

## Model 1077L Viscometer

ATAC offer the most versatile range of process viscometers available. ATAC are the only manufacturer to offer a process viscometer to measure very high viscosity fluids including multi-range and viscometers suitable for the measurement of both Newtonian and non Newtonian fluids.

The model 1077L Viscometer+ can measure the viscosity of all Newtonian fluids. The analysis results of the model 1077L Viscometer+ correlate directly to ASTM D-445 test method.

- Intuitive software with touchscreen HMI
- Configurable ranges 0-5cP to 0-1000cP
- High precision
- Fast 60 seconds response time
- CAN bus connectivity
- Wireless and Ethernet remote access
- Analogue & digital communications
- Single or Dual bath, Viscosity Index
- Small footprint, wall or floor mounting

### TYPICAL APPLICATIONS

- *Lube oil blending*
- *Fuel oil blending*
- *Lube oil de-waxing*
- *Distillate fuel product specification*

*The Hagen-Poiseuille equation*

$$\mu = 1.45 \times 10^5 \times d^4 P / QL$$

Where:

$\mu$  = absolute viscosity in centiPoise (cP)

d = capillary bore (mm)

P = differential pressure across capillary (bar)

Q = sample flow (ml/min)

L = capillary length (mm)

### Optimise your process control

Combining innovative solutions for hazardous area installation and advanced control and diagnostic features with proven analytical methods, the ATAC 1077L Viscometer+ sets a new standard.



### PRINCIPLE OF OPERATION

Viscometers measure differential pressure across a capillary through which the sample fluid is passed.

The differential pressure is proportional to the absolute viscosity of the fluid as described by the Hagen-Poiseuille equation.

As d, Q and L are constants, the absolute viscosity ( $\mu$ ) is directly proportional to the differential pressure measured across capillary (P).

A precision pump meters sample flow and two heat exchangers, fitted either side of the metering pump, ensure the sample metered by the pump is at approximately the same temperature as sample entering the capillary.

Input pressure is set so that the metering pump suction pressure is always positive.

The sample flows at a constant rate through the capillary across which a differential pressure transmitter is connected.

## Highly responsive touchscreen for ease of operation

The model 1077L Viscometer+ features an ultra responsive projective capacitive touchscreen which has a unique IECEx & ATEX Zone 1 IIC rating without the need for air purge. This innovative screen has integral armoured glass which can be operated while coated in grease and with gloved hands.

## CAN bus connectivity

The model 1077L Viscometer+ employs the very latest data bus technology enabling extensive diagnostic information to be gathered in real time from all the critical components of the analyser.

## Extensive communications protocols

4-20mA inputs & outputs, programmable alarm relays and Modbus serial communications are standard, other protocols are available on request. Networking is simple with Ethernet, Wireless and VPN connectivity for remote access.

## Single or Dual bath options

The new lightweight oil bath is temperature controlled at set points from 40-150oC with exceptional precision of +/- 0.002oC. The addition of a second bath enables simultaneous measurement at dual temperatures for Viscosity Index calculation.

## High performance capillary viscometer

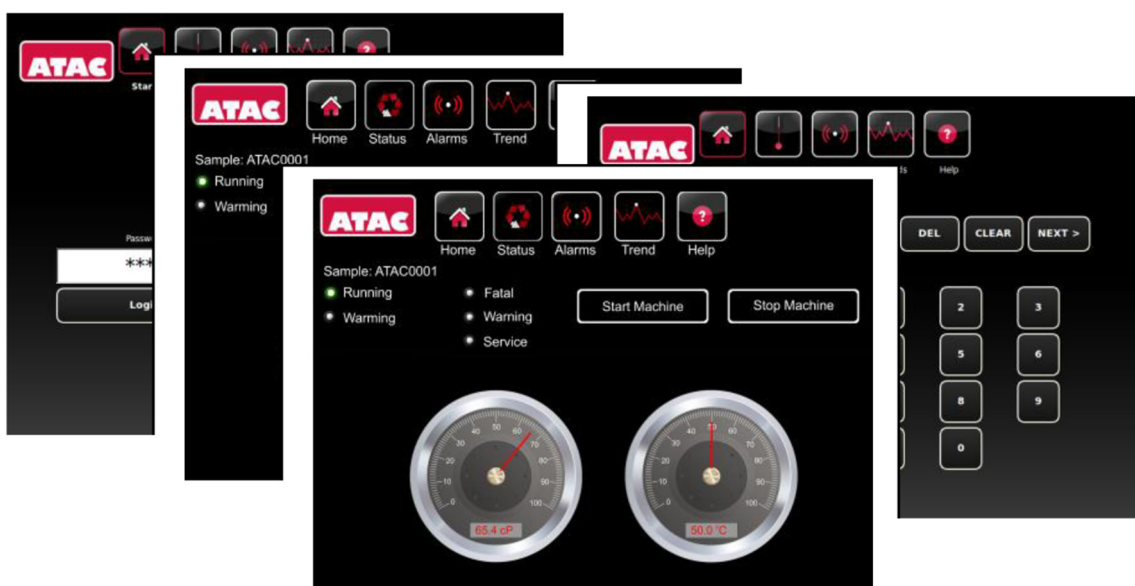
The model 1077L Viscometer+ can be configured for viscosity ranges from 0-5cP up to 0-1000cP. The precision exceeds that of the ASTM method. Response time is less than 60 seconds.

