USER MANUAL

ROTARY VISCOSIMETER WITH TOUCHSCREEN

PCE-RVI 10

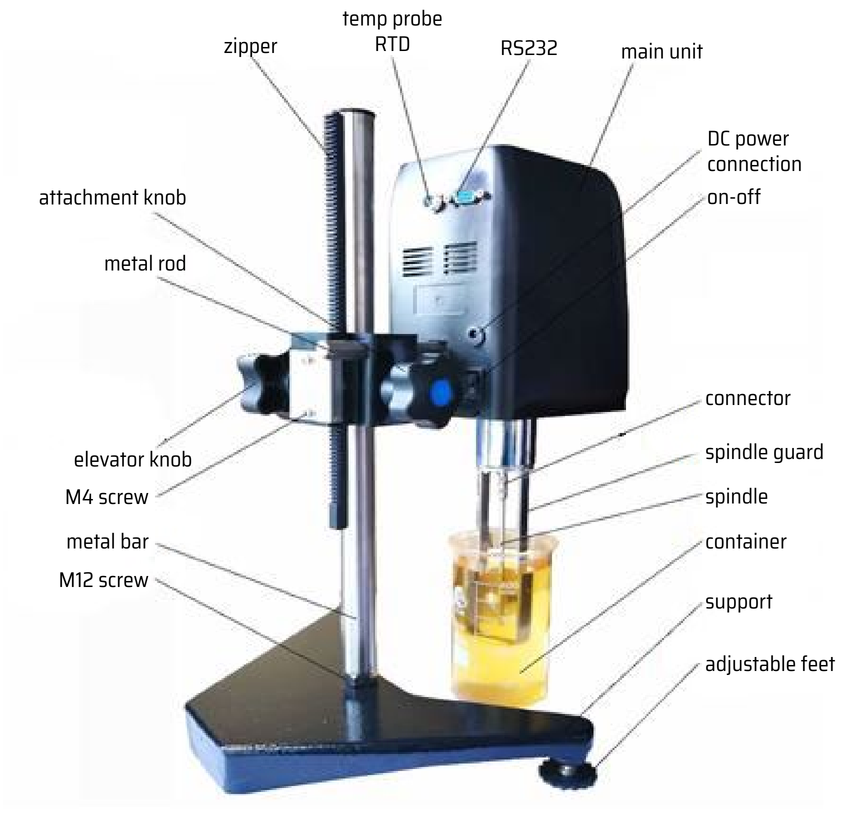
ENGLISH

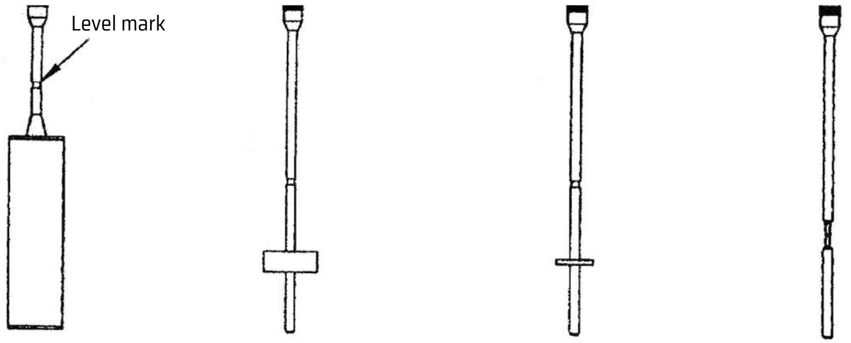
User manuals in various languages (français, italiano, español, português, nederlands, türk, polski) can be found via our product search on:
www.pce-instruments.com

CONTENTS OF SHIPMENT

- Main unit / Display
- Spindles
- Lifting bar and support
- Mains adapter
- Spindle protector
- Assembly wrench
- RTD temperature sensor
- Instructions
- Touch pen

PREPARATION BEFORE USE





No. 1 No. 2 No. 3 No. 4

ASSEMBLY DIAGRAM OF THE VISCOMETER

(1) Take all the components out of the box.
(2) The opening of the pedestal should be facing the user. Then insert the elevator bar into the pedestal and tighten the M12 screw with the wrench. Screw the two level adjustment feet respectively at the two ends of the base at the same height as possible.
(3) Turn the elevator knob and check its flexibility and self-locking. If it does not work properly, adjust it with the M4 screw. To prevent the viscometer from falling, it is better if the knob is tightened a little more.

Note: The knob has been adjusted before leaving the factory.

