

tecSpec®: (Integrated) Diode Array Spectrometer Family

Compact diode array based spectrometer unit with outstanding performance for feasibility studies and measurement tasks in research, development and industry.

Easy adaptation of light guides and fiber-optic probes is possible by use of a standard SMA connector at the front panel.



Features

- UV to extended NIR wavelength ranges
- Based on Carl Zeiss Spectral Sensors
- Compact, maintenance-free and long-term stable
- Designed for fast spectral data acquisition
Selectable USB or Ethernet Interface
- For integration in inspection and production machinery
- Digital I/O

Applications

- Reaction monitoring
- End point detection
- Thin film measurements
- Color classification
- Concentration analysis
- Product and waste sorting
- Laboratory Research

Spectrometer Unit tecSpec

tecSpec is a ready-to-use spectrometer module with SMA fiber input connector and a USB or Ethernet interface. Taking advantage of Carl Zeiss high-performance spectrometer modules and tec5 electronic components, it allows to acquire accurate spectral data while offering a compact format and maintenance-free operation.

The module available in various wavelength ranges and allow high-speed analysis of ultraviolet, visible and near-infrared radiation with high dynamic range and a very good cost-performance ratio. Their mechanical design and universal functionality makes them an ideal choice for many applications in spectroscopy.

Light Source Unit

A 7W Halogen light source unit is available. Designed for low power consumption, it is ideally suited for transmission measurements. The signals for shutter control are supplied via cable from the tecSpec spectrometer unit.

Software Support

- MultiSpec Pro II Spectroscopy Software
- tec5 AdminTool included (configuration, testing, raw data acquisition)
- Various Programmer Interfaces (SDK) are available

Technical Data

Product Overview

| tecSpec Unit | Wavelength Range [nm] | Optical Resolution [nm] | Detector Type |
|-----------------|-----------------------|-------------------------|----------------------------|
| tecSpec MCS | UV-VIS-NIR 190 – 1020 | 3 – 4 | High dynamic range silicon |
| tecSpec MCS CCD | UV-VIS-NIR 190 – 980 | 3 – 4 | High sensitivity silicon |
| tecSpec PGS | NIR 960 – 2150 | 5 – 16 | InGaAs |
| tecSpec MMS | UV-VIS-NIR 190 – 1020 | 7 – 10 | High dynamic range silicon |
| tecSpec CGS | UV-VIS-NIR 190 – 1000 | 2 – 3 | High sensitivity silicon |

tecSpec MCS

| USB: ID 11-014800 - ETH: ID 11-014810 - | Wavelength Range [nm] | Spectral Resolution [nm] | Wavelength Repeatability [nm] | Detector Array | Number of Pixels |
|--------------------------------------------|-----------------------|--------------------------|-------------------------------|----------------|------------------|
| 3-01 MCS UV | 195 – 620 | Approx. 3 | 0.05 | Si NMOS | 512 |
| 3-02 MCS UV VIS | 300 – 720 | Approx. 3 | 0.05 | Si NMOS | 512 |
| 3-03 MCS VIS | 360 – 780 | Approx. 3 | 0.05 | Si NMOS | 512 |
| 3-04 MCS NIR | 695 – 1100 | Approx. 3 | 0.05 | Si NMOS | 512 |
| 3-05 MCS UV NIR | 195 – 1020 | Approx. 3 – 4 | 0.05 | Si NMOS | 1024 |

tecSpec MCS CCD

| | | | | | |
|---------------------|-----------|---------------|-----|--------------------|-----------|
| 2-00 MCS CCD UV | 200 – 600 | Approx. 3 | 0.1 | Peltier cooled CCD | 532 x 64 |
| 2-01 MCS CCD UV NIR | 200 – 980 | Approx. 3 – 4 | 0.1 | Peltier cooled CCD | 1044 x 64 |

tecSpec PGS

| | | | | | |
|-----------------|-------------|------------|-----|-----------------------|-----|
| 1-01 PGS 1.7 tc | 960 – 1690 | Approx. 5 | 0.1 | Peltier cooled InGaAs | 512 |
| 1-02 PGS 1.7 tc | 960 – 1690 | Approx. 10 | 0.1 | Peltier cooled InGaAs | 256 |
| 1-03 PGS 2.0 tc | 1340 – 2000 | Approx. 6 | 0.1 | Peltier cooled InGaAs | 256 |
| 1-04 PGS 2.2 tc | 1000 – 2150 | Approx. 16 | 0.1 | Peltier cooled InGaAs | 256 |

For detailed specifications please refer to the data sheets of Carl Zeiss Spectral Sensors in use.

