

Elecksys Catalogue

UV, Green & Nd:YAG Laser Optics Consumables

2020 | 2021

Company Profile

Elecksys Engineering Co. (or “**Elecksys**”), is the leading global consultant, supplier & exporter bringing you high quality Laser Optics, Acousto-Optics, Laser Safety products and IT-based Industrial solutions. Since October 2013, **Elecksys** (Earlier “**RSH Optronics**”) is managed by experienced professionals with exceptional engineering and management backgrounds.

Headquartered in Ajmer, Rajasthan, India, **Elecksys** is serving a wide range of markets and applications – range from Research & Development, Medical & Life Sciences to Industrial & Military. In order to meet the customers’ requirements, we also partnered with best to make sure the customer gets the best. But more than just products, we offer Electrical & Laser Engineering solutions with superior quality, best value, support and commitment.

Our objective is to excel by meeting our National & International customer demands through employee dedication to continuous improvement.





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Benefits

- ✚ Superior Optical Quality & Reliability.
- ✚ Easy Exchange & Return.
- ✚ Lifetime Compatibility.
- ✚ Best Price in getting your Optics demands from us.



F-Theta Scan Lenses

Application

The wide range of applications of **F-Theta Scan Lens** includes:

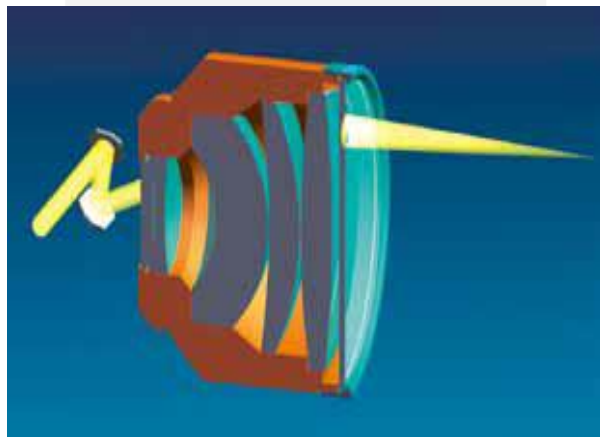
- Drilling and fine cutting of metals and ceramics.
- Plastic Welding.
- Structuring or perforating of metallic and nonmetallic materials.
- Marking (e.g. smart cards, ICs, keyboards, dashboard designs in the automotive industry).

F-Theta Scan Lens is used in conjunction with XY galvanometer scanner and beam expander to form a two dimensions scanning system.

Customized Solutions

For all major applications, a wide variety of lenses exist with various focal lengths ranging from 100mm to 1000mm and for different wavelengths from 266nm to 1550nm.

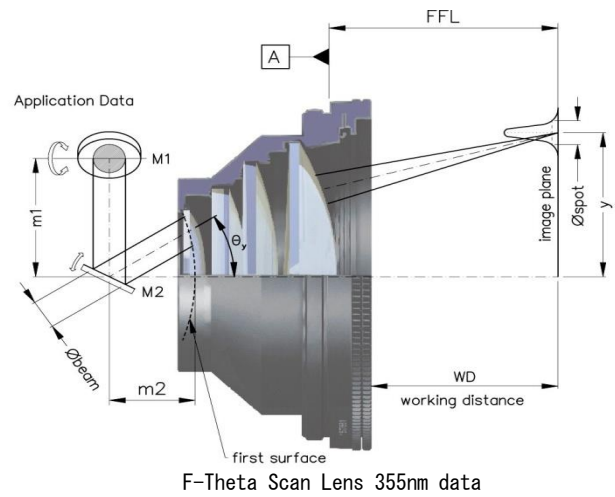
In addition to our existing **F-Theta Scan Lenses**, *Elecsys* offers customized solutions from adapted wavelength shift of standard lenses up to complete new designs. Please contact *Elecsys* to discuss your requests with our technical experts.



F-Theta Scan Lenses

F-Theta Scan Lens 355nm

- Fused-silica Design.
- Focal lengths ranging from 100mm to 1000mm.
- Screw Thread M85X1.
- Transmission $\geq 96\%$ with good performance in VIS-range.
- Includes interchangeable fused-silica protective glasses.
- All lenses can be used with enlarged beam diameters and different mirror distances. Accordingly the scan fields and spot size diameters will be changed.



F-Theta Scan Lens

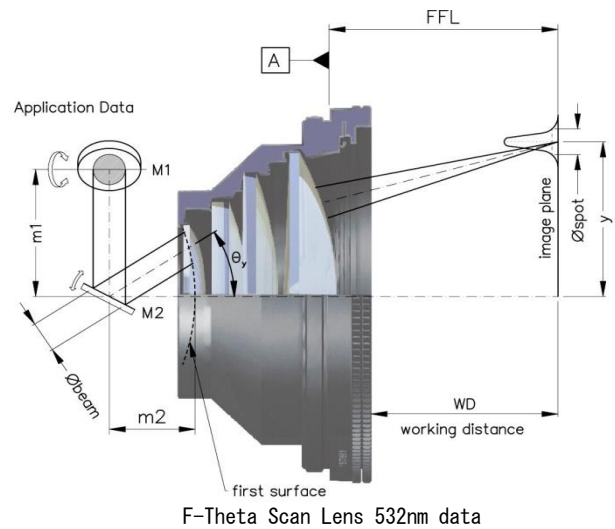
Standard F-Theta Scan Lens at 355nm

Part Number	Effective Focal Length EFL (mm)	Scan Angle ($\pm^\circ$)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μ m)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL355-060-100Q	100.0	25.0	87.0	60*60	6.0	10.0	62.5	133.4	Yes
FSL355-105-170Q	170.0	27.0	148.0	105*105	6.0	17.0	50.9	216.1	Yes
FSL355-155-250	250.0	25.5	220.0	155*155	10.0	14.0	54.9	299.8	Yes
FSL355-F290-020	290.0	25.5	255.0	180*180	20.0	40.0	65.0	332.5	Yes
FSL355-180-295A	295.0	25.0	256.0	180*180	10.0	15.5	45.3	359.0	Yes
FSL355-180-295	295.0	25.0	254.0	180*180	10.0	20.3	55.9	362.8	Yes
FSL355-212-300	300.0	28.6	300.0	212*212	10.0	17.5	55.0	364.0	Yes
FSL355-210-328	328.0	26.4	299.0	210*210	10.0	17.5	79.6	406.4	Yes
FSL355-250-408	407.5	25.0	354.0	250*250	10.0	27.5	46.8	488.2	Yes
FSL355-350-580	580.0	24.5	496.0	350*350	10.0	28.5	65.1	684.8	Yes
FSL355-500-815	815.0	25.0	707.0	500*500	10.0	44.1	83.2	976.4	Yes
FSL355-650-1000	1000.0	26.5	919.0	650*650	10.0	50.8	91.9	1200.1	Yes

Subject to technical changes and availability

F-Theta Scan Lens 532nm

- Fused-silica and Optical-glass designs.
- Focal lengths ranging from 100mm to 750mm.
- Screw Thread M85x1 except FSL532-355-520 M102x1.
- Transmission $\geq 96\%$ with good performance in VIS-range.
- Includes interchangeable fused-silica protective glasses.
- All lenses can be used with enlarged beam diameters and different mirror distances. Accordingly the scan fields and spot size diameters will be changed.



