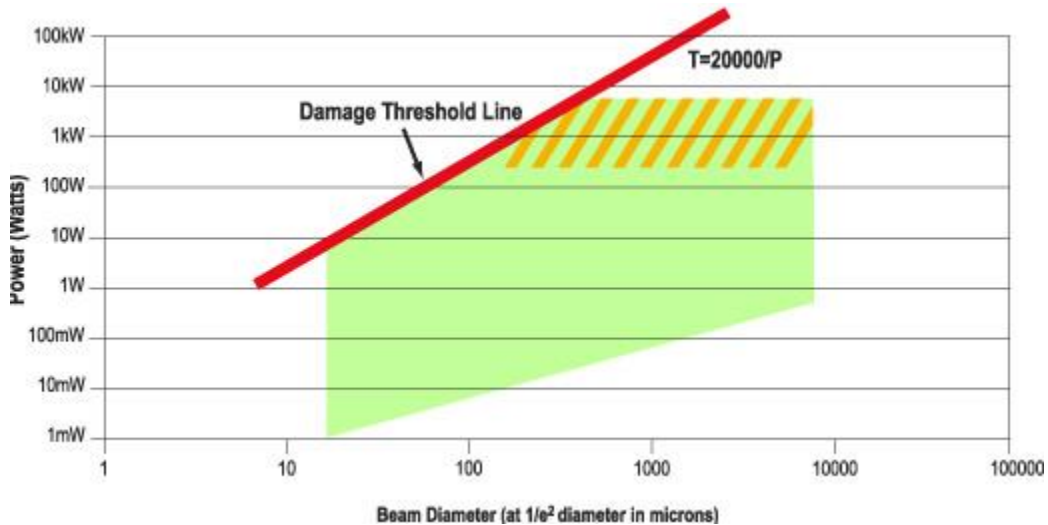


High-Power NanoScan Operating Space Chart

Pyroelectric 9mm Aperture / 5 μm Slit

Wavelengths from 3 μm to 100 μm



This chart shows minimum and maximum measurable laser powers for various spot sizes for lasers with wavelengths in the 300 μm to over 100 μm , which includes the common lines for CO₂ lasers. The spot size (1/e²) is in microns. The upper boundary is limited by the detector saturation and or the maximum input power density, which is **5x10⁶ Watts/cm²**. The left boundary is limited by the smallest accurately measurable spot size, which is dependent on the slit width, and the right side represents the useful instrument detector diameter. Generally the largest beam size will be approximately this value divided by 1.3 to 1.5. The lower boundary represents the lowest useful input power, below which the signal-to-noise ratio will be less than 10:1.

The front cap entrance aperture diameter is larger than the instrument detector diameter to prevent light reflected from the scan drum being captured on the inside of the front cap and heating it. The beam should be centered in the aperture to ensure that it will be correctly measured.

Boundary line widths are extremely wide. This is because these boundaries are imprecise due to actual detector response and slit width variations. Damage to apertures is a function of many things including surface finish, tarnish, dirt and more. Thus the boundaries are only a guide. The life of the scan head will be increased if you expose the high power for the shortest time needed to get your measurement.

The crosshatched area indicates power levels that require limited exposure times. For example, at **5000 Watts** we suggest a four-second exposure.

The suggested maximum exposure time for powers within the crosshatched area can be estimated from the equation below.

$$T(\text{sec}) = 20000 / \text{laser power in watts}$$

Below the crosshatched area and within the operating space continuous operation should be possible without heating the scanhead unduly, provided that the fan is functioning and airflow is unimpeded.