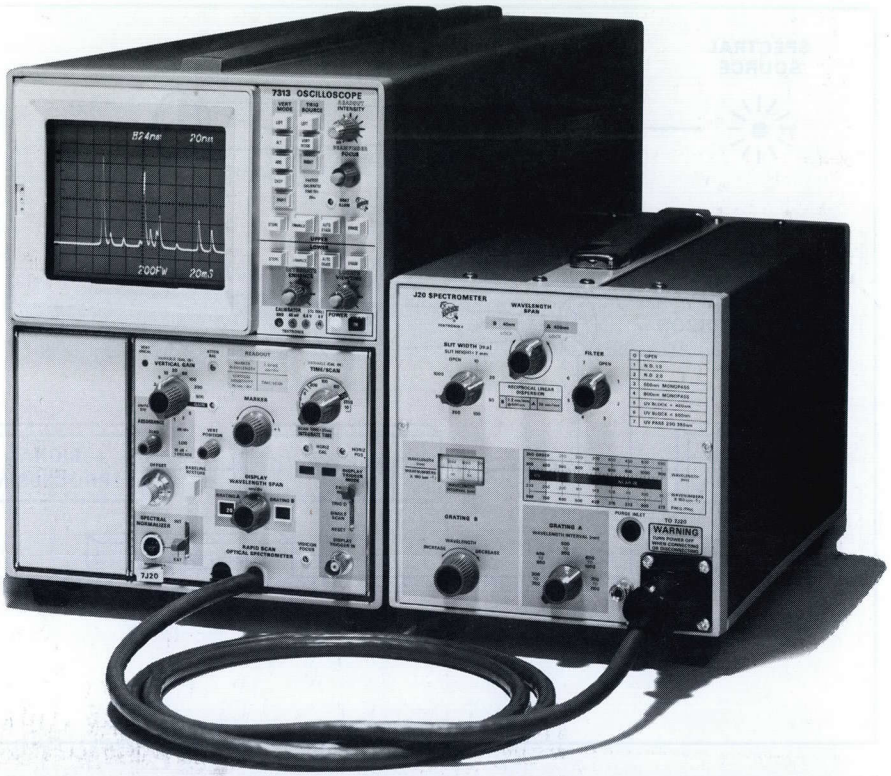
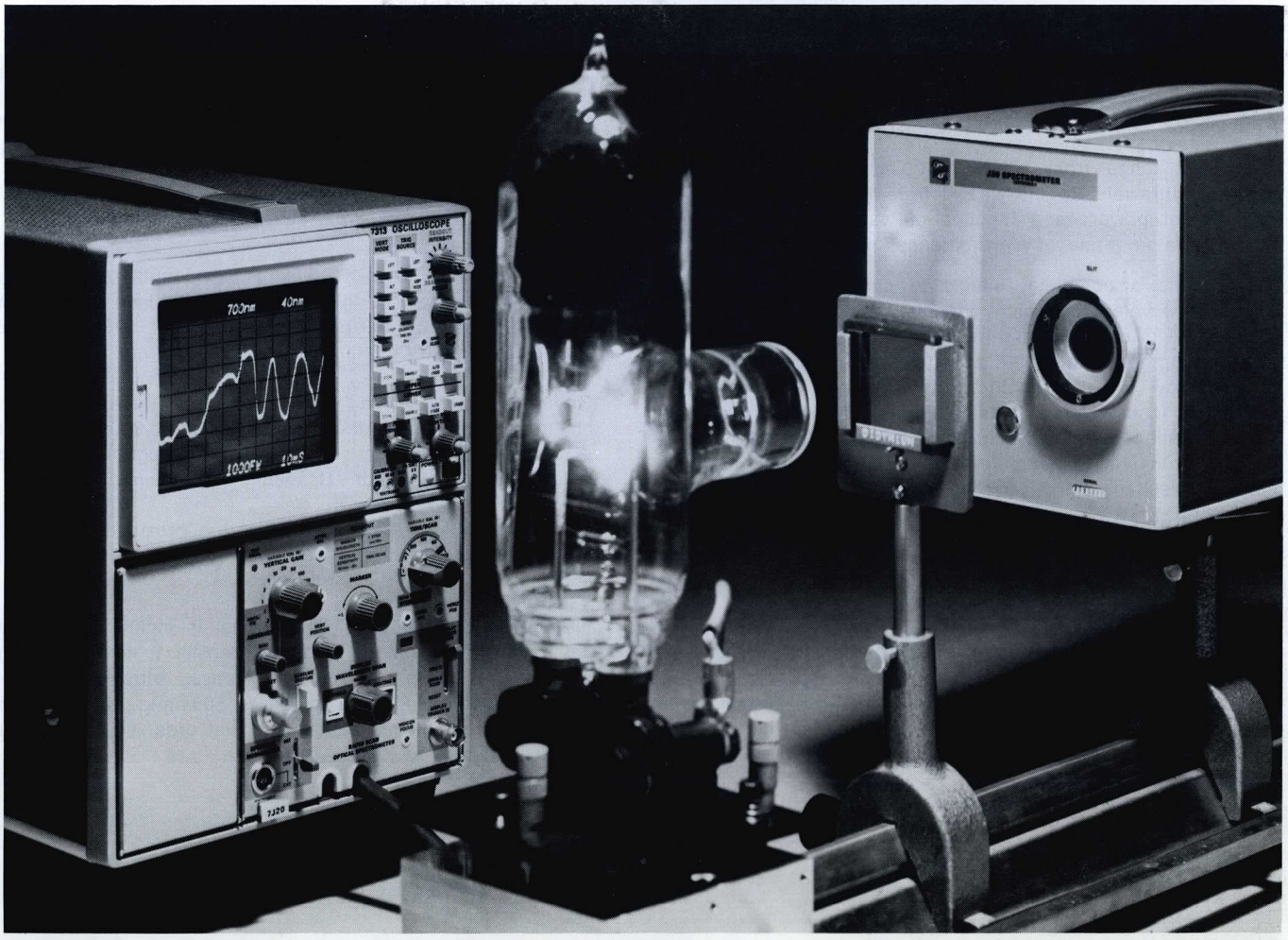
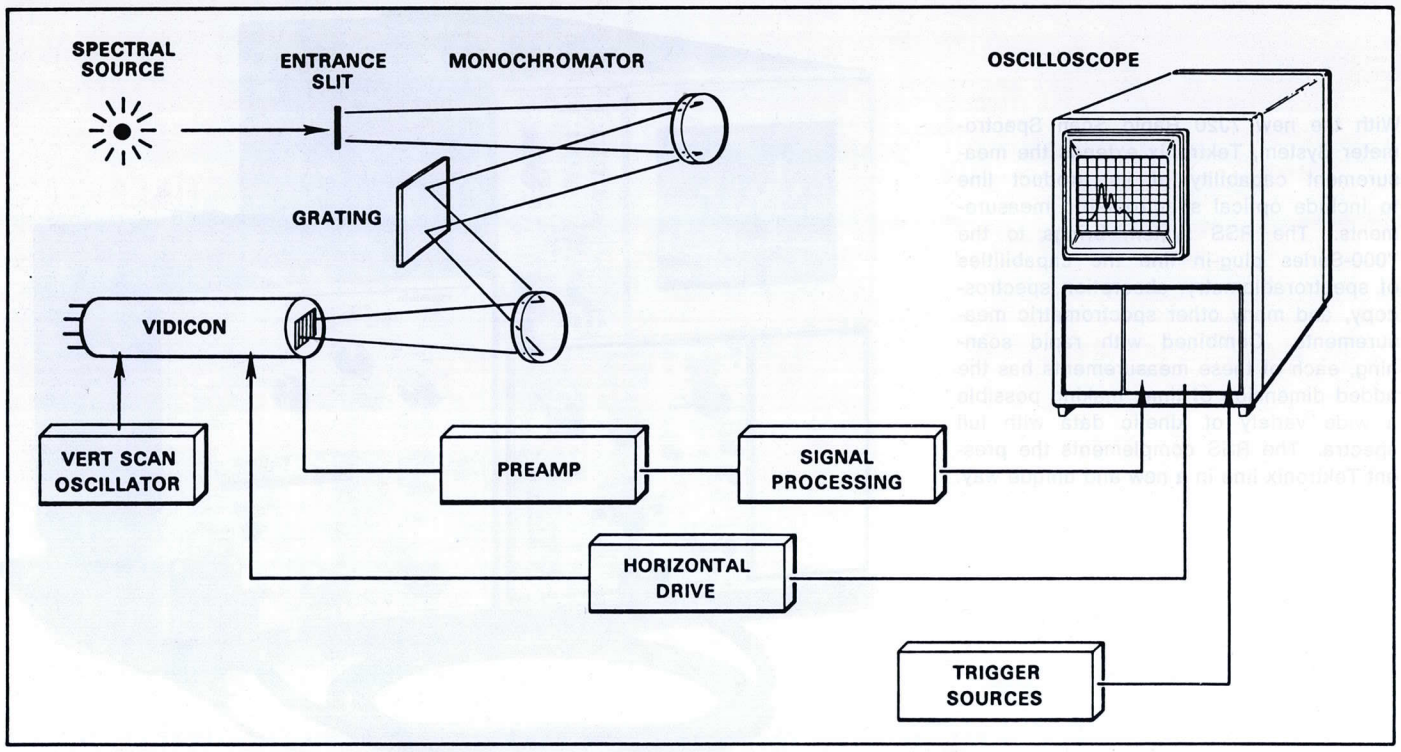
With the new 7J20 Rapid Scan Spectrometer System, Tektronix extends the measurement capability of its product line to include optical spectrometric measurements. The RSS system brings to the 7000-Series plug-in line the capabilities of spectroradiometry, absorption spectroscopy, and many other spectrometric measurements. Combined with rapid scanning, each of these measurements has the added dimension of time, making possible a wide variety of kinetic data with full spectra. The RSS complements the present Tektronix line in a new and unique way.







