

DRV-Series

ROTATIONAL VISCOMETER

OPERATION MANUAL



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IT --- Scansiona il codice QR oppure visita il sito web per il manuale d'uso.

CZ -- Pro návod prosím naskenujte QR kód nebo navštivte webovou stránku.

ES -- Por favor, escanee el código QR o visite la página web para ver el manual de instrucciones.

FR -- Veuillez scanner le QR Code ou visiter notre site web pour accéder aux manuels d'utilisation.

DE -- Bitte scannen Sie den QR-Code oder besuchen Sie die Website für die Bedienungsanleitung.

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MN-DRV-Series-E

V0

Thank you for choosing the DRV Touch Screen Digital Display Viscometer, a high-end device designed for accurate measurement of liquid viscosity. The instrument is combined with modern touch screen technology to achieve a simple and intuitive operating interface and thus it can ensure measurement accuracy and is easy to operate. For better test accuracy, please read this instruction manual carefully and follow the safe operation rules.

Please keep this instruction manual at your side for reference when necessary!

Attention:

- 1) Please ensure that only trained personnel are allowed to operate this instrument. Please comply with safety regulations and other regulations concerning personal safety and accident prevention and etc.
- 2) This instrument is suitable for use in normal temperature environment, please stay away from corrosive gas.
- 3) Do not use the instrument in an environment with high humidity or high dust for a long time.
- 4) Please check the instrument and accessories before use to ensure that they are not damaged.
- 5) The protective cap must be unscrewed before use to prevent damage to the instrument.
- 6) Rotor cleaning on the instrument is strictly prohibited. After the rotor is installed, it shall not rotate in the state of no liquid, so as to avoid damage to the shaft tip and shaft bearing.
- 7) After the rotor is installed, the instrument shall not be placed sideways or backward; For special liquid to be measured, thermostatic measurements should be used with thermostatic tanks or thermostatic cups.
- 8) Suspensions, emulsions, polymers and many other viscous liquids are so called "non-Newtonian liquids" whose apparent viscosity changes with the time change of shear velocity, so it is measured under different rotors, rotational speeds and time. Therefore inconsistent results are normal phenomena, the results are not due to inaccurate instruments (generally non-Newtonian liquid measurement should specify the rotor, speed and time)
- 9) Do not disassemble and adjust the parts of the instrument at will, and do not fill the lubricating oil by yourself. When the spare parts are damaged, please only use the original spare parts to replace them. In case of failure, contact our company for maintenance guidance or return it to the factory for overhaul.

I. General Introduction

A viscometer is a physical property analysis instrument for measuring the viscosity of a fluid. Viscosity is the physical property of a fluid. It reflects the internal friction between molecules when a fluid is acted upon by an external force. The viscosity of a substance is closely related to its chemical composition. In industrial production and scientific research, viscosity is often measured to monitor the composition and quality of fluid substances.

II. Product Structure

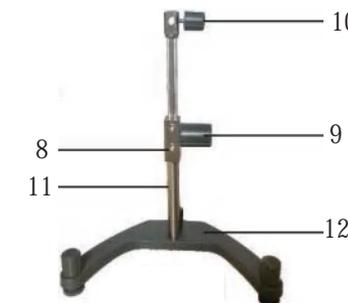
1. General Structure

- (1) Level Gauge
- (1) Touch Screen
- (3) Bottom Cover of the Viscometer
- (4) Rotor Connector
- (5) Rotor Protection Frame
- (6) Rotor
- (7) Level Adjuster



2. General Structure

- (8) Adjusting Screw for Lifting and Tightening. (Equipped with a wrench)
- (9) Hand Wheel for Lifting.
- (10) Hand Wheel for Fixing the Head to the Post
- (11) The Supporting Post
- (12) the Base of the Instrument



3.The Back of the Instrument Interface

- (13) Temperature Sensor
- (14) Power Switch
- (15) Power Port
- (16) USB Interface
- (17) RS232 Port



III.Product Features

- 1.It is equipped with automatic test mode;
- 2.It is equipped with data storage function;
- 3.It has a 5-inch LCD color touch screen, so parameters are more intuitive, it is easy to use and operate, and it has a nice shape;
- 4.In order to meet the public demand, the product is equipped with RS232 interface so it can be connected to the printer output;
- 5.It is equipped with temperature sensor interface, and can detect the sample temperature in real time;
- 6.It is equipped with microcomputer control technology, which has high measurement sensitivity, reliable test results and strong anti-interference capacity;
- 7.the rotor connection interface uses a universal joint, which is easy to turn;
- 8.The material of the handwheel is engineering plastic which has high-wear-resistance and high-performance and stainless steel. So the handwheel is easy to operate;
9. It is displayed in both Chinese and English, and the languages can be switched randomly;
10. It can also be used to measure the absolute viscosity of Newtonian liquids and the apparent viscosity of non-Newtonian liquids.

