

# **PS-2003 Automatic oleic acid value tester**

## **Operation Manual**

Please read the operation manual carefully before using this product and keep the operation manual for future reference.

**Baoding Push Electrical Manufacturing Co., Ltd.**

# **Product Catalog**

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## **Preface**

Dear users:

Thank you for choosing the PS-2003 Automatic oleic acid value tester! For your convenience as soon as possible to operate the instrument, we were equipped with a detailed manual, from which you can get information about the product introduction, use method, instrument performance and safety precautions and many other aspects of information.

Before the first use of the instrument, please read this manual carefully, and maintenance according to the manual of equipment for the operation and use, it will help you to better the product, and can prolong the service life of the instrument.

In the preparation of this manual, although we are working in a scientific and rigorous manner, and that the information provided in this manual is correct and reliable. However, there are bound to be mistakes and omissions in this manual. If you find the mistake, please be sure to your time as soon as possible, try to inform the relevant personnel of the company, and we should supervise quickly correct the error! We shall be grateful to all the staff of the company!

The company reserves the right to improve the use of the instrument. If it is found that the function of the instrument is inconsistent with that of the operating manual during the use of the instrument, the actual function

of the instrument shall prevail. We hope that this instrument will make your work easier and more enjoyable. I hope you will feel the relaxed and beautiful feeling of office automation in your busy work!

When you are satisfied with our instrument, please recommend it to your friend! When you have valuable advice and advice on this instrument, please feel free to contact us. We will do our best to give you a satisfactory answer. Thank you again for your great support for our company!

## **1.Summary**

PS-2003 Automatic oleic acid value tester is our company's scientific research and technical personnel, according to the relevant provisions of the national standards, to play its own advantages, through long-term unremitting efforts, carefully developed and developed high-precision, fully digital industrial instruments. The machine is easy to operate and elegant in appearance. The instrument adopts fully automatic digital computer control to the chemical analysis, acid-base neutralization reaction as the basic framework, with self-developed background subtraction and blank titration end point logic decision procedure, so the measurement precision and accuracy are ideal.

The detection of transformer and turbine oleic acid value is a routine inspection item of power system and industrial and mining enterprises charging oil and electric equipment, and the acid value measuring

instrument is a special equipment developed by our company for measuring the acid value of the above-mentioned oil products. The instrument is based on a single chip microcomputer, and integrates many disciplines, such as light, computer, electricity and chemistry. The utility model basically replaces manual operation, not only improves work efficiency, but also reduces labor intensity of operators, and furthest reduces the harm to human body caused by organic solvent and other chemicals.

The acid value measuring instrument adopts the principle of neutralization method. Under the normal temperature condition, the microcomputer control automatically completes liquid addition, agitation, titration and end point judgment. The touch screen is used to select all the working parameters. The man-machine conversation interface is simple, friendly and easy to operate. The average analysis period of the oil sample is about 2 minutes. They can display up to 35 sets of measurement results, and print out a number of parameters related to the measurement.

A special reagent bottle is used to extract and neutralize the liquid. The choice of neutralizing liquid polyethylene plastic bottle storage, completely avoid the glass reaction may with caustic potash. In addition, developed a neutralizing liquid solid equilibrium gas purification device, completely avoid the effects of carbon dioxide and water vapor and solution concentration, but will not happen will be wrong with high

concentration of caustic potash or caustic soda solution purification as standard solution titration accident. During the working process, the user does not need to touch the organic solvent by hand, thereby reducing the harm of the chemical to the human body.

According to the user's requirements, the acid value tester can be used to determine 1~3 samples.