(4) Please insert the metal rod of the viscometer into the hole of the elevator, then tighten it by turning the knob. Adjust it at the same time taking into account the bubble level. Remove the black lid of the viscometer and set it aside

(the cover should be installed during maintenance and transportation of the device). The black cover can protect the connection screw, so it should be installed during a long period of non-use or transportation.

(5) Adjust the two feet until the bubble level at the top is in the center.
(6) Install the RTD temperature sensor in the RTD temperature sensor connection. If necessary, install the printer in the RS232 interface and the USB in the USB interface.
(7) Make sure that the power switch on the viscometer is in the "OFF" position. Connect the power adapter to the DC power socket on the viscometer. Insert the other side into a 220V AC power socket. If you want to disconnect the AC power adapter, first remove the power plug from the power socket and then disconnect it from the viscometer.

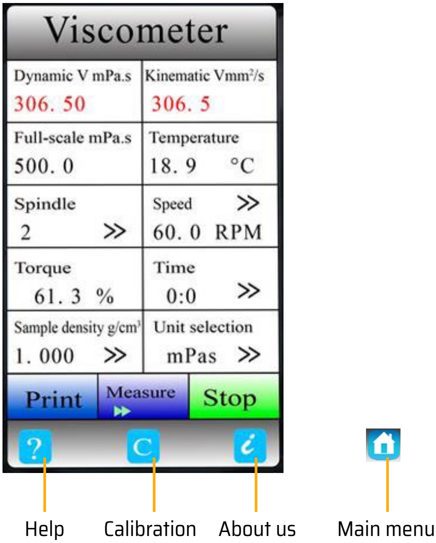
Model	PCE-RVI 10
Range (mPa.s)	20 … 2000 000
Rotation speed (rpm)	0.3, 0.6, 1.5, 3, 6, 12, 30, 60
Spindles	No. 1, 2, 3, 4 (No. 0 is optional)
Accuracy	±1.0% (from the adjusted scale background)
Repeatability	±0.2% (from the adjusted scale background)
Power Supply	AC100 … 240V, 50Hz/60Hz Output: DC 12V 1.5A

Note:
If the viscosity is less than 20 mPa.s, please select spindle No. 0

SCREEN DESCRIPTION

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

Fig. 1



Please click on either the "Spindle 2" or "Speed 60.0 RPM" option (in Fig. 2) and configure the test parameters.

1. Range selection (rotation speed and spindle configuration), as in Fig. 2.

Speed / Spindle	0.3RPM	0.6RPM
No.0	2000	1000
No.1	20000	10000
No.2	100000	50000
No.3	400000	200000
No.4	2000000	1000000
Unit: mPa.s	Choose range	

Speed / Spindle	1.5RPM	3RPM
No.0	400	200
No.1	4000	2000
No.2	20000	10000
No.3	80000	40000
No.4	400000	200000
Unit: mPa.s	Choose range	

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: mPa.s	Choose range	

Speed / Spindle	30RPM	60RPM
No.0	20	10
No.1	200	100
No.2	1000	500
No.3	4000	2000
No.4	20000	10000
Unit: mPa.s	Choose range	

Fig. 2

Then select a range by clicking, and the spindle and rotation speed will be selected. If, for example, the user selects the 50,000 range, click on the range and then spindle No. 4 and a rotation speed of 12 rpm will be selected.

2. Setting the time and print interval at "Time 0:0" (Fig. 3):
To set the end time. The default value is 00:00.

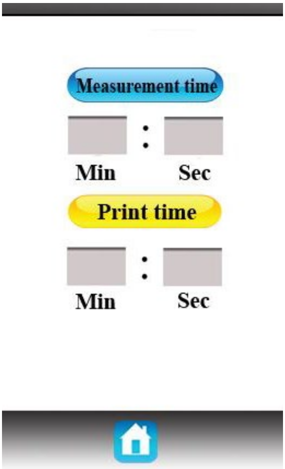


Fig. 3

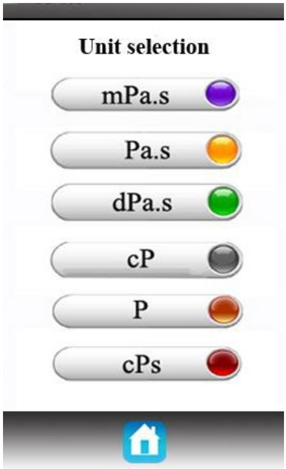


Fig. 4

Click on "Min", enter the number from the keyboard and press OK, then enter the minute value. The "Second" entry is configured in the same way. Then return to the main menu.

