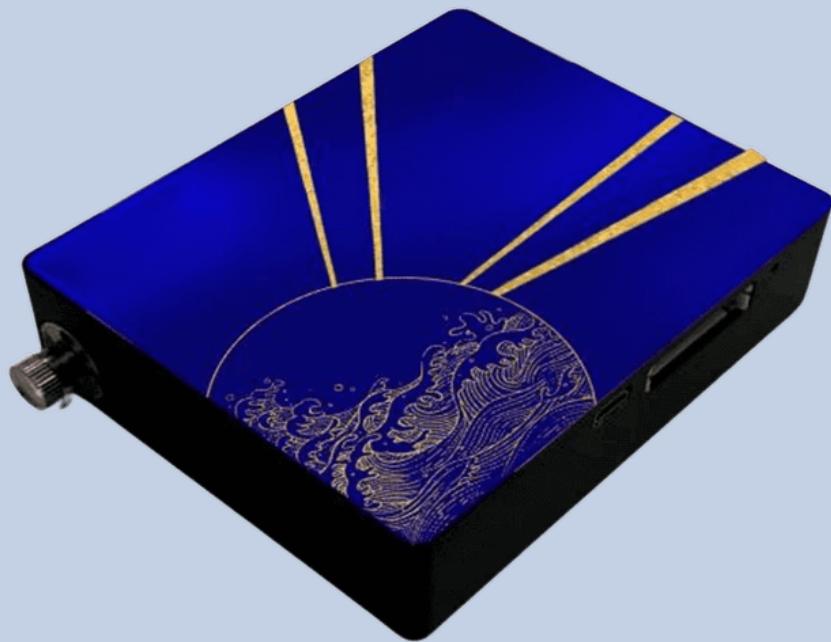


Sharp 2K Spectrometer



One Platform Many Possibilities

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Introduction

Sharp 2K Spectrometer is a miniature spectrometer with a compact structural design and configurable spectral range. It boasts high resolution, with the optimal resolution reaching up to 0.07 nm; low stray light, approximately 0.1%; and minimal temperature drift, with a wavelength temperature drift of about 0.1 pixel/°C.

It is suitable for various industrial on-site measurement scenarios, including laser measurement, plasma emission spectroscopy measurement, color measurement, absorbance measurement, and Raman measurement. It is a cost-effective industrial-grade fiber optic spectrometer.

Features

- Stray Light ~0.1%;
- With high resolution, up to a maximum of 0.07 nm;
- Wavelength temperature drift ~0.1 pixel/°C ;
- Compatible with Venuslab pin-type multi-core densely arranged bundled optical fibers, with consistency of fiber insertion/extraction strength $\pm 7\%$;
- Strong ultraviolet (UV) spectral response;
- CCD quantized background noise ≤ 30 RMS (at minimum integration time);
- Equipped with multiple communication interfaces including USB and serial port, a 24PIN interaction interface, and dedicated DAC and ADC, which enables enablement, intensity control and power feedback of matching light sources.

Applications

1. Illumination & Light Source Analysis

LED Production Testing: Sorting, Color Temperature (CCT), Color Rendering Index (CRI), and Dominant Wavelength measurement.

Laser Characterization: Measuring Center Wavelength, Spectral Bandwidth (FWHM), and Power Stability.

Display Panel Testing: Color uniformity and brightness calibration for OLED, LCD, and Micro-LED displays.

Solar Irradiance: Monitoring absolute irradiance and UV index.

2. Color Measurement (Colorimetry)

Industrial Color Quality Control: Ensuring color consistency in textiles, coatings, plastics, and painting industries. **Printing & Packaging:** Ink color verification and print quality monitoring.

Reflective Color Analysis: Measuring CIE Lab* values and color difference (ΔE) for solid surfaces.

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3. Material Science & Optical Testing

Transmittance & Absorbance: Analysis of optical lenses, filters, and glass materials.

Thin Film Measurement: Determining thickness of optical coatings and semiconductor layers via interference patterns.

Gemstone Identification: Spectral fingerprinting to distinguish natural from synthetic stones.

4. Chemical, Biomedical & Environmental Sensing

Water Quality Monitoring: Detecting chemical oxygen demand (COD), ammonia nitrogen, and heavy metals. **Fluorescence Spectroscopy:** High-sensitivity detection for biological tracers, DNA/RNA analysis (typically requires larger slit).

Agricultural Analysis: Non-destructive testing of fruit sugar content (Brix) and moisture levels.

