Oriel Cornerstone™ 260 1/4 m Monochromator

Cornerstone 260 1/4 m Monochromator with a detector mounted to each output port

- New, USB2.0 models
- Operate two or three gratings simultaneously, individually replaceable
- Dual output ports
- Superior resolution and very low stray light

Our Oriel Cornerstone 260 1/4 m Monochromators are economical, fully automated, multi-grating instruments with dual output ports and exceptional optical performance. We offer a dual grating and a triple grating model; both were designed for fast, automated, continuous scanning over a broad spectral range. Simply program your filter, grating, and port changeover points, and walk away while Cornerstone 260 automatically scans from the UV through the far IR. Other standard features include a built-in electronic shutter, filter wheel control, USB 2.0 or RS-232 and IEEE-488 communications, nitrogen purge for work below 180 nm, and a family of interchangeable gratings and slits.

Why The Cornerstone 260?

Superior performance and ease of use at an economical price make the Cornerstone 260 Monochromator one of the best choices for UV-IR spectroscopy and radiometry. The dual grating instruments offer improved resolution, over the triple grating instruments. The grating mounts are interchangeable, so if you currently have a triple grating Cornerstone, you can easily convert it to a dual grating instrument for improved resolution in your spectral range of interest.

Optical Configuration

Fig. 1 shows the asymmetrical in-plane Czerny-Turner optical configuration of the Cornerstone 260. The input F/number is F/3.9. The resolution is 0.10 nm (dual grating instruments with a 1200 l/mm grating and 10 µm x 2 mm slit). Throughput is high and stray light is very low. We relied on our extensive research on optical flat black paints and baffles, and the use of high efficiency spherical mirrors and gratings to minimize surface reflections, and thus, stray light.

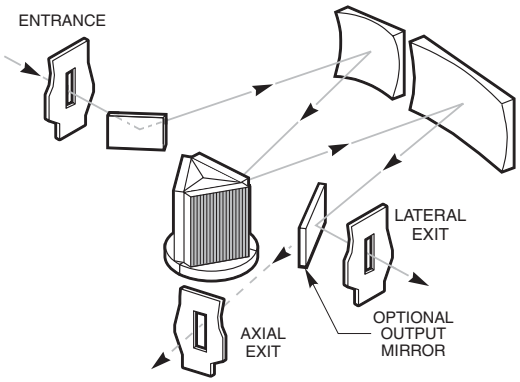

Fig. 1 Optical design of the triple grating Cornerstone 260 1/4 m Monochromator

Two Output Ports

Cornerstone 260 has two output ports to allow continuous scanning over a broad wavelength range without breaking down the instrument to switch detectors. This switcher is commanded through the Cornerstone 260 software or hand controller. Note that with the help of model 77713 Motorized Beam Steerer (see page 1316), it is also possible to turn the monochromator into a dual input instrument.

Instrument Control

We offer Cornerstone 260 Monochromators with USB 2.0 or with RS232 and IEEE-488 interfaces. You can communicate with any of the Cornerstone 260 instruments in one of 3 manners.

Hand Controller

The 74009 Hand Controller is a dedicated interface just for the Cornerstone Monochromator Family. There is no need to memorize commands or key sequences; the 24 keys are clearly labeled with functions like “Step Up,” “Go Wave,” and “Shutter”. The backlit LCD display provides constant information on grating lines/mm, filter wheel position, current wavelength, and shutter status. The 74009 provides intuitive access to nearly all the functionality of the Cornerstone 260.

Computer Control

The computer interface was also designed for simplicity and ease of use. The Cornerstone ASCII command set is simple to use via RS 232 or GPIB. For example, close the shutter is “SHUTTER C” and change to the second grating is “GRAT 2”.

