



Interfacial Tensiometer

LB-11PIT

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1. Safety Measures

Working Environment

The working environment of the instrument should meet the requirements mentioned below.

1.1 Platinum Ring

The plane of the ring should be parallel to the page on the north side, and the ring should have a certain roundness. The platinum ring should be clean, and it can be cleaned with detergent and then rinsed with pure water, and then the platinum wire is heated in the oxidation flame of the alcohol lamp to orange red.

1.2 Test Cup

The test cup should be clean, and it can be cleaned and washed, then rinsed with hot water, and finally rinsed with pure water, and drained before use.

1.3 Obtaining Pure Water

It is best to use distilled water that has been purified multiple times. Tests have shown that some commercially available purified drinking water can meet the experimental requirements.

1.4 Calibration of the instrument

After the instrument is subjected to a large impact, or after moving, the weight in the setting items should be calibrated.

2. Introduction

Interfacial tensiometer LB-11PIT is an automatic tensiometer unit for stable force measurement. Enclosed potentiometer and multi-point calibration improves repeatability and reproducibility of test results. Conforms to the ASTM D971 standard test method for interfacial tension of oil.

3. Features

1. Microprocessor controlled system
2. Large screen color LCD display
3. Platinum ring method
4. Built-in function: auto breakdown diagnostic , auto testing, calculations, display results
5. Automated storage under power-off connection
6. Automatic lift platform drive
7. Output: USB interface to observe tension curves

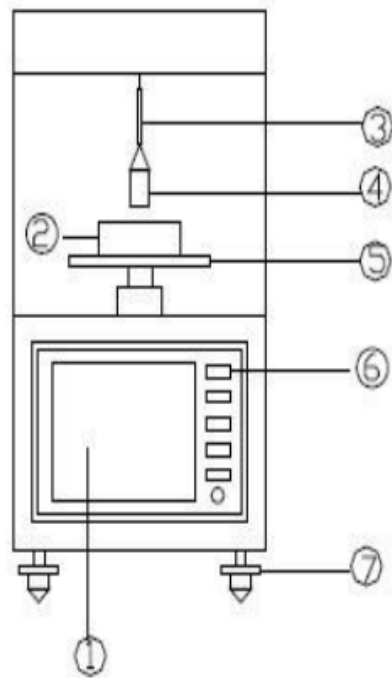
4. Specifications

Model	LB-11PIT
Testing range	0 mN/m ~ 200 mN/m
Kinematic velocity	0.1 mm/s ~ 0.44 mm/s
Sensitivity	0.1 mN/m
Accuracy	± 0.2 mN/m
Compliance	ASTM D971
Ambient temperature	10 °C ~ 40 °C
Relative humidity	≤ 80 %
Power	45 W
Power supply	220 ± 10 %, 50 Hz
Dimensions	185 x 310 x 380 mm

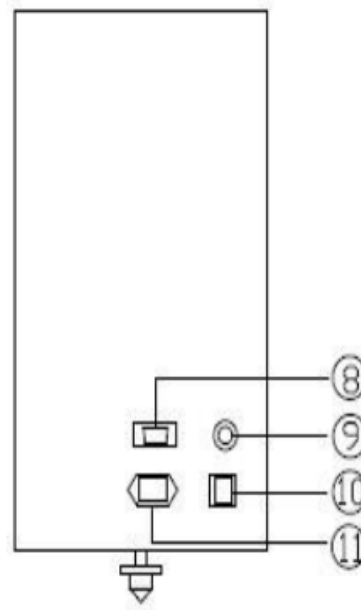
5. Applications

Used to determine interfacial tension of oils, detergents, dyes, cosmetics, insecticides, emulsifiers, biological fluids in aviation, jet fuels, industries, research and quality control field.

6. Instrument Introduction



Front View



Back View

- 1) Screen
- 2) Sample Container
- 3) Pt circle Staff
- 4) Pt Circle
- 5) Test Board
- 6) Button
- 7) Under-Chassis

- 8) RS232 interface
- 9) Fuse
- 10) Switch
- 11) Electrical Source

The instrument should be placed on a flat and stable table, adjust the three adjustment feet, observe the horizontal bubble, and make the bubble in the middle position. There must be no strong magnetic field interference around the instrument. Avoid wind blowing on the platinum ring during the test. The temperature of the test environment should be kept constant. Do not place the instrument in an environment with high humidity and corrosive gases. Menu and key operation instructions.

