



TECHNICAL DATA SECTION 67.92

ULO Optics

BSL17 BEAMEXPANDERS

Introduction

The BSL17 series are a set of compact and economical beamexpanders for use with small or medium size CO₂ lasers, such as Synrad, and Coherent 'Diamond' lasers.

The output clear aperture is 35.0mm diameter, and models from the BSL17 range are useful for expanding the beam to a limit of about 25mm (1/e²) output diameter.

A slide-and-lock type focus mechanism eliminates rotation of the lenses and beam wander during focusing (assuming the input beam is correctly aligned).

Models from BSL17 series are intended for use up to 500W CW power.

Specifications

Dimensions:	See Figure 67.921.
Construction (Mech.):	Aluminium alloy, black anodised, with laser-engraved legends/focus scale.
Construction (Optical):	Lasergrade ZnSe lenses, with low-absorption anti-reflection coatings for 10.6µm.
Focus range:	-1m through infinity to +1m.
Fittings:	38.0 mm dia x 1.0 pitch male thread.
Operation:	Manual slide focus, with lock screw.
Cooling:	Air-cooled.
Output clear aperture:	35.0mm diameter, all models.
Transmission:	>98.5% (assumes zero beam clipping).

Focusing details

The 'infinity focus' mark is engraved on the beamexpander body. A series of lines are engraved at 1mm intervals either side of the infinity mark. The meaning of infinity focus is that if the input beam has a flat wavefront, then the magnified output will also have a flat wavefront. A flat wavefront occurs at the beam waist.

Focus corrections by the user will be required to correct for wavefront curvature of the input beam and control the properties of the output beam.



Fig 67.922 shows how the geometrical focal distance varies with spacing change, plotted as a reciprocal. E.g if the focus adjustment is increased by 3mm, the focal distance is 1/0.5 = 2m (+ve = converging). This is the wavefront radius of the output beam if the input is flat.

The BSL17 Beamexpander range			
Part no.	Mag.	Physical input aperture	Approx. max. input beam dia.
BSL17/130	1.3	19mm	13mm
BSL17/150	1.5	19mm	13mm
BSL17/200	2.0	19mm	13mm
BSL17/250	2.5	19mm	10mm
BSL17/300	3.0	19mm	9mm
BSL17/350	3.5	19mm	7mm
BSL17/400	4.0	19mm	6mm

Input aperture

Note that the mechanical input aperture is 19mm for all models. This is distinct from the optical clear aperture. The table above gives approximate maximum beam diameter ($1/e^2$) that should enter the beam expander. As a general rule, for a TEM₀₀ beam, allow 50% excess aperture over the beam diameter (at input and output). This will limit the beam clipping to 1% for a well centred beam. E.g. for the x4, although there is plenty of clear aperture at the input, the 24mm beam at the output will have the 50% clearance.

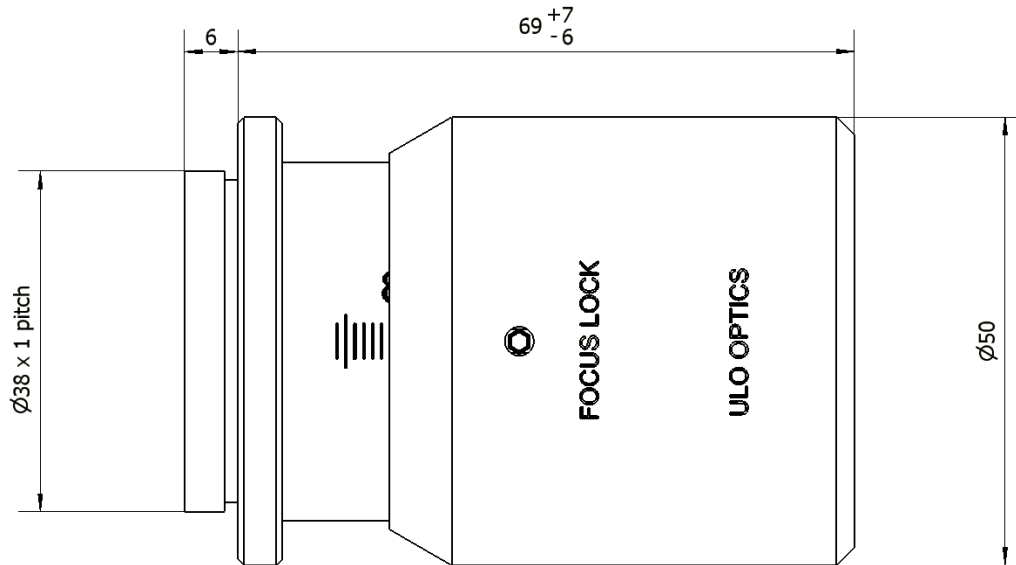


Fig 67.921

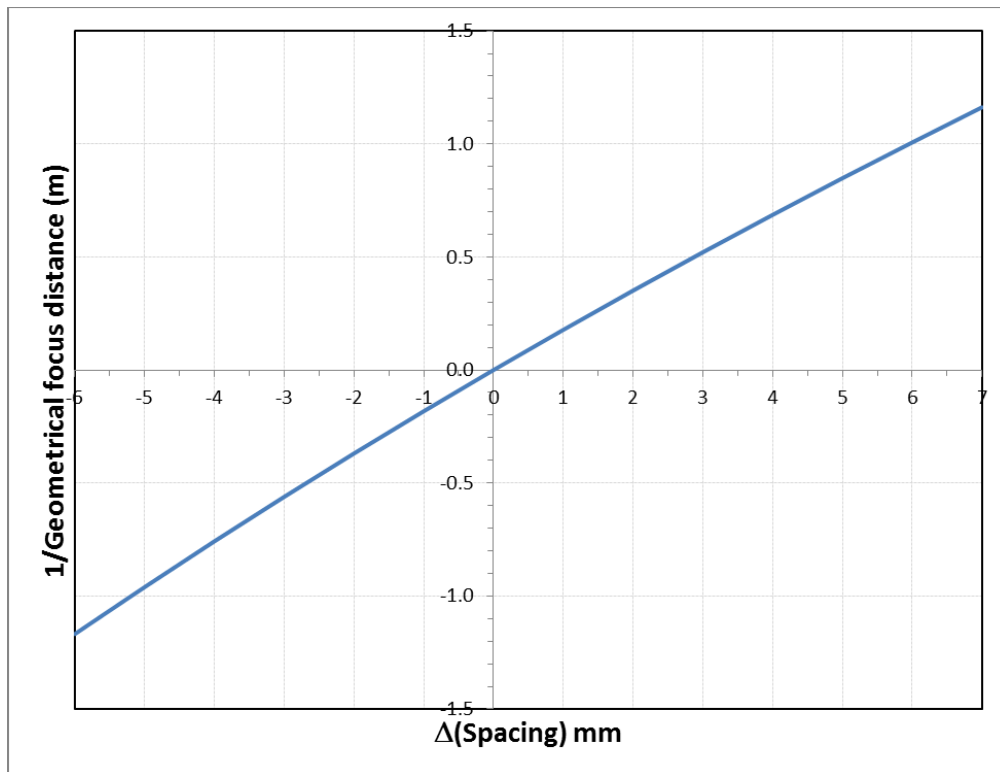


Fig 67.922