



PCE Instruments

**PCE-RVI 8**

**Viscometer Instruction Manual**

This Instruction Manual is applicable for all viscosity meters, please read as per the model or configuration of the instrument you purchased!

**Dear User:**

**Thank you for selecting our viscometer, please read through this Instruction Manual before correctly using this product. Any further revision will not be informed separately.**

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## I. Working principle and purpose

The brand new touch screen viscometer is an intelligent instrument based on the ARM technology, and it is the first full touch screen viscometer in China replacing the traditional operation mode with keys and a small-size LCD. This series of viscometer is integrated with a high-performance step motor and a driver running accurately and stably as per the program setting, and the motor drives the rotor to rotate through a torque sensor at a constant speed. When the rotor meets any viscous resistance in the liquid tested, the resistant force will be fed back to the torque sensor, processed and computed internally, and then displayed as a viscosity value of the liquid tested.

Comparing with similar instruments, this series of instrument has many advantages such as convenient operation, direct reading, rich display, high measuring accuracy, stable rotating speed, high interference resistance and wide working voltage (100V~240V, 50/60Hz), etc.

For the operation with this series of instrument, the measuring value percentage of the full measuring range can be displayed, and the instrument has the functions of measuring range overflow warning and automatic scanning. The user can choose a suitable rotor and a combination of rotating speeds directly, fast and accurately, save the identified testing conditions, and use them conveniently for future testing.

This series of instrument can be extensively used in measuring the viscosity of solvent adhesive, emulsion, biochemical product, paint, cosmetics, ink, paper pulp and food, etc.

## II. Main technical performance

Model	Measuring range (mPa.s/cp)	Measuring accuracy (full range)	Standard rotors	Rotating speed	Optional accessories
NDJ-5T NDJ-9T	1 <sup>*</sup> -100,000	±1%	L1,L 2, L3,L 4	6, 12, 30, 60	Thermostatic bath, jacket cup, high temperature heating oven, temperature sensor, portable printer, standard viscosity fluid, minor sample adaptor rotor, ultra-low viscosity adaptor rotor (rotor #0), rotor R1, software  Optional accessories are chosen as per the viscometer model, as they are not applicable for
NDJ-8T SNB-1T	1 <sup>*</sup> -2,000,000	±1%	L1,L 2, L3,L 4	0.3, 0.6, 1.5, 3, 6, 12, 30, 60	
SNB-1A-T NDJ-1C-T SNB-1J-T	10-200,000	±1%	21, 27, 28, 29	0.5, 1, 2, 5, 10, 20, 50	
LVDV-1T	1 <sup>*</sup> -2,000,000	±1%	L1,L 2, L3,L 4	0.3~100 stepless speed change, 998 optional rotating speed steps	
LVDV-2T	1 <sup>*</sup> -6,000,000	±1%	L1,L 2, L3,L 4	0.1~200 stepless speed change, 2000optional rotating speed steps	
RVDV-1T	100 <sup>**</sup> -13,000,000	±1%	R2, R3, R4, R5, R6, R7	0.3~100 stepless speed change, 998 optional rotating speed steps	
HADV-1T	200 <sup>**</sup> -26,000,000	±1%	R2, R3, R4, R5, R6, R7	0.3~100 stepless speed change, 998 optional rotating speed steps	
HBDV-1T	800 <sup>**</sup> -104,000,000	±1%	R2, R3, R4, R5, R6, R7	0.3~100 stepless speed change, 998 optional rotating speed steps	
RVDV-2T	100 <sup>**</sup> -40,000,000	±1%	R2, R3, R4, R5, R6, R7	0.1~200 stepless speed change, 2000 optional rotating speed steps	



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HADV-2T	200**~80,000,000	±1%	R2, R3, R4, R5, R6, R7	0.1~200 stepless speed change, 2000 optional rotating speed steps	all models.
HBDV-2T	800**~320,000,000	±1%	R2, R3, R4, R5, R6, R7	0.1~200 stepless speed change, 2000 optional rotating speed steps	
PCE-RVI8	40.2-141KU 27-5250cp 32-1099g	±1%	KU1	200	

- ※ 1cP requires the lower limit that can be reached by the optional ULR adapter
- ※ \*\* The lower limit that can be reached by optional R1 rotor
- ※ Unit conversion: 1Pa.s = 1000mPa.s, 1P = 100mPa.s, 1cP = 1mPa.s
- ※ ULR ultra-low viscosity adapter, referred to as No. 0 rotor

### III. Environmental conditions

Ambient temperature: 5°C ~ 35°C (recommended temperature: 20°C)

Relative humidity: ≤80%

Power supply: AC100~240V (50/60Hz)

There is no strong electromagnetic interference, no strenuous vibration and no corrosive gas near the instrument.

### IV. Instrument installation

Take out the base, lifting column, viscometer host, host connecting rod, power adapter and other components in turn from the box as shown in Fig.1. Insert the lifting column into the hole of the base and tighten with a nut (note: the lifting knob is placed on the right side), turn the lifting knob to adjust the appropriate lifting tightness so that the host will not automatically slide down, and the damping feel during lifting is moderate. If it is too loose or too tight, it can be adjusted by the adjusting screw in front of the lift slider. Then remove the screws on the connecting rod of the host, and then insert the milling plane down into the mounting hole at the bottom of the host. Connect the host connecting rod to the base plate of the host with the removed hex screw and tighten it. Then insert the host with the connecting rod into the mounting hole of the lift slider, and tighten the fixed knob after it is straightened. Adjust the three level feet below the base so that the level bubble in front of the instrument is in the center of the black circle. Remove the transport protective cap under the instrument cover, connect the instrument to the power supply, and install the viscometer. Remove the transport protection cap under the instrument cover, and power on the instrument. After the assembly is completed, the shape is shown in Fig. 2.

The L1 ~ L4 rotors and rotor protection frames that come with the machine are shown in Fig.3.

The R1 ~ R7 rotor and the rotor protection frame provided with the machine are shown in Figure 4.(HADV and HBDV are not equipped with a rotor protection frame)

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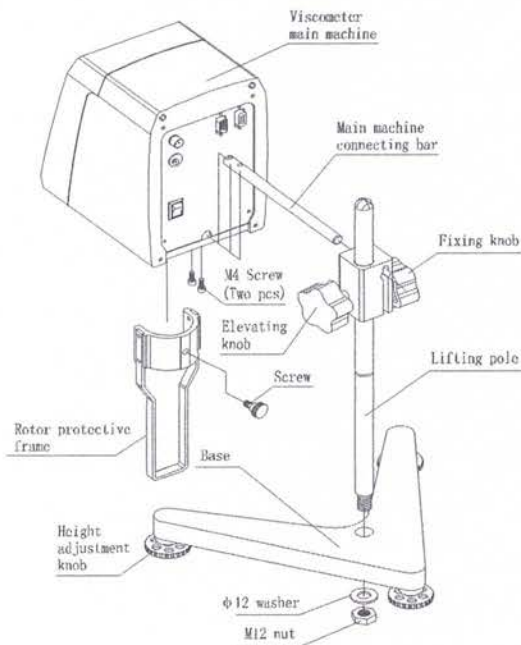


Fig. 1

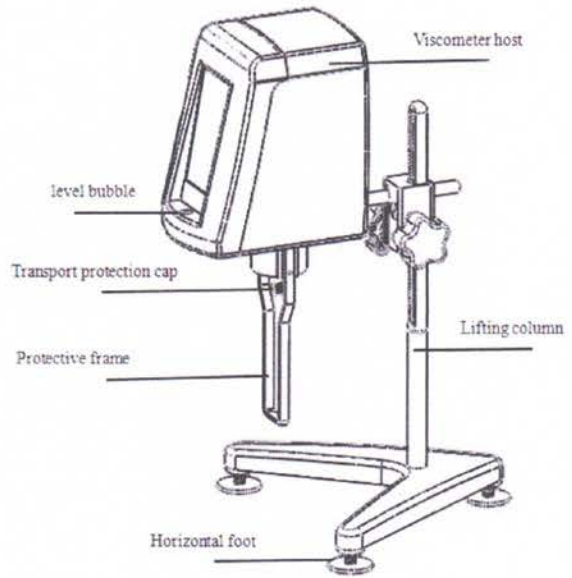


Fig. 2

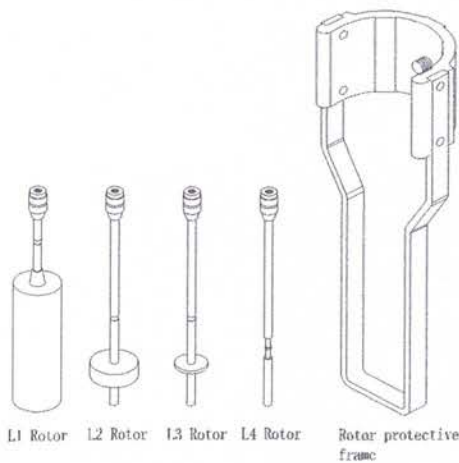


Fig. 3

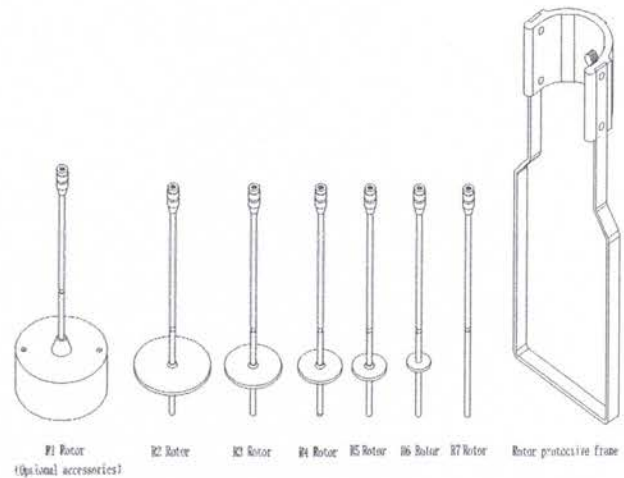


Fig. 4

#### 4.1 Installation and operation of rotor #0 (this part is optional)

1) The No. 0 rotor component is composed of a fixed sleeve, No. 0 rotor, and a test cylinder. Its structure is shown in Fig. 5. This component can only be used when the No. 0 rotor is measured, and this component is not suitable for other rotor tests.

2) The installation of No. 0 rotor is as shown in Fig.6. First, rotate No. 0 rotor clockwise on the rotor connecting screw (universal joint).

3) Insert the fixing sleeve from the bottom to the cylinder or the bottom cover of the instrument. Be careful not to touch the No. 0 rotor, and tighten it with the sleeve fixing screw.

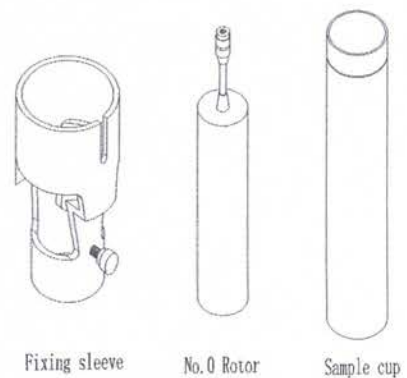


Fig. 5

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4) Pour 22ml of test sample into the test cylinder.

