

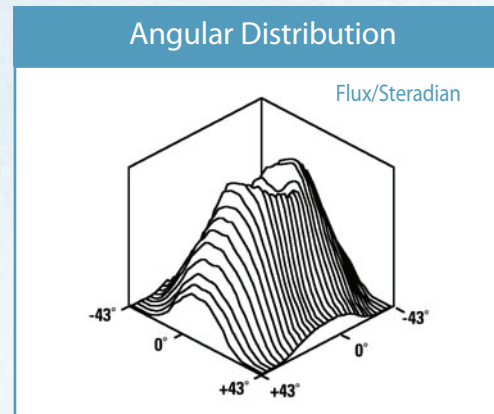
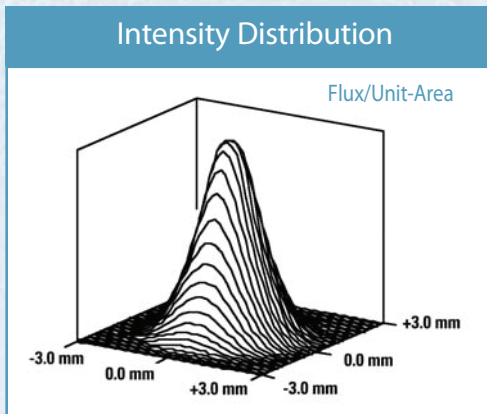
ELLIPTICAL REFLECTORS

The Short Arc Gap

USHIO's Sōlarc® single-ended lamps allow the equipment designer to capitalize on the lamp's unique short arc length. At 1.27mm, with a peak luminance at the cathode, the lamp begins to approximate a point source. Coupled with carefully designed lenses or reflectors with maximum light capture and the appropriate focus, the lamp can deliver high-intensity light to tightly controlled or divergent beam applications. The figure below shows the luminous intensity distribution of the arc. The two sources of peak intensity lie near the electrode tips.

Highest Efficacy

Metal halide lamps are inherently very efficient, providing two to three times the efficacy of either halogen or xenon lamps. Optimizing the optical system using the short arc can provide an efficiency increase in many applications, allowing the Sōlarc lamp to deliver as much light as a halogen lamp with four to five times more wattage. High efficacy plus the resultant decreased demand for power allow the equipment designer to develop miniature, lighter weight, portable and even battery-powered product configurations.



Bright White Light

Sōlarc lamps inherently exhibit a correlated color temperature comparable to the sun of 5,000K–7,000K. Halogen lamps normally operate in the 3,000°K–3,200°K range and vacuum incandescent lamps in the 2,600K–2,900K range. In visible terms, the lower color temperature dictates more red or yellow in the light. The higher color temperature enables realistic visualization of color rendering and contrast. While it is possible to operate halogen lamps up to 4,300K by the use of filters, it is at the expense of severely reducing the lamp's light output and life. The daylight color temperature of the Sōlarc lamp produces a whiter, "cooler" light, which reproduces the full range of colors. The output is color balanced, making it ideal for use with CCD video cameras.

Excellent Light Maintenance

Unlike many metal halide lamps, Sōlarc lamps maintain much of their intensity and color balance throughout their life. In applications requiring white light, the life of the Sōlarc lamp could be many times that of a competing halogen lamp. Typically our lamps will maintain 75% of their initial intensity. Shifts in X and Y chromaticity values are typically less than 1.5%.

Lamp life is defined as a rated median life with a duty cycle of one hour on and 15 minutes off for 19, 22 and 25W lamps. The median life is the time at which 50% of the lamps are still operational. An application requiring a duty cycle with a longer “on” time for each start will extend the life, and shorter “on” times will reduce lamp life. The predominant symptom of end of life will be failure of the lamp to start.

The Spectrum

A typical spectral distribution of reflectorized lamps is illustrated on pages 3 and 6. In general, the distribution is optimized for the visible range. The dichroic coating of the reflector reduces the projected infrared, but lamps can be manufactured which are uniquely rich in the mid and far infrared.

