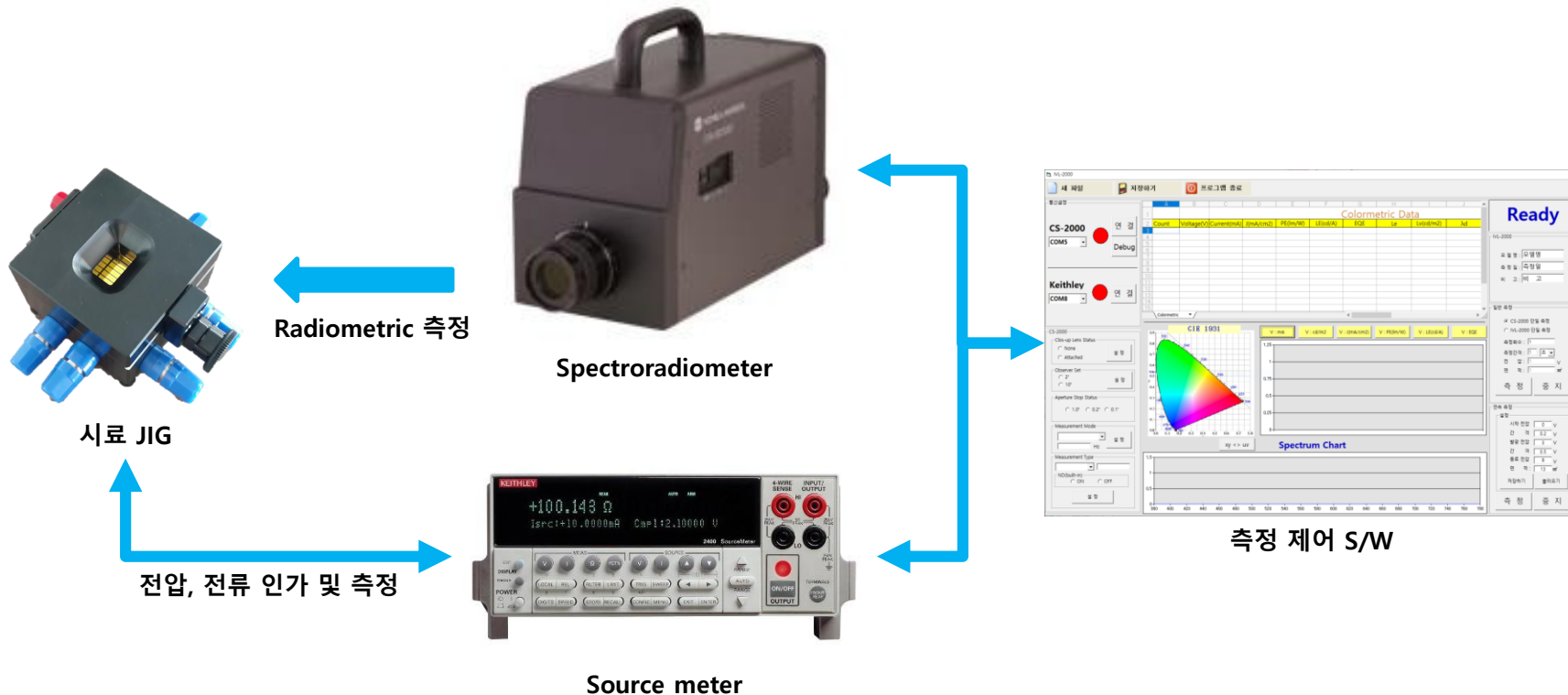


IVL 측정시스템

시스템 구성



Spectroradiometer KONICA MINOLTA CS-2000



Major specifications of the CS-2000

Model	CS-2000		
Wavelength range	380 to 780 nm		
Wavelength resolution	0.9 nm/pixel		
Display wavelength bandwidth	1.0 nm		
Wavelength precision	±0.3 nm (median wavelength: 435.8 nm, 546.1 nm, 643.8 nm Hg-Cd lamp)		
Spectral bandwidth	5 nm or less (half bandwidth)		
Measuring angle (selectable)	1°	0.2°	0.1°
Measurement luminance range (Standard light source A)	0.003 to 5,000 cd/m ²	0.075 to 125,000 cd/m ²	0.3 to 500,000 cd/m ²
Minimum luminance display	0.00002 cd/m ²		
Accuracy: Luminance (Standard light source A)*1	±2%		
Accuracy: Chromaticity (Standard light source A)*1	x, y : ±0.003 (0.003 to 0.005 cd/m ²)	x, y : ±0.003 (0.075 to 0.125 cd/m ²)	x, y : ±0.003 (0.3 to 0.5 cd/m ²)
	x, y : ±0.002 (0.005 to 0.05 cd/m ²)	x, y : ±0.002 (0.125 to 1.25 cd/m ²)	x, y : ±0.002 (0.5 to 5 cd/m ²)
	x : ±0.0015 (0.05 cd/m ² or more) y : ±0.001	x : ±0.0015 (1.25 cd/m ² or more) y : ±0.001	x : ±0.0015 (5 cd/m ² or more) y : ±0.001
Repeatability: Luminance (2 σ)	0.4% (0.003 to 0.05 cd/m ²)	0.4% (0.075 to 1.25 cd/m ²)	0.4% (0.3 to 5 cd/m ²)
	0.3% (0.05 to 0.1 cd/m ²)	0.3% (1.25 to 2.5 cd/m ²)	0.3% (5 to 10 cd/m ²)
	0.15% (0.1 to 5,000 cd/m ²)	0.15% (2.5 to 125,000 cd/m ²)	0.15% (10 to 500,000 cd/m ²)
