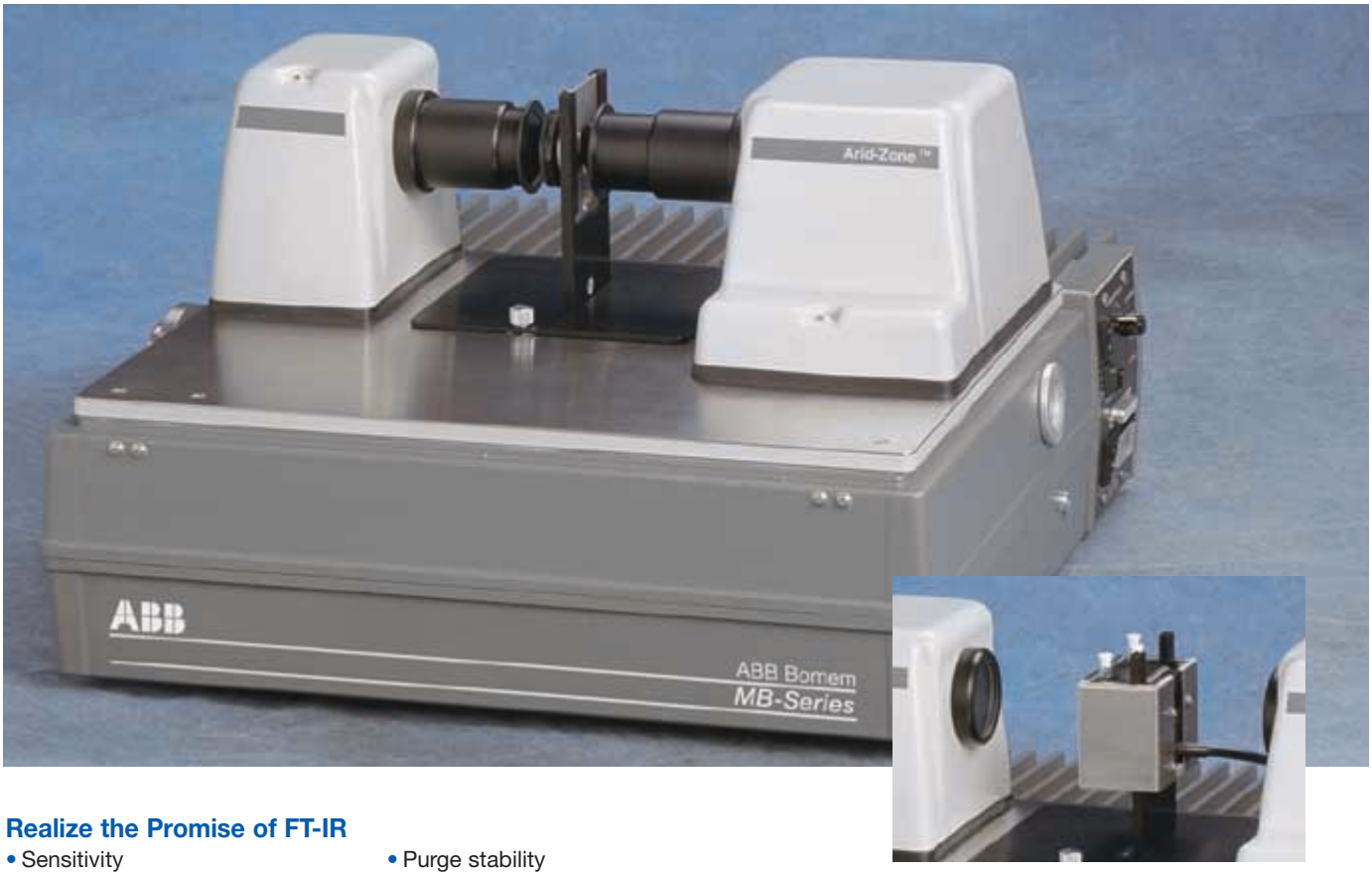
MB160D

FT-IR for Dedicated Near-IR Analysis



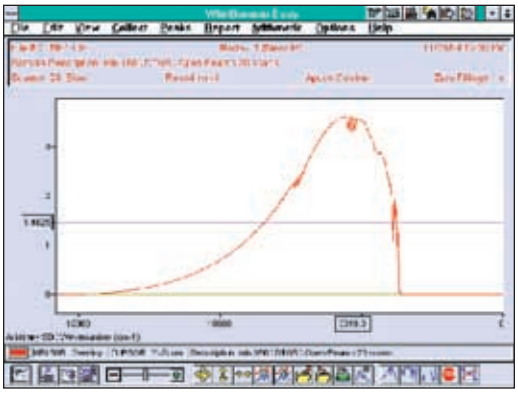
Realize the Promise of FT-IR

- Sensitivity
  - Peak signal-to-noise ratio >100000: 1 rms with extended signal averaging
- Baseline stability
  - <0.1% deviation in 100% line short-term
  - No long-term drift
  - Temperature coefficient <1% / °C at 8000 cm^{-1}
- Purge stability
  - < 0.0001A water vapor variation with minimal time delay using the unique Arid-Zone sample compartment
- Resolution better than 1 cm^{-1}
- No scheduled maintenance for 3 years: Lifetime warranty on scan mechanism
- Windows-based data processing and analysis software included

The **MB160D** brings the superior accuracy, repeatability and stability of FT-NIR to the Near IR. It is specially designed for economical, dedicated near-IR analysis. It comes with a built-in quartz halogen source and extended-range DTGS detector. This combination provides excellent results for most analyses performed in the sample compartment. The optional TE-cooled InAs detector is recommended for sampling of strongly scattering samples, diffuse reflectance sampling and fiber optic-coupled sampling. Spectral reproducibility from unit-to-unit closely resembles the repeatability. This is important when developing an analysis method for use with multiple FT-IR's. Analysis methods will transfer directly from one MB Series FT-IR unit to another without any adjustments.

The **MB160D** forms the basis for dedicated analyzers such as the HOval Analyzer, used for OH value determination. Sampling techniques, using temperature controlled, disposable glass vials are ideally suited for the demanding analysis requirements of many organic liquids. Near IR analysis of samples in powder form is done with the PowderSampl*ir*. When samples have a course texture the Diffus*ir* is recommended.

Optional vial sampling.



System response with the DTGS detector and quartz halogen source.
