BGD 160 series
Portable Digital Viscometer

INSTRUCTION MANUAL

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About Us

Biuged Laboratory Instruments （Guangzhou）Co. Ltd. has been focusing on developing and innovating high-quality and high-precision instruments for 50 years. We are the biggest and most professional manufacturer of testing instruments for paint, coating, ink and printing field in China. All our products are in according with ISO, ASTM, EN standards etc and get CE Certification.

Originally founded in 1963, Biuged have grown to an internationally recognized company with many worldwide customers base which includes the world leading paint and coatings manufactures.

At the same time, Biuged has a young, motivate and vibrant team. Our R&D department continually investigates new product design ideas, in conjunction with the major standards committees. In order to supply up to date instrumentation for the Quality Control of coatings, we always apply the advanced contemporary techniques and experience to our new products. Our manufacturing department ensures that all our products are built to the highest quality, every instrument undergoing rigorous calibration and testing before it leaves our premises.

Moreover, Biuged has own independent Calibrate laboratory and more than 40 agents and offices all over the world. We are also the major member of Chinese Standardization Technology Committee of Paint and Pigment.

Produce the highest cost-effective products and offer the most professional service are Biuged mission. Satisfying our customers' needs are our ultimate wishes.

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1.0 Introduction

Portable digital viscometer is the domestic first instrument that can real-time measure fluid viscosity in China. It is portable to be used in outdoor place, laboratories, assembly lines and field fluid viscosity measure. BGD 160 series can measure in three methods: portable, handheld and lifting.

There are many humanization designs in BGD 160 series :

●LCD display ●Non-slip handle ●Outrange alarm ●Timing ●Remote control

●Universal power ●Lithium battery(measure for 8h without charging)

●Clear button signs ●Programming design

●directly display viscosity, speed, centigrade meter scale, spindle number, and max range.

●Print interval can be set

● Stepping motor drived by high segmentation and Microcomputer-based technology make the spindle rotate smoothly, measure accurately.

●Main board, subdivision drive plate all adopt the SMT technology.

●Circuit design uses the most advanced microcomputer processor, the structure layout is compact and reasonable.

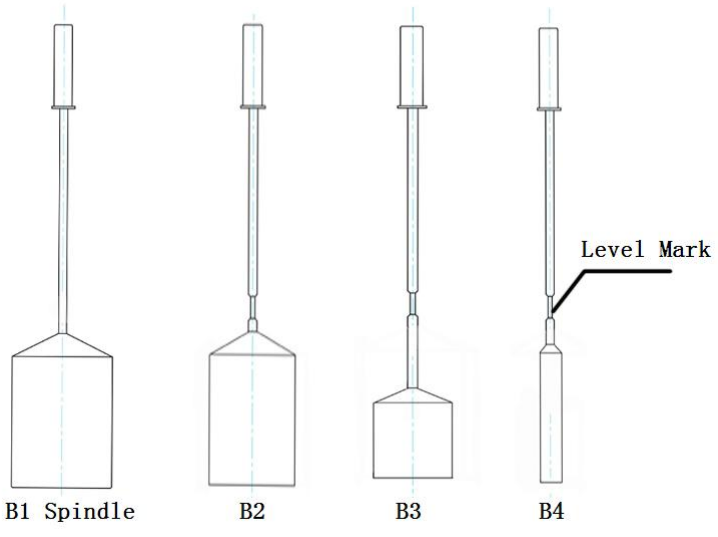
●Operational accessories: PT100 temperature probe, RS232 communication interface

