

P R E C I S I O N L A M P S



Precision Lamps

The addition of a lens end to a technical lamp is an important development in miniature lamps as it allows the use of lower wattage lamps while maintaining light output. The lens gathers light resulting in an intensity increase of up to 10 times at the end of the lamp, compared to the output of an equivalent lamp without a lens, measured at this same point. Most popular lens end lamps are those types mounted in a smooth or threaded type base as illustrated in this catalog.

The purpose of the lens end lamp is to gather light and project it into a useful direction. These lens end lamps by themselves cannot satisfy all requirements of an optical system. The lamps have both a focal length and working plane. The working plane is that area where light distribution is optimized for intensity, uniformity and consistency of light pattern between lamps. The working plane is typically located perpendicular to the lamp mechanical axis and at a distance of 0.5-3 millimeters from the lens end. Due to variations in the manufacturing process for these lamps the light pattern will vary slightly from lamp to lamp. A sample of lamps should be tested in any new design to ensure proper operation.

To best utilize these lens end lamps it is recommended that the area to be illuminated (fiber optics aperture, or light guide) be placed directly into the working plane. For projection of the light at distances exceeding the distance of the working plane, the addition of an external lens is recommended. Using the working plane with an aperture as the source for a larger transfer lens can provide a uniform well-defined beam for illumination of a distant object.

Lens end lamps are designed and constructed for those critical optical applications, which require a miniature light source with high quality glass envelopes and precisely positioned compact tungsten filaments. Preferred filaments for technical lamps are of C-6 style. These filaments are designed to operate at low voltage and high current providing for rugged construction, miniature size, and high light output. Many of the subminiature lamps are equipped with sturdy coiled, coil filaments (CC-6 style). Each filament is carefully positioned and secured to the electrodes.

Typical color temperatures for lamps in this section range between 1,800 Kelvin for long life lamps and 3,000 Kelvin for shorter life lamps.

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Fabrication of these lamps occurs in atmospherically controlled environments, incorporating rigid production control. Inspection of each unit to stringent quality control standards is mandatory. The end results are quality glass bulbs free of contamination, filaments of consistent shape, and quality bases manufactured to extremely close tolerances.

These stringent manufacturing processes, coupled with quality glass, and compact filaments allow for the addition of an optical lens placed directly onto the lamp. This lens increases light output up to 10 times compared to an equivalent lamp without lens. This phenomenon makes possible a reduction in operational voltage of the lamp resulting in prolonged lamp life. Lens end lamps can be vacuum or, more commonly, filled with a gas such as argon, krypton, or a halogen mixture. Vacuum lamps have a lower surface temperature than gas filled lamps. Maximum current rating for vacuum lamps is approximately 400 milliamps. Gas-filled lamps minimize tungsten filament evaporation and make possible the unique combination of high brightness, high color temperature and long life in a miniature lamp size. Current draw of gas filled lamps exceeds 400 milliamps.

The 1/4 inch diameter smooth side based lamps and the 1/2-20 threaded base lamps provide an optical axis aligned to the mechanical axis of the base within a tolerance of $\pm 3^\circ$. These lamps also allow for axial adjustment necessary to optimize light distribution and light pattern.

Mounting these lamps must be done carefully to ensure the sleeve is not distorted which can cause premature lamp failure. The smooth sided sleeve lamps are typically mounted in a bored hole of matching diameter and held in place by the use of a setscrew on the rear portion of the lamp. It is recommended that the setscrew only contact the rear one third of the sleeve and that the torque be limited to prevent distortion of the sleeve. Any sign of indentation on the sleeve indicates excessive pressure from the setscrew.