Additional Cooling

Sōlarc lamps operate at relatively high temperatures and require adequate cooling. The reflectorized lamps are designed to let the heat pass through the reflector, simplifying the mechanical/thermal design. Ushio America can offer a test lamp with embedded thermocouples to evaluate the cooling design of your application.

Accessories

Sōlarc lamps require a ballast to ignite and sustain operation. The ballast model numbers listed in the tables on pages 3 and 6 are specifically designed to operate Ushio America’s patented arc lamp technology. A special connector, C18A003, is required to connect the lamp and ballast. This connector assembly includes a polarized mating connector with 457 mm of silicone-jacketed wire rated for high-voltage pulses.

Operating Characteristics

Start/Restart: Igniting the lamp requires short high-voltage pulses provided by the Ushio America ballast. The lamp will require some time, generally less than 50 seconds, to reach 90% of its light output. Color temperature will vary during start-up.

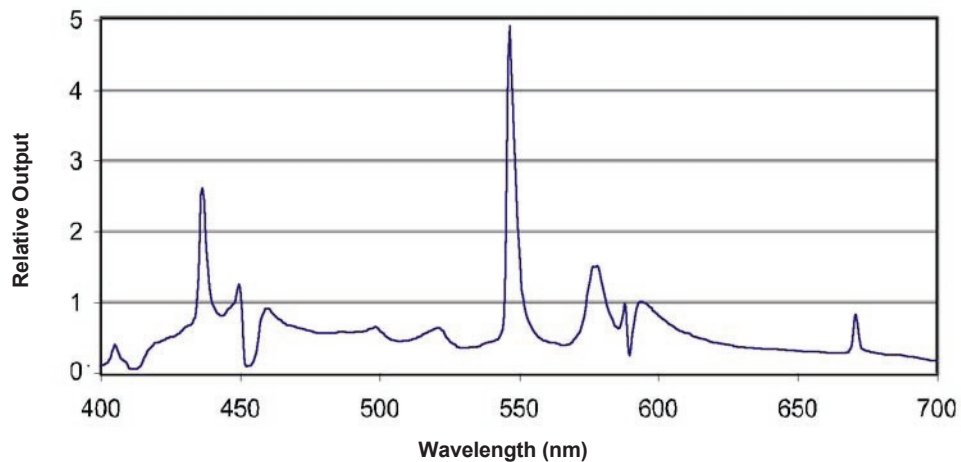
Orientation and Cooling

The lamp data provided was characterized in the recommended horizontal operating position. The lamp may be operated in other mounting orientations but performance may vary significantly. To maximize lamp life, the anode and cathode seal areas must be maintained at 200°C to 285°C and 100°C to 150°C, respectively.

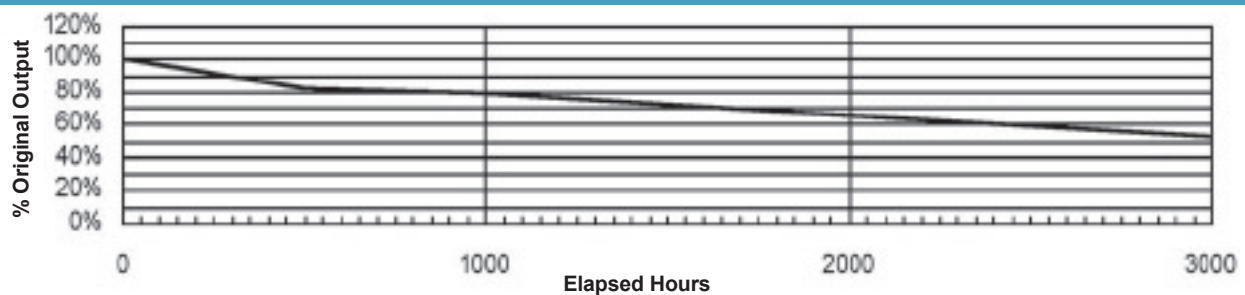
Sölarc® MR-16 Elliptical Lamp Performance Specifications