The 7J20 Rapid Scan Spectrometer (RSS) can measure and record spectral information of dynamic events with durations of milliseconds. Spectral information can be gathered over a wide range, with scan times as low as 4 ms, and displayed instantly for convenient examination.

A spectral range from 250 to 1100 nm permits observation from the Ultraviolet to the Near Infrared Region. It can measure radiant power as a function of wavelength and absorption spectra in terms of transmittance or absorbance.

The RSS is a complete, integrated spectrometric unit calibrated in wavelength, which appears digitally on the display screen. It is compact, lightweight and rugged. It consists of a spectrometer and an electronic plug-in. Light dispersed by a Czerny-Turner monochromator with two interchangeable gratings is focused onto a vidicon target, which gathers spectral information at all wavelengths simultaneously. This spectral information is then electronically scanned from the target and the resultant signal can be displayed on the crt of an oscilloscope.

The TEKTRONIX RSS may be used with any of the oscilloscope mainframes comprising the TEKTRONIX 7000-Series Oscilloscope line.

Computer real-time treatment of spectral data is provided by the TEKTRONIX 7000-Series Digital Processing Oscilloscope, which can be made an integral part of the RSS system, or to other computers taking the signals provided at the interface plug on the 7J20 plug-in unit.

THE SPECTROMETER UNIT

The Spectrometer contains a Czerny-Turner monochromator, two interchangeable gratings, silicon-vidicon target and electronic circuitry. This circuitry transforms a selectable portion of the spectrum into electronic signals ready for further processing by the Plug-In Unit.

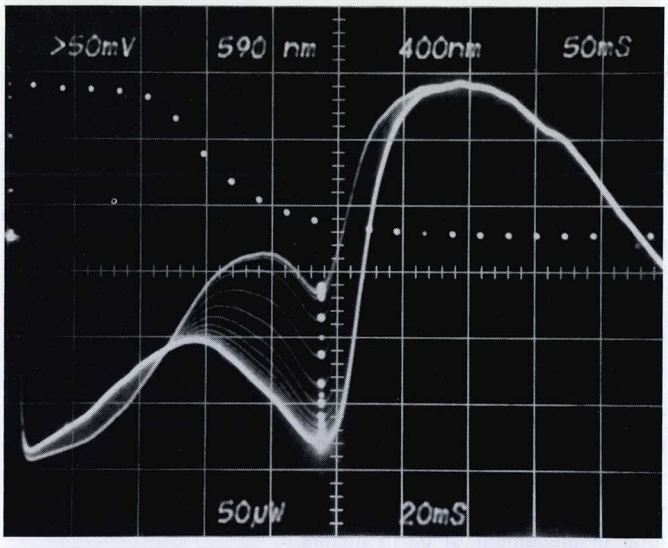
Gratings—Two interchangeable gratings can be selected.