Precision Lamps **26-33** >

Focused Lens End **27-28**

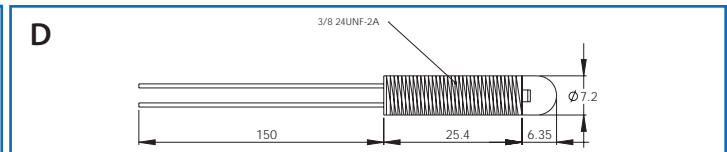
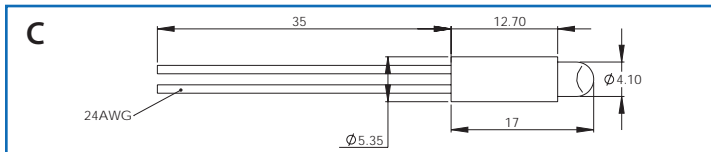
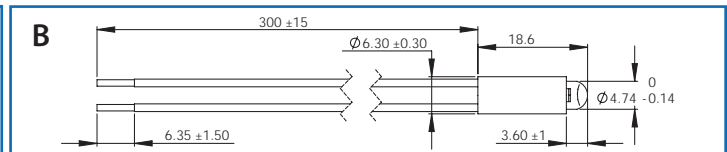
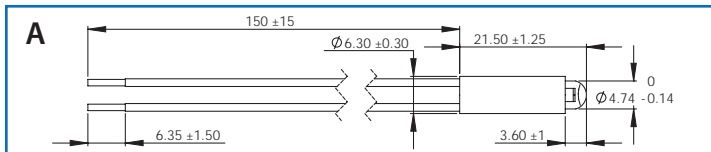
Precision Half Spherical **29**

Medical Instrument **30**

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Miniature **32**

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Note: All dimensions are in mm

Focused Lens End Lamps

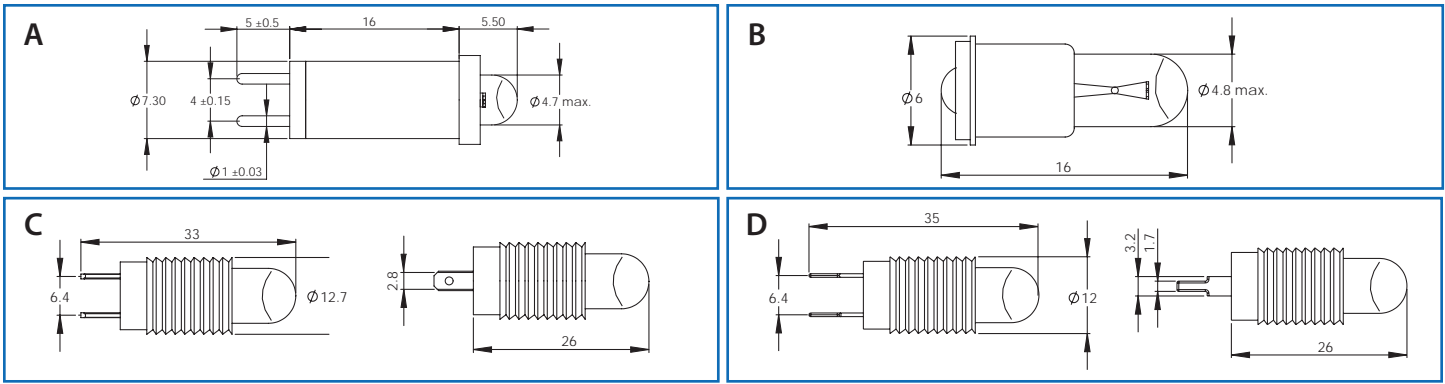
Line No.	Part No.	Volts	Amps	Lux*	CCT	Life Hours	Vacuum Or Gas	Filament Type	Base Type	Drawing
1	L1005	2.5	0.350	1550	2200	25000	V	C-6	Brass	A
2	L1005A	2.5	0.350	1550	2200	25000	V	C-6	Brass	B
3	L1026A**	2.5	0.350	2000	2250	10000	V	C-2R	Brass	B
4	L103	2.5	0.350	2000	2250	10000	V	C-6	Sleeve	C
5	L1023	2.5	0.350	2100	2250	15000	V	C-6	Brass	A
6	L102	2.5	0.800	0.08 MSCP	2250	5000	V	C-2R	Sleeve	A
7	L1006	3.5	0.450	1600	2230	30000	G	C-6	Brass	A
8	L1024	3.5	0.560	3800	2490	4500	Krypton	C-6	Brass	A
9	L1024A	3.5	0.560	3800	2490	4500	G	C-6	Brass	B
10	L1021	3.5	0.600	12000	2850	100	Krypton	C-6	Brass	A
11	L1030	3.5	1.200	16000	2950	150	Halogen	C-6	Brass	A
12	L1007	5	0.160	880	2300	12500	V	C-2R	Brass	A
13	L1025	5	0.240	1200	2450	10000	V	C-2R	Brass	A
14	L105	5	0.180	1200	2250	10000	V	C-2R	Sleeve	C
15	L1041	5	1.31	75	2700	3300	Halogen	C-6	Brass	A
16	L1051-C	6	1.9	50000	2900	1000	Halogen	C-6	3/8 24 UNF-2A	D

