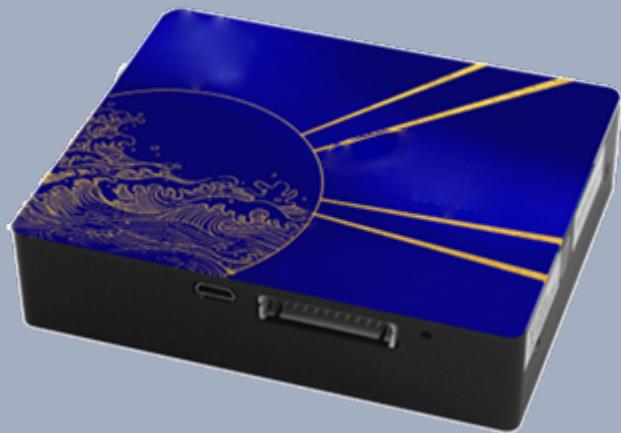# Fiber Spectrometers
PixelMax 4K Spectrometer

High-performance micro fiber optic spectrometer

• Ultra-high resolution and high sensitivity

• Low stray light characteristics

• Excellent temperature stability

• Wide spectral coverage and flexible configuration

Applications: High-precision laser characterization, plasma monitoring, and emission spectroscopy.

One Platform Many Possibilities

Contact Us sales@venuslabtech.com

Overview

Introduction to PixelMax 4K Spectrometer

This product is designed based on a symmetric CT or M-type optical path, featuring a compact structure with dimensions of 98×74×22.5mm and a weight of 236g. It adopts a key-SMA905 optical fiber interface, which is compatible with multi-core densely arranged bundled optical fibers, and the consistency of optical fiber insertion and extraction strength is ＜7%. Some materials mention that it uses a numerical aperture of N.A0.08 and a platform-based design, which can be configured with various specifications of gratings ranging from 500g/l to 2400g/l.It is suitable for laser measurement, plasma emission spectroscopy measurement, color measurement, absorbance measurement, Raman measurement, etc. In industrial production processes, it can be used for product quality inspection, material composition analysis, production process monitoring, etc., such as detecting impurity content in metal materials and monitoring reaction processes in chemical production.

Specifications

Product specifications

Optical parameter	
Optical fiber interface	Key-SMA905
Number of pixel channels	4096
Stray light	~0.1%
Temperature drift	~0.2pixel/°C
Fiber insertion and removal consistency	7%
Functional parameter	
AD sampling	16 bit
Data interface	USB2.0, RS232
Extended function interface	24PIN
Acquisition mode	Single, continuous, software trigger, synchronous external trigger, asynchronous reset external trigger
Detector integration time	60 µs-65 s
CCD read noise 1*	20
CCD dynamic range 2*	3200 : 1
Signal-to-noise ratio	400 : 1
Response linearity 3*	98%
Weight	260 g
Dimension	0°C~40°C
Operating temperature	20%-85%

Notes:**CCD readout noise:** the minimum integration time, the root mean square of the CCD readout noise;**CCD dynamic range:** dynamic range for the minimum integration time, (saturation value - dark noise baseline) / CCD readout; noise of the standard deviation, the evaluation method refers to the Oceanhood standards;**Response linearity:** response nonlinearity is before calibration.

Spectral Range & Resolution

HS4096-200-800	200	800	0.60	1.00	1.60	2.00	3.80
HS4096-750-1100	750	1100	0.40	0.50	0.70	-	-

* The actual spectral resolution is expected to exceed approximately 120% of the nominal value* The spectrometer can be tailored to customer specifications for spectral range, resolution, and other parameters

Interface Definition

Interface description

The following figure shows the interfaces of the PixelMax 4K Spectrometer. The optical fiber interface is the SMA905 interface, which is used to connect the sampling accessories such as the reflection probe, the transparent reflection bracket, and the liquid flow tank. The MicroUSB interface is used to connect a computer via a data cable. The 2.0MM-24P interface (24pin port) is used for secondary development of the spectrometer.

### Definition of the wiring pin

24pin port uses 2.0MM-24Psocket.

