







C-Tech
Laboratory equipment co.,limited

AUTOMATIC VICAT APPARATUS 63-L3000

PRODUCT MANUAL



C-TECH LABORATORY EQUIPMENT CO., LTD

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SINCE 2006


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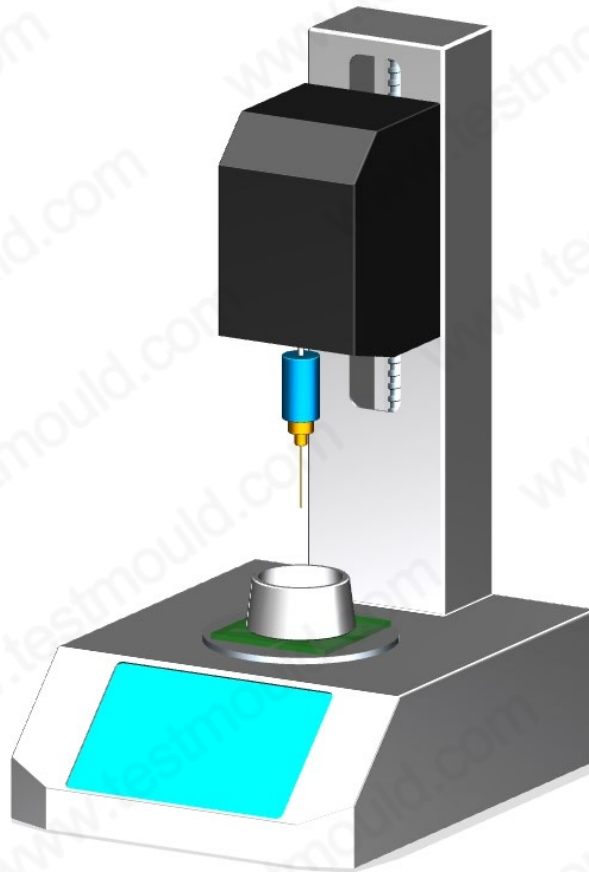
I. Description

This Automatic Vicat Apparatus provides a completely automatic method for determining the water requirement for standard consistency, initial and final setting time of cements or mortar pastes.

This instrument is mainly suitable for Portland cement, ordinary Portland cement, slag Portland cement, fly ash Portland cement, pozzolanic Portland cement, composite Portland cement and other cements designated to use this method.

II. Structure, technical specifications and features

Structure



The instrument is mainly composed of chassis support, touch screen, screw lifting system, sliding components, displacement measurement system and other parts.



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Technical specifications

Standards	AASHTO T131, EN 196/3, DIN 1164, DIN 1168 gypsum, NF P15/431, BS4550, ASTM C191, ASTM C187
Time control	Time display resolution: 0.1S Time control accuracy: $\leq \pm 0.1S$
Displacement	Using high-precision LVDT displacement sensor, split structure, no friction when the needle falls. Range: 0-50mm Displacement display resolution: 0.01mm Relative displacement accuracy: 0.1mm
Data storage	200 sets
Slide assembly	300g \pm 1g (including test rod/test needle), meets the requirements of the standard;
Interface	RS485 data output interface USB data export interface
Power supply	220 \pm 10% VAC/50Hz; maximum 40W
Dimensions	390 x 310 x 575mm (length x width x height)
Weight	12.5kg

Features

Automatic position calibration Automatic accurate position calibration;

Position storage After the position calibration is completed, it will be stored in memory, no need to repeat the calibration

Automatic test process One-key operation, automatic penetration measurement, and automatic lifting of components after completion;


Intelligent judgment of results Automatically judge the result data according to the requirements of the test specification, and prompt the operation;


Data report storage Test data is automatically made into charts and stored; there are RS485 communication, USB export and other interfaces;



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III. Operation

Preparation

1. Please read the manual carefully before using the instrument. For more help, you can enter the "help" on the touch screen to view it;
2. Prepare all kinds of test apparatus and materials for the test according to the requirements of the standard;
3. Check the working environment of the instrument to make it conform to the working environment and conditions specified in the manual;

Installation

1. After unpacking the instrument, please check the accessories carefully. If there is any missing, please contact our company in time;
2. Adjust the horizontal adjusting pad of Vicat to make the working platform in a horizontal and stable state;
3. Wipe the test mold and glass base plate with wet cloth, put the glass on the round platform, and put the test mold on the glass base plate;