F-Theta Scan Lens for 532nm, focal length 330 mm

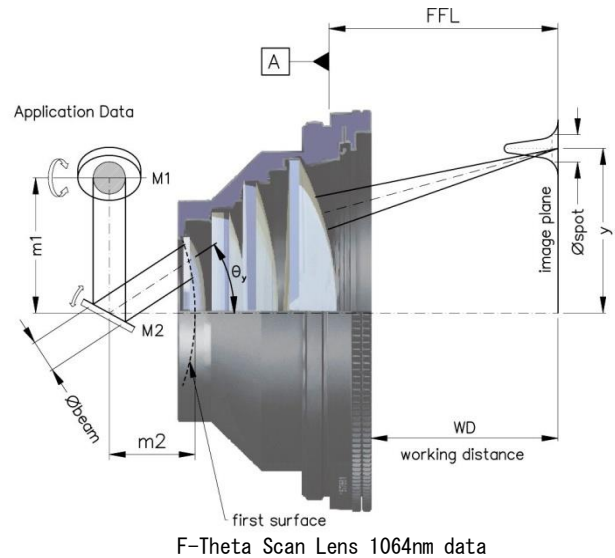
Standard F-Theta Scan Lens at 532nm

Part Number	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μm)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL532-070-100	100.0	25.0	87.0	70*70	14.0	12.0	47.1	100.9	Yes
FSL532-090-120A	120.0	25.0	116.0	80*80	8.0	10.8	38.8	134.0	Yes
FSL532-115-165	165.0	20.0	163.0	115*115	10.0	18.5	45.5	188.5	Yes
FSL532-180-254	254.0	10.6	254.0	180*180	10.0	27.0	47.1	303.3	Yes
FSL532-150-254B	254.0	24.0	212.0	150*150	10.0	19.5	49.0	294.0	Yes
FSL532-180-254	254.0	25.0	220.0	150*150	10.0	21.5	51.0	280.0	Yes
FSL532-204-330	329.9	25.0	287.9	204*204	14.0	23.0	50.1	389.0	Yes
FSL532-225-410	410.0	25.0	366.0	225*225	15.0	15.0	48.9	443.7	Yes
FSL532-355-520	520.0	23.5	502.0	355*355	16.0	25.3	57.4	599.2	Yes
FSL532-510-740	740.0	20.0	721.0	510*510	16.0	42.0	65.0	896.5	Yes
FSL532-500-750	750.0	27.7	707.0	500*500	16.0	37.5	97.0	911.2	Yes

Subject to technical changes and availability

F-Theta Scan Lens 1064nm

- Fused-silica and Optical-glass designs.
- Focal lengths ranging from 100mm to 815mm.
- Screw Thread M85x1 except FSL1064-152-192 and FSL1064-305-338, 3.875" x32. Also, FSL1064-560-815 in M102x1.
- Transmission $\geq 96\%$ with good performance in VIS-range.
- Includes interchangeable fused-silica protective glasses.
- All lenses can be used with enlarged beam diameters and different mirror distances. Accordingly the scan fields and spot size diameters will be changed.



F-Theta Scan Lens for 1064nm, focal length 420mm

Standard F-Theta Scan Lens at 1064nm

Part Number	Effective Focal Length EFL (mm)	Scan Angle ($\pm^\circ$)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μ m)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL1064-070-100	100.0	25.0	90.0	70*70	14.0	22.5	49.5	100.0	Yes
FSL1064-065-125	125.0	21.3	91.0	65*65	15.0	13.1	54.5	146.6	Yes
FSL1064-105-152	152.0	25.0	132.0	105*105	14.0	28.0	48.0	175.0	Yes
FSL1064-110-160	160.0	28.0	156.0	110*110	12.0	21.0	41.0	187.1	Yes
FSL1064-107-163	163.0	18.6	151.0	107*107	12.0	19.3	43.2	181.2	Yes
FSL1064-112-163	163.0	25.0	158.0	112*112	14.0	31.5	51.0	184.0	Yes
FSL1064-112-163A	163.0	25.0	159.0	112*112	10.0	27.8	47.0	181.7	Yes
FSL1064-114-163R	163.0	25.0	142.0	114*114	15.0	24.0	53.9	184.0	Yes
FSL1064-100-165	165.0	22.5	141.0	100*100	25.0	18.3	93.7	197.1	Yes
FSL1064-152-192	192.0	32.0	215.0	152*152	15.0	25.0	63.0	221.8	Yes
FSL1064-030-201F	200.9	6.6	42.0	30*30	30.0	13.0	82.7	243.0	Yes
FSL1064-140-210	210.0	25.0	198.0	140*140	14.0	24.5	50.0	238.4	Yes
FSL1064-100-254F	254.0	16.1	141.0	100*100	30.0	13.5	66.1	303.3	Yes
FSL1064-175-254	254.0	25.0	250.0	175*175	16.0	31.5	64.0	288.0	Yes
FSL1064-175-254B	254.0	23.0	247.0	175*175	10.0	37.5	50.0	280.0	Yes
FSL1064-180-260	260.0	25.0	254.0	180*180	10.0	47.0	63.0	297.0	Yes
FSL1064-200-310F	310.0	26.0	282.0	200*200	25.0	24.5	78.1	352.3	Yes
FSL1064-205-330	330.0	25.0	290.0	205*205	14.0	50.0	60.0	385.0	Yes
FSL1064-305-338	338.0	36.5	431.0	305*305	15.0	46.5	52.5	362.8	Yes
FSL1064-300-420	420.0	27.0	400.0	300*300	14.0	42.5	69.4	495.5	Yes
FSL1064-330-580	580.0	23.0	466.0	330*330	10.0	83.6	47.4	709.5	Yes
FSL1064-370-653	653.8	22.6	528.6	370*370	25.0	75.0	48.5	728.9	Yes
FSL1064-560-815	815.0	27.2	804.50	560*560	24.0	43.2	58.0	888.5	Yes