5) Slowly insert the test tube containing the sample into the fixing sleeve from the bottom to the top, and tighten it with the test tube fixing screw. When tightening, pay attention to the tapered end of the test tube fixing screw to turn into the triangular groove on the upper end of the outer wall of the test cylinder. All installed No. 0 rotor parts are shown in Fig. 7. Control the temperature of the liquid to be tested, and adjust the level of the instrument to test.

6) Note that when rotor No. 0 is used, no-load rotation is not allowed when no fluid is loaded. When rotor No. 0 is used, there is no need to install a rotor protection frame.

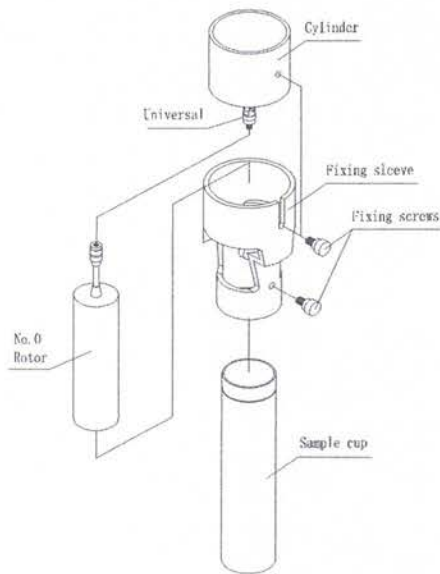


Fig. 6

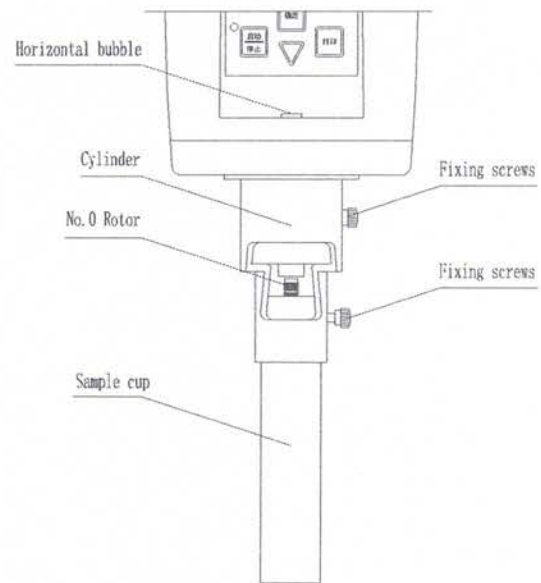


Fig. 7

#### 4.2 SSR small sample adapter installation steps

1) As shown in Fig.8, a complete set of rotors includes the following components.

2) First fix the mounting bracket on the lower cover, and then fix the sample collet in the lower hole of the mounting bracket.

3) The transition joint and the rotor are installed in turn, and the rotor is placed at the center of the sample collet. (Note that the connector and rotor are screwed clockwise at this time)

4) Insert the sample tube from the bottom to the middle of the sample holder and fix it with the locking screw.

5) According to the selected rotor, pour the required sample amount (see the table below) for testing. After completion, put the sample tube cap on it, as shown in Fig.9 and Fig.10.

6) Reconfirm the horizontal state of the machine. If conditions permit, you can control the temperature of the liquid to be measured. Select a proper speed and press the start button of the rotor to test the viscosity.



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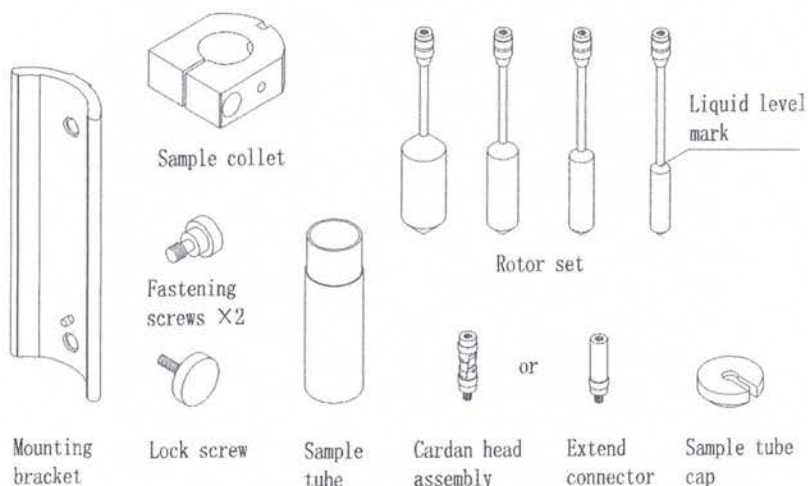


Fig. 8

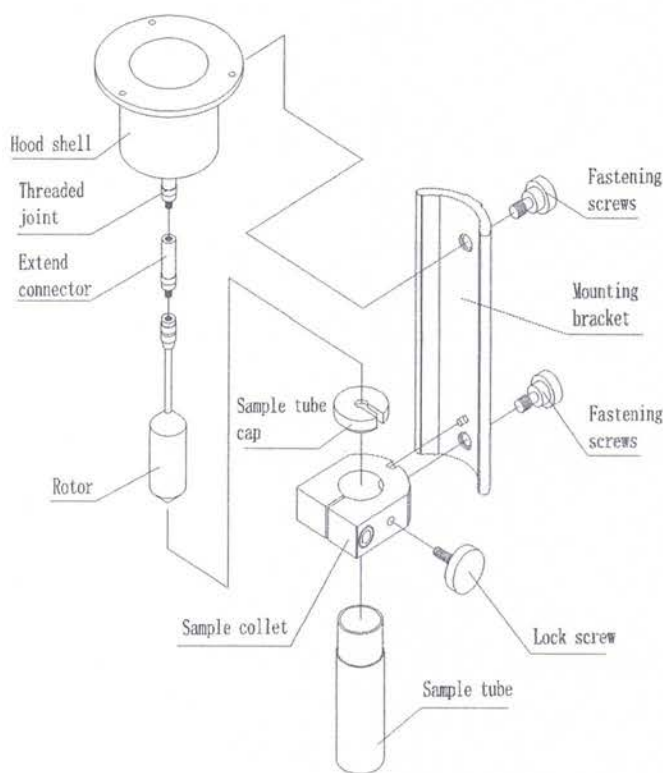


Fig. 9

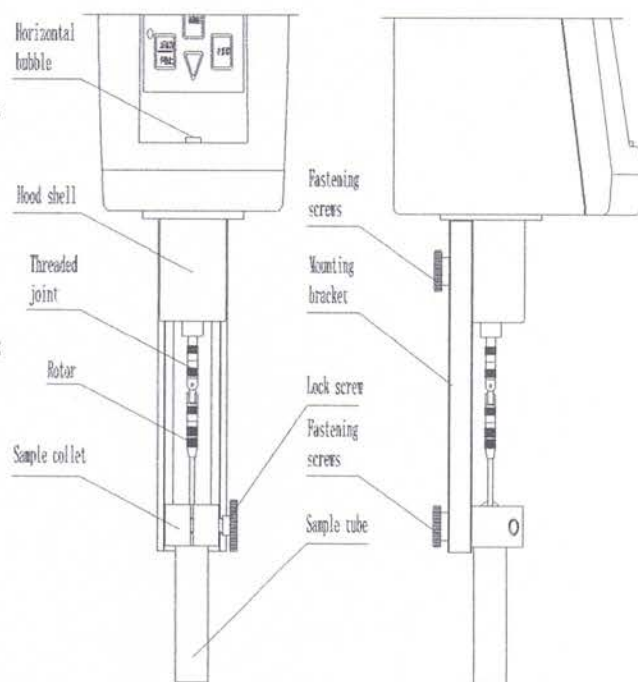


Fig. 10

Sample volume required with SSR adapter Tab. 1

Rotor	18#	25#	31#	34#	21#	27#	28#	29#
Sample volume (approximate)	7mL	9mL	10.5mL	11mL	7.8mL	11.3mL	12.6mL	11.5mL

#### 4.3 Steps for installing the rotor of viscometer PCE-RVI8

(1) Take the rotor and rotor sleeve out from the packing box, and fix the rotor with the fixing screw. Notice: fix the screw to the oblate opening on the rotor bar, and fix the other end

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of the rotor sleeve to the central axis. Transfer a suitable amount of the tested sample into the material tube. See details in Fig. 11.

(2) Rotate the elevating knob to lower the instrument slowly, immerse the rotor into the sample and align the liquid level mark (the concave or convex line on the rotor pole) to the level of the tested liquid. See details in Fig. 12.

(3) Check if the front level meter of the instrument is at the level position.

(4) Make sure everything is well prepared and then click "Run" to test the viscometer directly.

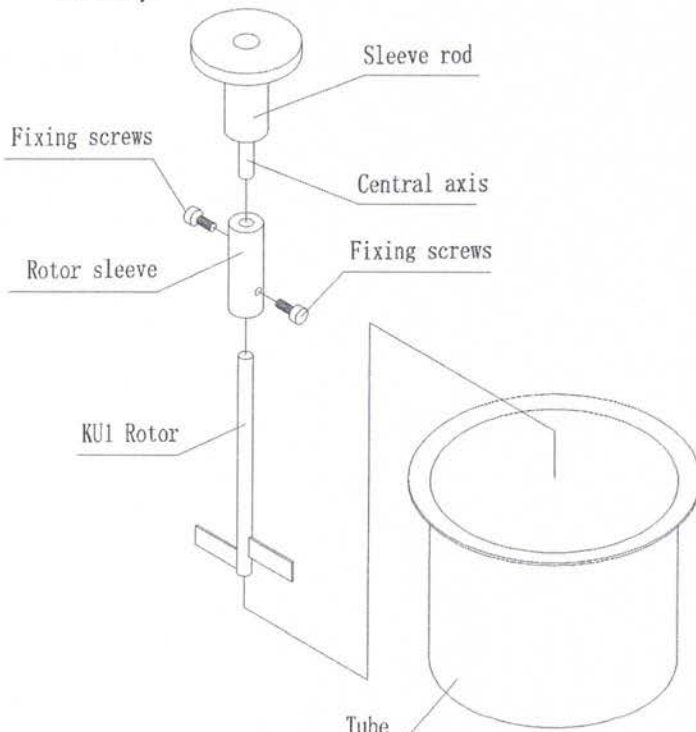


Fig. 11

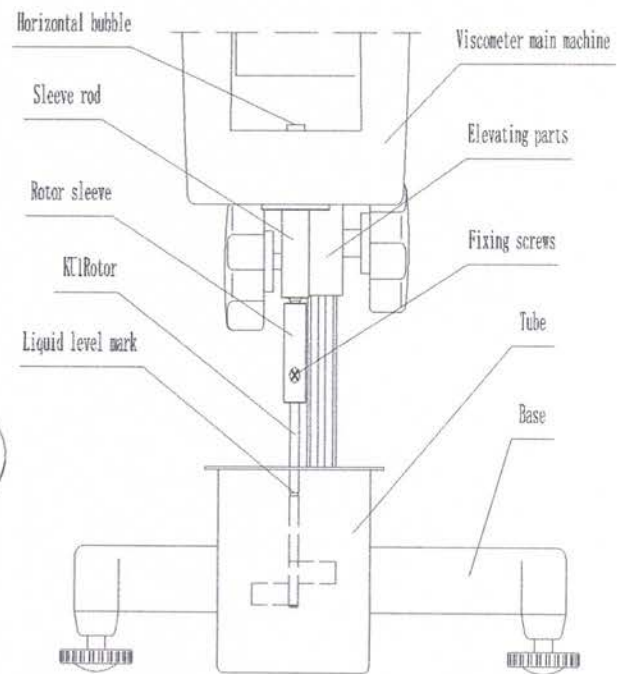


Fig. 12

#### 4.4 Installation of viscometer NDJ-1C-T/SNB-1J-T

1) Take out the parts of the machine from the packing box, and refer to the introduction of "Instrument Installation" above to install the host and base of the viscometer.