LAMP P/N	M50E014/M50E012	M50E021/AL-5060
Wattage	50W	50W
Performance @ Rated Power: Luminous Flux		
Lumens Through a 10 mm Aperture	1,300	2,500
Lumens Through a 8 mm Aperture	1,300	–
Lumens Through a 6 mm Aperture	–	2,000
Lumens Through a 4 mm Aperture	–	1,250
Lumens Through a 2 mm Aperture	–	400
Correlated Color Temperature (K)	6,500	5,700
Chromaticity (CIX, CIY)	0.308, 0.314	0.33, 0.37
Lamp Life (Hours)	2,500	
Lamp Maintenance and Spectrum	Refer to charts below	
Warm-Up Time to 90% Output	40 Seconds	
Restart Time to 90% Output	60 Seconds	
Reflectorized Lamp Application Information		MR16
Numerical Aperture	NA–0.42	NA–0.69
Spot Size @ Focal Plane F2	10 mm @50% Intensity	6 mm @50% Intensity
F2 Distance from Rim	47.2 mm / 38.0 mm	23.8 mm / 18.6 mm
Ballast Requirements		
Regulated Ballast P/N	B50R004R	
Input Voltage (VDC)	12.0–15.0	
Steady State Current (Amps)	5.6 @ 12 VDC	

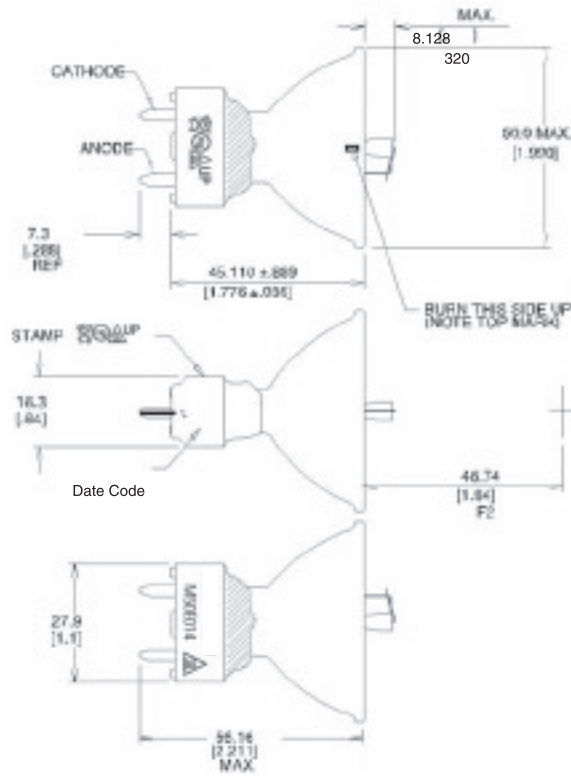
50W Typical Spectral Output (Reference)