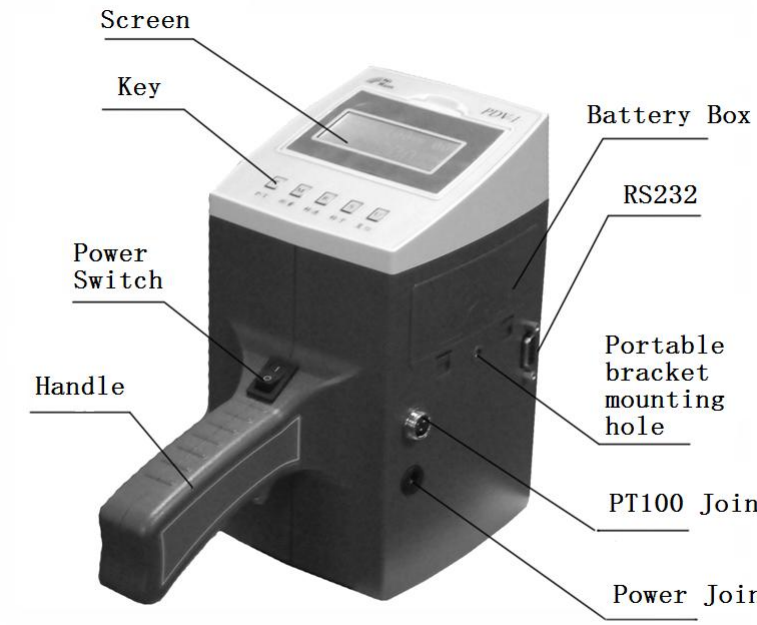
●Max range and linearity are all revised by PC port.

BGD 160 series can measure viscous drag and get dynamic viscosity of fluid. It is widely used to measure fluid viscosity of oil, paint, food, papermaking, cosmetics, chemicals, capsule, adhesive, medicines and so on.

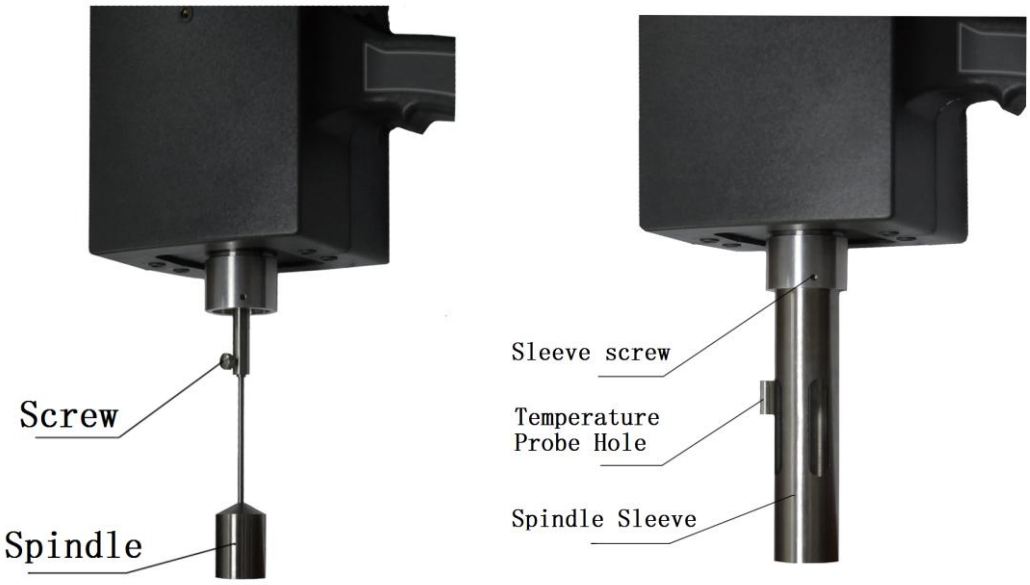
Keeping the communication power grounding well can eliminate the damage of internal circuit caused by static.

- **Spindle Diagram**





BGD 160 series portable digital viscosity measuring instrument schematic diagram



BGD 160 series portable digital viscosity measuring instrument Spindle installation diagram

- **Three kinds of measure methods**

Portable

Lifting

Handheld

Note: the lift and handheld support is optional components

2.0 Specifications

Model	BGD 160/1	BGD 160/2	BGD 160/3
Range(mPa.s)	25-150,000	50-300,000	200-1200,000
Speed (R/Min)	60、100、150、200	60、100、150、200	60、100、150、200
Spindle	Four types:B1、B2、B3、B4		
Viscosity Accuracy	±2.0%(Full range)		
Repeatability	1.0%		

- **Component**

(1) Portable digital viscometer 1
(2) Simple support 1
(3) Spindle sleeve 1
(4) Battery charger 1
(5) Spindle (B1、B2、B3、B4) 1
(6) Lithium battery 1

- **Operational accessories：**

(1)PT100 temperature probe (2)Miniprinter (3)Portable bracket
(4)Special waterbath (5)Remote control (6)Lifting support

3.0 Install（Referring to assembly plan）

3.1 Open the package to get viscometer, simple support, lithium battery, battery charger, ect.
3.2 Install and fix 2 support frames at the back of simple support plate to keep plate firm.

