

# illumia®Plus2 Integrating Sphere Spectroradiometers

Flexible, modular solutions with centralized data management



## Build a system that meets your needs

Labsphere illumia®Plus2 integrating sphere spectroradiometers offer flexibility to meet your most demanding requirements and grow with your business. A choice of integrating sphere sizes ranging from 25 cm to 3 m, spectrometer options, and application-specific modules help you maximize throughput and productivity while maintaining high absolute accuracy and repeatability.

Integral® Software drives it all with operation from any device, any platform, any location and in any language.

## Improve productivity

- Add-on electronic modules increase functionality and simplify compliance with IES LM-79-19, IES LM-78 and equivalent measurement guidelines
- Automated calibration routines ensure ease-of-use and improved efficiency
- Automated IES LM-79-19 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

# Find the illumia®Plus2 system that best fits your application

## illumia®Plus2 600/610

### Measure

- Packaged LEDs
- Clustered LEDs
- Miniature Lamps
- Entertainment Lighting
- Automotive Lighting
- LED Troffers
- LED Luminaires

### Features

- Wide spectral range
- Fast CCD array detector
- Compact size
- Ideal for QC and manufacturing applications
- High sensitivity

## illumia®Plus2 2600

### Measure

- Indoor Lighting
- Outdoor Lighting
- Roadway Lighting
- Lamp and Luminaires
- LEDs
- Entertainment Lighting
- Automotive Lighting
- Troffers
- Luminaires
- CFLs
- Fluorescent Lamps
- OLEDs
- Low Power LEDs

### Features

- Fast, low noise; TE cooled back – thinned CCD array detector
- Shutter for dark measurements in real time
- Hardware triggering capability
- Exceptional stability at long exposure time
- High dynamic range

## illumia®Plus2 3020/3030

### Measure

- Packaged LEDs
- Clustered LEDs
- Miniature Lamps
- Entertainment Lighting
- Automotive Lighting
- LED Troffers
- LED Luminaires
- CFLs
- Fluorescent Lamps
- OLEDs
- Low Power LEDs
- HID Lamps
- LED Devices in High Speed
- Production Environment

### Features

- Exceptional measurement sensitivity
- Inbuilt filter wheel with ND filters provides excellent dynamic range
- Low stray light
- High speed
- Easily synchronized with other devices

## Every illumia®Plus2 system features these standard products

### Programmable DC Power Supplies

Designed to accurately provide DC current to reference lamp, auxiliary lamp, and DCV devices under test.

The current output is selected, set and controlled using Integral Software included with the power supply.

- Programmable regulated DC current
- Programmable regulated DC voltage
- Controlled current ramp up
- Lamp operation timer
- Easy on/off operation
- Front panel or remote control
- Current, voltage readback

### ICM-500 Control Module

The illumia®Plus2 Control Module is the routing module that ties Labsphere's powerful Integral Software to the illumia®Plus2 total spectral flux measurement hardware. When the ICM-500 is controlled by Integral, this user friendly, turn key system automatically routes power and metering.

- Main hub for power supplies and power meters
- Routes DC voltage to 2π and 4π reference locations
- Routes power to absorption correction lamp
- Routes DC or AC power to devices under test
- USB inputs



### Calibrated Spectral and Luminous Flux Standards

Each standard has been carefully screened, seasoned, and calibrated at our manufacturing facility under the guidelines recommended by the NVLAP accredited ISO 17025 practices for the highest degree of confidence.



