

Model Number Smart Part Number	USLR-A20F-XAN2 A5XA-N2NN-NNAR-NS00-0000	USLR-A20F-XDN2 A5XD-N2NN-NNAR-NS00-0000	USLR-A20F-XMN2 A5XM-N2NN-NNAR-NS00-0000
OPTICAL PERFORMANCE SPECIFICATIONS			
UNIFORMITY (EACH LAMP OR COMBINED)			
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6
QTH ONLY			
Expected Maximum Luminance Output: cd/m2	4,200	4,200	4,200
Expected Maximum Illuminance at Port: lux	13,200	13,200	13,200
Peak Radiance: W/m2-sr-um @ 0.95 um	105	105	105
Peak Irradiance @ Port: Photons/s-m2-um @ 0.95um	4.50E+20	4.50E+20	4.50E+20
Minimum Resolution: lux	1.32E-03	1.20E+00	2.64E-01
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500hrs	>500hrs	>500hrs
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
PLASMA OR XENON ONLY			
Expected Maximum Luminance Output: cd/m2	14,300	14,300	14,300
Expected Maximum Illuminance at Port: lux	45,000	45,000	45,000
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	250	250	250
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI or 0.47 Xe	6.50E+20	6.50E+20	6.50E+20
Minimum Resolution: lux	4.50E-03	4.09E+00	9.00E-01
Approximate Correlated Color Temperature	6000K +400K/-200K	6000K +400K/-200K	6000K +400K/-200K
Plasma Rest Mode/Xenon Flicker (Peak-Peak/RMS/Hz) - Typical	4%/1%/5kHz	4%/1%/5kHz	4%/1%/5kHz
Plasma Test Mode (Peak-Peak/RMS/Hz) - 30 minutes (Rest 5min)	N/A	N/A	N/A
Installed Cold Mirror (330-750nm)	Yes	Yes	Yes
Typical Lamp Lifetimes (hrs) Plasma/Xenon	1000/450	1000/450	1000/450
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-50% & -600K	-50% & -600K	-50% & -600K
Est. Output Degradation over 50hrs (% & CCT Shift)	-2.5% / -30K	-2.5% / -30K	-2.5% / -30K
PLASMA/XENON & QTH (Both Full Open VA)			
Expected Maximum Luminance Output: cd/m2	18,500	18,500	18,500
Expected Maximum Illuminance at Port: lux	58,200	58,200	58,200
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	349	349	349
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI @ 0.47 Xe	7.03E+20	7.03E+20	7.03E+20
Approximate Correlated Color Temperature (Xenon & QTH)	5100K +400K/-200K	5100K +400K/-200K	5100K +400K/-200K
ATTENUATORS			
Number of Steps in Attenuator Range	2.00E+06	1.20E+04	1.00E+04
Dynamic Range/Bits/dB - Full Range of System (both lamps)	4.41E+07/25/152	4.85E+04/15/93	2.20E+05/17/106
INTEGRATING SPHERE			
Coating / Material	Spectrafect®	Spectrafect	Spectrafect
Sphere Internal Diameter: Inches (Meters)	20 (0.5)	20 (0.5)	20 (0.5)
Frame Type	20 in Cage	20 in Cage	20 in Cage
Output Port Size: Inches (Meters)	8 (0.2)	8 (0.2)	8 (0.2)
SYSTEM COMPONENTS			
QTH Lamps Internal (#, Wattage)	(0)	(0)	(0)
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150
Xenon Lamp & Housing	300W	300W	300W
Plasma Lamp & Housing	None	None	None
Power Supplies (# - Model)	(1) LPS-400	(1) - LPS-400	(1) - LPS-400
Special Power Supply	Integrated Xenon	Integrated Xenon	Integrated Xenon
Variable Attenuator	(2) VAA-220S	(2) VAD-012	(2) VA-MM
Monitor Detector(s)	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic
System Software	HELIOsense	HELIOsense	HELIOsense
Cube Computer	Included	Included	Included
Spectral Radiance Monitor (Type, Spectral Range)	CDS-610	CDS-610	CDS-610