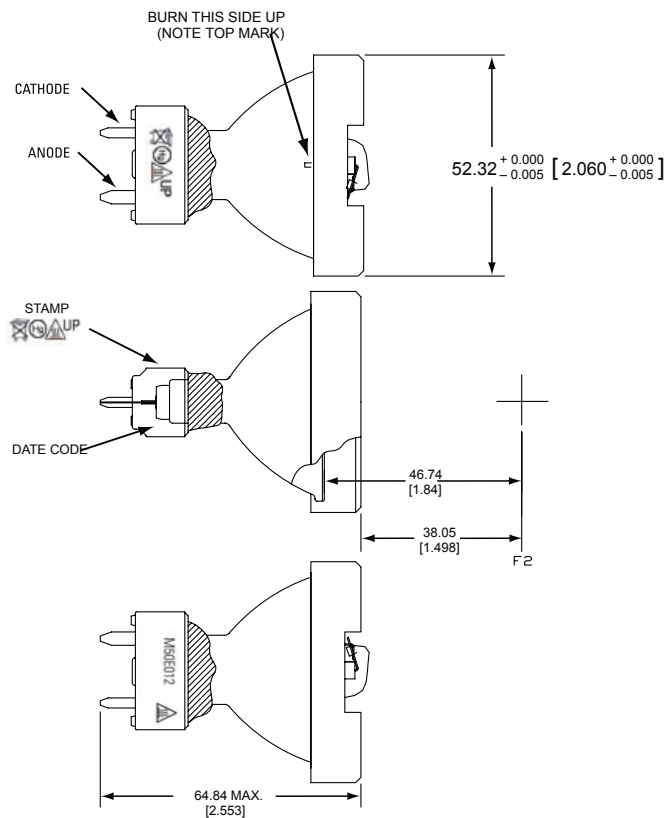
Typical Light Maintenance–50W Lamp



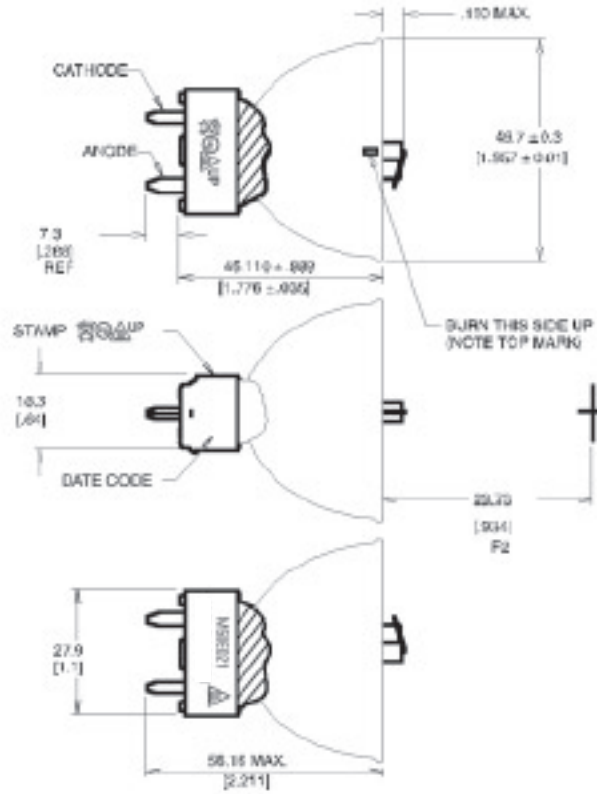
M50E014 (Measurements are in mm [inches].)



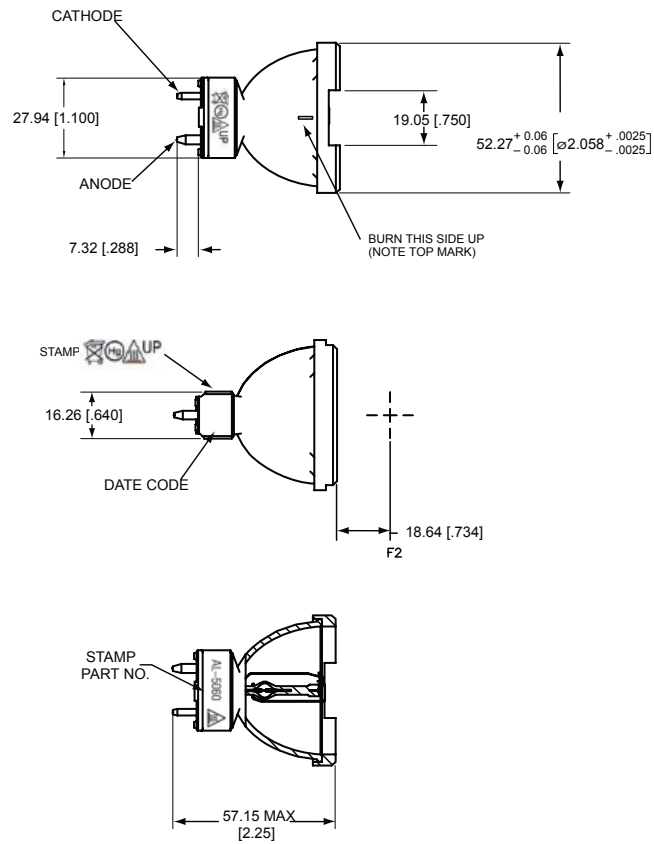
M50E012 (Measurements are in mm [inches].)