Complete Software Packages

We offer various software applications for Cornerstone™:

- A simple utility program to get up and running right away (included with all Cornerstone 260 instruments)
- For LabView programming we offer VIs (included with all Cornerstone 260 instruments)
- TRACQ Basic™; this is an optional instrument control and data acquisition software package. It controls the Cornerstone 260, its accessories, the Oriel Merlin™ Digital Lock-in, and new Optical Power Meter. TRACQ™ Basic lets you set the monochromator parameters, i.e. grating changeover point, data collection points, etc., and walk away while Cornerstone does the work. See page 1220 for full details on TRACQ™ Basic.
- TRACQ™ Pro; this optional program is our advanced Radiometry Software Application; it is primarily used to complement our InstaSpec™ Benchtop Spectrometers, although it will control all Oriel Spectroscopic instruments (including the Cornerstone family of Monochromators), see page 1220 for details.

Interchangeable Gratings

The Cornerstone 260 holds two or three gratings simultaneously. Each is mounted in its individual, prealigned mount. Simply drop it in place, and program the grating specifications into the Cornerstone through the Control/Utility Program or Hand Controller. If you intend to use the Cornerstone 260 as a triple grating instrument, choose your gratings from the “Triple Grating Assemblies” list in Table 1. If you intend to use the instrument as a dual grating monochromator, order two gratings from the “Dual Grating Assemblies” list.

Add Gratings in the Field

You can add and change gratings in the field without changing the instrument’s grating turret. However, you may have to replace your current grating assemblies. If you want to change a dual grating instrument into a triple grating instrument, you cannot simply order a third grating; all three of your gratings need to be Triple Grating Assemblies. Similarly, if you wish to convert your triple grating Cornerstone 260 to a dual grating Cornerstone 260 (to improve resolution), you can’t simply remove one grating; you will need to order two new Dual Grating Assemblies.

Four Types of Slits

We offer four types of slit assemblies for the Cornerstone 260. Choose the same size and type of slit for the input and output of your monochromator. All our slit assemblies have a 1.5 Inch Series male flange.

Motorized Slit Assembly

- Automated resolution control
- Variable width from 6 µm to 3 mm
- ±5 µm repeatability
- 6 µm resolution
- ±10 µm accuracy

This is our most versatile slit assembly. Change your instrument’s resolution by varying the slit width from 6 µm to 3 mm, in 6 µm steps. To operate a motorized slit, you also need the 74116 Slit Control Board; this board operates up to three motorized slits. Control is via the 74009 Hand Controller, or software. Input and output motorized slits are slightly different due to the mounting blocks. Please order motorized slits at the time you order the monochromator, so that we may factory install them. We do not recommend the installation of motorized slits in the field.

Micrometer Driven Slit Assembly

- Continuously variable width from 4 µm to 3 mm
- Continuously variable height from 1 to 15 mm
- ±10 µm repeatability
- ±10 µm accuracy from 4 to 250 µm, ±5% from 250 µm to 3 mm

The 74001 is a more economical choice than the motorized assembly, if you need to change resolutions frequently. It uses a precision micrometer drive to adjust the slit width from 4 µm to 3 mm.

Multiple Fixed Slit Assembly

- 8 fixed slit positions from 50 µm to 3.16 mm
- Slit height is adjustable from 1 to 12 mm

The 77269 is a rotating disc with eight highly repeatable fixed slit positions. A manual wheel rotates the disc to the desired slit width; each position has a positive detent for high repeatability.

Fixed Slits

- Most economical for single slit size
- Fixed width and height

If you only need a few slit sizes, this is the most economical choice. These are precision slits fixed on a machined slide. You need the 77294 Fixed Slit Holder to hold the slit and mate it to the monochromator.

Table 1 Grating Specifications for Cornerstone 260 1/4 m Monochromator

These gratings are mounted in pre-adjusted holders that can be inserted and removed, at any time, from the Cornerstone 260.