STANDARD SYSTEM CALIBRATIONS (NIST Traceable)			
Luminance	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes
QTH Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
Xenon Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
QTH & Xenon Spectral Radiance (350-2400nm) & CDS	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes
Operational Duration of Calibration (Xe/QTH)	25 hrs / 50 hrs	25 hrs / 50 hrs	25 hrs / 50 hrs

Model Number Smart Part Number	USLR-A20F-PAN2 A5PA-N2NN-NNAR-NS00-0000	USLR-A20F-PDN2 A5PD-N2NN-NNAR-NS00-0000	USLR-A20F-PMN2 A5PM-N2NN-NNAR-NS00-0000
OPTICAL PERFORMANCE SPECIFICATIONS			
UNIFORMITY (EACH LAMP OR COMBINED)			
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6
QTH ONLY			
Expected Maximum Luminance Output: cd/m2	4,200	4,200	4,200
Expected Maximum Illuminance at Port: lux	13,200	13,200	13,200
Peak Radiance: W/m2-sr-um @ 0.95 um	105	105	105
Peak Irradiance @ Port: Photons/s-m2-um @ 0.95um	4.50E+20	4.50E+20	4.50E+20
Minimum Resolution: lux	1.32E-03	1.20E+00	2.64E-01
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500hrs	>500hrs	>500hrs
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
PLASMA OR XENON ONLY			
Expected Maximum Luminance Output: cd/m2	15,600	15,600	15,600
Expected Maximum Illuminance at Port: lux	48,000	48,000	48,000
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	210	210	210
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI or 0.47 Xe	6.90E+20	6.90E+20	6.90E+20
Minimum Resolution: lux	4.80E-03	4.36E+00	9.60E-01
Approximate Correlated Color Temperature	5100K +/-200K	5100K +/-200K	5100K +/-200K
Plasma Rest Mode/Xenon Flicker (Peak-Peak/RMS/Hz) - Typical	6%/1.5%/0.1Hz	6%/1.5%/0.1Hz	6%/1.5%/0.1Hz
Plasma Test Mode (Peak-Peak/RMS/Hz) - 30 minutes (Rest 5min)	0.6%/0.06%/DC	0.6%/0.06%/DC	0.6%/0.06%/DC
Installed Cold Mirror (330-750nm)	None	None	None
Typical Lamp Lifetimes (hrs) Plasma/Xenon	>5000/450	>5000/450	>5000/450
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & -200K	-10% & -200K	-10% & -200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-0.2% & +5K	-0.2% & +5K	-0.2% & +5K
PLASMA/XENON & QTH (Both Full Open VA)			
Expected Maximum Luminance Output: cd/m2	19,800	19,800	19,800
Expected Maximum Illuminance at Port: lux	61,200	61,200	61,200
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	300	300	300
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI @ 0.47 Xe	8.70E+20	8.70E+20	8.70E+20
Approximate Correlated Color Temperature (Xenon & QTH)	4500K +/-300K	4500K +/-300K	4500K +/-300K
ATTENUATORS			
Number of Steps in Attenuator Range	2.00E+06	1.20E+04	1.00E+04
Dynamic Range/Bits/dB - Full Range of System (both lamps)	4.64E+07/25/152	5.10E+04/15/94	2.32E+05/17/106
INTEGRATING SPHERE			
Coating / Material	Spectrafect	Spectrafect	Spectrafect
Sphere Internal Diameter: Inches (Meters)	20 (0.5)	20 (0.5)	20 (0.5)
Frame Type	20 in Cage	20 in Cage	12 in Cage
Output Port Size: Inches (Meters)	8 (0.2)	8 (0.2)	8 (0.2)
SYSTEM COMPONENTS			
QTH Lamps Internal (#, Wattage)	(0)	(0)	(0)
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150
Xenon Lamp & Housing	None	None	None
