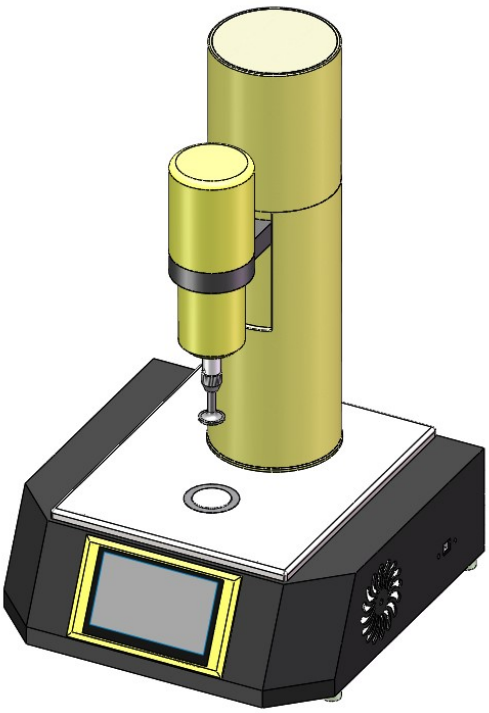
Intelligent Cone and Plate Viscometer

BEVS1132

User Manual

(Version V201801)



This manual shall be read carefully before starting. Directions included in this operation manual shall be strictly followed.

Content

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1 Company Profile

BEVS Industrial Co., Ltd. is a leading developer & manufacturer that specializes in coatings, ink, painting, resin testing instruments and laboratory whole solution.

We offer the complete and unique products in this field to meet customer's challenging demands of today and tomorrow, the products are complied with the standards of ISO, ASTM, DIN, BS, EN etc.

With strong supports and hard work by lots of end-users and worldwide agents, BEVS become more and more famous in the world and provides more competitive values for our customers.

2 Product Introduction

BEVS1132 Intelligent Cone and Plate Viscometer is an automatic and touch screen controlled coating viscometer, which is used under strict testing conditions. High precision and stable cone is measured by high shear rate measurement. It is used to measure the viscosity of non-Newtonian paints and coatings with high precision. It is suitable for the viscosity measurement of coatings, paints and other coatings. The temperature of reagent plate is controlled by a precise and stable temperature control system, and the temperature control speed is very fast, which can quickly change the temperature to improve the working efficiency of the modulation formula.

The product is standard equipped with five different cones to measure the viscosity values of different ranges. Different cones use different shear rates. The measuring ranges include 0-5P, 0-10P, 0.1-20P, 0.1-50P, 0.1-100P. The measuring methods refer to the standards of ASTM D 4287, ISO 2884, GB9751, BS 3900. BEVS1132 Intelligent Cone and Plate Viscometer combines automation with industrial design to provide the most accurate and stable measurement results. Its characteristics are as follows:

* Automatic operation (automatic lifting), automatic positioning measurement of cone, one key to zero adjustment and proofreading;
* Reagents need less than 1 mL/time
* Real-time high-resolution graphics of test samples
* The results are displayed on the screen immediately after testing.
* High stability motor speed control the accuracy and repeatability of measurements.
* High-precision temperature control system of platform is 5-75°C, set the division value of 0.1°C.
* High temperature control efficiency, heating from the lower limit value to the upper limit value is less than 2 minutes, cooling from the upper limit value to the lower limit value is less than 3 minutes.
* High precision guideways are used in each motion mechanism to ensure smooth motion and low noise.

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* Simple and clean design, easy to clean, and even in harsh environments can reduce the degree of contamination of the instrument.
* Adopt 4.3-inch touch screen, simple and generous interface, friendly interactive experience;
* Data saving and connectable computer export (optional).

2.1 Technical Specifications

Instrument dimensions: length 280 × width 290 × height 460 (mm)
Weight: 13KG
Input voltage: 100-230V (50 / 60Hz)
Total power: <50W
Test sample parameters: dose <1mL
Standard cone and plate parameters: (FIG 1)

Cone	BEVS1132-P01	BEVS1132-P02	BEVS1132-P03	BEVS1132-P04	BEVS1132-P05
Standard speed （r/min）	750	750	750	750	750
Shear rate （S -1 ）	10000	10000	5000	2500	2500
Adjustable temperature (°C）	5-75	5-75	5-75	5-75	5-75
Measuring range （cP）	0-500	0-1000	10-2000	10-5000	10-10000

FORM 1

3 Product Operation Introduction

3.1 Important Information Description

3.1.1 Please keep the packaging. Put the instrument back in the correct packaging during handling, otherwise the instrument may be damaged. When the instrument is returned under the warranty, the instrument should be packed in the original container. If failure to do so may invalidate the warranty or incur additional costs outside the warranty period. When the original package is not available, please contact the agent or manufacturer.
3.1.2 Please read and understand the product operation instructions in the manual before opening the instrument. If you need clarification, please contact the agent or manufacturer.
3.1.3 Please save the manual for future use.
3.1.4 Do not open the instrument shell or the motion mechanism shell. There are no user-available

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components inside.