Repeatability: Chromaticity (2 σ)	0.002 (0.003 to 0.005 cd/m ²)	0.002 (0.075 to 0.125 cd/m ²)	0.002 (0.3 to 0.5 cd/m ²)
	0.001 (0.005 to 0.1 cd/m ²)	0.001 (0.125 to 2.5 cd/m ²)	0.001 (0.5 to 10 cd/m ²)
	0.0006 (0.1 to 0.2 cd/m ²)	0.0006 (2.5 to 5 cd/m ²)	0.0006 (10 to 20 cd/m ²)
	0.0004 (0.2 to 5,000 cd/m ²)	0.0004 (5 to 125,000 cd/m ²)	0.0004 (20 to 500,000 cd/m ²)
Polarization error	1°: 2% or less (400 to 780 nm); 0.1° and 0.2°: 3% or less (400 to 780 nm)		
Integration time	Fast: 0.005 to 16 sec.; Normal: 0.005 to 120 sec.		
Measurement time	2 sec. min. (Manual mode) to 243 sec. max. (Normal mode)		
Color space mode	Lxxy, LvuV, Lvtuuv, XYZ, dominant wavelength, spectral graph		
Interface	USB 1.1		
Operating temperature/humidity range	5 to 35°C, relative humidity 80% or less with no condensation		
Storage temperature/humidity range	0 to 45°C, relative humidity 80% or less with no condensation		
Size	Main unit: 158 (W) x 200 (H) x 300 (D) mm; Lens: ø70 x 95 mm		
Weight	6.2 kg		

*1: Average of 10 measurements in Normal mode at a temperature of 23±2°C and a relative humidity of 65% or less.

Close-up lens for measurement of even tinier areas

(Optional accessory)

Optional close-up lens allows measurements of areas as tiny as ø0.1 mm. Not only general display units but also small targets can be measured.