Plasma Lamp & Housing	250W	250W	250W
Power Supplies (# - Model)	(2) - LPS-400	(2) - LPS-400	(2) - LPS-400
Special Power Supply	No	No	No
Variable Attenuator	(2) VAA-220S	(2) VAD-012	(2) VA-MM
Monitor Detector(s)	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic
System Software	HELIOsense	HELIOsense	HELIOsense
Cube Computer	Included	Included	Included
Spectral Radiance Monitor (Type, Spectral Range)	CDS-610	CDS-610	CDS-610
STANDARD SYSTEM CALIBRATIONS (NIST Traceable)			
Luminance	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes
QTH Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
Xenon Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
QTH & Xenon Spectral Radiance (350-2400nm) & CDS	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes
Operational Duration of Calibration (Xe/QTH)	100 hrs / 50 hrs	100 hrs / 50 hrs	100 hrs / 50 hrs

Model Number Smart Part Number	USLR-A12F-XAN2 A3XA-N2NN-NNAR-NS00-0000	USLR-A12L-XAN2 A4XA-N2NN-NNAR-NS00-0000	USLR-A12L-UAN1 A4UA-N1NN-NNAR-NS00-0000
OPTICAL PERFORMANCE SPECIFICATIONS			
UNIFORMITY (EACH LAMP OR COMBINED)			
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6
QTH ONLY			
Expected Maximum Luminance Output: cd/m2	14,000	16,000	16,000
Expected Maximum Illuminance at Port: lux	44,000	50,200	50,200
Peak Radiance: W/m2-sr-um @ 0.95 um	350	400	400
Peak Irradiance @ Port: Photons/s-m2-um @ 0.95um	1.50E+21	1.70E+21	1.70E+21
Minimum Resolution: lux	4.40E-03	4.40E-03	4.40E-03
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500hrs	>500hrs	>500hrs
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
PLASMA OR XENON ONLY			
Expected Maximum Luminance Output: cd/m2	23,500	31,300	16,500
Expected Maximum Illuminance at Port: lux	73,800	98,000	51,800
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	380	510	300
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI or 0.47 Xe	9.08E+20	1.21E+21	7.16E+20
Minimum Resolution: lux	7.38E-03	9.80E-03	5.18E-03
Approximate Correlated Color Temperature	6000K +400K/-200K	6000K +400K/-200K	6600K +/-300K
Plasma Rest Mode/Xenon Flicker (Peak-Peak/RMS/Hz) - Typical	4%/1%/5kHz	4%/1%/5kHz	4%/1%/5kHz
Plasma Test Mode (Peak-Peak/RMS/Hz) - 30 minutes (Rest 5min)	N/A	N/A	N/A
Installed Cold Mirror (330-750nm)	Yes	Yes	None
Typical Lamp Lifetimes (hrs) Plasma/Xenon	1000/450	1000/450	1000/450
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-50% & -600K	-50% & -600K	-50% & -600K
Est. Output Degradation over 50hrs (% & CCT Shift)	-2.5% / -30K	-2.5% / -30K	-2.5% / -30K
PLASMA/XENON & QTH (Both Full Open VA)			
Expected Maximum Luminance Output: cd/m2	37,500	47,300	32,500
Expected Maximum Illuminance at Port: lux	117,800	148,200	102,000
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	600	770	620
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI @ 0.47 Xe	1.14E+21	1.52E+21	1.03E+21
Approximate Correlated Color Temperature (Xenon & QTH)	5100K +400K/-200K	5100K +400K/-200K	5400K +400K/-200K
ATTENUATORS			
Number of Steps in Attenuator Range	2.00E+06	2.00E+06	2.00E+06
Dynamic Range/Bits/dB - Full Range of System (both lamps)	2.68E+07/24/148	3.37E+07/25/150	2.32E+07/24/146