IV.Product Parameters

Code	DRV-105	DRV-206	DRV-606
Power supply	AC110V~240V 50/60Hz DC12V		
Input power (W)	9W+20%		
Range (mPa. s)	1~1×10 ⁵	1~2×10 ⁶	1~6×10 ⁶
Accuray	±2% (Newtonian liquid)		
Repeatability	1% (Newtonian liquid)		
Rotor NO.	1#、2#、3#、4#		
Rotation speed	6、12、30、60	0.3、0.6、1.5、3、6、12、30、60	0.3、0.6、1.5、3、6、12、30、60
Temperature Sensor Interface	Standard Configuration		
Computer USB Interface	Standard Configuration		
RS232 Interface	Standard Configuration		
Working environment	5°C~35°C, ≤80%		
Weight	6.3kg		
Di mensi on (L×W×H)	460×180×420mm		

V.Instrument Installation

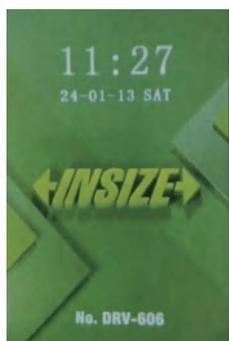
1. The choice of working environment should be selected in accordance with the following requirements;
 - (1)The studio should be kept clean and dry;
 - (2)The instrument should be kept away from the electromagnetic interference;
 - (3)The instrument shall not be used in an area with an explosive risk.

2. Installation

- (1) Open the packing box and check all spare parts according to the packing list;
- (2) Insert the toothed supporting post into the round hole of the host base. The toothed side of the post faces the front of the base. Tighten the nut on the post with an allen wrench to prevent the post from rotating.
- (3) Rotate the long lifting handwheel and move up and down. If the lifting handwheel is too tight or too loose when rotating, please adjust the elastic screw in front of the lifting seat. The handwheel should be slightly tight to prevent the viscometer head from falling due to its own weight. Screw the handle which is on the head of the viscometer into the mounting hole to keep the head level, rotate Handwheel for Fixing the Head to the Post to clamp the head;
- (4) Install the instrument on a workbench without corrosive gas, strong electromagnetic interference, and vibration;
- (5) Check the power supply, make sure that the grounding terminal is reliably grounded;
- (6) Adjust the three horizontal adjustment knobs on the host base so that the level bubble in the viscometer head is in the center position.

VI. User Interface

1. Boot Screen



Slide up to activate the viscometer



After the initialization, the instrument model number is displayed on the screen

2. Operating Interface

- (1) You can select the number of the rotor (0,1,2,3,4) by pressing the “△” and “▽” arrows.
- (2) The speed of the rotor can be selected through the “△” and “▽” arrows.
- (3) After setting up, the ranges is automatically displayed.
- (4) After setting the parameters you can start to test the viscosity.

3. Automatic Mode

- (1) Please select manual or automatic mode in the menu.
- (2) If you select manual mode, it will not stop after testing. If you select automatic mode, after setting up and hanging up the rotor and choosing the speed, the instrument will automatically stop after testing.

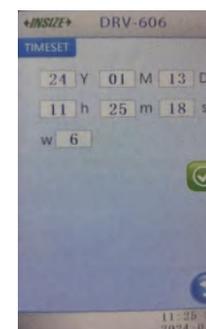
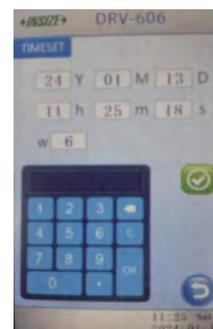
4. During the test, the data in the text mode can be transmitted to the computer when selecting the corresponding port.

5. Parameter setting

- (1) Language setting: Chinese or English.
- (2) Baud rate setting: the user does not need to set.
- (3) Print Settings

Please use our customized printer to connect the instrument via a standard connection cable.

Press the buttons on the screen to select the time. After entering the correct time, press the confirm button, then press ←, and then press √.



(4) Buzzer Switch Setting

Press the buttons to select the buzzer setting item and tap “on” button and press. The buzzer will be turned on and it will beep when tapping any keys .The “off” button will make no sound.

(5)Communication Settings

According to the communication,there are two choices for you which are output mode and baud rate. The output mode is divided into keyboard output and continuous output.keyboard output is manual output, which means it will output a string of numbers. The continuous output is automatic.