Subject to technical changes and availability

F-Theta Scan Lens: Other wavelengths

Standard F-Theta Scan Lens 266nm

Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μ m)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL266-073-101	100.5	29.2	103.0	73*73	5.0	17.1	49.0	136.5	Yes
FSL266-105-162	162.3	25.0	142.7	105*105	5.0	21.1	36.8	204.5	Yes
FSL266-148-250	249.5	24.2	218.9	148*148	4.0	13.5	47.0	254.0	No
FSL266-090-254	254.0	18.0	156.0	90*90	4.0	16.0	47.0	253.0	Yes

Subject to technical changes and availability

*Screw Thread M85x1

Standard F-Theta Scan Lens 405nm

Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μ m)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL405-110-175	175.9	25.0	154.76	110*110	6.0	21.1	36.8	220.7	Yes
FSL405-300-375**	375.3	31.0	420.36	300*300	10.0	35.5	48.0	447.5	No
FSL405-326-594	594.1	22.0	466.4	326*326	10.0	39.0	38.0	686.5	Yes

Subject to technical changes and availability

*Screw Thread M85x1

** Screw Thread M92x1

Standard F-Theta Scan Lens 633nm

Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μ m)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL633-019-075 [#]	74.8	10.4	27.0	19*19	10.0	31.0	45.0	100.3	No
FSL633-034-088 ^{##}	87.5	15.8	48.2	34*34	7.0	34.0	55.0	116.6	No
FSL633-036-089 [#]	89.0	17.0	52.0	36*36	16.0	34.0	62.0	113.4	No
FSL633-030-100	100.6	12.0	42.2	30*30	10.0	53.3	92.0	221.3	No
FSL633-077-156	156.1	20.0	108.8	77*77	10.0	53.3	92.0	223.3	No
FSL633-040-155 [#]	154.6	11.0	59.3	40*40	15.0	40.0	50.0	192.0	No
FSL633-075-204 ^{**}	203.5	15.0	105.8	75*75	20.0	116.5	94.0	236.0	No

Subject to technical changes and availability

* Screw Thread TK145

** Screw Thread TK133

[#] No Screw Thread

^{##} Screw Thread TK87



F-Theta Scan Lens for 980nm, focal length 330mm

Standard F-Theta Scan Lens 670nm

Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μm)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL670-034-088**	87.9	15.8	48.5	34*34	7.0	34.4	55.0	116.3	No
FSL670-077-157	157.3	20.0	109.7	77*77	10.0	53.3	92.0	223.0	No
FSL670-076-157A	157.5	19.6	107.7	76*76	5.0	53.4	90.0	225.2	No

Subject to technical changes and availability

*Screw Thread TK145

** Screw Thread TK87

Standard F-Theta Scan Lens 808nm

Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μm)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL808-053-098	97.5	28.0	75.7	53*53	10.0	18.0	40.0	108.9	Yes
FSL808-108-158	158.3	27.6	156.2	108*108	12.0	20.8	43.3	176.4	Yes
FSL808-103-159	158.9	26.8	150.0	103*103	20.0	29.0	66.0	187.3	Yes
FSL808-090-197	196.9	19.0	130.9	90*90	30.0	43.0	83.1	237.4	Yes
FSL808-115-249	248.7	19.2	168.8	115*115	30.0	47.9	75.5	290.0	Yes
FSL808-175-294	294.2	25.0	258.4	175*175	20.0	35.0	78.0	346.2	Yes
FSL808-213-398	397.9	21.4	303.1	213*213	20.0	33.0	53.0	486.9	No
FSL808-250-411#	410.9	25.2	374.6	250*250	30.0	54.6	52.0	468.6	No
FSL808-290-556	556.2	21.4	426.3	290*290	25.0	40.0	65.4	628.9	No
FSL808-415-637##	636.5	25.6	594.0	415*415	30.0	58.3	48.5	709.5	No
FSL808-450-804**	803.6	28.0	642.7	450*450	30.0	54.0	58.0	875.9	Yes

Subject to technical changes and availability

*Screw Thread M85x1

** Screw Thread M102x1

Screw Thread M132x1

Screw Thread M110x1

Standard F-Theta Scan Lens 980nm

Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μm)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL980-053-100	99.5	28.0	75.7	53*53	10.0	18.0	40.0	111.2	Yes
FSL980-108-161	161.2	27.6	156.2	108*108	12.0	20.8	43.3	179.9	Yes
FSL980-103-162	162.0	26.8	150.0	103*103	20.0	29.0	66.0	191.3	Yes
FSL980-090-200	196.9	19.0	130.9	90*90	30.0	43.0	83.1	241.7	Yes
FSL980-115-253	253.1	19.2	168.8	115*115	30.0	47.9	75.5	295.6	Yes
FSL980-175-299	298.5	25.0	258.4	175*175	20.0	35.0	78.0	351.3	Yes
FSL980-204-330	329.8	17.7	287.9	204*204	20.0	32.0	-	386.0	Yes
FSL980-213-400	400.2	21.4	303.1	213*213	20.0	33.0	53.0	489.2	No
FSL980-250-420#	419.6	25.2	374.6	250*250	30.0	54.6	52.0	478.7	No
FSL980-290-565	565.2	21.4	426.3	290*290	25.0	40.0	65.4	638.9	No
FSL980-415-650##	649.6	25.6	594.0	415*415	30.0	58.3	48.5	724.2	No
FSL980-450-812**	812.2	28.0	642.7	450*450	30.0	54.0	58.0	885.1	Yes