SMA interface

24 PIN interface
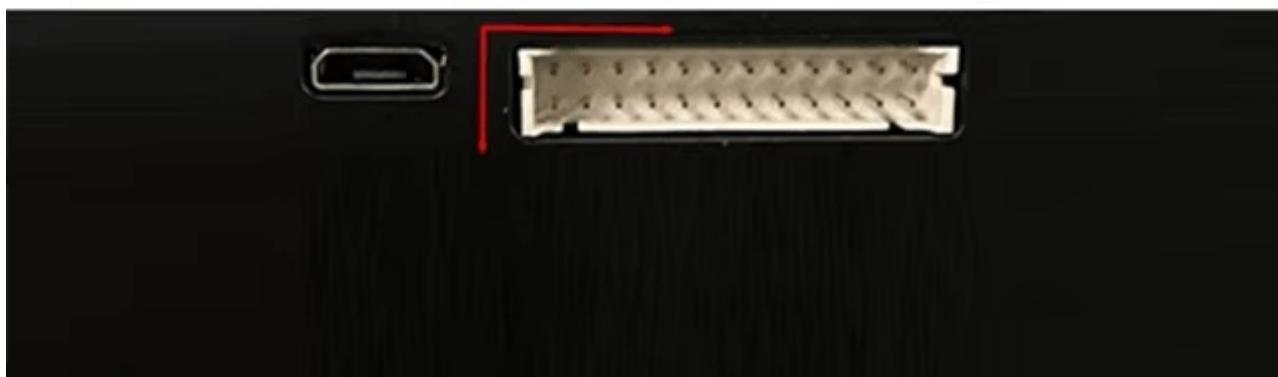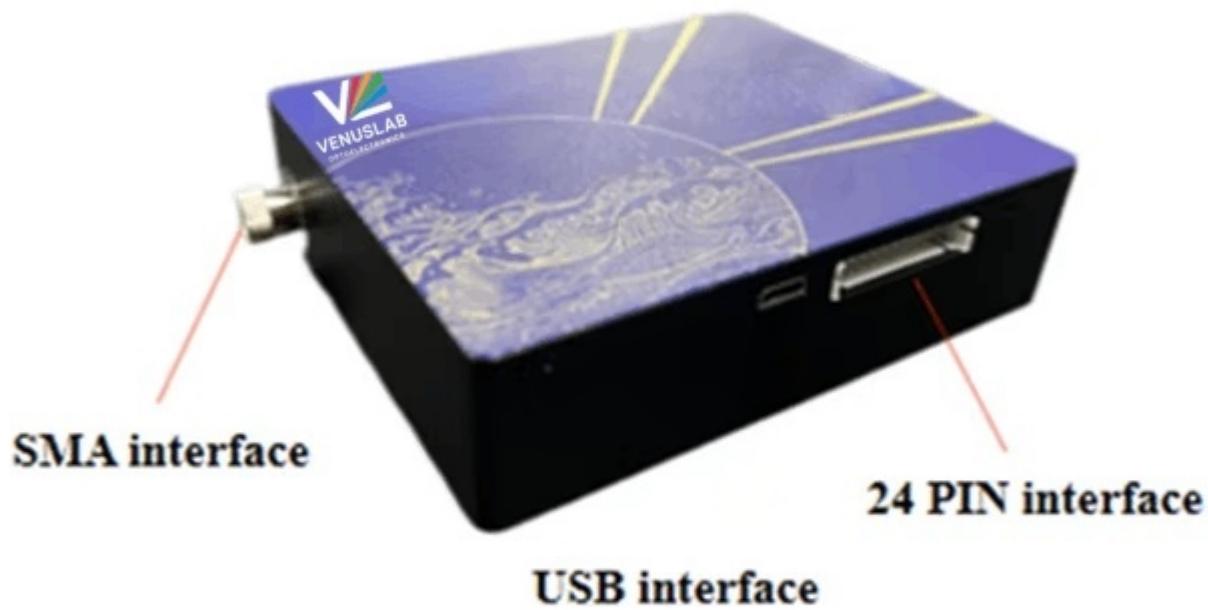
USB interface

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

Physical diagram of spectrometer 24pin interface

|		
1	EX_SET	Analog power output control laser power (input voltage 0~2.5V)
2	Monitor_RT	Laser temperature feedback
3	TEMP_SET	Reserve
4	Monitor_ILD	Laser power feedback
5	GPIO_PC6	TEC_SB mode
6	GPIO_PC10	Bluetooth device status pin
7	GPIO_PC7	GPIO output status can be configured
8	GPIO_PC11	GPIO output status can be configured
9	GPIO_PC8	Laser enable control
10	GPIO_PB8	Reserve
11	GPIO_PC9	Bluetooth control mode pin
12	GPIO_PB9	Reserve
13	UART5_TX	Serial data transmission (TTL serial port)
14	I2C2_SCL	Reserve
15	UART5_RX	Serial data reception (TTL serial port)
16	I2C_SDA	Reserve
17	SYNC_OUT	External trigger output signal
18	Laser_CLK	External Laser CLK Output Signal
19	InterLock_N	Laser InterLock control (switch that controls the laser)
20	SYNC_IN	External trigger input signal
21	DC5V	Mains positive
22	GND	Electrically
23	DC5V	Mains positive
24	GND	Signally

