

### GENERAL DESCRIPTION

The Model 2035 is a Czerny-Turner spectrometer. It has a focal length of 350-mm and aperture ratio of f/4.8. This instrument uses a concave optic to collimate the incoming radiation. A plane grating is used to diffract the radiation that is subsequently focused by a second concave mirror. Czerny-Turner instruments require the center of the grating to be mounted directly over its center of rotation. This fixes the diffraction angle and provides the user with a fixed trajectory exit beam. This keeps accessories after the exit slit on the optical axis and delivers a flat and fixed focal plane.

### HIGH PERFORMANCE OPTICAL SYSTEM

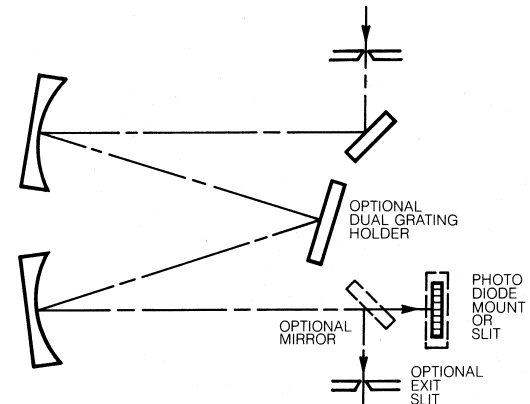
The Model 2035 utilizes master concave collimating and focusing optics polished to 1/8th wave. The high quality optics provide excellent performance from the Infrared to the Deep UV. This system is limited by the atmospheric cut-off (185-nm) and is available with fittings for purge gas. Spectrally agile, the Model 2035 features first surface optics with Aluminum and Magnesium Fluoride coatings for broadband response. To favor Infrared applications other optical coatings like Gold or Silver can be provided.

Wavelengths from 200-nm to 78-um can be covered within the scanning range and with appropriate gratings.

The Model 2035 optical system is optimized for two modes of operation. Instruments may be equipped with spherical optics for optimal spectral resolution. Spherical optics introduce astigmatism to the system that is not desirable in multi-channel fiber or other imaging applications. Configured for imaging the Model 2035 is equipped with an asphere to reduce astigmatism.



The McPherson Model 2035 Spectrometer is used in both conventional scanning applications and with multichannel array detectors for imaging applications.



Model 2035, Czerny-Turner Optical Layout

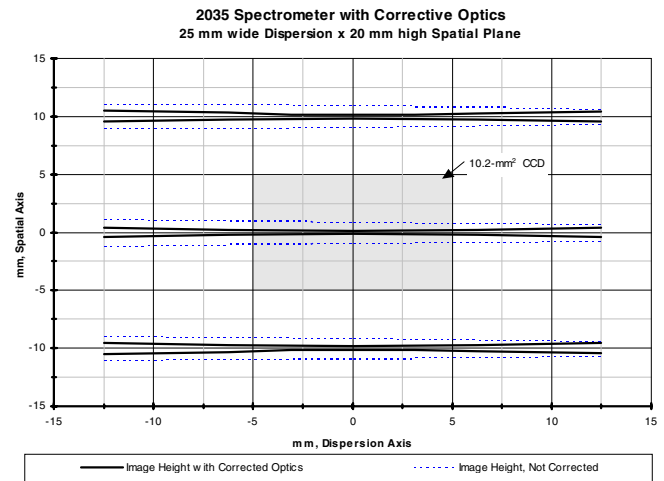
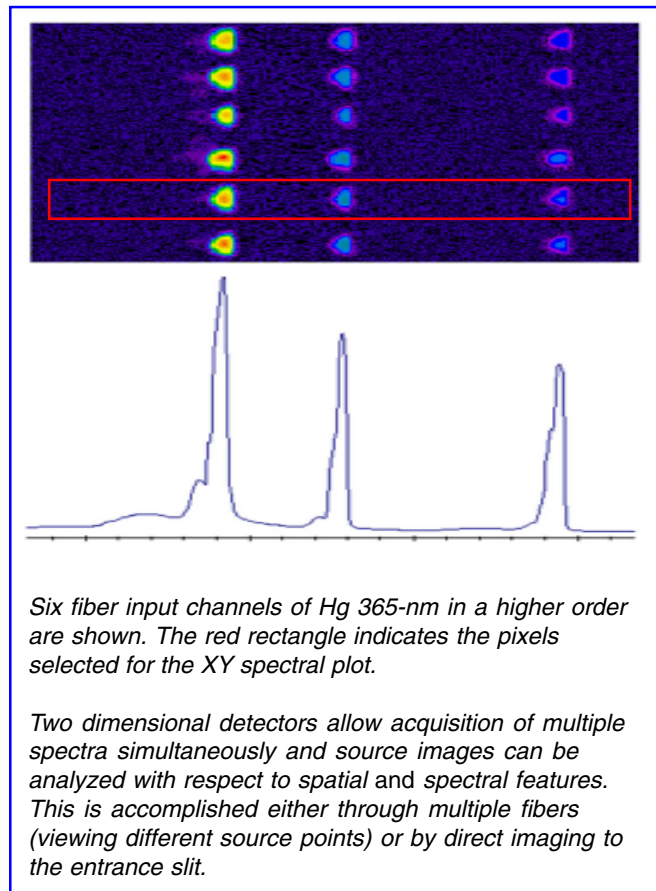
### SPECIFICATIONS ( \* with 1200 g/mm grating)