* Lux measured at 50mm

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Note: All dimensions are in mm

Cartridge Lens End Lamps

Line No.	Part No.	Volts	Amps	CCT	Life Hours	Filament Type	Base Type	Drawing
1	L4038	2.50	0.350	2240	10000	C-6	Cartridge	A
2	L4075	5.00	0.170	2300	12500	C-2R	Cartridge	A

Midget Grooved Base Lens End Lamps

Line No.	Part No.	Volts	Amps	Lux*	CCT	Life Hours	Vacuum Or Gas	Filament Type	Drawing
3	L4044	2.5	0.350	1600	2250	10000	V	C-6	B

* Lux at 50mm

Focused Lens End Lamps

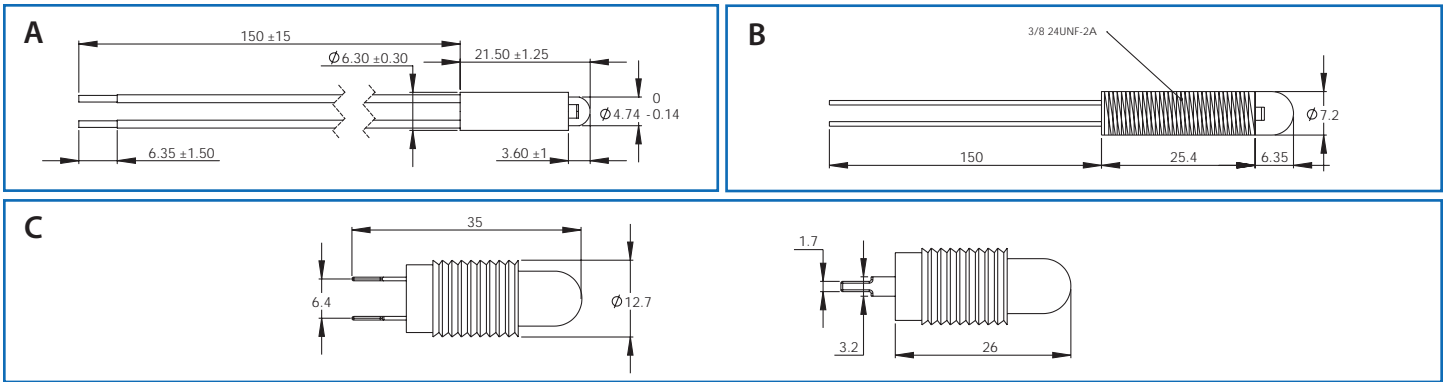
Line No.	Part No.	Volts	Amps	Lumens	Min. Lux*	CCT	Life Hours	Vacuum Or Gas	Filament Type	Base Type	Drawing
4	L8006	5	0.750	18	7000	2420	15000	G	C-6	½-20 UNF-2A	C
5	L8035	5	0.770	7000	7000	2420	15000	G	C-6	½-20 UNF-2A	D
6	L8008	5	0.750	8000	7000	2420	15000	G	C-6	½-20 UNF-2A	C
7	L8050**	5	0.810	3000	3000	2140	20000	G	C-6	½-20 UNF-2A	D
8	L8017	6	1.600	109	38000	2860	500	G	C-6	½-20 UNF-2A	C

