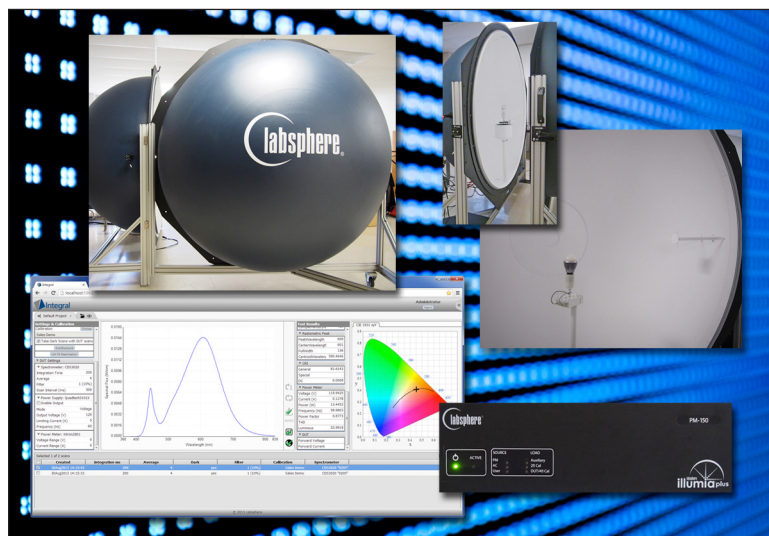


# illumia®plus Light Measurement Systems

*Flexible, modular solutions with centralized data management*



## DETAILS

A wide range of spectrometer options combined with integrating sphere choices ranging from 25 cm to 3 m

Add-on Electronic Modules increase functionality and simplify compliance with IESNA LM-79, IESNA LM-82 and equivalent measurement guidelines

NEW Integral™ Light Measurement Software Platform - the most innovative software platform in the market

Automated calibration routines ensure ease-of-use and improved efficiency

Automated IESNA LM-79 stabilization routine

Improved integrating sphere design allowing lamp "hot swap" to achieve greater efficiency and shorter measurement time

Generate reports using Excel templates: data where you want it, how you want it, formatted for language and style.

## FLEXIBILITY

Introducing LabSphere illumia®plus light measurement systems — flexibility to meet your most demanding requirements and grow with your business. A wide range of integrating sphere and spectrometer options, application-specific modules help you maximize throughput and productivity while maintaining high absolute accuracy, repeatability and NIST Traceability. Integral™ LM Software drives it all with operation from any device, any platform, any location and in any language.

## Add-on electronic modules make testing compliance easy



### AC MODULE

*Measure the luminous efficacy of your lighting products per LM-79 guidelines*

Combines Chroma AC Power Supply and Xitron Power Meter for integrated electrical testing per LM-79

Understand the luminous efficacy (lumens/watt) of the lighting products per LM-79 guidelines and evaluate their key electrical parameters such as Current, Voltage, Frequency, Total Harmonic Distortion (THD), Power Factor (PF), K-Factor etc.

Generate a comprehensive report with optical and electrical lamp parameters

Allow control of AC power to the lamp via Integral™ software platform and characterize lamp performance at variable electrical inputs



### AMBIENT TEMPERATURE CONTROL MODULE

*Features feedback control of device temperature to simplify testing per LM-82*

Accommodates a variety of LED lamps and light engines

Ambient temperature achievable between 15° C - 70° C

Multiple temperature sensors and monitors in accordance to LM-82 guidelines

Easily adaptable to most of LabSphere 1.5 m, 2 m, and 3 m integrating spheres

Software controlled feedback system for temperature controls

Test reports based on LM-82 guidelines

## Find the illumia®plus system that best fits your application

| illumia®plus 600/610 |                                             | illumia®plus 1100/2100 |                                                            | illumia®plus 3020/3030 |                                                                       |
|----------------------|---------------------------------------------|------------------------|------------------------------------------------------------|------------------------|-----------------------------------------------------------------------|
| <b>MEASURE</b>       | Packaged LEDs                               | <b>MEASURE</b>         | Packaged LEDs                                              | <b>MEASURE</b>         | Packaged LEDs                                                         |
|                      | Clustered LEDs                              |                        | Clustered LEDs                                             |                        | Clustered LEDs                                                        |
|                      | Miniature Lamps                             |                        | Miniature Lamps                                            |                        | Miniature Lamps                                                       |
|                      | Entertainment Lighting                      |                        | Entertainment Lighting                                     |                        | Entertainment Lighting                                                |
|                      | Automotive Lighting                         |                        | Automotive Lighting                                        |                        | Automotive Lighting                                                   |
|                      | LED Troffers                                |                        | LED Troffers                                               |                        | LED Troffers                                                          |
| <b>FEATURES</b>      | LED Luminaires                              |                        | LED Luminaires                                             |                        | LED Luminaires                                                        |
|                      | Wide spectral range                         |                        | CFLs                                                       |                        | CFLs                                                                  |
|                      | Fast CCD array detector                     |                        | Fluorescent Lamps                                          |                        | Fluorescent Lamps                                                     |
|                      | Compact size                                |                        | OLEDs                                                      |                        | OLEDs                                                                 |
|                      | Ideal for QC and manufacturing applications |                        | Low Power LEDs                                             |                        | Low Power LEDs                                                        |
|                      | High sensitivity                            |                        | UV LEDs (CDS 1100 model only)                              |                        | HID Lamps                                                             |
| <b>FEATURES</b>      |                                             | <b>FEATURES</b>        | Fast, low noise; TE cooled back-thinned CCD array detector | <b>FEATURES</b>        | LED Devices in High Speed Production Environment                      |
|                      |                                             |                        | Shutter for dark measurements in real time                 |                        | Exceptional measurement sensitivity                                   |
|                      |                                             |                        | Hardware triggering capability                             |                        | Inbuilt filter wheel with ND filters provides excellent dynamic range |
|                      |                                             |                        | Exceptional stability at long exposure time                |                        | Low stray light                                                       |
|                      |                                             |                        | High dynamic range                                         |                        | High speed                                                            |
|                      |                                             |                        |                                                            |                        | Easily synchronized with other devices                                |

