Cambridge Viscosity®

The Technology Leader in Viscosity℠

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VISCOpro 2000™

Monitoring and control for single-line
process environments

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When you have a process line or simulation system of components that are critical to your operations, you need to know that the viscosity parameters are correct or controlled at all times. You want automated monitoring for continuous, reliable, and accurate measurements, but you also want hands-on control – the ability to change settings, measure different attributes, and capture and analyze real-time data.

The VISCOpro 2000 viscometer offers menu-driven electronics to complement and control Cambridge Viscosity's high-quality in-line and in-tank sensors. Powerful yet easy to use, the VISCOpro 2000 provides viscosity, temperature, temperature-compensated viscosity, and optional density readings on an enhanced visual display panel. Thirteen factory-set standard measurement ranges from 0.2-20,000 cP are available for greater accuracy.

Selecting operating characteristics, control set points, and alarms (six different settings) are easy using a menu-driven interface with RS232 (standard) and RS485 (optional) communications ports. A built-in 1,000-point data logger captures key data in real time that can be easily exported to common graphing programs for analysis. The VISCOpro 2000 can be easily programmed for up to 40 different fluid settings, enabling rapid changeovers in production processes – with consistent results.

VISCOpro 2000 Features

- Four 4-20mA outputs for remote recording
- TTL alarm alerts user and process line if viscosity goes outside of range
- Remote operator interface feature allows for the sensors to be installed/mounted away from electronics/display — useful in process applications
- Maintain viscosity control by adding solvent or heat
- Data monitoring/collection/storage and transfer/Graphs up to 25 hours of viscosity, temperature, and control data in real time
- Multiple setups for different configurations, including set-point, data averaging, alarm settings, and TCV values
- User choice of readout in cP, cSt, or SSU
- All Cambridge Viscosity sensors and transmitters are field tested

VISCOpro Monitor and Control Menus

```
Operate
Control SetPoint
Chose Setup
Review Setup
```

```
Monitor Only
Monitor & Control
Sensor Standby
Select Up/Dn, Enter
```

```
Visc= 9.43 cP
Temp= +29.9° C*
TCV= 10.57 cP
Setup= 1-20cP
```
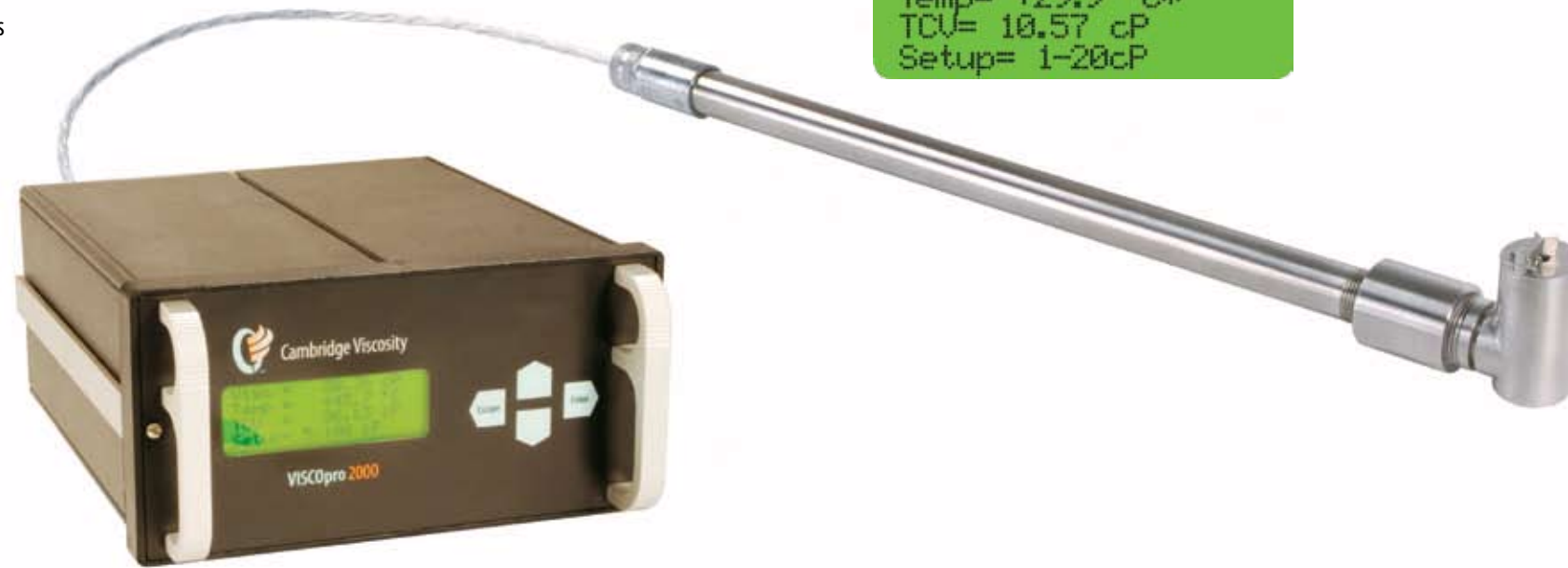
```
Control on Temp. Set
TSP= +40.0° C*
Setup= 1-20cP
Adjust Up/Dn, Enter
```

```
Units of Measure
Fluid Properties
Control Parameters
Alarm Points
```

```
Viscosity Units cP
SSU
cSt
Cup seconds
```

```
Set Data
Averaging
Purge Sensor
Set Data Log Intrvl
```

