4. When moving or shipping instrument, put the yellow caver cap on 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 to avoid damage.
5. Unauthorized removing or replacing the instrument parts or applying lubricates is not allowable.
6. Suspension, emulsion, or polymer and other high viscosity liquids are non-Newton liquids; therefore their viscosity will change with shear velocity and time. It is normal for their measured results to be inconsistent under the selected rotor and velocity and time; it is not resulted from the instrument problems. (In general, the rotor, velocity, and time should be specified for non-Newton liquids).
7. The cautions should be taken for followings to obtain a good measuring results:
   i. Accurately control the temperature of liquid to be measured;
   ii. Put the rotor into the liquid for enough time to 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



# Contents

## 1. General

USS-DVT6 is a Digital Rotary Viscometer which has been upgraded. This viscometer adopts advanced mechanical design technology. The manufacturing process and microcomputer control technology make data acquisition accurate. The display utilizes a LCD with blue backlight and high brightness making the displayed data clear.

USS-DVT6 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

USS-DVT6 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: $10\sim1\times10^5$ 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: ±5% (Newton liquid)
5) Power supply: 220V±10%　　50z±10%
6) Ambient temperature: 5°C~ 35°C；Relative humidity: ≤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 uses micro computer technology. The range (rotor number and speed) can be set and the data determined by a sensor and is processed conveniently and the rotor number, speed, viscosity etc. 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.



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, when measuring high viscosity liquid you should use small rotor and slow speed and measuring low viscosity liquid use large rotor with fast speed.

x. This instrument has overload alarm function. If the measured value is 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

a) The instrument has been regulated strictly before ex-factory. Please read the operation manual carefully before you use.

b) This instrument should be used under the designed voltage and frequency and their allowable error ranges, or incorrect results could be resulted.

c) Care should be taken for mounting or removing rotors. Gently lift the connecting screw bolt to avoid a transverse force acting on rotor to cause bending. Keep screws and connecting points between rotor and connecting bolt rod cleaned or an unstable rotation could affect measurement.

d) The instrument mounted with rotor should not be revolved without liquid to avoid damaging the axis tip.

e) After completing measurement each time, the rotor should be fully cleaned (rotor should be removed from instrument for cleaning), then placed on the protection bracket.

(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.

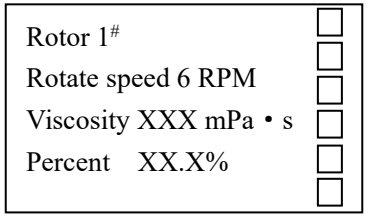


Figure 7

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: measures the viscosity of 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.

iv. Estimate the viscose range approximately, and then select the rotor and the rotate speed based on the range table.



## 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.

i. 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 loosening (Figure 2).

i. Adjust the clamping bolt to make the instrument move up and down and to protect it from dropping down from stanchions.

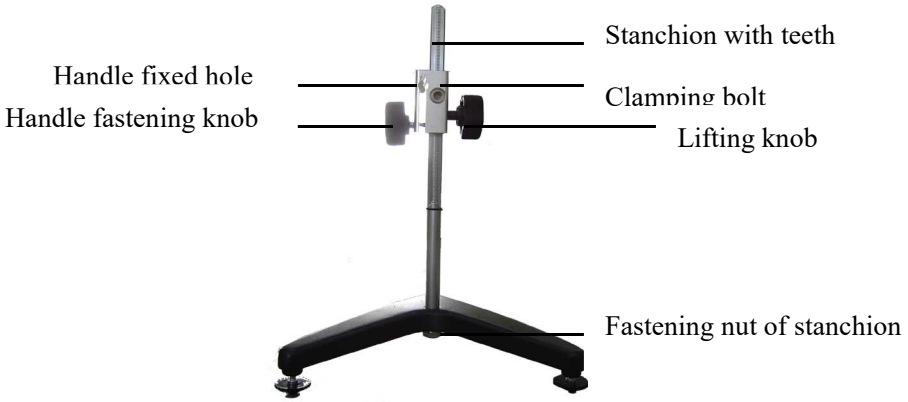


Figure 2

iii. Loosen and take away the yellow cover cap on the bottom of viscometer.

ii. Adjust the level adjustment screw, making sure the level bubble is at the central point.

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

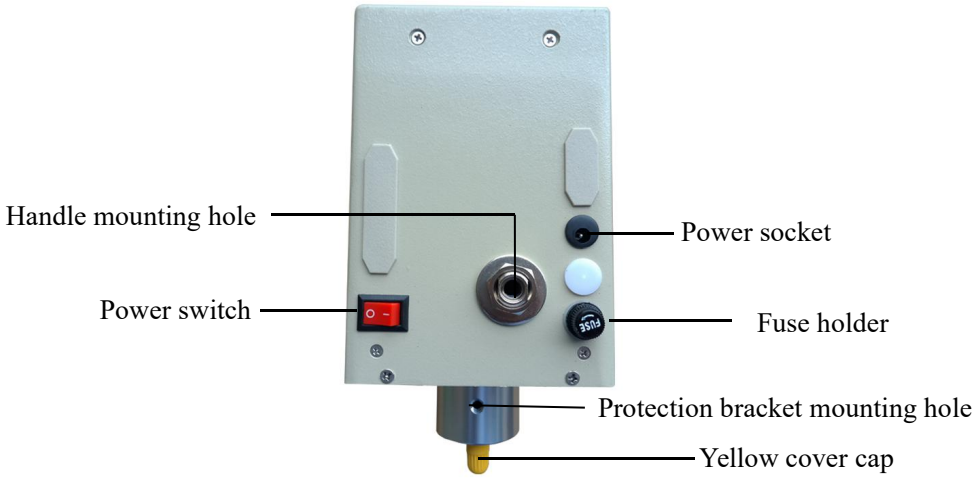


Figure 3



## 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) Monitor the liquid temperature.
3) Ensure the instrument is level.
4) Adjust the lifting screw and put the rotor into the measured liquid until the level mark on the rotor reaches the liquid surface.
5) Control panel operation and display interface

i. Figure 4: Control panel operation

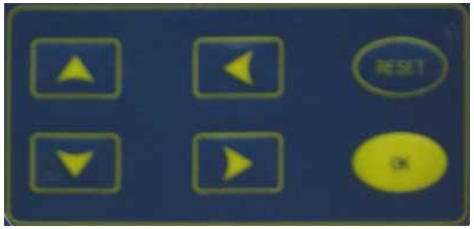


Figure 4

ii. Turn on the power switch, enter standby state, the instrument displays 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

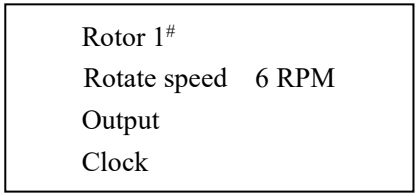


Figure 6

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

iii. Press  or  , switch to rotate speed mode. Cursor stop at 6RPM

# 7. Packing List

| No. | Name | Quantity | Standard configuration | Optional configuration |
|---|---|---|---|---|
| 1 | Head of 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 | License | 1 Qt. | √ | |
| 9 | Quality certificate | 1 Qt. | √ | |
| 10 | Temperature sensor | 1Qt. | √ | |
| 11 | 0# rotor | 1Qt. | | √ |

Inspector (signature) _____

Date on _____

# Operation Manual
# For
# USS-DVT6 Digital Rotary Viscometer