User Manual

7ISW505 Series Spectrometers

Optics Focus Instruments Co., Ltd.

Contents

1. Features

- Czerny-Turner optical design for high resolution & maximum throughput while minimizing stray light & aberrations

- Triple ruled gratings used for high efficiency ultraviolet to visible wavelength scanning

- Single or dual 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 Spectrometer is a high performance, economical and user-friendly spectrometer – an ideal instrument for research and OEM applications.

This series of Spectrometer uses an asymmetrical in-plane Czerny-Turner optical configuration. The optical configuration is designed to ensure high resolution and maximum throughput. The F/8 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 monochromator 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	7ISW5051	7ISW5052	7ISW5053
Focal Length	500mm		
F/#	F/8		
Stray Light	5×10^{-4}		
Minimum Step	0.0023nm		
Number of Gratings Supported	3		
Grating Name	Grating S55x55x6		
Grating Size	55mmx55mm		
Standard Grating	OG1200-300(1200g/mm, λp=300nm) OG600-750(600g/mm, λp=750nm) OG300-1250(300g/mm, λp=1250nm)		
Wavelength Selection Method	Motorized		
Output Ports	1	2	2
Output Ports Selection Method	N/A	Manual	Motorized
Position of CCD Detector	Axial Exit		
Slits	Micrometer Slit		
Slits Height	14mm		
Slits Width	10μm-3mm		
Size	560mmx320mmx204mm		
Weight	22kg		

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	0.8	0.1	0.05	0.03	185-500	0-550

OG1800-250	1.1	0.15	0.08	0.04	185-500	0-730
OG1800-500					330-730	
OG1200-250	1.7	0.2	0.1	0.05	185-500	0-1100
OG1200-300					200-600	
OG1200-500					330-1000	
OG600-500	3.4	0.4	0.2	0.1	330-1000	0-2200
OG600-750					500-1500	
OG600-1000					660-2000	
OG600-1250					830-2200	
OG300-500	6.8	0.8	0.4	0.2	330-1000	0-4400
OG300-1250					830-2500	
OG300-1800					1200-3600	
OG300-3000					2000-4400	
OG150-4000	13.6	1.6	0.8	0.4	2600-8000	0-8800
OG66-DB	30.6	3.7	1.8	0.9	2500-25000	0-20000
OG50-12000	41	5	2.5	1.2	8000-24000	0-26400

5. CCD Specifications

|	
Manufacturer	TOSHIBA
Pixel Size	8μm×200μm
Pixel Number	3648
Range	300nm-1100nm
Exposing Time	200μs－20ms
A/D Rate	187.5kHz
A/D Depth	16Bit
PC Interface	USB2.0

Spectral Response Curve:

SPECTRAL RESPONSE
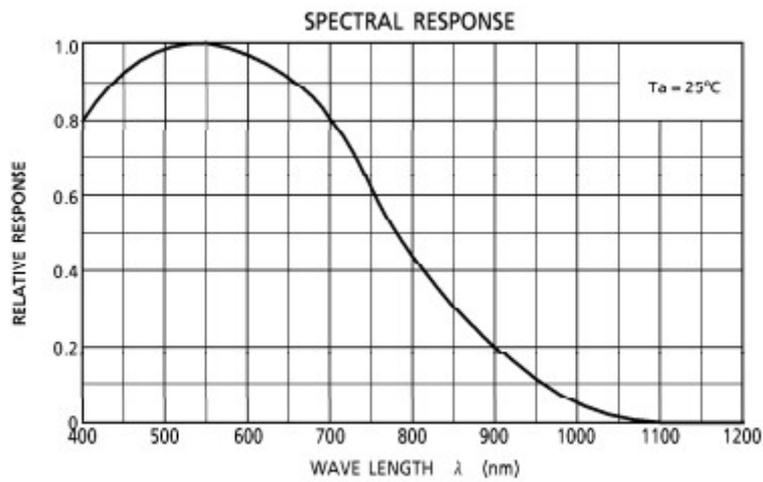
6. Optical Design

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/8 spectrometer is optimized to provide excellent stray light rejection while minimizing aberrations.
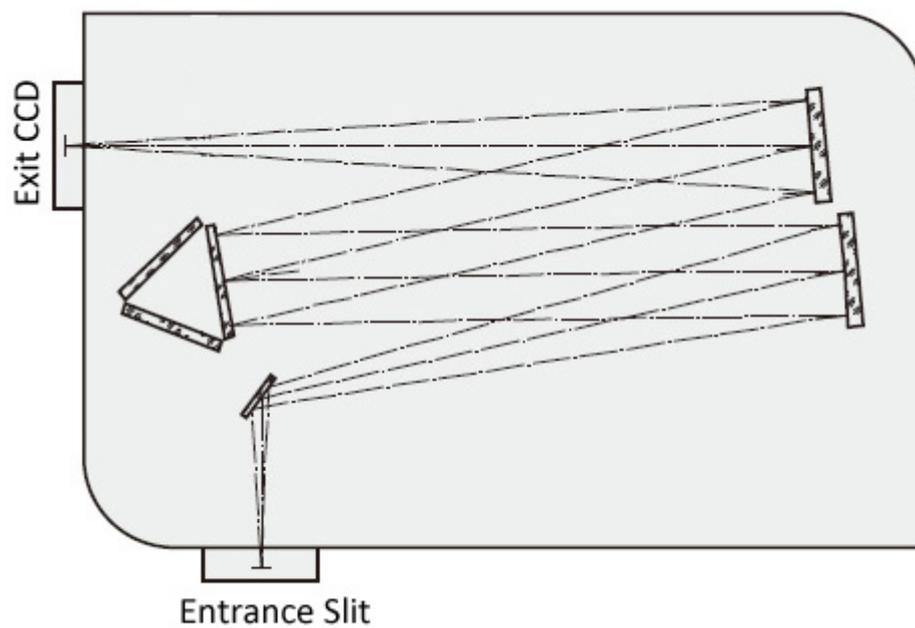
7ISW5051 spectrometer optical design
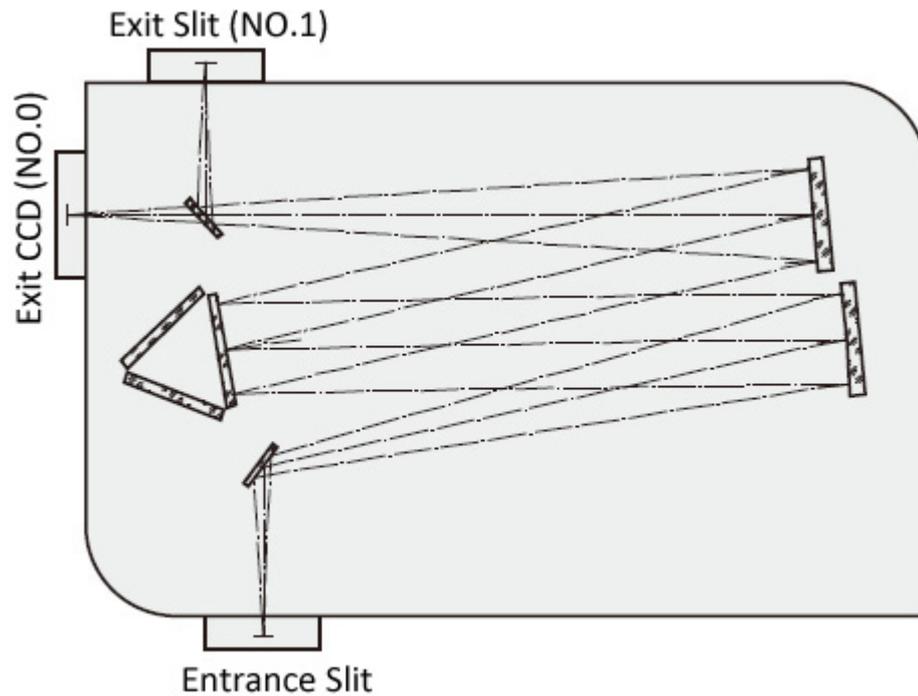
7ISW5052, 7ISW5053 spectrometer optical design

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 14 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.
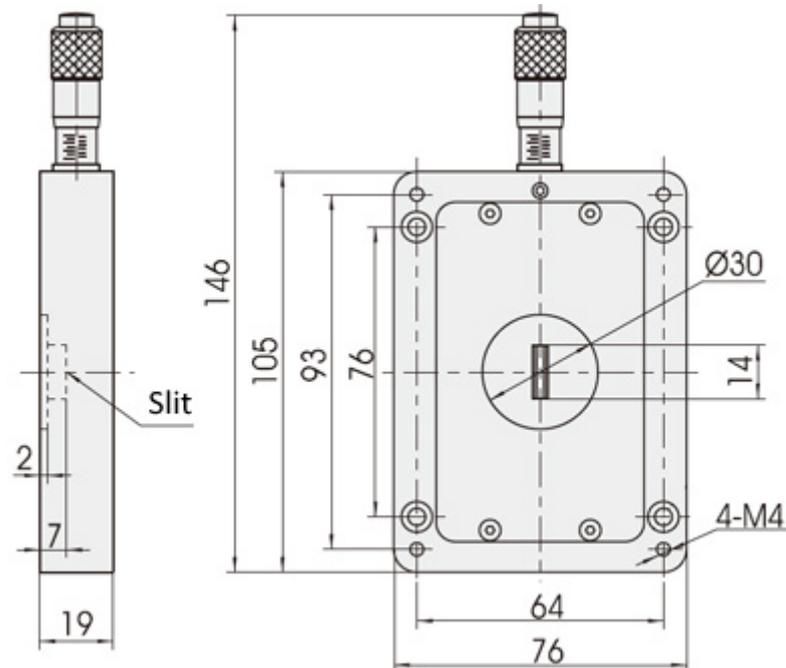
8. Usage

Before turning on the power of 7ISW5053 Monochromator, please remove the bolts under the lateral exit.