## illumia®plus System Specifications

| System                                                                                | illumia®plus 600/610                                            | illumia®plus 1100/2100                                            | illumia®plus 3020/3030                                            |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| Spectral Flux Measurements:                                                           | 350 nm - 850 nm (600 systems)<br>350 nm - 1000 nm (610 systems) | 350 nm - 850 nm (1100 systems)<br>350 nm - 1050 nm (2110 systems) | 350 nm - 830 nm (3020 systems)<br>350 nm - 1050 nm (3030 systems) |
| Minimum Measurable Lumens: (typical)                                                  | 0.04 lumens<br>(Cool white LED source with 50 cm sphere)        | 0.012 lumens<br>(Cool white LED source with 50 cm sphere)         | 0.007 lumens<br>(Cool white LED source with 50 cm sphere)         |
| Minimum Measurable Lumens: (typical)                                                  | ~46K lumens<br>(Cool white LED source with 195 cm sphere)       | ~159K lumens<br>(Cool white LED source with 195 cm sphere)        | ~317K lumens<br>(Cool white LED source with 195 cm sphere)        |
| Exposure Time Range:<br>(Actual exposure time depends on sphere size and source type) | 1 ms - 5 <sup>3</sup> s                                         | 8 ms - 15 min                                                     | 5 ms - 20 sec                                                     |
| <b>Software</b>                                                                       |                                                                 |                                                                   |                                                                   |
| Integral™ LM                                                                          | Included                                                        | Included                                                          | Included                                                          |
| <b>Standards</b>                                                                      |                                                                 |                                                                   |                                                                   |
| LM-79                                                                                 | Included                                                        | Included                                                          | Included                                                          |
| LM-82                                                                                 | Module Available                                                | Module Available                                                  | Module Available                                                  |

| Spectrometer                   | CDS 600                 | CDS 610                 | CDS 1100                     | CDS 2100                     | CDS 3020                      | CDS 3030                      |
|--------------------------------|-------------------------|-------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|
| Detector:                      | 2048 element Linear CCD | 2048 element Linear CCD | 1044 x 64 CCD (back thinned) | 1044 x 64 CCD (back thinned) | 1044 x 128 CCD (back thinned) | 1044 x 128 CCD (back thinned) |
| Spectral Range: (spectrograph) | 200 - 850 nm            | 350 - 1100 nm           | 250 - 850 nm                 | 350 - 1100 nm                | 350 - 830 nm                  | 350 - 1100 nm                 |
| Shutter:                       | No                      | No                      | Yes                          | Yes                          | Yes                           | Yes                           |

# illumia®plus 600/610 Ordering Information

| System                                                             | illumia®plus<br>with 25 cm<br>sphere | illumia®plus<br>with 50 cm<br>sphere | illumia®plus<br>with 100 cm<br>sphere | illumia®plus<br>with 165 cm<br>sphere | illumia®plus<br>with 195 cm<br>sphere |
|--------------------------------------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| illumia®plus 600                                                   |                                      |                                      |                                       |                                       |                                       |
| 2 pi version                                                       |                                      | AA-30022-050                         | AA-30022-100                          | AA-30022-165                          | AA-30022-195                          |
| 4 pi version                                                       | AA-30024-025                         | AA-30024-050                         | AA-30024-100                          | AA-30024-165                          | AA-30024-195                          |
| illumia®plus 610                                                   |                                      |                                      |                                       |                                       |                                       |
| 2 pi version                                                       |                                      | AA-30032-050                         | AA-30032-100                          | AA-30032-165                          | AA-30032-195                          |
| 4 pi version                                                       | AA-30034-025                         | AA-30034-050                         | AA-30034-100                          | AA-30034-165                          | AA-30034-195                          |
| Above Systems Include:                                             |                                      |                                      |                                       |                                       |                                       |
| Sphere                                                             | LMS-025                              | LMS-050                              | LMS-100                               | LMS-165                               | LMS-195                               |
| Spectrally-Calibrated Lamp (2 pi and 4 pi are not interchangeable) |                                      |                                      |                                       |                                       |                                       |
| 2 pi                                                               | SCL-600                              | SCL-600                              | SCL-1400                              | SCL-1400                              | SCL-1400                              |
| 4 pi                                                               | SCL-600                              | SCL-600                              | SCL-1400                              | SCL-1400                              | SCL-1400                              |
| Lamp Socket Assembly                                               |                                      |                                      |                                       |                                       |                                       |
|                                                                    | 2 pi/4 pi                            | 2 pi/4 pi                            | 2 pi/4 pi                             | 2 pi/4 pi                             | 2 pi/4 pi                             |
| Photometry Module (includes Cube Computer)                         |                                      |                                      |                                       |                                       |                                       |
|                                                                    | PM-100                               | PM-100                               | PM-150                                | PM-150                                | PM-150                                |
| Aux Lamp                                                           | AUX-600                              | AUX-600                              | AUX-1400                              | AUX-1400                              | AUX-1400                              |
| Software                                                           | Integral™ LM                         | Integral™ LM                         | Integral™ LM                          | Integral™ LM                          | Integral™ LM                          |

