User Manual

7ISW152 Spectrometer

Optics Focus Instruments Co., Ltd.

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1. Features

- Czerny-Turner optical design for high resolution & maximum throughput while minimizing stray light & aberrations
- Dual ruled gratings used for high efficiency ultraviolet to visible wavelength scanning
- Single output port version with CCD detector
- Micrometer adjustable slits
- Utility software and an ActiveX Control file included
- Control with USB and RS-232
- Nitrogen connector is available for UV and NIR testing
- Entrance is compatible with our light sources and fiber interface
- Exit is compatible with our single-point detector and other accessories
- The precision worm & gear structure guarantee the high accuracy and repeatability
- Optics chamber and mechanical drive chamber are separated to reduce stray light and pollution to optical components

2. Description

This series of Spectrometers is a high performance, economical and user-friendly spectrometer – an ideal instrument for research and OEM applications.

This series of Spectrometers uses an asymmetrical in-plane Czerny-Turner optical configuration. The optical configuration is designed to ensure high resolution and maximum throughput. The F/4.5 Spectrometer is optimized to provide excellent stray light rejection while minimizing aberrations. Its wavelength drive is designed to increase speed as much as possible without sacrificing accuracy or precision.

Utility software is included to control both the spectrometer and filter wheel. An ActiveX Control file and an easy-to-understand command set are provided for those wanting to create their own programs by LabView or other programing languages.

3. Specifications

Model	7ISW152
Focal Length	150mm
F/#	F/4.5
Stray Light	$5x10^{-4}$
Minimum Step	0.0045nm
Number of Gratings Supported	2
Grating Name	Grating S30x30x6
Grating Size	30mmx30mm
Standard Grating	OG1200-300(1200g/mm, λp=300nm) OG600-1000(600g/mm, λp=1000nm)
Wavelength Selection Method	Motorized
Output Ports	1 (with CCD detector)
Slits	Micrometer Slit
Slits Height	5mm
Slits Width	10μm-3mm
Communication Interfaces	RS232 and USB
Size	298mmx200mmx185mm
Center Height of Light Path	140mm (±5mm)
Weight	10kg

4. Specifications of Optional Gratings

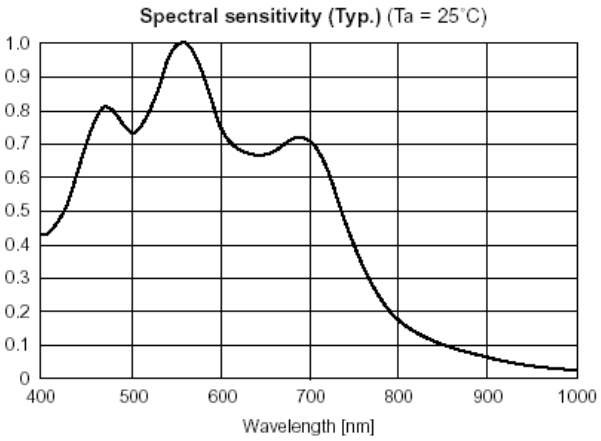
Grating Model	Linear Dispersion (nm/mm)	Accuracy (nm)	Repeatability (nm)	Resolution (nm)	Theoretical Spectral Range (nm)	Mechanical Spectral Range (nm)
OG2400-250	2.7	0.13	0.05	0.2	185-500	0-550
OG1800-250	3.6	0.17	0.08	0.27	185-500	0-730

OG1800-500					330-730	
OG1200-250	5.4	0.25	0.1	0.4	185-500	0-1100
OG1200-300					200-600	
OG1200-500					330-1000	
OG600-300	10.8	0.5	0.2	0.8	200-600	0-2200
OG600-400					260-800	
OG600-500					300-1000	
OG600-750					500-1500	
OG600-1000					660-2000	
OG600-1250					830-2200	
OG300-500	21.6	1.0	0.4	1.6	330-1000	0-4400
OG300-1250					830-2500	
OG300-1800					1200-3600	
OG300-3000					2000-4400	
OG150-4000	43.2	2.0	0.8	3.2	2600-8000	0-8800
OG66-DB	97	4.6	1.8	7.3	2500-25000	0-20000
OG50-12000	130	6	2.4	9.6	8000-24000	0-26400

5. CCD Specifications

Manufacturer	TOSHIBA
Pixel Size	8μm×200μm
Pixel Number	3648
SNR	≥60dB
A/D	16Bit
Exposing Time	1ms－100ms
PC Interface	USB2.0
Size	Ø123 x 40
Weight	0.6Kg
Range	45nm

