FTPA2000-HP360

Field Mountable Process FT-NIR Analyzer Platform for Hydrocarbon and Petrochemical Applications

FT-IR Field Mountable Process Analyzer Platform

The FTPA2000-HP360 Includes:

- Process FT-IR FTPA2000-HP360 analyzer, integrated cabinet designed for field or basic shelter mounting, temperature controlled FT-IR analyzer sample system, connection to DCS via MODBUS or OPC. Remote connection to controller in Safe Area via Ethernet
- Manual sample injection facility
- Turn-key Calibration and Modelling services on request at extra cost. See price list for selection
- Hazardous area approval to C1D2 or ATEX (specify with Purchase Order)
- Requires light hydrocarbons fast loop sample system and wash/reference fluid system. See price list for selection
- Requires startup plan sold separately
- Additional application and project support, training and performance audit services available on request

The FTPA2000-300 Series Process FT-IR Analyzers have the following features

- **Fully automatic operation:** All aspects of system operation, such as sampling system control, referencing, sample analysis, data communication, and data archiving, are controlled by ABB's FTSW100 Process Software
- **Certified for hazardous locations:** C1D2 and ATEX options are included for hazardous locations
- **NIR or MIR operation:** The FTPA2000-300 analyzers can be configured to operate in either the NIR (near-infrared) or the MIR (mid-infrared) spectral regions depending on the requirements of the application
- **Option for Two Analysis Channels (sample cells):** The FTPA2000-300 analyzers can monitor up to two separate process streams with independent cells. A separate extractive sampling system is required for the sampling point in each stream. More streams can be monitored by stream-switching
- **Transferable calibrations:** Calibrations models can be transferred without modification from one analyzer to another, or from Lab to Process analyzers without compromising performance. Calibrations can be performed by personnel trained to use advanced chemometric algorithms such as PLS. It can also be performed by ABB, ABB-qualified distributors, or by a qualified third party service company
- **Automatic Collect Function for grab sampling:** Pneumatic outputs are provided to control valves in the sampling system for grab sampling

- **Modular design for ease of maintenance:** Modules can be replaced as units to avoid servicing at the component level. All assemblies are prealigned
- **Digital data link:** The analyzer provides a digital data link to communicate the analysis results, alarms, and analyzer status to the plant DCS or PLC. The MODBUS industry-standard serial protocol is supported. An RS485 or RS422 converter is used for long distances
- **Local bus for distributed I/O:** This can be used for controlling sampling systems, sending analysis results to control systems and for controlling Human-Machine Interfaces. Both Digital (open/close) and analog (4-20 mA) I/O is provided using the CANbus (Controller Area Network bus) and the CANopen protocol
- **Ethernet and fiber-optic connectivity:** A Ethernet connection for linking the FTPA2000-300 analyzer to the Analyser controller and to the plant DCS. A fiber-optic Ethernet connection is optional

Field Mountable Process FT-NIR Analyzer Platform

FTPA2000-HP360 Field-Mountable Process FT-IR Analyzer for Hydrocarbon Streams

- Single Sample Cell 0.5 mm Fused Silica
- Option for Dual Cell version
- Purged Insulated Cabinet (IP 65). Suitable for Class 1 Division 2, T3 temperature rating, ATEX Category II 2G (EEx pemd [ib] IIC T4 or T3, for hazardous area operation
- 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 controller, I/O's (see options)
- Alarming contacts for purge status provided
- Internal Sample/Fluid Switching panel supplied and integrated into Analyzer Sample Cell Cabinet
- Analyzer Utility Requirements
  Instrumentation Air, oil-free, clean and dry, 80 psig (5.5 barg) 30 SCFM (906 sl/m), -32 degF (-34 degC) dew point at maximum instrument and ambient air temperature < 104degF (36 degC) FT-NIR optical purge air or N2 input, clean dry and oil-free, -40degF (-40 degC) dew point, 20 psig (1.4 barg) 1 SCFM (28.3 sl/m) Pentane Wash Fluid supply at < 100 psig (6.9 barg) Toluene Wash and Reference Fluid supply at < 100 psig (6.9 barg)

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

- FTPA2000-360 FT-IR Spectrometer, industrial FT-IR for NIR (BK7 optics) with Quartz Halogen source (range: 3800 - 12,000 cm^{-1}), Single DTGS detector. Comes with Ethernet connection Resolution variable from 1 to 64 cm^{-1}, in steps of 2×
- Best resolution 0.7 cm^{-1} (unapodized)
- Wavenumber reproducibility ±0.04 cm^{-1} (based on water vapor line at 7299.86 cm^{-1})
- Wavenumber repeatability ±0.001 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 ±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 °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 system
- 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 (optional remote computer 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.n One (1) 750-600: CANbus termination end module
- One (1) CAN-AC1: CANopen PCI board. To be installed in controller 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

- 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

Sample System Requirements (examples only, not included in FTPA2000-HP360 standard package)

Wash and reference system

- Wash fluid system (Pentane and Toluene): 2-cylinders (10 L/cylinder) for wash/reference and 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. Cabinet is Nema 4X suitable
- One-sample process input
- One-swirl clean, fast loop and filters. 0.2 µm filter elements
- Pressure regulation, flow-meter
- Auto grab sample for collection of reference samples for calibration modeling and laboratory analysis

Notes:

- 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

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