Grating A—This has a 400 nm wavelength span with 32 nm/mm dispersion at the vidicon target. Five step intervals can be selected: 300-700 nm, 400-800 nm, 500-900 nm, 600-1000 nm and 700-1100 nm. Resolution $\leq$ 4 nm.

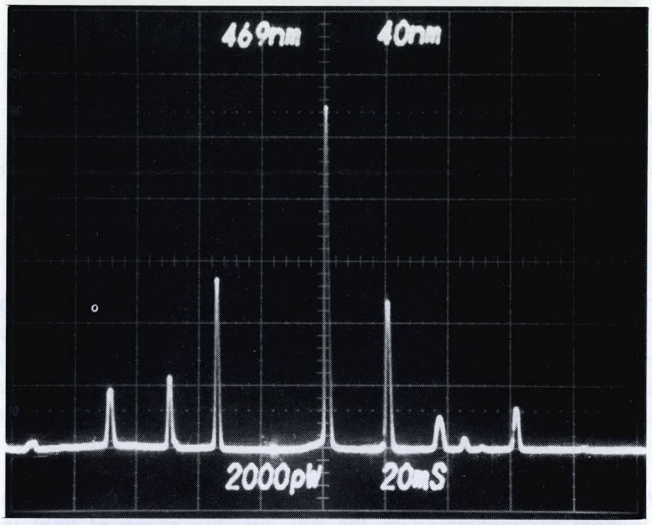
Grating B—This has a 40 nm wavelength span with a 3.2 nm/mm dispersion at the vidicon target at 600 nm. It allows a continuously variable scan of 40 nm throughout the spectral range of the instrument. Resolution $\leq$ 0.4 nm.

Slit Widths—Eight fixed slit widths are provided, each 10 mm high. The widths are 10, 20, 50, 100, 200, 500, 1000, and 5000 μm (or open).

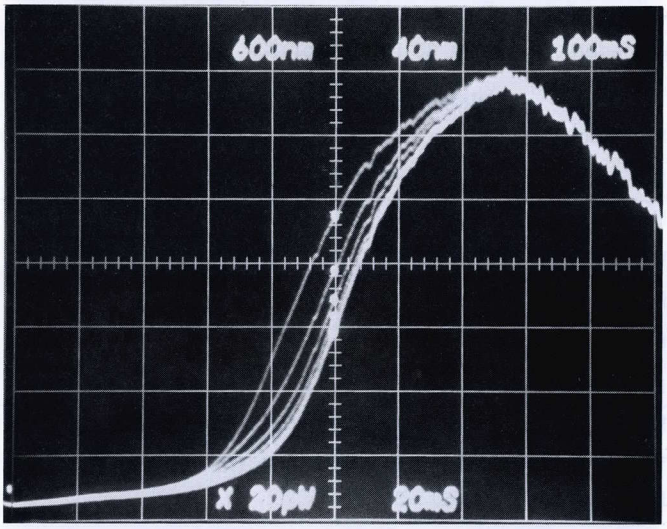
Filters—An eight position filter wheel is included in the optical path. These include a neutral density 1, neutral density 2, 500 nm monopass, 800 nm monopass, ultraviolet blocking ($\leq$400 nm), ultraviolet blocking ($\leq$500 nm), ultraviolet pass (passes 250 to 330 nm and blocks first order wavelengths from 400 to 650 nm), and open (no filter).



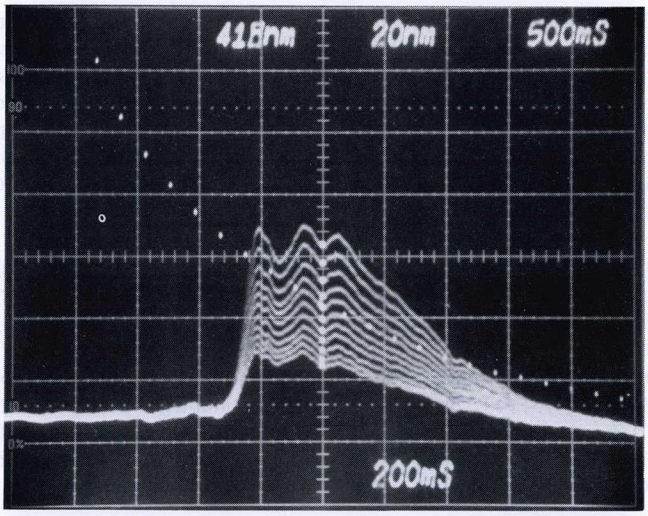
A family of spectra during the dehydration of CO_2 reaction using bromphenol blue indicator. The superimposed intensity versus time plot has a time coordinate of 50 ms per division and is taken at 590 nm.