2) Set the heating furnace under the main body of the viscometer, adjust the horizontal feet of the heating furnace base so that the water bubbles in the horizontal bubbles of the heating furnace base are located in the center, and after the adjustment is completed, tighten the horizontal foot fastening nuts.

3) Insert the lead of the heating furnace into the signal input port of the back cover of the temperature controller correspondingly, Please refer to Fig. 13 for the completed appearance. (Please pay attention to the direction when inserting the lead wire, and insert the corresponding slot to the corresponding position before inserting the connection.) The front and back views of the NKY-25 temperature controller are detailed in Fig.14.



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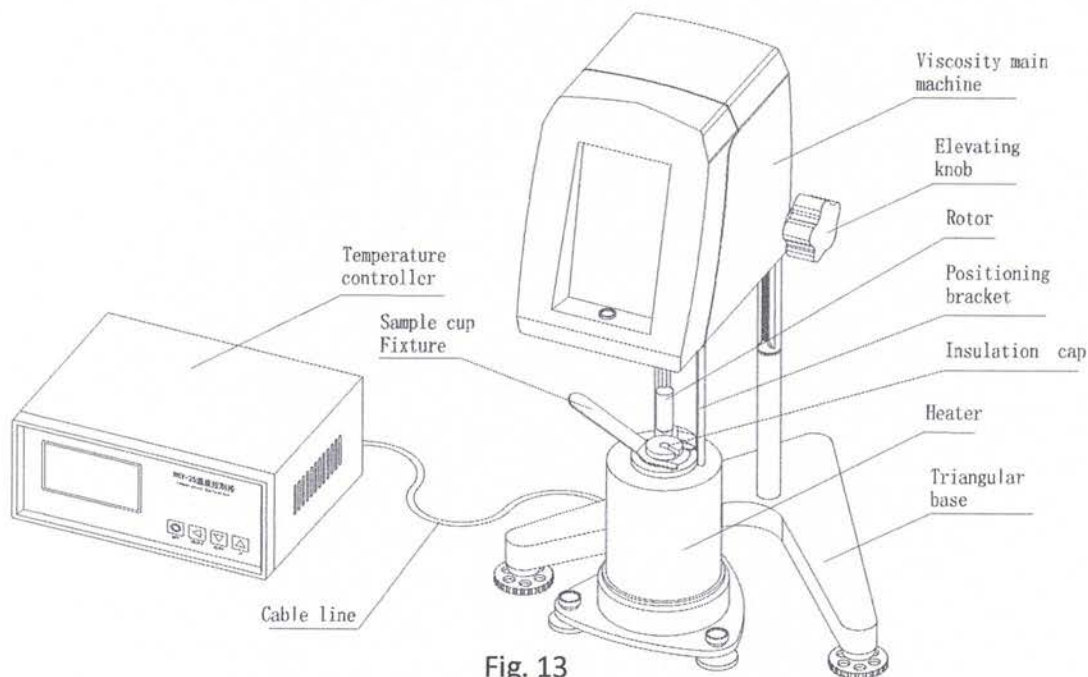
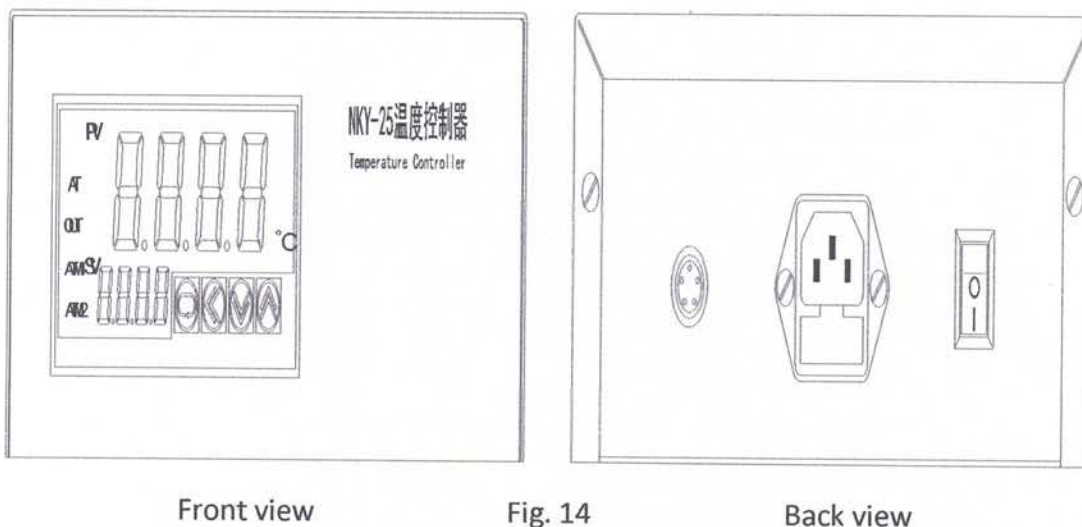


Fig. 13



Front view

Fig. 14

Back view

4) Remove the plastic protective cap of the shaft below the main body of the viscometer, screw the rotor extension hook clockwise (reverse thread) into the universal joint, and select the used rotor according to the viscosity range of the sample and hang it. See Fig.15 for details.

5) Take the corresponding measured sample amount (sample consumption table) according to the selected rotor and put it in the barrel (can be converted to mass according to the density of the sample) to avoid sample overflow or insufficient amount. The initial state of the sample is fluid enough to insert the rotor into the sample. At this time, please insert the selected rotor into the sample. If the sample is solid or paste-like at the beginning, the rotor cannot be inserted into it. When the temperature rises, insert the rotor when the sample begins to melt. If conditions permit, you can put the rotor in the oven to constant temperature to a temperature near the set temperature. When the sample temperature reaches, use the needle-nose pliers to hang the rotor on the extension hook and insert it into the sample for testing.

6) After the rotor is placed in the sample, check whether the liquid level mark (see Fig. 16 for details) is appropriate. The rotor can be adjusted to the appropriate height by lifting the knob.

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7) When the test is completed, use the special handle to take the sample tube out of the hole in the heating furnace. Please pay attention to burns.

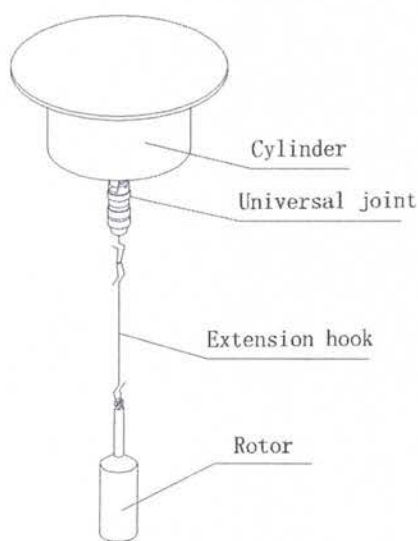


Fig. 15

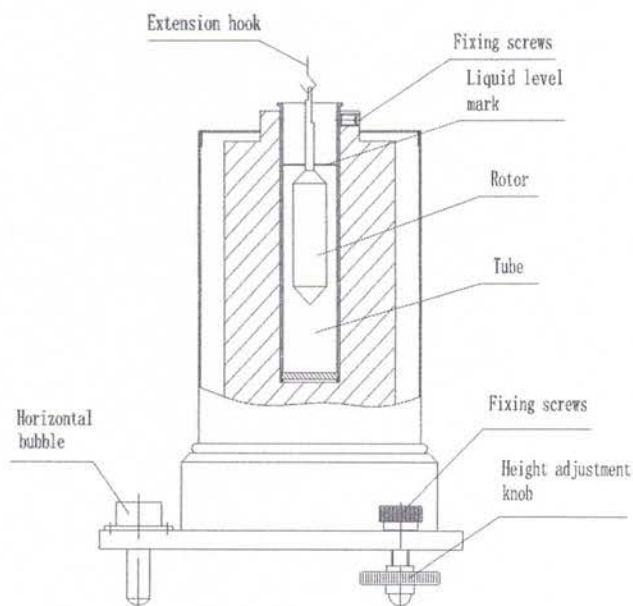


Fig. 16

#### 4.5 NKY-25 temperature controller instructions

1) As shown in Fig.14, the front view of the temperature controller

"PV": The temperature inside the actual sample cylinder.

"SV": Pre-set target temperature value.

" $\Pi$ ": This key is used to modify the set value and confirm the function of modifying the information.

" $\llcorner$ ": Shift key, used to move digits when modifying parameters.

" $\nabla$ ": Each time the parameter is modified, the corresponding setting value decreases by 1.

" $\wedge$ ": Each time the parameter is modified, the corresponding setting value is increased by 1.

"Power switch": It is used to control the temperature controller power on and off.

"Power socket": Set the temperature controller power fuse and power socket together.

"Signal input port": Connect to heating furnace

2) Parameter setting of temperature controller

Heating temperature setting: When the instrument is in the power-on standby state, press the " $\Pi$ " key once. The display value bit displays "SP" (indicating that it has entered the temperature setting state). The last digit on the set value display bit will flash. At this time, press " $\nabla$ " key or " $\wedge$ " key and " $\llcorner$ " key to set or modify the required heating temperature parameter value. After setting, press the " $\Pi$ " key again to confirm the set temperature value and return to the standby state at the same time.

Note: Each time the " $\Pi$ " key is pressed, the display cycles between temperature setting (SP)  $\rightarrow$  return to standby. After setting the parameters, you must press the " $\Pi$ " key to confirm the set value, otherwise the set value will not be saved.