The buttons of the instrument are non-identified. Under different display interfaces, the buttons have different function definitions, which are determined by the corresponding displayed menus. This design reduces the number of buttons, the key function definition is clear, and the human-machine interface is more friendly.

7. Operations

In the following key operation instructions, the numbers or figures highlighted in black are the contents of the current adjustment and modification.

7.1 Start-Up Screen:

The LCD screen display is as follows

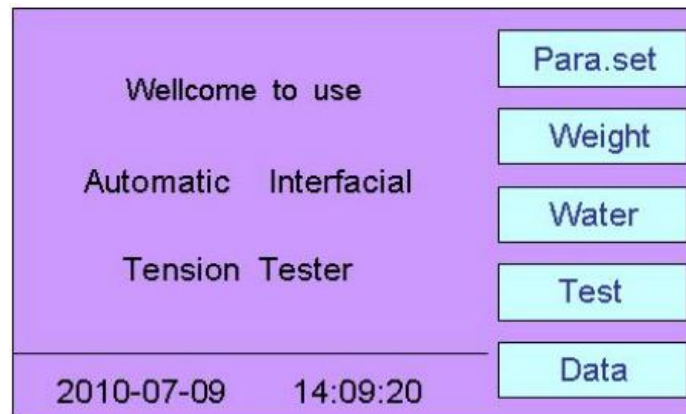


Figure-1

Connect the instrument power cord, and open the power switch, that is to enter the BOOT display screen. At present, there are five functional items to choose from:

Parameter Setting: Enter the parameter setting screen

Weight calibration: Enter the instrument calibration screen

Pure water calibration: Enter the pure water calibration screen

Sample determination: Enter the sample test screen

History: Enter the stored data screen

7.2 Parameter Setting Screen

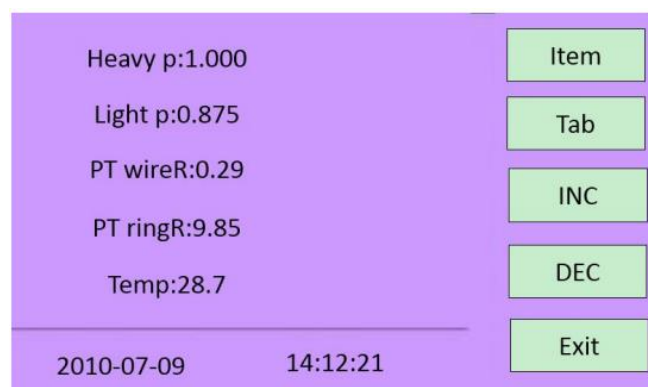


Figure-2

In the current display screen, press the "item" key to select the parameter to be modified, the "tab" key cursor moves horizontally between the current parameter values, the "increase" key to adjust the current parameter value, press the "exit" key to save Parameters and return to the startup screen as shown in [Figure 1](#)

The meaning of each parameter is explained as follows:

Density of heavy liquid-density of lower liquid, unit: g/mL

Light liquid density-upper liquid density or gas density unit: g/mL

Platinum wire radius-the radius of the platinum wire ring Unit: mm

Platinum ring radius-the average radius of the platinum ring unit: mm

Current temperature-ambient temperature Unit: °C

What needs special explanation:

- 1) When testing the surface tension, the light liquid density is the density of the air; when testing the interfacial tension, the light liquid density is the density of the upper liquid
- 2) The temperature indicated by the value of the current temperature may deviate from the current actual temperature. The user only needs to enter the current actual temperature here. The instrument will automatically calculate the difference between them and save it as a correction factor. The temperature displayed later in the value will be corrected by this difference.