INTEGRATING SPHERE			
Coating / Material	Spectraflex	Spectralon®	Spectralon
Sphere Internal Diameter: Inches (Meters)	12 (0.3)	11.5 (0.29)	11.5 (0.29)
Frame Type	12 in Cage	12 in Cage	12 in Cage
Output Port Size: Inches (Meters)	4 (0.1)	4 (0.1)	4 (0.1)
SYSTEM COMPONENTS			
QTH Lamps Internal (#, Wattage)	(0)	(0)	(0)
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150
Xenon Lamp & Housing	175W	175W	UV 175W
Plasma Lamp & Housing	None	None	None
Power Supplies (# - Model)	(1) - LPS-400	(1) - LPS-400	(1) - LPS-400
Special Power Supply	Integrated Xenon	Integrated Xenon	Integrated Xenon
Variable Attenuator	(2) VAA-220S	(2) VAA-220S	(2) VAA-220S
Monitor Detector(s)	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic
System Software	HELIOsense	HELIOsense	HELIOsense
Cube Computer	Included	Included	Included
Spectral Radiance Monitor (Type, Spectral Range)	CDS-610	CDS-610	CDS-600
STANDARD SYSTEM CALIBRATIONS (NIST Traceable)			
Luminance	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes
QTH Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
Xenon Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
QTH & Xenon Spectral Radiance (350-2400nm) & CDS	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes
Operational Duration of Calibration (Xe/QTH)	25 hrs / 50 hrs	25 hrs / 50 hrs	25 hrs / 50 hrs

Model Number Smart Part Number	USLR-A12F-XDN2 A3XD-N2NN-NNAR-NS00-0000	USLR-A12L-XDN2 A4XD-N2NN-NNAR-NS00-0000	USLR-A12L-UDN1 A4UD-N1NN-NNAR-NS00-0000
OPTICAL PERFORMANCE SPECIFICATIONS			
UNIFORMITY (EACH LAMP OR COMBINED)			
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6
QTH ONLY			
Expected Maximum Luminance Output: cd/m2	14,000	16,000	16,000
Expected Maximum Illuminance at Port: lux	44,000	50,200	50,200
Peak Radiance: W/m2-sr-um @ 0.95 um	350	400	400
Peak Irradiance @ Port: Photons/s-m2-um @ 0.95um	1.50E+21	1.70E+21	1.70E+21
Minimum Resolution: lux	4.00E+00	4.00E+00	4.00E+00
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500hrs	>500hrs	>500hrs
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
PLASMA OR XENON ONLY			
Expected Maximum Luminance Output: cd/m2	23,500	31,300	16,500
Expected Maximum Illuminance at Port: lux	73,800	98,000	51,800
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	330	400	430
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI or 0.47 Xe	9.08E+20	1.21E+21	7.16E+20
Minimum Resolution: lux	6.71E+00	8.91E+00	4.71E+00
Approximate Correlated Color Temperature	6000K +400K/-200K	6000K +400K/-200K	6600K +/-300K
Plasma Rest Mode/Xenon Flicker (Peak-Peak/RMS/Hz) - Typical	4%/1%/5kHz	4%/1%/5kHz	4%/1%/5kHz
Plasma Test Mode (Peak-Peak/RMS/Hz) - 30 minutes (Rest 5min)	N/A	N/A	N/A
Installed Cold Mirror (330-750nm)	Yes	Yes	None
Typical Lamp Lifetimes (hrs) Plasma/Xenon	1000/450	1000/450	1000/450
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-50% & -600K	-50% & -600K	-50% & -600K
Est. Output Degradation over 50hrs (% & CCT Shift)	-2.5% / -30K	-2.5% / -30K	-2.5% / -30K
PLASMA/XENON & QTH (Both Full Open VA)			
Expected Maximum Luminance Output: cd/m2	37,500	47,300	32,500