M50E021 (Measurements are in mm [inches].)



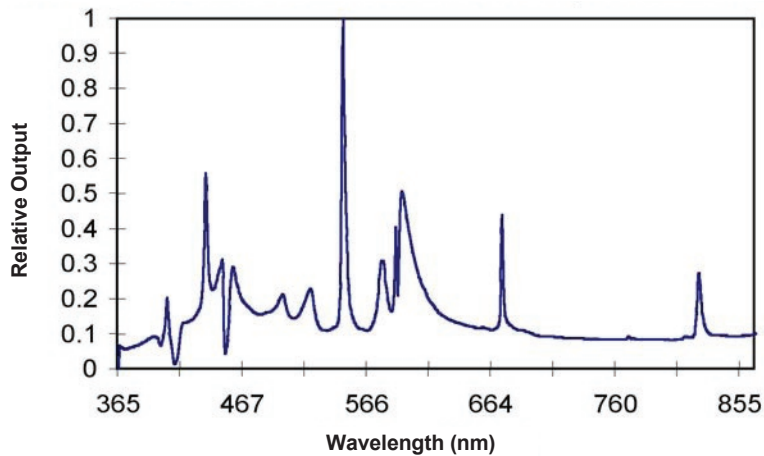
AL50-60 (Measurements are in mm [inches].)



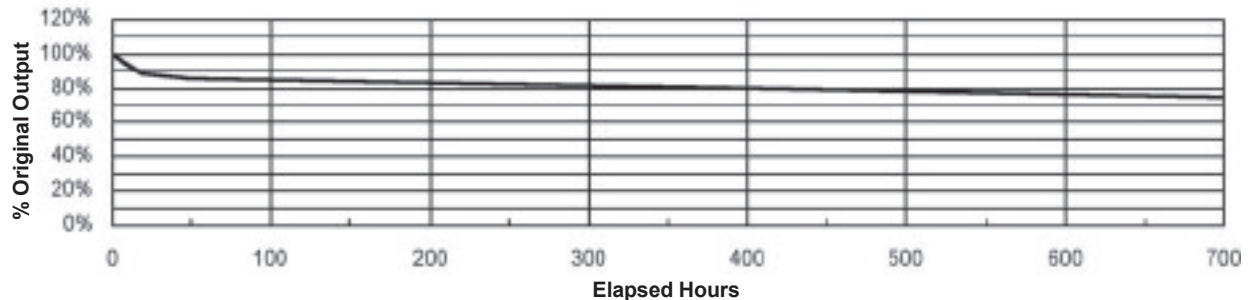
Sölarc® MR-11 Elliptical Lamp Performance Specifications