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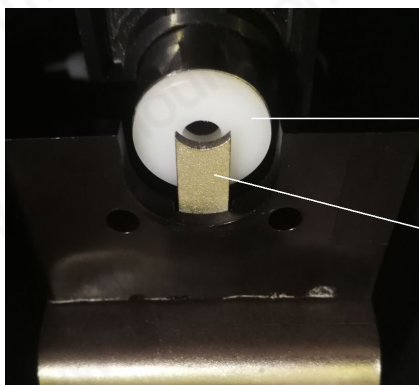
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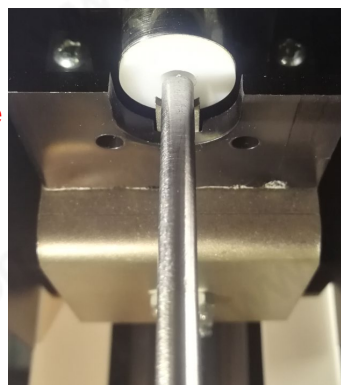
4. Sliding component installation



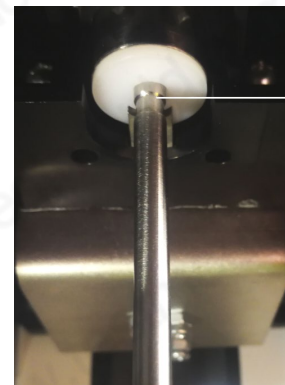
- a) Screw the counterweight cylinder ($\phi 29 \times 50 \text{mm}$) into the threaded end (M5) of the sensor rod, and tighten it;
- b) Screw the test rod/needle into the threaded end of the counterweight (M8) and tighten;
- c) After the assembly is completed, pinch the lower end of the component, insert the upper end of the sensor rod from the sensor sleeve, and lift up the assembly. When you hear the sound of the bolt snapping into the slot, the assembly is completed.



1. Observe the front inside of the nose from the bottom to top



2. The sensor rod pushes down the bolt



3. Insert the needle bar and lift it up to the clamping slot

5. The housing of the instrument should be in a good grounding state, and the external power cord must be grounded;
6. Insert the power cord plug into the power input interface on the back of the instrument host;
7. Turn on the power, enter the test preparation interface, press [Release Components] to check whether the sliding components can fall freely;