Line Density (l/mm)	Blaze Wavelength	Type	Reciprocal Dispersion (nm/mm)*	Peak Efficiency (%)	Primary Wavelength Region **	Instrument's Upper Wavelength Mechanical Limit (for specificed grating)	Model	
							Dual Grating Assemblies	Triple Grating Assemblies
2400	250	Holographic	1.6	60	180 - 700 nm	700 nm	74160	74060
1800	500	Holographic	2.1	65	300 - 925 nm	925 nm	74161	74061
1200	250	Holographic	3.2	80	180 - 650 nm	1400 nm	74162	74062
1200	350	Ruled	3.2	65	200 - 1400 nm	1400 nm	74163	74063
1200	1000	Ruled	3.1	80	550 - 1600 nm	1200 nm	77990	77989
1200	750	Ruled	3.1	80	450 - 1400 nm	1400 nm	74164	74064
600	200	Ruled	6.4	90	180 - 500 nm	2800 nm	74165	74065
600	400	Ruled	6.5	80	250 - 1300 nm	2800 nm	74166	74066
600	1000	Ruled	6.4	75	600 - 2500 nm	2800 nm	74167	74067
600	1250	Ruled	6.4	70	750 - 2500 nm	2800 nm	74168	74068
600	1600	Ruled	6.2	85	900 - 2800 nm	2800 nm	74169	74069
400	1200	Ruled	9.7	80	700 - 2500 nm	4.2 µm	74170	74070
400	1600	Ruled	9.6	80	900 - 2900 nm	4.2 µm	74171	74071
300	500	Ruled	12.8	85	250 - 1150 nm	5.6 µm	74172	74072
300	1000	Ruled	12.9	80	575 - 2500 nm	5.6 µm	74173	74073
300	2000	Ruled	12.9	90	1100 - 5000 nm	5.6 µm	74174	74074
246.16	226	Ruled	15.5	85	190 - 450 nm	6.8 µm	74175	74075
200	1000	Ruled	19.3	85	600 - 2200 nm	8.4 µm	74176	74076
150	300	Ruled	25.5	80	190 - 800 nm	11.2 µm	74177	74077
150	800	Ruled	25.6	80	425 - 1600 nm	11.2 µm	74178	74078
150	1250	Ruled	25.7	80	725 - 2800 nm	11.2 µm	74179	74079
150	4000	Ruled	25.8	75	2.5 - 12 µm	11.2 µm	74180	74080
121.6	413	Ruled	31.3	80	250 - 1000 nm	13.8 µm	74181	74081
75	7000	Ruled	51.7	80	4.5 - 20 µm	22.4 µm	74182	74082

* At blaze wavelength.
** The primary wavelength region is where the grating efficiency is ≥20%. System efficiency will also be affected by the reflectivity of the mirrors and the grating angle at any wavelength.

Optional Motorized Filter Wheel

A 6-position filter wheel, model 74010, is offered, to hold order sorting and/or neutral density filters at the input of Cornerstone 260. For convenience, the filter wheel is controlled by Cornerstone 260 and commanded through software or the Hand Controller. The 74010 holds six 1.0 inch (25.4 mm) diameter filters; the clear aperture is 0.87 inch (22 mm). Coupling the 74010 to the input of Cornerstone 260 does not change the instrument's F/#; it remains F/3.9.

Simple Filter Interchange

With most filter wheels, you have to break down the setup to change filters, but with the 74010, the filters are held in individual mounts that snap into place from the top of the wheel. Six individual filter holders are included with each 74010 Filter Wheel. We also offer these separately under model 74011. Mount all your filters in 74011 Holders to protect them and have them ready for insertion into the filter wheel. The 74012 Rod Mount holds a 74011 Filter Holder atop an optical rod.

Built-In Shutter

We built a rugged, 0.5 Hz repetition rate shutter into the Cornerstone 260. The instrument drives the shutter; it is commanded via software or the hand controller. In addition to measuring background levels, the shutter is a convenient safety feature. You can close it when changing gratings or filters to protect your detector.

