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OPTOELECTRONICS

Precision
Meets
Simplicity

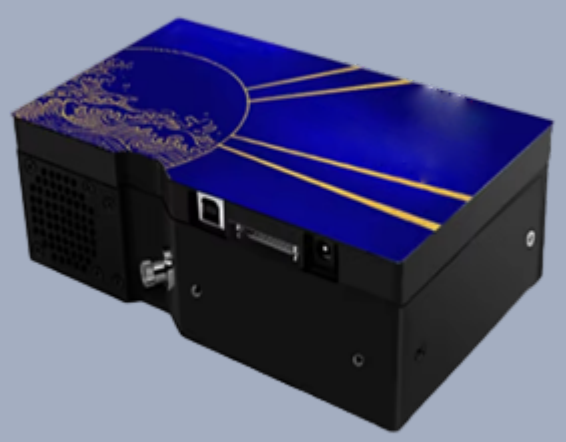
Fiber Spectrometers

CoolMute TEC Spectrometer

Industrial-grade refrigerated micro fiber optic spectrometer

- Shallow cooling temperature control, low noise and stability
- High optical performance
- Flexible acquisition and control
- Multi-interface for easy integration

Applications: Low-light fluorescence detection, Raman spectroscopy, and trace chemical analysis.



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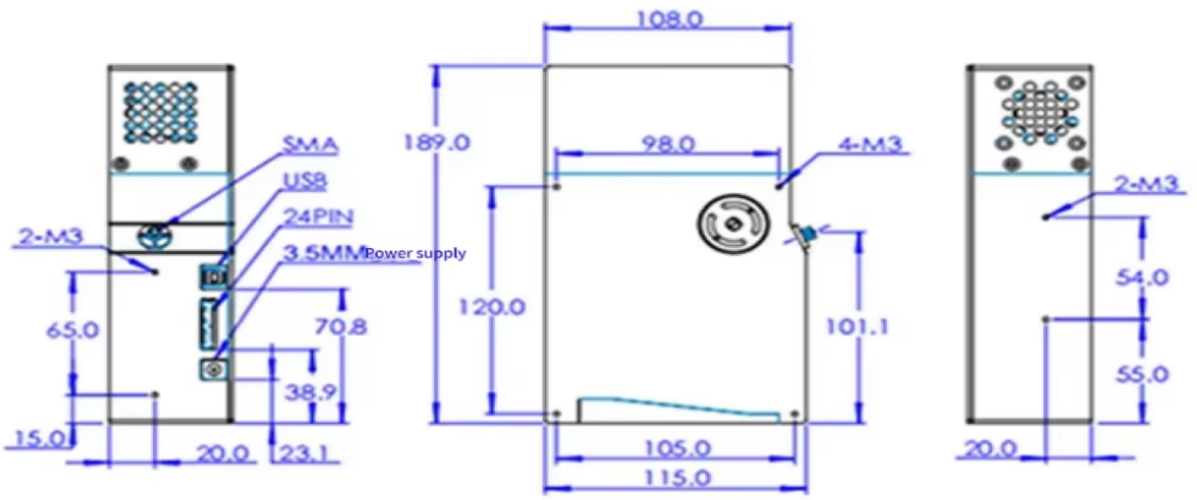
Overview

Introduction to CoolMute TEC Spectrometer：

Based on the symmetric CT optical path design, it has a front focal length of 100mm and a rear focal length of 110mm, adopts a numerical aperture of N.A0.11, and is equipped with a platform-based grating configuration (300-2400 lines/mm optional). It is adapted to the Key-SMA905 optical fiber interface, can be compatible with multi-core densely arranged bundled multi-core optical fibers, and the consistency of optical fiber plugging and unplugging strength is ≤7%. The overall size is 182×109×56mm and the weight is 1. 12kg, which takes into account both optical performance and integration portability, and is suitable for the long-term stable detection needs of industrial sites and scientific research scenarios.It is suitable for industrial on-site measurements such as laser measurement, plasma emission spectroscopy measurement, color measurement, absorbance measurement, and Raman measurement. It can also play an important role in the scientific research field, meeting the needs of long-term stable detection in both on-site and scientific research scenarios.

