

Fully Integrated Process FT-NIR Analyzer for Gasoline and Gasoil Final Product Blend Optimization



FTPA2000-460 Series Process Analyzer for Hydrocarbon Finished Product Blending Applications

Includes:

- Process FTIR FTPA 2000-460 Series single cell analyzer, Computer with FTSW100 software, touch screen, hazardous area approval, temperature controlled FTIR analyzer sample system, connection to DCS via MODBUS or OPC.
- Single stream gasoline or gasoil fast loop sample system and wash/reference and validation fluid system.
- Manual sample injection facility.
- Includes Starter Models for RON, MON, %Aromatics and %Benzene (Finished Product Gasoline)
- Turn-key Calibration and Modeling services on request at extra cost
- Requires startup plan sold separately
- Additional application and project support, training and performance audit services available on request
- Performance in accordance with or better than ASTM values for repeatability and reproducibility

FTPA2000-460 Process FTIR Analyzer for Hydrocarbon Streams.

NIR optics covering the 3800 cm⁻¹ to 12,000 cm⁻¹ range, Single cell, Single Fluid Switching Kit.

Includes:

- Fully integrated NEMA 3 (IP54) ATEX Category II 2 G (EEx p d [ib] ib IIB+H2 T4) or Class 1 Division 2 CSA(C,US) , hazardous area classification. 120/240 VAC 50-60Hz.
 - i) Electronic Enclosure compartment with CANBus I/O, Ethernet Communications, Temperature Controller for Sample Cell cabinet, System Alarms:
 - ii) Spectrometer Compartment with Temperature controlled Fourier Transform Spectrometer, Data processor includes FTSW100 Software pre-configured, local data storage. GRAMS/LT (for spectra visualization). DCS communication through MODBUS, OPC.
 - iii) Sample Cell Compartment:
 - Temperature controlled at 25°C.
 - Process/wash fluids inputs, additional Protofuel input available as option.
 - Fluid switching panel has low flow sense switches for detecting low sample flows.
 - iv) Custom documentation and system drawings.
- Installation and start-up sold separately.
 - Analyzer Custom Documentation and drawings.
- Basic system alarms are:
 - Analyzer (Hardware)
 - Maintenance (Reference failure)
 - Alarm (Properties, Chemometric results)
 - Warning (Properties, Low flow, Chemometric diagnostic)
 - Off-Line

Industrial grade FT-NIR spectrometer with BK7 optics for near IR operation

Spectral range from 14,000 to 3800 cm^{-1}

Resolution variable from 1 to 64 cm^{-1} , in steps of 2 \times

Best resolution 0.7 cm^{-1} (unapodized)

Wavenumber reproducibility $\pm 0.04 \text{ cm}^{-1}$ (based on water vapor line at 7299.86 cm^{-1})

Wavenumber repeatability $\pm 0.001 \text{ cm}^{-1}$

Peak signal-to-RMS-noise ratio typically 30,000:1 for open beam, 1-min scan time, 4 cm^{-1} resolution

Less than 15 micro absorbance at 32 cm^{-1} resolution and 10 seconds scan time

Scan times at 4 cm^{-1} resolution: 3 s with DTGS, 1.2 s with fast detectors

100% line repeatability $\pm 0.3\%$ for open beam, 9000 to 4100 cm^{-1} , 2 consecutive measurements in constant-temperature environment after warm-up

Temperature coefficient of change in 100% line is 1% per $^{\circ}\text{C}$ at 10,000 cm^{-1}

Maximum beam divergence: 90 milliradians

FTSW100 Industrial Process software with the following features:

The new FTSW100 Software Suite allows full integration of any ABB FTIR/FTNIR analyzer into your environment. It enables real time process monitoring for closed-loop control and quality assurance applications.

- Support of CANOpen I/O: Local bus for distributed I/O. Used for controlling sampling system, getting inputs from other sensors and sending results to control system.
- Includes PCAnyWhere remote access software.

Features and benefits:

- Complete solution for 24/7 continuous unattended operation.
- Validated software for pharmaceutical and other demanding industries.
- Integrated support for FTIR acquisition and control.
- Compliant with 21 CFR Part 11 environments.
- Built-in data management and archiving.
- Connectivity to PLC- and DCS-based control systems.
- Support for sample conditioning using local sensors and transducers eliminating the need for additional PLCs or DCS programming.

Easy and flexible configuration:

- Visual configuration explorer allows complete setup without programming.
- Schedule multiple sample preparation and analysis cycles on a time basis or on external events.
- Table-based setup of I/Os for result transmission.
- Easily setup links to external sensors and transducers.
- Configuration information stored in SQL database with built-in version management and complete log of all changes.

Operator console:

- Provides graphical trend chart and table of latest analysis values in real time.
- Shows the status of all the analysis cycles.
- Shows the status of all I/O points and alarms in the system.
- Historical data browser for event log, spectra, spectral diagnostics and results.