Subject to technical changes and availability

*Screw Thread M85x1

** Screw Thread M102x1

Screw Thread M132x1

Screw Thread M110x1

Standard F-Theta Scan Lens 1550nm

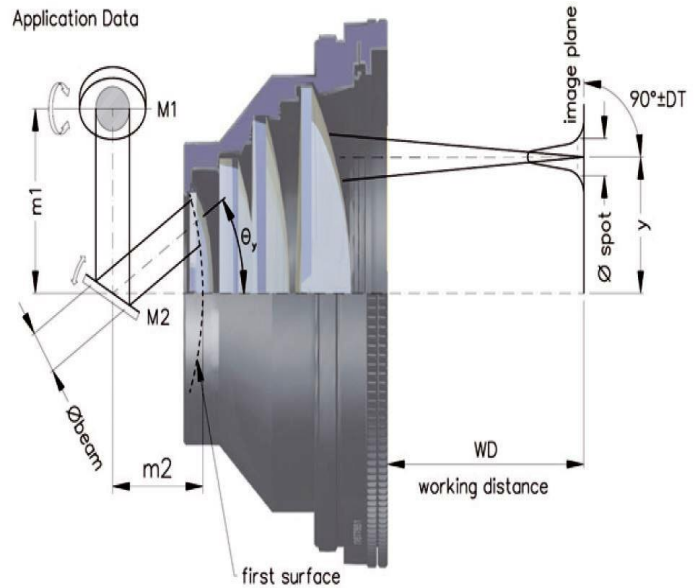
Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μm)	Length (mm)	Working Distance WD (mm)	Protective Glass
FSL1550-070-100	100.1	22.0	76.9	55*55	10.0	18.0	40.0	112.0	Yes
FSL1550-142-277	277.1	21.4	205.6	142*142	15.0	31.0	61.0	346.1	Yes
FSL1550-073-163	163.1	18.8	104.0	73*73	15.0	32.2	183.3	155.4	Yes
FSL1550-110-160	159.9	28.0	-	110*110	12.0	18.0	-	180.0	Yes

Subject to technical changes and availability

*Screw Thread M85x1

F-Theta Scan Lens: Telecentric Versions

- The beam impact angle on the work piece is nearly perpendicular over the entire scan field.
- Fused-silica and Optical-glass designs.
- Screw Thread M85x1, TK133.0 and TK267.0.
- Incredibly Less Distortion.
- Transmission $\geq 96\%$ with good performance in VIS-range.
- Includes interchangeable fused-silica protective glasses.
- All lenses can be used with enlarged beam diameters and different mirror distances. Accordingly the scan fields and spot size diameters will be changed.



F-Theta Telecentric Scan Lens Data

Standard F-Theta Scan Lens 355/532/1064nm

Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm^\circ$)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μm)	Length (mm)	Working Distance WD (mm)	Protective Glass
For 355nm									
FSLT355-006-032	32.0	8.0	8.9	6*6	10.0	16.5	39.9	28.9	No
FSLT355-020-056	56.0	15.2	29.4	20*20	6.0	19.5	39.8	75.9	Yes
FSLT355-063-109	109.4	24.2	89.8	63*63	6.0	33.1	86.0	154.6	Yes
FSLT355-064-167	167.2	15.6	90.1	64*64	10.0	37.2	133.0	264.4	Yes
FSLT355-086-257	256.8	14.6	124.5	86*86	6.0	24.0	173.5	145.2	No
For 532nm									
FSLT532-015-053	53.1	11.8	21.8	15*15	6.0	25.5	40.7	52.6	-
FSLT532-020-059	59.3	14.0	28.5	20*20	10.0	16.9	58.0	73.2	-
FSLT532-049-077	77.0	26.6	68.7	49*49	14.0	22.8	83.8	74.2	-
FSLT532-054-100	100.2	22.0	77.0	54*54	15.0	7.0	82.4	126.6	Yes
FSLT532-069-100	100.1	29.2	97.6	69*69	10.0	30.0	85.5	127.7	-
FSLT532-075-163	162.7	19.6	109.6	75*75	10.0	53.9	128.5	194.6	-
FSLT532-090-164	163.9	21.0	126.0	90*90	10.0	26.6	98.0	219.0	-
FSLT532-050-171	171.0	11.9	70.7	50*50	10.0	98.4	70.6	198.4	-
FSLT532-075-199#	198.5	15.6	107.2	75*75	20.0	111.6	93.9	231.9	-
FSLT532-139-202**	201.5	29.2	197.1	139*139	10.0	46.0	160.0	280.5	-
For 1064nm									
FSLT1064-006-033F	32.8	8.0	9.1	6*6	10.0	16.5	39.9	28.7	No
FSLT1064-016-057	56.6	11.8	23.2	16*16	10.0	26.4	40.7	58.4	Yes
FSLT1064-019-060	59.7	13.6	27.9	19*19	14.0	20.1	58.0	66.6	No
FSLT1064-020-080	79.9	21.5	58.4	39*39	25.0	27.2	84.1	79.5	Yes
FSLT1064-020-082F	82.0	10.0	28.4	20*20	15.0	33.0	103.1	84.6	Yes
FSLT1064-040-099	99.3	17.6	59.9	40*40	25.0	37.4	80.4	114.9	Yes
FSLT1064-069-108	107.7	26.8	97.5	69*69	12.0	34.9	85.5	137.9	Yes
FSLT1064-073-163	162.9	19.0	106.1	73*73	20.0	61.5	114.9	194.8	Yes
FSLT1064-075-164	163.6	19.0	106.9	75*75	10.0	58.3	128.5	193.5	Yes
FSLT1064-139-207**	206.7	28.4	197.4	139*139	14.0	46.0	176.7	274.5	Yes

Subject to technical changes and availability

*Screw Thread M85x1

** Screw Thread TK267.0

Screw Thread TK133.0

F with Fused Silica Lenses

Remark: The F-Theta Scan Lens consists of 3 lenses and 1 protective glass. The coating is a dielectric layer. Two sides of the protective glass are AR coated at 355/532/1064nm.