Measuring distance vs. measuring area		Measuring angle			(Units: mm)
		1°	0.2°	0.1°	
When a close-up lens is attached	55.0	ø1.00	ø0.20	ø0.10	
	70.9	ø1.39	ø0.28	ø0.14	
	350	ø5.00	ø1.00	ø0.50	
	500	ø7.78	ø1.56	ø0.78	
	1,000	ø16.66	ø3.33	ø1.67	
	2,000	ø34.18	ø6.84	ø3.42	

Source meter Keithley 2400



KEITHLEY
A Tektronix Company

General Specifications

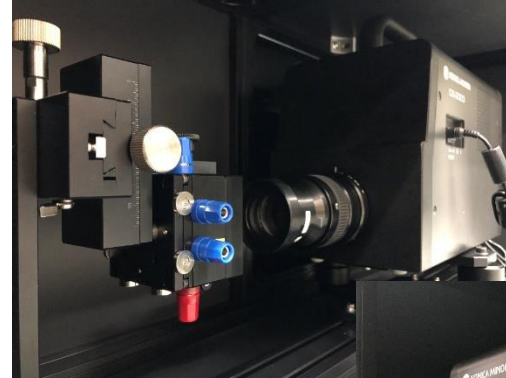
Noise Rejection

	NPLC	NMRR	CMRR
Fast	0.01	—	80 dB
Medium	0.1	—	80 dB
Slow	1	60 dB	100 dB ¹

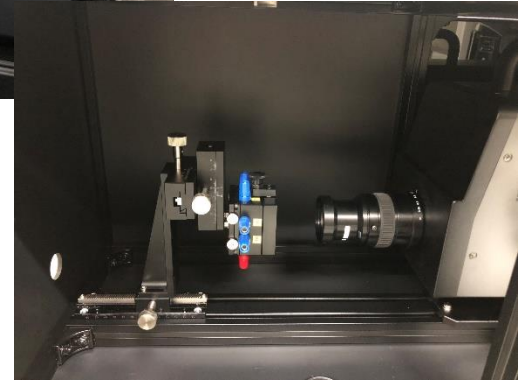
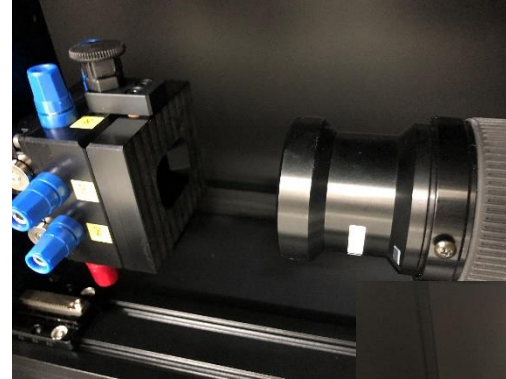
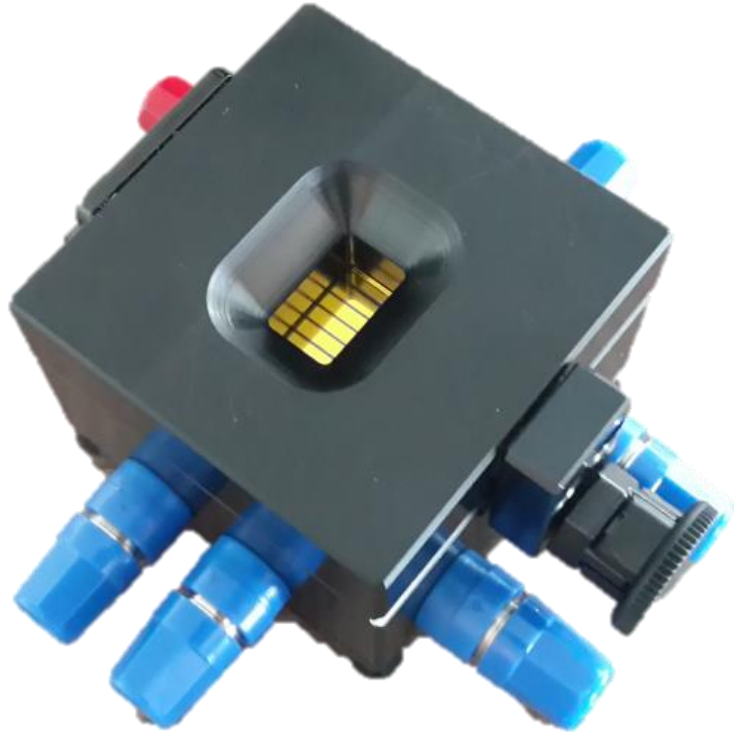
¹ Except lowest 2 current ranges = 90dB.