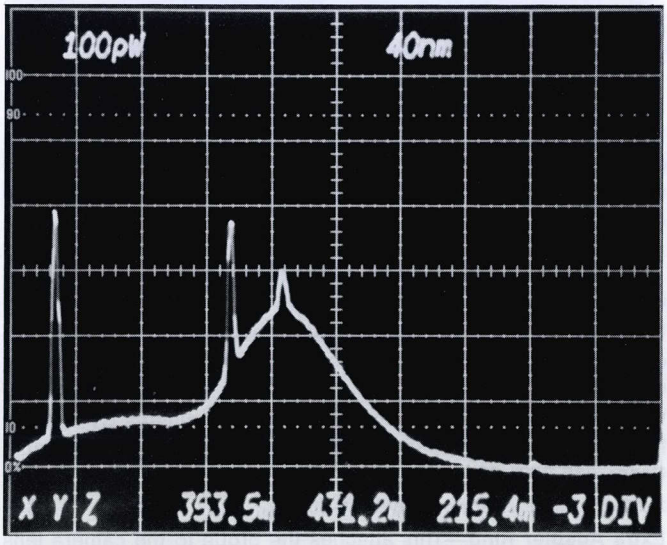
The spectrum of a low-pressure mercury arc in the 300-700 nm spectral range. The intensified spot is located at 469 nm.



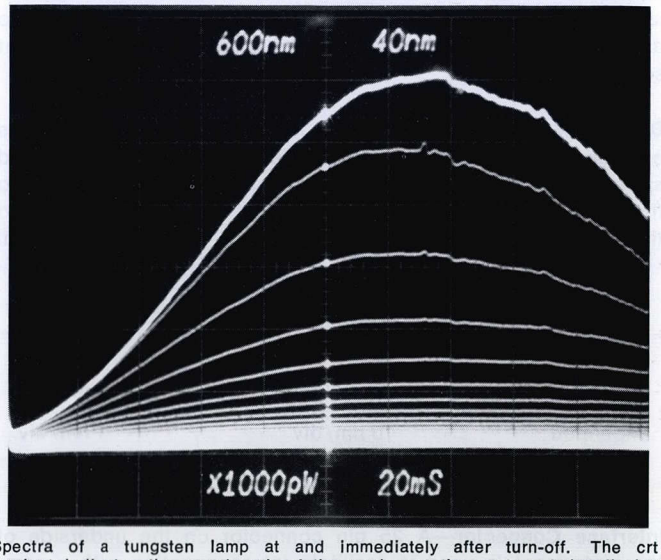
A family of spectra during the reaction of 0.01 M Fe^{3+} with 0.01 M CNS^-. The scan duration is 20 ms with a separation of 40 ms.



Diphenylamine phosphorescence showing the decay of the spectrum after shutting off the excitation.



The power spectrum of a fluorescent lamp in the 400 to 800 nm spectral range. The computer-calculated color coordinates (x, y and z) appear below the spectrum.



Spectra of a tungsten lamp at and immediately after turn-off. The crt readout indicates the wavelength of the marker at the center of the display as 600 nm, the horizontal scale factor as 40 nm/div. The vertical scale factor is uncalibrated but is about 1000 pW/div and the spectra were viewed every 20 ms.

Field of View—Horizontal 8.2 degrees
Vertical 9.5 degrees

Equivalent f-Number—f/6.3 non-vignetting

Stray Light— ≤1% at 600 nm to a notch filter with tungsten illumination.

THE PLUG-IN UNIT

The Plug-In Unit is designed to operate with the TEKTRONIX 7000-Series family of oscilloscopes. It functions as an electronic signal processor and control unit. A signal from the Spectrometer Unit is further amplified, filtered and processed to provide vertical deflection on the oscilloscope crt. The horizontal is a wavelength scan.

Vertical Gain Control—This controls the sensitivity of the instrument to accommodate the full dynamic range of light intensities. Three types of vertical deflection are provided: linear, logarithmic and absorbance.

