

**Operation Manual
For
NDJ-5S Digital Rotary Viscometer**



Contents

1. General.....	2
2. Main technical data.....	2
3. Working principle.....	2
4. Installation.....	3
5. Operation procedures.....	4
6. Precautions.....	7
7. Packing List.....	8

1. General

NDJ-5S is a Digital rotary viscometer which has been upgraded. This viscometer adopts advanced mechanical design technology, manufacturing process and micro computer control technology, make the data acquisition correct and the display adopts LCD with blue backlight and high brightness, make the displayed data clear.

NDJ-5S Digital rotary viscometer is used for determining the liquid viscose capacity and the absolute viscosity. Comparing with other similar products, this instrument has the following features:

- High measuring accuracy;
- Stable in measured display;
- Easy operation and read-out;
- Excellent in Anti- interference.

NDJ-5S has been widely used to determine and measure the liquid viscosity in many applications such as grease, painting, pharmacy and adhesives.

2. Main technical data

- 1) Measurement range: $1\sim 1\times 10^5$ mPa·s
- 2) Rotor types: 1#, 2#, 3# and 4# rotors; (You can determine viscosity as low as 0.1mPa.s with 0# rotor.)
- 3) Rotor velocity: 6 rpm, 12 rpm, 30 rpm, and 60 rpm (automatic)
- 4) Measurement error: $\pm 5\%$ (Newton liquid)
- 5) Power supply: 220V $\pm 10\%$ 50z $\pm 10\%$
- 6) Ambient temperature: 5°C~ 35°C; Relative humidity: $\leq 80\%$

3. Working principle

This instrument is a rotary viscometer; rotor could be rotated constantly by the variable speed motor. Rotate the standard rotor, the rotors will subject to a torque moment proportional to liquid viscosity because of the liquid viscose hysteresis. The torque moment will be measured by the sensors and processed into the viscosity and shown on the display.

This instrument adopts micro computer technology, range (rotor number and speed) can be set and the data determined by sensor can be processed conveniently, and the rotor number、 speed、 viscosity etc. can be displayed clearly on LCD.

The instrument was designed and manufactured with 4 rotors (1#, 2#, 3#, 4#) and 4 different velocity (6 rpm, 12 rpm, 30 rpm, and 60 rpm), which

enable it to measure any viscosity value in the given range.

4. Installation

1) Instrument structure



Figure 1

(1) Level indicator (2) LCD (3) Housing (4) Protection bracket (5) Base
(6) Operation key (7) Rotor connector (8) Rotor (9) Level adjustment knob

2) Installation

- i. Check power supply, it should meet the requirement of the instrument: according to the relevant provisions, the instrument should be grounded.
- ii. No corrosive gas, no electro-magnetic interference and no severe vibration in instrument surrounding area.
- iii. Screw the stanchions into the hole on the base, put the tooth side of the stanchions facing on the front of base, and tight it by a wrench to avoid loosen (Figure 2).
- iv. Adjust the clamping bolt to make the instrument moving up and down, and to protect it drop down from stanchions.