Dimension drawing



Specifications

Product Specifications

Product model	CoolMute TEC Spectrometer
Optical Parameter	
Optical fiber interface	Key-SMA905
Number of pixel channels 1*	2084
Stray light	~5‰
Wavelength temperature bleaching	≦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	8 ms-300 s (Max)
CCD read noise 2*	≦10
Dynamic range 3*	8000 : 1
Full signal dynamic range 4 *	15000 : 1
Signal-to-noise ratio	800 : 1
Response linearity 5*	≥98%
Weight	1.12 kg
Dimension	182*109*56 mm
Operating temperature	0~40°C
Working humidity	20%-85%

Notes & Definitions1* Number of pixel channels: CCD pixels can be selected from 2048×1 or 2048×64 pixels .**2* CCD readout noise:** Minimum integration time, the root mean square of the CCD readout noise.**3* CCD dynamic range:** Dynamic range for the minimum integration time, (saturation value - dark noise baseline) / CCD readout noise standard deviation; the evaluation method refers to the Oceanhood standards.**4* Full-signal dynamic range:** In accordance with the CCD manufacturer's indicators or peer evaluation indicators.**5* Response linearity:** Response nonlinearity for the calibration before.

Model Variants & Performance

Specification	Cooling temperature	Spectral Range		Resolution
	°C	Start Wavelength (nm)	Cut off Wavelength (nm)	25 μm
VLTEC-535-630	10	535	630	0.30
VLTEC-795-1040	10	795	1040	0.45
VLTEC-200-1000	10	200	1000	1.40

Disclaimer: 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.

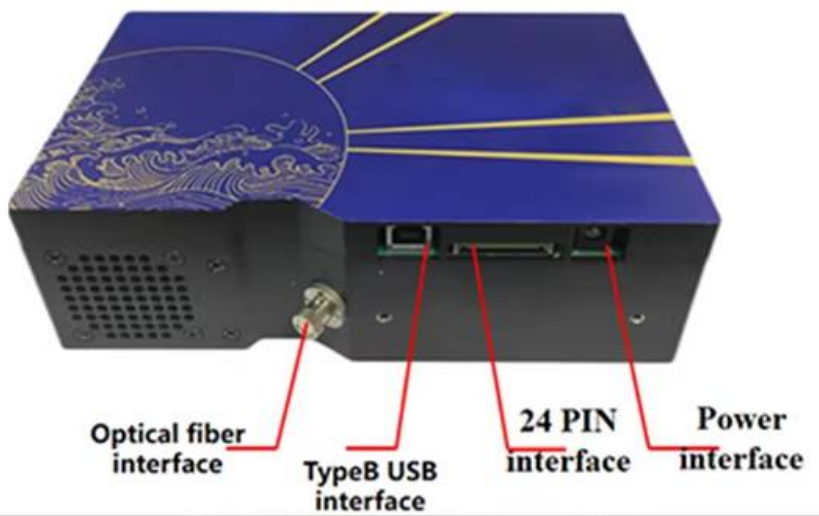
Interface Definition

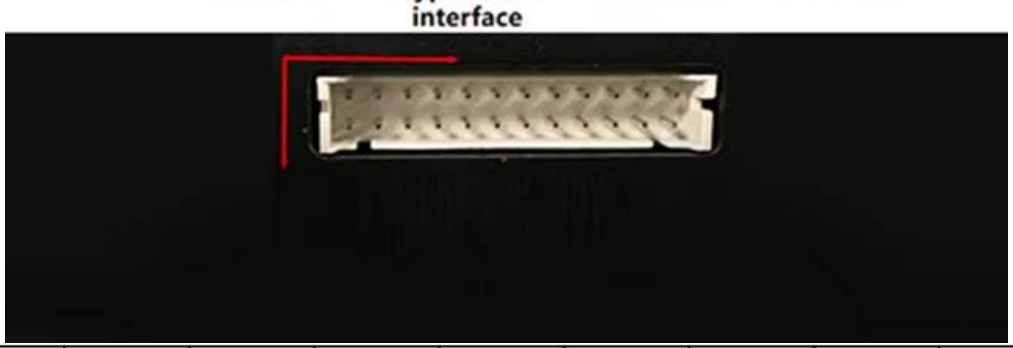
Interface description

The following figure shows the interfaces of the CoolMute TEC 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 TypeB USB interface is used to connect a computer through a data cable. The 2.0MM-24P interface (24pin port) is used for secondary development of the spectrometer. The power port connects to the 5V10A power adapter for power supply.