Load Impedance	Stable into 20,000 pF typical.
Common Mode Voltage	250 V DC (40V DC for 2440).
Common Mode Isolation	>10 ⁹ Ω, <1000pF.
Overrange	105% of range, source and measure.
Max. Voltage Drop Between Input/Output and Sense Terminals	5 V.
Max. Sense Lead Resistance	1 MΩ for rated accuracy.
Sense Input Impedance	>10 ¹⁰ Ω.
Guard Offset Voltage	<150 μV, typical (300 μV for 2440).
Source Output Modes	Fixed DC level Memory List (mixed function) Stair (linear and log)
Memory Buffer	5,000 readings @ 5 digits (two 2,500 point buffers). Includes selected measured value(s) and time stamp. Lithium battery backup (3 yr+ battery life).
Source Memory List	100 points max.
Programmability	IEEE-488 (SCPI-1995.0), RS-232, 5 user-definable power-up states plus factory default and "RST."
Digital Interface	
Output Enable	Active low input.
Handler Interface	Start of test, end of test, 3 category bits. +5 V @ 300 mA supply. Not available on 2401.
Digital I/O	1 trigger input, 4 TTL/Relay Drive outputs (33 V @ 500 mA, diode clamped). Not available on 2401.
Power Supply	100 V to 240 V rms, 50–60 Hz (automatically detected at power up). 2400 , 2401 : 190 VA. 2410 : 210 VA. 2420 : 220 VA. 2440 : 240VA.
Cooling	2401 : Convection. 2410 , 2420 , 2440 : Forced air, variable speed.
EMC	Conforms to European Union Directive 89/336/EEC, EN 61326-1.
Safety	Conforms to European Union Low Voltage Directive. 2400 and 2401 UL listed to UL 61010-1:2012 and UL 61010-2-30:2012.
Vibration	MIL-PRF-28800F Class 3 Random.
Warm-Up	1 hour to rated accuracies.
Dimensions	89 mm high × 213 mm wide × 370 mm deep (3½ in × 8½ in × 14½ in). Bench Configuration (with handle and feet) : 104 mm high × 238 mm wide × 370 mm deep (4¼ in × 9½ in × 14½ in).
Weight	3.21 kg (7.08 lbs.) (2440 : 4.1kg, 9.0 lbs).
Environment	Operating : 0°–50°C, 70% R.H. up to 35°C. Derate 3% R.H./°C, 35°–50°C. Storage : –25°C to 65°C.