* Lux at 50mm

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PRECISION LAMPS



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Precision Half Spherical Lamps

Line No.	Part No.	Volts	Amps	Lumens	CCT	Life Hours	Vacuum Or Gas	Filament Type	Filament Dimensions Lgth. x Dia.	Base Type	Drawing
1	L1008	2.5	0.340	2.7	2230	30000	V	C-6	1.2 x 0.4	Brass	A
2	L1009	3.5	0.450	4.5	2230	30000	Argon	C-6	1.2 x 0.4	Brass	A
3	L1027	3.5	0.600	24.0	2850	100	Krypton	C-6	1.2 x 0.4	Brass	A
4	L1031	3.5	1.200	40.0	2950	150	Halogen	C-6	1.2 x 0.6	Brass	A
5	L1010	5	0.160	3.5	2300	12500	V	C-2R	—	Brass	A
6	L1040	5	1.31	75	2700	3300	Halogen	C-6	1.6 x 0.7	Brass	A
7	L1050-C	6	1.9	180	2900	1000	Halogen	C-6	1.6 x 0.85	3/8 24 UNF-2A	B

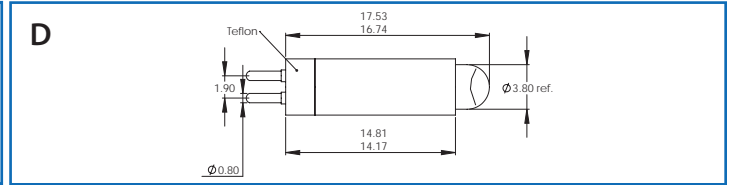
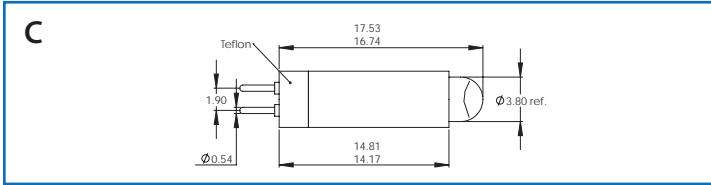
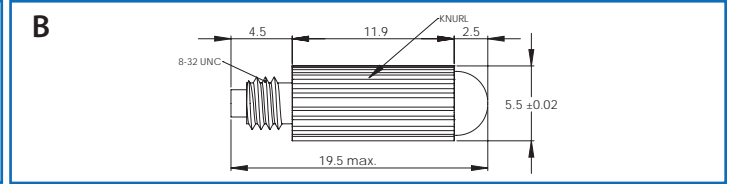
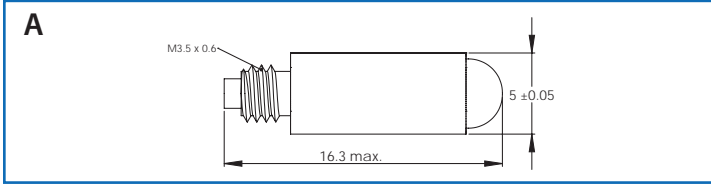
Precision Half Spherical Lamps (Threaded)

Line No.	Part No.	Volts	Amps	Lumens	CCT	Life Hours	Vacuum Or Gas	Filament Type	Filament Dimensions Lgth. x Dia.	Base Type	Drawing
8	L8013	5	0.300	1.51	1800	100000	G	C-6	1.2 x 1.1	1/2-20 UNF-2A	C
9	L8029	5	0.450	5.65	1900	25000	G	C-6	1.2 x 1.1	1/2-20 UNF-2A	C
10	L8010	5	0.750	23*	2420	20000	V	C-6	1.2 x 1.1	1/2-20 UNF-2A	C
11	L8015	6	1.600	109	2900	500	G	C-6	1.2 x 1.1	1/2-20 UNF-2A	C

