



Model P-800LT Freeze Point Analyzer Low Temp



On-line Freeze Point Analyzer for the continuous measurement of freeze point temperatures in petroleum products.

- ▶ Operating range -150°F to +77°F (-100°C to +25°C)
- ▶ Rapid analysis cycle 10 minutes or less
- ▶ Superior repeatability of less than 1°F (0.5°C)
- ▶ Internal Cryo chiller cools to -125°C without external cooling system
- ▶ Increased reliability with operating uptime better than 99%
- ▶ High pressure sample detection cell eliminates the need for atmospheric recovery

The Model P-800LT Freeze 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 Freeze Point measurement system that produces the process control signal required to perform today's optimized and cost-efficient petroleum refining operations.

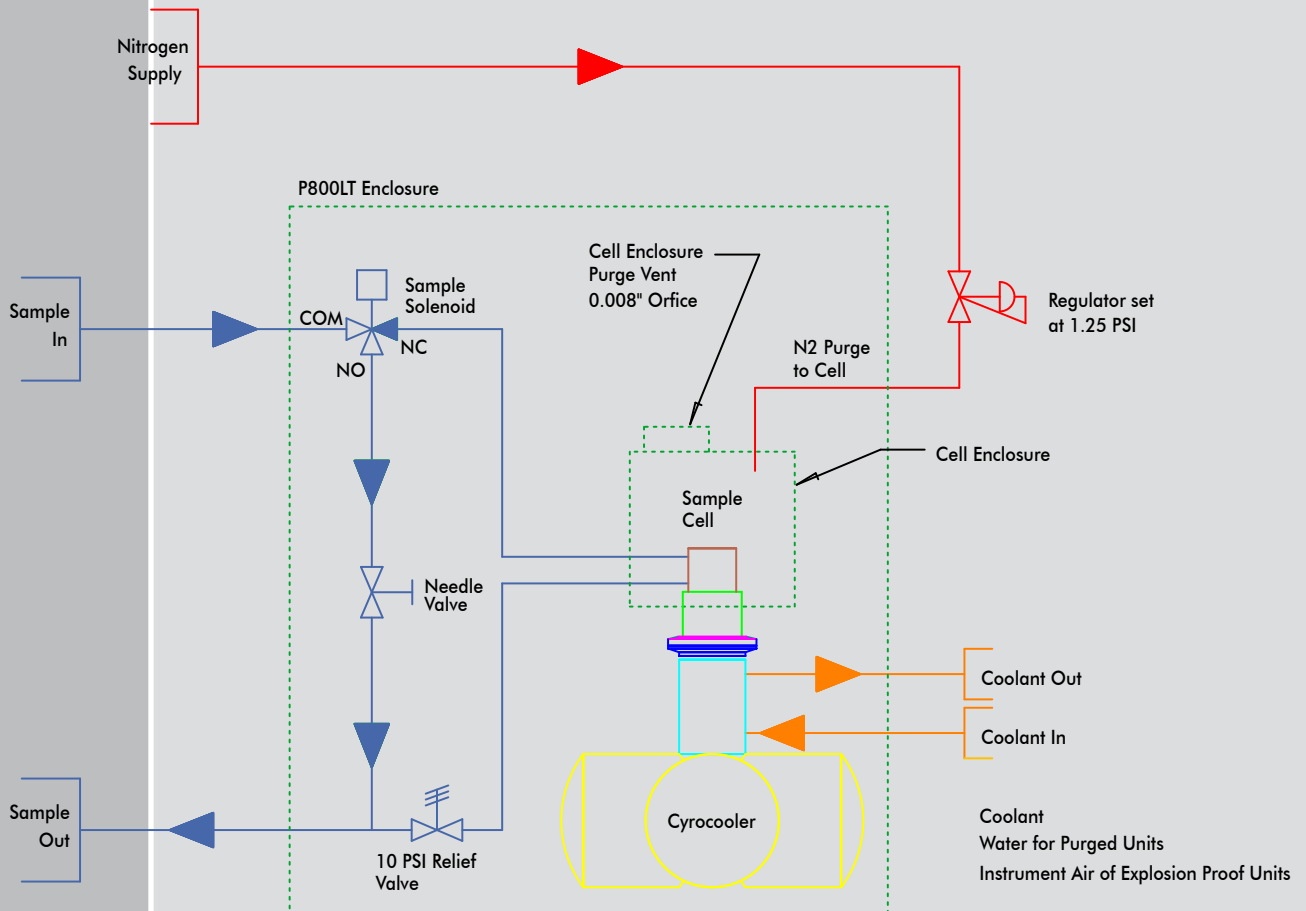
A self contained cryogenic cooling compressor out performs traditional Peltier modules reaching colder temperatures and eliminating the need for an expensive external cooling system. This small cooling system allows captured samples to be cooled to -125°C. The high pressure sample cell optics allow sample extraction and return to process and pressure conditions, thereby 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 Freeze 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-800LT measurement cycle is designed to correlate to ASTM Method D-2386 and IP-16. A near infrared fiber-optic sensing system has been employed to monitor the formation and removal of the 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-800LT. 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