F-Theta Telecentric Scan Lens for 355nm, focal length 167mm

Standard F-Theta Scan Lens 266/405/808/980/1550nm

Part Number*	Effective Focal Length EFL (mm)	Scan Angle ($\pm$ °)	Scan Length (mm)	Maximum Scan Field (mm ²)	Entrance Beam Diameter (mm)	Image Spot Diameter (μm)	Length (mm)	Working Distance WD (mm)	Protective Glass
For 266nm									
FSLT266-010-030	30.1	14.6	15.0	10*10	6.0	12.7	55.5	28.9	Yes
FSLT266-020-053	53.4	16.0	29.4	20*20	6.0	17.8	39.8	71.7	No
FSLT266-050-099	99.3	21.0	72.1	50*50	5.0	26.9	86.2	142.2	Yes
FSLT266-064-160	159.8	16.2	90.3	64*64	10.0	32.3	133.0	253.7	Yes
For 405nm									
FSLT405-029-055	55.0	22.8	42.1	29*29	7.5	16.2	52.0	67.2	No
For 808nm									
FSLT808-014-056	56.3	11.0	21.6	14*14	10.0	17.5	55.2	69.1	Yes
FSLT808-019-077#	76.8	9.8	26.4	19*19	10.0	32.6	45.0	103.6	No
FSLT808-039-080	79.6	21.2	58.2	39*39	25.0	27.7	83.4	79.5	Yes
FSLT808-068-106	105.6	26.8	96.4	68*68	12.0	35.0	85.5	135.3	Yes
For 980nm									
FSLT980-014-057	57.4	11.0	21.6	14*14	10.0	17.5	55.2	70.6	Yes
FSLT980-019-078	78.2	9.8	26.4	19*19	10.0	32.6	45.0	105.6	No
FSLT980-039-081	80.9	21.2	58.2	39*39	25.0	27.7	83.4	81.3	Yes
FSLT980-068-107	107.2	26.8	96.4	68*68	12.0	35.0	85.5	137.2	Yes
For 1550nm									
FSLT1550-053-100	100.0	15.6	-	53*53	15.0	20.0	-	127.9	Yes

*Screw Thread M85x1
Screw Thread TK60.0

Subject to technical changes and availability

Selection Criteria of F-Theta Scan Lens:

- When the maximum scan field increases, the EFL will be longer and the entrance beam diameter will be larger.
- When the entrance beam diameter is larger, the power density on the work piece will be lower. Thus, the power of laser must be high.
- When the power of laser is high, the laser beam quality may be worse and the focused beam diameter will be larger. Thus the marking field should be appropriate as per your requirement.

Protective Glasses (or Windows)

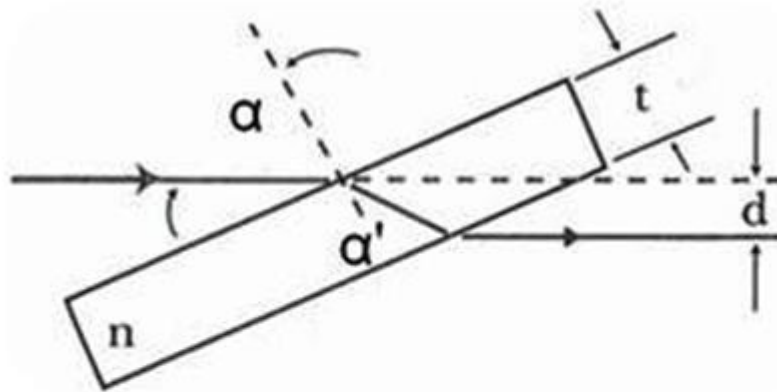
- Optimum protection for the optical system.
- Coated on both sides.
- High transmission for the corresponding wavelength or wavelength range.
- High laser damage threshold.
- Diameter ranging from 12mm to 150mm and thickness ranging from 1mm to 4mm.
- Customized solutions available.



Standard Protective Glasses: Wavelength Range

Part Number	Diameter (mm)	Thickness(mm)	AR coated for λ (nm)	Material
PG3-1	75.0	1.5	340-380	Fused Silica
PG3-2	113.0	3.0	340-380	Fused Silica
PG5-1	113.0	3.0	515-540	Fused Silica
PG5-2	132.0	3.0	515-540	Fused Silica
PG9-1	75.0	1.6	940-980	-
PG9-2	100.0	3.0	940-980	-
PG9-3	113.0	3.0	940-980	-
PG10-1	113.0	3.0	1030-1080	Fused Silica
PG10-2	132.0	3.0	1030-1080	Fused Silica
PGD-1	42.0	1.6	532/1064	-
PGD-2	113.0	3.0	532/1064	-

Subject to technical changes and availability



$$d = t \sin \alpha \left(1 - \frac{\cos \alpha}{n \cos \alpha'} \right)$$

Protective Glasses

Where

α = Angle of Incidence

n = Index of Refraction

t = Thickness

d = Displacement of the material

Standard Protective Glasses: Single Wavelength

Part Number	Diameter (mm)	Thickness(mm)	AR coated for λ (nm)	Material
PG355-1	25.4	3.0	355	Fused Silica
PG355-2	38.0	3.0	355	Fused Silica
PG355-3	75.0	1.5	355	-
PG355-4	90.0	3.0	355	Fused Silica
PG355-5	104.0	3.0	355	Fused Silica
PG532-1	25.4	3.0	532	Fused Silica
PG532-2	12.7	2.0	532	BK7
PG532-3	75.0	1.6	532	-
PG532-4	75.0	2.5	532	BK7
PG532-5	80.0	4.0	532	BK7
PG532-6	86.0	2.5	532	BK7
PG532-7	97.0	2.5	532	BK7
PG532-8	108.0	2.5	532	BK7
PG532-9	113.0	3.0	532	-
PG532-10	118.0	3.0	532	BK7
PG532-11	126.0	3.0	532	BK7
PG633-1	75.0	1.5	633	Fused Silica
PG633-2	113.0	3.0	633	Fused Silica
PG1030	113.0	3.0	1030	-
PG1064-1	15.0	2.0	1064	Fused Silica
PG1064-2	16.0	1.6	1064	Fused Silica
PG1064-3	18.0	3.0	1064	Fused Silica
PG1064-4	24.0	2.0	1064	BK7
PG1064-5	25.1	1.1	1064	BK7
PG1064-6	25.4	3.0	1064	Fused Silica
PG1064-7	25.4	5.0	1064	Fused Silica
PG1064-8	25.4	6.4	1064	Fused Silica
PG1064-9	30.0	1.4	1064	BK7
PG1064-10	36.0	2.0	1064	Fused Silica
PG1064-11	38.2	2.0	1064	Fused Silica
PG1064-12	38.0	2.0	1064	BK7
PG1064-13	38.0	3.0	1064	BK7
PG1064-14	38.1	5.0	1064	Fused Silica
PG1064-15	47.0	2.0	1064	BK7
PG1064-16	50.0	1.5	1064	Fused Silica
PG1064-17	50.0	2.0	1064	Fused Silica
PG1064-18	60.0	3.0	1064	BK7
PG1064-19	72.0	3.0	1064	BK7
PG1064-20	75.0	1.7	1064	BK7
PG1064-21	76.0	3.0	1064	BK7
PG1064-22	78.0	1.5	1064	BK7
PG1064-23	78.0	3.0	1064	BK7
PG1064-24	80.0	2.5	1064	BK7
PG1064-25	83.0	3.0	1064	BK7
PG1064-26	85.0	2.0	1064	BK7
PG1064-27	86.0	2.5	1064	BK7
PG1064-28	96.0	3.0	1064	BK7
PG1064-29	98.0	2.5	1064	BK7
PG1064-30	100.0	3.0	1064	-
PG1064-31	106.0	3.0	1064	BK7
PG1064-32	110.0	2.5	1064	BK7
PG1064-33	110.0	2.5	1064	Fused Silica
PG1064-34	113.0	3.0	1064	-
PG1064-35	116.0	2.0	1064	BK7
PG1064-36	116.0	3.0	1064	BK7
PG1064-37	120.0	3.0	1064	BK7
PG1064-38	123.0	3.0	1064	BK7
PG1064-39	126.0	3.0	1064	BK7
PG1064-40	128.0	2.0	1064	BK7
PG1064-41	140.0	4.0	1064	Fused Silica
PG1064-42	150.0	3.0	1064	BK7
PG1550	113.0	3.0	1550	-