3.3 Spindle install: Unscrew the screw on main roller. Insert spindle into main roller. Screw the screw. Install spindle sleeve. Watch sleeve bottom and spindle keep coaxial or not. Then fix the sleeve with the M3 screw.
3.4 If equip PT100 temperature probe, insert it into temperature port.
If equip miniprinter, connect to the Rs232 port.

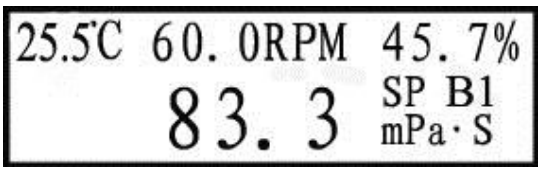
- **Key Functions**

U	Restart program and stop viscosity	P	Print or timing function
R	Choose speed	M	Start measure
S	Choose spindle		

- **Display**

After start or reset viscosity , show the model at first.(LPDV-1)

After 3 seconds：



“25.5℃”means the temperature measured by PT100.

“SP B1”means spindle number “B1”. The same as “SP B2”.

“60 RPM”means speed of stepping motor is 60 rounds per minute.

“83.3 mPa.S”means the full range with the speed and the spindle.

After press “M”button ,screen will show the viscosity like:“888 mPa.s”at the place of the full range.

“45.7%” means torque. It’s common that the value is in the range of 10% to 90%. If not, viscosity will alarm to advise users to change the speed and spindle.

4.0 **Operation**

4.1 Install viscometer

4.2 Open the power switch. If screen shows nothing, it means lithium battery is without electricity. Insert battery charger into viscometer. The red indicator runs. About 3 hours later, the green indicator light runs and charging complete. After that viscometer can be used without charging for 8 hours.

4.3 Click “S”button to change spindle number. (B1 → B2 → B3 → B4 → B1)

The number must connect with the real spindle.

4.4 Click “R”button to change speed. For example: 60, 100, 150, 200 rpm.

4.5 Click “M”button to start to measure the viscosity and torque with the spindle and the speed.

4.6 Changing spindle during measure: Click “M”button to restart. Motor stops. After changing spindles, do 3rd and 4th step again to go on the measure.

4.7 “Print” and “Timing”：

a ． Timing：Click “P” button. Screen show “S:00:00” in the bottom left. It changes with the click of “P” button (00 :00 → 00 :10 → 00 :30 → 01 :00 → 02 :00 → 03 :00 → 04 :00 → 05 :00 →10:00 →15:00→20:00). This number is the time to complete the measure.

b. Print: Connect with the miniprinter. Click “P” and the miniprinter will print “on”. It means the printer start. Click “P” once more, it print “off”. It means print is over.

5.0 Unknow Viscosity Measurement

5.1 General principles：Use small spindles (B3, B4) and low speed to measure high viscosity sample. Use big spindles (B1, B2) and high speed to measure low viscosity sample. During measure, viscosity is correct ,when the torque value keeps in the range from 10% to 90%.

5.2 Estimate viscosity range of sample. It is common to choose spindle first and speed next. For example, when the spindle number is “B1” with the speed of 100 rpm, the full range is 500 mPa.s. When the speed turn to be 150 rpm, the full range becomes 333 mPa.s.

5.3 When the viscosity of sample can not be estimated, regard it as high viscosity sample. Choose the spindle number from “B4” to “B1” and speed from low to high. It is common viscosity value that the torque is in the range from 10% to 90%. If not, should change speed and spindle. Don’t forget choosing the spindle number ,after change the spindle.

6.0 Attention

6.1 Be careful to install and remove the spindle. Don’t use big force and curve the spindle.

6.2 Choosing new spindle number, after change the spindle. The changed spindle need to be cleaned and dried at once and put back to the spindle stand. Don’t clean the spindle connecting with the viscosity.

6.3 When new fluid is waited for measure, clean the spindle and sleeve. The old fluid left on spindle and sleeve may cause measure inaccuracy.

