

Heated Viscometer

Measuring viscosity

- Fill the viscometer with oil (see over page)
- Use Reset key to initialise operation.

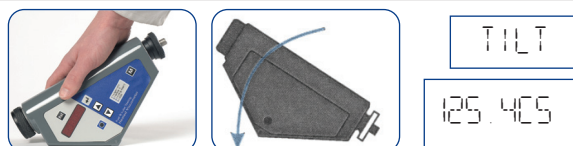
- Use Arrow keys to toggle display and select the temperature required with the Return key.

Unheated Lube Oil (correct up to 40°C)	2 00
Heated Lube Oil (to 40°C)	2 40
Heated Fuel Oil (to 50°C)	2 50

- Temperature display flashes as Viscometer heats the oil. Degree [°] symbol flashes until the oil temperature stabilises.

Display flashes	XX.X°
Temperature stabilises	40.00°

- Tilt viscometer when prompted. When oil temperature is stable, the display will show viscosity at 40°C or 50°C as selected.



- Wait for "TILT" prompt before taking repeat readings.



- Use Arrow keys to toggle display of cSt from 40° or 50° to 100°C.

indicator cSt at 100°C	100 c
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Improving accuracy in heated mode

- Take several readings over a longer period of time until readings stabilise.

Correct reading for density:

The Mode 1 density value (kg/m³ at 15°C in vacuo) used by the viscometer will default at: 0.900 for 0°C- 40°C operation and to 0.990 for 50°C fuel oil operation

- Select Mode 1.

Density = 0.9	10 .900
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Use Speed and Arrow keys to input the oil density (i.e. density at 15°C in vacuo).

- Select Mode 5 to recalculate cSt. value and press **Return**.

5 XXX

Improving accuracy in unheated mode with multigrade or synthetic oils

- Follow 'Measuring viscosity' to obtain a reading in cSt. corrected to 40°C.

125.405

- Select Mode 1. Use Speed and Arrow keys to input the oil density (i.e. density at 15°C in vacuo). The density of many synthetic oils is nearer to 1.0 than 0.9.

Density = 0.9	10 .900
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Density = 0.992	10 .992
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- Select Mode 5. Enter the approximate Viscosity Index (VI). The VI of multigrade oils will be higher than the default VI of 100.

Viscosity Index = 100	5 100
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Viscosity Index = 126	5 126
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- Press **Return** key in Mode 5 to recalculate cSt. corrected to 40°C.

132.505

Correcting the density from 50°C to 15°C in vacuo

The small [c] in Mode 1 [1c] indicates the reading is as 15°C in vacuo. Sometimes you may be given the reading at 50°C in air and this will need to be corrected.

- Select Mode 1 density at 15°C in vacuo.

10 .900

- Press **Return** to enter the reading at 50°C in air. (This is indicated by the [u] for uncorrected [1u]). Use the Speed and Arrow keys to enter the reading.

10 .970

- Press Return and the uncorrected reading is automatically corrected to 15°C in vacuo. This value will then be used by the viscometer for all other calculations.

10 .992

Calculated Carbon Aromaticity Index (CCAI)

- Select Mode 1. Use Speed and Arrow keys to enter the density. Use the Return key to toggle between corrected and uncorrected density (see 'Correcting the density').

10 .992

10 .970

- Select Mode 3 and display the last recorded viscosity. Alter this if necessary using the Speed and Arrow keys.

3 133

3 147

- Select Mode 4 to calculate CCAI for this density and viscosity.

4 864

Test Kits, Spares and Reagents

774976 Viscosity Meter Spare Seals, Fuse and Ball

Cleaning after use: see page 3

Specifications

Range	20 - 810 cSt at 50°C (ISO Fuel Grades RMA10 to RML55) 20 - 810 cSt at 40°C (lube oils SAE 5 through SAE 50)
Accuracy:	Typically with +/- 3%(20 - 450 cSt) or +/- 2 cSt
Power:	110 to 240 VAC 50/60Hz 200VA
Fuse rating:	2.5A 20mm 250VAC HRC A/S (T) Ceramic

Intended use

The Unitor Heated Viscometer is designed to measure the viscosity of oil either room temperature or warmed to 40°C or 50 °C.

Setting the mains voltage

Before connecting the power supply to the mains check that the correct supply voltage is selected. Failure to do this may damage the instrument.

To change supply voltage:

Remove fuse box using a screwdriver.

Select correct voltage supply.

Replace box, ensuring white arrows are aligned.



Connecting the power supply

- Connect the yellow power supply lead to the viscometer and lock into place by rotating the outer collar.
- Connect the mains lead into the socket on the side of the power supply, checking the correct mains voltage is selected. Plug the other end of the lead into the mains supply.
- Turn on the mains power and then turn on the power supply using the switch next to the socket, the green light should come on and the viscometer display should illuminate.

