

Field-mountable Process FT-NIR Analyzer for Gasoline and Gasoil Final Product Blend Optimization



FTIR Field Mountable Process Analyzer for Hydrocarbon Finished Product Blending Applications

Includes:

- Process FTIR FTPA2000-360, integrated cabinet designed for field or basic shelter mounting, temperature controlled FTIR analyzer sample system, connection to DCS via MODBUS or OPC. Remote connection to Computer in Safe Area via Ethernet.
- 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
- Hazardous area approval to C1D2 (ATEX available as an option)
- 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

FTPA2000-360 Field-Mountable 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 Refinery Hydrocarbon Analyzer includes the following:
 - FTPA2000-360 FT-IR Spectrometer, industrial FT-IR for NIR (BK7 optics) with Quartz Halogen source (range: 3800 - 14,000 cm⁻¹), Single DTGS detector. Comes with Ethernet connection.
 - Single Sample Cell 0.5 mm Fused Silica
 - Purged Insulated Cabinet (IP 65). Suitable for Class 1 Division 2, T3 temperature rating, for hazardous area operation.
 - Electrical Equipment used is suitable for NEC Class 1 Division 2, Hazardous Area electrical classification.
 - Cabinet / cell temperature electrically controlled at 25°C with Hazardous Area certified heaters.
 - Connected to a general purpose remote temperature controller.
 - For outdoor mount ambient 5-40°C.
 - Needs weather protection (such as a three sided shelter, supplied by others).
 - The dual compartment cabinet arrangement is:
 - i) Spectrometer and Vortex temperature controlled compartment.
 - ii) Sample cell (oven compartment), controlled at 25°C.
 - Remote PC, I/O's (see options).

- Cabinet Class 1 Division 2 certification included (Option available for ATEX certification).
- Alarming contacts for purge status provided
- Internal Sample/Fluid Switching panel supplied and integrated into Analyzer Sample Cell Cabinet
- Requires instrument Air supply 80-100 psig / 30 scfm

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.

Basic CANBus I/O modules:

- One (1) 750-337: Fieldbus Coupler for CANopen, digital and analog signals.
- One (1) 750-600: CANbus termination end module.
- One (1) CAN-AC1: CANopen PCI board. To be installed in computer for CANbus communication with I/O's.
- One (1) 787-912: CANopen Fieldbus Power Supply 24 VDC DIN rail, Universal VAC Input, Output 24 VDC, 2 A.
- One (1) SVL4200G: CANopen cable 10 ft. to connect PC to I/O module.

Control modules:

- One (1) 750-402: 4 Channel input module, 15-24 VDC, 3.0 ms (e.g.: Low sample flow, on-line/off-line, Enable/Disable Stream, etc.)
- Four (4) 750-513: 2-channel digital relay output module (NO dry contact, 30 VDC, 250 VAC, 2 A) for: (e.g.: System Alarm, System Warning, System Fault, Off-line/On-Line, SSO control, etc.)

Notes:

- Does not include 4-20 mA outputs for property outputs.
- Additional line items for additional modules should be part of the quote to complete the I/O Package.
- Pre-mounted onto a DIN rail.

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
- RS232 / RS485 Conversion Pack, requires external power supply. For use with serial MODBUS communication, when distance between the computer serial interface and the

DCS is greater than 30 meters. Increase the Range of RS-232 Data Signals Up to 4000 feet. DIN rail mount.

- Fiber-Optic Ethernet Hub Converter for distances >100 meters. Does not include communication fiber-optic cables.

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 µm 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 ±15°C
- Minimum pressure differential between input and output of sample handling system: 40 psig

Calibration:

Analyser 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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Spec_FTLA2000-360 B4249 2005-04

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