VII. Operation Method

1. Notice Before Measurement

(1)Before measuring, first estimate the viscosity range of the liquid, and then select the appropriate rotor and speed in the range table.

(2)When the approximate viscosity of the liquid cannot be estimated, it should be considered as high viscosity, and choose the rotor size from small to large. (The higher the number, the smaller the rotor) and choose the speed from slow to fast. In principle, to test a liquid of high viscosity, select small rotor (whose rotor number is high) and slow speed, To test low viscosity liquid, you should choose a large rotor (whose rotor number is low) and fast speed. The rotor number is engraved on the rotor cap.

The measurement range percentage should be controlled between 10% and 90%, that is,depending on the torque percentage, If there is torque of the same range, choose the one close to 50%.

2. Operation Steps

(1)Prepare the liquid to be measured, place the liquid in a beaker or straight container with a diameter of no less than 70mm and a height of no less than 120mm.

(2) Accurately control the temperature of the liquid.

(3) After installing the rotor protection frame, carefully adjust the instrument level,check whether the level bubble is centered, and ensure that the instrument is in a horizontal working state.



(4) Refer to the range table, select the suitable rotor and screw it into the cardan joint.(When looking down, clockwise direction means loading in, counterclockwise direction means unloading).

To load and unload the rotor, first remove the protective cover of the cardan joint,insert the rotor into the cardon joint, and tighten the joint in the clock-wise direction.

Note: The rotor should be handled with care when loading and unloading, and the cardanjoint should be lifted slightly upward. Do not exert too much force.



(5) Slowly adjust the lifting knob to adjust the height of the rotor in the liquid. Until the liquid level mark of the rotor (in the middle of the groove) is level with the liquid surface.

Procedure for testing No.0 rotor and low viscosity fluids

- (1) Clamp the No.0 rotor on the rotor connecting screw.
- (2) Insert the fastening cylinder(No.6) into the lower part at the bottom of the instrument. Tighten it with sleeve screw(No.7).
- (3) Inject 25~35 ml of the liquid to be tested into the outer test cylinder (with a bottom).
- (4) Insert the outer test cylinder into the fastening sleeve and screw the outer test cylinder. When tightening, make sure that the cone end of the fastening screw goes into the groove of the upper end of the outer test cylinder. Observe whether the triangular groove is located in the center of the round hole. After controlling the temperature of the liquid, the test can be carried out.

- 1.Test cylinder
- 2.No.0 Rotor
- 3.Fastening block screws
- 4.Fastening block
- 5.Fastening screws on the test cylinder
- 6.Fastening sleeve
- 7.Fastening screw



VIII. Maintenance

1.Rotor(including outer cylinder)must be clean and free of dirt. Generally,it should be cleaned in time after measurement, especially after measuring paint and adhesives,Please pay attention to the cleaning method, The rotor can be soaked in appropriate organic solvents. Do not use metal tools and other hard objects to scrape, because if the rotor surface has serious scratches ,it will bring about the deviation of the test results. Moreover the rotor and the outer cylinder should be properly placed in the storage box after cleaning.

- 2.The threads and connecting ends between the screw and rotor should be kept clean,otherwise it will affect the stability and the normal connection of the rotor.
- 3.the viscometer shall be examined and tested after using for a period of time and after moving to another place so as to ensure the correctness and accuracy of the viscometer.

IX. Malfunction Analysis

phenomenon	reason	treatment
No screen display	The power supply is not connected.	Power on
The rotor cannot rotate	1.the power supply is not connected, 2.the correct speed is not set.	1.Power on 2.reset the speed
The rotor is shaking and the track looks bent	1.the connecting screw 2.the rotor is bent 3.there is dust in the joint area between the screw and the rotor. 4.thread wear 5.The viscometer joint is bent	1.Tighten the connecting screw 2.Adjust the rotor position 3.Clean the dust in the screw and rotor joint area 4.Return to themanufacturer for maintenance 5.Return to the manufacturer for maintenance

X. Appendix (Range Table)

Range Table for DRV-105

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

Range Table for DRV-206 DRV-606

speed	rotor				
	0 #	1 #	2 #	3 #	4 #
0.1	6000	60000	300000	1200000	6000000
0.3	2000	20000	100000	400000	2000000
0.6	1000	10000	50000	200000	1000000
1.5	400	4000	20000	80000	400000
3	200	2000	10000	40000	200000
6	100	10000	5000	20000	100000
12	50	500	2500	10000	50000
30	20	200	1000	4000	20000
60	10	100	500	2000	10000