Definition of the wiring pin

24pin port uses 2.0MM-24Psocket.

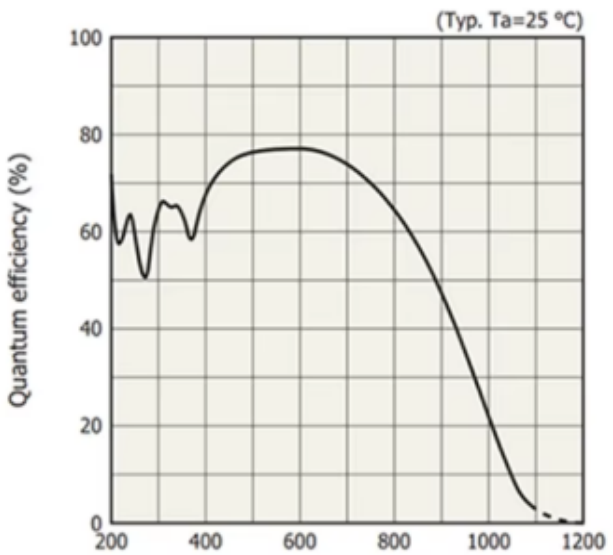




24	22	20	18	16	14	12	10	8	6	4	2
23	21	19	17	15	13	11	9	7	5	3	1

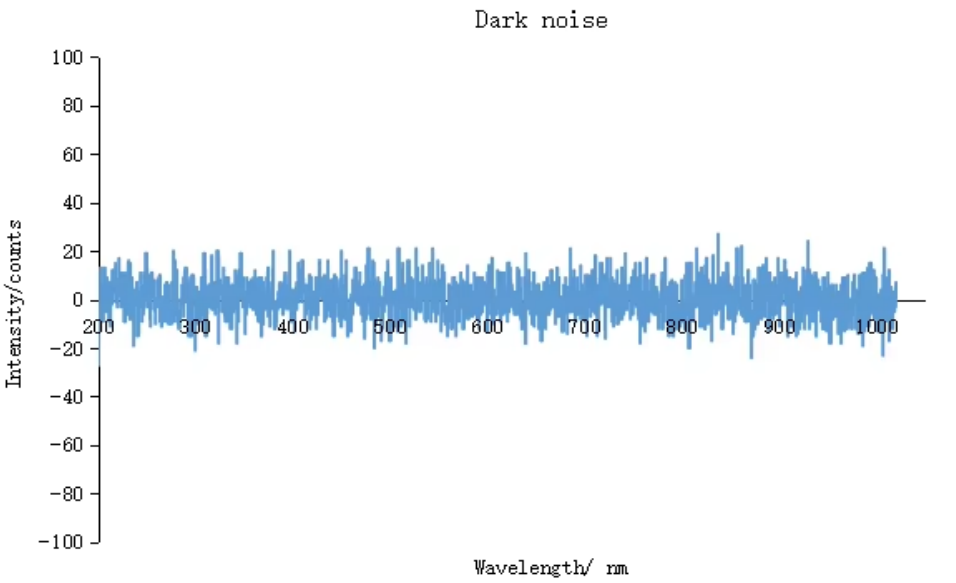
Pin Number	Definition	Function
1	EX_SET	Analog power output control laser power (input voltage 0~2.5V)
2	Monitor_RT	Laser temperature feedback
3	TEMP_SET	Reserve
4	Monitor_ILD	Laser power feedback
5	GPIO_PC6	TEC_SB mode
6	GPIO_PC10	Bluetooth device status pin
7	GPIO_PC7	GPIO output status can be configured
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 trigger reset 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 (Power Ground)
23	DC5V	Mains positive
24	GND	Signally (Signal Ground)