Location

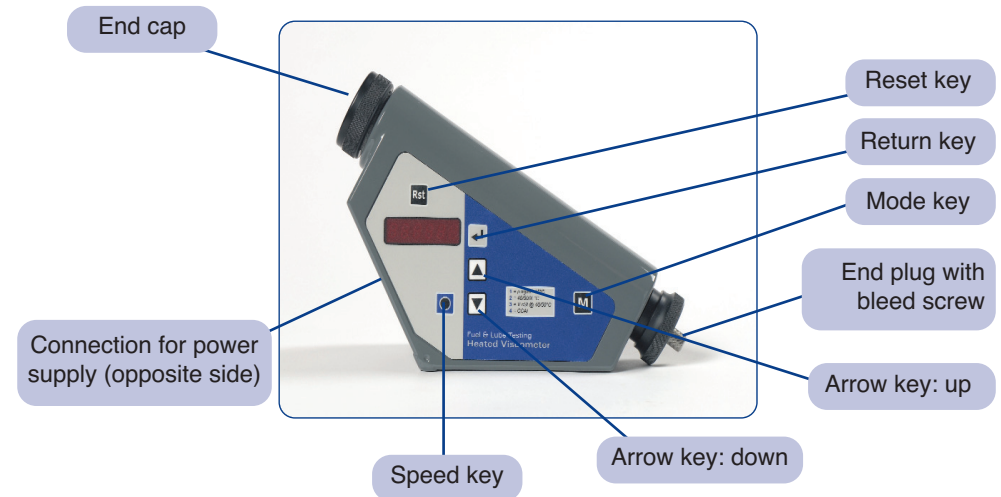
The unit is designed to operate on a flat level surface such as a workbench. This is essential for accurate and reliable operation. Ensure that the Viscosity Meter can be rocked back and forward without obstruction in one clean movement.

Make sure the power supply is located towards the rear of the workbench where the cable cannot be caught during operation.

Controls and features

The instrument measures viscosity by timing the descent of a metal ball through the internal tube. The instrument is designed to easily 'TILT' from side to side allowing the ball to fall under gravity. Measurements are taken in both directions to compensate for the workbench being slightly out of level.

There is an internal circuit that controls the heating of the oil to allow measurements to be taken on higher viscosity oil. The display will request a 'TILT' for measurement only when the temperature is stable, to ensure accurate results. The processing circuitry compensates for the temperature of the oil and allows display of centiStokes adjusted to 40,50 or 100 °C. There is a calculator feature, which allows the reading to be adjusted for Density and Viscosity Index for improved accuracy and to display the CCAI.



To change fuse

- Remove fuse box using a screwdriver.
- Carefully remove and replace fuse.
- Replace box, ensuring white arrows are aligned to correct voltage supply.

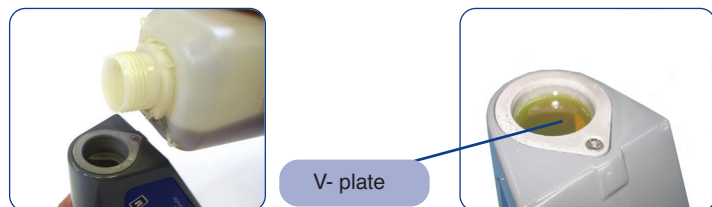


Filling with oil

- Support viscometer vertically, slacken bleed valve, then pull out the sliding plug. Ensure viscometer tube is clear, clean and contains the metal ball.



- Fill the tube with the oil sample to just above the V-plate.



- Loosely fit the bleed valve and place the viscometer in an upright position. Leave to stand for 5min. Slowly push in and rotate the plug with the valve open until all air is expelled. Do not use excess force.



- Tighten the bleed valve fully and wipe off excess oil from the plug. Place viscometer back on its base and connect the power cable. The viscometer is now ready for use, but do not tilt yet.



Note: If air is not fully expelled from the unit, it may affect results

Cleaning after use

After a measurement is taken the inside of the measuring chamber must be clean of any residual oil. If any is left it could affect the accuracy of the next result. It is also essential to ensure there are no foreign bodies (grit, pieces of tissue etc) inside the tube, as they will affect the motion of the metal ball.

- Turn off the power supply and disconnect the yellow lead from the viscometer. Carefully open the end cap to empty the oil out of the tube.

CAUTION: The oil may be hot (50°C).

- Using the sieve supplied to catch the metal ball, tip the oil out into a container.
- Using the rod supplied push a wad of clean tissue down the centre of the tube ensuring all remaining oil is cleaned out. Replace the metal ball into the tube and fit end caps for safe keeping.

General cleaning and maintenance

- Make sure that the power supply is disconnected from the mains. Wipe down the instrument with a clean dry soft cloth. Do not immerse in water, if necessary to remove stubborn marks use a cloth soaked in warm soapy water.
- If the unit fails to power up, disconnect the power lead supplied and check the fuse is OK. Replacement fuses of the correct type are in the spares pack. Do not use any other type of fuse.
- There are no other user serviceable parts inside the unit, if the unit still does not operate return to the supplier for repair.

Note: If the equipment is used in a manner or for a purpose other than that described above then any safety protection may be impaired.

General operation

- Use Reset key to initialise operation.
- Use Mode key to select viscometer functions.
- Use Arrow keys to change values.
- Speed key toggles on/off. Used for rapid slewing of values.