Expected Maximum Illuminance at Port: lux	117,800	148,200	102,000
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	600	770	620
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI @ 0.47 Xe	1.14E+21	1.52E+21	1.03E+21
Approximate Correlated Color Temperature (Xenon & QTH)	5100K +400K/-200K	5100K +400K/-200K	5400K +400K/-200K
ATTENUATORS			
Number of Steps in Attenuator Range	1.20E+04	1.20E+04	1.20E+04
Dynamic Range/Bits/dB - Full Range of System (both lamps)	2.95E+04/14/89	3.71E+04/15/91	2.55E+04/14/88
INTEGRATING SPHERE			
Coating / Material	Spectralect	Spectralon	Spectralon
Sphere Internal Diameter: Inches (Meters)	12 (0.3)	11.5 (0.29)	11.5 (0.29)
Frame Type	12 in Cage	12 in Cage	12 in Cage
Output Port Size: Inches (Meters)	4 (0.1)	4 (0.1)	4 (0.1)
SYSTEM COMPONENTS			
QTH Lamps Internal (#, Wattage)	(0)	(0)	(0)
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150
Xenon Lamp & Housing	175W	UV 175W	UV 175W
Plasma Lamp & Housing	None	None	None
Power Supplies (# - Model)	(1) - LPS-400	(1) - LPS-400	(1) - LPS-400
Special Power Supply	Integrated Xenon	Integrated Xenon	Integrated Xenon
Variable Attenuator	(2) VAD-012	(2) VAD-012	(2) VAD-012
Monitor Detector(s)	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic
System Software	HELIOsense	HELIOsense	HELIOsense
Cube Computer	Included	Included	Included
Spectral Radiance Monitor (Type, Spectral Range)	CDS-610	CDS-610	CDS-600
STANDARD SYSTEM CALIBRATIONS (NIST Traceable)			
Luminance	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes
QTH Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
Xenon Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
QTH & Xenon Spectral Radiance (350-2400nm) & CDS	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes
Operational Duration of Calibration (Xe/QTH)	25 hrs / 50 hrs	25 hrs / 50 hrs	25 hrs / 50 hrs

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OPTICAL PERFORMANCE SPECIFICATIONS			
UNIFORMITY (EACH LAMP OR COMBINED)			
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6
QTH ONLY			
Expected Maximum Luminance Output: cd/m2	14,000	16,000	16,000
Expected Maximum Illuminance at Port: lux	44,000	50,200	50,200
Peak Radiance: W/m2-sr-um @ 0.95 um	350	400	400
Peak Irradiance @ Port: Photons/s-m2-um @ 0.95um	1.50E+21	1.70E+21	1.70E+21
Minimum Resolution: lux	8.80E-01	1.00E+00	1.00E+00
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500hrs	>500hrs	>500hrs
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
PLASMA OR XENON ONLY			
Expected Maximum Luminance Output: cd/m2	23,500	31,300	16,500
Expected Maximum Illuminance at Port: lux	73,800	98,000	51,800
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	330	400	430
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI or 0.47 Xe	9.08E+20	1.21E+21	7.16E+20
Minimum Resolution: lux	1.48E+00	1.96E+00	1.04E+00
Approximate Correlated Color Temperature	6000K +400K/-200K	6000K +400K/-200K	6600K +/-300K
Plasma Rest Mode/Xenon Flicker (Peak-Peak/RMS/Hz) - Typical	4%/1%/5kHz	4%/1%/5kHz	4%/1%/5kHz
Plasma Test Mode (Peak-Peak/RMS/Hz) - 30 minutes (Rest 5min)	N/A	N/A	N/A
Installed Cold Mirror (330-750nm)	Yes	Yes	None