## Reduced footprint and improved layout

The new enclosure can be wall mounted or free standing; transport wheels are available for ease of installation. Access to all components is available via the fully opening front door panels; the new lightweight bath can be raised and lowered with a simple jack, all maintenance procedures can be carried out by a single technician.

## Extensive diagnostics and alarms capability

The CAN bus system enables all machine devices to be monitored for their operating status, any malfunction is immediately identified and can be addressed to one of 6 alarm outputs.



The analyser control software is organised as a series of menu screens accessed and navigated by touching screen icons. The main screen displays the current viscosity measurement, bath temperature and density (density may be entered as a constant or read as an input from a density meter). Screens are available for setting up of the analyser, viewing system alarms, run & stop functions, security configuration and plotting real time and historical data. The software is easy to use, and there is a full help package accessed from a click on the “Help” button.

## Specifications

<b>Configuration</b>	Single narrow bore capillary
<b>Ranges</b>	Minimum 0 to 5 cP (Maximum 0 to 1000 cP)
<b>Repeatability</b>	± 0.5% FS
<b>Precision</b>	± 1% FS
<b>Response Time</b>	<60 Seconds
<b>Measurement Temperature</b>	Normally 40°C to 150°C (100°F to 300°F)
<b>Units of Measurement</b>	cP (cSt available with density input)
<b>Temperature Bath Capacity</b>	28 to 40 Litres of oil (dependant on specification), use Shell Thermia B or equivalent oil. Normal maximum working temperature of bath oil is 150°C (protected by thermal fuse). Sample temperature at capillary outlet is measured by a high precision thermometer.
<b>Certification</b>	Pending
<b>Dimensions</b>	<b>Width:</b> 912mm—allow service access to the left side <b>Depth:</b> 506mm with removable doors closed (1006mm with doors open) <b>Height:</b> Adjustable: Low Position 1713mm, High Position 1913mm <b>Weight:</b> 300kg
<b>CAN Bus</b>	Local machine highway and remote via Ethernet (option)
<b>Networking</b>	Ethernet for remote access via VPN. Zigbee™ wireless networking
<b>Serial</b>	Modbus 485 RTU Slave, other protocols available
<b>Analogue &amp; Digital</b>	3 x 4-20mA isolated outputs, 2 x Digital inputs
<b>Relays</b>	2 x change over, 4 x normally open, zero volt isolated
<b>Local Display</b>	15” Colour projective capacitive touch screen
<b>Cooling Water</b>	When sample is at a high temperature relative to measuring temperature or when measurement temperature is low with respect to ambient temperature, a supply of cool, potable water (9 to 45 L/Hr) should be provided to carry away excess heat. The necessary coil is fitted as standard. If potable water is not available, alternative cooling coil materials can be provided.
<b>Connections</b>	<b>Sample:</b> ¼” O/D Bulkhead <b>Cooling Water:</b> ¼” O/D Bulkhead <b>Electrical:</b> M20 (Power), M20 (Signal)
<b>Sample Conditions At Inlet</b>	<b>Pressure:</b> within range 0.7 to 21 barg (10 to 306 psig) depending on viscosity of sample <b>Temperature:</b> must be within ±100°C (212°F) of the required measuring temperature <b>Flow Rate:</b> <100 MI/Min
<b>Power Supply</b>	<b>Voltage:</b> 115Vac or 230Vac ± 10% <b>Frequency:</b> 50 or 60 Hz <b>Consumption:</b> 2 to 2 KVA depending on specification
<b>Viscosity Index</b>	Dual bath Viscosity Index, continuous viscosity measurement at dual temperature (typically 40°C & 100°C)
<b>Customer Connection</b>	Metric adaptors for customer connections
<b>Sample Heat Tracing</b>	Steam at low pressure (1 bar max) required for samples having pour point above lowest ambient temperature. Connection is ¼” O/D compression type.
<b>Analogue &amp; Digital</b>	2 x 4-20mA Inputs
<b>CAN Bus Remote</b>	CAN Bus via Ethernet