7.3 Weight Calibrate Interface

Use Weights to calibrate the instrument as follows

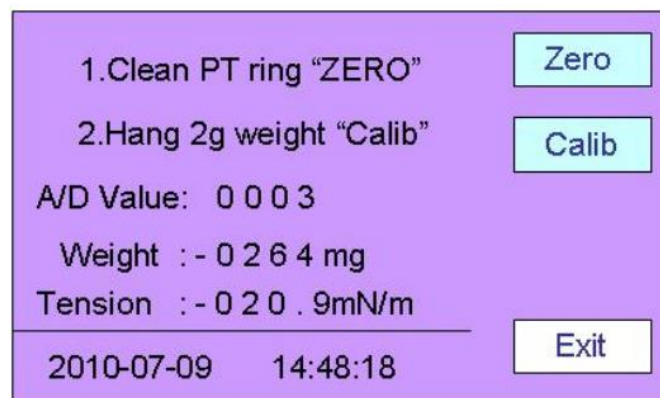


Figure-3

This operation has a greater impact on the accuracy of the instrument, so caution is required. Performed in two steps:

Step 1: Ensure that the instrument is adjusted to a level state and that the platinum ring is clean. After the instrument reading changes a little, gently press "zero" to complete the instrument zero operation.

Step 2: Hang the hook weight for full-scale calibration on the platinum ring beam. When the reading of the meter changes relatively small, gently press the "Calibration" key to complete the full-scale calibration operation. The "Exit" key stores the weight calibration result and returns to the setting main screen as shown in [Figure 1](#)

7.4 Pure Water Calibration Screen

The calibration here refers to the calibration of pure water, that is, to test whether the instrument is accurate by testing the surface tension of pure water. The instrument automatically defaults to the lower layer of liquid as water and the upper layer as air. According to the current ambient temperature value, look up the table to obtain the water density at this temperature, and perform temperature compensation on the result. Because the surface tension of pure water at 25 degrees Celsius is 71mN/m-72mN/m. Users can judge whether the instrument works normally according to the result of pure water calibration. According to the prompts on the LCD screen, the following screens will appear in sequence.

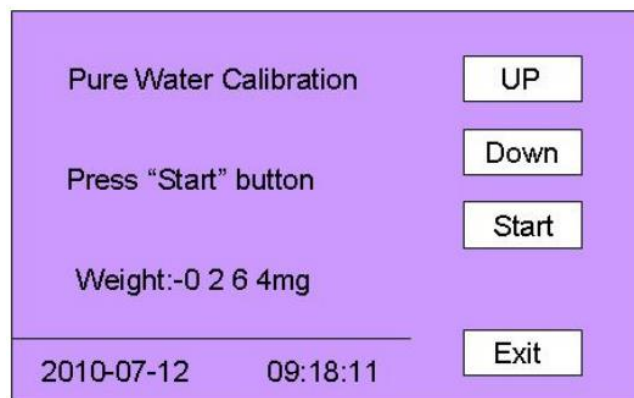


Figure-4

Press the "**up**" and "**down**" keys to adjust the height of the test bench so that it can be put into the sample cup. After pressing "**Start**", the instrument automatically raises the test stand and immerses the platinum ring 5 mm below the liquid.

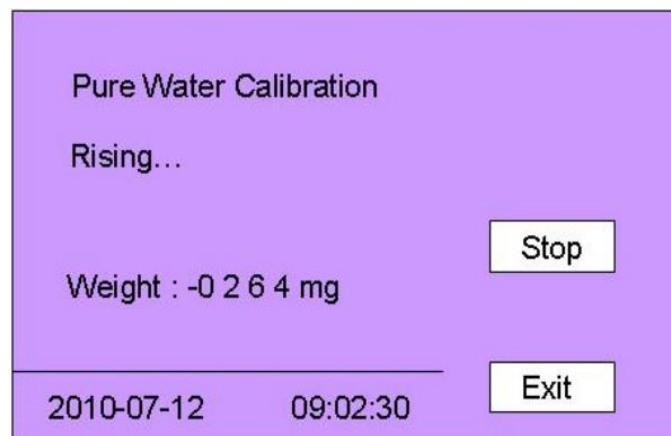


Figure-5

Interfacial Tensiometer LB-11PIT

After an automatic delay of 30 seconds, the instrument automatically descends slowly on the test bench to start the measurement process.

