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THORLABS

EL-25-20X-A - March 13, 2015

Item # EL-25-20X-A was discontinued on March 13, 2015. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

VISIBLE OPTICAL BEAM EXPANDERS, SLIDING LENS DESIGN

► 2.5X, 3X, 5X, 10X, or 20X Beam Expansion
► Four Broadband AR Coatings
► Three Broadband AR Coatings Available

EL-25-10X-B

EL-25-2.5X-A

EL-25-5X-B

EL-25-20X-A

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Features

- 2.5X, 3X, 5X, 10X, or 20X Beam Expansion
- Produce Diverging, Collimated, or Focusing Beams
- Sliding Lens Adjustment that Minimizes Walk-Off
- Best Form or Spherical Broadband AR-Coated Lenses
- Three Coating Ranges Available
- Damage Threshold: 100 W/cm² (50 W/cm² for -E)
- Removable Endcaps Protect Optics

The EL series of Galilean Beam Expanders are designed to expand or reduce the diameter of a collimated beam while introducing a wavefront error of less than λ/4, (i.e., diffraction-limited performance). An expanded beam can be focused to a narrower diffraction-limited waist; such a reduced beam is sometimes necessary for use with optics or instruments that have narrow input apertures such as the SA200 family of scanning Fabry-Perot interferometers.

The housing contains two best form lenses (spherical lenses for -E) that are designed to minimize aberrations in the recollimated beam. Both optics have broadband AR coatings to minimize surface reflections. The input lens is mounted in a precision-milled tube that can slide in and out of the tube containing the output lens. The sliding design allows for the adjustment of the collimating lens and minimizes the beam walk-off effect that is inherent to lens adjustments. The beam expander can be mounted via either the 1/4"-20 or the M6-threaded hole in the base. In addition, the groove milled into the base can be used to clamp the beam expander to an optical table using CL6 mounting cleats (not included). The beam expanders have threaded input and output apertures, which allow additional lenses and filters to be installed easily along the optical axis of the beam expander.

Thorlabs also offers many other types of beam expanders, including lens based variable and fixed beam expanders whose expansion ratio is achieved via rotation as well as beam expanders with a non-rotating adjustment mechanism that have narrowband AR coatings centered at 248 nm, 351 nm, or 1064 nm. Thorlabs also offers reflective beam expanders. For more information on our extensive line of beam expanders, please click on the Selection Guide tab.
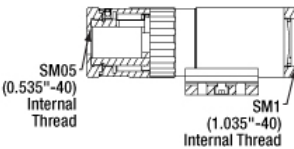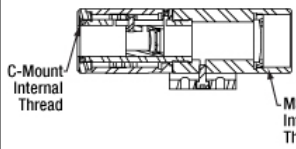
Mechanical Housing Update

These beam expanders originally featured an internal C-Mount threading on the input side and an internal M32 x 0.75 threading on the output side. In order to improve mechanical compatibility with Thorlabs' SM05- (0.535"-40) and SM1-threaded (1.035"-40) optomechanics, Thorlabs is in the process of converting the housing design so that it has internal SM05 threading on the input side and internal SM1 threading on the output side. Please refer to the table below to determine whether a given beam expander is currently being shipped with the new housing.

Thorlabs offers an extensive line of thread adapters for converting from one threading to another. Should you have any concerns, please contact Technical Support.

Info	New	Old
Mechanical Drawing (Click for Details)		
Input Threading	SM05 (0.535"-40)	C-Mount
Output Threading	SM1 (1.035"-40)	M32 x 0.75
EL-25-2.5X-A		X
EL-25-5X-A	X	
EL-25-10X-A	X	
EL-25-20X-A	X	
EL-25-2.5X-B	X	
EL-25-5X-B	X	
EL-25-10X-B	X	
EL-25-20X-B		X
EL-25-3X-E	X	
EL-25-5X-E	X	

- Lens Substrates (-A and -B Coatings): Fused Silica Lithosil and/or N-SF8
- Lens Substrate (-E Coating): CaF_2