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**Sample volume required with NKY-25 Heating furnace Tab. 2**

Rotor	18#	25#	31#	34#	21#	27#	28#	29#
Sample volume (approximate)	11mL	12mL	13.6mL	14.5mL	12.5mL	14.5mL	16mL	15mL

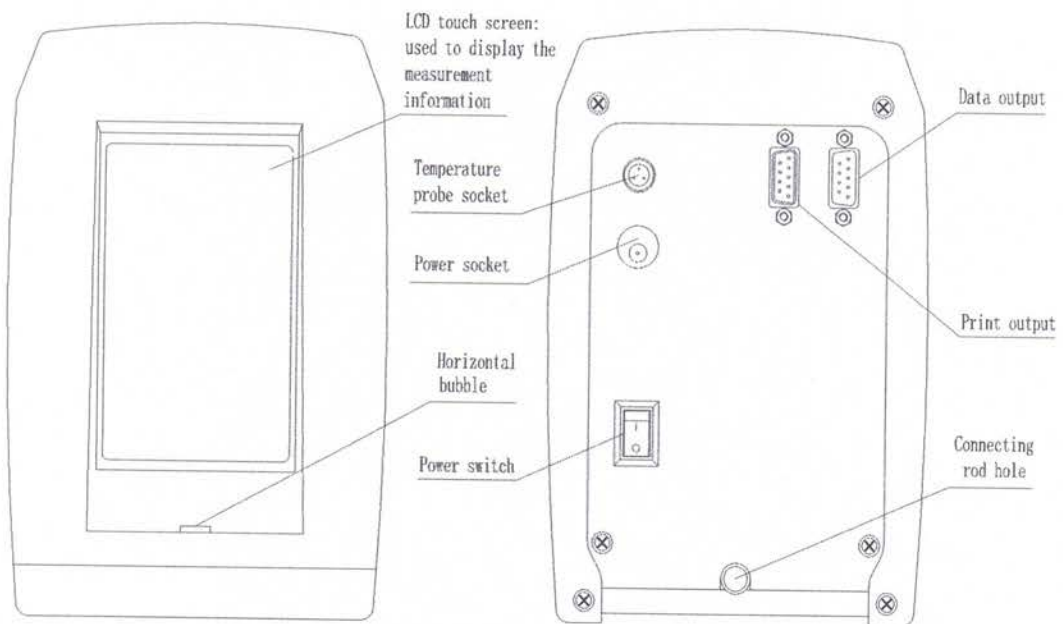
**V. Preparation before test**

1. For series NDJ/SNB/LVDV viscometers, transfer the tested sample into a round and flat-bottom container whose diameter is 60mm at least.  
For series RVDV/HADV/HBDV viscometers, the diameter of the sample container must be 100mm at least.
2. Mount the rotor protective frame onto the silver casing under the instrument.
3. Select a suitable rotor, and clockwise (counter-thread)screw it to the shaft connector under the main machine.
4. Rotate the elevating knob to lower the instrument slowly, immerse the rotor into the sample and align the liquid level mark (the concave or convex line on the rotor pole) to the level of the tested liquid.
5. Check if the front Horizontal bubble of the instrument is at the level position.

**Notices: Never transversally pull the shaft connector when attaching or detaching the rotor, or the inner structure may be damaged.**

**The ambient temperature must be constant during measuring so as to maintain the stability and correctness of the measured value.**

**VI. Instrument operating interface and operating method**



Take model PCE-RV18 for example, after turned on, the instrument will firstly display the initial interface and then enter the main menu after 3sec(Fig.17), and the main menu has 4 option bars:

Viscosity test: Parameter setting for viscosity test, measurement and display of related data such as viscosity.



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Stored test: The previously guaranteed test conditions are directly used for viscosity testing.

Manage results: Delete the saved viscosity test data and export management of U disk.

Setting: Used to modify the machine time and date and temperature correction.



Fig. 17

### 6.1. Viscosity test

1) Click on "Viscosity Test" to enter the viscosity test interface (Fig.18)

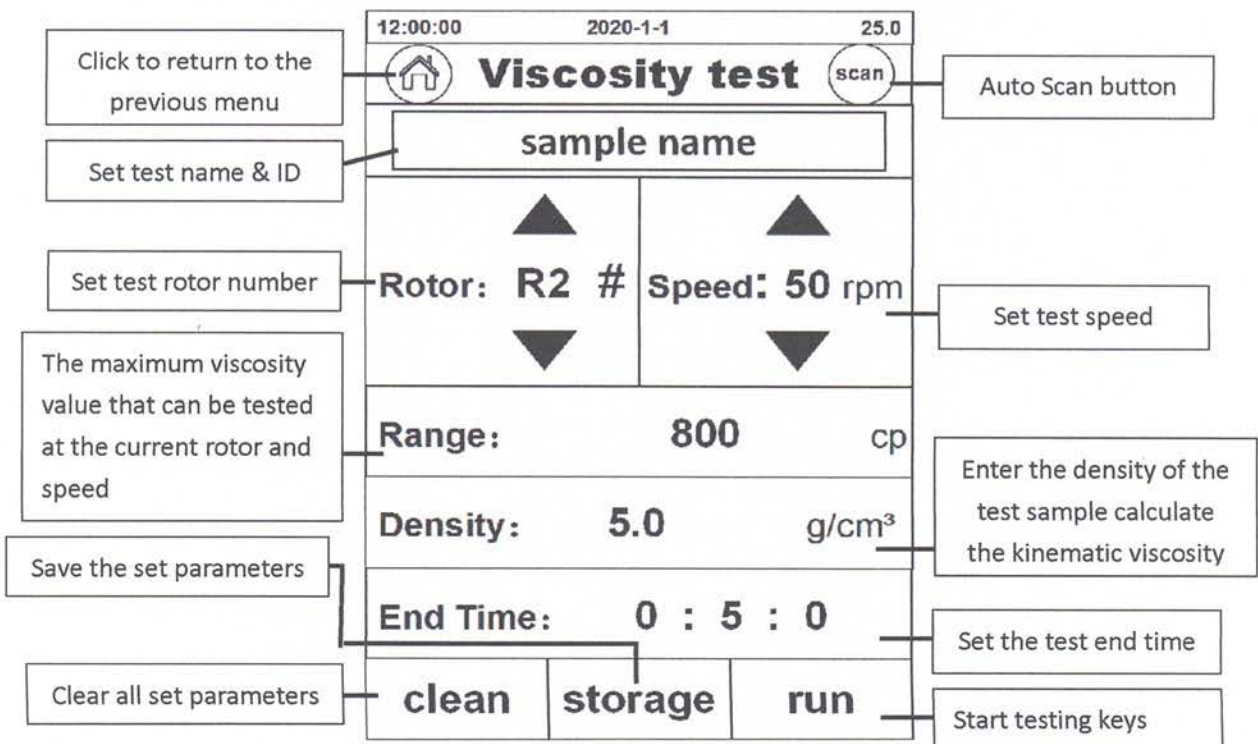


Fig. 18

2) Parameter setting: Before the viscosity test, the test parameters suitable for the sample to be tested must be set (Fig.18), where "Sample name (when the sample name is not set, the default is the year, month, day and time node of the test), "Rotor" and "Speed" are required,

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and "End Condition" and "Sample Density" are optional. The rotor / speed setting is selected by the numerical “ ▼ ▲ ” button. The rest of the parameters are entered by clicking the parameter value and using the virtual keyboard.

Example: If the viscosity value of the measured sample is known to be about 500mpa.s, the following combinations can be selected: R2, 50RPM

After the parameter setting is completed, the parameter can be saved in the built-in storage. In the next test, the parameter can be directly used to perform the viscosity test through the "stored condition test".

3) Start the test: After the parameters are set, click "Run" to start the test, and the interface will switch to the test interface (Fig.19)

Viscosity: The viscosity value of the tested sample 。 (if ERROR is displayed during the test, it means that the larger range is required if it exceeds the range)

Temp: The temperature value measured by the temperature sensor (requires optional temperature sensor to display the temperature value, 0.0 °C is not inserted)

Rotor: The currently selected rotor number

Speed: the currently selected speed (the speed of the viscometer can be adjusted steplessly, that is, the speed is changed without stopping)

Shear rate: Shear rate value under current test conditions

Shear stress: current shear stress value

Bar trend bar: The% torque trend bar scale represents the current torque percentage, and the red dashed lines at both ends represent 10% and 90%, respectively.

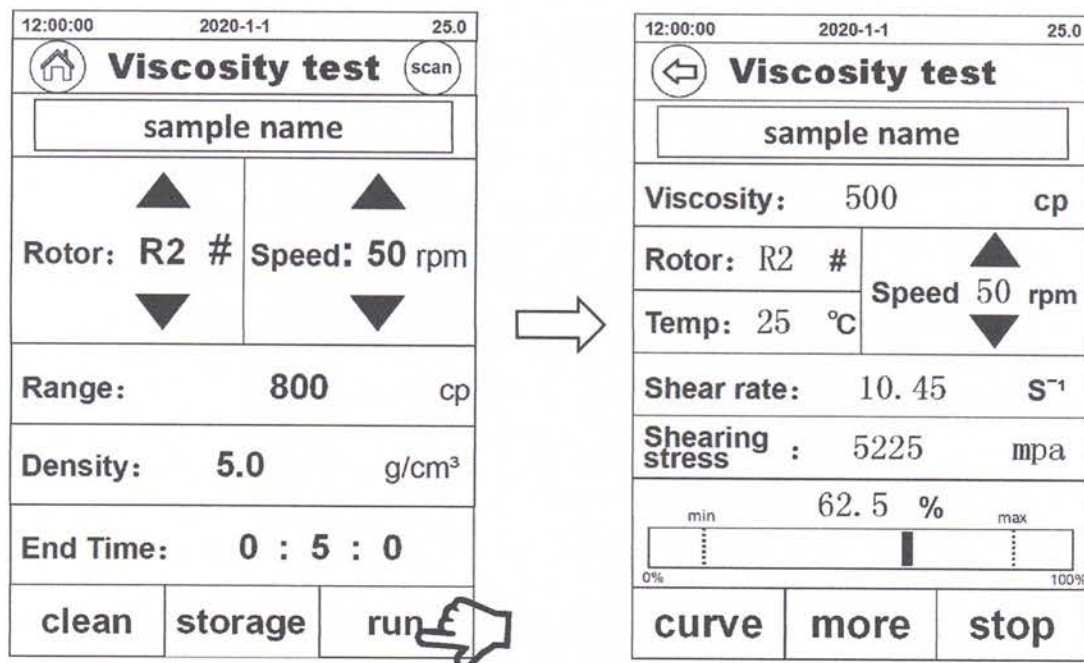


Fig. 19

4) Click “Curve” during the test, and the display interface will change from the list display to the coordinate system display status (Fig.20). To return to the list interface, click the “ ← ” icon in the upper left corner or click the “List” button.