Shutter Specifications

Light Leakage	<0,001 %
Minimum Exposure Time	0.2 s
Maximum Frequency	0.5 Hz

Mounting

Cornerstone 260 is heavy enough (21 lbs; 9.5 kgs) to stand on its own with accessories mounted to the 1.5 Inch Series input and output slit assemblies. To simplify alignment of optical trains, order the 74105 Mounting Plate that bolts the Cornerstone 260 to inch (1/4-20) or metric (M6) optical surfaces. If you are coupling an Oriel Light Source into Cornerstone 260, order one of these kits:

- 74102; couples 7340/7341 Dual Source into Cornerstone 260
- 74104; couples 250 W Research Source into Cornerstone 260
- 70632; couples Apex Illuminator into Cornerstone 260

Specifications

Focal Length	260 mm
F/#	F/3.9
Usable Wavelength Range	180 nm to 24 µm, with interchangeable gratings
Wavelength Accuracy	0.35 nm
Resolution (triple grating instrument)*	0.15 nm
Resolution (double grating instrument)*	0.10 nm**
Wavelength Precision	0.08 nm
Maximum Slew Rate	205 nm/s***
Weight	21 lb (9,5 kg)

*With 1200 l/mm grating, 10 µm x 2 mm slit.
**Optical resolution step size limit is 0.08 nm.
***With 1200 l/mm grating.

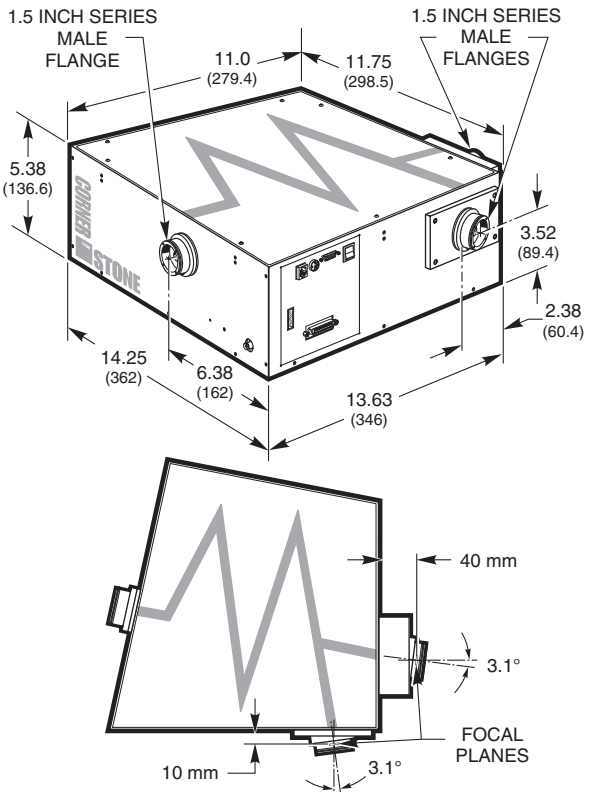

Fig. 2 Dimensional diagram of Cornerstone 260 1/4 m Monochromator

Ordering Information

Cornerstone 260 Monochromators and Monochromator Systems

Model (Metric)	Description	Interface(s)	Grating Type Included	Slits Included
74125	Cornerstone™ 260 1/4 m Monochromator	USB 2.0	None; Order separately	None; Order separately
74126	UV-VIS Cornerstone™ 260 1/4 m Monochromator System	USB 2.0	(1) 74062 (1) 74063 (1) 74064	(2) 74001 Micrometer Driven Slit Assemblies
74127	High Resolution Cornerstone™ 260 1/4 m Monochromator System	USB 2.0	(1) 74060 (1) 74061 (1) 74064	(2) 77294 Fixed Slit Holders (2) 77222 Fixed Slits
74128	VIS-NIR Cornerstone™ 260 1/4 m Monochromator System	USB 2.0	(1) 74066 (1) 74067 (1) 74069	(2) 74001 Micrometer Driven Slit Assemblies
74100	Cornerstone™ 260 1/4 m Monochromator	RS-232 and IEEE-488	None; Order separately	None; Order separately
74110	UV-VIS Cornerstone™ 260 1/4 m Monochromator System	RS-232 and IEEE-488	(1) 74062 (1) 74063 (1) 74064	(2) 74001 Micrometer Driven Slit Assemblies
74111	High Resolution Cornerstone™ 260 1/4 m Monochromator System	RS-232 and IEEE-488	(1) 74060 (1) 74061 (1) 74064	(2) 77294 Fixed Slit Holders (2) 77222 Fixed Slits
74112	VIS-NIR Cornerstone™ 260 1/4 m Monochromator System	RS-232 and IEEE-488	(1) 74066 (1) 74067 (1) 74069	(2) 74001 Micrometer Driven Slit Assemblies