Typical Lamp Lifetimes (hrs) Plasma/Xenon	1000/450	1000/450	1000/450
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-50% & -600K	-50% & -600K	-50% & -600K
Est. Output Degradation over 50hrs (% & CCT Shift)	-2.5% / -30K	-2.5% / -30K	-2.5% / -30K
PLASMA/XENON & QTH (Both Full Open VA)			
Expected Maximum Luminance Output: cd/m2	37,500	47,300	32,500
Expected Maximum Illuminance at Port: lux	117,800	148,200	102,000
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	600	770	620
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI @ 0.47 Xe	1.14E+21	1.52E+21	1.03E+21
Approximate Correlated Color Temperature (Xenon & QTH)	5100K +400K/-200K	5100K +400K/-200K	5400K +400K/-200K
ATTENUATORS			
Number of Steps in Attenuator Range	1.00E+04	1.00E+04	1.00E+04
Dynamic Range/Bits/dB - Full Range of System (both lamps)	1.34E+05/17/102	1.48E+05/17/102	1.02E+05/16/99
INTEGRATING SPHERE			
Coating / Material	Spectralect	Spectralon	Spectralon
Sphere Internal Diameter: Inches (Meters)	12 (0.3)	11.5 (0.29)	11.5 (0.29)
Frame Type	12 in Cage	12 in Cage	12 in Cage
Output Port Size: Inches (Meters)	4 (0.1)	4 (0.1)	4 (0.1)
SYSTEM COMPONENTS			
QTH Lamps Internal (# , Wattage)	(0)	(0)	(0)
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150
Xenon Lamp & Housing	175W	175W	UV 175W
Plasma Lamp & Housing	None	None	None
Power Supplies (# - Model)	(1) - LPS-400	(1) - LPS-400	(1) - LPS-400
Special Power Supply	Integrated Xenon	Integrated Xenon	Integrated Xenon
Variable Attenuator	(2) VA-MM	(2) VA-MM	(2) VA-MM
Monitor Detector(s)	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic
System Software	HELIOsense	HELIOsense	HELIOsense
Cube Computer	Included	Included	Included
Spectral Radiance Monitor (Type, Spectral Range)	CDS-610	CDS-610	CDS-600
STANDARD SYSTEM CALIBRATIONS (NIST Traceable)			
Luminance	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes
QTH Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
Xenon Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
QTH & Xenon Spectral Radiance (350-2400nm) & CDS	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes
Operational Duration of Calibration (Xe/QTH)	25 hrs / 50 hrs	25 hrs / 50 hrs	25 hrs / 50 hrs

Model Number Smart Part Number	USLR-A12F-PAN2 A3PA-N2NN-NNAR-NS00-0000	USLR-A12L-PAN2 A4PA-N2NN-NNAR-NS00-0000	USLR-A12F-PDN2 A3PD-N2NN-NNAR-NS00-0000
OPTICAL PERFORMANCE SPECIFICATIONS			
UNIFORMITY (EACH LAMP OR COMBINED)			
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6
QTH ONLY			
Expected Maximum Luminance Output: cd/m2	14,000	16,000	14,000
Expected Maximum Illuminance at Port: lux	44,000	50,200	50,200
Peak Radiance: W/m2-sr-um @ 0.95 um	350	400	350
Peak Irradiance @ Port: Photons/s-m2-um @ 0.95um	1.50E+21	1.70E+21	1.50E+21
Minimum Resolution: lux	4.40E-03	5.02E-03	4.56E+00
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500hrs	>500hrs	>500hrs
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
PLASMA OR XENON ONLY			
Expected Maximum Luminance Output: cd/m2	52,000	62,000	52,000
Expected Maximum Illuminance at Port: lux	160,000	190,000	160,000
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	700	830	700