## Performance Specifications (lumens)

|                    |                                         |        |                                         |      |                                         |       |                                         |       |                                         |       |
|--------------------|-----------------------------------------|--------|-----------------------------------------|------|-----------------------------------------|-------|-----------------------------------------|-------|-----------------------------------------|-------|
|                    | min                                     | max    | min                                     | max  | min                                     | max   | min                                     | max   | min                                     | max   |
| Tungsten Filament: | 0.0125                                  | 1880.5 | 0.05                                    | 7522 | 0.2                                     | 16360 | 0.54                                    | 41122 | 0.756                                   | 57435 |
| Cool White LED:    | 0.01                                    | 1770   | 0.04                                    | 7080 | 0.16                                    | 13855 | 0.416                                   | 33632 | 0.58                                    | 46973 |
| Warm White LED:    | 0.0085                                  | 1134   | 0.034                                   | 4536 | 0.136                                   | 14525 | 0.374                                   | 37080 | 0.52                                    | 51788 |
| Blue LED:          | 0.0125                                  | 77.25  | 0.05                                    | 309  | 0.2                                     | 1216  | 0.542                                   | 2752  | 0.76                                    | 3844  |
| Red LED:           | 0.008                                   | 195.75 | 0.032                                   | 783  | 0.128                                   | 1187  | 0.358                                   | 3572  | 0.5                                     | 4989  |
|                    |                                         |        |                                         |      |                                         |       |                                         |       |                                         |       |
| Upper Range:       | Ambient temp<br>can not exceed<br>100°C |        | Ambient temp<br>can not exceed<br>100°C |      | Ambient temp<br>can not exceed<br>100°C |       | Ambient temp<br>can not exceed<br>100°C |       | Ambient temp<br>can not exceed<br>100°C |       |

## Optional Modules and Accessories Ordering Information

|                                                                                                                           |  |              |              |              |              |
|---------------------------------------------------------------------------------------------------------------------------|--|--------------|--------------|--------------|--------------|
| Upgrade Module Options:                                                                                                   |  |              |              |              |              |
| ATC-82 (IESNA-LM-82 Measurement Option)                                                                                   |  |              |              | AA-30200-000 | AA-30200-000 |
|                                                                                                                           |  |              |              |              |              |
| AC-1500 (AC Measurement Option)                                                                                           |  | AA-30100-000 | AA-30100-000 | AA-30100-000 | AA-30100-000 |
| Optional Accessories:                                                                                                     |  |              |              |              |              |
| 4 pi Kit (Needed to upgrade a 2 pi system. Includes lamp post, baffle, junction box, SCL calibrated in the 4 pi geometry) |  |              |              |              |              |
| Included                                                                                                                  |  | AA-30001-050 | AA-30001-100 | AA-30001-165 | AA-30001-195 |
|                                                                                                                           |  |              |              |              |              |
| Ambient Temperature Probe and Monitor                                                                                     |  | TPM-100      | TPM-400      | TPM-400      | TPM-400      |
|                                                                                                                           |  |              |              |              |              |
| Forward Flux Standard                                                                                                     |  | FFS-100-400  | FFS-100-1000 | FFS-100-1000 | FFS-100-1000 |

# illumia®plus 1100/2100 Ordering Information

| System                                                             | illumia®plus<br>with 25 cm<br>sphere | illumia®plus<br>with 50 cm<br>sphere | illumia®plus<br>with 100 cm<br>sphere | illumia®plus<br>with 165 cm<br>sphere | illumia®plus<br>with 195 cm<br>sphere |
|--------------------------------------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| illumia®plus 1100                                                  |                                      |                                      |                                       |                                       |                                       |
| 2 pi version                                                       |                                      | AA-30042-050                         | AA-30042-100                          | AA-30042-165                          | AA-30042-195                          |
| 4 pi version                                                       | AA-30044-025                         | AA-30044-050                         | AA-30044-100                          | AA-30044-165                          | AA-30044-195                          |
| illumia®plus 2100                                                  |                                      |                                      |                                       |                                       |                                       |
| 2 pi version                                                       |                                      | AA-30052-050                         | AA-30052-100                          | AA-30052-165                          | AA-30052-195                          |
| 4 pi version                                                       | AA-30054-025                         | AA-30054-050                         | AA-30054-100                          | AA-30054-165                          | AA-30054-195                          |
| <b>Above Systems Include:</b>                                      |                                      |                                      |                                       |                                       |                                       |
| Sphere                                                             | LMS-025                              | LMS-050                              | LMS-100                               | LMS-165                               | LMS-195                               |
| Spectrally-Calibrated Lamp (2 pi and 4 pi are not interchangeable) |                                      |                                      |                                       |                                       |                                       |
| 2 pi                                                               | SCL-600                              | SCL-600                              | SCL-1400                              | SCL-1400                              | SCL-1400                              |
| 4 pi                                                               | SCL-600                              | SCL-600                              | SCL-1400                              | SCL-1400                              | SCL-1400                              |
| Lamp Socket Assembly                                               |                                      |                                      |                                       |                                       |                                       |
|                                                                    | 2 pi/4 pi                            | 2 pi/4 pi                            | 2 pi/4 pi                             | 2 pi/4 pi                             | 2 pi/4 pi                             |
| Photometry Module (includes Cube Computer)                         |                                      |                                      |                                       |                                       |                                       |
|                                                                    | PM-100                               | PM-100                               | PM-150                                | PM-150                                | PM-150                                |
| Aux Lamp                                                           | AUX-600                              | AUX-600                              | AUX-1400                              | AUX-1400                              | AUX-1400                              |
| Software                                                           | Integral™ LM                         | Integral™ LM                         | Integral™ LM                          | Integral™ LM                          | Integral™ LM                          |