Key features and benefits
Combining powerful electronics with our innovative sensor technology, the VISCOpro 2000 viscometer is the ideal solution for single-line monitoring and control applications. Its numerous features and benefits include:

Self-cleaning operation
Our proprietary software cleans the sensor at regular intervals by forcing the piston to the bottom of the chamber with increased force. This action does not affect measurement levels or data capture, yet effectively eliminates particles that can interfere with the system's reliability. The VISCOpro 2000 will even switch to cleanout mode whenever necessary.

Automatic viscosity control (proportional-integral)
The system is factory-set yet configurable. Its microprocessor "learns" how much control is needed for each fluid setting, and automatically adjusts to the ideal level, maximizing accuracy and allowing for minimal operator intervention.

Multiple output signals
The VISCOpro 2000 does more than simply measure straight viscosity; it also transmits analog signals for temperature, temperature-compensated viscosity (TCV), — optional density measurement is available as well. TCV is a particularly important attribute as fluctuations in temperature wastes money and materials while harming quality control efforts. The VISCOpro 2000 eliminates the effects of variations in process temperature and increases viscosity-control efficiency.

Automatic date and timecoded data logging
The VISCOpro 2000 works all shifts — but you don't. With automatic date and timecoded data logging, you have an audit trail to identify errors and changes to the process, as well as performance and quality trends. The data can easily be exported to spreadsheet programs for further analysis and customized reports.

Security and alerts
The VISCOpro 2000 features a supervisory lock-out function to prohibit unauthorized viewing of line status or changing of settings. When levels reach user-configured thresholds, alarms are triggered to alert operators so they can quickly take appropriate action.

Quick change memory settings
If your process line runs more than one fluid, very often each fluid requires its own viscosity control setting. When you change the fluid, you have to be sure to consistently and accurately change the settings. The VISCOpro 2000 allows you to name each fluid and select its setting.

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Compatible Viscosity Sensors

Compatible In-Line Sensors

301
Ideal where threaded connections are desired, the 301 sensor mates directly to a tee or pipe with standard 1.25" NPT ends. Recommended for line sizes <2".

311
Appropriate for most applications, the 311 sensor has a quick-disconnect flange for fast, tool-less removal. Recommended for line sizes <2".

372
The 372 sensor installs directly into small-diameter process lines using 1/4" NPT fittings. Available with removable jacket.

392
Designed with a rugged, four-bolt stainless steel flange, the 392 sensor fits easily to any pipe line size over 1.5".

440
The SPL440 installs into a high pressure pump-through type system. Multiple ranges; easy changeover. Used in oil research, exploration and for supercritical fluid viscosity.

571
Small yet reliable, the 571 sensor is used for compressor, used oil analysis, on-engine, and hydraulic fluid applications. Designed to fit into 13/16 UNEF threaded ports.
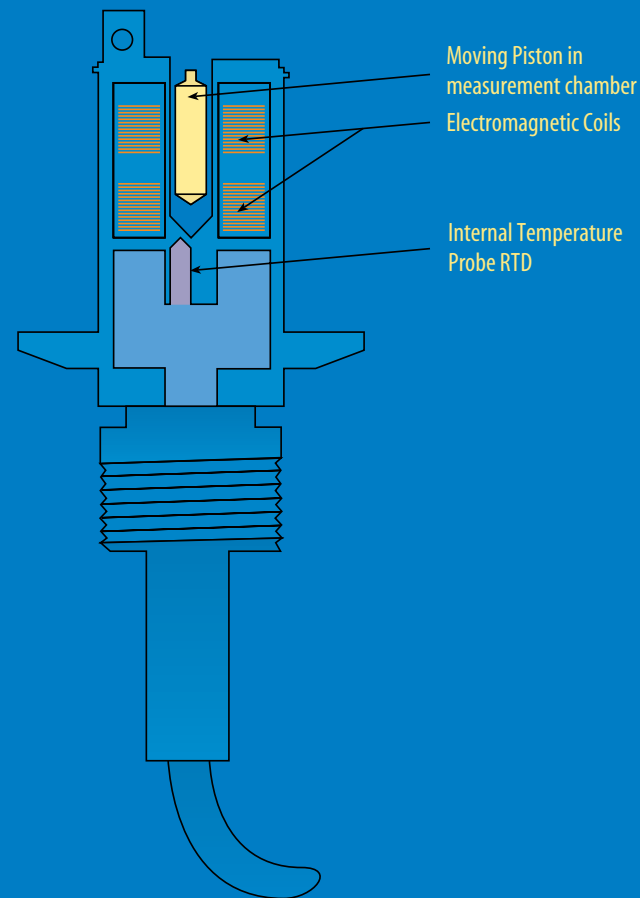
Compatible In-Tank Sensors

