

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)	1000	1000	1000
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
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 ASPA-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)	>5000	>5000	>5000
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
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)	1000	1000	1000
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	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) 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
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)	1000	1000	1000
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	Spectrafect	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
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)	1000	1000	1000
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	Spectrafect	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
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)	>5000	>5000	>5000
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
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)	>5000	>5000	>5000
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
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