

Photographic Lamp

The [figure](#) below shows the physical arrangement used to produce a light sheet from a 1kW halogen photograph lamp. Key features are:

- A spherical lens on the front of the case to focus either the lamp filament or the adjustable slide (less light but more uniform than the filament). There is a trade off between the focal length and diameter of the lens. The larger the diameter and shorter the focal length, the more light you will get into the sheet. Our lenses are approx 100mm diameter with a focal length of about 150mm.
- Cooling fan. The 1kW input into the compact size of the photographic lamp means that if it is to be turned on for extended periods (more than about five minutes), forced cooling is required to prevent overheating.
- Linear filament 1kW photographic lamp. These lamps are much more intense and have a much higher colour temperature than the type used in normal flood lamps. Physically they are somewhat more compact. Note these lamps **must** be mounted horizontally. If you mount them vertically the neighbouring coils in the filament will short, decreasing the resistance and ultimately burning out the lamp. The lamp holders are available through, for example, RS Components.
- Adjustable slide. The adjustable slide may be used to decrease the numerical aperture of the lamp and thus increase the in-focus depth of field of the sheet. The cost of shutting down the aperture of the slide is, of course, a reduced light level. We typically use a 2 to 4mm aperture.
- Baffle. The baffle is designed to both prevent excess light leaving through the ventilation holes. Ideally a cylindrical baffle with its axis close to the filament would be best, but at the danger of overheating the light. In practice it may be better to have the baffle reflect the light away from the slide - we do not want light from far from the filament otherwise the depth of field will be reduced. In line with this, the baffle should probably be black and perhaps slightly convex.
- Focus adjustment. It is necessary to be able to adjust the position of the lamp and slide relative to the lens to focus the light sheet. We have found it easiest to mount the baffle, lamp and adjustable slide off the support and have the position of the support adjustable relative to the lens.
- Case. Our original ones were 5 1/4" BBC disk drive cases, but these are no longer available. The latest one was folded out of aluminium sheet and electro-phoretic painted (black) both inside and out. This is significantly better than the earlier versions.
- Safety. I strongly recommend fitting the lamp with a thermal cutout. For ours, we have a 150°C thermal switch fitted to the bottom of the case near the rear end. The original versions also had a thermal switch to turn on the fan and keep it on until the lamp had cooled, but we found it was a bit too slow at turning the fan on. The mains switch is also near the rear end of the case to prevent it getting too hot.

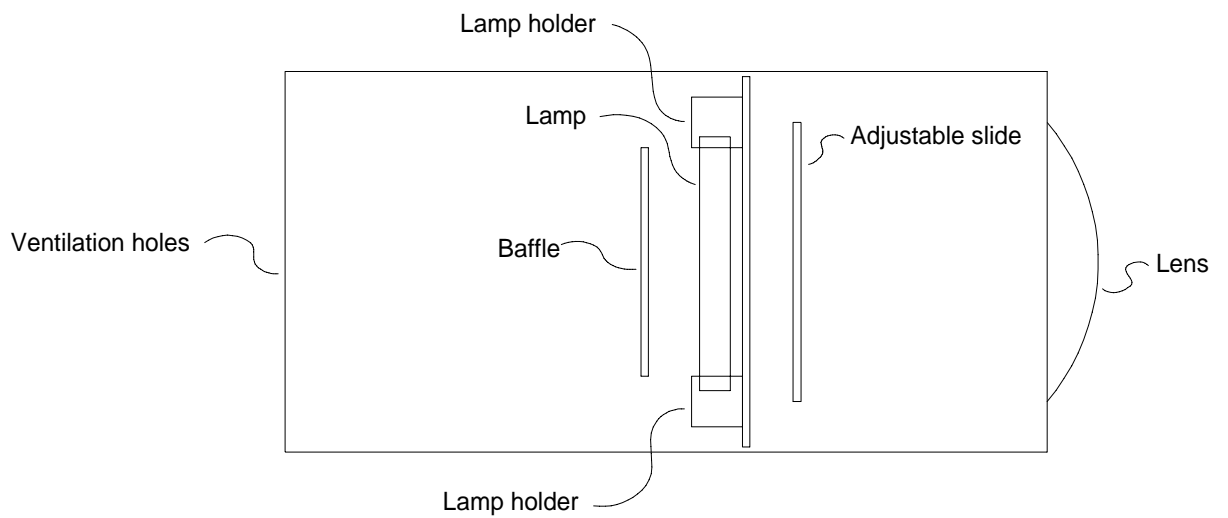
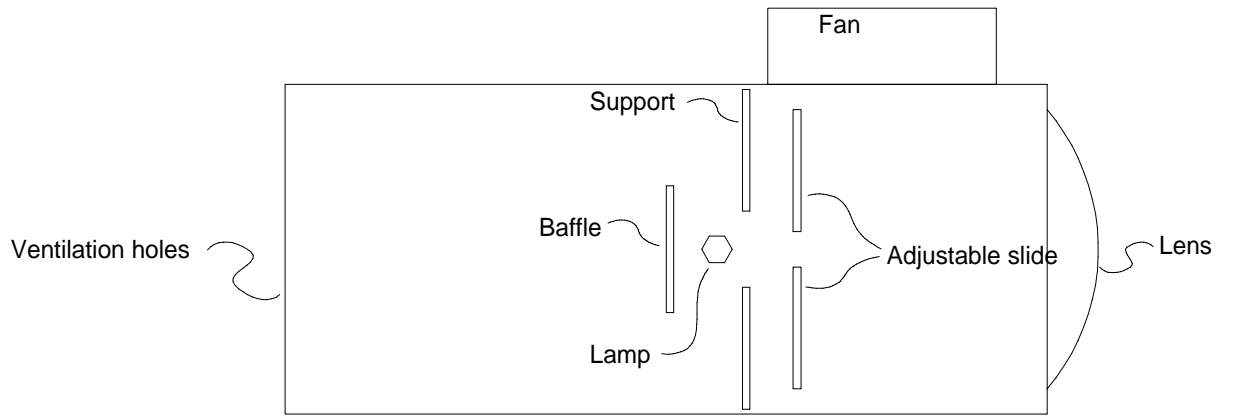


Figure: Sketch of lamp elevation (top) and plan (bottom).

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