## Performance Specifications (lumens)

|                    |                                         |         |                                         |       |                                         |       |                                         |        |                                         |        |
|--------------------|-----------------------------------------|---------|-----------------------------------------|-------|-----------------------------------------|-------|-----------------------------------------|--------|-----------------------------------------|--------|
|                    | min                                     | max     | min                                     | max   | min                                     | max   | min                                     | max    | min                                     | max    |
| Tungsten Filament: | 0.00775                                 | 3437.5  | 0.031                                   | 13750 | 0.12                                    | 21690 | 0.335                                   | 88615  | 0.47                                    | 123764 |
| Cool White LED:    | 0.003                                   | 1332.75 | 0.012                                   | 5331  | 0.048                                   | 29961 | 0.132                                   | 114401 | 0.18                                    | 159779 |
| Warm White LED:    | 0.00225                                 | 1887.75 | 0.009                                   | 7551  | 0.036                                   | 25006 | 0.098                                   | 98543  | 0.14                                    | 137631 |
| Blue LED:          | 0.0005                                  | 141     | 0.002                                   | 564   | 0.01                                    | 1756  | 0.027                                   | 5972   | 0.04                                    | 8341   |
| Red LED:           | 0.00175                                 | 330.25  | 0.007                                   | 1321  | 0.03                                    | 1905  | 0.079                                   | 7655   | 0.11                                    | 10692  |
|                    |                                         |         |                                         |       |                                         |       |                                         |        |                                         |        |
| Upper Range:       | Ambient temp<br>can not exceed<br>100°C |         | Ambient temp<br>can not exceed<br>100°C |       | Ambient temp<br>can not exceed<br>100°C |       | Ambient temp<br>can not exceed<br>100°C |        | Ambient temp<br>can not exceed<br>100°C |        |

## Optional Modules and Accessories Ordering Information

### Upgrade Module Options:

|                                         |              |              |              |              |              |
|-----------------------------------------|--------------|--------------|--------------|--------------|--------------|
| ATC-82 (IESNA-LM-82 Measurement Option) |              |              |              | AA-30200-000 | AA-30200-000 |
| AC-1500 (AC Measurement Option)         |              |              |              |              |              |
|                                         | AA-30100-000 | AA-30100-000 | AA-30100-000 | AA-30100-000 | AA-30100-000 |

### Optional Accessories:

|                                                                                                                           |              |              |              |              |  |
|---------------------------------------------------------------------------------------------------------------------------|--------------|--------------|--------------|--------------|--|
| 4 pi Kit (Needed to upgrade a 2 pi system. Includes lamp post, baffle, junction box, SCL calibrated in the 4 pi geometry) |              |              |              |              |  |
| Included                                                                                                                  | AA-30001-050 | AA-30001-100 | AA-30001-165 | AA-30001-195 |  |
| Ambient Temperature Probe and Monitor                                                                                     |              |              |              |              |  |
| TPM-100                                                                                                                   | TPM-100      | TPM-400      | TPM-400      | TPM-400      |  |
| Forward Flux Standard                                                                                                     |              |              |              |              |  |
| FFS-100-400                                                                                                               | FFS-100-400  | FFS-100-1000 | FFS-100-1000 | FFS-100-1000 |  |