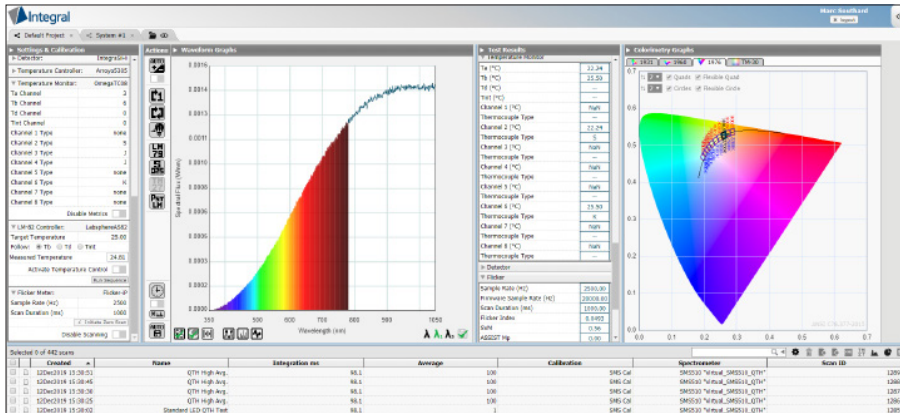
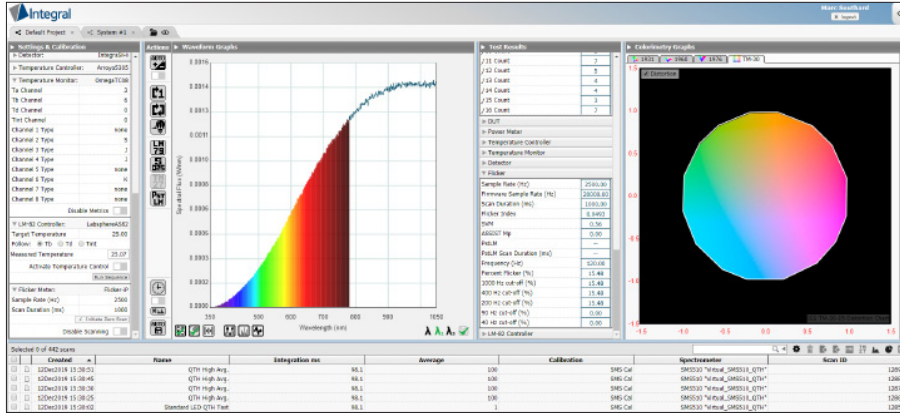
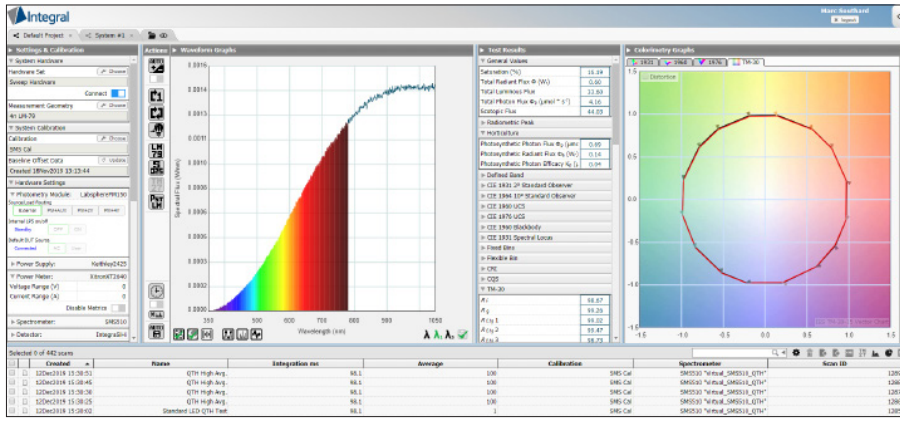
Advancing the Technology of Light: Measure. Create. Reflect.