LIBS (Laser-Induced Breakdown Spectroscopy): Rapid elemental analysis for alloy sorting and hazardous material detection.

Specification data for the Sharp 2K Spectrometer

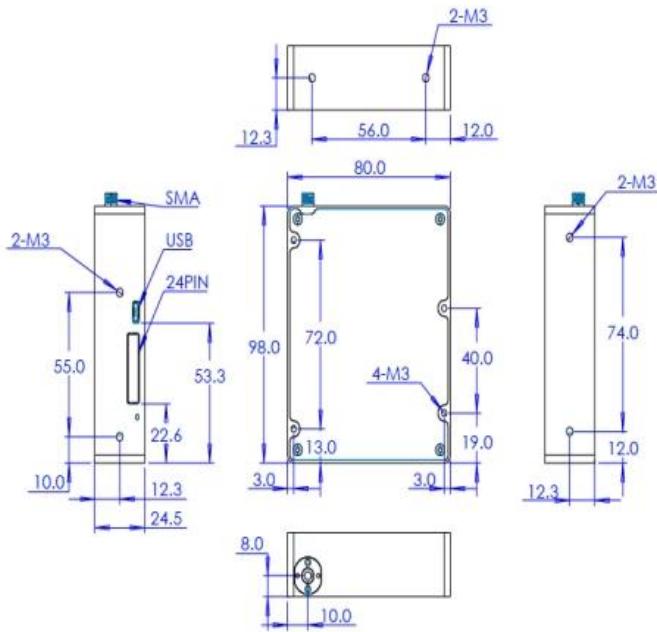
Category	Parameter	Value
Optical Parameters	Optical Fiber Interface	Key-SMA905
	Pixel Channel Count	2048
	Stray Light	~0.1%
	Wavelength Temperature Drift	~0.1 pixel/
	Consistency of Fiber Insertion/ Extraction	7%
	AD Sampling	16 bit
Functional Parameters	Data Interfaces	USB2.0, RS232
	Extended Function Interface	24 PIN
	Acquisition Modes	Single-shot, Continuous, Software Trigger, Synchronous External Trigger, Asynchronous Reset External Trigger
	Detector Integration Time	60 μ s (microseconds) - 65 s (seconds)
	External Trigger Delay Accuracy	10 ns (nanoseconds)
	CCD Readout Noise	30
	CCD Dynamic Range	3000:1
	Signal-to-Noise Ratio (SNR)	380:1
	Response Linearity	98%
	Operating Temperature	0 ~ 40
	Operating Humidity	20% - 85%

Notes:

CCD Readout Noise: At the minimum integration time, it refers to the root mean square (RMS) of CCD readout noise.

CCD Dynamic Range: At the minimum integration time, the dynamic range is calculated as (saturation value - dark noise baseline) divided by the standard deviation of CCD readout noise; the evaluation method refers to Oceanhood's enterprise standards.

Dimension



Interface Definition

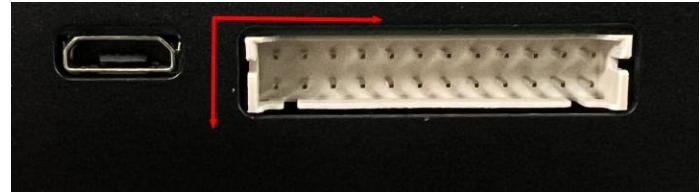
The figure below shows the various interfaces of the Sharp 2K Spectrometer. The optical fiber interface is an SMA905 interface, which is used to connect sampling accessories such as reflective probes, transmission-reflection holders, and liquid flow cells.

The Micro USB interface is used to connect to a computer via a data cable. The 2.0MM-24P interface (24-pin port) is used for the secondary development of the spectrometer.



Wiring Pin Definition

The 24pin interface uses a 2.0MM-24P connector.