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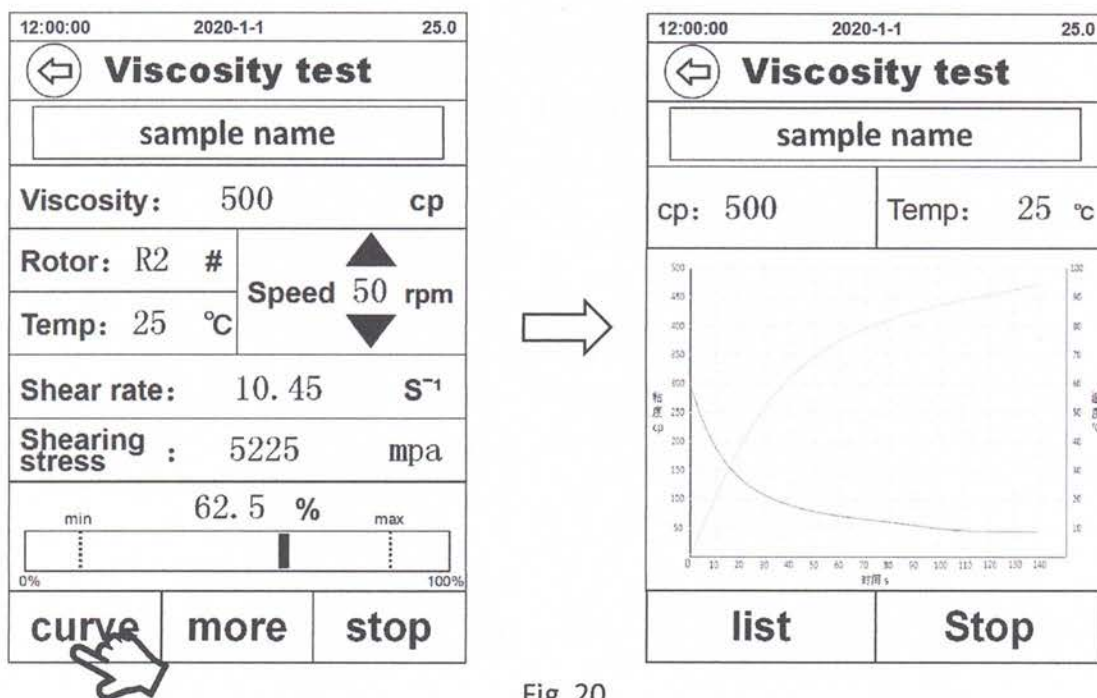


Fig. 20

5) Click “ More ” during the test. The content displayed on this interface is the previous optional parameters (Fig. 21). If it is not set before the test, the data will be displayed as zero.

**Dynamic viscosity:** The viscosity value measured by this rotational viscometer.

**End condition:** Set a period of time, from the start of the test, the test will automatically stop after this time. At this time, the data is still on the test interface, which is equivalent to measuring the viscosity value at a regular time.

**Remaining time:** remaining end test time

**Density:** The density of the test sample filled before the test, which is used to convert the kinematic viscosity value

**Kinematic viscosity:** The kinematic viscosity value of the measured sample, which is equivalent to the dynamic viscosity value divided by the density

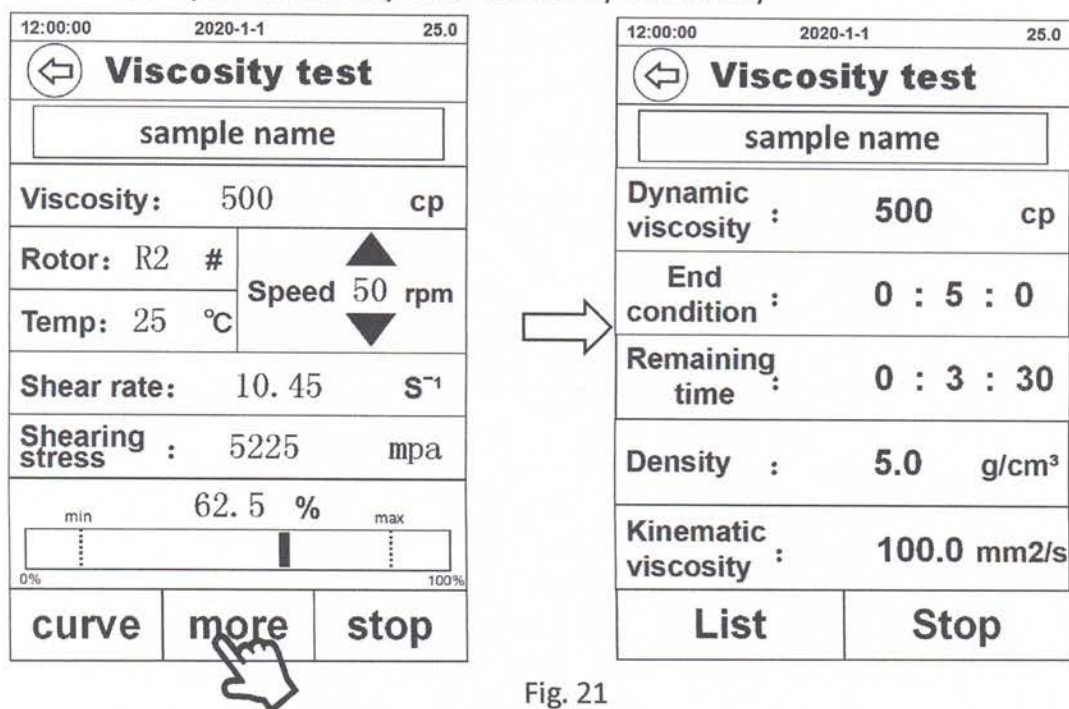


Fig. 21



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6) End the test: After finishing the test, click "Stop" to enter the test data interface (Fig.22), click "Storage" to enter the save preview interface, click "Enter" to save the test record to the instrument memory, and click "Print" Data can be printed out by connecting an external printer.

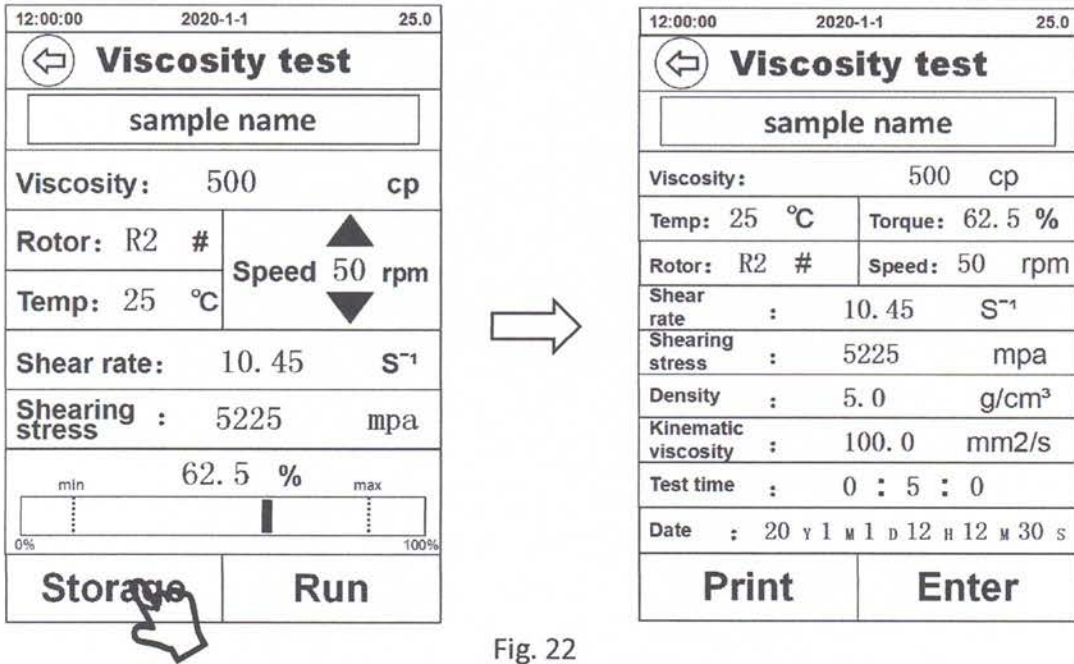


Fig. 22

7) Automatic scan: This function can provide the operator with the best combination of rotor and speed. Click "Auto Scan" in the upper right corner of the parameter setting interface, the interface will switch to the scanning interface (Fig.23), set any rotor, and install this type of rotor at the same time, click "start" to start scanning, and the "Scan Results" column The scan status starts to be displayed. When the scan result meets the test requirements, "Suitable" is displayed at the "Scan result". Click "Use" to directly apply the scan result to the test parameters. If the scan result fails to meet the test requirements, "Please replace the small rotor" or "Please replace the large rotor" is displayed at the "Scan result", and then follow the on-screen instructions.

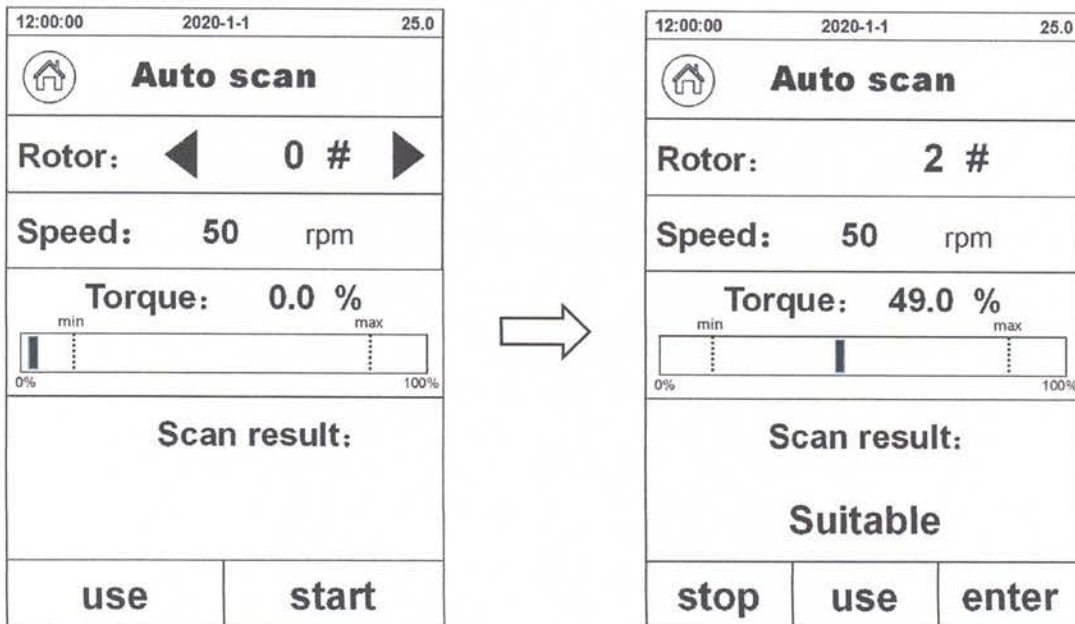



Fig. 23

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6.2 View and recall test condition records: After clicking “Stored test”, the stored test records will be displayed on the screen (Fig.24), and select the required test conditions. Click "Edit", the  icon will appear to delete the stored test conditions.