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PB-13060-000 Rev 15

# Integral® Light Measurement Software



Supported Devices		
<b>Spectrometer</b>	<b>Power Supply</b>	<b>Power Meter</b>
CDS1100	Agilent6811B	Q10Z48775C1
CDS1200	Agilent6812B	TETP2201
CDS2400	AgilentE3632A	Xiltron2801
CDS2600	AgilentE3633A	YonogawaWT210
CDS3000	AgilentE3634A	YonogawaWT3000
CDS3010	AgilentN5751A	YonogawaWT310
CDS3020	AmetekVX	
CDS3030	Ametek_1501X	
CDS500	Chroma1601	
CDS610	Chroma1602	
QEPGeneric	Chroma1603	
SMS500	Chroma1604	
SMSS00ULS	Chroma1605	
SMSS10	Keithley2400	
	Keithley2410	
	Keithley2420	
	Keithley2425	
	Keithley2430	
	Keithley2440	
<b>Photometry Module</b>	LabsphereLPS	
	LabspherePM100	
	LabspherePM150	
<b>LM-82 Controller</b>	CSZ_CP	
	LabsphereAS82	
	LabsphereATC82	

List of Integral Supported Devices

- 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, 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
- Meets LM-79-19 and LM-78 integrating sphere spectrometer recommended measurement methods
- 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, ANSI SSL 2015 binning, TM-30-18 fidelity and gamut data, distortion and vector graphics, and horticulture



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# illumia®Plus2 - 600/610 Ordering Information

System:	illumia®Plus2 with 25 cm sphere	illumia®Plus2 with 50 cm sphere	illumia®Plus2 with 100 cm sphere	illumia®Plus2 with 165 cm sphere	illumia®Plus2 with 195 cm sphere
illumia®Plus2 600					
2π version:	—	AA-40022-050	AA-40022-100	AA-40022-165	AA-40022-195
4π version:	AA-40024-025	AA-40024-050	AA-40024-100	AA-40024-165	AA-40024-195
illumia®Plus2 610					
2π version:	—	AA-40032-050	AA-40032-100	AA-40032-165	AA-40032-195
4π version:	AA-40034-025	AA-40034-050	AA-40034-100	AA-40034-165	AA-40034-195

## Above Systems Include:

Sphere:	LMS-025	LMS-050	LMS-100	LMS-165	LMS-195
Control Module:	ICM-500	ICM-500	ICM-500	ICM-500	ICM-500
DC Power Supply:	LPS-175-27	LPS-175-27	LPS-525-42	LPS-525-42	LPS-525-42
Spectrally-Calibrated Lamp: (2π and 4π are not interchangeable)					
2π	2PI-1-INT-650	2PI-1-INT-650	2PI-1-INT-1400	2PI-1-INT-1400	2PI-1-INT-1400
4π	SCL-650	SCL-650	SCL-1400	SCL-1400	SCL-1400
Aux Lamp:	AUX-650	AUX-650	AUX-1400	AUX-1400	AUX-1400
Lamp Socket Assembly:					
	2π/4π	2π/4π	2π/4π	2π/4π	2π/4π
Software:	Integral	Integral	Integral	Integral	Integral

All systems include Retouch 6080 and Tool Kit

## Typical Performance Specifications (lumens)

Spectral Flux Measurements: 350 nm - 850 nm (600 systems) 350 nm - 1000 nm (610 systems)

Exposure Time Range: 1 ms - 5 sec (Actual exposure time depends on sphere size and source type)

	min	max	min	max	min	max	min	max	min	max
Tungsten Filament:	0.012	1880	0.05	7500	0.20	16300	0.54	41000	0.75	57000
Cool White LED:	0.010	1770	0.04	7100	0.16	14500	0.41	37000	0.58	52000
Warm White LED:	0.008	1100	0.03	4500	0.13	13800	0.37	34000	0.52	47000
Blue LED:	0.012	77	0.05	300	0.20	1200	0.54	2700	0.76	3800
Red LED:	0.008	195	0.03	800	0.12	1100	0.35	3500	0.50	5000
Upper Range:	Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C	



# illumia®Plus2 - 2600 Ordering Information

System:	illumia®Plus2 with 25 cm sphere	illumia®Plus2 with 50 cm sphere	illumia®Plus2 with 100 cm sphere	illumia®Plus2 with 165 cm sphere	illumia®Plus2 with 195 cm sphere
illumia®Plus2 2600					
2π version:	—	AA-40072-050	AA-40072-100	AA-40072-165	AA-40072-195
4π version:	AA-40074-025	AA-40074-050	AA-40074-100	AA-40074-165	AA-40074-195

