Specifications

MR304SC Series

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.)
- Functionality 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 cm⁻¹ (2-15 μm) capability
Optional extension to 10,000 cm⁻¹ (1 μm) available

**FOV uniformity**
± 7.5% on 85% of measured FOV

**Spectral resolution**
6 computer selectable unapodized resolutions (1, 2, 4, 8, 16, and 32 cm⁻¹) at all wavelengths

**Spectral stability**
Better than 0.01 cm⁻¹

**Scan speed**
23.5 cm/s, fixed

**Scan rate**

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Scan/Sec.</th>
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</thead>
<tbody>
<tr>
<td>1 cm⁻¹</td>
<td>10</td>
</tr>
<tr>
<td>2 cm⁻¹</td>
<td>17</td>
</tr>
<tr>
<td>4 cm⁻¹</td>
<td>34</td>
</tr>
<tr>
<td>8 cm⁻¹</td>
<td>54</td>
</tr>
<tr>
<td>16 cm⁻¹</td>
<td>82</td>
</tr>
<tr>
<td>32 cm⁻¹</td>
<td>107</td>
</tr>
</tbody>
</table>

**FOV of interferometer**
45 mrad (without input collimator or telescope)

**Maximum optical throughput**
8.1 x 10⁻³ cm² sr

**Detectors**

**InSb:** 1,800-5,000 cm⁻¹ (2-5.5 μm)
Optional extension to 10,000 cm⁻¹ (1 μm) available

**MCT:** 667-2,500 cm⁻¹ (4-15 μm)
Optional PV MCT available 740-2500 cm⁻¹

**Detector cooling**
Stirling cryocooler

**Noise equivalent spectral radiance**
(at 16 cm⁻¹ resolution, 1 s. observation time, calibration and measurement near ambient temperature, measured at peak response)

**MCT:** NESR (RMS) < 2.5 x 10⁻⁹ W/(cm² sr cm⁻¹)

**InSb:** NESR (RMS) < 2.5 x 10⁻¹⁰ W/(cm² sr 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 g²/Hz from 5 to 40 Hz. Monotonic slope down to 0.00015 g²/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