3.2 Safety Notice

3.2.1 The instrument must be installed and operated by properly trained personnel
3.2.2 Carefully understand all safety warnings on the instrument
3.2.3 Please understand the standard input voltage of the instrument (the power supply voltage fluctuation cannot exceed 10% of the calibration voltage)
3.2.4 The internal voltage of the instrument is very dangerous. Only professionals or authorized personnel can open the instrument.
3.2.5 Cone spindle system automatically lifts. Do not attempt to manually push and move. This is the wrong operation. This operation will damage the limit switch inside.
3.2.6 When using the cone, the cone has corners. Be careful not to knock or fall, avoid scratches. The matching cone is an independent and important component. It needs to be well preserved. If damaged or deformed, please repair or purchase again.
3.2.7 When installing the cone, the machine must be completely stopped first, and gloves are strictly prohibited.
3.2.8 Protect the cooling fan and prohibit inserting objects into the ventilation holes at any time.

3.3 Operation Environment

3.3.1 The following points should be noted when using the instrument
3.3.1.1 Prohibit operation in excessive thermal environment
3.3.1.2 It is forbidden to place the instrument in the environment of excessive humidity and excessive floating particles. There are inlet/outlet fans in the instrument, which will damage the internal components by bad air and affect the life of the instrument.
3.3.1.3 Operate in excessive vibration environment is prohibited. In addition, the operating environment should be kept clean.
3.3.1.4 There must be no heater, radiator or airflow near the instrument
3.3.1.5 There must be no magnetic field near the instrument, such as high-power motor, transformer, etc.
3.3.1.6 There must be no water source near the instrument, such as tap, sink, etc.
3.3.1.7 Instruments should be placed in areas without lightning protection measures.
3.3.1.8 The instrument is designed for laboratory use. The operating environment should meet the requirements of temperature is 10℃～35℃, humidity is 15~85% without condensation, wind speed is 0-0.2m/s. Recommended environment is 23±0.5℃, humidity is 50 ± 5 %.

3.4 Instrument Placement

3.4.1 Ensure to put the machine on a firm and horizontal desktop with suitable plug.
3.4.2 After any move of the instrument, check the level before work.

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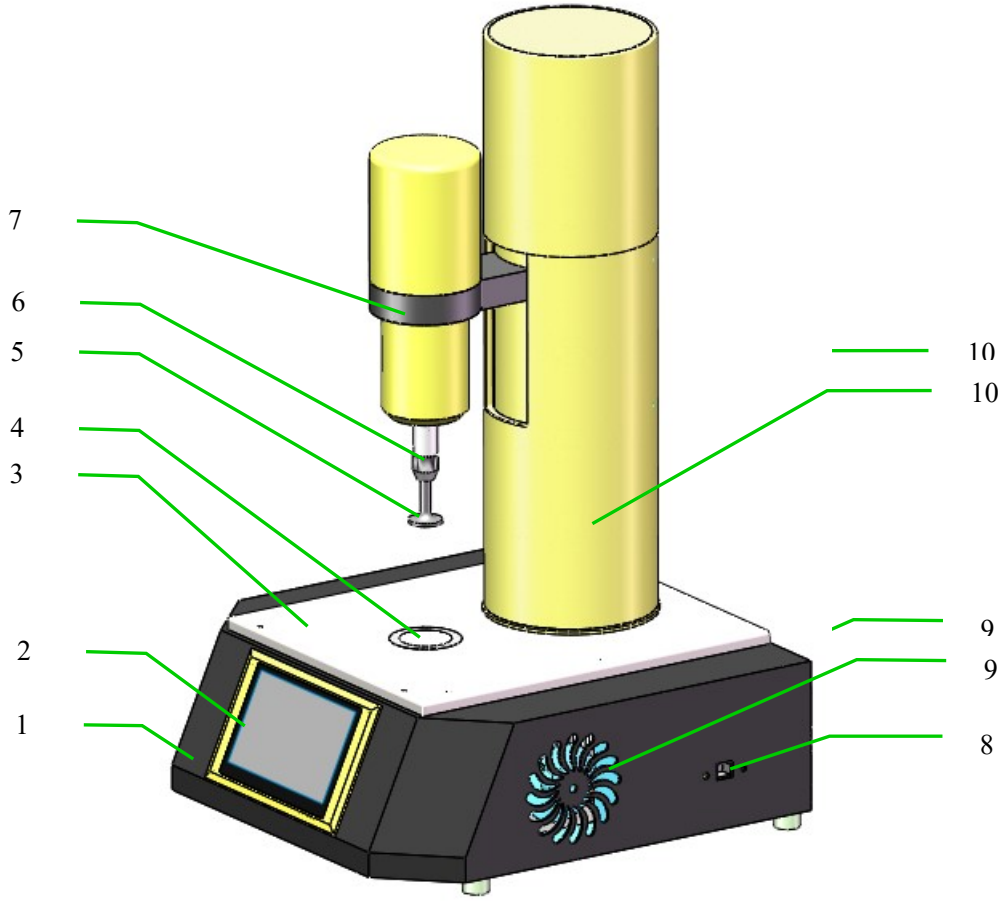
3.5 Power