## **2. Technical parameter**

1. Linear range:  $0.001 \sim 0.900 \text{ mgKOH/g}$ ;

2. correlation coefficient:  $0.999 \sim 0.9998$

3. Rate of recovery:  $99 \sim 102\%$

4. Minimum resolution:  $0.001 \text{ mgKOH/g}$

5. Repeatability:  $2 \sim 5\%$  (RSD )

6. Measurement accuracy:

Acid value between  $0.001 \sim 0.100 \text{ mgKOH/g}$  is  $+ 0.003 \text{ mgKOH/g}$ ;

Acid value between  $0.100 \sim 0.900 \text{ mgKOH/g}$ , indicating  $2 \sim 5\%$ ;

7. Display mode:  $5.4''$  Large screen touch type color LCD screen (all English display)

8. Outline size:  $420 \text{ mm} \times 190 \text{ mm} \times 340 \text{ mm}$

9. Net weight:  $\sim 9 \text{ kg}$

## **3. Use condition**

1. Ambient temperature  $0 \sim 40^{\circ}\text{C}$
2. Relative humidity  $\leq 85\%$
3. Work power  $AC220V \pm 10\%$
4. Power frequency  $50\text{Hz} \pm 10\%$
5. Power consumption  $< 150\text{ W}$

#### 4. Illustration of cabinet and panel parts



Figure 1 PS-2003 Automatic oleic acid value tester



Figure 2 Oil determination darkroom

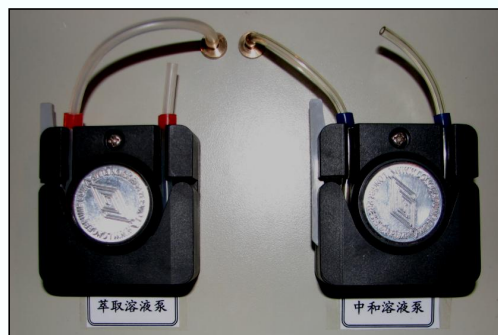


Figure 3 Extracting agent and neutralizing liquid peristaltic pump

## 5. Diagram of operation procedure

1. Plug in the power cord, turn on the power switch, and the LCD screen shows the boot page. ( Figure 4 )

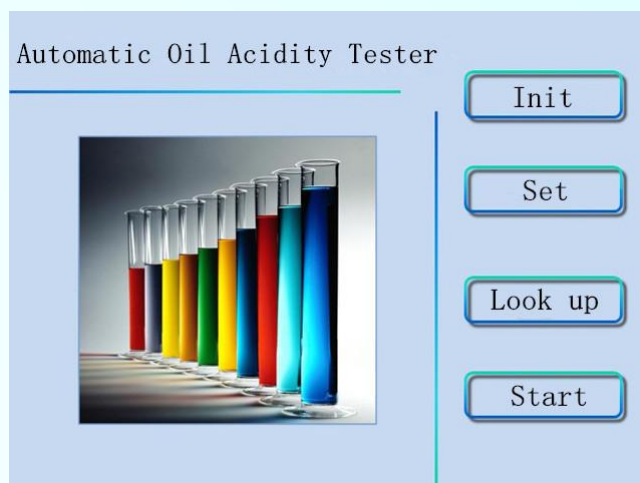


Figure 4 Boot page

2. Under the page shown in Figure 4, press the **Init** to enter the next page ( Figure 5 ) ;



Figure 5 Initialization page

3. In Figure 5 page, open the oil sample chamber cover with determination, a cup plate gently, make a cup of liquor hole position deviation titration. Take a cup in a cup of liquid hole, according to the



cleaning system for cleaning key system will automatically extract and neutralization pipeline, waste cup will undertake cleaning wastewater. The system cleaning page is shown in figure 6.



Figure 6 System cleaning page

4. When the system is finished, press the **ECS** to return to the initialization page (Figure 5). On the page shown in Figure 5, press the **extraction clean**, open the oil sample at the same time, test the darkroom lid, observe the exhaust condition until the naked eye is clear of the bubbles, then press the return key to return to the initialization page (Figure 5). The same steps are performed to neutralize clean operations;



Figure 7 Extraction clean page



Figure 8 Neutralize clean page

5. When the initialization operation is complete, press the **ECS** back to the boot page in the initialization page shown in Figure 5, and press the **Set** to enter the settings page (Figure 9).