# illumia®plus 3020/3030 Ordering Information

| System                                                             | illumia®plus<br>with 50 cm<br>sphere    |       | illumia®plus<br>with 100 cm<br>sphere   |       | illumia®plus<br>with 165 cm<br>sphere   |        | illumia®plus<br>with 195 cm<br>sphere   |        |
|--------------------------------------------------------------------|-----------------------------------------|-------|-----------------------------------------|-------|-----------------------------------------|--------|-----------------------------------------|--------|
| illumia®plus 3020                                                  |                                         |       |                                         |       |                                         |        |                                         |        |
| 2 pi version                                                       | AA-30082-050                            |       | AA-30082-100                            |       | AA-30082-165                            |        | AA-30082-195                            |        |
| 4 pi version                                                       | AA-30084-050                            |       | AA-30084-100                            |       | AA-30084-165                            |        | AA-30084-195                            |        |
| illumia®plus 3030                                                  |                                         |       |                                         |       |                                         |        |                                         |        |
| 2 pi version                                                       | AA-30092-050                            |       | AA-30092-100                            |       | AA-30092-165                            |        | AA-30092-195                            |        |
| 4 pi version                                                       | AA-30094-050                            |       | AA-30094-100                            |       | AA-30094-165                            |        | AA-30094-195                            |        |
| Above Systems Include:                                             |                                         |       |                                         |       |                                         |        |                                         |        |
| Sphere                                                             | LMS-050                                 |       | LMS-100                                 |       | LMS-165                                 |        | LMS-195                                 |        |
| Spectrally-Calibrated Lamp (2 pi and 4 pi are not interchangeable) |                                         |       |                                         |       |                                         |        |                                         |        |
| 2 pi                                                               | SCL-050                                 |       | SCL-050                                 |       | SCL-600                                 |        | SCL-600                                 |        |
| 4 pi                                                               | SCL-050                                 |       | SCL-050                                 |       | SCL-600                                 |        | SCL-600                                 |        |
| Lamp Socket Assembly                                               |                                         |       |                                         |       |                                         |        |                                         |        |
|                                                                    | 2 pi/4 pi                               |       | 2 pi/4 pi                               |       | 2 pi/4 pi                               |        | 2 pi/4 pi                               |        |
| Photometry Module (includes Cube Computer)                         |                                         |       |                                         |       |                                         |        |                                         |        |
|                                                                    | PM-100                                  |       | PM-150                                  |       | PM-150                                  |        | PM-150                                  |        |
| Aux Lamp                                                           |                                         |       |                                         |       |                                         |        |                                         |        |
|                                                                    | AUX-050                                 |       | AUX-600                                 |       | AUX-600                                 |        | AUX-600                                 |        |
| Software                                                           |                                         |       |                                         |       |                                         |        |                                         |        |
|                                                                    | Integral™ LM                            |       | Integral™ LM                            |       | Integral™ LM                            |        | Integral™ LM                            |        |
| Performance Specifications (lumens)                                |                                         |       |                                         |       |                                         |        |                                         |        |
|                                                                    | min                                     | max   | min                                     | max   | min                                     | max    | min                                     | max    |
| Tungsten Filament:                                                 | 0.025                                   | 19135 | 0.1                                     | 76541 | 0.268                                   | 208559 | 0.3752                                  | 291284 |
| Cool White LED:                                                    | 0.007                                   | 20844 | 0.013                                   | 83377 | 0.036                                   | 227184 | 0.0504                                  | 317296 |
| Warm White LED:                                                    | 0.004                                   | 19766 | 0.009                                   | 79065 | 0.023                                   | 215437 | 0.0322                                  | 300890 |
| Blue LED:                                                          | 0.01                                    | 1135  | 0.018                                   | 4541  | 0.05                                    | 12372  | 0.07                                    | 17280  |
| Red LED:                                                           | 0.008                                   | 1561  | 0.015                                   | 6245  | 0.042                                   | 17017  | 0.0588                                  | 23767  |
| Upper Range:                                                       |                                         |       |                                         |       |                                         |        |                                         |        |
|                                                                    | Ambient temp<br>can not exceed<br>100°C |       | Ambient temp<br>can not exceed<br>100°C |       | Ambient temp<br>can not exceed<br>100°C |        | Ambient temp<br>can not exceed<br>100°C |        |

## Optional Modules and Accessories Ordering Information

### Upgrade Module Options:

|                                         |              |              |              |              |
|-----------------------------------------|--------------|--------------|--------------|--------------|
| ATC-82 (IESNA-LM-82 Measurement Option) |              |              | AA-30200-000 | AA-30200-000 |
| AC-1500 (AC Measurement Option)         | AA-30100-000 | AA-30100-000 | AA-30100-000 | AA-30100-000 |

### Optional Accessories:

|                                                                                                                           |              |              |              |              |
|---------------------------------------------------------------------------------------------------------------------------|--------------|--------------|--------------|--------------|
| 4 pi Kit (Needed to upgrade a 2 pi system. Includes lamp post, baffle, junction box, SCL calibrated in the 4 pi geometry) | AA-30005-050 | AA-30005-100 | AA-30005-165 | AA-30005-195 |
| Ambient Temperature Probe and Monitor                                                                                     | TPM-100      | TPM-400      | TPM-400      | TPM-400      |
| Forward Flux Standard                                                                                                     | FFS-100-400  | FFS-100-1000 | FFS-100-1000 | FFS-100-1000 |

# System Photometry Module Specifications (PM100 / PM150)

## Line Input

Voltage: 90 min - 264 VAC max  
Current: 19 A max  
Frequency: 47 min - 63 Hz max

## Lamp Source Output

Current Setpoint Accuracy:  $\pm 0.1\%$   
Current Stability:  $\pm 0.1\%$   
Current Rise Time:  $20 \pm 5$  seconds  
Temperature Coefficient:  $\pm 0.1\%/^{\circ}\text{C}$  at  $25 \pm 5^{\circ}\text{C}$

Compliance Voltage: 0 - 5 VDC (PM-100)  
15 - 32 VDC (PM-150)  
Temperature Coefficient: 1000 ppm/ $^{\circ}\text{C}$  Maximum change in output after 30 min warm-up