Typical Spectrum

1 Dark noise: integration time 100ms
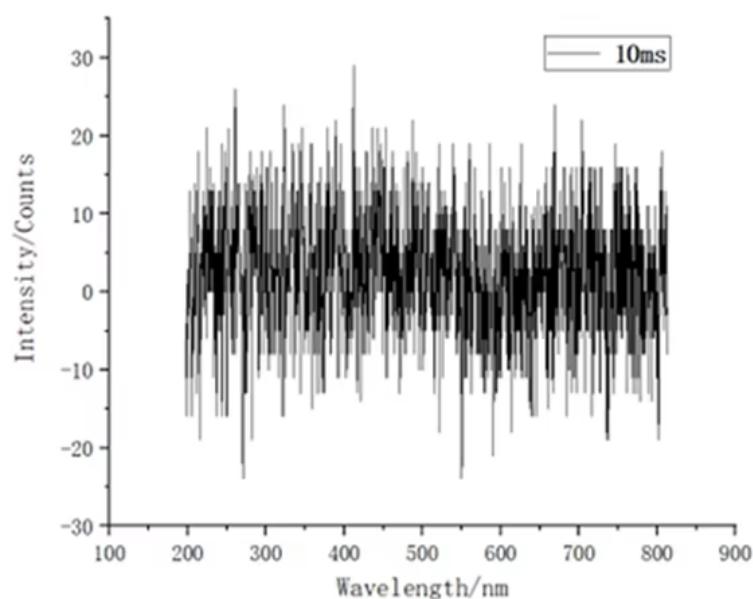
2 Dark noise: integration time 100s
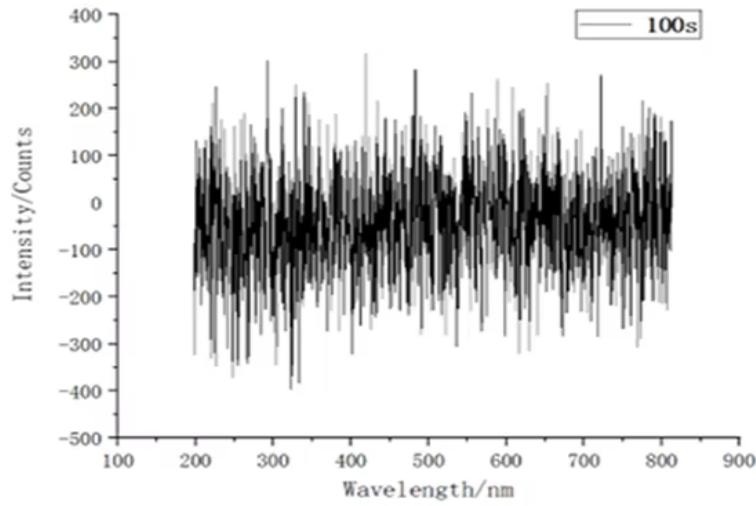
3 Deuterium tungsten lamp: integration time 5ms
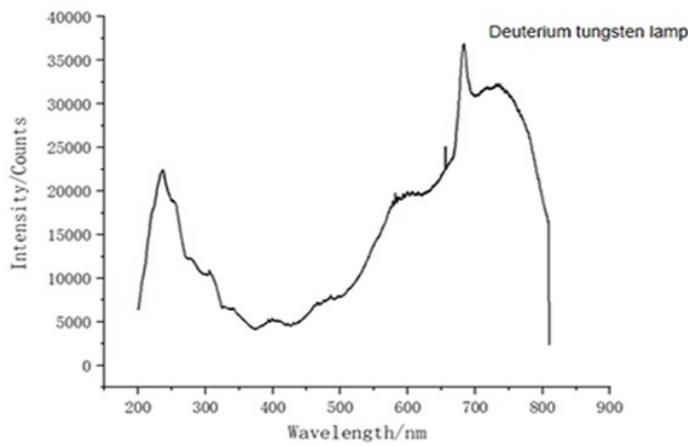
Explore Series

ModelSpectral	Resolution (50μm)	Spectral Resolution (25μm)	Spectral Resolution (100μm)	Spectral Region (nm)	Spectral Resolution (200μm)	Spectral Resolution (10μm)
VL4096-200-800	1.60	1.00	2.00	200-800	3.80	0.60
VL4096-750-1100	0.70	0.50	-	750-1100	-	0.40

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