

Intelligent Touch-screen Rotary Viscometer (Basic)

INSTRUCTION MANUAL

Please open the packing box and check the attachment of the product

Composition of the product:

The host



Spindles



Lifting rod & Pedestal



Power adapter



Protection framework



Wrench

1 Pcs

RTD temperature probe

1 Pcs

Instruction

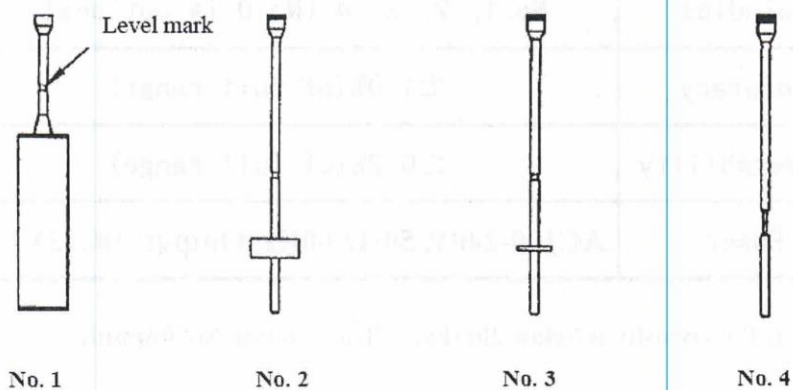
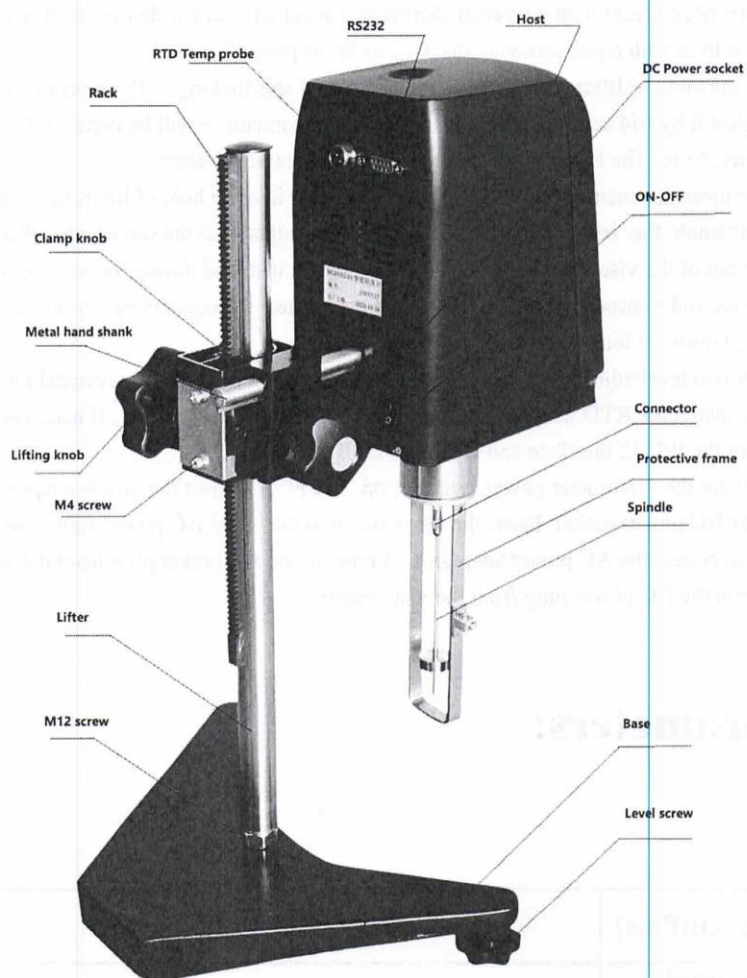
1 Pcs

Certificate

1 Pcs

Note: Please make comparison according to the actual situation because different types match with specific spindles and accessories respectively.