Output Rise Time: 15 secs min - 25 secs max  
Compliance: CE

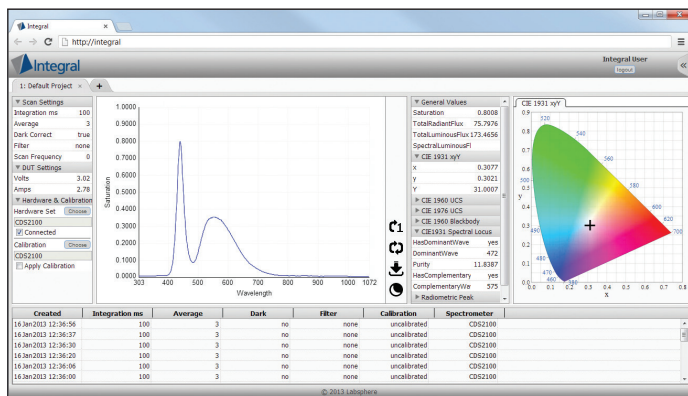
## Physical

Storage Temperature & Humidity:  $-20 - 70^{\circ}\text{C}$ , 10 - 95% RH  
Operating Temperature & Humidity:  $15 - 40^{\circ}\text{C}$ , 30 - 90% RH  
Trigger Link: TTL  
Power Requirements: 110/220 VAC, 50/60 Hz  
Dimensions: 134 x 457 x 445 mm H x W x D  
Weight: 5.5 kg

## General

Number of USB Ports: 6  
Communication Port Details: USB2.0  
Display Mode: HDMI  
Types of Loads Supported: Labsphere Calibration and Auxiliary Lamps  
Mounting Provisions: Desktop of 19" EIA Electronics Rack

# Integral™ Light Measurement Software Features



HTML5-enabled web browser based light measurement software

Operation from any device, any platform, any location and in any language

Instantly switch between English, Mandarin Chinese, Japanese, Korean, German, Italian and French

Large assortment of test hardware configurations are supported (spectrometer, AC and DC power supplies, temperature controls and monitors)

Powerful, easy-to-use Application Programming Interface (API) supports Labview, .NET, C, and VBA

One user can control many test stations and multiple users can access the same test station from anywhere

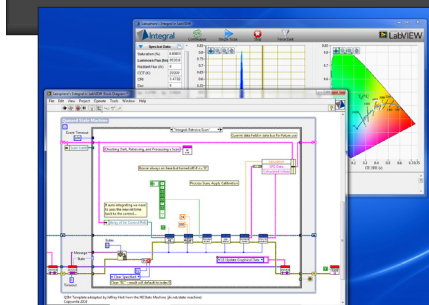
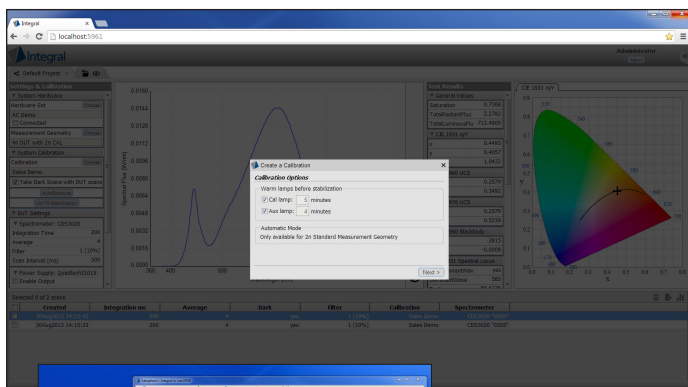
Automated LM-79 stabilization followed by test

Automated calibration routines

Built-in report generator with the ability to create custom reports

All Industry standard color calculations including:

- x, y, u, v, u', v', CCT, CRI (1-15 and general), CQS, luminous flux (lumens), scotopic lumens, Duv, dominant wavelength, peak wavelength, FWHM, Centroid, Purity



# Optional System Add-on Module Specifications

## Ambient Temperature Control IESNA LM-82 Module

|                                                                       |                                |
|-----------------------------------------------------------------------|--------------------------------|
| <b>Included with LM-82 Module:</b>                                    |                                |
| - Thermal Chamber with TEC,<br>Temperature Sensors, Device Mount      |                                |
| - 1U size Electronic Module with<br>Temperature Monitors              |                                |
| - Integral™ License with LM-82 Report Generator                       |                                |
| Chamber Temperature Range :<br>(T <sub>min</sub> - T <sub>max</sub> ) | 15°C – 70°C                    |
| Time to Achieve T <sub>max</sub> from Ambient:                        | 20 minutes                     |
| Temperature Accuracy:                                                 | ± 2°C                          |
| Time to Achieve T <sub>min</sub> from Ambient:                        | 20 minutes                     |
| Thermal Chamber Dimensions:                                           | 14" h x 8.5" diameter          |
| Thermal Chamber Weight:                                               | 9 lb with top chamber          |
| Max Device Sizes That Can Be Mounted:                                 | 7" h x 6" diameter             |
| Max Weight That Chamber Can Withstand:                                | 25 lbs                         |
| Device Mounting Arrangement:                                          | ¼-20 breadboard inside chamber |
| Type of Thermocouples:                                                | Mini J                         |
| Number of Temperature Monitoring Points: 3<br>(inside chamber)        |                                |