Time/Scan—This seven position switch selects mode and time of scanning the vidicon target. In the 10 and 20 ms positions, the vidicon is continuously scanned by successive sweeps. In the 50 through 1000 ms positions, the vidicon is scanned by successive 20 ms sweeps with a delay time that adds up to the integration time selected. A variable times/scan provides a continuously variable scan. This increases the speed to at least 4 ms.

Baseline Restore—This switch closes the entrance slit shutter to provide a zero-light level reference baseline in the crt display and reset the dark current restoring circuit.

Display Trigger Mode—Four modes of display trigger are provided: (1) Free Run—Display is continuously provided; (2) Triggered—Automatically triggers scan by an external signal; (3) Single Scan—Triggers scan once with signal, until reset; (4) Reset—Rearms the system for a single scan sweep.

Spectral Normalizer—Selection is between normalized and unnormalized mode. Internal normalization means that the system is radiometrically calibrated. Use of an external normalizer optional accessory allows tailoring of the responses to allow for spectral characteristics of external filters and light sources.

Display Wavelength Span—This four position switch enables expansion of the display at any selected point. An intensified spot on the crt can be moved horizontally along the trace to the desired position. The display can be expanded around the central spot to get a magnified view of the desired area.

	Grating A	Grating B
Full Scan	40 nm/div	4 nm/div
Expanded	20 nm/div	2 nm/div
Expanded	10 nm/div	1 nm/div
Expanded	4 nm/div	0.4 nm/div

Interface Connector—A 25 pin connector on the underside of the instrument is used to facilitate interconnection with a computer or other associated equipment.

OPTIONAL ACCESSORIES

RSS External Normalizer—This uses 19 slide potentiometers to adjust the response of the RSS, such that the spectrum of a smooth continuous light source (e.g. tungsten lamp) can appear as a flat line allowing one to measure transmittance or absorbance of a substance, with the flat line as a 100% T (or 0% absorbance) reference. It may also be used to do a custom radiometric calibration over a 40 or 400 nm spectral window.

ENVIRONMENTAL SPECIFICATIONS

Temperature—Operating +15°C to +35°C. Non-operating −30°C to +50°C.

Altitude—Operating 15,000 ft. Non-operating 50,000 ft.

Humidity— ≤ 95% relative humidity non-condensing from +15°C to +35°C, operating or non-operating for 4 hours.

Vibration— 15 minutes along each of the 3 major axes, at a total displacement of 0.015 inches.

Shock— 30 g's, ½ sine, 11 ms duration. Two guillotine type shocks per axis in each direction total of twelve shocks.

Transportation—Tested to National Safe Transit Committee procedure 1A with a 36 inch drop.

DIMENSIONS & WEIGHTS

Spectrometer—

Dimensions	in	cm	Weights	lb	kg
Height	8	≃20	Net Weight with connection cable	16.5	≃7.5
Width	7	≃18			
Depth	13	≃33	Shipping Weight	21.6	≃9.8

Plug-In—

Dimensions	in	cm	Weights	lb	kg
Height	5.0	≃12.7	Net Weight	4.3	≃2.0
Width	5.5	≃14.0	Shipping Weight	9.3	≃4.2
Depth	14.5	≃36.8			

Complete RSS Shipping Weight 32 lb ≃14.5 kg

INCLUDED ACCESSORIES

7J20 Operators Instruction Manual.
7J20 RSS Service Instruction Manual.

ORDERING INFORMATION

7J20 Rapid Scan Spectrometer & Plug-In with Radiometric Calibration **$12,000**
Opt. 1 RSS without Radiometric Calibration ..... **Sub $1,000**
Mainframe Prices listed under 7000 Series

OPTIONAL ACCESSORIES

External Normalizer (016-1000-00) **$360**

Fiber-Optics Probe—This facilitates transferring light to the entrance slit of the spectrometer (up to 36″). Includes adapter ring. **Order 016-0580-00** **$190**

UV Fiber-Optics Probe—This quartz probe facilitates UV transfer to the entrance slit of the spectrometer. Includes adapter ring. **Order 016-0603-00** **$390**

2 x 2 in Filter Holder (016-0581-00) **$45**

Extra Adapter Ring—This attaches the probe to the camera lens ring at the front of the spectrometer.
Order 016-0582-00 ..... **$30**