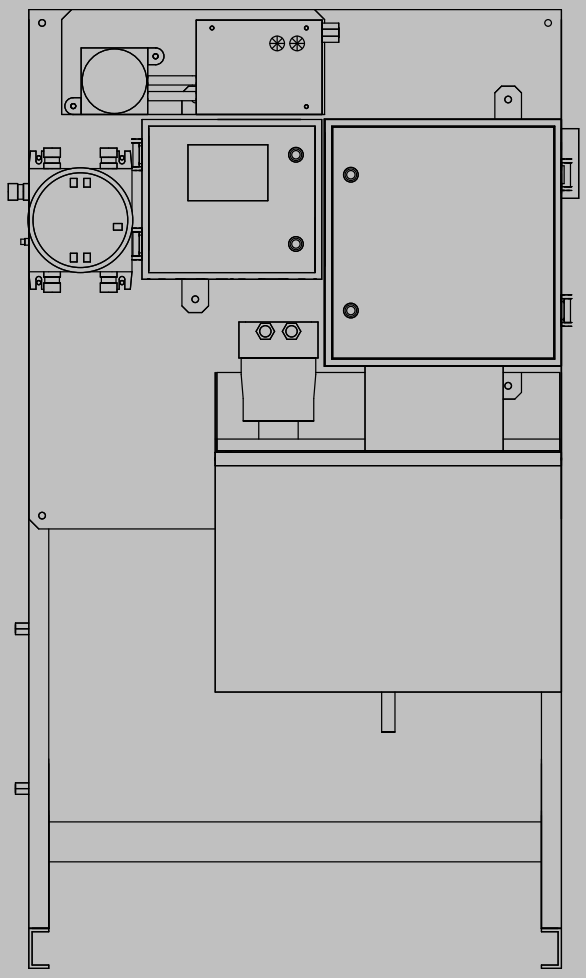
ORB instruments, inc.

Model P-900 Viscosity Analyzer



On-line Viscosity Analyzer for continuous measurement of absolute viscosity of Newtonian fluids.

- Customizable 2-4000 cP Sample Range (Available Optional Kinematic Ouput Package)
- Continuous Sample Viscosity Ouput
- Does not require atmospheric recovery system
- Superior repeatability Exceeding ASTM D-445
- Increased reliability with operating uptime better than 99%

The Model P-900 Viscosity Analyzer is the result of combining the latest, state-of-the-art technology with over 20 years of industry experience. The result is an unsurpassed, high-quality Viscosity measurement system that produces the process control signal required to perform today's optimized and cost-efficient petroleum refining operations.

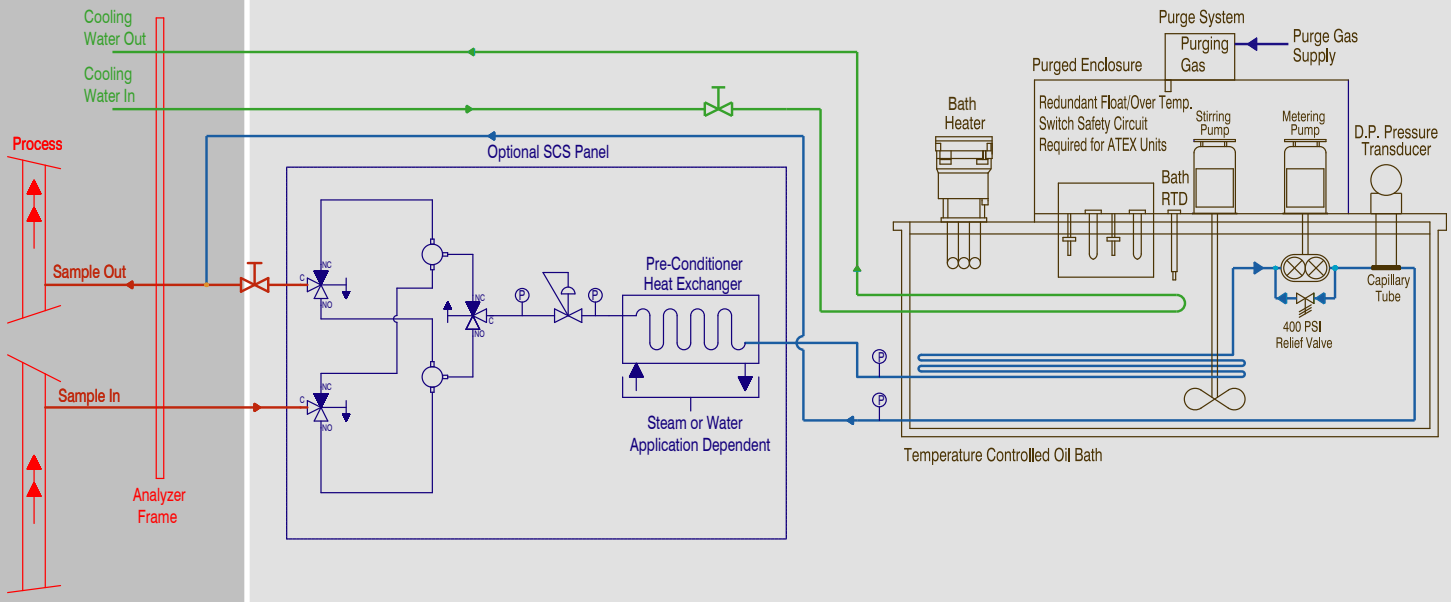
This updated classical design, combines traditional oil bath viscosity reliability with upgrades on systems control. Attention to design detail with the end user in mind allows for an ease of maintenance before thought unattainable by classical systems.