Technical Data

| Electronics | Si NMOS | Peltier cooled CCD | Peltier cooled InGaAs |
|-------------------------------|--------------------------------------------------------------------------------------------|--------------------|-----------------------|
| Dynamic Range | 16 bit (65536 Counts) | | 15 bit (32768 Counts) |
| Noise Typ. | < 2 Counts | < 2 Counts | < 4 Counts |
| Integration Time | 1.2 ms – 6.5 s | 3.0 ms – 6.5 s | 0.1 ms – 1.5 s |
| Interface (PC) | USB 2.0 (USB 1.1, USB 3.0 compatible), Ethernet 100BASE-T (10, 100, 1000 Mbits compatible) | | |
| Miscellaneous | | | |
| Power Supply | 110 / 220 V; 50 / 60 Hz (External Power Supply) | | |
| Dimensions [mm ³] | 235 x 175 x 115 | 290 x 175 x 115 | 235 x 175 x 115 |
| Weight | Approx. 2.5 kg | | |
| Operating Temperature | 5°C – 35°C | | |

tecSpec MMS

| (USB) ID: 11-014800 - (ETH) ID: 11-014810 - | Wavelength Range [nm] | Spectral Resolution [nm] | Wavelength Repeatability [nm] | Detector Array | Number of Pixels |
|------------------------------------------------|-----------------------|--------------------------|-------------------------------|----------------|------------------|
| 4-10 MMS UV-VIS enh. | 360 – 900 | Approx. 10 | 0.2 | Si diode array | 256 |
| 4-20 MMS UV | 220 – 390 | Approx. 3 | 0.2 | Si diode array | 256 |
| 4-30 MMS UV-VIS | 220 – 720 | Approx. 7 | 0.2 | Si diode array | 256 |
| 4-40 MMS NIR enh. | 400 – 1100 | Approx. 10 | 0.2 | Si diode array | 256 |
| 4-50 MMS UV-VIS II | 250 – 785 | Approx. 7 | 0.2 | Si diode array | 256 |
| 4-60 MMS UV SB | 190 – 390 | Approx. 3 | 0.2 | Si diode array | 256 |
| 4-70 MMS UV-VIS SB | 190 – 720 | Approx. 7 | 0.2 | Si diode array | 256 |

For detailed specifications please refer to the data sheets of Carl Zeiss Spectral Sensors in use.

| Electronics | MMS |
|-------------------------------|-----------------------------------------------------------------------------------------|
| Dynamic Range | 15 bit (32768 Counts) |
| Noise Typ. SD | typ. < 1,5 Counts standard deviation; S/N: ≈ 20 000 |
| Integration Time | 1.5 ms – 6.5 s |
| Interface (PC) | USB 2.0 (USB 1.1, USB 3.0 compatible), Ethernet 100Mbit (10, 100, 1000 Gbit compatible) |
| Miscellaneous | |
| Power Supply | 110 / 220 V; 50 / 60 Hz (External Power Supply) |
| Dimensions [mm ³] | 120 x 120 x 180 |
| Weight | Approx. 1 kg |
| Operating Temperature | 5°C – 35°C |

Technical Data

tecSpec CGS

| ID: 11-0148201-00 | Wavelength Range [nm] | Spectral Resolution [nm] | Wavelength Repeatability [nm] | Detector Array | Number of Pixel |
|-------------------------------|-------------------------------------------------|--------------------------|-------------------------------|-----------------------|-----------------|
| CGS UV-NIR | 190 – 1000 | Approx. 2-3 | - | Backthinned CCD array | 2048 |
| Electronic | | | CGS | | |
| Dynamic Range | 16 bit (65536 Counts) | | | | |
| Noise Typ. | typ. < 6 rms | | | | |
| Integration Time | 0.2 ms – 1.5 s | | | | |
| Interface (PC) | USB 2.0 (USB 1.1, USB 3.0 compatible) | | | | |
| Miscellaneous | | | | | |
| Power Supply | 110 / 220 V; 50 / 60 Hz (External Power Supply) | | | | |
| Dimensions [mm ³] | 78 x 115 x 175 | | | | |
| Weight | Approx. 0.8 kg | | | | |
| Operating Temperature | 5°C – 35°C | | | | |

tecSpec LS-H

| ID: 11-0202045-00 | Wavelength Range [nm] | Max. Power [W] | Life Time | Stability | Number of Pixel |
|------------------------------------------|-------------------------------------------------|----------------|--------------------|-----------------------------------|-----------------|
| Lamp Halogen | 400 – 2500 | 7 | > 1000 h (Halogen) | <5 x 10 ⁻⁵ AU @ 500 nm | 2048 |
| Power Supply | 110 / 220 V; 50 / 60 Hz (External Power Supply) | | | | |
| Dimensions (per unit) [mm ³] | 120 x 115 x 116 | | | | |
| Weight | Approx. 1.0 kg | | | | |
| Operating Temperature | 5°C – 35°C | | | | |

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