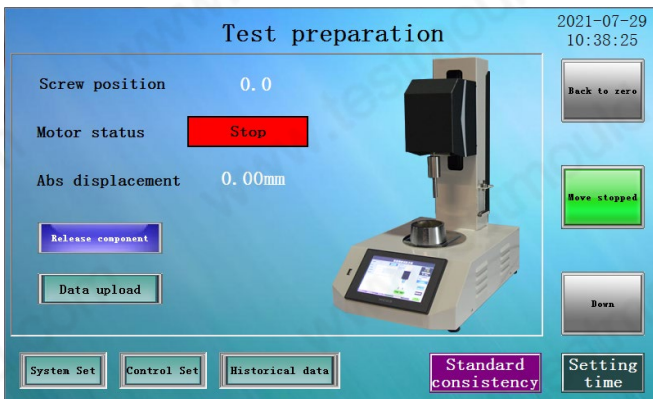


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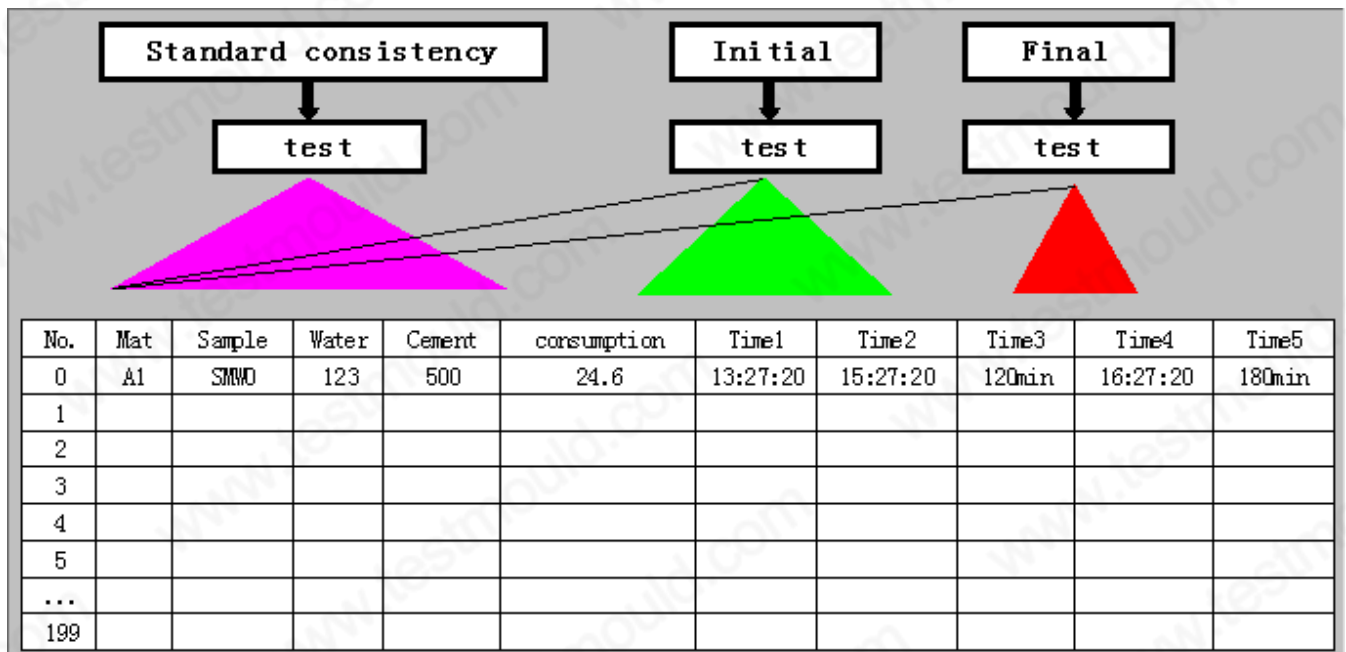
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Test process and data storage relationship structure

When performing any test, you must first select the test [NO.] of the corresponding test piece, and then perform position calibration. The test data generated during the test is automatically loaded into the [data item] of the test [NO.].



When testing, it is recommended to mark the number on each test mold and be consistent with the test number in the data list for more intuitive management;

Position calibration



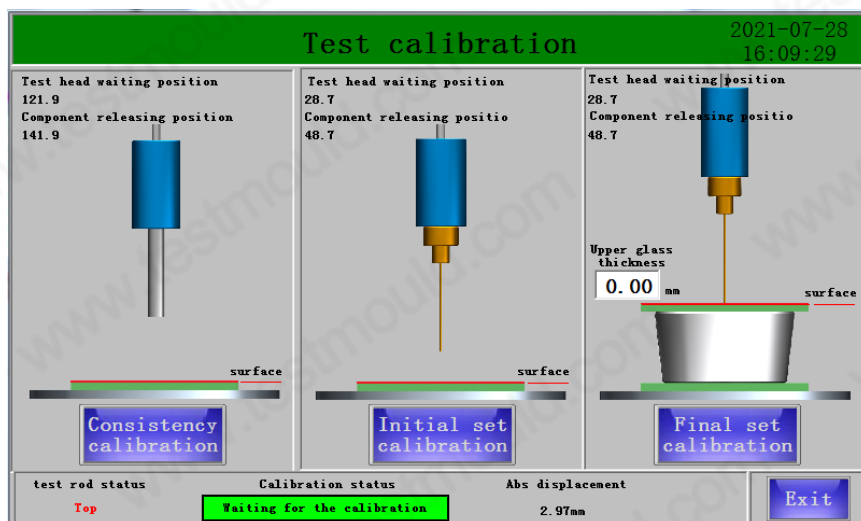
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1. [Standard Consistency Calibration] Use consistency plunger, put [glass plate] on [Circular Platform];
2. [Initial setting calibration] Using initial setting needle, put [glass plate] on [Circular Platform];
3. [Final Setting Calibration]
 - a) Method one, using the initial setting needle, put [glass plate] on the [circular platform], put [test mold] on the [glass plate], and put a [glass plate] on the [test mold] (the thickness of the glass plate needs to be set)
 - b) Method two, using the initial setting test needle, put [glass plate] on the circular platform, put [test mold] on the [glass plate], and use the upper edge of the test mold to calibrate the needle (the thickness of the glass plate needs to be set to 0)
4. Every time the consistency plunger/needle is changed, the position of the corresponding test needs to be calibrated;
5. When replacing the glass plate, if the thickness of the glass plate changes, you need to set the glass thickness and re-calibrate the position;
6. When changing the test mold, if the height of the test mold changes, you need to set the height of the test mold and re-calibrate the position;
7. The calibration interface is as follows:



Standard consistency test



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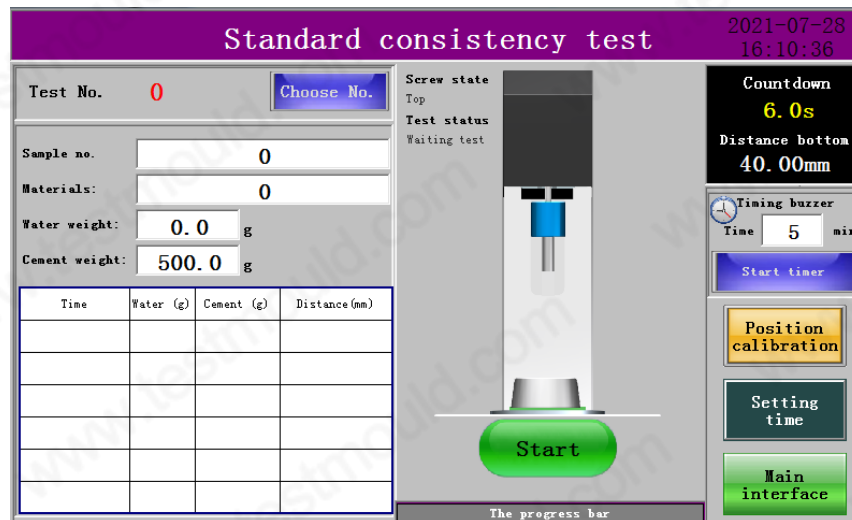
Step 1. Assemble the consistency plunger. Lift the machine head, screw the consistency plunger into the M8 thread at the lower end of the counterweight cylinder, and tighten it;

Step 2. Calibration of standard consistency position. Put the glass bottom plate on the test platform as shown in the figure and enter the [calibration interface] to calibrate the standard consistency position;

Step 3. According to the specification, put the mixed cement paste into the test mold placed on the glass bottom plate;

Step 4. Place test mold. Place the test mold with the mixed pure slurry on the test platform together with the glass bottom plate, and set the center of the test mold under the test rod;

Step 5. Start the test. The machine head drives the sliding component down to the upper surface of the cement paste, releases the component and measures the distance between the consistency plunger and the glass bottom plate. If the standard consistency requirement is reached 30 seconds after the component is released (the distance between the consistency plunger and the bottom plate is $6\text{mm}\pm 1\text{mm}$), a dialog box will automatically pop up, confirm the message according to the prompt, and automatically calculate the standard consistency water consumption P (in percent of the cement mass) and store it.



Setting time test

Initial setting test



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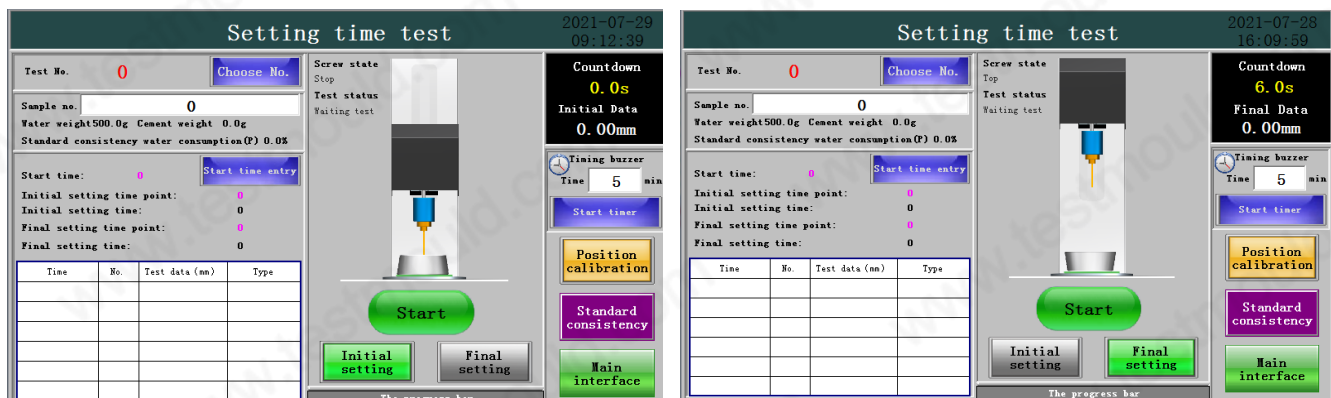
Step 1. Assemble standard test needle. Lift the machine head, screw the standard test needle into the M8 thread at the lower end of the counterweight cylinder, and tighten it;