OPERATING PRINCIPLE

The P-900 measurement cycle is designed to correlate to the ASTM Method D-445. The measurement itself is based on the Hagan-Poiseuille principle, which states that a fluid's pressure differential across a capillary will vary proportionally to the fluid's absolute viscosity.

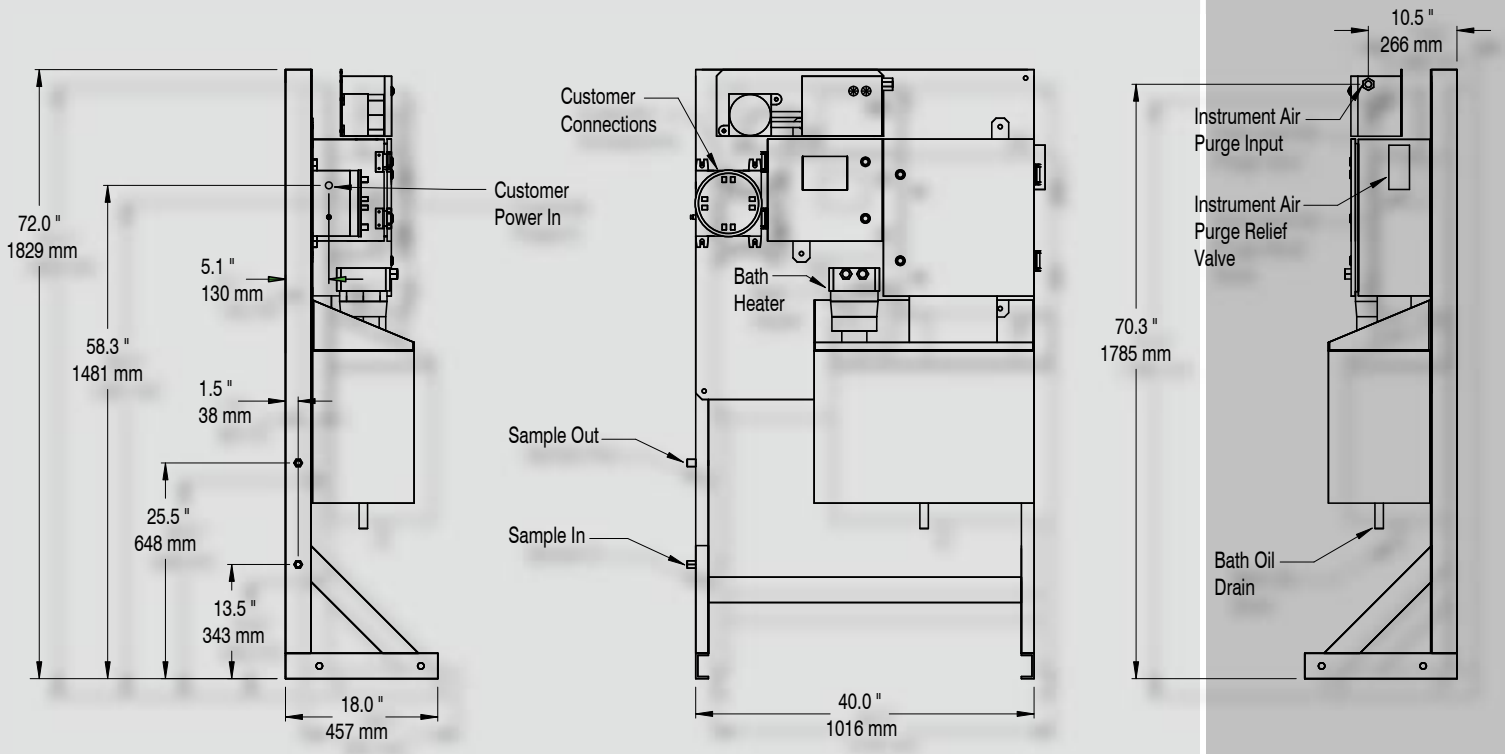
Sample is continuously refreshed via a bypass line on the instrument. A filterted sample slipstream is pulled from this line into the microprocessor controlled heat exchanger oil bath which brings the sample temperature to the specified measuring temperature. An AC sychronous motor and dual precision pumping system simultaneously raises the sample pressure to a preset limit and pushes a small portion of this sample through a capillary restriction where the pressure is measured at both ends. This pressure differential is recorded by the instrument and a corresponding absolute viscosity is output. An optional kinematic viscosity output package allows the end user to program fixed or enter assgined sample densities for an output of kinematic viscosity.