3.5.1 You must use the power supply with a ground wire.
3.5.2 The machine input voltage is 200 ~ 250V, 50 ~ 60HZ.

3.6 Guidance on Operation

3.6.1 Instrument Structure Description
Main structure and parts description of the instrument：



1	Shell	6	Rotating spindle
2	Touch screen	7	Spindle lift plate
3	Working panel	8	USB socket
4	Reagent plate	9	Cooling fan
5	Cone	10	Spindle mechanism

3.6.2 General Description of Instrument Operation
A. Intelligent Cone and Plate Viscometer is used to measure the dynamic viscosity of non-Newtonian fluids. This type of material exhibits different viscosities, depending on the application of shear rate. This measurement behavior is usually used for R&D commissioning prior to paint production. The measured results include viscosity, temperature and shear rate. The

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enterprise standard of BEVS1132 intelligent cone and plate viscometer is set as the parameters in FORM 1. Standards can be selected for the use process, and other speeds can be set to use other shear rates as required.

B. Paint viscosity measurement is very sensitive to temperature changes, so all the tests are carried out under strict control: the temperature of reagent plate is precisely controlled by advanced temperature control system. The test sample is applied to the plate, and the cone is placed on the plate. The excess liquid between the plate and the cone is discharged. The sample and the cone are kept within the temperature range set by the temperature controller.

C. The preheating time of viscometer depends on test conditions, such as different ambient temperature, humidity, air density, altitude and so on. Therefore, the preheating time is recommended for at least 30 seconds in order to stabilize at the required temperature.

3.6.3 Operation Steps

3.6.3.1 Switch on

According to steps 3.2-3.5, place the instrument in the right place, connect to the power cord, and turn on the power switch of the instrument.

3.6.3.2 Main interface

After booting, the instrument enters the main interface as shown in FIG 2. The main interface settings button can enter the settings of the interface and adjust the relevant parameters. The up and down button is the operation for lifting. Run/Stop button can start/stop instrument test at any time.

FIG 2

3.6.3.3 Cone assembly and disassembly

The cone is a high precision key component. It must be wiped clean when not in use and stored in a sealed pocket. When using it, please follow the steps in FIG 3 to ensure that the parts of the instrument will not be damaged due to long-term use.

