

Fiber-optic Multichannel Process FT-NIR Analyzer Platform for Hydrocarbon and Petrochemical Applications

Standard Configuration for Safe-Area (pricing for Hazardous Area enclosure and Certification of Analyzer available as Option)

The FTPA2000-HP260 includes:

- Process FT-IR FTPA2000-HP260, with integrated air-conditioned rack-mount cabinet designed for safe area mounting. Connection to DCS via MODBUS or OPC. Rack-mount controller with FTSW100 software
- Requires remote fiber-optic temperature controlled sample cell enclosure, or in-line transmission probes. See price list for selection
- Requires fast loop sample system. See price list for selection
- Requires Wash/reference fluid system. See price list for selection
- Requires pair FCP300 f/optic cables, for use in 1st / 2nd Overtone / 2nd Combination region, 5500-9500 cm^{-1} . See price list for selection
- Requires selection of appropriate InGaAs detectors for application and number of channels. See price list for selection
- Turn-key Calibration and Modelling on request at extra cost.
- Requires startup plan sold separately
- Additional application and project support, training and performance audit services available on request
- Hazardous area packaging options available as NEC/CSA Class 1 Division 2 or ATEX Category II 2G (EEx pem [ib] IIC T4, for hazardous area operation

FTPA2000-HP260 Fiber-Optic Process FT-IR Analyzer for Hydrocarbon Streams

NIR optics covering the 3800 cm^{-1} to 12,000 cm^{-1} range, 8 output channels

Includes:

- FT-IR Multichannel Process Spectrometer covering the 12,000 cm^{-1} to 3800 cm^{-1} range (BK7 optics) with 8 channels fiber optics output
- Ethernet connection
- FTSW100 software, remote access software
- Startup and Installation sold separately

Notes:

- To be installed into a temperature controlled and dry environment. General purpose classified area (hazardous area packaging available)
- Operating temperature range: 0°C to 40°C, stable within $\pm 5^\circ\text{C}$
- Humidity range: 5% to 95% non-condensing



- FTPA2000-260 Purge assembly, to be used with (SDG1000G) membrane dryer kit. Requires customer-supplied oil free, dry instrumentation air between 2 and 5 L/min
- Includes High Sensitivity Room-temperature InGaAs range 4800 to 11,000 cm^{-1} (2100 to 900 nm) with SMA connector for FTPA2000-200 series

Rack Mount Cabinet with IBM 1U 19 in. rack mount computer Includes:

- Keyboard slide
- Flat screen LCD color monitor
- Industrial 19 in. Rack cabinet, with Air Conditioning, 110/220 VAC version, Nema 12, 69 in.(1753 mm) tall X 24 in. (610 mm) wide X 32 in. (813 mm) deep
- For FTPA2000-200 Series Process FT-IR Spectrometer, RACKPC industrial computer and available space for one extra FTPA2000-200 Series Process FT-IR Spectrometer or one ACC129 and I/O's.
- Cabinet includes air conditioning with dust filter.
- For operations between 0-40°C (32°F-86°F)

Fibre-optic Multichannel Process FT-NIR Analyzer Platform

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

- Spectral range from 12,000 to 3800 cm^{-1} (operational range depends on choice of fibres and detectors)
- Resolution variable from 1 to 64 cm^{-1} , in steps of 2x
- 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
- Noise 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 FTSW100 Software Suite allows full integration of any ABB FT-IR/FT-NIR 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 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 FT-IR 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 controller and spectrometer (remote controller supplied separately). Comes with FTSW100 Industrial Process software pre-configured at ABB with the following features:
 - Standard Ethernet networking
 - MODBUS
 - 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 selected to complete the I/O Package if required
- 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

- RS422/485 serial link
- 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 and Local OPC Server support

Remote Access for Maintenance, Diagnostics, Configuration and Calibration Update

- Connection by 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

Example Fiber-Optic Sample Cell Cabinet Specification (not included in FTPA2000-HP260 platform package – see price list for selection)

One-stream Sampling Handling System for Sampling one process stream

Includes:

- Industrial (ACC115) Sampling cell: Fiber-Optic coupled transmission liquid cell. Fixed optical pathlength: 1, 2 or 5 mm optical path, 316 stainless steel body, seals, BK7 windows, Temperature sensor port, 90° parallel fiber-optic ports inputs
- Suitable for ATEX or Class 1 Division 2, T4 temperature rating, for hazardous area operation
- Continuously purged optical path
- Nema 4X insulated cabinet
- Electrical Equipment used is suitable for ATEX or NEC Class 1 Division 2, Hazardous Area electrical classification

- Cabinet/cell temperature electrically controlled at 25°C with Hazardous Area certified heaters. RTD sensor and transmitter installed into cabinet. - Connected to a general purpose remote temperature controller
- Sample low flow indication/measurement included

Notes:

- Requires sample input from filtered bypass fast loop sample system panel
- Nitrogen and wash fluids circuit for cell wash and referencing included with manual valves
- See I/Os in options for sampling handling system control
- Requires Inst Air at 80 psig / 25 SCFM for Vortex Cooling
- Requires nitrogen or dry Instrument Air (- 40°C dewpoint) for cell reference (non continuous flow)

Sample System Requirements (examples only, not included in FTPA2000-HP260 plat-form package – see price list for selection)

Wash and reference system

- Wash fluid system (Pentane and Toluene): 2-cylinders (10 L/cylinder) for wash/reference fluids, flexible hose connectors, pressure relief valves, mounted into a stainless steel cabinet. Includes cabinet insulation

Fast loop sample conditioning system panel

- One stainless steel (304), wall mounted panel
- One-sample process input
- One-swirl clean, fast loop and filters. 0.2 µm filter elements
- Back-pressure regulation, flow-meter
- Manual grab sample for collection of reference samples for calibration modeling and laboratory analysis

Sample Stream Requirements

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

Options:

- Additional sample cells / cabinets up to max 8 in total
- Alternative sample cell materials, Hastelloy, titanium etc
- Cabinet temperature control from 25 °C to 80°C available
- TE cooler assembly for TE cooled detectors
- TE InGaAs 1.7. 2.1 or 2.6 and TE InAs detectors available
- Additional sample conditioning and system integration options
- ATEX and NEC Class 1 Div 2 analyzer packaging options
- Remote maintenance and communications PC via Ethernet LAN
- Air conditioning or Vortex cooling for FTPA2000-260 enclosures
- Fibre-optic run lengths up to 300m (one way)

Contact us

ABB Analytical Measurement

585 Charest Blvd East, suite 300
Quebec, (Quebec) G1K 9H4
Canada
Phone: +1 418-877-2944
Email: ftir@ca.abb.com

www.abb.com/analytical

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