While continuously streaming viscosity data output, the P-900 also monitors several system parameters in order to assure a reliable measurement. Sample inlet temperature, bath temperature, and bath oil level are all continuously monitored to assure system reliability. An optional customizable sample conditioining system can be added to handle samples of extreme temperatures and/or heavy particulates.



APPLICATION

Given today's highly competitive environment, oil refiners are demanding instrumentation that aids in the optimization of the refining process. Therefore, refineries require a reliable and accurate viscosity analysis system to meet the required specifications. This analysis will allow the operators to optimize the refining process and therefore lower production costs while improving product quality.



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PRODUCT GUIDE

Petroleum Analyzers
- **Flash Point**
- **Salt In Crude**
- **RVP**
- **RVP/VL20**
- **Freeze Point**
- **Cloud Point**
- **Pour Point**
- **Viscosity**

Water Analyzers
- **UV-COD**
- **UV-Oil in Water**

Other Products
- **Environmental Cabinets**
- **Sample Conditioning Systems**
- **Sample Recovery Systems**
- **Spare Parts**

Analyzer Services
- **Field Service**
- **Start-Ups**
- **Training**
- **Technical Support**

CE Ex

SPECIFICATIONS: **P-900 VISCOSITY ANALYZER**

ANALYSIS PERFORMANCE	
Measurement Cycle Time	Continuous
Measurement Range	2-4000 cP, Customizable Based on Capillary Specification
Repeatability	± 1% Full Scale
Reproducibility	Meets or exceeds ASTM Method D-445
Accuracy	Meets or exceeds ASTM Method D-445
Temperature Accuracy	± .2°F (0.1°C)
SAMPLE REQUIREMENTS	
Sample Flow Rate	Min. 2 gal/hr (125 mL/min)
Sample Return Pressure	Atmospheric – Max. 150 psi (10 bar)
Sample Pressure	Min. 20 psi (1.4 bar) – Max. 200 psi (14 bar)
Sample Temperature	± 100°F (38°C) of bath temperature set point
Sample Particulates	less than 10 μm - optional sample conditioning system available
Sample Conditions	homogenous, single-phase sample without free water
ENCLOSURE/INSTALLATION REQUIREMENTS	
Dimensions	40" (1016) Width – 40" (1016) Height – 20" (381) Depth
Weight	approximately 350lbs. (159kg)
Operating Temperature	Min. 40°F (5°C) – Max. 105°F (40°C)
Enclosure Material/Rating	stainless steel - NEMA 4X / IP65 / ATEX rated Ex-Proof Enclosures
Area Classification	NEC Class 1 Div 1 Group D or ATEX Zone1 II B + H2 T4
Power	100 to 125VAC or 200 to 240 VAC, 50/60 Hz, single phase, 20A
Cabinet Purge Gas Supply	Instrument grade air at Min. 40 psi (2.7 bar) – Max. 100 psi (6.8 bar)
Coolant/Steam Supply	0.5 gal/min (2 l/min) maximum at 10°F (6°C) below bath set point
END USER CONNECTIONS	
Analog Output Signal	single isolated 4-20 mA output (optional second output available), selectable for sample Viscosity values, analyzer system/maintenance warning or analysis measurement indication
Relay Output Contact	three SPDT Relays with contacts rated at 3A resistive load at 250VAC ,selectable for sample Viscosity value alarm, analyzer maintenance warning or analyzer fault alarm
Serial Input/Output Signal	single RS232 or RS485 bi-directional / optional ModBus output available

HOW TO ORDER

ANALYZER SYSTEMS	
Catalog Number P-900-1400	ORB Model P-900 Viscosity Analyzer, NEC Explosion Proof
Catalog Number P-900-1500	ORB Model P-900 Viscosity Analyzer, ATEX Explosion Proof
OPTIONS	
Catalog Number 700538	Standard Panel Mount Sample Conditioning System
ACCESSORIES	
Catalog Number 700478	1-Year Spare Parts Kit
Catalog Number 700479	2-Year Spare Parts Kit

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