Applied Instrument Technologies
by Schneider Electric

PIONIR® 1024X™

Near Infrared Refinery Analyzer

*Welcome to the Next Generation of process Near Infrared analyzers. The **PIONIR®1024X™** analyzer leverages technology developed for the PIONIR 1024 which was described by one major refiner as "the most reliable analyzer in the refinery." Enhanced by the new **SpectraSuite™** software package you can now work at the system via a Windows® based embedded touch screen processor. Utilizing AIT's new flagship operating platform **SpectraRTS,™** the innovative PIONIR 1024X system is capable of easy to use tools for sample system control, modeling and DCS communications. The 15" monitor provides you with easy access to our new user-friendly HMI.*

"Seven of ten of the worlds leading refineries use AIT products"

PIONIR 1024X

Upgrade to the *1024X* Platform

For heritage users, our engineers have designed an upgrade path to bring your existing on-line system into a state-of-the-art configuration. We can upgrade your current system in the field.

The upgrade kit features our new embedded electronics with SpectraSuite software that will allow you to extend the life of your PIONIR 1024 system.

You can use your existing models or develop new models with our SpectraQuant modeling software. It's your choice. The kit comes with SpectraRTS software.

PIONIR APPLICATIONS

Gasoline Properties	Diesel Properties	Component Streams
RON, MON	Cetane Number	FCC
Distillation Points	Cetane Index	Reformate
E200, E300	Density	Alkylate
RVP	Gravity	Isomerate
Aromatics, Benzene	Polycyclic Aromatics	MTBE
Olefins	E360	Straight Run Naptha
Oxygenates	Aromatics	Pentanes
Gravity	Kinematic Viscosity	Raffinate
V/L Ratio*	Distillation Points	Pyrolysis Gasoline
Drivability Index	Flash point	Heavy Aromatic

*Vapor to Liquid Ratio For specific property performance, AIT requires submittal of a User Specification Foreordaining process composition and conditions.

Superior Technology, Superior Implementation

Sample Conditioning Systems

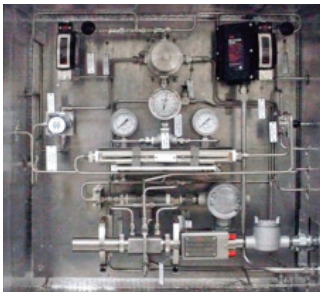
AIT has the expertise to design your extractive sampling system. Our turn-key system achieves optimum performance giving your analyzer consistently accurate and reliable measurements. Experience you can count on!

Our offerings include including:

- *Analyzer loop-thermal enclosure with temperature conditioning.*
- *Fast loop conditioning panel.*
- *Automated sample collection.*
- *Automated ASTM validation and wash system.*

Additional customized systems that can be provided:

- *Sample recovery system.*
- *Fast loop pumping system.*



Analyzer loop thermal enclosure with fast loop conditioning panel

Fast loop panel installation

Grating & Diode Array Assembly

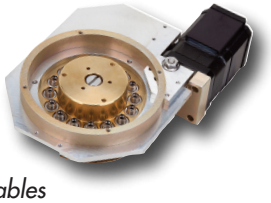
The optical bench, heart of the PIONIR system, utilizes a fixed holographic grating and a 1024 element silicon diode array assembly. Mounted in an Invar™ fixture, the entire assembly is designed to eliminate the effects of thermal variation. The result is stable and reliable measurements month after month, year after year.

Dual Beam Slip-Stream Probe

Innovative dual beam, self-referencing probe design eliminates instrument variations resulting from the source, fiber optics, or any other component by taking a new background scan with each sample scan.

- *10cm pathlength minimizes variations from window fouling*
- *Rugged design withstands temperatures & pressures up to 80°C & 3450 KPa (176°F & 500 psi)*
- *Can be located up to 1km from the analyzer*

Multi-Channel Fiber Optic Multiplexer



- *8-channel rotary multiplexer; expandable to 15-channel*
- *Allows interfacing of multiple probes to the analyzer*
- *Precision alignment for use with 200 micron fiber optics*
- *Compatible with Kevlar® jacketed industrial fiber optic cables*

ASTM Compliant Analytical Systems

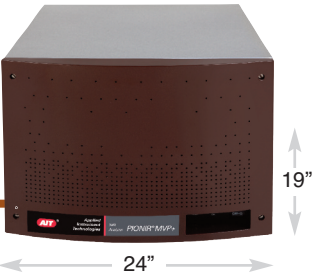
- *ASTM D6122: Standard practice for validation of the performance of multivariate process infrared spectrometers*
- *ASTM E1655: Standard practices for infrared multivariate for quantitive analysis*

Validation Skid

Getting Started with the PIONIR MVP+ Laboratory Analyzer

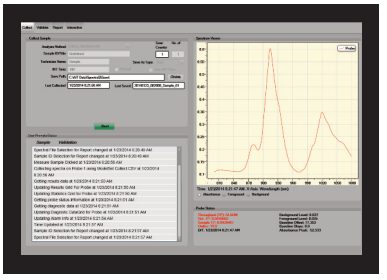
*The **PIONIR MVP+**™ laboratory analyzer is the companion to the PIONIR 1024X on-line analyzer. SpectraQ software allows for easy collection of calibration spectra and performing routine analysis. Calibrations developed in the lab on the PIONIR MVP+ analyzer can then be seamlessly transfered to the on-line PIONIR 1024X system to provide real-time analysis.*