## AC Module

|                                        |                                             |
|----------------------------------------|---------------------------------------------|
| <b>AC Power Supply Specifications</b>  |                                             |
| <b>Model</b>                           | <b>Chroma 61603</b>                         |
| <b>AC OUTPUT RATING</b>                |                                             |
| Max. Power:                            | 1.5 kVA                                     |
| <b>Voltage</b>                         |                                             |
| Range:                                 | 0 - 300 V                                   |
| Accuracy:                              | 0.2% + 0.2% F.S.                            |
| Resolution:                            | 0.1 V                                       |
| Distortion:                            | 0.3% @50/60 Hz 1% 15 - 1K Hz                |
| Line Regulation:                       | 0.10%                                       |
| Load Regulation:                       | 0.20%                                       |
| Temp. Coefficient:                     | 0.02% per degree from 25°C                  |
| <b>Maximum current</b>                 |                                             |
| r.m.s.                                 | 12 A / 6 A                                  |
| Peak:                                  | 72 A / 36 A                                 |
| Range:                                 | DC, 15-1K Hz                                |
| Accuracy:                              | 0.15%                                       |
| <b>DC OUTPUT RATING</b>                |                                             |
| Power:                                 | 750 W                                       |
| Voltage/Current                        | 212 V at 6 A<br>424 V at 3 A                |
| <b>Temperature Range</b>               |                                             |
| Operation:                             | 0°C to 40°C                                 |
| Storage:                               | -40°C to 85°C                               |
| Humidity:                              | 30% to 90%                                  |
| Safety & EMC:                          | FCC 15J class A, CE                         |
| <b>AC Power Meter Specifications</b>   |                                             |
| <b>Model</b>                           | <b>Xitron 2801</b>                          |
| Operating:                             | 0°C to 55°C, <95% RH non-condensing         |
| Storage:                               | -20°C to 70°C, non-condensing.              |
| Measurement Range:                     | up to 2000 V peak and 150 A peak internally |
| Frequency Range:                       | DC and 20m Hz – 200k Hz                     |
| Frequency Accuracy                     |                                             |
| Measurements:                          | 0.005%                                      |
| <b>Voltage</b>                         |                                             |
| Range: (measurable)                    | 2000 V pk (850 V rms) max. continuous       |
| Internal Current Range: (measurable)   | 150 A pk (30 A rms) max. continuous         |
| Crest Factor Accuracy:                 |                                             |
| V                                      | (50m V + 0.01% of pk rng)/RMS value         |
| A                                      | (50u A + 0.01% of pk rng)/RMS value         |
| Harmonic Accuracy: (voltage & current) | 0.02%                                       |
| Base Accuracy:                         | <0.08%.                                     |

# System Integrating Sphere Specifications

| Sphere                                             | LMS-025                     | LMS-050                       | LMS-100                          | LMS-165                          | LMS-195                    |
|----------------------------------------------------|-----------------------------|-------------------------------|----------------------------------|----------------------------------|----------------------------|
| Order Number:                                      | AA-80000-025                | AA-80000-050                  | AA-80000-100                     | AA-80000-165                     | AA-80000-195               |
| Sphere Size:                                       | 25 cm                       | 50 cm                         | 100 cm                           | 165 cm                           | 195 cm                     |
| Required Footprint:                                |                             |                               |                                  |                                  |                            |
| closed                                             | 45.9 cm x 30.2 cm x 39.1 cm | 74.1 cm x 50.4 cm x 74.0 cm   | 128.0 cm x 98.1 cm x 166.7 cm    | 185 cm x 165 cm x 200 cm         | 213.2 cm x 187 cm x 226 cm |
| open                                               | 64.2 cm x 46.8 cm x 39.1 cm | 103.7 cm x 89.9 cm x 74.0 cm  | 174.4 cm x 165.9 cm x 166.7 cm   | 269.3 cm x 271.8 cm x 200 cm     | 310 cm x 307.4 cm x 226 cm |
| Sphere Weight:                                     | 4 Kg                        | 20 Kg                         | 92 Kg                            | 300 Kg                           | 347 Kg                     |
| Sphere Color:                                      | Labsphere Blue              | Labsphere Blue                | Labsphere Blue                   | Labsphere Blue                   | Labsphere Blue             |
| Sphere Open Style:                                 | Clam Shell                  | Clam Shell                    | Clam Shell                       | Clam Shell                       | Clam Shell                 |
| Sphere Assembly:                                   | Spun Aluminum               | Spun Aluminum                 | Spun Aluminum                    | Spun Aluminum                    | Spun Aluminum              |
| Frame Style:                                       | Extruded Aluminum           | Extruded Aluminum             | Extruded Aluminum                | Extruded Aluminum                | Extruded Aluminum          |
| Sphere Coating:                                    | Spectrafect                 | Spectrafect                   | Spectrafect                      | Spectrafect                      | Spectrafect                |
| Spectrafect Coating Reflectance:                   | > 97% (nominal)             | > 97% (nominal)               | > 97% (nominal)                  | > 97% (nominal)                  | > 97% (nominal)            |
| Total Number of Ports:                             | 6                           | 6                             | 6                                | 6                                | 6                          |
| SMA Adapter:                                       | Included                    | Included                      | Included                         | Included                         | Included                   |
| Cosine Corrector:                                  | Included                    | Included                      | Included                         | Included                         | Included                   |
| External DUT 2pi Port Size:                        | 5.08 cm                     | 15 cm                         | 33 cm                            | 53 cm                            | 63 cm                      |
| Detector Port Dimension:                           | 1.25 cm                     | 1.25 cm                       | 1.25 cm                          | 1.25 cm                          | 1.25 cm                    |
| Detector Port Quantity:                            | 1                           | 2                             | 2                                | 2                                | 2                          |
| Port Frame Reducer:                                | n/a                         | 15 - 2.5 cm<br>15 cm - 2.5 cm | 33 cm - 15 cm;<br>15 cm - 2.5 cm | 53 cm - 15 cm;<br>15 cm - 2.5 cm | 63 cm - 15 cm;             |
| Temperature Probe Port:                            | 2.5 cm                      | 2.5 cm                        | 2.5 cm                           | 2.5 cm                           | 2.5 cm                     |
| Max Lamp Size: (LM-79)<br>4 pi geometry            | 2.5 cm                      | <7 cm dia,<br>33 cm long      | <14 cm dia,<br>67 cm long        | <23 cm dia,<br>110 cm long       | <27 cm dia,<br>130 cm long |
| Max Port or DUT Area: (2 pi)                       | 5.08 cm dia.;<br>20 cm²     | 15 cm dia.;<br>71 cm²         | 33 cm dia.;<br>337 cm²           | 53 cm dia.;<br>879 cm²           | 63 cm dia.;<br>1246 cm²    |
| Max Linear DUT Dimension:<br>(2/3 sphere diameter) | 15 cm                       | 33 cm                         | 66 cm                            | 110 cm                           | 130 cm                     |
| Max Internal Surface Size:<br>(2% Rule)(cm²)       | 15 cm²                      | 63 cm²                        | 254 cm²                          | 673 cm²                          | 922 cm²                    |
| Maximum Sphere Temp:                               | 100°C                       | 100°C                         | 100°C                            | 100°C                            | 100°C                      |