## Above Systems Include:

Sphere:	LMS-025	LMS-050	LMS-100	LMS-165	LMS-195
Control Module:	ICM-500	ICM-500	ICM-500	ICM-500	ICM-500
DC Power Supply:	LPS-175-27	LPS-175-27	LPS-525-42	LPS-525-42	LPS-525-42
Spectrally-Calibrated Lamp: (2π and 4π are not interchangeable)					
2π	2PI-1-INT-650	2PI-1-INT-650	2PI-1-INT-1400	2PI-1-INT-1400	2PI-1-INT-1400
4π	SCL-650	SCL-650	SCL-1400	SCL-1400	SCL-1400
Aux Lamp:	AUX-650	AUX-650	AUX-1400	AUX-1400	AUX-1400
Lamp Socket Assembly:	2π/4π	2π/4π	2π/4π	2π/4π	2π/4π
Software:	Integral	Integral	Integral	Integral	Integral

All systems include Retouch 6080 and Tool Kit

## Typical Performance Specifications (lumens)

Spectral Flux Measurements: 350 nm - 1050 nm

Exposure Time Range: 8 ms - 900 sec (Actual exposure time depends on sphere size and source type)

	min	max	min	max	min	max	min	max	min	max
Tungsten Filament:	0.007	3400	0.031	13800	0.12	22000	0.33	89000	0.47	124000
Cool White LED:	0.003	1900	0.012	7600	0.04	30000	0.13	114000	0.18	160000
Warm White LED:	0.002	1300	0.009	5300	0.03	25000	0.09	98500	0.14	138000
Blue LED:	0.001	140	0.002	600	0.01	1800	0.02	6000	0.04	8300
Red LED:	0.002	330	0.007	1300	0.03	1900	0.07	7600	0.11	11000
Upper Range:	Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C	



# illumia®Plus2 - 3020/3030 Ordering Information

System:	illumia®Plus2 with 50 cm sphere	illumia®Plus2 with 100 cm sphere	illumia®Plus2 with 165 cm sphere	illumia®Plus2 with 195 cm sphere
illumia®Plus2 3020:				
2π version:	AA-40082-050	AA-40082-100	AA-40082-165	AA-40082-195
4π version:	AA-40084-050	AA-40084-100	AA-40084-165	AA-40084-195
illumia®Plus2 3030:				
2π version:	AA-40092-050	AA-40092-100	AA-40092-165	AA-40092-195
4π version:	AA-40094-050	AA-40094-100	AA-40094-165	AA-40094-195
<b>Above Systems Include:</b>				
Sphere:	LMS-050	LMS-100	LMS-165	LMS-195
Control Module:	ICM-500	ICM-500	ICM-500	ICM-500
DC Power Supply:	LPS-175-27	LPS-175-27	LPS-175-27	LPS-175-27
Spectrally-Calibrated Lamp: (2π and 4π are not interchangeable)				
2π:	2PI-1-INT-040	2PI-1-INT-040	2PI-1-INT-650	2PI-1-INT-650
4π:	SCL-040	SCL-040	SCL-650	SCL-650
Aux Lamp:	AUX-040	AUX-040	AUX-650	AUX-650
Lamp Socket Assembly:	2π/4π	2π/4π	2π/4π	2π/4π
Software:	Integral	Integral	Integral	Integral

All systems include Retouch 6080 and Tool Kit

## Typical Performance Specifications (lumens)

Spectral Flux Measurements: 350 nm - 830 nm (3020 systems) 350 nm - 1050 nm (3030 systems)