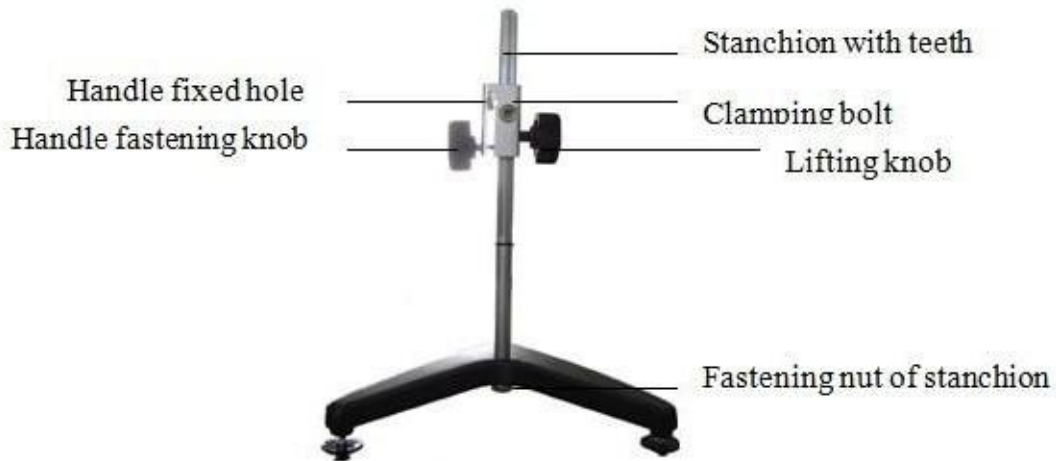


Figure 2

- v. Loosen and take away the yellow cover cap on the bottom of viscometer.
- vi. Adjust the level adjustment screw; make the level bubble to locate on the central point.

Notice: "PC computer interface", "Printer interface" and "Temperature sensor probe interface" in figure 3 have not been used yet.



Figure 3

5. Operation procedures



- 1) Prepare the liquid to be measured and put it into a glass beaker or a right angle container with the diameter not smaller than 70 mm and the

height not less than 125mm.

- 2) Take care of the liquid temperature.
- 3) Ensure the instrument is level.
- 4) Adjust the lifting screw and put the rotor into the measured liquid till the level mark on the rotor reach the liquid surface.
- 5) Control panel operation and display interface
 - i. Figure 4: Control panel operation



Figure 4

- ii. Turn on the power switch, enter standby state, the instrument display both Chinese and English character. Screen shown in figure 5. Press  or  to select language mode you need, press OK to set, press OK to enter, screen shown in figure 6:

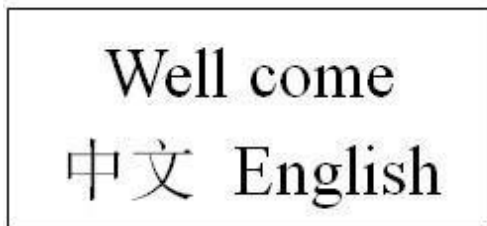


Figure 5

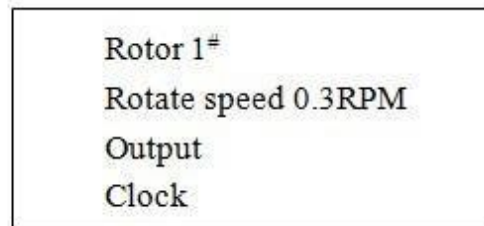






Figure 6

Cursor stop at , press  or  to select the rotor you need.

- iii. Press  or , switch to rotate speed mode. Cursor stop at 6RPM (Figure 6), press  or , select rotate speed, the instrument has five rotate speeds: 6 rpm, 30 rpm, 60 rpm and auto mode. After setting rotor and rotate speed, press OK, the rotor begins to rotate, and the instrument begins to measure, screen shown in figure 7
- iv. After setting auto mode and rotor, press OK, the instrument begins to measure automatically, search appropriate speed gradually. Finally, display the measured result or the required rotor number

automatically.

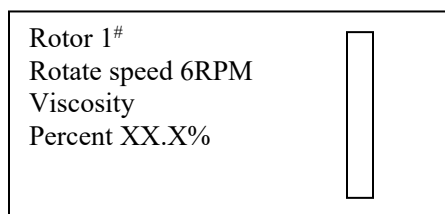






Figure 7

In figure 7, the rotate speed unit is RPM, and the viscosity unit is mPa·s; the vertical bar on right side displays the sampling process; percent: the measured viscosity is the percent of the full scale.