Step 2. Calibration of initial setting time position. Put the glass bottom plate on the test platform as shown in the figure and enter the [calibration interface] to calibrate the initial setting time position;

Step 3. According to the specification, put the standard consistency pure slurry into the test mold placed on the glass bottom plate for curing;

Step 4. Place test mold. Place the test mold with standard consistency pure paste under the test needle on the test platform together with the glass bottom plate during curing;

Step 5. Start the test. The machine head drives the sliding component down to the upper surface of the cement paste, releases the component and measures the distance between the test needle and the glass bottom plate. If the initial setting state requirement is reached 30 seconds after the component is released (the distance between the test needle and the bottom plate is $4\text{mm}\pm 1\text{mm}$), a dialog box will pop up automatically, confirm the information according to the prompt, and automatically record the initial setting time point and store it.



Final setting test

Step 1. After the initial setting time is measured, the test mold and the slurry are removed from the glass bottom plate in a translational manner, and turned over 180° , the large end of the diameter is upward, and the small end is downward, and placed on the glass bottom plate. Then put it in the curing box to continue curing, ready to measure the final setting time;

Step 2. Assemble standard test needle. Lift the machine head, screw the standard test needle into the M8 thread at the lower end of the counterweight cylinder, and tighten it;



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Step 3. Position calibration of final setting time. Put the glass bottom plate on the test platform as shown in the figure, place the test mold on the glass bottom plate, and then place another glass bottom plate on the test mold, enter the [calibration interface], and perform the position calibration of the final setting time;

Step 4. Place test mold. Place the test mold with standard consistency pure paste under the test needle on the test platform together with the glass bottom plate during curing;

Step 5. Start the test. The machine head drives the sliding component down to the upper surface of the cement paste, releases the component and measures the displacement of the test needle penetrating the test body. If the final setting state requirement is reached 30 seconds after the component is released (test needle penetration displacement $\leq 0.5\text{mm}$), a dialog box will automatically pop up, confirm the information according to the prompt, and automatically record the final setting time point and store it.


Precautions


1. In the initial measurement operation, the counterweight cylinder should be gently supported to lower it slowly to prevent the test needle from hitting and bending, but the result is subject to free fall;
2. During the whole measurement process, the position where the test needle sinks must be at least 10mm away from the inner wall of the test mold;
3. When approaching the initial setting time, measure it every 5 minutes (or shorter time); when approaching the final setting time, measure it every 15min (or shorter time);
4. When the initial setting is reached, the measurement should be repeated immediately, and the initial setting can be confirmed only when the two conclusions are the same. When the final setting is reached, it needs to be tested at two other different points of the test body to confirm that the conclusions are the same to confirm the final setting state;
5. Do not let the test needle fall into the original pinhole during each measurement. After each test, wipe the test needle and put the test mold back into the curing box. The test mold must be protected from vibration during the entire test.


Historical data query



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Click "Historical Data" to enter the [Historical Data Query] interface:

Historical data query								2021-07-28 16:10:46	
No.	Materials	Sample no.	Water (g)	Cement (g)	Standard consistency	Start time	Initial		
0	0	0	0.0	500.0	0.0	0		Detailed information	
1	0	0	0.0	500.0	0.0	0		Page up	
2	0	0	0.0	500.0	0.0	0		Page down	
3	0	0	0.0	500.0	0.0	0		data delete	
4	0	0	0.0	500.0	0.0	0		Data export	
5	0	0	0.0	500.0	0.0	0		Back	
6	0	0	0.0	500.0	0.0	0			
7	0	0	0.0	500.0	0.0	0			
8	0	0	0.0	500.0	0.0	0			
9	0	0	0.0	500.0	0.0	0			
10	0	0	0.0	500.0	0.0	0			
11	0	0	0.0	500.0	0.0	0			
12	0	0	0.0	500.0	0.0	0			
13	0	0	0.0	500.0	0.0	0			

1. [Detailed Information] View, delete or print the detailed data of this group of samples;
2. [Data delete] Delete all test data inside the instrument;
3. [Data Export] Export the internal result data or process data of the instrument;
4. [Page up/Page down] data page turning display;

IV. Other functions

Data upload

After the Vicat apparatus is connected to the computer through the instrument's 485 interface, click the "data upload" button in the Vicat apparatus [Preparation] interface to enter the [data upload] interface. The test data in the instrument can be retrieved through the special software on the computer, and loaded into the special format report in the software, and the test result report can be viewed, edited and printed.



