ORB instruments, inc.

Model P-820LT Cloud Point Analyzer Low Temp

On-line Cloud Point Analyzer for continuous measurement of cloud point temperatures in hydrocarbons.

- Operating range -150°F to 77°F (-100°C to 25°C)
- Rapid analysis cycles of 8 minutes or less
- High pressure sample detection cell eliminates the need for atmospheric recovery
- Superior repeatability of less than 1°F (0.5°C)
- Increased reliability with operating uptime better than 99%

The Model P-820LT Cloud Point 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 Cloud Point measurement system that produces the process control signal required to perform today's optimized and cost-efficient petroleum refining operations.

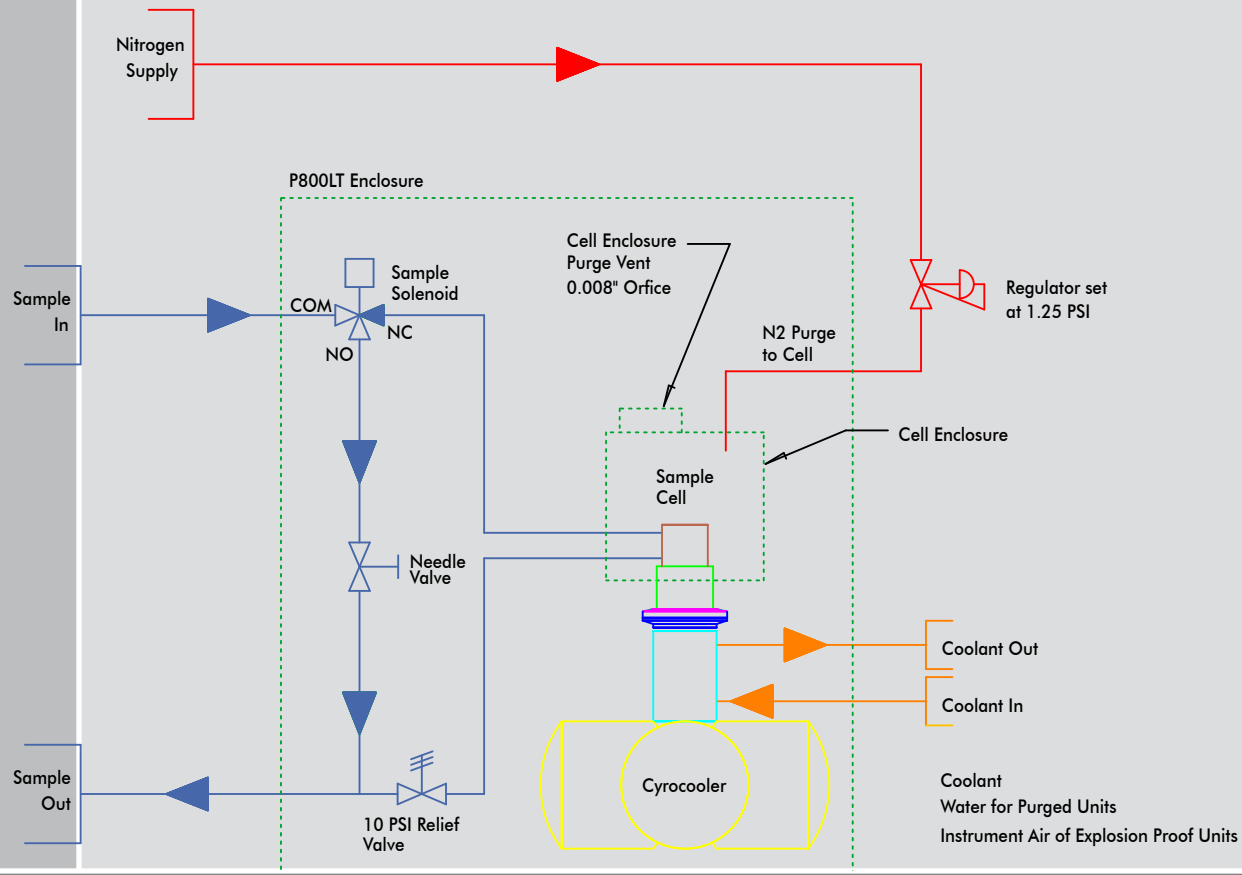
A self contained cyrogenic cooling compressor out performs traditional Peltier modules reaching colder temperatures and eliminating the need for an expensive external cooling system. This small cooling system allows captured samples to be cooled to -125°C. The high pressure sample cell optics allow sample extraction and return to process and pressure conditions, thererby eliminating the need for atmospheric recovery.