PIONIR MVP+



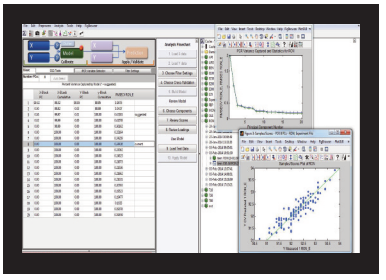
AVI™ Absolute Virtual Instrument

- *Proprietary, patented instrument standardization protocol*
- *Assures that any one PIONIR is analyzer optically identical to any other PIONIR analyzer*
- *Provides seamless calibration transferability between PIONIR analyzer systems*
- *Reduce maintenance downtime – no need for calibration updates during component changes*

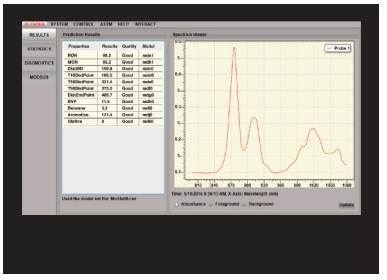


SpectraSuite™ Power Drives the Process

***SpectraQ**™ enables the effective use of the PIONIR MVP+ for laboratory analysis and instrument validation. Collect calibration spectra and perform routine quantitative analysis on samples. It is unique in the fact that it's designed to integrate seamlessly with AIT's **SpectraSuite**™ process spectroscopy software.*



***SpectraQuant**™ chemometric software is a dynamic Windows® based tool that utilizes Principal Component Analysis/Principal Component Regression (PCA/PCR). It consolidates today's best features for modeling complex multi-components.*



***SpectraRTS**™ delivers flexible set-up and control of your system, extensive diagnostics, easy-to-use scripting and robust DCS communications. Interactive communications allow model sets to be switched automatically when changing blend types thereby maximizing blended measurement efficency.*

Specifications

Spectrometer:

- Fixed holographic grating with photodiode array detector, features no moving parts

Operating Range:

- 800–1080 nm (third overtone)

Analysis Time:

- 30–90 seconds for multiple property predictions

Optical Fiber:

- Proprietary design and manufacture. 200 micron fiber diameter; low OH silica core inside environmentally jacketed cable

Spectral Performance:

- Spectral Resolution: 3.3 nm over full range, Absolute Virtual Instrument standard
- Dynamic Range: 25,000:1 at 850 nm (15 second measurement)
- Wavelength Repeatability: ± 0.004 nm scan to scan
- Wavelength Accuracy: ± 0.01 nm long term (AVI Corrected)

Sample Probe (Slip Stream):

- Fiber optically coupled to analyzer
- Modular design for easy maintenance
- Self-referencing design features dual sample and reference paths for background correction
- 1/8 inch NPT (female) threaded ports–2 input, 2 output
- Silica window material, 316 stainless steel sample cell body
- Pressure rating to 3450 KPa (500 psi)
- Sample flow: 200 to 800 mL per minute
- Temperature rating to 80°C (176°F)

Process Control Interface:

- Control: 4 digital AC inputs and 4 outputs standard, up to 16 total AC inputs or outputs (optional)
- Optional 4–20 mA analog output to interface to process control computer with external accessory
- Optional OPC or Modbus™ interface allows bi-directional information exchange between the PIONIR and the process control computer
- Sensor input: Two 4–20 mA analog inputs standard

Area Classification:

- PIONIR 1024X: General Purpose - Non Hazardous
- PIONIR 1024X: Z-Purge – NEC Class I, Div 2
  – ATEX Zone 2
  X-Purge – NEC Class I, Div 1
  – ATEX/IECEx Zone 1
  – GOST P51330/Metrology/ Pattern Approval

Environmental Conditions:

- PIONIR 1024X: -40°C to 50°C (-40°F to 122°F)
  – Humidity: 0 to 100%

Utility Requirements:

- Electrical Power:
  PIONIR1024X/P: 110/120 Vac, 50/60 Hz
  220/240 Vac, 50/60 Hz
- Cooling Water:
  PIONIR1024X/P: Water cooled systems only
  – Pressure: 2.5 kg cm^2 (155 psi) minimum differential across inlet outlet
  – Flow: Up to 1.9 Liters/minute (0.5 gal/min)
  – Temperature: 32°C (90°F) Maximum
  – Particulates: 500 micron Maximum
  – Connections: 3/8 inch NPT Male (Flow and Return)
- Instrument Air:
  PIONIR1024X/P: Purged systems only
  – Pressure: 3.5 kg cm^2 (50 psi) at stated flow
  – Flow: 450 Liters/minute (16 cfm) Rapid Exchange
  150 Liters/minute (5.3 cfm) Running
  – Contaminants: Free from oils, mists and water
  – Connections: 1/2 inch Swagelok Tube connector

Instrument Dimensions:

- PIONIR1024X:
  – 107x99x43 cm (42x39x17 inches)–Without shipping stand
  – 173x109x74 cm (68x43x29 inches)–With shipping stand
  – Weight: 204 kg (450 lb)–Uncrated

AIT Customers Include

Abu Dhabi Nat'l Oil Refining, Takreer
BP Australia
BP North America
Texas City
Whiting
Chennai Petroleum (CPCL)
CHS Refining
Citgo
Lake Charles
Corpus Christi
Phillips 66-
Bayway Refinery
LA Refinery
Wood River
Big West Oil, LLC
Gazpromneft
Hindustan Petroleum (HPCL)
Indian Oil (IOCL)
LyondellBasell-
Houston Refining
PBF Energy-
Toledo Refining
PDVSA Refineria Isla
ROMPETROL
Oman Oil Refineries, Sohar
Statoil
Tesoro
Carson Refinery

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