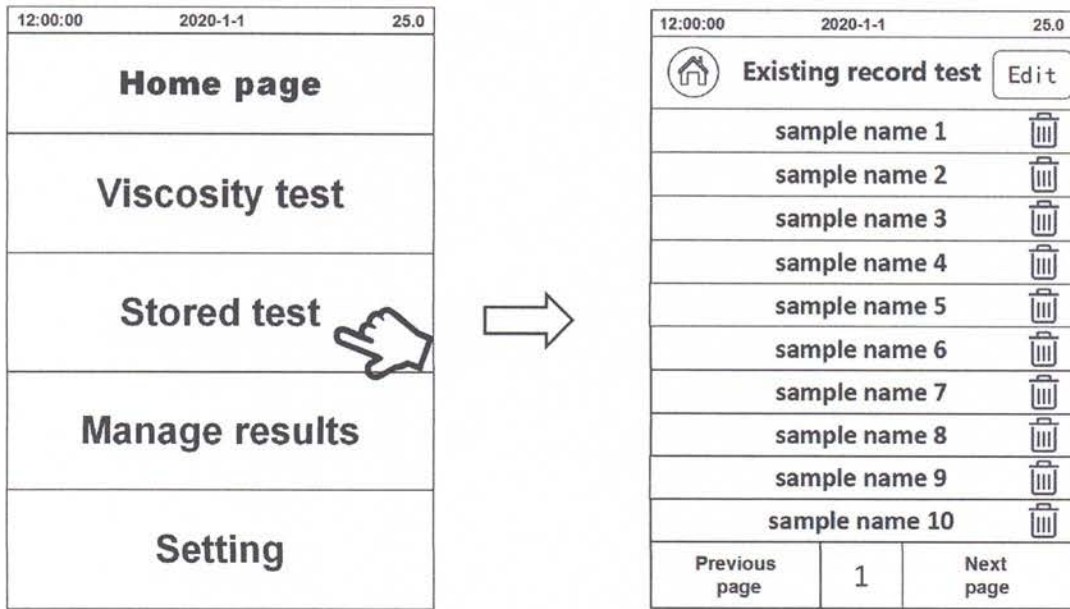


Fig. 24

6.3、Manage test records: After clicking “Manage results”, the stored test records will be displayed on the screen (Fig.25). Select the required records to view, delete, and export the record by USB disk.

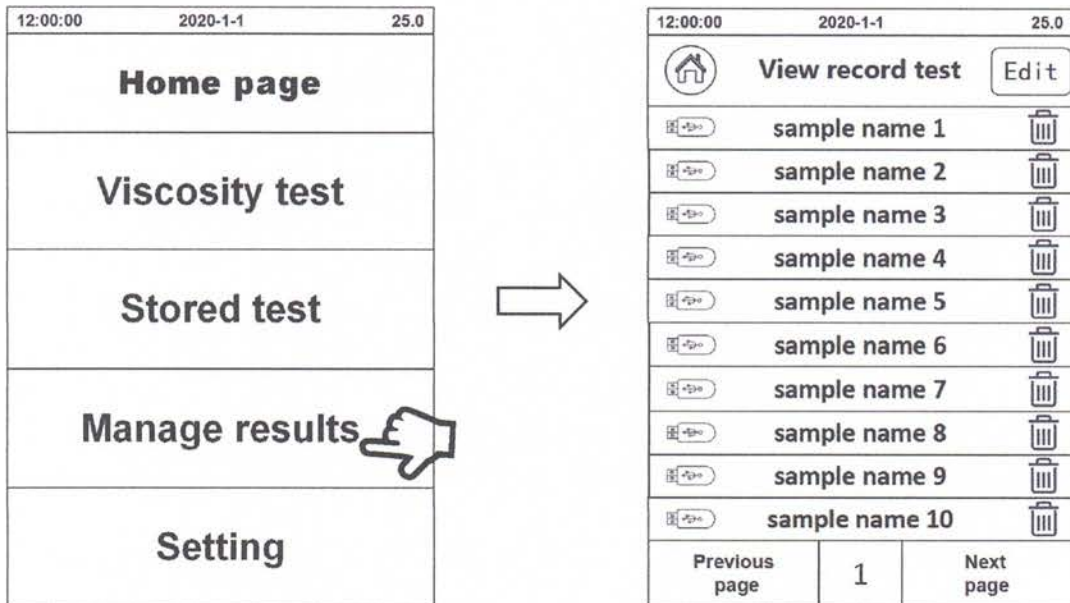




Fig. 25

6.4、Click the  icon to delete the selected test data, and click the  icon to export the data to a USB flash drive. See Fig.26 for details.

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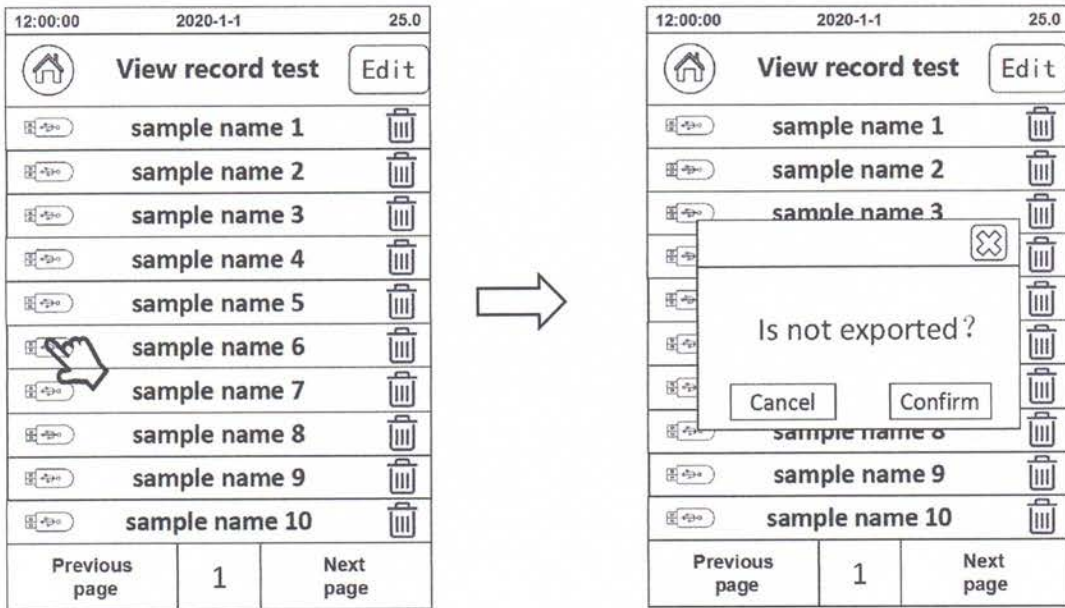


Fig. 26

6.5 、 Setting: The general settings of the instrument, time and date, and operation instructions, etc., see Fig. 27 for details.

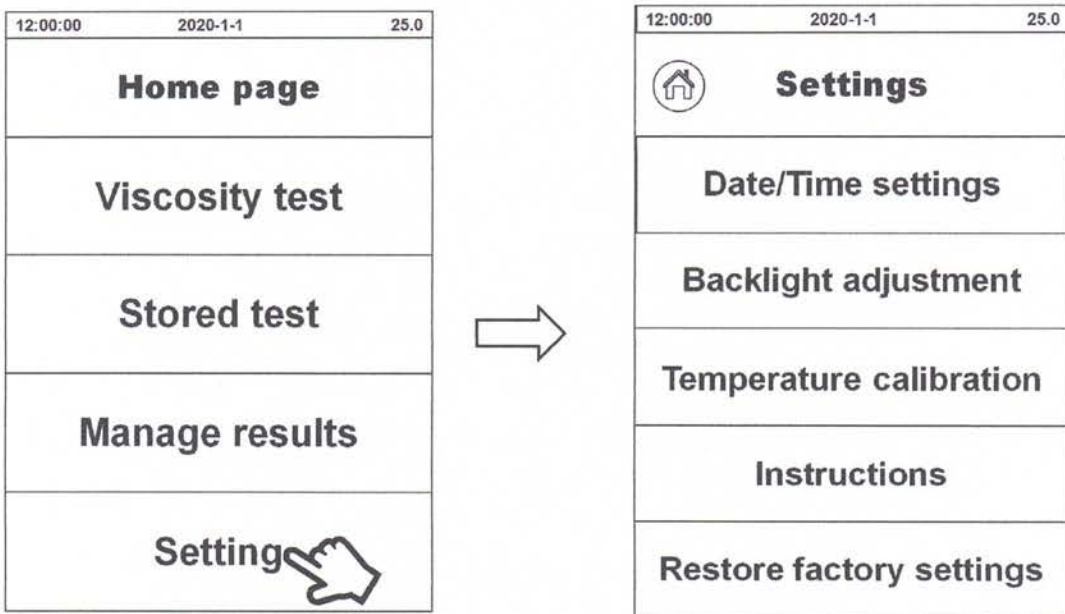


Fig. 27

1) Time and date settings: Click "Date / time settings" to directly adjust the values in the date and time columns.



This Instruction Manual is applicable for all viscosity meters, please read as per the model or configuration of the instrument you purchased!

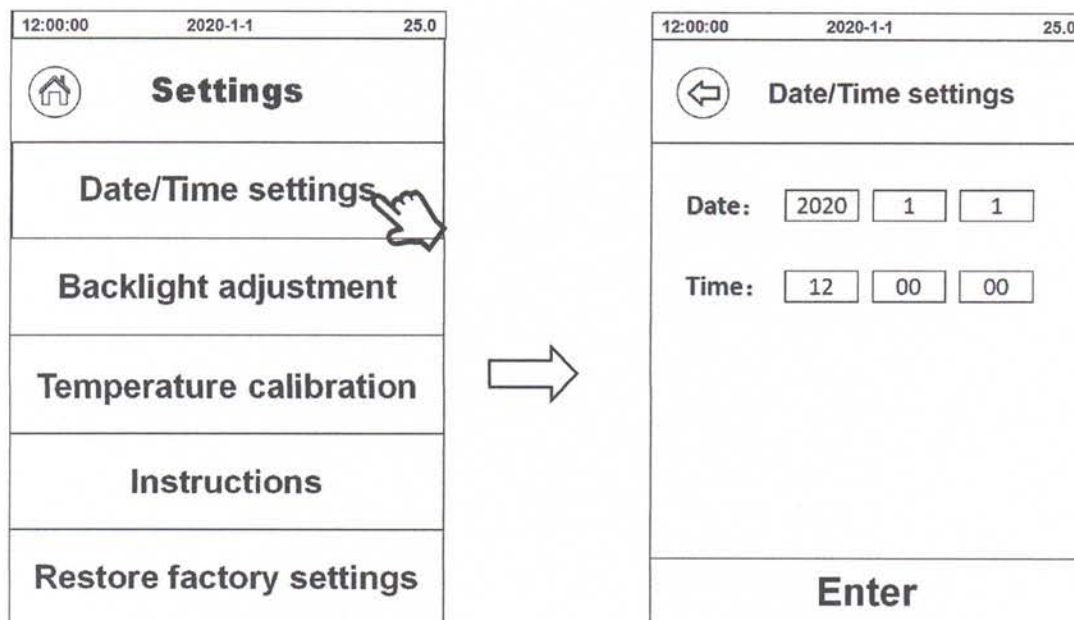


Fig. 28

2) Backlight adjustment: Click "Backlight adjustment", and adjust the screen brightness by "-" "+" at both ends of the indicator bar or directly dragging the circular adjustment button. (Fig.29).

