



## Configuration

The system consists of a spectroradiometer with two input and two output ports. The system features simultaneous data acquisition from the two output ports (configured with a MCT and an InSb detector).

One input port is used to fix a reference cancellation source. The other input port is designed to receive an input telescope and a viewing device.

The MR304SC is equipped with stirling cooled detectors.

The spectroradiometer includes:

- Complete Fourier Transform Interferometer, with two detectors
- Electronic controls built into the FTIR module
- External power supply module
- Acquisition and data processing radiometric software
- Input collimator
- FTIR Internal temperature control system
- FTIR base with handles and fixation points for tripods
- Room temperature cancellation reference source
- Aluminum transport case

## Data acquisition and radiometric software

### Communication link to PC

100 Mb Ethernet communication with shielded CAT 5 cable

### Recording time (continuous mode)

Up to 30 minutes (equivalent to 5 GB)

### Transfer to hard disk

Data saved in real time to hard disk

### Data time stamping

On-board, at ZPD from embedded processor

### FTSW500 radiometric software (features)

- Control of the instrument (configuration, status, commands, etc.)
- Real time data acquisition on both channels (MCT and InSb det.)
- Functionalities to perform instrument diagnostics
- Data analysis and post processing
- Built-in radiometric calibration function (Radiance, Irradiance and Apparent Intensity)
- Built-in data export function to GRAMS spectroscopy software
- Library of java functions compatible with MATLAB and IDL for further data processing
- Windows XP compatible

## Options

### Telescopes

- Wide-angle telescope (maximum field of view = 75 mrad) focusing range: 2 m to infinity
- Medium-angle telescope (maximum field of view = 28 mrad) focusing range: 10 m to infinity
- Narrow-angle telescope (maximum field of view = 4.9 mrad) focusing range: 30 m to infinity

### Viewing devices

- Ocular
- CCD camera with controller and monitor

### Others

- Tripod
- Computer

## Spectrometric characteristics

### Spectral technique

Fourier Transform Interferometer

### Spectral range

667 - 5,000  $\text{cm}^{-1}$  (2-15  $\mu\text{m}$ ) capability

Optional extension to 10,000  $\text{cm}^{-1}$  (1  $\mu\text{m}$ ) available

### FOV uniformity

$\pm 7.5\%$  on 85% of measured FOV

### Spectral resolution

6 computer selectable unapodized resolutions (1, 2, 4, 8, 16, and 32  $\text{cm}^{-1}$ ) at all wavelengths

### Spectral stability

Better than 0.01  $\text{cm}^{-1}$

### Scan speed

23.5 cm/s, fixed

### Scan rate

Resolution	Scan/Sec.
1 $\text{cm}^{-1}$	10
2 $\text{cm}^{-1}$	17
4 $\text{cm}^{-1}$	34
8 $\text{cm}^{-1}$	54
16 $\text{cm}^{-1}$	82
32 $\text{cm}^{-1}$	107

### FOV of interferometer

45 mrad (without input collimator or telescope)

### Maximum optical throughput

$8.1 \times 10^{-3} \text{ cm}^2 \text{ sr}$

### Detectors

InSb: 1,800-5,000  $\text{cm}^{-1}$  (2-5.5  $\mu\text{m}$ )

Optional extension to 10,000  $\text{cm}^{-1}$  (1  $\mu\text{m}$ ) available

MCT: 667-2,500  $\text{cm}^{-1}$  (4-15  $\mu\text{m}$ )

Optional PV MCT available 740-2500  $\text{cm}^{-1}$

### Detector cooling

Stirling cryocooler

### Noise equivalent spectral radiance

(at 16  $\text{cm}^{-1}$  resolution, 1 s. observation time, calibration and measurement near ambient temperature, measured at peak response)

MCT: NESR (RMS)  $< 2.5 \times 10^{-9} \text{ W}/(\text{cm}^2.\text{sr}.\text{cm}^{-1})$

InSb: NESR (RMS)  $< 2.5 \times 10^{-10} \text{ W}/(\text{cm}^2.\text{sr}.\text{cm}^{-1})$

### Dynamic range InSb detector

1-64 gain and 16-bit ADC

### Dynamic range MCT detector

1-256 gain and 16-bit ADC

### Gain control

Computer controlled (manual and automatic mode) in steps of 1, 2, 4, 8, 16, 32, 64 (128, 256 MCT only)

### FOV selection

Computer-controlled field stop

## Physical and electrical characteristics

### Weight

Sensor head: 35 kg

Power supply module: 3.5 kg

### Dimensions (L x W x H)

Spectroradiometer: 390 mm x 375 mm x 390 mm

Input collimator: 190 mm x 102 mm x 115 mm

Power supply module: 390 mm x 255 mm x 110 mm

### Modulation frequency

15.7 kHz to 117.5 kHz

### Temperature operation range

0°C to 45°C operating, -30°C to 55°C survival

### Humidity

$< 90\%$  relative humidity non condensing

### Operational random vibration

Acceleration spectral density 0.015  $\text{g}^2/\text{Hz}$  from 5 to 40 Hz. Monotonic slope down to 0.00015  $\text{g}^2/\text{Hz}$  at 500 Hz. (Along typical mounting direction)

Acceleration magnitude 1 g RMS along typical mounting direction (0.63 g RMS for the other 2 directions)

Reference to MIL-STD 810 F method 514.5

### Shock

Optical head 6 g during 10 ms

Acceleration amplitude 6 g (half sine)

Shock duration 10 ms

Number of shocks 15 (5 each direction)

Reference to MIL-STD 810 method 516.5



### ABB Analytical Measurement

585, boulevard Charest E., suite 300  
Québec, Qc G1K 9H4  
Canada  
Phone: 418-877-2944  
Fax: 418-877-2834  
Email: ftir@ca.abb.com  
www.abb.com/analytical

MR170 spec B4314 2010-07

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