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI or 0.47 Xe	2.30E+21	2.70E+21	2.30E+21
Minimum Resolution: lux	1.60E-02	1.90E-02	1.45E+01
Approximate Correlated Color Temperature	5100K +/-100K	5100K +/-100K	5100K +/-100K
Plasma Rest Mode/Xenon Flicker (Peak-Peak/RMS/Hz) - Typical	6%/1.5%/0.1Hz	6%/1.5%/0.1Hz	6%/1.5%/0.1Hz
Plasma Test Mode (Peak-Peak/RMS/Hz) - 30 minutes (Rest 5min)	0.6%/0.04%/DC	0.6%/0.04%/DC	0.6%/0.04%/DC
Installed Cold Mirror (330-750nm)	None	0.6%/0.06%/DC	0.6%/0.06%/DC
Typical Lamp Lifetimes (hrs) Plasma/Xenon	>5000/450	>5000/450	>5000/450
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & -200K	-10% & -200K	-10% & -200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-0.2% & +5K	-0.2% & +5K	-0.2% & +5K
PLASMA/XENON & QTH (Both Full Open VA)			
Expected Maximum Luminance Output: cd/m2	66,000	78,000	66,000
Expected Maximum Illuminance at Port: lux	204,000	240,200	210,200
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	900	1050	900
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI @ 0.47 Xe	2.90E+21	3.40E+21	2.90E+21
Approximate Correlated Color Temperature (Xenon & QTH)	4500K +/-300K	4500K +/-300K	4500K +/-300K
ATTENUATORS			
Number of Steps in Attenuator Range	2.00E+06	2.00E+06	5.00E+04
Dynamic Range/Bits/dB - Full Range of System (both lamps)	4.64E+07/25/152	4.78E+07/25/153	5.00E+04/18/93
INTEGRATING SPHERE			
Coating / Material	Spectralect	Spectralon	Spectralect
Sphere Internal Diameter: Inches (Meters)	12 (0.3)	11.5 (0.29)	12 (0.3)
Frame Type	12 in Cage	12 in Cage	12 in Cage
Output Port Size: Inches (Meters)	4 (0.1)	4 (0.1)	4 (0.1)
SYSTEM COMPONENTS			
QTH Lamps Internal (#, Wattage)	(0)	(0)	(0)
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150
Xenon Lamp & Housing	None	None	None
Plasma Lamp & Housing	250W	250W	250W
Power Supplies (# - Model)	(2) - LPS-400	(2) - LPS-400	(2) - LPS-400
Special Power Supply	No	No	No
Variable Attenuator	(2) VAA-220S	(2) VAA-220S	(2) VAD-012
Monitor Detector(s)	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic
System Software	HELIOsense	HELIOsense	HELIOsense
Cube Computer	Included	Included	Included
Spectral Radiance Monitor (Type, Spectral Range)	CDS-610	CDS-610	CDS-610
STANDARD SYSTEM CALIBRATIONS (NIST Traceable)			
Luminance	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes
QTH Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
Xenon Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
QTH & Xenon Spectral Radiance (350-2400nm) & CDS	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes
Operational Duration of Calibration (Xe/QTH)	100 hrs / 50 hrs	100 hrs / 50 hrs	100 hrs / 50 hrs

Model Number Smart Part Number	USLR-A12L-PDN2 A4PD-N2NN-NNAR-NS00-0000	USLR-A12F-PMN2 A3PM-N2NN-NNAR-NS00-0000	USLR-A12L-PMN2 A4PM-N2NN-NNAR-NS00-0000
OPTICAL PERFORMANCE SPECIFICATIONS			
UNIFORMITY (EACH LAMP OR COMBINED)			
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6	+/-2.0% - 35° / 0.85 / 0.6
QTH ONLY			
Expected Maximum Luminance Output: cd/m2	16,000	14,000	16,000
Expected Maximum Illuminance at Port: lux	50,200	44,000	50,200
Peak Radiance: W/m2-sr-um @ 0.95 um	400	350	400