Wattage	19 Watts	22 Watts	25 Watts
Performance @ Rated Power: Luminous Flux			
Lumens Through a 4 mm Aperture	560	620	720
Lumens Through a 2 mm Aperture	200	260	350
Correlated Color Temperature (K)	6,900	6,200	5,200
Chromaticity (CIX, CIY)	0.32, 0.31	0.33, 0.32	0.33, 0.34
Lamp Life (Hours)	1,100	750	350
Lamp Maintenance and Spectrum	Refer to charts below		
Warm-Up Time to 90% Output	20 seconds		
Restart Time to 90% Output	30 seconds		
Reflectorized Lamp Application Information		MR11	
Numerical Aperture	NA=0.67		
Spot Size @ Focal Plane F2	2 mm @ 50% Intensity		
F2 Distance from Rim	14.7 mm		
Ballast Requirements		Refer to Ballast Datasheet LSL018	
Regulated Ballast P/N	B19R001	B22R001R	B25R001R
Input Voltage (VDC)	9.8	9.8–15.0	9.8–15.0
Steady State Current (Amps)	2.0	2.3	2.6

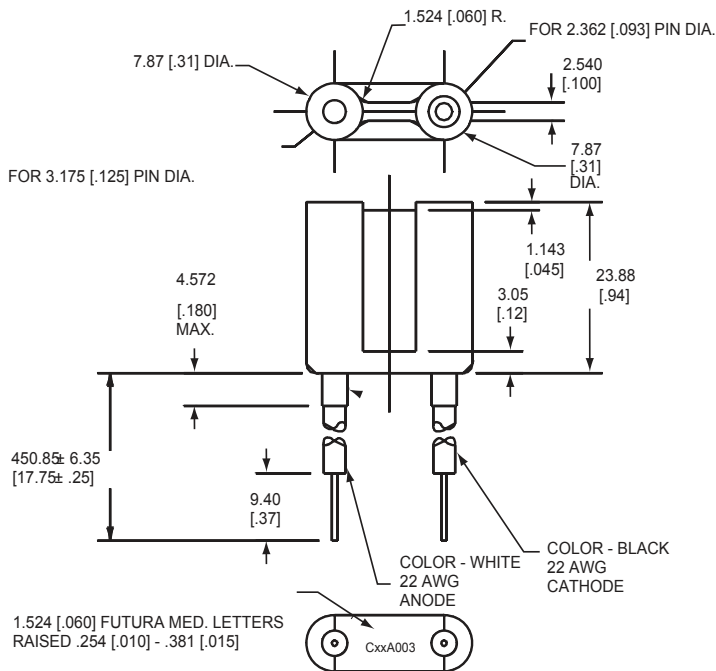
21W Typical Spectral Output (Reference)



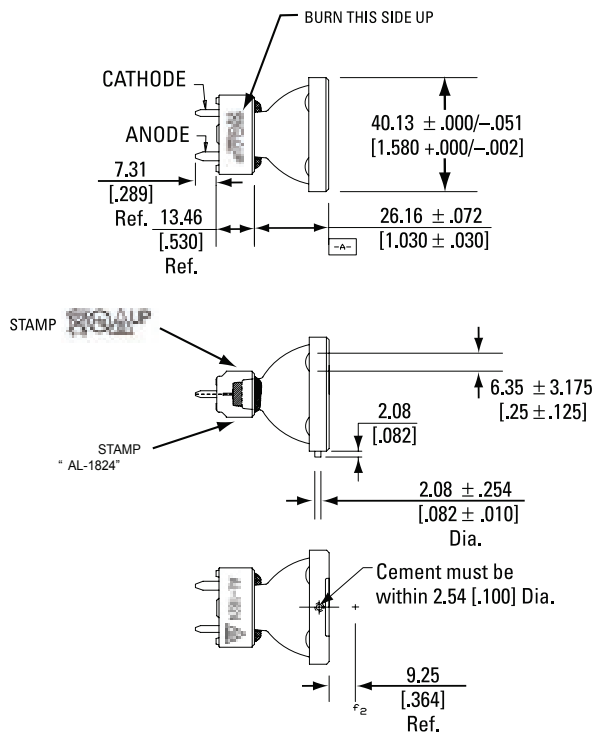
Typical Light Maintenance—21W Lamp



C18A003 Connector Assembly (All dimensions in mm [inches])



AL-1824



M21E001