321
The 321 sensor can be fitted to any pipe configuration without welding. The sensor's head is attached to its stem at a 90-degree angle.

322
Typically used in permanent in-tank mounted applications, the 322 sensor's head it attached to its stem at a 45-degree angle.

Viscosity Measurement Technology

Moving Piston in measurement chamber
Electromagnetic Coils
Internal Temperature Probe RTD

VISCOpro System Specification Comparison

	ViscoPro1600	**ViscoPro2000**	ViscoPro8000
Measurement Principle:	Electromagnetic	**Electromagnetic**	Electromagnetic
Repeatability:	± .8% Reading	**± .8% Reading**	± .8% Reading
Viscosity Range:	0.2-20,000cP	**0.2-20,000cP**	0.2-20,000cP
Max Pressure Ratings:	1,000 psi	**1,000 psi**	1,000 psi
Self Clean/Recovery:	Automatic	**Automatic**	Automatic
Continuous Analysis:	Yes	**Yes w/logging**	Yes w/graphing
Viscosity Units:	cP; cSt; cup sec; SSU	**cP; cSt; cup sec; SSU User Selectable**	User Selectable
Temp: °C or °F:	°C or °F Factory Set	**°C or °F Selectable**	User Selectable
Sensor Temperature Range:	-40°C to 190°C	**-40°C to 190°C**	-40°C to 190°C
Analog Outputs:	4-20mA (2)	**4-20mA (4)**	4-20mA (1) User Selectable
Digital Communications:	RS485	**RS485/RS232**	RS232, TCP/IP
Input power:	12VDC	**100-240 VAC/12-36 VDC**	100-240 VAC
Remote Trouble:	Yes	**Yes**	Yes
Temperature Compensated Viscosity: (TCV)	No	**Available**	Available
Profibus, Modbus Compatible:	Yes, Optional	**Yes, Optional**	Yes, Optional
Temp/Viscosity Control:	No	**PI**	PI
Alarm Output:	Yes	**Yes**	Yes
Screen:	LCD Optional	**Menu Driven LCD PC Optional**	Touchscreen-Multichannel
FM, CE, ATEX Class 1, Div 1, Group C&D	Standard	**Optional**	Optional

Power input:	100-240 VAC, 12 VDC, 24 VDC, 12 W
Outputs:	4 4-20mA; 1 RS232 (standard)/RS485 (optional); 1 5V-TTL alarm; 1 on-off port for alarm or control
Accuracy:	+/- 1.0% of full scale (correlates to ASTM D445)
Repeatability:	0.8%
Ranges:	0.2-20,000cP (0.2-2cP, 0.25-5cP, 0.5-10cP, 1-20cP, 2.5-50cP, 5-100cP, 10-200cP, 25-500cP, 50-1,000cP, 100-2,000cP, 250-5,000cP, 500-10,000cP, 1,000-20,000cP)
Wetted Components:	Standard 316L/430 Stainless Steel Optional: Hastalloy and Sanitary Components
Maximum Temperature:	190°C (sensor); 60°C (display electronics)
Maximum Standard Operating Pressure:	1000 psi (70.3 bar)
Optional Operating Pressure:	2000psi (140.2 bar):
Temperature Sensor Type:	4 wire Platinum RTD
Certifications:	FM, 3A, CE, ATEX - EExdIIIC (300 series sensor only) [EEx d IIC T4, -20C<Ta<95C (For SPL Models), EEx d IIC T2, -20C<Ta<190C (For SPL Models)] Factory Mutual - Class 1 Div.1, Group C, D:T3 NEMA4,IP-66

The Technology Leader in Viscosity℠

With more than 8,000 installations worldwide, Cambridge Viscosity is the proven leader in viscosity management technology. Founded in 1984 as Cambridge Applied Systems, the company offers a full range of real time in-line, in-vessel, pilot plant and lab viscometers. Users of its products include Fortune 500 companies and their equivalents throughout North America, Asia, Europe and South America.

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