* Unbased

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PRECISION LAMPS



Note: All dimensions are in mm

Medical Instrument Lens End Lamps

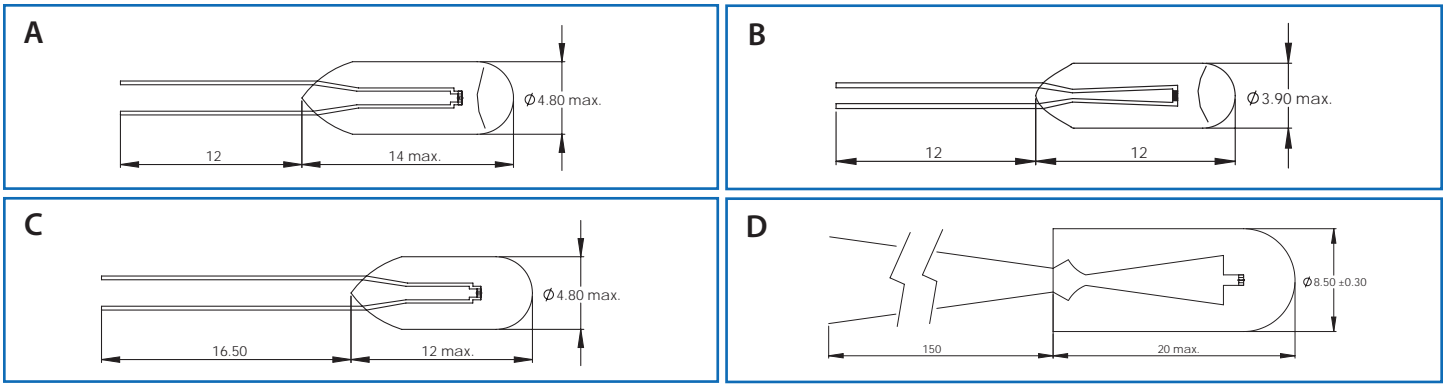
Line No.	Part No.	Volts	Amps	Lumens	CCT	Life Hours	Filament Type	Vacuum Or Gas	Drawing
1	ML2	2.5	0.280	7	2650	20	C-6	✓	A
2	ML3	2.5	0.310	3500 lux*	2700	20	C-6	✓	B
3	ML4	2.5	0.670	16	2950	15	C-6	Krypton	B
4	ML4H	2.5	0.690	18	3000	25	C-6	Halogen	B
5	ML7	3.5	0.600	24	2850	100	C-6	Krypton	B
6	ML11**	3.5	0.740	30	3000	40	C-6	Krypton	C
7	ML11-K1	3.5	0.740	30	3000	40	C-6	Krypton	D

* Lux at 50mm

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Unbased Lens End Lamps

Line No.	Part No.	Volts	Amps	Lux*	Color Temp. Degrees Kelvin	Life Hours	Vacuum Or Gas	Filament Type	Drawing
1	169-1	2.5	0.350	1550	2170	30000	V	C-6	A
2	180-1	2.5	0.350	2100	2250	15000	V	C-6	A
3	172-1	3.5	0.450	1600	2230	30000	G	C-6	A
4	185-1**	3.5	0.740	13000	3050	40	G	C-6	B
5	179-1**	3.5	0.740	13000	3000	35	G	C-6	A

* Lux at 50mm

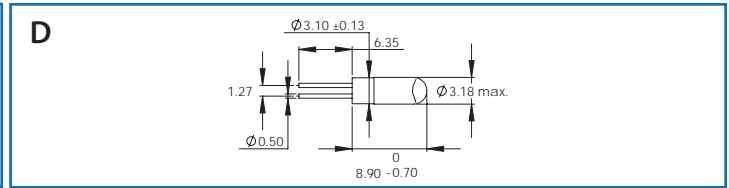
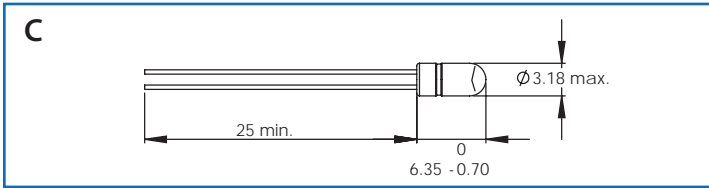
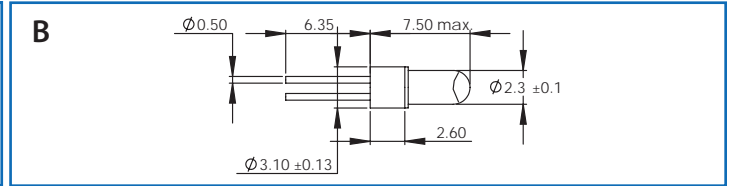
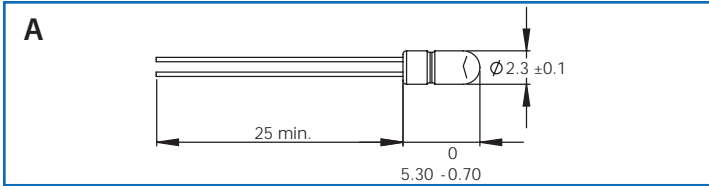
Unbased Lamps