- v. In figure 6, move the cursor to output mode, press  or  to select communication state or print state.
Notice: Print function and communication function have not been used yet.
- vi. In figure 6, move the cursor to clock mode, press  or  to select display mode or amendment mode, if you choose the display mode, current time can be displayed; if you choose the amendment mode, you can amend time and date.
- vii. Press Reset, viscometer will stop measuring; press OK again, the viscometer will begin to measure according to the rotor number and rotate speed which you set last time.
- viii. Estimate the viscose range approximately, and then select the rotor and the rotate speed based on the range table.
- ix. If the viscosity of liquid cannot be estimated, the measured liquid should be regarded as high viscosity liquid. Select rotor from small to large (the rotor number from high to low) and select rotate speed from slow to fast. In general, measure high viscosity liquid, you should use small rotor and slow speed, measure low viscosity liquid, you should use large rotor with fast speed.
- x. This instrument has overload alarm function, if the measured value bigger than 100%, measured value will be displayed “over”. In order to ensure measurement precision, the range percent should be within 10%~100%.
- xi. Press Reset key at any time, system will return to the initial state.
- xii. Range table

Velocity range rotor	60	30	12	6
0	10	20	50	100
1	100	200	500	1000
2	500	1000	2500	5000
3	2000	4000	10000	20000
4	10000	20000	50000	100000

6. Precautions

- 1) The instrument has been regulated strictly before ex-factory. Please read the operation manual carefully before you use.
- 2) This instrument should be used under the designed voltage and frequency and their allowable error ranges, or incorrect results could be resulted.
- 3) Care should be taken for mounting or removing rotors, slightly and lift the connecting screw bolt to avoid a transverse force acting on rotor to cause it bending. Keep cleaned on screws and connecting points between rotor and connecting bolt rod, or a unstable rotation could be caused in the real measurement.
- 4) The instrument mounted with rotor should not be revolved without liquid to avoid damaging the axis tip.
- 5) After completing measurement each time, the rotor should be fully cleaned (rotor should be removed from instrument for cleaning), then place it on the protection bracket.
- 6) When moving or shipping instrument, put on the yellow caver cap and lift the connecting bolt rod and screw the bolt on the cap tightly.
Notice: Before turning on the instrument, you should take away the yellow cover cap, avoid damage.
- 7) Unauthorized removing or replacing the instrument part, and applying lubricates are not allowable.
- 8) Suspension, emulsion or polymer and other high viscosity liquids are non-Newton liquids, their viscosity will change with shear velocity and time, it is normal for their measured inconsistent results under the selected rotor and velocity and time, and it is not resulted from the instrument problems (in general, the rotor and velocity and time should be specified for non-Newton liquids).

- 9) The cautions should be taken for followings to obtain a good measuring result:
- i. Accurately control the temperature of liquid to be measured;
 - ii. Put the rotor emerged in liquid the unchanged temperature for enough time under make its temperature same as liquid;
 - iii. Ensure the liquid homogeneity;
 - iv. Put the rotor located on the center of the liquid container in real measurement;
 - v. Remove bubbles adhered on the rotor when put it into liquid;
 - vi. Use the settings close to full range as far as possible for measurement;
 - vii. Use rotor protection bracket for measurement;
 - viii. Ensure rotor cleaned;
 - ix. Strictly follow the operation instruction for measurement.
 - x. Please use 0# rotor when the viscosity of measured liquid less than 15mPa.s

7. Packing List

No.	Name	Quantity	Standard configuration	Optional configuration
1	NDJ-5S Digital Rotary Viscometer	1 Qt.	√	
2	Rotors, 1#, 2#, 3# and 4#	1 Qt of each	√	
3	Power adapter	1 Set	√	
4	Protection bracket	1 Qt.	√	
5	Base	1 Qt.	√	
6	Lifting assembly	1 Set	√	
7	Operation manual	1 Qt.	√	
8	Allen wrench	1 Qt.	√	
9	wrench	1 Qt.	√	
10	0# rotor	1Qt.		√