Exposure Time Range: 5 ms - 20 sec (Actual exposure time depends on sphere size and source type)

	min	max	min	max	min	max	min	max
Tungsten Filament:	0.025	19000	0.100	76000	0.26	210000	0.37	291000
Cool White LED:	0.007	20800	0.013	83000	0.03	227000	0.05	317000
Warm White LED:	0.004	20000	0.009	79000	0.02	215000	0.03	300000
Blue LED:	0.010	1100	0.018	4541	0.05	12300	0.07	17000
Red LED:	0.008	1600	0.015	6245	0.04	17000	0.05	24000
Upper Range:	Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C	

# illumia®Plus2 - 3 Meter Light Measurement Systems Ordering Information

System:	illumia®Plus2 600-300	illumia®Plus2 610-300	illumia®Plus2 2600-300	illumia®Plus2 3020-300	illumia®Plus2 3030-300
4π version:	AA-40024-300	AA-40034-300	AA-40074-300	AA-40084-300	AA-40094-300
Sphere:	LMS-300	LMS-300	LMS-300	LMS-300	LMS-300
Control Module:	ICM-500	ICM-500	ICM-500	ICM-500	ICM-500
Power Supply:	LPS-525-42	LPS-525-42	LPS-525-42	LPS-525-42	LPS-525-42
Spectrometer:	CDS-600	CDS-610	CDS-2600	CDS-3020	CDS-3030
Spectrally-Calibrated Lamp:					
4π:	SCL-1400	SCL-1400	SCL-1400	SCL-1400	SCL-1400
Aux Lamp:	AUX-1400	AUX-1400	AUX-1400	AUX-1400	AUX-1400
Lamp Socket Assembly:	4π	4π	4π	4π	4π
Software:	Integral® LM	Integral® LM	Integral® LM	Integral® LM	Integral® LM

All systems include Retouch 6080 and Tool Kit

Sphere Weight:	1020 lbs (462 kg)
Sphere Max Height:	140 inches (3.6 cm)
Sphere Foot Print Open/Closed:	150 in W x 201 L

## Typical Performance Specifications (lumens)

	illumia®Plus2 600-300 & 610-300		illumia®Plus2 2600-300		illumia®Plus2 3020-300 & 3030-300	
	min	max	min	max	min	max
Tungsten Filament:	1.69	128250	1.06	279000	0.83	654750
Cool White LED:	1.31	117000	0.41	360000	0.11	713250
Warm White LED:	1.17	105750	0.32	310500	0.07	675000
Blue LED:	1.71	8550	0.09	18675	0.16	38250
Red LED:	1.13	11250	0.25	24750	0.11	54000
Upper Range:	Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C		Ambient temp can not exceed 100°C	



# Integrating Sphere Specifications

Model Number:	LMS-025	LMS-050	LMS-100	LMS-165	LMS-195
Order Number:	AA-30000-025	AA-30000-050	AA-30000-100	AA-30000-165	AA-30000-195
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 2 $\pi$ 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 15 cm - 2.5 cm	33 cm - 15 cm; 15 cm - 2.5 cm	53 cm - 15 cm; 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 Recommended Lamp Size: (LM-79) 4 $\pi$ geometry	2.5 cm	<7 cm dia, 33 cm long	<14 cm dia, 67 cm long	<23 cm dia, 110 cm long	<27 cm dia, 130 cm long
Max Port or DUT Area: (2 $\pi$ )	5.08 cm dia.; 20 cm <sup>2</sup>	15 cm dia.; 71 cm <sup>2</sup>	33 cm dia.; 337 cm <sup>2</sup>	53 cm dia.; 879 cm <sup>2</sup>	63 cm dia.; 1246 cm <sup>2</sup>
Max Recommended Linear DUT Dimension: (2/3 sphere diameter)	15 cm	33 cm	66 cm	110 cm	130 cm
Max Recommended Internal Surface Size: (2% Rule)(cm <sup>2</sup> )	13 cm <sup>2</sup>	50 cm <sup>2</sup>	200 cm <sup>2</sup>	545 cm <sup>2</sup>	760 cm <sup>2</sup>
Maximum Sphere Coating Temp:	100°C	100°C	100°C	100°C	100°C