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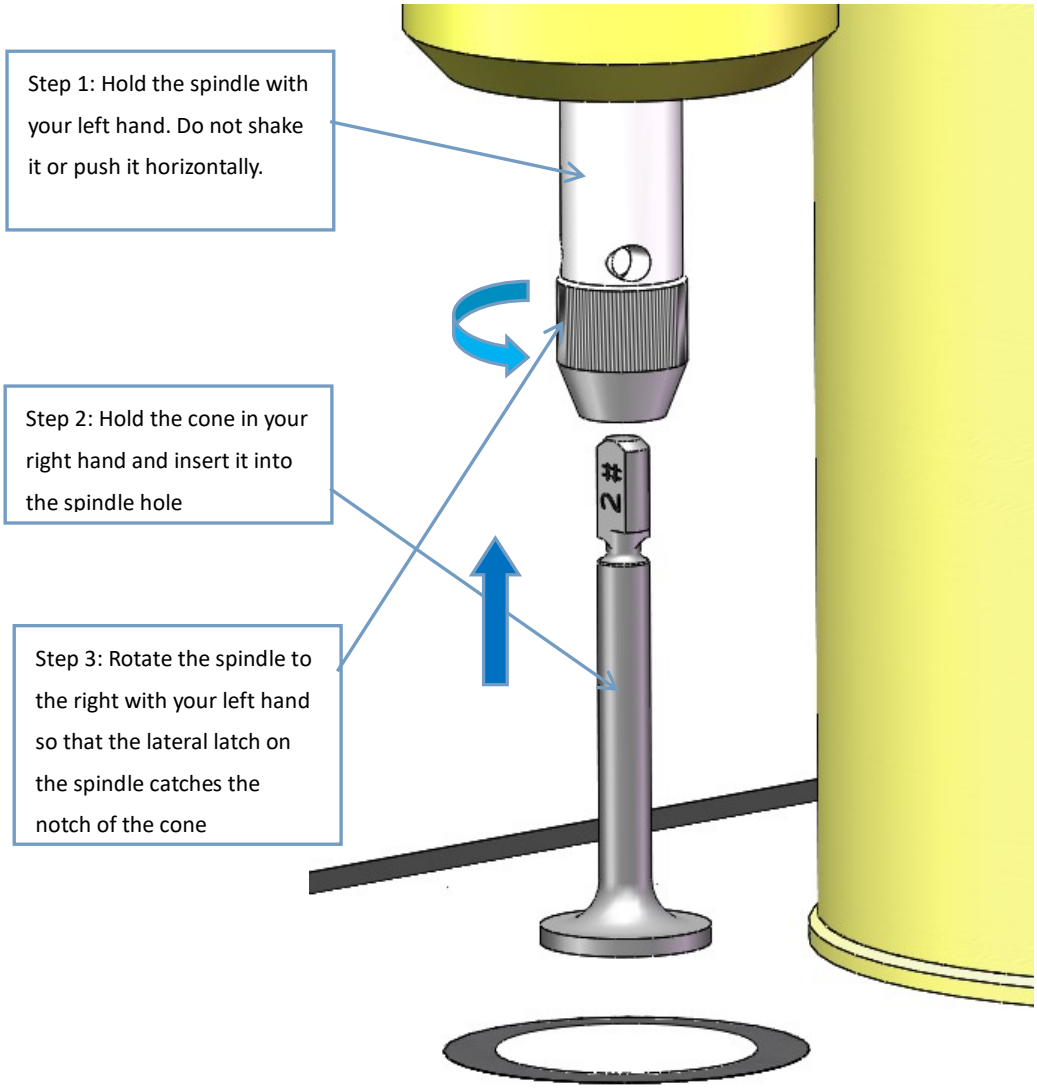

FIG 3

3.6.3.4 Setting test mode

In the main interface, click on the Run Settings button to enter. As shown in FIG 4, on the screen, set the start waiting time (preheating time) according to the difference between the cone and plate temperature and the ambient temperature. Generally, it is recommended to set more than 30 seconds. According to different coatings, the recommended running time is 25-35 seconds. Set the test running temperature. When the temperature control option is turned on, it means that the temperature can be controlled to the set temperature in real time as long as it returns to the main interface. When it is not turned on, it only controls the temperature of the cone and plate to the set temperature when it is tested. When the automatic lifting option is turned on, the instrument will automatically rise to the starting position. Click on the next page as shown in FIG 5 to set the running speed and the number of the cone selected by the running rotor (selected according to the actual cone installed by the instrument). The instrument automatically calculates the shear rate and the maximum shear force provided by the instrument. When the storage option is turned on, the instrument tests automatically save data and other records. Number: Users can

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input different serial numbers to distinguish different samples. Click on the data button to view the data and historical records.