The usable spectral range is from 14,000 cm^{-1} to 3,800 cm^{-1}.

ABB Bomem

MB Series FT-IR Specifications and Features

Specifications

- Best resolution: 0.7 cm^{-1}, unapodized.
- Wavenumber reproducibility:
  Mid IR models: 0.1 cm^{-1} at 1918 cm^{-1}
  Near IR models: 0.04 cm^{-1} at 7300 cm^{-1}.
- Wavenumber repeatability ± 0.002 cm^{-1} ($\pm 2\sigma$).
- Calibration transferability test: All NIR models will reproduce the absorbance spectrum of toluene (4100-6000 cm^{-1}) in a 0.5 mm cell at 28°C ± 1° to within 0.002 A when compared with any other NIR unit.
- Mid IR Signal-to-RMS-noise ratio at peak response is typically 30,000: 1 for the MB100 for 1 min scan time, 4 cm^{-1} resolution, open beam.
- Near IR RMS-noise absorbance at peak response is typically 4 micro-A for 1 min scan time, 16 cm^{-1} resolution, open beam.
- 100% line reproducibility is within 0.1% in the 4000 to 550 cm^{-1} range for MIR models and the 8000 to 4500 cm^{-1} range for NIR models, for 2 consecutive measurements.
- 100% line long-term stability is affected only by temperature change. Temperature coefficient of change in 100% line is 1% / 1°C at 8000 cm^{-1} for Near IR models and at 4000 cm^{-1} for Mid IR models.
- Resolution selectable from 1 (2 in NIR mode) to 64 cm^{-1}, (apodized resolution) in steps of 2 X.
- Two scan times available: 3 s for DTGS, 1.2 s for fast semiconductor detectors, at 4 cm^{-1} resolution.
- Arid-Zone sample compartment with counter-current purge flow in telescopic purge tubes provides continuous purge up to sample. Arid-Zone sample compartment with "Open-architecture" provides free space for accessories.
- IR beam at sample focus is f/4.5.
- IR beam at sample focus has nominally 5 mm size.
- Beam diameter at beam stop is 2.5 cm.
- Maximum beam divergence: 90 milliradians.
- Sample focus is 3.5 in. (8.9 cm) above base.
- Free accessory space is 4 in. (10 cm) on each side of sample focus.
- Overall dimensions: 20"w x 22-1/4"d x 12"h (51 cm x 56 cm x 30 cm)
- Weight: 97 lbs. (44 kg).