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 analysis system of the Cloud Point temperature 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.

OPERATING PRINCIPLE

The P-820LT measurement cycle is designed to correlate to ASTM Method D-2500 and IP-219. A near infrared fiber-optic sensing system has been employed to monitor the formation of wax crystals during the measuring cycle. The optical emitter and detectors monitor the state of the crystals through high-pressure optical windows that allow measurement cycles to occur at process pressures, eliminating the need for expensive sample recovery. A state of the art, Stirling Thermoacoustic (Pulse Tube) Cryocooler has been incorporated in the P-820LT. This cooler is a helium-based device that can cool at a capacity of 8 Watts at 77 °K. The cryocooler hot surface is cooled by either plant cooling water (purged unit) or by instrument air (explosion proof unit). The use of the cryocooler eliminates the requirement of an external explosion proof re-circulating chiller system. It also allows cooling to –125 °C, significantly colder than the –85 °C conventional Peltier cooled systems reach.

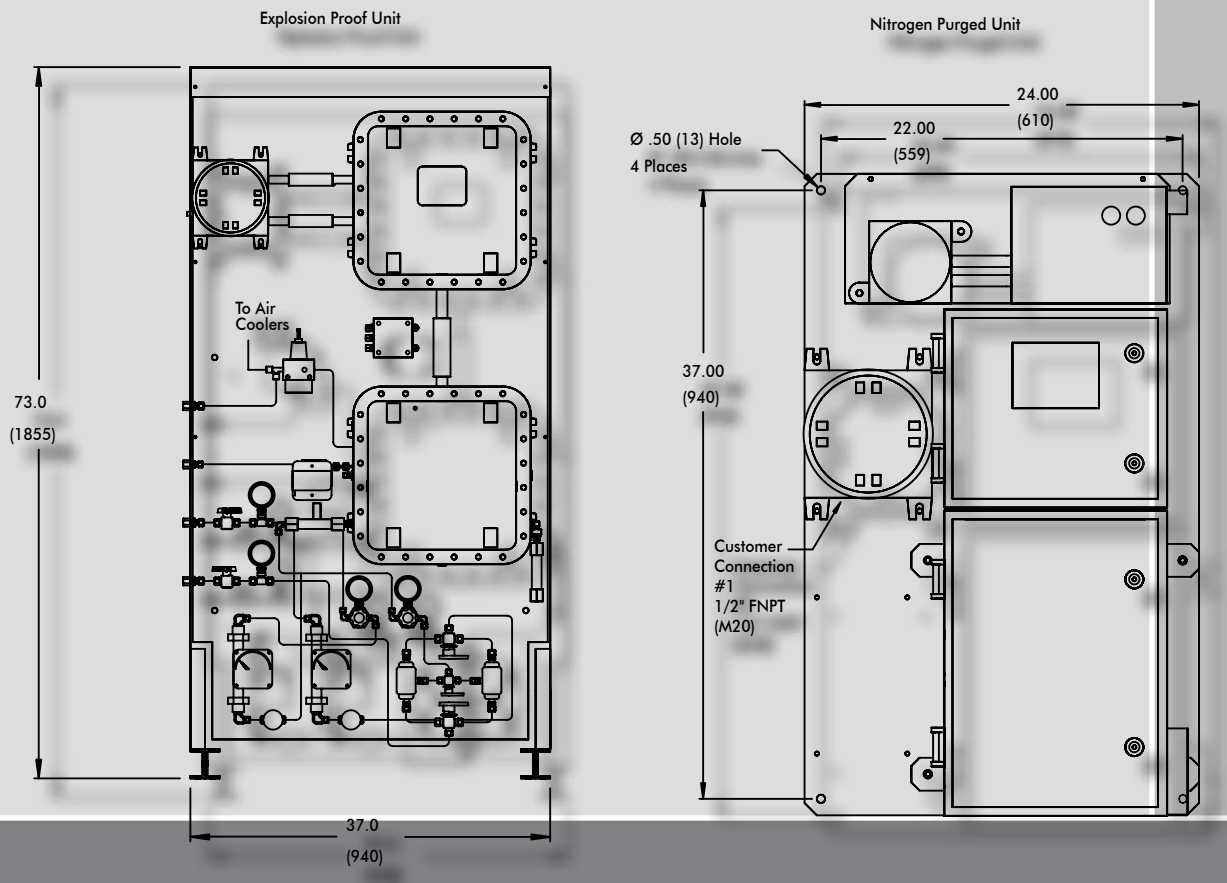


The P-820LT measurement cycle is initiated by a sample flush through the sample detection cell. This flush time is programmable and allows fresh sample to be placed in the detection cell for the next cycle. This flush also helps to warm and dislodge any remaining wax crystals that have adhered to detection cell windows.