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.

There is a manual switch bar for 7ISW5052 spectrometer. You can select the exit port manually, and there is an icon near it to represent the current exit port. Please put the switch bar in place without too much force.

For 7ISW5053 spectrometer, exit ports changing is controlled automatically by software, please read the 7ISWS software manual.

The spectrometers should be power on when using CCD. The wavelength range of CCD need to be set by the spectrometers. 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.
Before turning on the power of 7ISW5053 Monochromator, please remove the bolts under the lateral exit.

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.
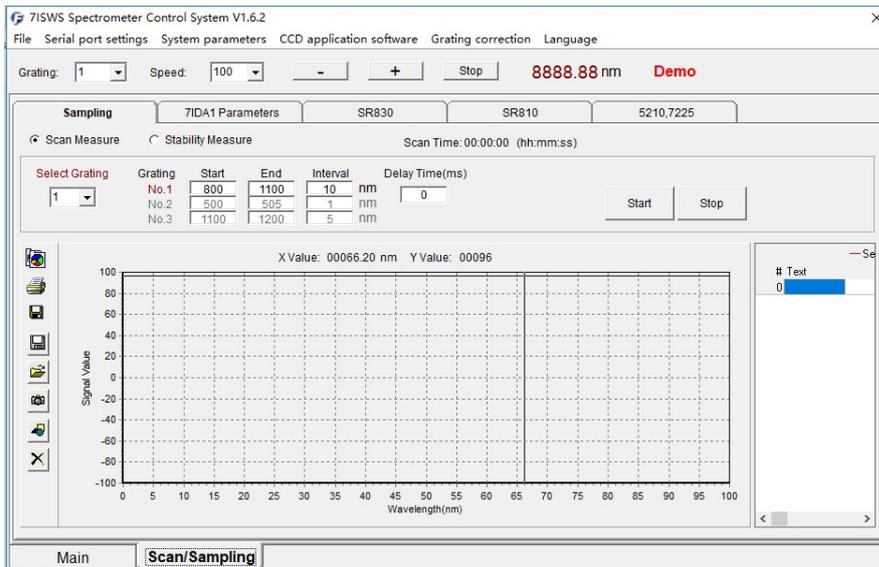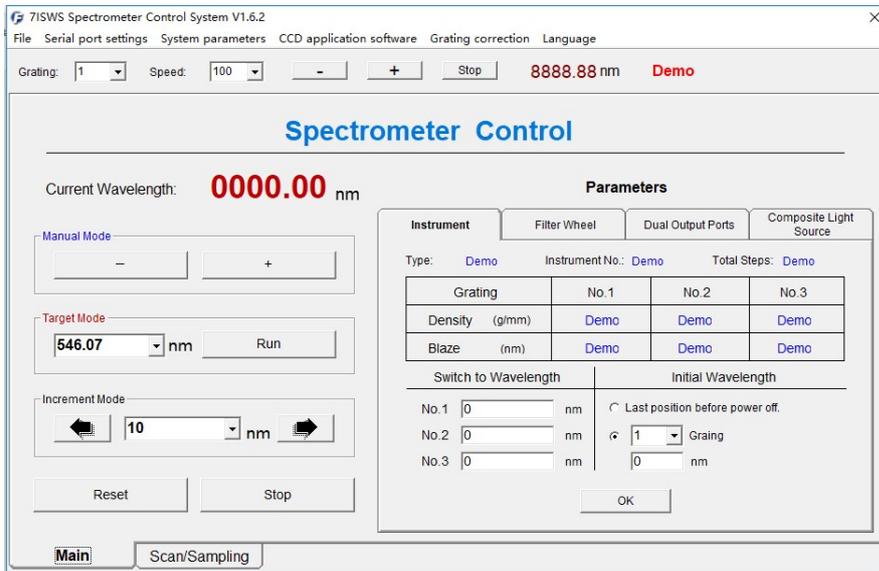
Nitrogen connector

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 Windows 7 32-bit and 64-bit operating systems. The software can also control the instrument through an RS232 or USB connection. Please refer to the Software Manual provided with the monochromator/Spectrometer for instructions on installation and use.

Utility Software Screens

11. Accessories

1 x 220V line cord or 110V line cord

1 x RS232 cable

1 x USB cable

1 x USB cable for CCD

2 x 3A fuse

1 x Nitrogen connector