Specifications subject to change without notice.

Interferometer

- Four-port optical design. Eliminates retro-modulation induced artifacts.
- Patented Michelson-type interferometer with 2 cube corner retroreflectors mounted on a "wishbone" swing arm.
- Factory prealigned interferometer and input/output optics; requires no adjustments by user.
- Scanning is by rotating the swing arm on a flex pivot bearing, driven by an induction motor. This provides smooth, constant-velocity, perturbation-free scanning.
- The scanning mechanism has a lifetime warranty against breakage and wear-out.
- Swing arm is balanced to permit operation in any orientation.
- Self-compensating, single-plate beamsplitter/compensator.
- Maximum scan length is 1 cm optical path difference both before and after centerburst.
- Scan mode: double-sided interferograms acquired in both forward and reverse directions.
- He-Ne reference laser for: digital sampling, mirror velocity control, quadrature detection of scan direction, and fringe counting for path-difference determination.
- Automatic white-light zero path difference location on power-up.
- Diagonal mirror with flipper mechanism to switch to side-port beam.

Interferometer enclosure

- The interferometer module, control electronics, power supply, source, and source power supply are housed in a cast-aluminum housing with the lower and upper halves bolted together and sealed with an O-ring.
- Optional output or emission port available on left side of instrument.
- Enclosed volume is desiccated by easy-change cartridge with status indicator.
- Source access panel permits source replacement by user.
- Purge inlet with disperser.
- Electrical power, switch, fuses, data cable, and status lights are interfaced at a side panel on the back right side of the instrument.

Data acquisition

- Single-board electronics module provides: scan start-up logic with ZPD synchronization; 2 scan velocities selectable via a "personality" switch on the detector module; bi-directional coadding, 16-bit ADC with built-in sample and hold, 100 kHz max. rate; byte parallel data transmission.

Computer interface

- ISA bus compatible parallel interface with 2-m opto-isolated parallel cable.
- Optional serial interface for greater interferometer-computer separation.

Computer

- The PC must be a 486 DX66 or better. The PC may be supplied by ABB Bomem or by the client.

Software

- Win Bomem Easy, a Windows-based program for acquisition, display, and processing of spectral data.
- Optional Advanced spectroscopic software for Windows 95, 98, and NT.
- Optional Spectral Search function.
- Optional PLS and PCR quant software packages.
- Optional quality-control software package (AIRS).
- Optional industrial turn-key automated analysis program (CAAP).
- Software compatibility with spreadsheet and word-processing programs.

Operating environment

- AC input: 120 or 240 V manually selectable.
- Power consumption: 150 W.
- Ambient temperature: -15° to 50°C non-operating, 0° to 30°C operating.
- Relative humidity (operating): 0% to 95% noncondensing for MB104, MB154S and MB160D models;
  0% to 40% noncondensing for MB100, MB102, MB155S, and MB157S models.

Model	Internal Source	Optics	Detector	Spectral range cm^{-1}
MB100	SiC	KBr	DTGS	6,500-350
MB102	SiC	CsI	DTGS	5,000-200
MB104	SiC	ZnSe	DTGS, ZnSe window	6,500-500
MB154S	dual SiC / NIR	ZnSe	MIR-NIR DTGS, ZnSe window	12,000-500
MB155S	dual SiC / NIR	KCl	MIR-NIR DTGS	12,000-450
MB157S	dual SiC / NIR	KCl	MIR-NIR DTGS/FT-RAMAN	12,000-450
MB160D	NIR	BK7	NIR DTGS	14,000-3,800

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