<b>Focal Length</b>	350-mm
<b>Aperture Ratio</b>	f/4.8
<b>Wavelength Range</b>	185-nm to 78-um
<b>*Spectral Resolution</b>	0.05-nm
<b>*Bandpass</b>	0.1 - 4 nm, varies with slit width
<b>*Wavelength Accuracy</b>	± 0.2-nm
<b>*Repeatability</b>	± 0.005-nm
<b>*Grating Exchange</b>	± 0.02 nm, single grating removal and insertion
<b>Stray Light</b>	1 part in 100,000 at 10-nm from HeNe laser line

### IMAGING

The primary function of a spectrometer is to disperse arriving radiation into discrete wavelength components. By scanning the grating or mounting a multichannel detector the component spectra may be viewed and analyzed. Wavelength dispersion is viewed in one dimension of the exit focal plane (usually horizontal.) Use of two dimensional CCD detectors allows gathering additional information from the spectra at the exit focal plane.

The Model 2035 equipped with an internal corrective optic completely separates spatial input images. Up to eight 100-um diameter input fibers can be used on a 6-mm high CCD array. The internal correction optic, a swing away mirror, is mounted in the 90-degree port position. With the mirror in this optical path the Model 2035 delivers optimal imaging performance. This allows use of the axial ports for optimal spectral resolution.



### MULTICHANNEL DETECTORS

The Model 2035 is ideally suited for use with array detectors up to 25-mm wide. The wavelength range covered in the 25-mm focal plane varies with the grating in use.

- 800-nm coverage with 75-g/mm grating
- 400-nm coverage with 150-g/mm grating
- 200-nm coverage with 300-g/mm grating
- 100-nm coverage with 600-g/mm grating
- 50-nm coverage with 1200-g/mm grating
- 25-nm coverage with 2400-g/mm grating

Spectral resolution attained with arrays may differ from that attained during scanning. For example, the Model 2035 resolves lines as closely adjacent as the 313.15 and 313.18-nm doublet when scanned with 10-um slits. Typical CCD detectors have 25-um pixels and exhibit pixel-to-pixel cross talk. In an application where the 25-um pixel is the smallest detectable wavelength increment optimal resolution may be reduced.

### DETAIL SPECIFICATION AND GRATING SELECTION

<b>Grating Groove Density (g/mm)</b>	3600	2400	1800	1200	600	300	150	75
<b>Resolution (nm)</b>	0.02	0.03	0.04	0.05	0.10	0.20	0.40	0.80
<b>Dispersion (nm/mm)</b>	0.75	1	1.5	2	4	8	16	32
<b>Wavelength Range</b>	185 - 430 nm	185 - 650 nm	185 - 860 nm	185 - 1300 nm	185 - 2600 nm	185 nm - 5.2 um	185 nm - 10.4 um	185 nm - 20.8 um
<b>Available Grating Blazes</b>	Holographic* 240	Holographic* 250 300	Holographic* 250 400	Holographic* 240 300 400 500 600 750 1 um	Holographic* 240 300 400 500 700 750 1 um 2 um 3 um 3.5 um 4 um	300 500 1 um 2 um 3 um 3.5 um 4 um	450 500 4 um 5 um 6 um 8 um	8 um 10 um 12 um

(\* Holographic gratings are available where noted.)

### SALIENT FEATURES

Exit ports may be equipped with bilaterally adjustable slits, as used in scanning applications, or with adapters for selected CCD or PDA array detectors.

Holds chosen ruled or holographic gratings.

Available with a dual (2) grating turret. Single gratings feature kinematic mounts for ease of installation and exchange. Both types of grating holders permit simple and precise positioning. Additional gratings can easily be installed.

Robust, high accuracy wavelength drive and mechanical wavelength readout insure easy use. The sine drive delivers a linear relationship between motor motion and wavelength of interest.

The high precision drive may be actuated manually, via stepper motor controller or from the PC.

Supplied with side and/or front mounted slit assemblies. Side ports are accessed by 90-degree mirror assemblies which are optionally motor driven.

Imaging optical system easily adapts to commercial PDA and CCD type detectors. The mechanical interface for uncommon detectors will be manufactured to order.

Precision bilaterally adjustable slit assemblies. Width is variable by micrometer from 10-um to 4-mm. The micrometer is directly readable to 10-um. Slit height is adjusted by occulter from 2-mm to 20-mm. The slits are optionally motor driven.

The wide range of available accessories allows configuration of optimized systems and facilitates changing experimental needs.

Heavy duty aluminum construction for high stability with respect to vibration and thermal effects.

Outperforms and exceeds specifications of comparable monochromators in resolution, dispersion, wavelength accuracy, and wavelength reproducibility.

**350-mm focal length, f/4.8  
MODEL 2035 SPECTROMETER**

Dimensions are in inches and are provided for reference only.