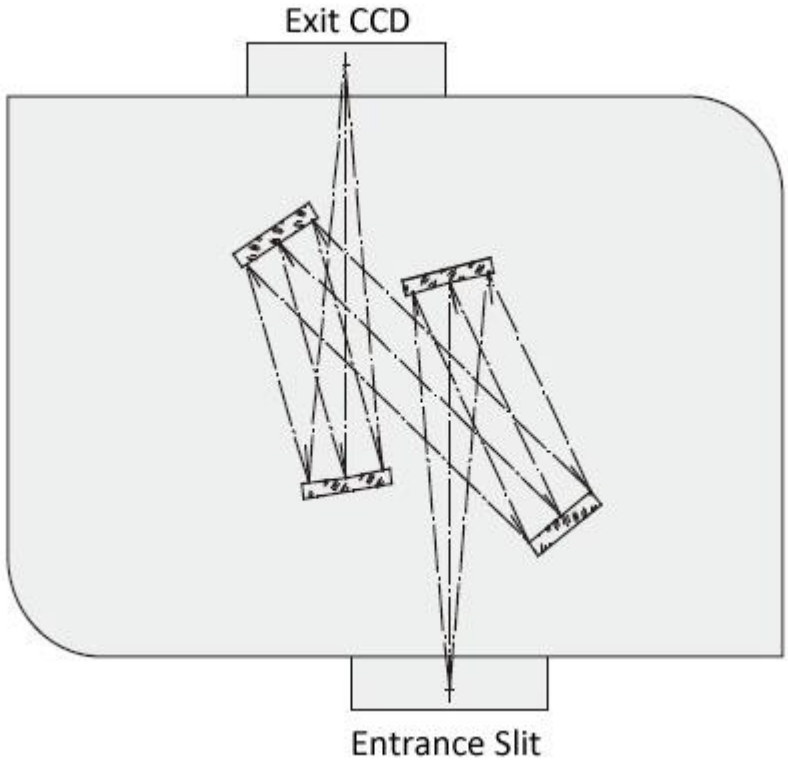
Spectral Response Curve:



6. Optical Design

This series of spectrometers uses unsymmetrical horizontal light paths and changes the off-axis angle to correct coma, improves symmetry of spectral lines and improves resolution.

Eliminating secondary dispersion is designed to restrain stray light. The F/4.5 spectrometer is optimized to provide excellent stray light rejection while minimizing aberrations.

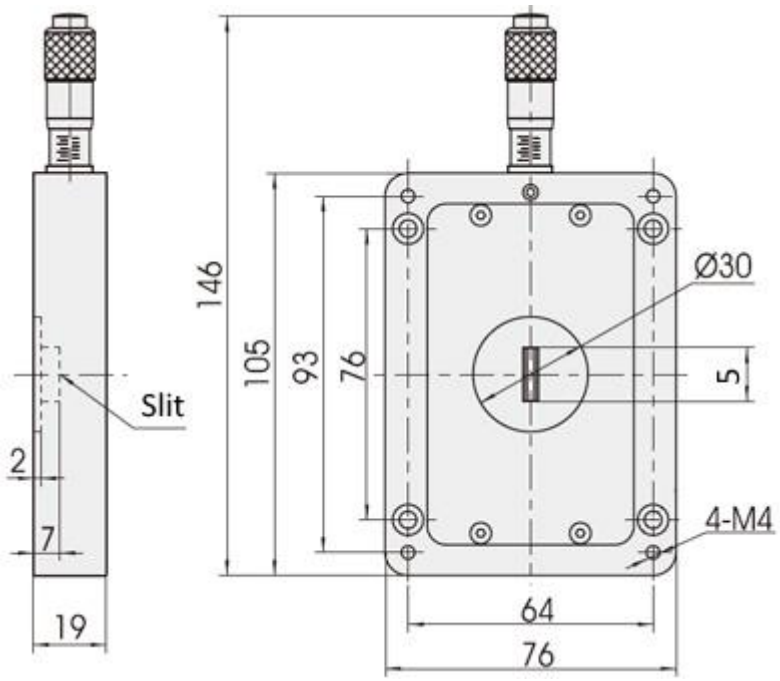


7ISW152 spectrometer optical design

7. Slits Adjustment

This series of spectrometers uses micrometer adjustable slits with sharp stainless-steel blades. The narrowest practically achievable width is 10 μm. The slit is 5 mm high and its width can be adjusted from 10 μm to 3 mm.