6.4 Viscosity and the spindle is a group. Don’t mix with other viscosity and spindle.

6.5 Don’t remove or adjusting the viscosity and the other parts.

6.6 When instrument needs to be moved, fix the screw and put it into the package.

6.7 There is a lot of “Non Newtonian fluid” in suspension liquid, emulsion, high polymer and other high viscosity liquid. Their viscosity changed with speed, time or some other reasons. So it is common that the viscosity is different in the measure with different spindle, speed and time. It is not the instrument inaccuracy. Make a rule of measure with spindle number, speed and measure time to measure them.

6.8 Before measure, check each spindle and sleeve. If they were etched or shape change, the viscosity would be wrong. Please connect with us to get new spindle. If viscosity would be used in special environment, 316L series stainless steel spindle could be choose. In addition, the spindle of other special material can be ordered.

When spindle is fixed, be careful to lock it. Sleeve bottom and spindle must keep coaxial. When using “B3” and “B4” spindle, sleeve can be removed. But spindle can be touch wall of container. This may change the coaxial. If sleeve was not used, take a note in the result.

6.9 To get more accurate value:

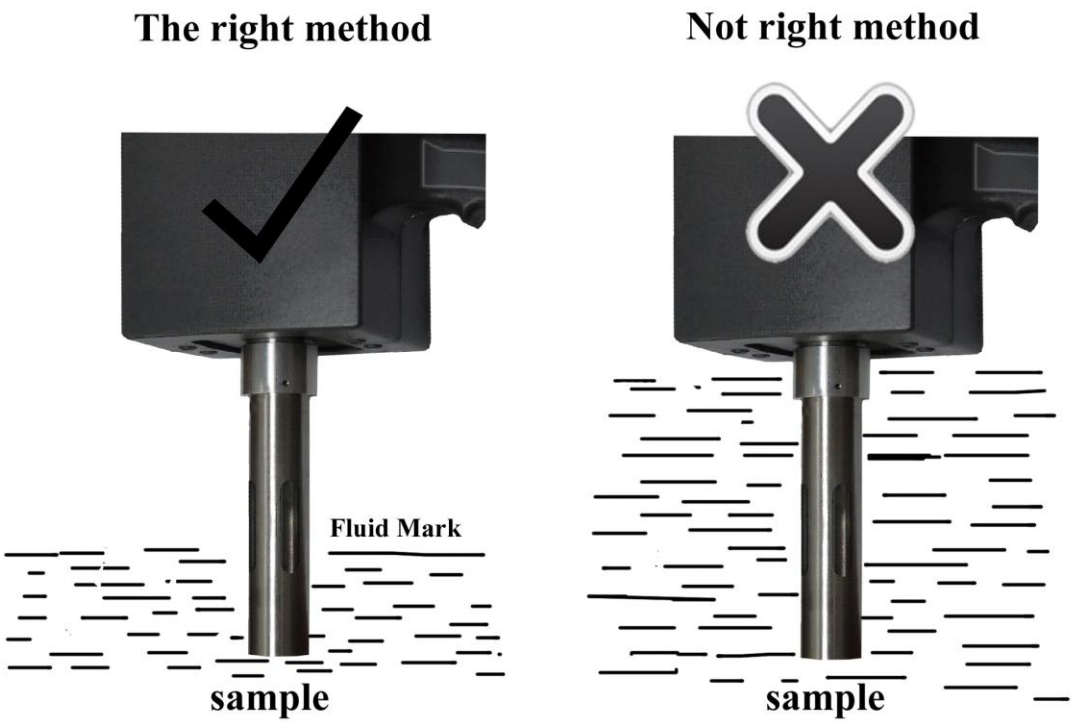
- •Control the temperature of fluid accurately;
- •Keep spindle in the fluid for some time to make their temperature be same;
- •Keep viscometer stability, place of spindle and fluid balance;
- •Keep the spindle in the middle of fluid. Equip the sleeve;
- •Keep spindle clean and balance ;

•When speed turns from high to low, pause for some time or make the measure time to be longer. It is to recover the inaccuracy caused by liquid rotary inertia;

•"B1" spindle is used to measure low viscosity. "B4" spindle is used to measure high viscosity.

•The time for measure with low speed is longer than the high.

•After use according to the figure , must clean the spindle and cylinder in time, Otherwise will affect the measurement accuracy



7.0 Others

If you want to know more detail information or get a catalog, please visit www.biuged.com or contact with Biuged headquarters or our agents in different regions.