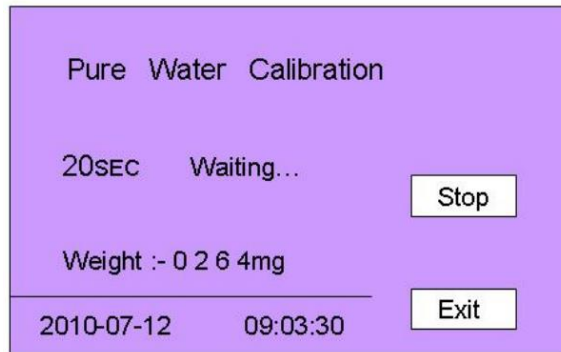


Figure-6

After the measurement is completed, the measured tension value is displayed. As shown below.

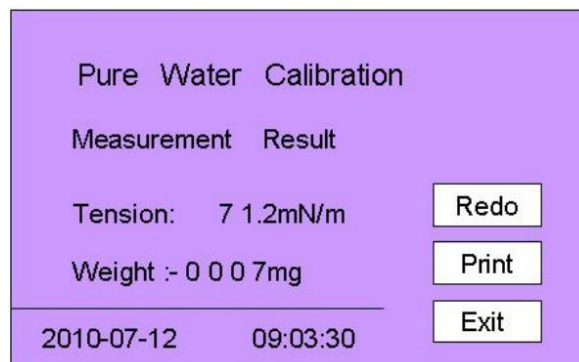


Figure-7

The **"Retest"** button returns to [Figure 3](#) **"Print"** will output the current record to the printer and print it. **"Exit"** Return to [Figure 1](#).