Gratings

Line Density (l/mm)	Blaze Wavelength	Type	Primary Wavelength Region	Instrument's Upper Mechanical Limit (For Specified grating)	Triple Grating Assembly Model	Dual Grating Assemblies Model
2400	250	Holographic	180 - 700 nm	700 nm	74060	74160
1800	500	Holographic	300 - 925 nm	925 nm	74061	74161
1200	250	Holographic	180 - 650 nm	1400 nm	74062	74162
1200	350	Ruled	200 - 1400 nm	1400 nm	74063	74163
1200	1000	Ruled	550 - 1600 nm	1200 nm	77989	77990
1200	750	Ruled	450 - 1400 nm	1400 nm	74064	74164
600	200	Ruled	180 - 500 nm	2800 nm	74065	74165
600	400	Ruled	250 - 1300 nm	2800 nm	74066	74166
600	1000	Ruled	600 - 2500 nm	2800 nm	74067	74167
600	1250	Ruled	750 - 2500 nm	2800 nm	74068	74168
600	1600	Ruled	900 - 2800 nm	2800 nm	74069	74169
400	1200	Ruled	700 - 2500 nm	4.2 µm	74070	74170
400	1600	Ruled	900 - 2900 nm	4.2 µm	74071	74171
300	500	Ruled	250 - 1150 nm	5.6 µm	74072	74172
300	1000	Ruled	575 - 2500 nm	5.6 µm	74073	74173
300	2000	Ruled	1100 - 5000 nm	5.6 µm	74074	74174
246.16	226	Ruled	190 - 450 nm	6.8 µm	74075	74175
200	1000	Ruled	600 - 2200 nm	8.4 µm	74076	74176
150	300	Ruled	190 - 800 nm	11.2 µm	74077	74177
150	800	Ruled	425 - 1600 nm	11.2 µm	74078	74178
150	1250	Ruled	725 - 2800 nm	11.2 µm	74079	74179
150	4000	Ruled	2.5 - 12 µm	11.2 µm	74080	74180
121.6	413	Ruled	250 - 1000 nm	13.8 µm	74081	74181
75	7000	Ruled	4.5 - 20 µm	22.4 µm	74082	74182

Slit Assemblies

Model (Metric)	Description
74001	Micrometer Driven Slit Assembly
77269	Multiple Fixed Slit Assembly
74115	Motorized Input Slit Assembly (Requires 74116 Motorized Slit Control Board)
74117	Motorized Lateral Output Slit Assembly (Requires 74116 Motorized Slit Control Board)
74118	Motorized Axial Output Slit Assembly (Requires 74116 Motorized Slit Control Board)
74116	Motorized Slit Control Board (Controls up to 3 slit assemblies)
77294	Fixed Slit Holder (Order fixed slits separately)

Fixed Slits

Model (Metric)	Slit Width (µm)	Slit Height (mm)	Resolution @ 546.1 nm** For triple grating CS260 (nm)
77222	10	2	0.25
77220	25	3	0.25
77219	50	6	0.35
77218	120	18*	0.5
77217	280	18*	1.0
77216	600	18*	2.0
77215	760	18*	2.5
77214	1240	18*	4
77213	1560	18*	5
77212	3160	18*	10
77211	6320	18*	20

* Slit height is 18 mm; usable height in Cornerstone 260 Monochromator, is 12 mm.
** For 1200 l/mm gratings.

Accessories

Model (Metric)	Description
77890	TRACQ Basic™
77891	TRACQ Pro™
74009	Hand Controller
74105	Mounting Plate
74102	7340 Dual Light Source and Cornerstone™ 260 Mounting Kit
74104	250 W Research Source and Cornerstone™ 260 Mounting Kit
70632	Cornerstone™ 260 to Apex Monochromator Illuminator Mounting Kit
74010	Motorized Filter Wheel
74011	Filter Holder (6 included with 74010)
74012	Rod Mount for 74011 Filter Holder

WEB *See our website for more info*