Figure 9 Set page

6. Under the figure 9 page, press the **system calibration** to enter the system calibration page (Figure 10).

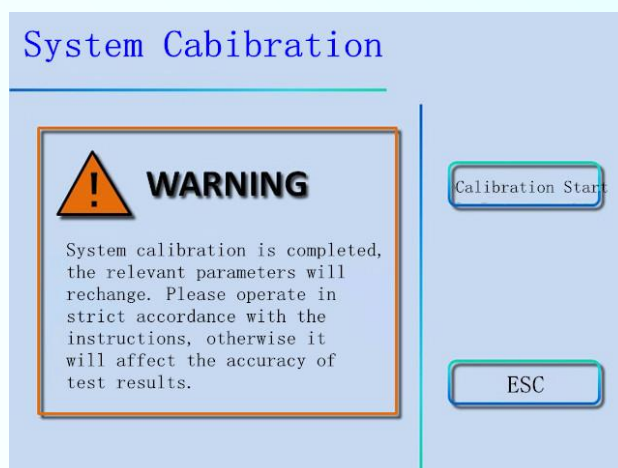


Figure 10 System calibration page

Open the oil sample chamber cover, add 1 bottles of instrument calibration special standard acid solution in the cup 1, 2 cup in a closed, determination of anechoic chamber cover, press **start** to calibrate the system calibration. The standard acid solution in No. 1 cup is used to calibrate the system error, and the standard acid solution in No. 2 cup is used to check the accuracy of the calibration result. The calibration

process is shown in Figure 11 page. After the calibration is complete, the page will show the calibration results for the system as shown in figure 11. After the calibration is complete, the page will show the calibration results for the system as shown in figure 11. The theoretical value of the system calibration should be 0.067 mgKOH/g, while the measured values close to the theoretical values. Generally, the calibration value shall be within the range of  $0.067 \pm 0.003$  mgKOH/g when required. When the allowable error is large, proper adjustment can be made according to the actual situation.

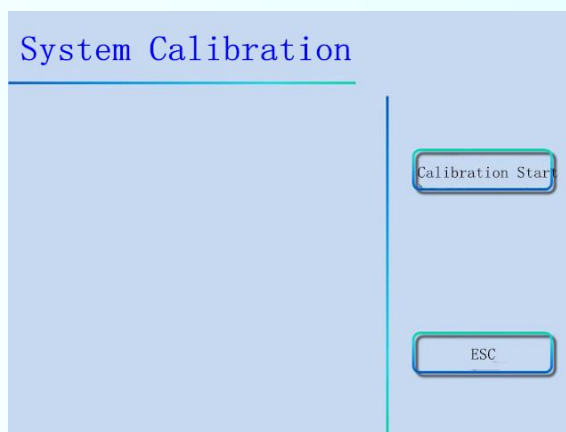


Figure 11 System calibration page

7. In the settings page, press the **cup set** to enter the cup settings page (Figure 12), press the **Choice** to select the cup number, press the **Yes** or **No** to order the cup to participate in the measurement or not participate in the determination.

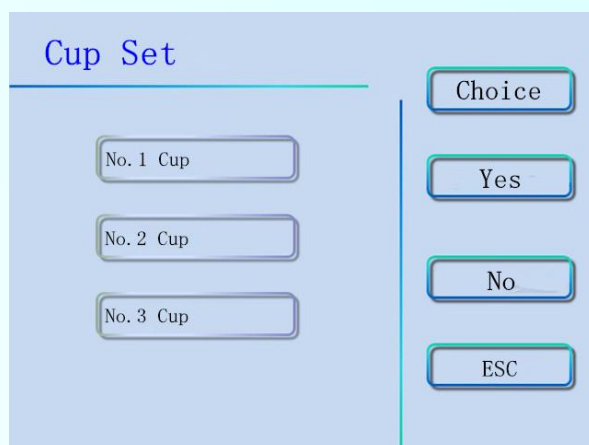


Figure 12 Cup set page

8. In the settings page, press the **oil set** to enter the oil sample settings page (Figure 13), the user can select the oil sample transformer oil or turbine oil according to the sample, and then press the **ESC** to return to the settings page.