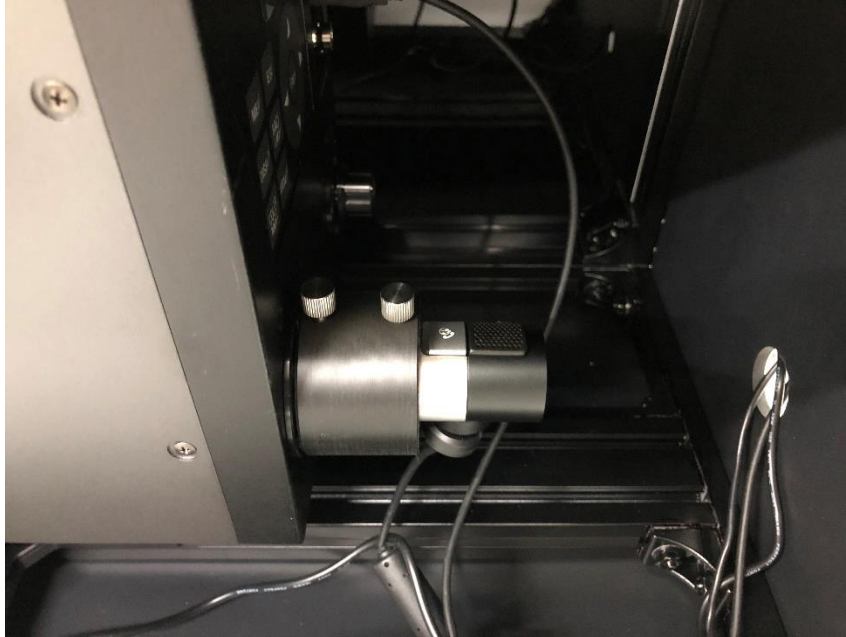
Dark box



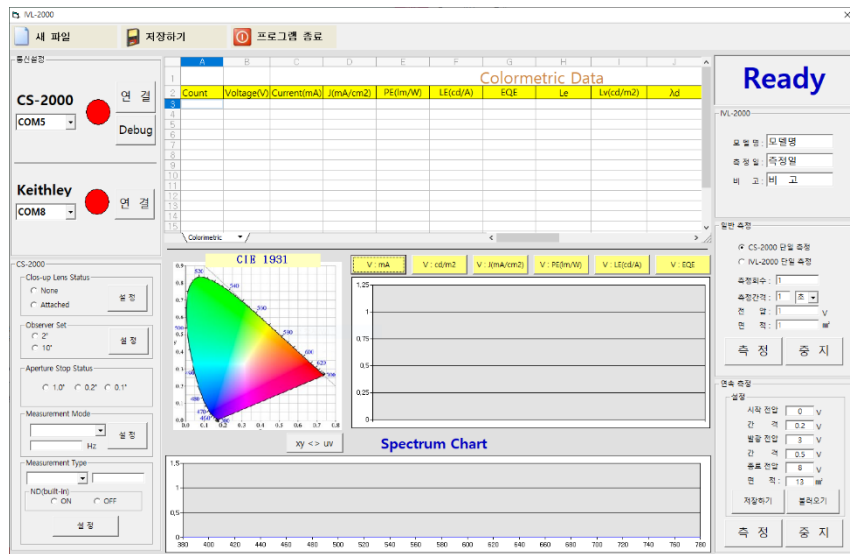
Sample Jig



Viewfinder camera



IVL Software

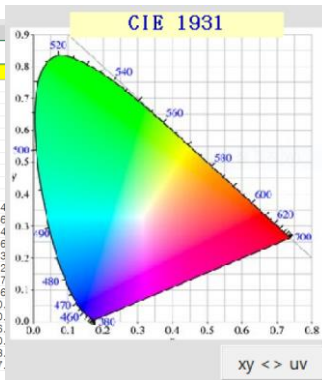


- 데이터 테이블
- 휘도, 색좌표, 스펙트럼 측정
- Source meter 연동 제어
- 전류밀도, 광효율, EQE 연산
- V-I, V-L, V-효율, V-전류밀도, V-EQE 그래프
- Color coordinate, Spectral distribution chart
- 엑셀 데이터 저장 포맷 지원