1.Preparation before use



Series assembly diagram

- (1) Please take out all components from the box.
- (2) The opening direction of the pedestal should face users, please insert the lifter into the pedestal and tighten M12 screw with a wrench. Screw two level adjustment feet respectively into the two ends of the base with equal screwing distance as far as possible.
- (3) Turn the knob of lifter and check its flexibility and self-locking. If it does not work well, please adjust it by M4 screw. To avoid the fall of a viscometer, it will be better if the knob is a little tighter. Note: The knob has been adjusted before leaving factory.
- (4) Please insert the metal hand shank of the viscometer into the hole of lifter, then tighten it by turning the knob. Pay attention to the bubble level and adjust it at the same time. Please take out the black cap of the viscometer and set aside.(it must be installed during the instrument maintenance and transportation). The black cap can protect the connecting screw, so it must be installed during a long time of no use or transportation.
- (5) Adjust two level adjustment feet until the bubble level at the top is in a central location.
- (6) Please install the RTD temp probe into the RTD temp probe interface . If necessary, install the printer into the RS232 interface and USB into USB interface.
- (7) Make sure the viscometer power switch is on " OFF" . Connect the power adapter to the viscometer DC power socket. Insert the other side into the 220V AC power supply socket. If you want to disconnect the AC power adapter, first remove the AC power plug from the socket, and then remove the DC power plug from the viscometer.

2.Parameters:

Range (mPa.s)	1-2, 000, 000
Rotate speed (rpm)	0.3, 0.6, 1.5, 3, 6, 12, 30, 60
Spindles	No.1, 2, 3, 4 (No.0 is optional)
Accuracy	±1.0%(of full range)
Repeatability	±0.2%(of full range)
Power	AC100-240V, 50Hz/60Hz. Output: DC12V1.5A

Note: If the viscosity is below 20mPa.s, Please choose No. 0 spindle.

3. Screen displayed

The start-up screen will display viscometer model and version number. (Fig. 1)

Dynamic V	Average V mm^2/s
Full-scale	Temperature °C
Spindle »	Speed » RPM
Torque %	Time : »
Sample density g/cm^3 »	Unit selection »

Print
Measure
Stop

?
C
i

Fig. 1



: “Help”



: “About”



: “Calibration”



: “Main menu”

Please click “»” (in the Fig.2) and set testing parameters.

1. Range selection (spindles and speed setting), like Fig.2.

Speed Spindle	6RPM	12RPM
No.0	100	50
No.1	1000	500
No.2	5000	2500
No.3	20000	10000
No.4	100000	50000

Unit: $\text{mPa}\cdot\text{s}$
◀ Choose range ▶

Fig.2

Please click a range by a touch pen, then the spindle and speed will be selected. If users choose Range 50,000, click the range, then No. 4 spindle and 12 rpm will be imputed.

2. Timing and print interval setting(Fig. 3): To set the end time. The default value is 00:00.

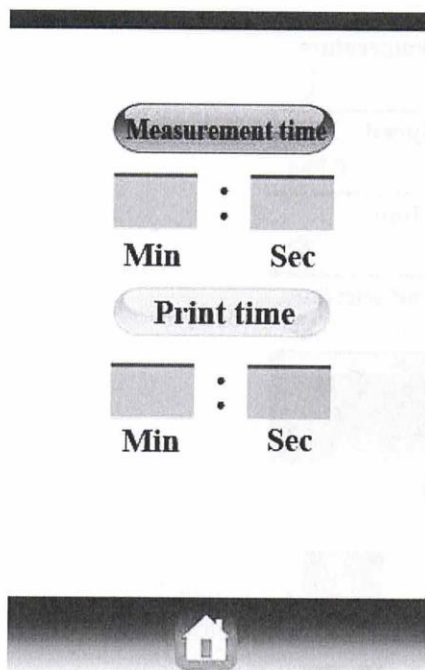


Fig. 3

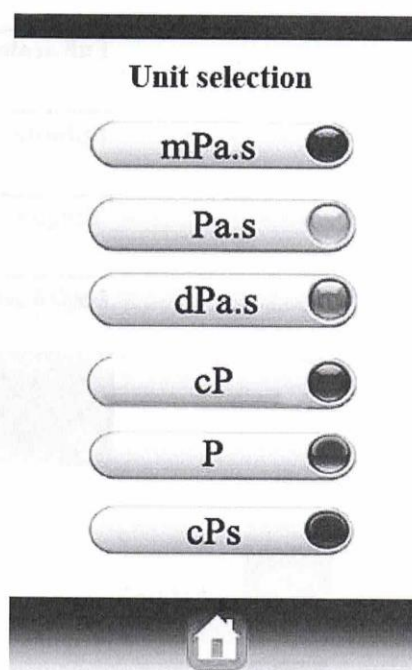


Fig. 4

Click "Min" enter the number from the digital keyboard and press OK, then the value of minute is entered. The input of "Second" is the same. Then return to the main menu. Same operation for "Seconds" setting.