# System Spectrometer Specifications

| Spectrometer                   | CDS 600                               | CDS 610                               | CDS 1100                              | CDS 2100                              | CDS 3020                              | CDS 3030                            |
|--------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|-------------------------------------|
| Detector:                      | 2048 element Linear CCD               | 2048 element Linear CCD               | 1044 x 64 CCD (back thinned)          | 1044 x 64 CCD (back thinned)          | 1044 x 128 CCD (back thinned)         | 1044 x 128 CCD (back thinned)       |
| Spectral Range: (spectrograph) | 200 - 850 nm                          | 350 - 1100 nm                         | 250 - 850 nm                          | 350 - 1100 nm                         | 350 - 830 nm                          | 350 - 1100 nm                       |
| Resolution: (FWHM)             | 1.5 nm                                | 1.5 nm                                | 1.5 nm                                | 1.5 nm                                | 3.0 nm                                | 3.7 nm                              |
| Integration Time:              | 1 ms - 5 sec                          | 1 ms - 5 sec                          | 8 ms - 15 min                         | 8 ms - 15 min                         | 5 ms - 20 sec                         | 5 ms - 20 sec                       |
| Cooling:                       | n/a                                   | n/a                                   | -10 ± 0.05°C                          | -10 ± 0.05°C                          | -10 ± 0.05°C                          | -10 ± 0.05°C                        |
| Linearity:                     | ± 0.13%                               | ± 0.13%                               | ± 0.5%                                | ± 0.5%                                | ± 0.5%                                | ± 0.5%                              |
| Wavelength Accuracy:           | < ± 0.3 nm                            | < ± 0.3 nm                            | < ± 0.3 nm                            | < ± 0.3 nm                            | < ± 0.3 nm                            | < ± 0.3 nm                          |
| Average % Noise on 100% Line:  | 0.20%                                 | 0.20%                                 | 0.05%                                 | 0.05%                                 | 0.18%                                 | 0.18%                               |
| Stray Light: (Y-50 filter)     | 1.66%                                 | 1.66%                                 | 1.87%                                 | 1.87%                                 | 0.97%                                 | 0.97%                               |
| Stray Light LED/Laser:         | 2.6E-5 from 450-550 nm w/633 nm laser | 1.8E-5 from 450-550 nm w/633 nm laser | 1.8E-5 from 450-550 nm w/633 nm laser | 1.2E-5 from 450-550 nm w/633 nm laser | 1.8E-5 from 450-550 nm w/633 nm laser |                                     |
| Optical Input:                 | 600 um, 3 m long SMA Connection       | 600 um, 3 m long SMA Connection       | 600 um, 3 m long SMA Connection       | 600 um, 3 m long SMA Connection       | 1000um, 2 m long Ferrule Connection   | 1000um, 2 m long Ferrule Connection |
| Measurement Dynamic Range:     | 15K                                   | 15K                                   | 475K                                  | 475K                                  | 1.6M                                  | 1.6M                                |
| x, y Chromaticity Accuracy:    | <0.001 for x, y                       | <0.001 for x, y                       | <0.001 for x, y                       | <0.001 for x, y                       | <0.001 for x, y                       | <0.001 for x, y                     |
| Mechanical Shutter:            | No                                    | No                                    | Yes                                   | Yes                                   | Yes                                   | Yes                                 |
| AD Converter:                  | 16 bit                                | 16 bit                                | 16 bit                                | 16 bit                                | 16 bit                                | 16 bit                              |
| PC Interface:                  | USB 2.0                               | USB 2.0                               | USB 2.0                               | USB 2.0                               | USB 2.0                               | USB 2.0                             |
| Trigger: hardware              | No                                    | No                                    | Yes                                   | Yes                                   | Yes                                   | Yes                                 |
| Trigger: software              | Yes                                   | Yes                                   | Yes                                   | Yes                                   | Yes                                   | Yes                                 |
| OD Filters:                    | No                                    | No                                    | No                                    | No                                    | Yes: ND1 & ND2                        | Yes: ND1 & ND2                      |
| Shutter:                       | No                                    | No                                    | Yes                                   | Yes                                   | Yes                                   | Yes                                 |

## NOTES:

1. Values above are the noise equivalent power in W/nm or lumens for the different wavelength ranges cited. They were all taken with a 5W lamp, 10" sphere and 10 ms integration time.