IVL Software

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2	Count	Voltage(V)	Current(mA)	J(mA/cm2)	PE(lm/W)	LE(cd/A)	EQE	Le	Lv(cd/m2)	λd	X	Y
3	1	1	0	0.00001								
4	2	1.2	0	0.00001								
5	3	1.4	0	0.00001								
6	4	1.6	0	0.00002								
7	5	1.8	0.00001	0.00005								
8	6	2	0.00008	0.00058								
9	7	2.2	0.0008	0.00617								
10	8	2.4	0.00452	0.03476								
11	9	2.6	0.01651	0.12703								
12	10	2.8	0.04506	0.3466								
13	11	3	0.09934	0.76416	4.99642	4.77123	1.62721	0.080513	36.46	574.1	32.799	36.4
14	12	3.2	0.18078	1.39044	5.61058	5.71489	1.94669	0.17529	79.462	574.08	71.44	79.46
15	13	3.4	0.30366	2.33582	5.99143	6.48425	2.20581	0.33374	151.46	574.05	136.05	151.4
16	14	3.6	0.47357	3.64284	6.22055	7.12823	2.42174	0.57153	259.67	574.01	233.02	259.6
17	15	3.8	0.69704	5.36182	6.32701	7.653	2.59702	0.90228	410.34	573.98	367.9	410.3
18	16	4	0.97896	7.53042	6.34405	8.0775	2.73848	1.3364	608.27	573.94	544.85	608.2
19	17	4.2	1.32921	10.22469	6.2825	8.39908	2.84451	1.8851	858.78	573.91	768.97	858.7
20	18	4.4	1.75096	13.46889	6.17577	8.64956	2.92825	2.5551	1165	573.87	1041.5	116
21	19	4.6	2.24946	17.30352	6.03917	8.84271	2.98807	3.3526	1530.1	573.83	1366.4	1530
22	20	4.8	2.83275	21.79036	5.85735	8.94937	3.02135	4.2698	1950.1	573.75	1737.9	1950
23	21	5	3.50444	26.95719	5.70161	9.07439	3.05974	5.3506	2446.2	573.7	2177.1	2446
24	22	5.2	4.27651	32.68622	5.52964	9.15272	3.0825	6.5185	3010.9	573.64	2675.5	3010
25	23	5.4	5.15359	39.64301	5.35461	9.20389	3.09456	7.9622	3648.7	573.58	3236.5	3648
26	24	5.6	6.14583	47.27561	5.18296	9.2388	3.1012	9.5183	4367.7	573.51	3867.4	4367

Colormetric Data



일반 측정

- ☒ CS-2000 단일 측정
☐ IVL-2000 단일 측정

측정회수 : 1

측정간격 : 1 초

전압 : 1 V

면적 : 1 mm²

측정

중지

연속 측정

설정

시작 전압 : 0 V

간격 : 0.2 V

발광 전압 : 3 V

간격 : 0.5 V

종료 전압 : 8 V

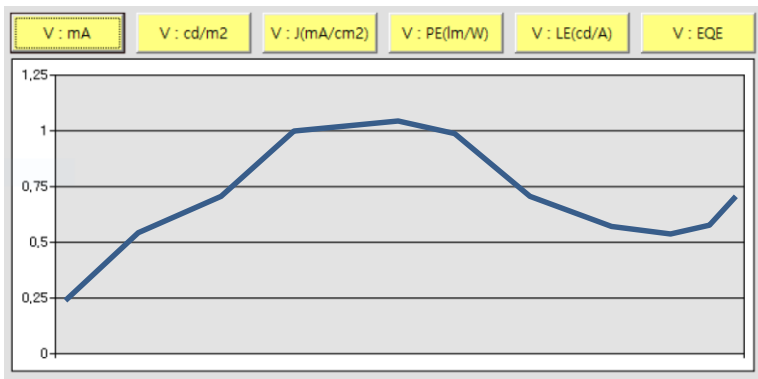
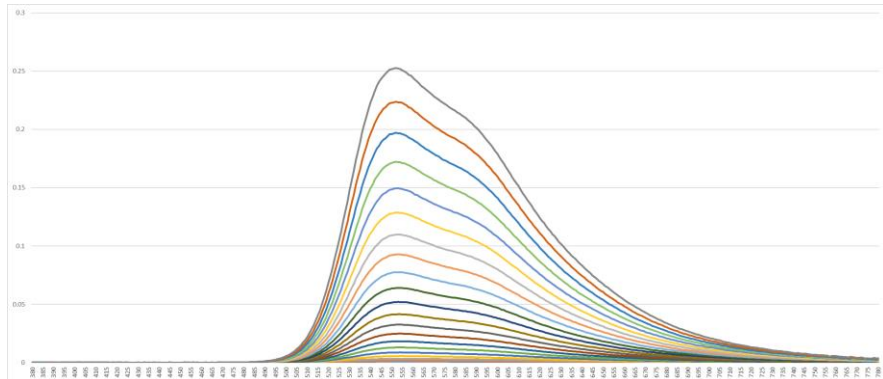
면적 : 13 mm²

저장하기

불러오기

측정

중지



THANK YOU