The slit uses micrometer head with 10μm graduations to drive the width of slits. The displacement is 0.25mm per revolution.



8. Usage

Cable Connection:

- Connect 9-pin connector of spectrometer to the RS232 serial port of computer. Or connect the spectrometer to computer by USB line.
- If you have bought our 7IFW6 filter wheel, please connect 15-pin connector of spectrometer to the 9-pin connector of 7IFW6 filter wheel.
- Connect the CCD to computer by USB line.

After connecting all the cables firmly, turn on the power of the instrument. The red indicator light will be lighted up to represent normal power supply. If the red light is not lighted up, please check the fuse or power socket.

After you turn on the power, you will hear worm gear is rotating. That means the instrument is making self-

checking and resetting. After finishing self-checking, the instrument will stop automatically and wait for communication with computer.

Now you can run the 7ISWS application software and select the actual RS232 port to make communication. During the self-checking, the instrument cannot communicate with computer and the software will prompt the communication was failed. Please exit the software, after self-checking is finished (the sound of rotation is stopped), rerun the software and select the actual RS232 port, the communication will be successful.

You can use software to operate the instrument to automatically change the wavelength, scan spectrum, switch gratings and change filters (if you have bought 7IFW6 filter wheel from us). Please refer to the software manual.

The spectrometer should be power on when using CCD. The wavelength range of CCD need to be set by the spectrometer. Please connect CCD by USB line and switch to CCD by hand or by software. Please refer to software manual.

Note: To avoid damage of computer and instrument, please do not plug / unplug cables when the instrument is still power on.

9. Others

Fiber adapter

If you have bought the adapter for SMA905 fiber from us, please replace the cover of the slits with the fiber adapter and connect the fiber directly.

Nitrogen connector

To avoid the absorption of air, you can fill the spectrometer with nitrogen in ultraviolet and near infrared band to improve the efficiency. There is a specific nitrogen connector with the spectrometer.

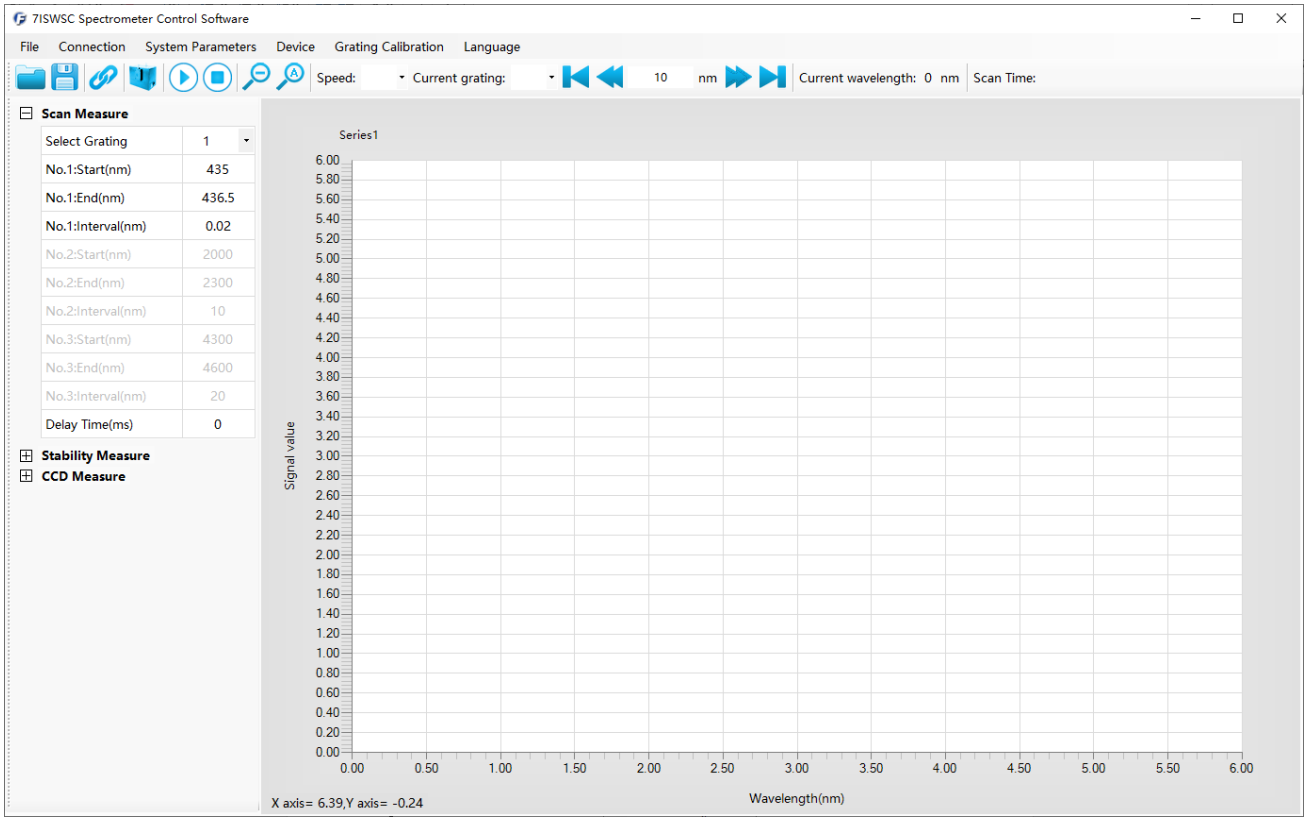
When you need to use it, remove the cover and install the nitrogen connector, then connect the nitrogen pipe.