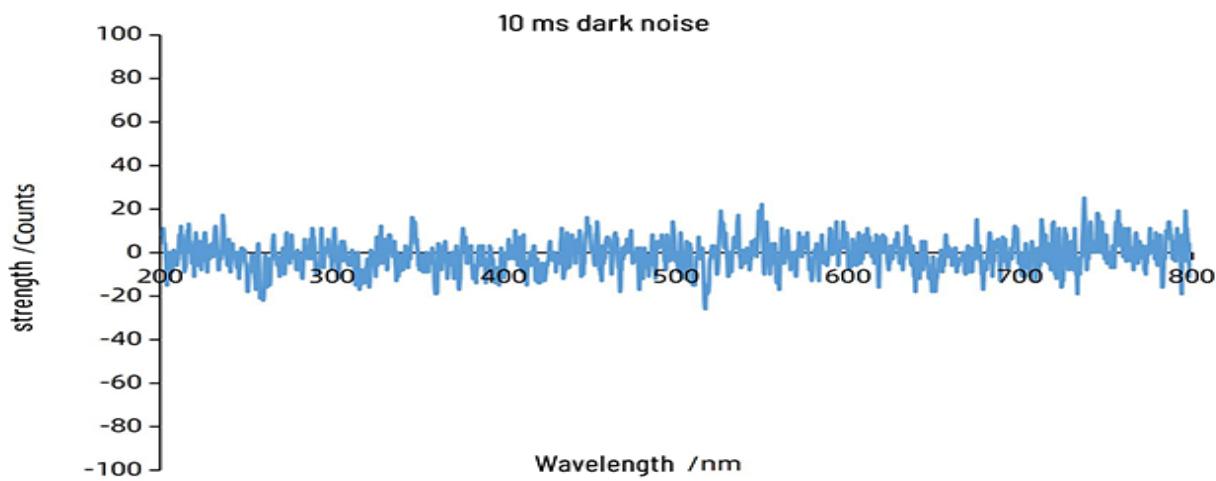
Physical Diagram of the Spectrometer's 24pin Interface (Note the Interface Direction)

24	22	20	18	16	14	12	10	8	6	4	2
23	21	19	17	15	13	11	9	7	5	3	1

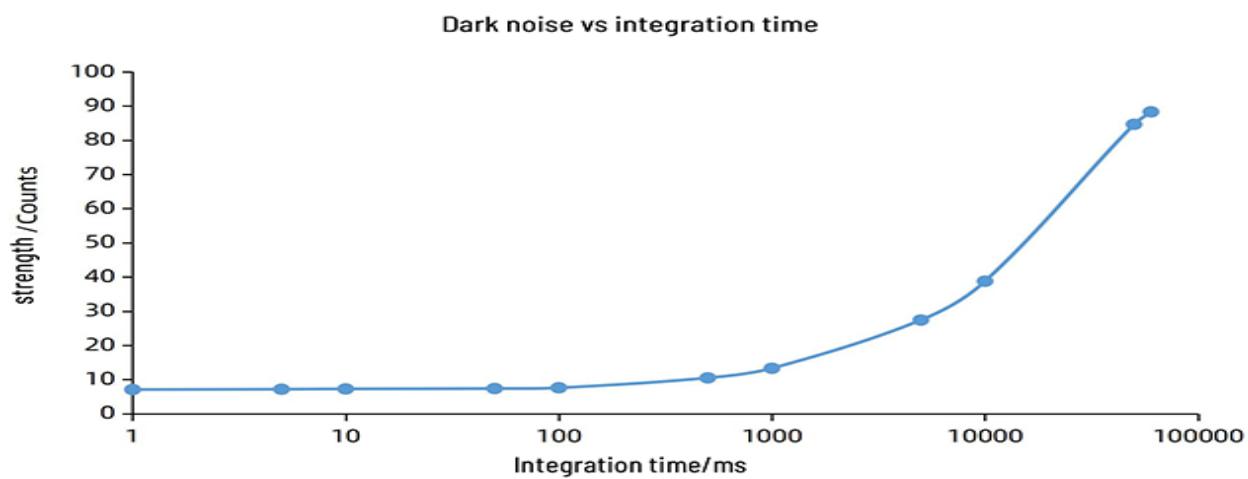
Pin No.	Definition	Function
1	EX_SET	Analog power output for laser power control (input voltage: 0~2.5V)
2	Monitor_RT	Laser temperature feedback
3	TEMP_SET	Reserved
4	Monitor_ILD	Laser power feedback
5	GPIO_PC6	TEC_SB mode
6	GPIO_PC10	Bluetooth device status pin
7	GPIO_PC7	GPIO output state configurable
8	GPIO_PC11	GPIO output state configurable
9	GPIO_PC8	Laser enable control
10	GPIO_PB8	Reserved
11	GPIO_PC9	Bluetooth control mode pin
12	GPIO_PB9	Reserved
13	UART5_TX	UART data transmission (TTL UART)
14	I2C2_SCL	Reserved
15	UART5_RX	UART data reception (TTL UART)
16	I2C_SDA	Reserved
17	SYNC_OUT	External trigger output signal
18	Laser_CLK	External laser clock output signal
19	InterLock_N	Laser InterLock control (controls laser on/off)
20	SYNC_IN	External trigger input signal
21	DC5V	Positive power supply (DC5V)
22	GND	Power ground
23	DC5V	Positive power supply (DC5V)
24	GND	Signal ground