I/O Format:

- CANOpen I/O's for sampling system control.
- Standard communication is done through serial MODBUS for property and analyzer status communication to plant DCS. If MODBUS not used, see Option section for 4-20 mA AO and DO I/O's.
- Analyzer default digital status flags are: Outlier (per property and/or per stream), Maintenance (Reference failed), Fault (Hardware failure: loss of connection), Off-Line, Data invalid (per stream).
- Proprietary Ethernet card for communication between PC and spectrometer (remote computer supplied separately). Comes with FTSW100 Industrial Process software pre-configured at ABB with the following features:
 - Standard Ethernet networking.
 - MODBUS
 - VistaNET 2
 - CANOpen I/O: Local bus for distributed I/O. Used for controlling sampling system, getting inputs from other sensors and sending results to control system.

Hardwired

- Digital input (typically volt free contact)
- Digital output (typically dry contact relay)
- Analog input and output (typically 4-20 mA)

Modbus

- RS232 serial link (RS422/485 optional)
- Modbus register address pattern: RTU protocol/ Slave
- Baud rate: default 19,200 baud (configurable from 110 to 115,200 baud)

OPC

- Ethernet link
- Based on Microsoft's COM technology

Remote Access for Maintenance, Diagnostics, Configuration and Calibration Update

- PC Anywhere
- Connection by Dial-Up Modem or Ethernet LAN

Sample System Requirements

Wash and reference system

- Wash fluid system (Pentane and Toluene): 3-cylinders (10 L/cylinder) for wash/reference and validation fluids, flexible hose connectors, pressure relief valves, mounted into a stainless steel cabinet. Include optional cabinet insulation.

Fast loop sample conditioning system cabinet

- One stainless steel (304), wall mounted cabinet 48 in. H x 36 in. W x 12 in. D (122 cm x 91 cm x 30 cm). Cabinet is Nema 4X rated.
- One-sample process input
- One-swirl clean, fast loop and filters. 0.2 μ m filter elements
- Back-pressure regulation, flow-meter
- Auto grab sample for collection of reference samples for calibration modeling and laboratory analysis

Note:

Sampling system automated valves are pneumatically actuated via 1/8 in. (3.1 mm) tubing, between Analyzer pneumatic solenoid valves and sampling system.

Sample Stream Requirements:

- Fast-loop flow rate: 3.8 to 7.6 L/min
- Sample temperature at fast loop 25 \pm 15°C
- Minimum pressure differential between input and output of sample handling system: 40 psig

Calibration:

Analysers calibrations can be selected from the following list

GAS-RON-MON	Blended Gasoline	Basic Pre-Calibrated Application for RON, MON
GAS-BASIC	Blended Gasoline	Basic Pre-Calibrated Application for RON, MON, %Aromatics, %Benzene
GAS-FPB-6	Blended Gasoline	Custom Calibration for RON, MON, %Aromatics, %Benzene, %Olefins, RVP, ASTM D86 Distillation, E70, E180 (up to max 6 properties) For ONE Finished Gasoline GRADE. Add multiples for additional Grades.
GAS-FPB-ADDMULTIGRADE	Blended Gasoline	ADDER per Grade for a Multigrade Blended Gasoline Application
GAS-FPB-ADD	Blended Gasoline	ADDER for one additional Property to Blended Gasoline Custom Calibration
GAS-GBC-6	Gasoline Blending Component	Custom Calibration for RON, MON, %Aromatics, %Benzene, %Olefins, RVP, ASTM D86 Distillation, E70, E180 (up to max 6 properties)
GAS-GBC-ADD	Gasoline Blending Component	ADDER for one additional Property to Gasoline Blending Component Custom Calibration
DSL-FPB-6	Blended Gasoil	Custom Calibration for Cetane Index, Cetane Number (clear), Cloud Point, Flash Point, %Aromatics, Viscosity, ASTM D86 Distillation, E360, E370 (up to max 6 properties) For ONE Finished Gasoil GRADE. Add multiples for additional Grades.
DSL-FPB-ADDMULTIGRADE	Blended Gasoil	ADDER per Grade for a Multigrade Blended Gasoil Application
DSL-FPB-ADD	Blended Gasoil	ADDER for one additional Property to Blended Gasoil Custom Calibration
DSL-GBC-6	Gasoil Blending Component	Custom Calibration for Cetane Index, Cetane Number (clear), Cloud Point, Flash Point, %Aromatics, Viscosity, ASTM D86 Distillation, E360, E370 (up to max 6 properties)
DSL-GBC-ADD	Gasoil Blending Component	ADDER for one additional Property to Blended Gasoil Custom Calibration
REF-RON	Reformate Product	Pre-calibrated RON 87 - 103
REF-ADD	Reformate Product	ADDER for one of RON extension to 105, MON, %Benzene, %Aromatics
REF-FEED-9	Reformer Feed (Naphtha)	P%, I%, N%, A%, ASTM D86 Distillation (up to max 6 properties)



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