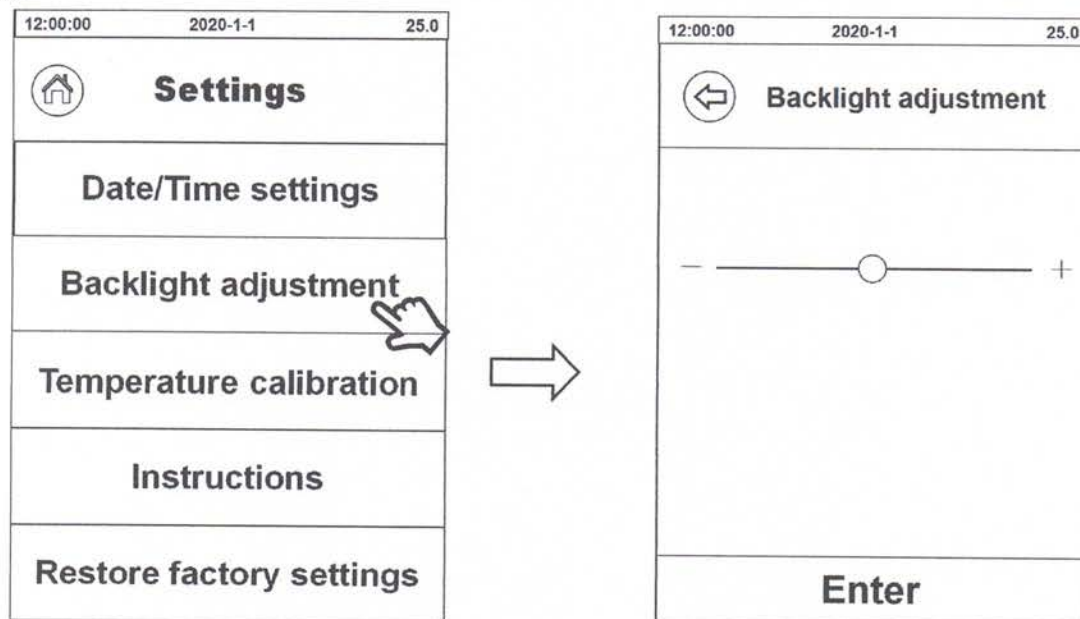


Fig. 29

3) Temperature calibration: This function allows the user to self-calibrate the temperature value measured by the temperature sensor. (Fig.30).

This Instruction Manual is applicable for all viscosity meters, please read as per the model or configuration of the instrument you purchased!

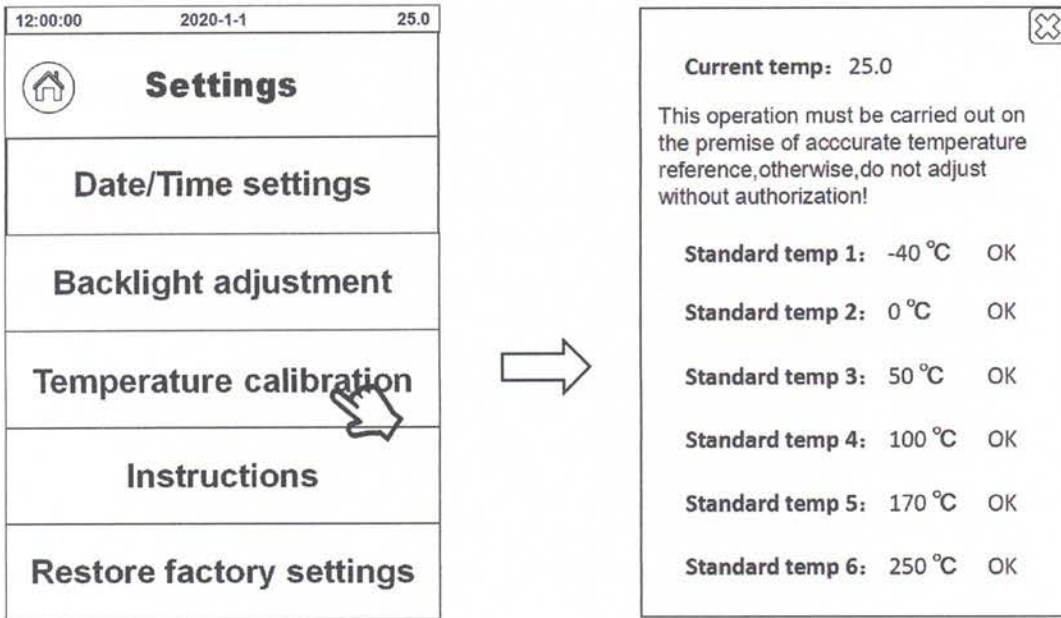


Fig. 30

4) Instructions: Briefly describe the installation and basic operation of the machine, and provide operating instructions for beginners.

5) Restore factory settings: Click “Restore Factory Settings”, the interface shown on the right will appear. If you click “OK” at this time, the instrument will return to the factory state, and the test records and parameter records in the internal memory of the instrument will also be cleared. (Fig.31)

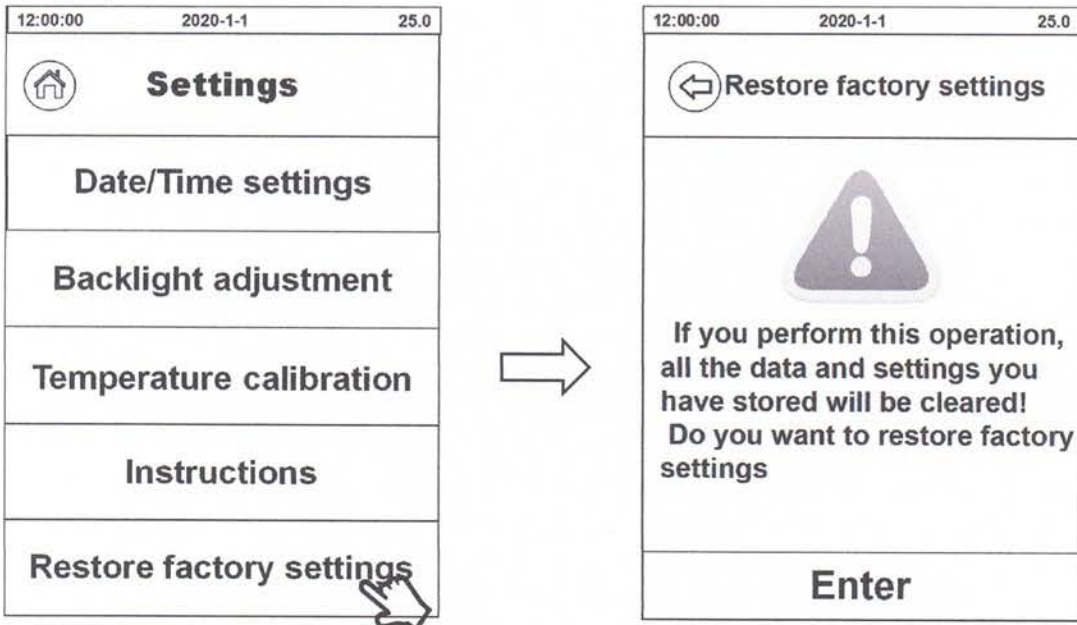


Fig. 30

## 7. Operating interface of model PCE-RV18

After turned on, the instrument will firstly display the initial interface and then enter the main menu after 3sec (Fig. 32), and the main menu has 4 option bars:

**Viscosity test:** test the viscosity of the sample;

This Instruction Manual is applicable for all viscosity meters, please read as per the model or configuration of the instrument you purchased!

**View test data:** view and print the saved test result;

**Manage test data:** output or delete the saved test data in batch;

**Setting:** set the basic parameters of the instrument, including: time, date, save path, factory parameter resetting, language selection, and background light adjustment, etc.

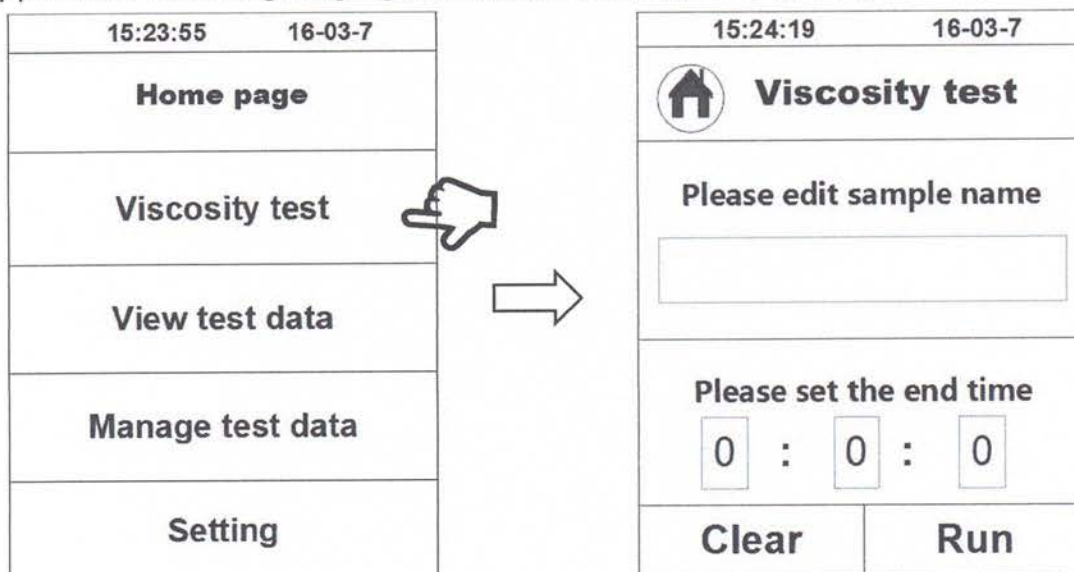


Fig. 32

### 5.1. Viscosity test

Click "Viscosity test" to enter the interface for viscosity testing (Fig. 32), firstly enter the sample name (CH/EN, or digital), set the testing time (H-M-S), and then click "RUN" to start viscosity testing. If you do not enter a name, the name shows "Default" and the End time is 23:59:59 by default.

Start testing: enter the viscosity measuring interface (Fig. 33) after testing is started, and in this interface, values of the sample tested can be read directly. In testing, click "Chart" to enter the coordinate curve interface (Fig. 34), and in this interface, the data will be displayed as a curve in a coordinate system. After testing, click "Stop" to complete the test, or testing will be automatically terminated at the end of the testing time set.

If the sample viscosity is excessively large, there will be an overflow warning, and ERROR will be displayed for KU, CP and the load, in this case, it means the sample viscosity is beyond the maximum measuring range of this instrument.



This Instruction Manual is applicable for all viscosity meters, please read as per the model or configuration of the instrument you purchased!