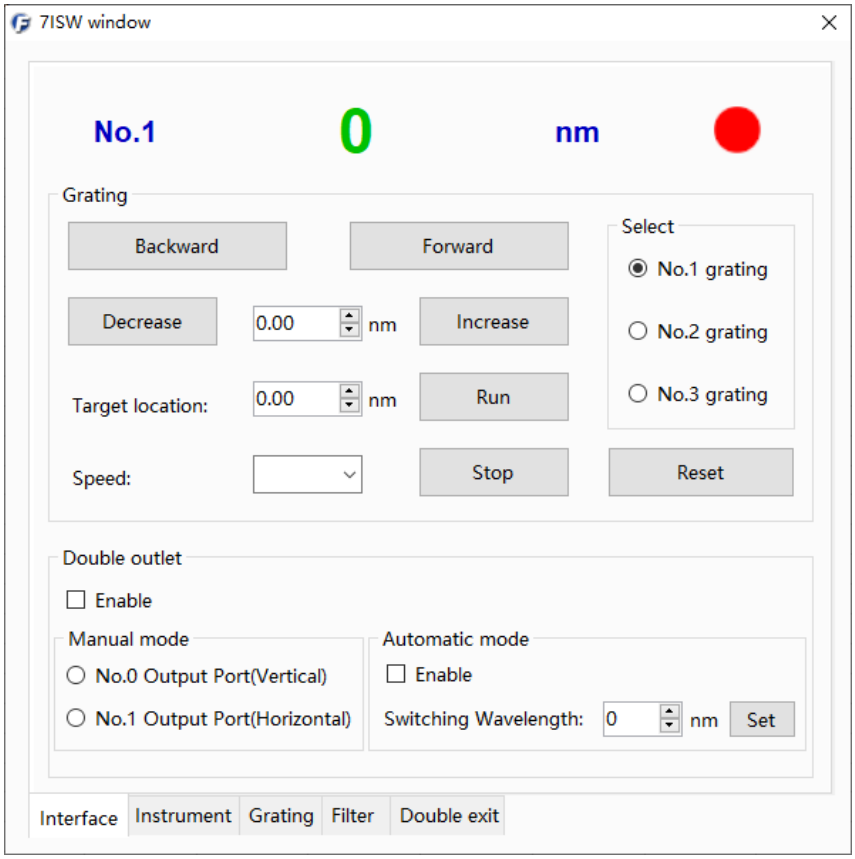
Note: The nitrogen connector can't be used for other gases.

The nitrogen is a kind of non-toxic, pollution-free, non-irritating and non-corrosive gas, so you can keep filling it during the whole experiment to keep the nitrogen concentration and positive pressure in the instrument. The excess gas will leak off through gaps.

10. Utility Software

The utility software is included at no extra cost with all models to control both the monochromator/Spectrometer and filter wheel accessory. The utility software provided with the monochromator/Spectrometer includes USB drivers for 64-bit operating systems. Please refer to the Software Manual provided with the monochromator/Spectrometer for instructions on installation and use.





11. Accessories

1 x 220V line cord or 110V line cord

1 x USB to RS232 convertor cable

1 x USB cable for CCD

2 x 3A fuse

1 x Nitrogen connector