
13	Print paper	2
14	Power line	1