## Upgrade Modules Ordering Information

### Model Number: IL-AC1

Order Number: AA-40000-002

Includes:

- Chroma 61603 Programmable Instrument Grade AC Power Source
- Cabling for ICM-500 connections

### Model Number: IL-PM1

Order Number: AA-40000-001

Includes:

- XITRON 2640 Precision Multi-Channel Power Analyzer
- Cabling for ICM-500 and AC power source connections

## Optional Accessories Ordering Information

### illumia®Plus2 - 600/610 and 2600

	25 cm sphere	50 cm sphere	100 cm sphere	165 cm sphere	195 cm sphere
<b>4<math>\pi</math> Kit</b> (To perform 4 $\pi$ measurement geometry with 2 $\pi$ systems. 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
Order Number:					

<b>4<math>\pi</math> Kit</b> (To perform 4 $\pi$ measurement geometry with 2 $\pi$ systems. Includes lamp post, baffle, junction box, does not include calibration lamp)	Included	AA-30006-050	AA-30006-100	AA-30006-165	AA-30006-195
Order Number:					

### Ambient Temperature Probe and Monitor

Model Number:	TPM-100TC-08	TPM-200TC-08	TPM-400TC-08	TPM-400TC-08	TPM-400TC-08
Order Number:	AS-03003-100	AS-03003-200	AS-03003-400	AS-03003-400	AS-03003-400

### Forward Flux Standard

Model Number:	FFS-100-400	FFS-100-400	FFS-100-1000	FFS-100-1000	FFS-100-1000
Order Number:	AS-02768-100	AS-02768-100	AS-02768-200	AS-02768-200	AS-02768-200

### illumia®Plus2 - 3020/3030

	50 cm sphere	100 cm sphere	165 cm sphere	195 cm sphere
<b>4<math>\pi</math> Kit</b> (To perform 4 $\pi$ measurement geometry with 2 $\pi$ systems. 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
Order Number:				

<b>4<math>\pi</math> Kit</b> (To perform 4 $\pi$ measurement geometry with 2 $\pi$ systems. Includes lamp post, baffle, junction box, does not include calibration lamp)	AA-30006-050	AA-30006-100	AA-30006-165	AA-30006-195
Order Number:				

### Ambient Temperature Probe and Monitor

Model Number:	TPM-200TC-08	TPM-400TC-08	TPM-400TC-08	TPM-400TC-08
Order Number:	AS-03003-200	AS-03003-400	AS-03003-400	AS-03003-400

### Forward Flux Standard

Model Number:	FFS-100-400	FFS-100-1000	FFS-100-1000	FFS-100-1000
Order Number:	AS-02768-100	AS-02768-200	AS-02768-200	AS-02768-200

## illumia®Plus to illumia®Plus2 Upgrade Kit Ordering Information

Model Number:	ICM-500-175	ICM-500-350	ICM-500-525
Order Number:	AS-40000-175	AS-40000-350	AS-40000-525
	<i>includes: ICM-500, LPS-175 27 DC Power Supply, jumper cable and documentation for systems using 2PI-INT-050, 2PI-INT-650, SCL-040, SCL-650, AUX-040, AUX-650 and FFS-100-400 lamps</i>	<i>includes: ICM-500, LPS-350 28 DC Power Supply, jumper cable and documentation for systems using AUX-75, FFS-100-1000, and AUX-100 lamps</i>	<i>includes: ICM-500, LPS-525 42 DC Power Supply, jumper cable and documentation for systems using 2PI-INT-1400, AUX-1400, ISC-1400, and SCL-1400 lamps</i>

### Model Number: Integral LM-User ASM

Order Number: AS-81021-000

*Integral Major Module Software Upgrade to existing illumia and/or Integral installation. Single user, single Integral License and 1 year support and maintenance*