Peak Irradiance @ Port: Photons/s-m2-um @ 0.95um	1.70E+21	1.50E+21	1.70E+21
Minimum Resolution: lux	4.56E+00	8.80E-01	1.00E+00
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500hrs	>500hrs	>500hrs
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
PLASMA OR XENON ONLY			
Expected Maximum Luminance Output: cd/m2	62,000	52,000	62,000
Expected Maximum Illuminance at Port: lux	190,000	160,000	190,000
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	830	700	830
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI or 0.47 Xe	2.70E+21	2.30E+21	2.70E+21
Minimum Resolution: lux	1.73E+01	3.20E+00	3.80E+00
Approximate Correlated Color Temperature	5100K +/-100K	5100K +/-100K	5100K +/-100K
Plasma Rest Mode/Xenon Flicker (Peak-Peak/RMS/Hz) - Typical	6%/1.5%/0.1Hz	6%/1.5%/0.1Hz	6%/1.5%/0.1Hz
Plasma Test Mode (Peak-Peak/RMS/Hz) - 30 minutes (Rest 5min)	0.6%/0.04%/DC	0.6%/0.04%/DC	0.6%/0.04%/DC
Installed Cold Mirror (330-750nm)	0.6%/0.06%/DC	0.6%/0.06%/DC	0.6%/0.06%/DC
Typical Lamp Lifetimes (hrs) Plasma/Xenon	>5000/450	>5000/450	>5000/450
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & -200K	-10% & -200K	-10% & -200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-0.2% & +5K	-0.2% & +5K	-0.2% & +5K
PLASMA/XENON & QTH (Both Full Open VA)			
Expected Maximum Luminance Output: cd/m2	78,000	66,000	78,000
Expected Maximum Illuminance at Port: lux	240,200	204,000	240,200
Peak Radiance: W/m2-sr-um @ 0.60um PI @ 0.47 Xe	1050	900	1050
Peak Irradiance @ Port: Photons/s-m2-um @ 0.60um PI @ 0.47 Xe	3.40E+21	2.90E+21	3.40E+21
Approximate Correlated Color Temperature (Xenon & QTH)	4500K +/-300K	4500K +/-300K	4500K +/-300K
ATTENUATORS			
Number of Steps in Attenuator Range	1.20E+04	1.00E+04	1.00E+04
Dynamic Range/Bits/dB - Full Range of System (both lamps)	5.26E+04/17/94	2.32E+05/17/106	2.39E+05/17/107
INTEGRATING SPHERE			
Coating / Material	Spectralon	Spectrafect	Spectralon
Sphere Internal Diameter: Inches (Meters)	11.5 (0.29)	12 (0.3)	11.5 (0.29)
Frame Type	12 in Cage	12 in Cage	12 in Cage
Output Port Size: Inches (Meters)	4 (0.1)	4 (0.1)	4 (0.1)
SYSTEM COMPONENTS			
QTH Lamps Internal (#, Wattage)	(0)	(0)	(0)
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150
Xenon Lamp & Housing	None	None	None
Plasma Lamp & Housing	250W	250W	250W
Power Supplies (# - Model)	(2) - LPS-400	(2) - LPS-400	(2) - LPS-400
Special Power Supply	No	No	No
Variable Attenuator	(2) VAD-012	(2) VA-MM	(2) VA-MM
Monitor Detector(s)	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic
System Software	HELIOsense	HELIOsense	HELIOsense
Cube Computer	Included	Included	Included
Spectral Radiance Monitor (Type, Spectral Range)	CDS-610	CDS-610	CDS-610
STANDARD SYSTEM CALIBRATIONS (NIST Traceable)			
Luminance	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes
QTH Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
Xenon Only Spectral Radiance (350-2400nm)	Yes	Yes	Yes
QTH & Xenon Spectral Radiance (350-2400nm) & CDS	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes
Operational Duration of Calibration (Xe/QTH)	100 hrs / 50 hrs	100 hrs / 50 hrs	100 hrs / 50 hrs