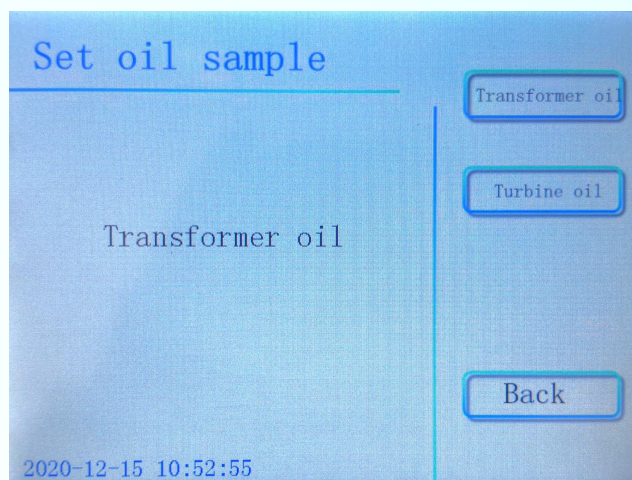


Figure 13 Oil setting page

9. In the formal sample before, should be clean sample cup horizontally in a corresponding hole in each cup, an accurate determination of the parallel injection 10.0mL of tested sample oil (or in an oil sample weighing 8.3 ~ 8.5g, and will add a cup homing), stirring rod, cover sample chamber cover. In the boot page (Figure 4) were

measured at the same time, press the **start**, the display screen in the test page, different test stages display the "X cup test, please.....", "is, after the completion of titration determination also shows the titration end point (EP) values (Figure 14) and" test complete "(Figure 15) and other words.

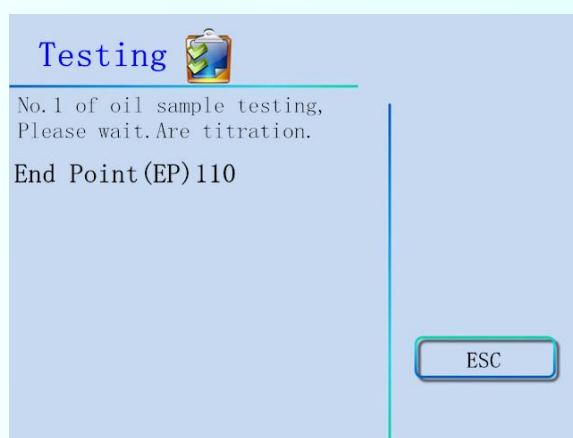


Figure 14 Test page

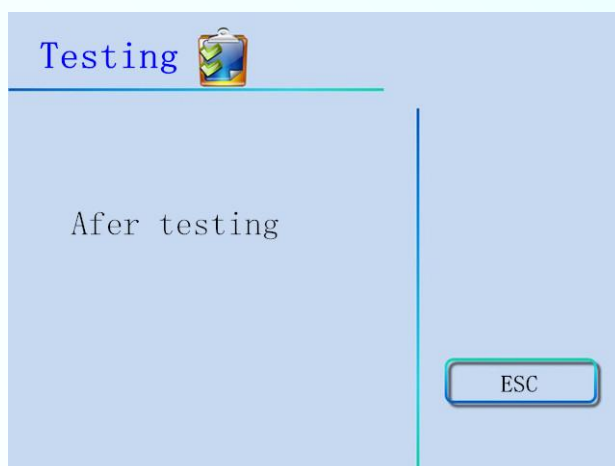


Figure 15 Test page

10. After the measurement is completed, the machine automatically saves 35 sets of data. The operator if you want to check out, please press the **ECS** to enter boot page (Figure 4), click the **Look up** to enter the page



to access (Figure 16), click on the **Last** or the **Next** to view 01~35 number of sets of data, click the **print** can be output through the printer data required.

The screenshot shows a software interface titled "Look Up" with a magnifying glass icon. It features two input fields at the top: "No." and "Time". Below these is a table with two columns: "Cup" and "Result(mg KOH/g)". The table contains three rows with "1", "2", and "3" in the "Cup" column. To the right of the table are four buttons: "Last", "Next", "Printting", and "ESC".