Item #	R_{avg}[a]	T[b]	Damage Threshold (CW)	Mag.	Max Input Beam Diameter[c] ($1/e^2$)	Input Aperture	AR Coating Range	Scratch-Dig	Housing Dimensions
EL-25-2.5X-A	<0.5%	>96%	100 W/cm^2	2.5X	4.4 mm	Ø9 mm	400 - 650 nm	10-5	Ø38 x 126 mm
EL-25-2.5X-B	<0.5%	>96%	100 W/cm^2	2.5X	4.4 mm	Ø11.0 mm	650 - 1050 nm	10-5	Ø37.9 x 115.0 mm
EL-25-3X-E	<2%	>90%	50 W/cm^2	3X	4.0 mm	Ø11.0 mm	3000 - 5000 nm	20-10	Ø37.9 x 115.0 mm
EL-25-5X-A	<0.5%	>96%	100 W/cm^2	5X	2.2 mm	Ø10.9 mm	400 - 650 nm	10-5	Ø37.9 x 135.0 mm
EL-25-5X-B	<0.5%	>96%	100 W/cm^2	5X	2.2 mm	Ø10.9 mm	650 - 1050 nm	10-5	
EL-25-5X-E	<2%	>90%	50 W/cm^2	5X	2.2 mm	Ø11.0 mm	3000 - 5000 nm	20-10	Ø37.9 x 115.0 mm
EL-25-10X-A	<0.5%	>96%	100 W/cm^2	10X	1.1 mm	Ø10.9 mm	400 - 650 nm	10-5	Ø38.0 x 202.1 mm
EL-25-10X-B	<0.5%	>96%	100 W/cm^2	10X	1.1 mm	Ø10.9 mm	650 - 1050 nm	10-5	
EL-25-20X-A	<0.5%	>96%	100 W/cm^2	20X	0.6 mm	Ø3.8 mm	400 - 650 nm	10-5	Ø37.9 x 262.1 mm
EL-25-20X-B	<0.5%	>96%	100 W/cm^2	20X	0.6 mm	Ø3.5 mm	650 - 1050 nm	10-5	Ø38 x 279 mm

a. Average Reflectance over AR Coating Range
b. Transmission
c. For Diffraction-Limited Performance

Thorlabs offers several different families of beam expanders to meet various experimental needs. The table below provides a direct comparison of the options we offer. Please contact Tech Support if you would like help choosing the best beam expander for your specific application.

Beam Expander Description	UV Sliding Lens	Visible-IR Sliding Lens	1064 nm Sliding Lens	Visible-IR Rotating Lens	Visible-IR Variable Ratio Rotating Lens	Visible-IR Sliding Lens	Broadband Fixed Ratio
Expansions Available	2.5X, 5X, 10X, 20X	2.5X, 3X, 5X, 10X, 20X	2.5X, 5X, 10X, 20X	2X, 3X, 5X, 10X, 15X, 20X	2 - 5X 5 - 10X	0.5 - 2X	2X, 4X, 6X
AR Coating Range(s) Available	248 nm 351 nm	400 - 650 nm 650 - 1050 nm 3000 - 5000 nm	1064 ± 40 nm	400 - 650 nm 650 - 1050 nm 1050 - 1620 nm		400 - 650 nm 650 - 1050 nm	N/A
Mirror Coating (Range)	N/A						Protected Silver (450 nm - 20 μm)
Average Reflectance (per Surface)	<0.2%	<0.5% (<2% for -E Coating)	<0.2%	<0.5%		<0.5%	>96%
Max Input Beam Diameter ($1/e^2$)[a]	2.5X: Ø4.4 mm 5X: Ø2.2 mm 10X: Ø1.1 mm 20X: Ø0.6 mm	2.5X: Ø4.4 mm 3X: Ø4.0 mm 5X: Ø2.2 mm 10X: Ø1.1 mm 20X: Ø0.6 mm	2.5X: Ø4.4 mm 5X: Ø2.2 mm 10X: Ø1.1 mm 20X: Ø0.6 mm	2X, 3X: Ø4.0 mm 5X, 10X, 15X, 20X: Ø2.25 mm	Ø3.0 mm	0.5X: Ø6.0 mm to 2X: Ø3.0 mm	Ø3 mm
Input Aperture	2.5X: Ø9 mm 5X: Ø10.9 mm 10X: Ø9 or Ø10.9 mm 20X: Ø3.5 or Ø3.8 mm	2.5X: Ø9 or Ø11.0 mm 3X: Ø11.0 mm 5X: Ø10.9 mm 10X: Ø9 or Ø10.9 mm 20X: Ø3.5 or Ø3.8 mm	2.5X: Ø11 mm 5X, 10X: Ø10.9 mm 20X: Ø3.5 mm	2X, 3X: Ø8 mm 5X, 10X, 15X, 20X: Ø4.5 mm	Ø8.0 mm	Ø10.0 mm	Ø6 mm
Wavefront Error	<λ/4						<λ/10[b]
Surface Quality	10-5 Scratch-Dig (20-10 Scratch-Dig for -E Coating)			20-10 Scratch-Dig			40-20 Scratch-Dig
Optics	Two Best-Form or Spherical Lenses			One Plano-Concave Singlet, One Doublet	Spherical Singlets and Doublets		Two Spherical Mirrors

a. For Diffraction-Limited Performance
b. Ø1.5 mm Input Beam for 2X, Ø1.0 mm Input Beam for 4X, Ø0.5 mm Input Beam for 6X