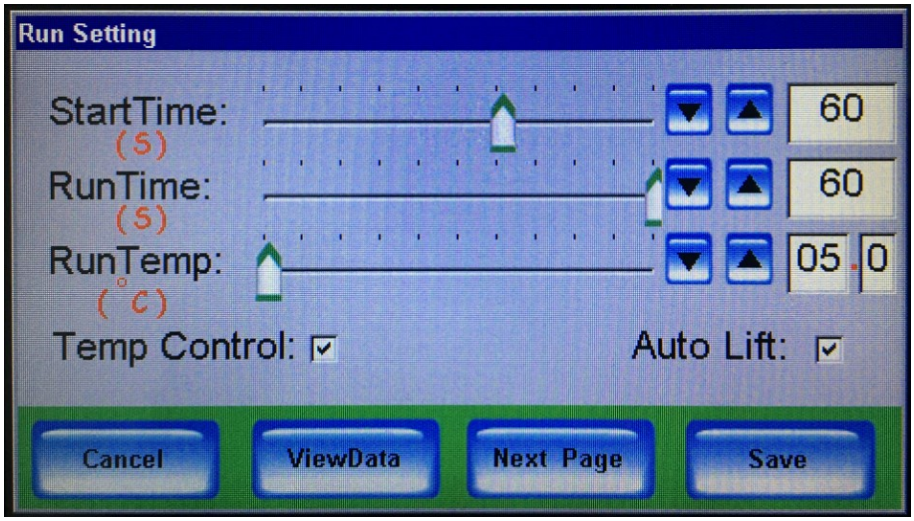

FIG 4

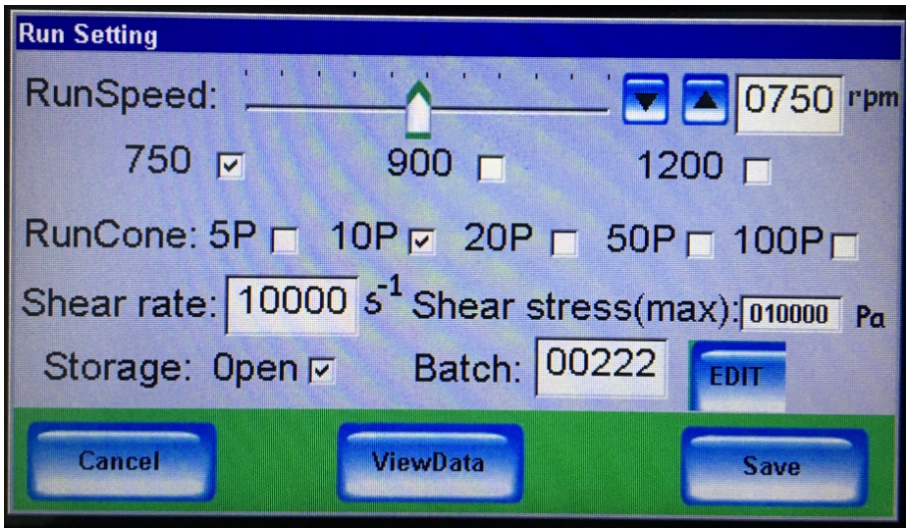

FIG 5

3.6.3.5 Place sample

Samples should be completely dispersed and free of bubbles. Use disposable pipette to drop a small amount (< 1mL) in the middle of the test plate. Do not drop on parts outside the test plate. If it is, clean them in time. Refer to FIG 6

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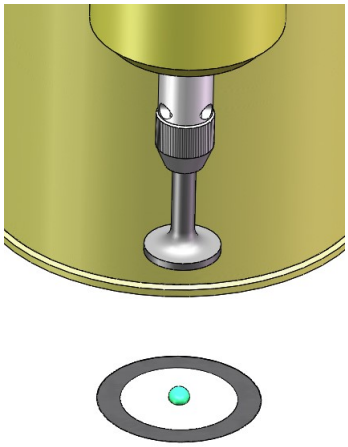

FIG 6

3.6.3.6 Preheating

The test is carried out at a known temperature. The instrument can control the temperature of the test board and can be stabilized between 5~75°C±0.3. However, in order to ensure the accuracy of the test conditions. It is necessary to stabilize the temperature of the cone, the coating sample and the test plate at the target temperature at the same time. Select the descent button in the main panel, the temperature control system will start, adjust the work state according to the set temperature value; the main shaft descends, locates, so that the cone is on the paint sample, and starts to warm up until the temperature displayed on the panel is stable at the set value. This is the equilibrium temperature condition.

3.6.3.7 Testing

The viscosity value of the test is displayed in real time on the main interface, displayed as a curve, as well as the state of the test conditions. The test results are shown in FIG 7.

FIG 7

3.6.3.8 System settings

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Clicks the settings button to enter the settings interface (FIG 7), click the system button to enter the system settings (FIG 8) to set the screen brightness and turn on or off the buzzer and turn on or off the automatic energy saving.