7.5 Sample Measurement Screen

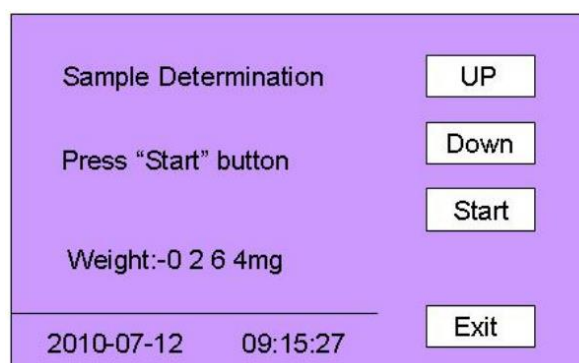


Figure-8

Interfacial Tensiometer LB-11PIT

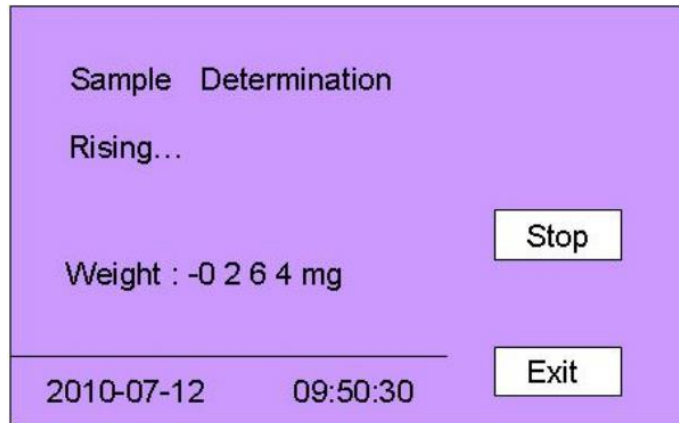


Figure-9

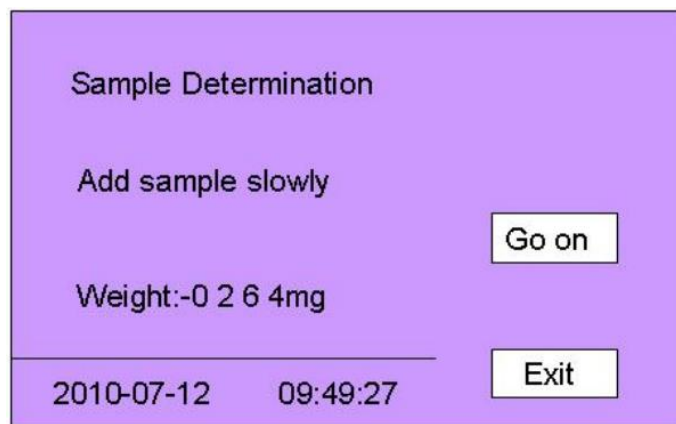


Figure-10

Press the "**up**" and "**down**" keys to adjust the height of the test bench so that it can be put into the measuring cup.
After pressing "**Start**", the instrument automatically raises the test stand and immerses the platinum ring.

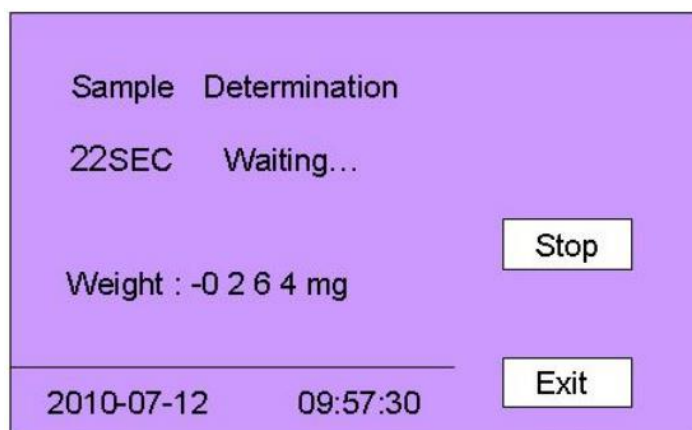


Figure-11

Interfacial Tensiometer LB-11PIT

Prompt the user to add the upper layer of liquid (if the surface tension is measured, press "**Continue**"), after adding the upper layer of liquid, press the "**Continue**" button to measure the sample.

Sample Determination
Measuring . . .

Weight : 0 9 1 4 mg

2010-07-12 09:57:30

Buttons: Stop, Exit

Figure-12

Sample Determination
Measurement Result

Tension: 9 5.1mN/m

Weight :- 0 0 0 7mg

2010-07-12 09:03:30

Buttons: Redo, Print, Exit

Figure-13

According to the national standard, keep the interface for 30 seconds. After 30 seconds the instrument automatically descends slowly on the test stand and starts the measurement. When the liquid film ruptures, the measured tension value is calculated and displayed. The "**Retest**" button returns to [Figure 8](#). "**Print**" will output the current record to the printer and print it. "**Exit**" returns to [Figure 1](#).

7.6 History Screen

Total 0 7 5 pages

No. :0 1 5

Tension: 7 1. 4mN/m

Date:1 0 -0 7-1 2

Time:1 0 : 0 4: 5 3

2010-07-12 10:29:35

Buttons: Left Arrow, Right Arrow, Del, Print, Exit

Figure-14

The previous page displays the previous history record, and the record number is decremented by one, press this key for a long time to quickly page forward. "**Next page**" displays the next history record, the record number increases by 1, long press the key, and quickly page backward. "**Delete**" deletes the current history record and displays the next record. If the current record is the last, the previous record is displayed, and the record number is reduced by 1.

"**Print**" outputs the current record to the printer and prints it.

"**Exit**" returns to the startup screen as shown in [Figure 1](#).

Each historical record contains 3 items:

- 1 tension value,
- 2 detection date,
- 3 Detection Time

8. Troubleshooting

Phenomenon	Reason	Disposal methods
The weight cannot be calibrated	The polarity of the magnetic cylinder is wrong.	Stick to the correct polarity Replace the magnetic cylinder.
The LCD screen does not display	The LCD cable is not plugged in.	Plug in the LCD screen cable.
No response at boot	The switch is not in good contact. The Blown fuse.	Replace the switch Replace the fuse.
The test data is too small	The parameter setting is incorrect. The Platinum ring is not clean.	Set the parameters correctly Clean the platinum ring.
The data is abnormal	Weight calibration is incorrect.	Recalibrate the weight.



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