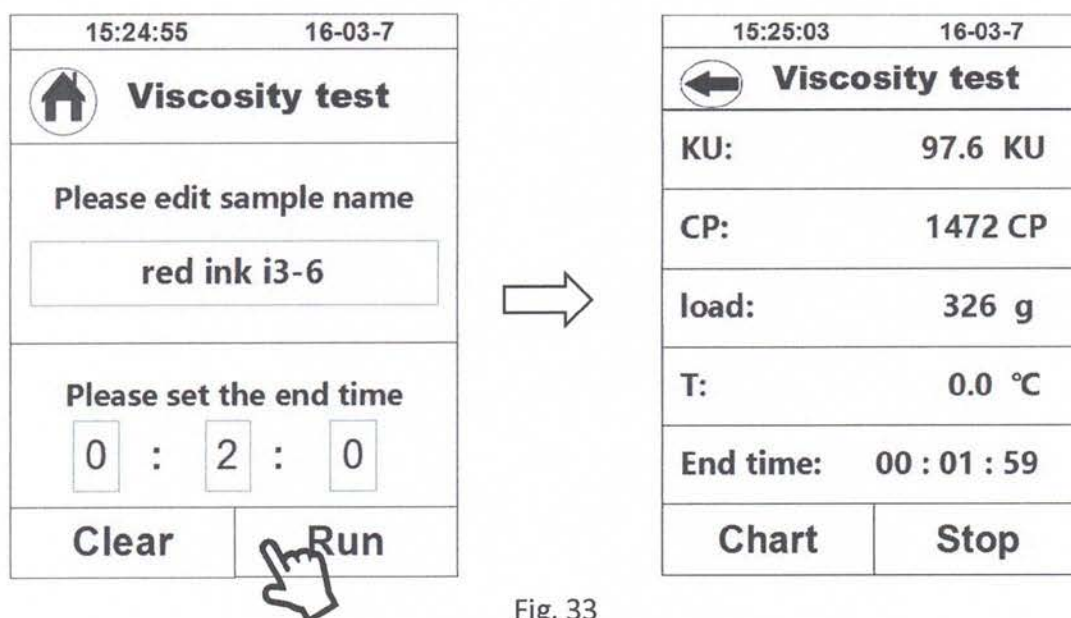


Fig. 33

"KU" represents the Stormer viscosity value

"CP" represents the viscosity value

"load" represents the load weight value

"T" represents the temperature value (the temperature probe needs to be configured separately, there is no installation temperature probe shows 0.0)

"End time" represents the value of the test end time

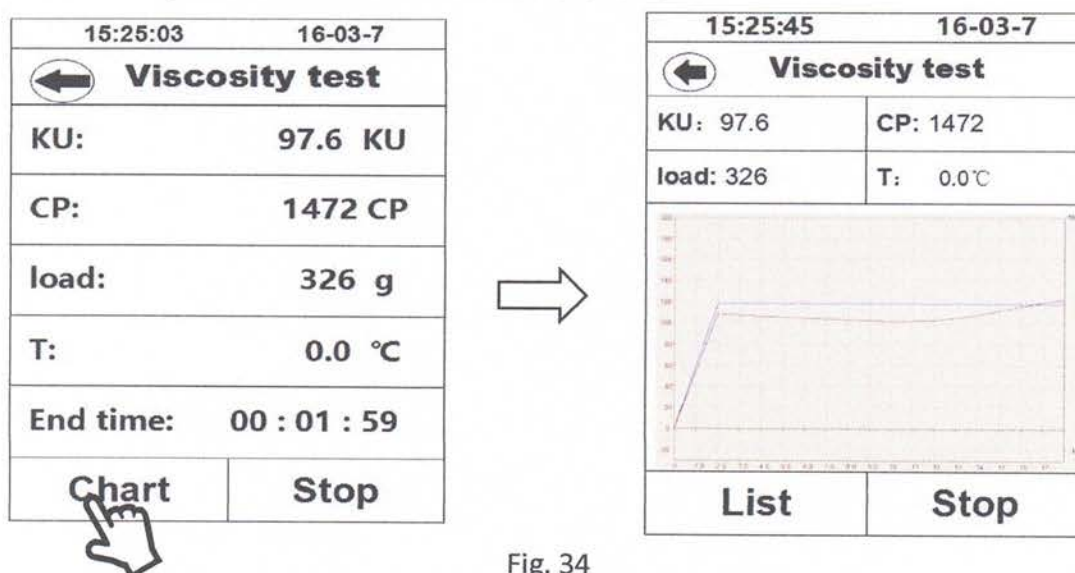


Fig. 34

The tested data and coordinate curve can be saved and printed after testing.

For measuring the viscosity of an unknown sample, the viscosity of the sample shall be estimated at first before selecting the corresponding combination of rotor and rotating speed.

If it is hard to estimate the approximate viscosity of the sample, it is necessary to imagine the sample has a high viscosity before measuring by rotors from small to big (cubage) and in a rotating speed from low to high.

The principle for viscosity measuring is: small (cubage) rotor and low rotating speed for a high viscosity fluid; big (cubage) rotor and high rotating speed for a low viscosity fluid.

## VII. Precautions

1. Viscosity is a function of temperature, so the temperature fluctuation must be controlled within  $\pm 0.1^{\circ}\text{C}$  when the instrument is working at the normal temperature, or the measurement accuracy will be degraded, and a thermostatic bath can be equipped if necessary.

2. The rotor surface must be kept clean.

3. The hairspring has a certain linear area, so the torque percentage shall be controlled during measurement, and this value shall be 10%~90%, and if the angle percentage is too high or too low, "ERROR" will be displayed for the torque and viscosity, the rotor or rotating speed shall be changed, or the measurement accuracy will be degraded.

E.g.: when LVDV-1T is used for sample testing by the combination of "Rotor 1# and rpm 60", the torque percentage displayed is "ERROR", so the rotating speed shall be decreased. If the value is decreased to "rpm 0.3" but the torque percentage displayed is still "ERROR", it means a smaller rotor (smaller surface area) shall be used for measuring. If the torque percentage is always 10%~90% at different rotating speed with a same rotor, the one whose intermediate percentage is near 50% shall be used, and other tests are performed by analogy.

4. The rotor shall be carefully mounted or removed by lifting the universal joint up gently. The rotor cannot be forced under any horizontal stress or pulled down, otherwise the shaft will be damaged. Because the rotor and the universal joint are connected in left thread, rotor attaching or detaching must be performed in the correct the rotating direction (Fig. 35), or the universal joint will be damaged.

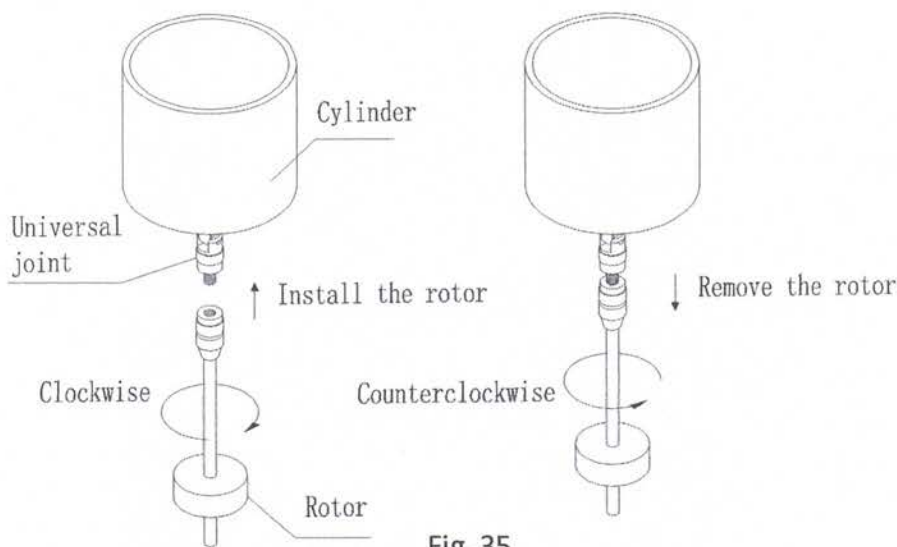


Fig. 35

5. The instrument shall be lowered slowly by carrying it by hands to protect the shaft from vibration.

6. The universal joint shall be protected by plastic cap when the instrument is being transported or handled.

7. Suspending liquid, emulsion liquid, high polymer and some other high viscosity liquid are mostly "Non-Newton" liquid, and their viscosity is varying with shear velocity and time, so there will be different measured values when measuring with different rotors, rotating speeds and durations, (the result will be also varying if measuring a non-Newton liquid with a same rotor in different rotating speeds) it is determined by the liquid property, and is not any problem arising from the instrument.

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8. For the introduction of temperature sensor installation, see the figure below. (This accessory is an optional accessory, not included in the standard configuration)

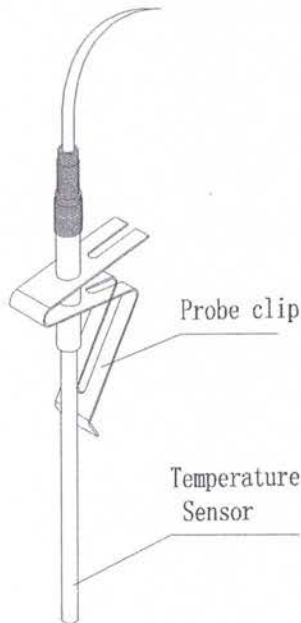


Fig. 36

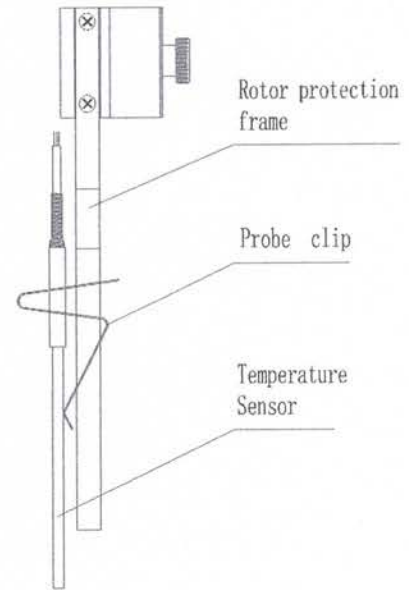


Fig. 37

### VIII. Viscometer standard packing list

SN	Name	Qty	SN	Name	Qty
1	Digital display viscometer main machine	1 set	9	Power supply adaptor	1 piece
2	Main machine connecting rod	1 piece	10	Instruction manual	1 piece
3	Elevating pole and elevating slider	1 set	11	Certificate of Acceptance	1 piece
4	Triangle base	1 piece	12	Card of Guaranteed Repair	1 piece
5	Rotor sleeve (Only for PCE-RV18)	1 piece	13	Material tube (Only for PCE-RV18)	1 piece
6	Rotor protective frame (Not available for HA/HB/STM)	1 piece	14	Hexagon wrench	1 piece
7	Rotors (Varying with model)	1 set	15	Fixing ring, testing tube, metal connecting piece, extension hook (Only for SNB-1A-T)	1 piece each
8	Temperature controller NKY-25 (only for SNB-1J-T/NDJ-1C-T)	1 piece	16	Heater (Only for SNB-1J-T/NDJ-1C-T)	1 piece