CCD Spectral response efficiency diagram

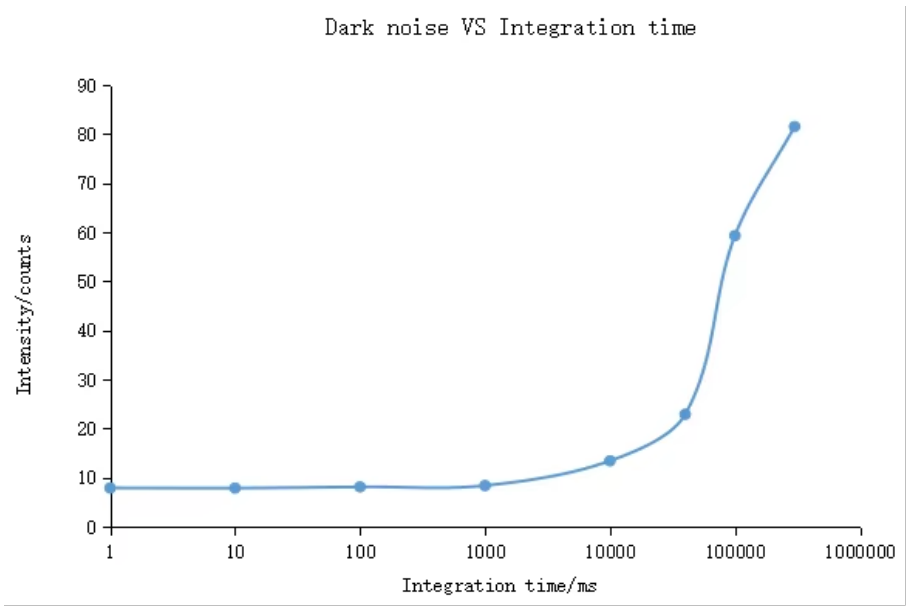


Typical Spectrum

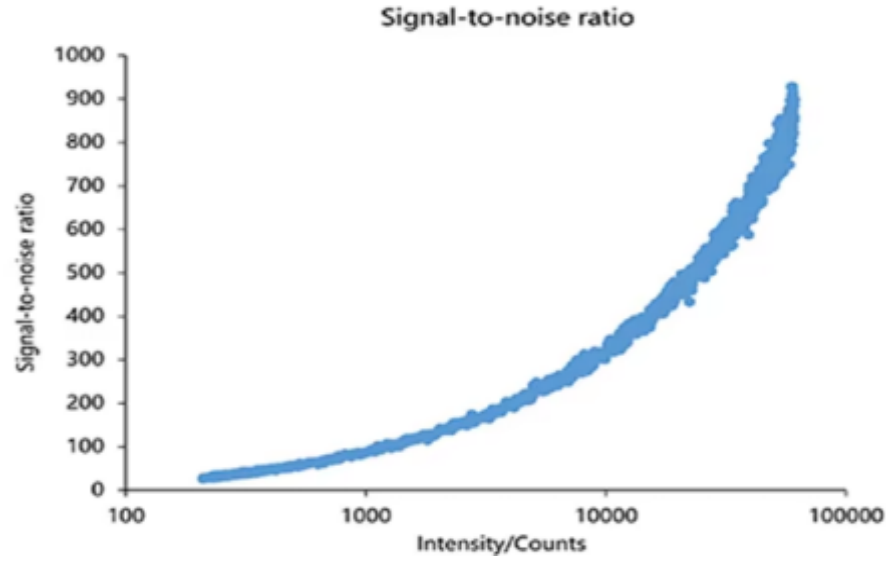
(1) Typical dark spectrum at 10ms integral time