3. Unit selection: Click on » in the option „Unit selection mPas", Fig. 4 will be displayed.
Select a unit and return to the main menu.
Note: If the viscosity (max. value on the scale) <100, the user can only select between mPa.s, cPs, cP.

4. Kinematic viscosity: If the user needs the kinematic viscosity value, please enter the sample density first. Click on the sample density symbol on "Sample density g/cm³ 1.000" and enter the correct value. The viscometer will calculate the kinematic viscosity during the measurement. Then return to the main menu.

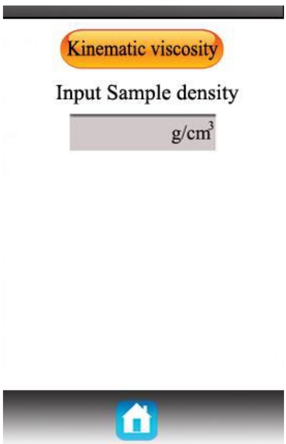


Fig. 5

5. Check the parameters, then prepare the samples and start the measurement.
The parameters displayed are:

Temperature: Real-time temperature checked by the RTD temperature probe.
Without RTD, the temperature will be ----

Tightening torque: The deviation of the torque sensor with the range 0 ... 100%. If the torque value is between 20 and 100%, the viscometer will obtain a result with the necessary precision. If the torque is less than 20%, a sound will be produced. Adjust the detection parameters appropriately according to the percentage of data.

Viscosity: Calculated from the torque detected with the specific spindle and rotation speed.

Timing: The countdown from the start of the measurement. The test will stop when the countdown ends.

Full range: The maximum measurement range that can be calculated by the combination of spindle type and speed. If it exceeds the current measurement range of the spindle and speed, the display will show 100% with the sound.

OPERATION

» Install the viscometer in its place, as described above

» Install the protective frame at the junction of the viscometer Turn it to the right to install it, to the left to uninstall it

» Turn the selected shaft on the connection screw Turn to the left to install, to the right to uninstall

» Start-up. Set the test parameters.

» Turn the nut on the lifting frame to lower the viscometer and gradually immerse the spindle in the measured liquid until the mark on the spindle reaches the level of the liquid. Return the viscometer to the horizontal position.

» Click on the “measurement” button and measure the viscosity value and the percentage scale with the spindle and the current speed simultaneously.

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

PREPARATION BEFORE MEASUREMENT

A) Viscosimeter: Install the viscometer following the steps described above; use the two feet on the base to adjust the level , and confirm the level by the gradient in front of the viscometer. Check that it is horizontal before each test or during the test process

B) Sample: The fluid to be measured (sample) must be placed in a container. The PCE-RVI 10 is suitable for 400ml, spindle in tall glass diameter greater than or equal to 70mm). We recommend that you choose the appropriate spindle with the specific container. A replacement container can be used for convenience, but it may have some impact on the accuracy of the measurement. The viscometer is adapted to the shaped container. The result of the replacement container is repeatable, but may not be the true value of the standard viscosity.
The spindle is used with the protection frame installed. Otherwise, the results may be repeatable, but may not be the true viscosity value.
When comparing data with others, check whether the protection frame is used, whether the sample container, the spindle, the spindle speed and the sample, the temperature is consistent.
In the viscosity test, many samples need a specific temperature, when users adjust the temperature of the samples, the temperature of the spindles and the containers must be the same.

C) The spindle and the rotation speed: In the case of an unknown fluid, repeated experiments are usually necessary to select the spindle and the rotation speed. The right selection can make the torque of the viscometer be in the range of 20% ... 100%.

There are two general rules in the rehearsal process:

» The viscosity range is inversely proportional to the size of the spindle

» The viscosity range is inversely proportional to the spindle speed.
In other words, for the high viscosity test, choose a small volume and a low speed spindle. If the spindle and spindle speed cause the torque to exceed 100%, please reduce the speed or set a smaller spindle. When the test shows that several combinations of spindle and speed can achieve the test results, any of these combinations can be used.
The viscosity value of the tested non-Newtonian fluid can change with the spindle and speed
To compare viscosity data, make sure you use the same test, i.e. using the same device, spindle, speed, container, temperature and test time.

ATTENTION

(1) Pay attention to the assembly and disassembly of the spindles. The spindle should be attached or removed with the coupling screw slightly raised. Do not apply excessive force.