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Data uploading interface					Uploaded test data	
No.	Materials	Sample no.	Water (g)	Cement (g)	No.	
0	0	0	0.0	500.0	No.	0
1	0	0	0.0	500.0	Sample no.	0
2	0	0	0.0	500.0	Materials	0
3	0	0	0.0	500.0	Water weight	0.0g
4	0	0	0.0	500.0	Cement weight	500.0g
5	0	0	0.0	500.0	Standard consistence	0.0%
6	0	0	0.0	500.0	Start time	0
7	0	0	0.0	500.0	Initial se	0
8	0	0	0.0	500.0	Initial se	0
9	0	0	0.0	500.0	Final sett	0
10	0	0	0.0	500.0	Final sett	0
11	0	0	0.0	500.0		
12	0	0	0.0	500.0		

EXIT

Control parameter settings

2021-07-29
11:20:01

Control parameter settings


<p>Standard consistency test parameters</p> <p>Standard value: <input type="text" value="6.0mm"/></p> <p>Error: <input type="text" value="1.0mm"/></p> <p style="text-align: center;"> surface</p> <p style="font-size: small;">When the distance between the consistency plunger and the plate is between 6.0mm 1.0mm the test meets the standard.</p>	<p>Initial setting time test parameters</p> <p>Standard value: <input type="text" value="4.0mm"/></p> <p>Error: <input type="text" value="1.0mm"/></p> <p style="text-align: center;"> surface</p> <p style="font-size: small;">When the distance between the needle and the plate is between 4.0mm 1.0mm the test meets the standard.</p>
<p>Final setting time test parameters</p> <p>Standard value: <input type="text" value="0.5mm"/></p> <p>Upper glass thickness: <input type="text" value="4.00mm"/></p> <p style="font-size: small;">Re-calibration is required after the glass thickness is changed. The penetrating distance of the needle is \leq 0.5mm the test meets the standard.</p> <p style="text-align: center;"> surface</p>	<p>Other test parameters</p> <p>Component release time: <input type="text" value="30s"/></p> <p>Test end buzzer: <input checked="" type="checkbox"/> ON <input type="checkbox"/> OFF</p> <p>Test mold height: <input type="text" value="40.00mm"/></p> <p style="font-size: small;">Re-calibration is required after the height of the test mold is changed.</p>


Change Password
Exit


- [Standard Consistency Test Parameters] The parameters required by the specification, it is recommended not to modify;
- [Initial setting time test parameters] The parameters required by the specification, it is recommended not to modify;
- [Final setting time test parameter] "Final setting standard value" is the maximum value of the sliding component penetrating into the net slurry in the final setting state;
- [Other test parameters] The "component release time" specification requires 30 seconds, and it



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is recommended not to modify it; The "test end buzzer" beeps briefly at the end of the test, and is "on" by default; "Test mold height" is input according to the actual size of the test mold, and generally does not need to be modified;


V. Cautions


1. After each test is completed, please remove the consistency plunger/needle, wipe it and dry it, and keep it properly;
2. The lead screw is regularly lubricated and maintained. Check the surface of the screw every half a month. If it is dry, apply a proper amount of grease on the screw.


Warning: If the instrument fails, please cut off the power in time and ask professional technicians to check and repair. You can continue to use it after troubleshooting to prevent accidents!



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Packing list

NO.	ITEM	UNIT	QUANTITY	REMARK
1	Vicat apparatus host	set	1	
2	sliding component	set	1	Sensor rod, counterweight cylinder
3	Test mold	pcs	1	Height 40mm
4	Consistency plunger	pcs	1	Length 50mm, Φ 10mm
5	Test needle	pcs	2	Length 50mm, Φ 1.13mm
6	Glass plate	pcs	2	10mm×10mm, thickness 4 ~ 5mm
7	Scraper	pcs	1	
8	Power line	pcs	1	
9	485 Communication data line	pcs	1	

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