Second, the sample solenoid is closed, capturing the sample. The cryocooler is then turned on to a programmed power level. This level is monitored each cycle and changed on the next cycle to maintain consistent cooling times to Cloud Point Detection. As the cooling cycle begins the temperature of the sample is monitored as well as the optical signal. The P820LT uses 0 and 90 degree optical sensors to improve accuracy and reduce errors due to entrained water or other contaminants. The cooling power is maintained until Cloud Point is determined, the temperature at which the wax crystals form.

The temperature at which this cloud point happens is recorded as the Cloud Point of the sample. At this point, the sample solenoid is turned on and the sample flush is initiated, starting the cycle over again.

DIMENSIONS inch (mm)



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PRODUCT GUIDE

Petroleum Analyzers
- **Flash Point**
- **Salt In Crude**
- **RVP**
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- **Freeze Point**
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Water Analyzers
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Other Products
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- **Sample Conditioning Systems**
- **Sample Recovery Systems**
- **Spare Parts**

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

CE Ex

SPECIFICATIONS: **P-820LT CLOUD POINT ANALYZER**

ANALYSIS PERFORMANCE	
Measurement Cycle Time	8 minutes or less
Measurement Range	Min. -150°F (-100°C) Max. +77°F (+25°C)
Repeatability	± 1°F (0.5°C)
Reproducibility	Meets or exceeds ASTM Method D-2500 or IP-219
Resolution	± 0.5 °F (0.25°C)
Accuracy	Meets or exceeds ASTM Method D-2500 or IP-219
Temperature Accuracy	± 1°F (0.5°C)
SAMPLE REQUIREMENTS	
Sample Flow Rate	Min. 1 L/min – Max. 2 L/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	Min. 35°F (2°C) – Max. 150°F (65°C)
Sample Particulates	less than 10 µm - optional sample conditioning system available
Sample Conditions	homogenous, single-phase sample without free water
ENCLOSURE/INSTALLATION REQUIREMENTS	
Dimensions	Width 24.0 in (610mm) – Height 39.0 in (991mm) – Depth 9.51 in (242mm)
Dimensions (Exd)	Width 37.0 in (940mm) – Height 73.7 in (1874mm) – Depth 30.0 in (762mm)
Weight	Purged Unit 150 lbs (68 kg)/ Exd Unit 500 lbs (228 kg)
Operating Temperature	Min. 40°F (5°C) – Max. 105°F (40°C)
Enclosure Material/Rating	stainless steel - NEMA 4X / IP65
Area Classification	NEC Class 1 Div 1 Group B, C + D or ATEX Zone1 II B + H2 T4
Power	self-selecting 100 to 125VAC & 200 to 240 VAC, 50/60 Hz, single phase, 10A
Cabinet Purge Gas Supply	Clean, dry Nitrogen or other inert gas (better than 98% pure) at Min. 80 psi (5.5 bar) – Max. 100 psi (6.8 bar) expected leakage compensation 1l/min
Purge System Air Logic Supply	Instrument grade air at Min. 40 psi (2.7 bar) – Max. 100 psi (6.8 bar)
END USER CONNECTIONS	
Analog Output Signal	single isolated 4-20 mA output (optional second output available), selectable for sample Cloud Point 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 Cloud Point 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-820LT-1100	ORB Model P-820LT Cloud Point Analyzer, Ex Area ready for NEC Class 1 Div 1 Group C+D
Catalog Number P-820LT-1200	ORB Model P-820LT Cloud Point Analyzer, Ex Area ready for ATEX Zone1 II B + H2 T4
Catalog Number P-820LT-1400	ORB Model P-820LT Cloud Point Analyzer, NEC Class 1 Div 1 Group B, C+D
OPTIONS	
Catalog Number 700474	Validation/Grab Sample System, Macro Flow
Catalog Number 700475	Dual-Stream Sampling System, Macro Flow
ACCESSORIES	
Catalog Number 700174-P820	Free-standing Mounting Rack
Catalog Number 700506	1-Year Spare Parts Kit
Catalog Number 700507	2-Year Spare Parts Kit

Lit. No. P-820LT-EN-US / JAN10

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