3. Unit selection: click "》", Fig. 4 will be displayed.

choose one unit, Then back to the main menu.

Note: If viscosity(full range) <100, users can only choose mPa.s, cPs, cP.

4. Kinematic viscosity: If users need kinematic viscosity value, please input sample density first.

Click sample density symbol, and input the correct value. The viscometer will calculate kinematic viscosity during measurement. Then back to main menu .

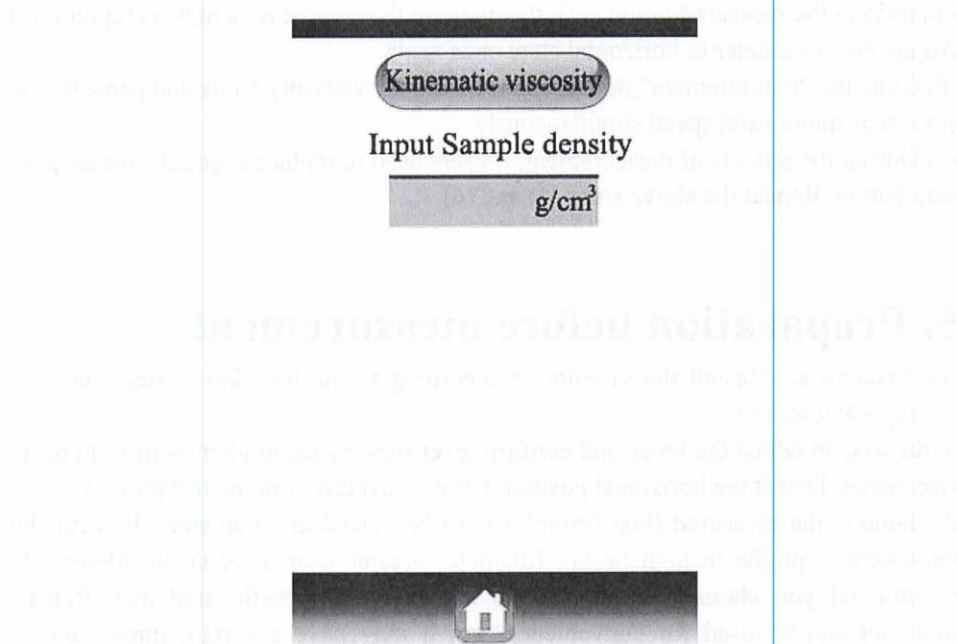


Fig. 5

5. Please check the parameters, then prepare samples and start measurement.

Parameters displayed:

Temperature: real-time temperature tested by RTD Temperature Probe. Without RTD, the temperature will be ----

Torque: the deflection of torque sensor with the range of 0-100%. If the torque reading is between 20 and 100%, our viscometer can obtain the result in needed accuracy. If the torque is below 20%, a “dudu” sound will occur. Adjust the detection parameters timely according to the percentage of data.

Viscosity: calculated based on the detected torque with the specific spindle and rotation speed.

Timing: the countdown from the beginning of the measurement. The test will stop when the countdown stops.

Full range: the maximum measuring range able to be calculated by the combination of spindle type and speed. If it exceeds the current measuring range of the spindle and the speed, the screen will be displaying 100% with “dudu” sound.

4.Operation

- (1) Install the viscometer in place according to the ‘Preparation’.
- (2) Install the protective frame to the shield juncture.(Spin it right to install, left to uninstall)
- (3) Spin the selected spindle into the connecting screw (Spin left to install, right to uninstall).
- (4) Start up. Set the test parameters.
- (5) Rotate lifting frame knob to lower the viscometer and make the spindle gradually

immerse in the measured liquid until the mark on the spindle is as high as liquid level. Adjust the viscometer to horizontal state once again.

(6) Click the “measurement” button and measure the viscosity value and percent scale at current spindle and speed simultaneously.

(7) During the process of measurement, if users need to replace a spindle, please press stop button. Repeat the above steps (5) and (6)

5. Preparation before measurement

A) Viscometer: Install the viscometer according to the installation steps; use two adjusting screws

of the base to adjust the level, and confirm level state by the gradienter in front of the viscometer. Detect the horizontal position before each test or in the test process.