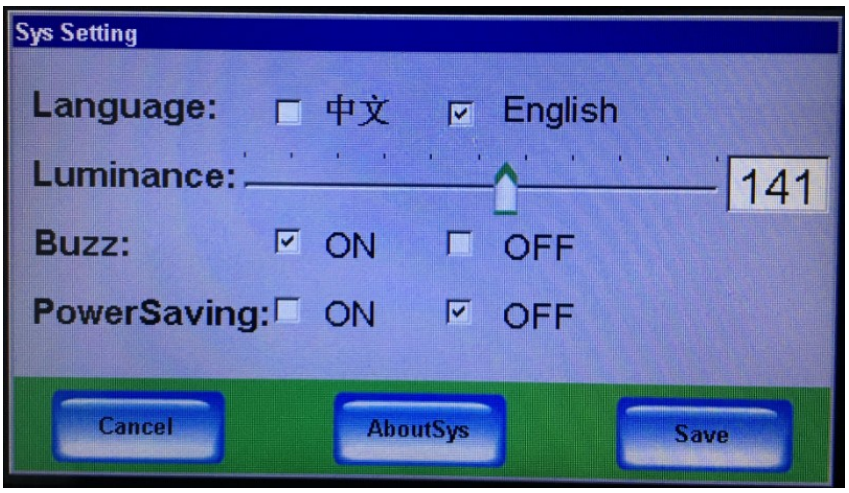

FIG 8

Click on the instrument information to view the serial number of the instrument and the software version and date of manufacture (FIG 9)

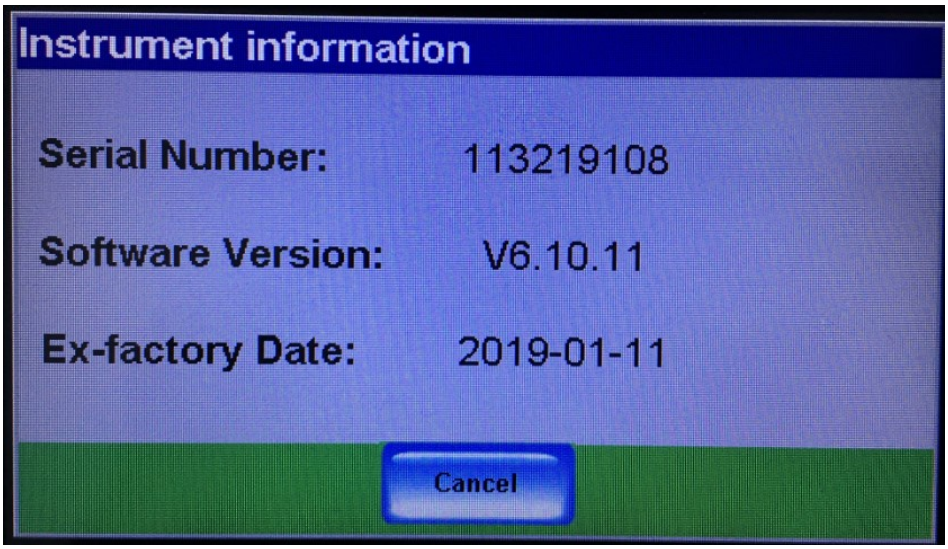

FIG 9

4 Calibration

4.1 The machine has been calibrated before leaving the factory;
4.2 The recommended calibration period is one year;
4.3 Cone and plate viscometer is a measurement method using high shear rate. The measurement results are biased under different shear rate conditions. The measurement results include below parameters, such as shear rate, temperature and torque etc.
4.4 Calibration operation should be carried out according to the professional calibration manual

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method. If the deviation between the test result and the standard parameter is found, it is necessary to replace the new cone or return to the factory for maintenance;

5 Maintenance

This machine needs regular maintenance. This responsibility is borne by the customer and does not belong to the warranty obligation.

5.1 When the cone is not in use, it must be wiped clean and stored in a plastic sealed pocket.
5.2 The cone and reagent plate must be wiped clean after each test.
5.3 If it is not used for a long time, the instrument must be placed in a dry environment and covered with a film bag to prevent foreign matter and dust from entering the inside of the instrument through the fan port.
5.4 The instrument must be kept clean and dirt or oil stains should be cleaned up in time.
5.5 Ensure the lubrication state of each operating mechanism of the instrument. Refueling frequency is once a year, using lithium grease lubricant.

6 Order Information

BEVS 1132 Intelligent Cone and Plate Viscometer
BEVS 1132-P01 Cone 1# （0-5P）
BEVS 1132-P02 Cone 2# （0-10P）
BEVS 1132-P03 Cone 3# （0.1-20P）
BEVS 1132-P04 Cone 4# （0.1-50P）
BEVS 1132-P05 Cone 5# （0.1-100P）

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