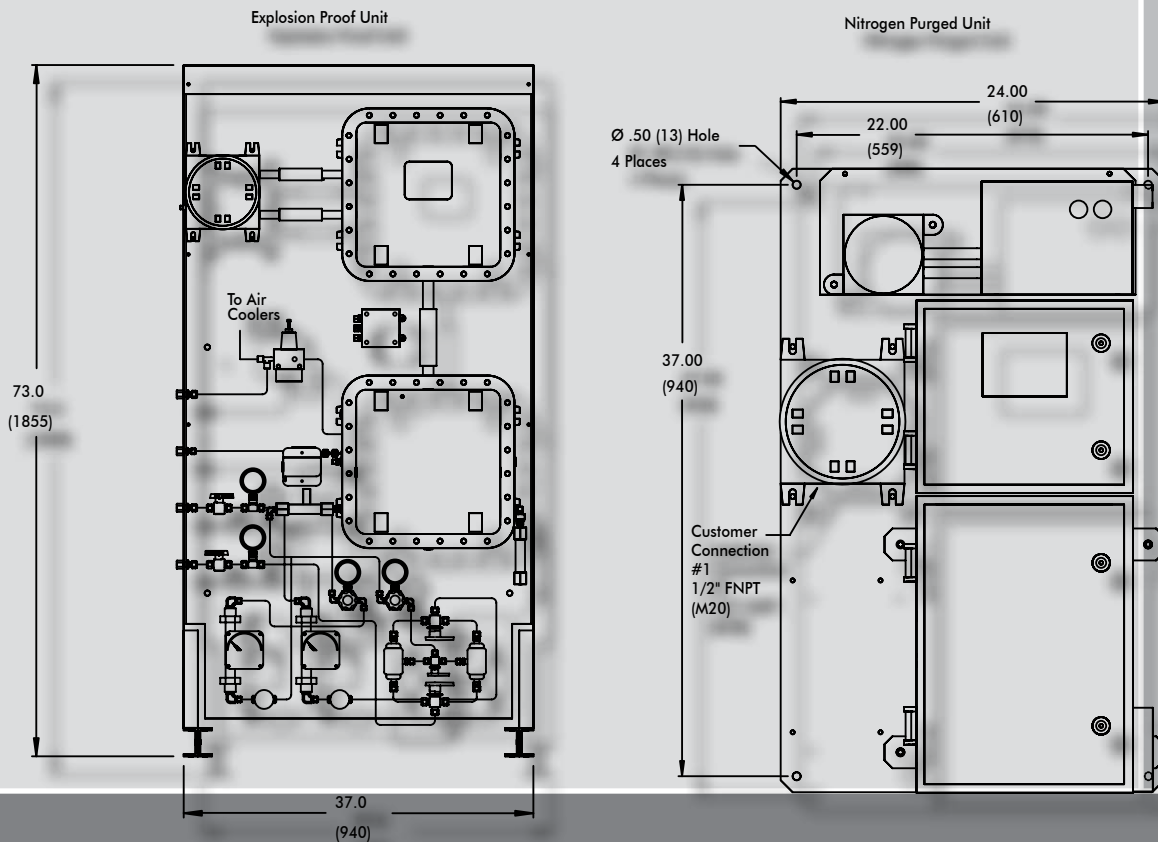
the cryocooler eliminates the requirement of an external explosion proof re-circulating chiller system. It also allows cooling to $-125\text{ }^{\circ}\text{C}$, significantly colder than the $-85\text{ }^{\circ}\text{C}$ conventional Peltier cooled systems reach.

The P-800LT 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 P800LT 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.

Third, with the cryocooler power off, the low power heating is applied to the detection cell, allowing the sample to warm. As this warming occurs the wax crystals start to disappear. The temperature at which the last of the crystals disappears is recorded as the Freeze 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)





PRODUCT GUIDE

Petroleum Analyzers

- Flash Point
- Salt In Crude
- RVP
- RVP/VL20
- Freeze Point
- Cloud Point
- Pour Point
- Viscosity
- Viscosity Index

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



SPECIFICATIONS: P-800LT FREEZE POINT ANALYZER

ANALYSIS PERFORMANCE	
Measurement Cycle Time	less than 10 minutes
Measurement Range	Min. -148°F (-100°C) Max. +77°F (+25°C)
Repeatability	± 1°F (0.5°C)
Reproducibility	Meets or exceeds ASTM D-2386 or IP16 requirements
Resolution	± 0.5 °F (0.25°C)
Accuracy	Meets or exceeds ASTM Method D-2386 or IP-16
Temperature Accuracy	± 1°F (0.5°C)
SAMPLE REQUIREMENTS	
Sample Bypass 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 (Purged)	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 120VAC or 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. 40 psi (2.7 bar) – Max. 100 psi (6.8 bar) / expected leakage compensation 1 l/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 Freeze 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 Freeze 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-800LT-1100	ORB Model P-800LT Freeze Point Analyzer, Ex Area ready for NEC Class 1 Div 1 Group C,D
Catalog Number P-800LT-1200	ORB Model P-800LT Freeze Point Analyzer, Ex Area ready for ATEX Zone1 II B + H2 T4
Catalog Number P-800LT-1400	ORB Model P-800LT Freeze 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-P800LT	Free-standing Mounting Rack
Catalog Number 700506	1-Year Spare Parts Kit
Catalog Number 700507	2-Year Spare Parts Kit

Lit. No. P-800LT-EN-US / JAN10

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