B)Sample: the measured fluid (sample) must be placed in a container. It is suitable for 400ml , spindle in high beaker (diameter greater than or equal to 70mm). We recommend you choose the appropriate spindle with specific container. Replace container can be used for convenience, but it may have a certain impact on the measurement precision. Our viscometer is matched with the form container. The result of replace container is repeatable, but it may not be the real standard viscosity value.

The spindle is used with protection framework installed. If not, the results can be repeatable but may not be the true viscosity value.

When you compare data with others, please check whether the protective frame is used, whether the sample container, the spindle, the spindle speed and the sample, temperature is consistent.

In the viscosity test, many samples need specific temperature, when users adjust the temperature of samples, the temperature of spindles and containers should be the same.

C)The spindle and rotation speed: For an unknown fluid, repeated experiments are usually needed to select the spindle and spindle speed. The suitable selection can make viscometer torque in the range of 20%-100%. There are two general rules in the trial process: 1) viscosity range is inversely proportional to spindle size.2) viscosity range is inversely proportional to spindle speed. In other words, for the test of high viscosity, choose a small volume and low speed spindle. If the spindle and spindle speed make the torque greater than 100%, please reduce speed or choose smaller spindle. When the test proves that several spindle and speed combinations can reach the test results, any of these combinations can be used.

Non-Newtonian fluid viscosity value tested may change with the spindle and speed.

To compare the viscosity data, please make sure to use the same test, i.e. using the same device, spindle, speed, container, temperature and test time.

6. Attention

- (1) Pay attention to spindles' attaching and dismounting. The spindle shall be attached or dismounted with the coupling screw lifted slightly. Do not apply excess force.
- (2) Please do not place a viscometer with spindles on the side or upside down.
- (3) Please keep the connecting rod and spindles clean, or it will affect the vibration of spindles.
- (4) Hold the viscometer in hand when move it up or down, to prevent the viscometer from dropping under the gravity.
- (5) Input a new spindle number if spindles are replaced. The replaced spindles should be cleaned (wiped up) and putted back to the spindle bracket. Please do not clean a spindle left in the instrument.
- (6) Please clean the spindle and the protecting frame in time when the tested fluid is replaced, in order to avoid the measurement error resulted from the mixed fluids.
- (7) Any spindle is exclusive for a given instrument, do not confuse the spindles of several instruments.
- (8) Please do not disassemble and adjust the instrument freely.
- (9) During the moving and transporting process, you should install the black cap to the connecting screw, tighten the screws and put them into the packing box.
- (10) Please do not rotate the spindle in the absence of liquid for a long time so as not to damage the shaft tip.
- (11) There are a lot of non-Newtonian liquids among suspension, emulsion, polymer and other high viscosity liquid, the viscosity value of which varies with changes of the shear rate, time and other conditions. It's normal that the results in different cases of spindle, rotating speed and time are not consistent. It's not the error of instrument. Generally, the spindle, rotation speed and time should be specified in measurement of non-Newtonian liquid.
- (12) To get highly accurate results, the flowing steps can be done:
 - Please control an accurate value of sample temperature.
 - Control the temperature of the liquid to be measured accurately.
 - Keep the uniformity of the liquid.
 - Place the spindle in the center of container and install the protective frame before the test.
 - Ensure the cleanness and shaking degree of the spindle.
 - When high-speed measurement turns into low-speed immediately, the test should be stopped; or the measure time at low rotation speed should be a little longer to overcome the error due to the rotation inertia caused by the liquid rotation.
 - Determination of low viscosity match with spindle No.1; high viscosity with spindle No.4.
 - The measure time at low rotation speed should be a little longer.
 - Check and adjust the horizontal position of the viscometer in time after changing the position of viscometer by turning lifting chuck for the need of changing spindle or the liquid to be measured in the measurement process.
 - Keep the AC power supply well grounded, eliminating the damage in the internal circuit caused by static electricity.

- Note: in the process of operation, is strictly prohibited in the rotation of the spindle, the spindle will be gradually immersed in the sample, especially for high viscosity samples, so as to avoid damage to the internal structure of the instrument, caused by measurement error.

When there are differences between the actual products and the pictures of the instruments, the actual products shall prevail.