Cup	Result(mg KOH/g)
1	
2	
3	

Figure 16 Lookup page

## 6.Maintenance and maintenance

1. After each use, extract and liquid infusion peristaltic pump plate must be loosened to prevent infusion pump was long, extrusion deformation and adhesion, measurement precision and accuracy influence. If long time stop, please and infusion tubing for peristaltic pumps removed, sealed immersion attached "neutralization liquid pump peristaltic activation solution". When using again, refer to figure 3 for resetting the installation;

2. After each use, it is necessary to use anhydrous ethanol to rinse the neutralization liquid, the extraction liquid and the infusion pipe to prevent the sediment from blocking the pipeline and the micro titration needle;

3. The infusion pump used for a long time after the middle of the material will be the natural aging, if found serious hardening, deformation or adhesion, should be given to maintenance or replacement. Replace, remove the pump from the peristaltic pump groove, a new pump, it is reset and related components can be connected correctly;

4. When the extraction liquid and neutralization liquid are replaced, the exhausted solution bottle can be taken off, and then replaced with a new solution bottle, and the pollution of the pipeline should be paid attention to during the replacement process;

5. When the cleaning agent in CO<sub>2</sub> and H<sub>2</sub>O purifier is obviously changed from pink to grey, the purifier should be replaced, otherwise it will affect the stability of neutralization liquid, and influence the accuracy of the result;

6. Replace print ribbon:

The ribbon box is installed when the printer leaves the factory, but after a period of use, the ribbon box needs to be replaced. You can change the ribbon box as follows.

( 1 ) Pull out the ribbon bin.

( 2 ) Remove the old ribbon box gently from the printer head. Note: lift the left end of the ribbon box first, then lift the ribbon box at the right end of the ribbon case.

( 3 ) New ribbon cartridge. First, the right end of the ribbon box is



gently placed on the gear shaft at the right end of the nose, and the left end is raised slightly. Do not lower it. When you find the right end of the ribbon box fall to the end, press the knob on the ribbon box with your fingers and turn it clockwise until the right end of the ribbon box falls to the bottom and then the left end of the ribbon box is lowered. Please check whether the ribbon straightened out or ribbon is also exposed in the ribbon box, then turn knob ribbon on the box, until the ribbon ribbon pulled into the box and straightened so far. It is easier to change the ribbon when there is no paper in the head.

( 4 ) Push the ribbon cabin into the reset and replace it.

7. Replace printing paper:

( 1 ) Pull out the paper bin, remove the paper reel, replace the printing paper, and press the paper reel into the guide slot of the printer. Make sure the paper reel is securely secured and will not fall out.

( 2 ) Cut the end of the paper into a triangle, turn on the instrument power, press SEL (left) key, make SEL indicate the light out, then press LF (right) button to rotate the handpiece. This paper will head into the paper below the mouth with the hand, the paper will slowly into the nose, until his head from the front, with a certain length should be. Then press the LF or SEL key, or turn off the power.

( 3 ) Push the paper bin into the reset.

## **7. Random attachments**

1. Power cord	1
2. Safety tube ( 3A )	2
3. Oil cup	4
4. Stirring paddle	4
5. Neutralization titration needle	6
6. Extraction syringe needle	2
7. Extraction liquid pump	2
8. Neutralizing liquid pump	1
9. Dust cap for extracting liquid	1
10. CO <sub>2</sub> 、H <sub>2</sub> O Special glue plug for purifier	1
11. Special glue plug for neutralizing liquid bottle	1
12. Extraction solution	2 ( 500 mL×2 )
13. Neutralizing solution	1 ( 250 mL×1 )
14. Standard acid solution (for instrument calibration)	4 ( 8 mL×4 )
15. Operation manual	1
16. Printing paper	1
17. Packing list	1

## **8. After-sale service**

1. This product is guaranteed for 18 months, lifetime service.
2. The company supply related reagents and supplies for many years.