Subject to technical changes and availability

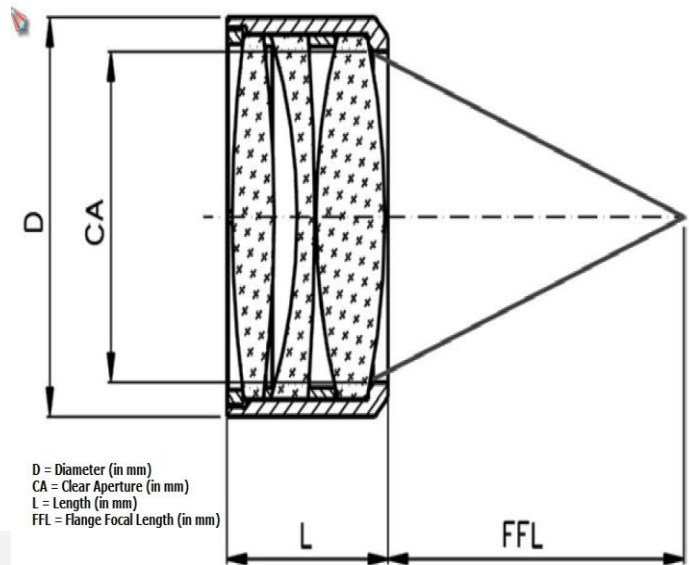
Focusing Lens

Application

Focusing Lens is optimized for high precision applications, as used in laser systems for welding, cutting, drilling and structuring.

- Focal lengths ranging from 58mm to 120mm.
- Flexible lens exchange without any adjustment.
- Three-lens element designs.
- Full fused silica designs.
- Available in 355nm, 535nm and 1064nm.
- Allows maximum possible entrance beam diameter of up to 35mm.

Please contact *Elecsys* to discuss your customized requests with our technical experts.



Focusing Lens Data



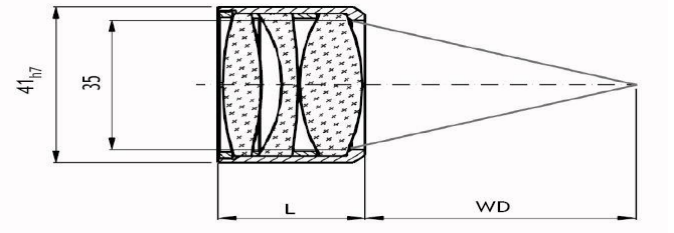
Focusing Lens for 355nm, focal length 90mm



Focusing Lens for 1064nm, focal length 58mm

Focusing Lens 355nm

- High Clear Aperture 35 mm.
- Housing diameter 41_{h7} mm.
- Transmission $\geq 98\%$.
- Good inspection performance at VIS wavelengths.
- Laser Damage threshold 5J/cm² at 355nm, 5ns, 100 Hz.



Focusing Lens 355nm Data

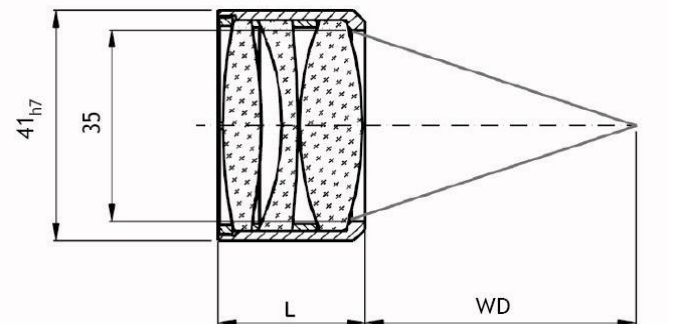
Standard Focusing Lens 355nm

Part Number	Effective Focal Length EFL (mm)	Length (mm)	Working Distance WD (mm)
FL355-058	58.0	26.7	48.9
FL355-077	77.0	25.1	68.8
FL355-090	90.0	25.1	81.7
FL355-120	120.0	24.7	112.1

Subject to technical changes and availability

Focusing Lens 532/1064nm

- High Clear Aperture 35 mm.
- Housing diameter 41_{h7} mm.
- The coating is optimized for 1064nm, T (1064nm) $\geq 97\%$ and T (532nm) $\geq 96\%$.
- Good inspection performance at VIS wavelengths.
- **Laser Damage threshold 6J/cm² at 532nm, 6ns, 100 Hz.**
- **Laser Damage threshold 10J/cm² at 1064nm, 9ns, 100 Hz.**



Focusing Lens 532/1064nm Data

Standard Focusing Lens 532/1064nm

Part Number	Effective Focal Length EFL (mm)	Length (mm)	Working Distance for 532nm WD (mm)	Working Distance for 1064nm WD (mm)
FL532-058/FL1064-058	58.0	24.6	47.7	48.3
FL532-077/FL1064-077	77.0	18.9	71.5	72.2
FL532-090/FL1064-090	90.0	33.6	73.3	73.7
FL532-120/FL1064-120	120.0	24.0	109.8	110.7

Subject to technical changes and availability

Beam Expanders

Application

Beam Expanders are optical systems for beam forming used in laser material processing. They can vary the diameter and the divergence of the laser beam, thus allowing optimization of focus diameter, focus position and beam propagation

Beam Expanders are used in conjunction with **F-Theta Scan Lenses** for applications including:

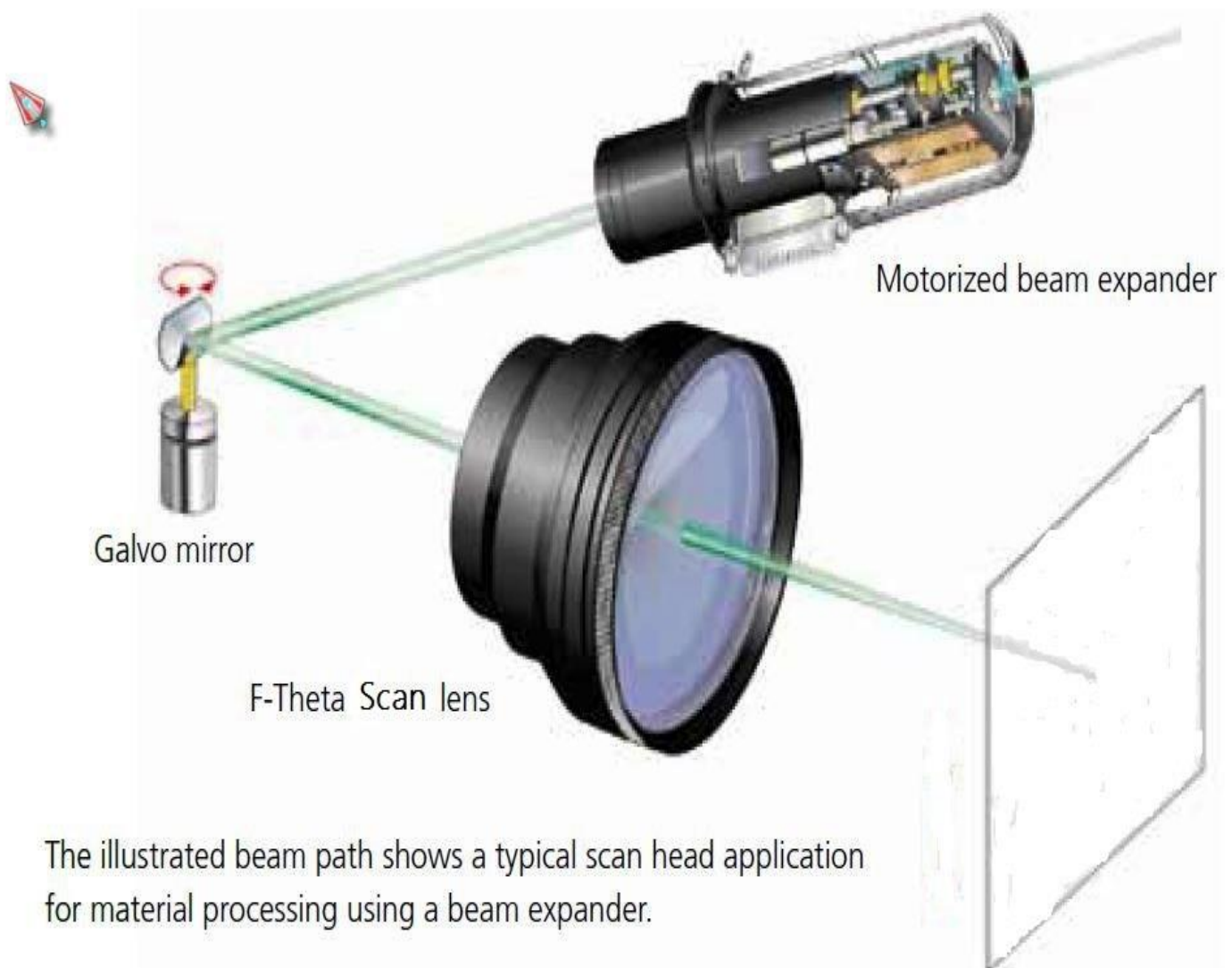
- Laser structuring of foils.
- Solar cells cutting.
- Laser Marking.
- Laser scribing and Micro drilling.

Customized Solutions

Eleksys offers standard versions of fixed, variable and motorized beam expanders.

For all major applications, we are able to provide expansion from 1x to 50x fixed magnification upto different wavelengths from 266nm to 1550nm.

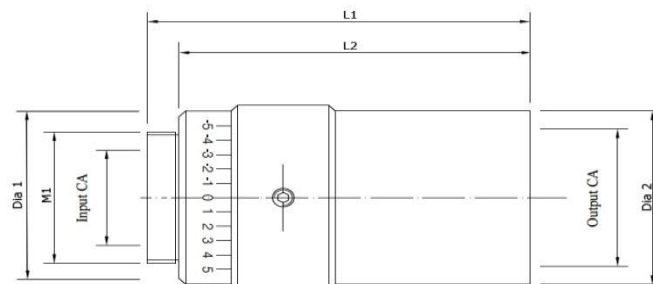
In addition to our existing **Beam Expanders**, *Eleksys* offers customized solutions as per the requirements for the particular project. Please contact *Eleksys* to discuss your customized requests with our technical experts.



The illustrated beam path shows a typical scan head application for material processing using a beam expander.

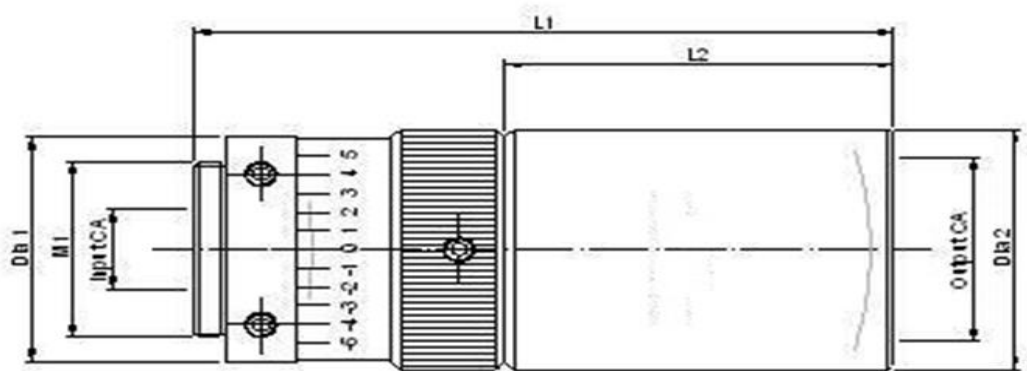
Beam Expanders Fixed Magnification (1x to 50x)

- Expansion 1x to 50x.
- Wavelength 266nm to 1550nm.
- Entrance lenses made of fused silica.
- High imaging quality.
- Mounting in customer machine at M16x0.75, M22x0.75 or M30x1.
- Laser damage threshold at 5J/cm² at 1064nm, 10ns, 100Hz.