Typical Spectrum

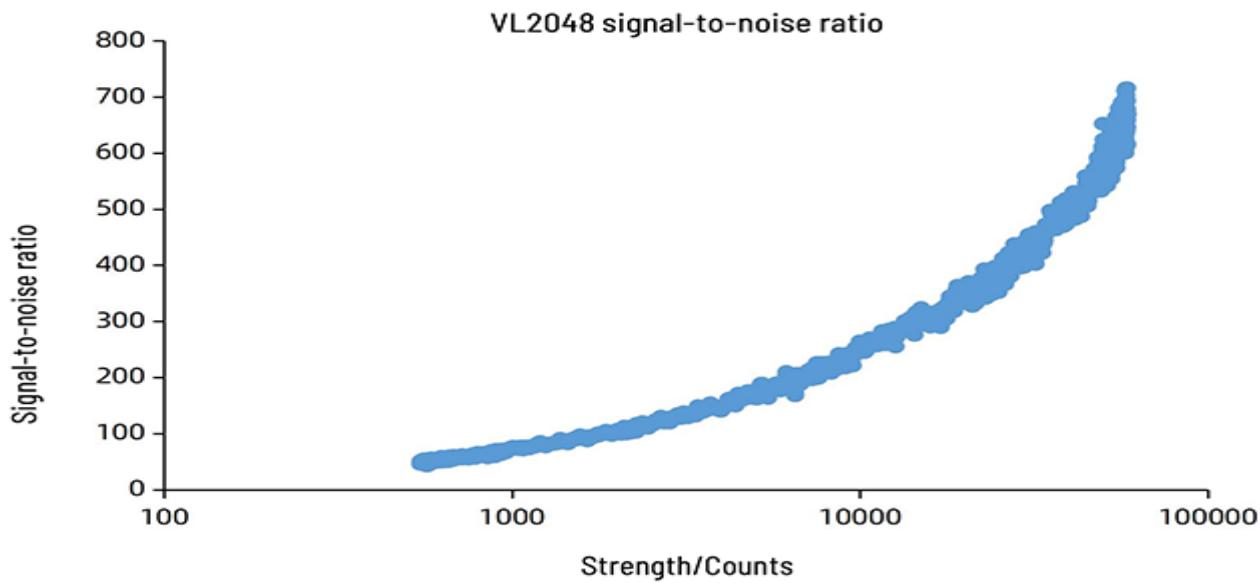
(1) Dark noise at 10 ms



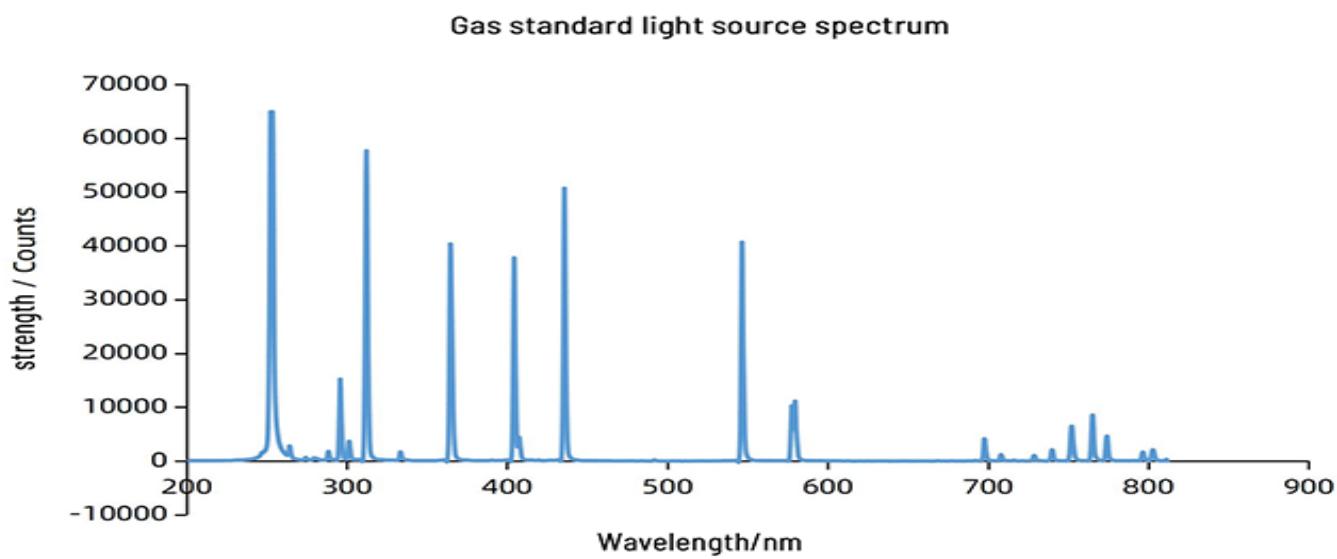
(2) Dark noise vs. Integration time



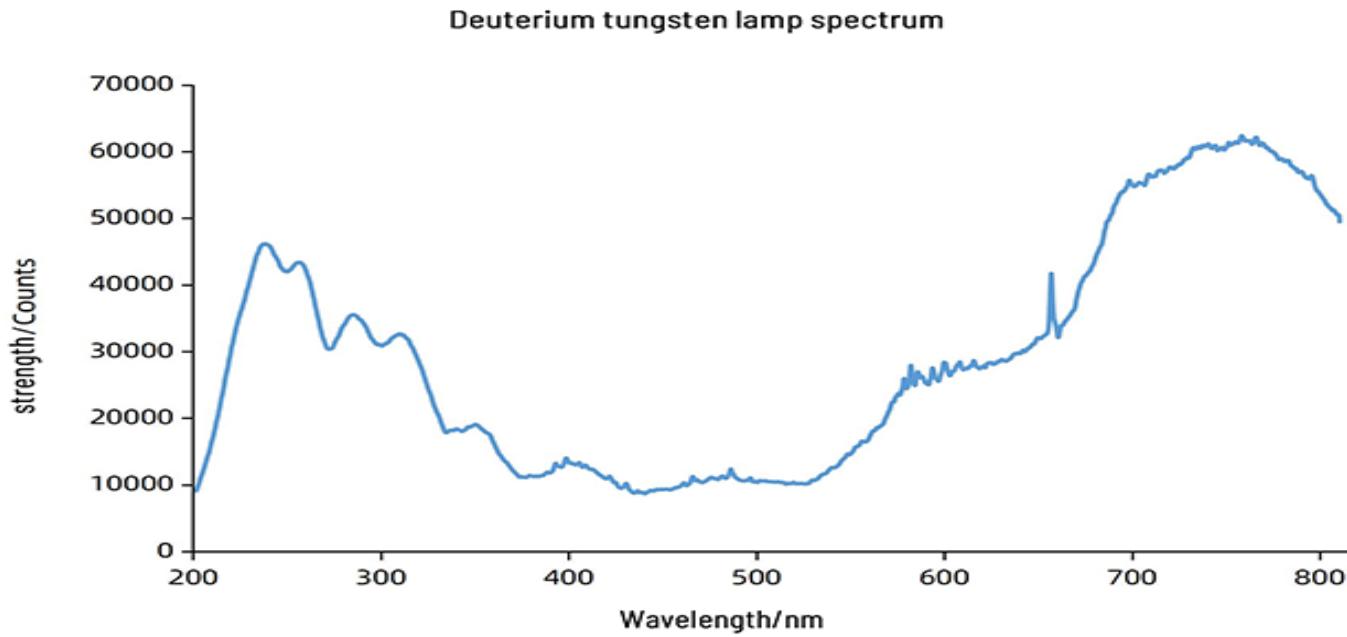
(3) Signal-to-noise ratio (SNR)



(4) Spectrum of spectral line lamp (200 - 800 nm)



(5) Spectrum of deuterium-tungsten lamp (200 - 800 nm)



VL2048 Series Spectrometer Selection Guide

Model	Spectral Region (nm)	Resolution @ 10µm Slit (nm)	Resolution @ 25µm Slit (nm)	Resolution @ 50µm Slit (nm)	Resolution @ 100µm Slit (nm)	Resolution @ 200µm Slit (nm)
VL2048-200-800	200 - 800	0.90	1.00	1.40	2.40	3.50
VL2048-350-940	350 - 940	0.80	1.00	1.50	2.40	3.60
VL2048-200-1100	200 - 1100	1.00	1.80	-	3.00	4.20
VL2048-350-1050	350 - 1050	0.90	1.00	1.60	2.80	4.00

 Get in touch with our team to explore configurations, request a quote, or learn more about customized solutions tailored to your needs.

Let us help you move science forward — faster and smarter.

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