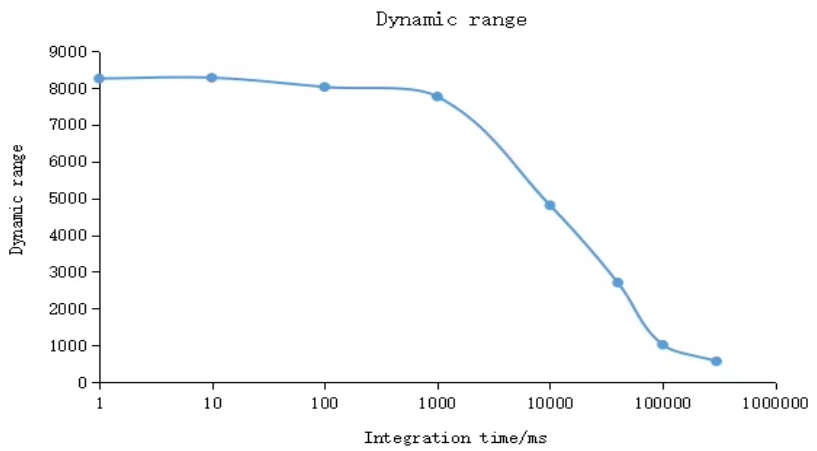
(2) Dark noise VS integration time



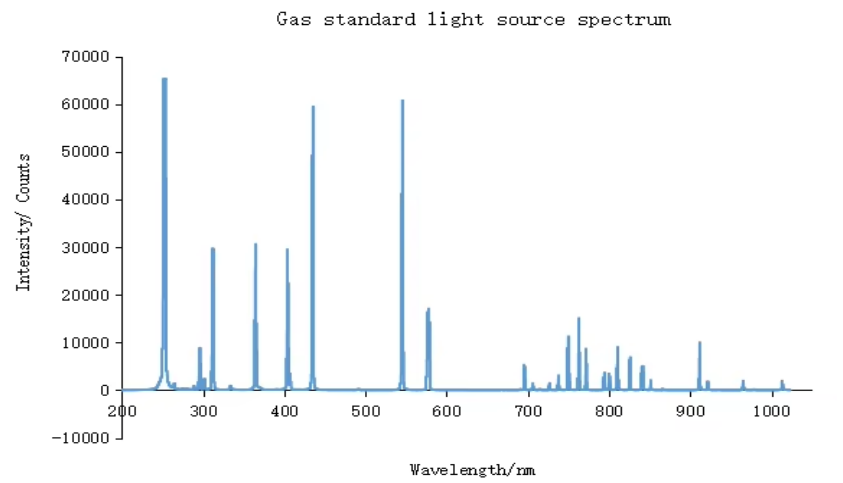
(3) 10ms integrated time signal to noise ratio (active)



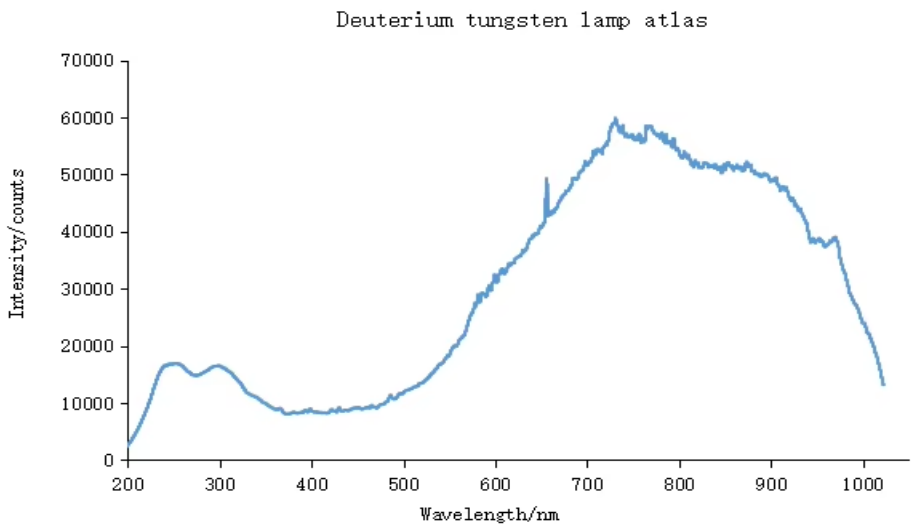
(4) Dynamic range



(5) Standard light source spectrum (200-1000 nm)



(6) Deuterium tungsten light spectrum (200-1000 nm)



Explore Series

Model	Spectral Resolution (at 25μm slit)	Refrigeration Temperature	Size	Spectral Region
VLTEC-535-630	0.30 nm	-5°C	182 × 109 × 56 mm	535 - 630 nm
VLTEC-795-1040	0.45 nm	-5°C	182 × 109 × 56 mm	795 - 1040 nm
VLTEC-200-1000	1.40 nm	-5°C	182 × 109 × 56 mm	200 - 1000 nm

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