Line No.	Part No.	Volts	Amps	M.S.C.P.	Lumens	Color Temp. Degrees Kelvin	Life Hours	Vacuum Or Gas	Filament Type	Filament Dimensions Lgth. x Dia.	Drawing
6	161X**	3.5	0.450	0.36	4.5	2230	30000	G	C-6	1.2 x 0.4	C
7	165	6	0.850	2.60	33.0	2340	15000	G	C-6	1.7 x 1.1	D

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PRECISION LAMPS



Note: All dimensions are in mm

T-3/4 Lens End Lamps

Line No.	Part No.	Volts	Amps	M.S.C.P.	CCT	Filament Life Hours	Type	Drawing
1	4560-1	5	0.060	0.050	2050	100000	CC-6	A
2	4560-12A**	5	0.060	0.050	2050	100000	CC-6	B
3	4575-1	5	0.075	0.090	2150	40000	CC-2R	A
4	4575-12A	5	0.075	0.090	2150	40000	CC-2R	B
5	4115-1B	5	0.115	0.150	2110	40000	CC-6	A
6	4115-12A	5	0.115	0.150	2110	40000	CC-6	B

T-1 Lens End Lamps

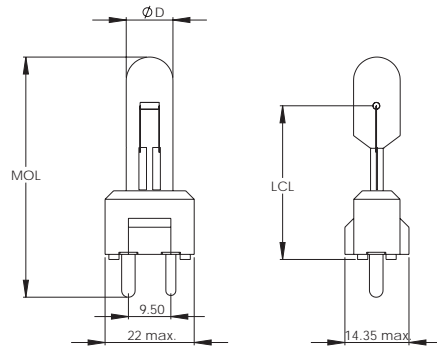
Line No.	Part No.	Volts	Amps	M.S.C.P.	CCT	Filament Life Hours	Type	Drawing
7	1045-1	5	0.045	0.060	2200	10000	CC-6	C
8	1045-19A	5	0.045	0.060	2200	10000	CC-6	D
9	1600-1	5	0.060	0.050	2050	100000	CC-6	C
10	1600-19A	5	0.060	0.050	2050	100000	CC-6	D
11	1150-1	5	0.115	0.150	2200	40000	CC-6	C
12	1150-19A	5	0.115	0.150	2200	40000	CC-6	D
13	1088-1	5	0.140	0.200	2250	18000	CC-6	C
14	1088-19A	5	0.140	0.200	2250	18000	CC-6	D
15	1089-1	5	0.150	0.350	2450	5000	CC-6	E
16	1089-19A	5	0.150	0.350	2450	5000	CC-6	D

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Prefocused Lamp



Note: All dimensions are in mm

Prefocused Lamp

Line No.	Part No.	Volts	Amps	Lumens	CCT	Burning Position	Filament Type	D	MOL	LCL	Base
1	L9404	12	20	300	2900	Any	C-6	11	55	30.3	GY9.5
2	L9389	12	50	900	3000	Any	C-6	12	60	33.3	GY9.5
3	L9390	12	100	2275	2990	s90*	C-Bar-6	11	60	33.3	GY9.5

* Cooling required

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