(2) Do not place the viscometer with the spindles on their sides or upside down.

(3) Keep the connecting rod and spindles clean, or it will affect the vibration of the spindles.

(4) Hold the viscometer by hand when moving it up or down to prevent the viscometer from falling due to gravity.

(5) Enter a new spindle number if the spindles are replaced. The replaced spindles must be cleaned and placed back in the spindle holder.

(6) Please clean the spindle and protector when replacing the tested fluid to avoid measurement errors resulting from mixed fluids.

(7) Each spindle is exclusive to a specific instrument, do not confuse the spindles of different instruments.

(8) Do not disassemble or configure the instrument freely.

(9) During the transfer and transportation process, you must install the black cap on the connection screw, tighten the screws and put them in the packing box.

(10) Do not rotate the spindle in the absence of liquid for a long time so as not to damage the tip of the shaft

(11) There are many non-Newtonian liquids among suspension, emulsion, polymer and other high viscosity liquids, whose viscosity value varies with changes in shear rate, time and other conditions . It is normal for the results in different cases of spindle, rotation speed and time not to be consistent. This is not an instrument error. Generally, the spindle, rotation speed and time must be specified in the measurement of the non-Newtonian liquid.

(12) To obtain an accurate result, follow these steps:

- Control an exact value for the temperature of the sample
- Control the temperature of the liquid to be measured with precision
- Maintain the uniformity of the liquid
- Place the spindle in the center of the container and install the protector before the test
- Ensure the cleanliness and degree of agitation of the spindle
- When the measurement at high speed immediately becomes low speed, the test should be stopped; or the measurement time at low rotational speed should be a little longer to overcome the error due to rotational inertia caused by the rotation of the liquid.

DISPOSAL

For the disposal of batteries in the EU, the (EU) 2023/1542 directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose. In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law. For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations. If you have any questions, please contact PCE Instruments.

ENGLISH

PCE INSTRUMENTS CONTACT INFORMATION

Germany
PCE Deutschland GmbH
Im Langel 26
D-59872 Meschede
Deutschland
Tel.: +49 (0) 2903 976 99 0
Fax: +49 (0) 2903 976 99 29
info@pce-instruments.com
www.pce-instruments.com/deutsch

France
PCE Instruments France EURL
23, rue de Strasbourg
67250 Soultz-Sous-Forets
France
Téléphone: +33 (0) 972 3537 17
Numéro de fax: +33 (0) 972 3537 18
info@pce-france.fr
www.pce-instruments.com/french

Spain
PCE Ibérica S.L.
Calle Mula, 8
02500 Tobarra (Albacete)
España
Tel. : +34 967 543 548
Fax: +34 967 543 542
info@pce-iberica.es
www.pce-instruments.com/espanol

United Kingdom
PCE Instruments UK Ltd
Trafford House
Chester Rd, Old Trafford
Manchester M32 0RS
United Kingdom
Tel: +44 (0) 161 464902 0
Fax: +44 (0) 161 464902 9
info@pce-instruments.co.uk
www.pce-instruments.com/english

Italy
PCE Italia s.r.l.
Via Pesciatina 878 / B-Interno 6
55010 Loc. Gragnano
Capannori (Lucca)
Italia
Telefono: +39 0583 975 114
Fax: +39 0583 974 824
info@pce-italia.it
www.pce-instruments.com/italiano

Turkey
PCE Teknik Cihazları Ltd.Şti.
Halkalı Merkez Mah.
Pehlivan Sok. No.6/C
34303 Küçükçekmece - İstanbul
Türkiye
Tel: 0212 471 11 47
Faks: 0212 705 53 93
info@pce-cihazlari.com.tr
www.pce-instruments.com/turkish

The Netherlands
PCE Brookhuis B.V.
Twentepoort West 17
7609 RD Almelo
Nederland
Telefoon: +31 (0)53 737 01 92
info@pcebenelux.nl
www.pce-instruments.com/dutch

United States of America
PCE Americas Inc.
1201 Jupiter Park Drive, Suite 8
Jupiter / Palm Beach
33458 FL
USA
Tel: +1 (561) 320-9162
Fax: +1 (561) 320-9176
info@pce-americas.com
www.pce-instruments.com/us

Denmark
PCE Instruments Denmark ApS
Birk Centerpark 40
7400 Herning
Denmark
Tel.: +45 70 30 53 08
kontakt@pce-instruments.com
www.pce-instruments.com/dansk

Subject to change without notice