Fixed Magnification Beam Expander Data

Standard Fixed Magnification Beam Expanders 266nm

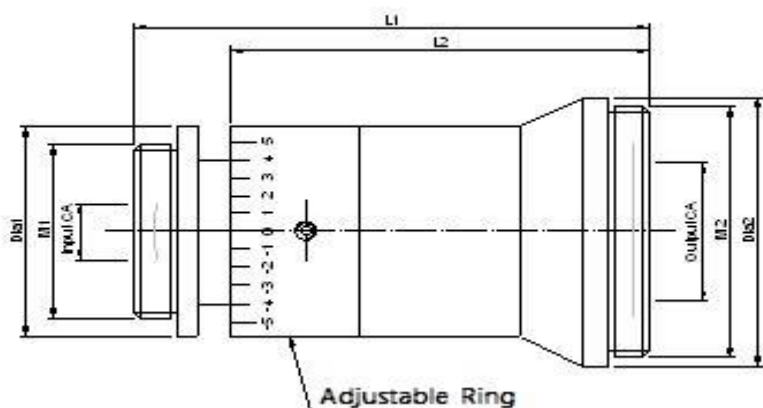


Beam Expander8x for 266nm

Part Number	Magnification factor	Input CA (mm)	Output CA (mm)	Mounting Diameter or Thread (mm)	Diameter 1 D1(mm)	Diameter 2 D2(mm)	Length 1 L1(mm)	Length 2 L2 (mm)
FMBE266-1.5	1.5x fixed	8.0	24.0	M22*0.75	30.0	30.0	63.7	46.2
FMBE266-2	2x fixed	8.0	24.0	M22*0.75	30.0	30.0	73.0	55.0
FMBE266-3	3x fixed	10.0	23.0	M22*0.75	30.0	30.0	68.7	38.2
FMBE266-5	5x fixed	10.0	23.0	M22*0.75	30.0	30.0	69.6	58.6
FMBE266-7	7x fixed	6.0	19.0	-	42.0	48.0	83.6	-
FMBE266-8	8x fixed	10.0	66.0	M33*0.75	38.0	80.0	191.5	181.0
FMBE266-10	10x fixed	6.0	23.0	M22*0.75	27.0	30.0	95.6	82.6
FMBE266-12	12x fixed	5.0	30.0	M22*0.75	27.0	42.0	91.7	59.7

Subject to technical changes and availability

Standard Fixed Magnification Beam Expanders 355nm



Beam Expander 2x for 355nm

Part Number	Magnification factor	Input CA (mm)	Output CA (mm)	Mounting Diameter or Thread (mm)	Diameter 1 D1(mm)	Diameter 2 D2(mm)	Length 1 L1(mm)	Length 2 L2 (mm)
FMBE355-1.5	1.5x fixed	7.0	24.0	M30*1	36.0	46.0	76.5	48.1
FMBE355-2-T	2x fixed	6.0	23.0	M22*0.75	28.0	33.0	57.0	47.0
FMBE355-2	2x fixed	7.0	24.0	M30*1	36.0	46.0	75.6	47.2
FMBE355-3	3x fixed	7.0	24.0	M30*1	36.0	46.0	77.3	48.9
FMBE355-4	4x fixed	8.0	28.0	M30*1	36.0	46.0	77.3	48.9
FMBE355-4-T	4x fixed	8.0	28.0	M22*0.75	30.0	38.0	82.5	72.5
FMBE355-5	5x fixed	8.0	28.0	M30*1	36.0	46.0	71.0	-
FMBE355-7	7x fixed	8.0	28.0	M30*1	32.0	45.0	88.1	73.1
FMBE355-8	8x fixed	8.0	28.0	M30*1	36.0	46.0	84.0	70.0
FMBE355-10	10x fixed	6.0	28.0	M30*1	36.0	45.0	96.0	80.5
FMBE355-15	15x fixed	6.0	28.0	M30*1	35.0	44.0	95.0	-
FMBE355-20	20x fixed	6.0	28.0	M30*1	36.0	45.0	97.0	81.3

Subject to technical changes and availability

Standard Fixed Magnification Beam Expanders 532nm

Part Number	Magnification factor	Input CA (mm)	Output CA (mm)	Mounting Diameter or Thread (mm)	Diameter 1 D1(mm)	Diameter 2 D2(mm)	Length 1 L1(mm)	Length 2 L2 (mm)
FMBE532-1.5	1.5x fixed	10.0	21.0	M30*1	37.0	34.0	78.1	36.2
FMBE532-2-A	2x fixed	13.0	23.0	M22*0.75	30.0	30.0	82.7	67.7
FMBE532-2-B	2x fixed	8.0	23.0	M22*0.75	33.0	36.0	54.8	45.8
FMBE532-4	4x fixed	6.0	23.0	M22*0.75	30.0	30.0	83.0	67.0
FMBE532-5	5x fixed	8.0	24.0	M30*0.5	30.0	30.0	83.0	65.0
FMBE532-6-I	6x fixed	6.0	23.6	M22*0.75	30.0	30.0	83.0	67.0
FMBE532-6-A	6x fixed	5.0	17.0	-	17.0	17.0	70.6	-
FMBE532-8	8x fixed	6.0	16.0	-	25.0	25.0	-	67.0
FMBE532-10A	10x fixed	4.0	30.0	M22*0.75	36.0	42.0	82.2	73.2
FMBE532-10B	10x fixed	6.0	23.0	M22*0.75	30.0	30.0	83.0	67.0
FMBE532-12	12x fixed	7.0	24.0	M22*0.75	30.0	30.0	83.0	67.0
FMBE532-15A	15x fixed	6.0	32.0	M30*1	40.0	M43*0.5	85.0	67.0
FMBE532-15B	15x fixed	6.0	32.0	M22*0.75	40.0	45.0	85.0	-
FMBE532-18	18x fixed	5.0	40.0	20.5mm	20.5	47.0	176.5	163.
FMBE532-20	20x fixed	8.0	32.0	M22*0.75	-	45.0	92.3	75.3
FMBE532-30	30x fixed	5.0	38.0	M22*0.75	30.0	46.0	108.7	123.0

Subject to technical changes and availability

Standard Fixed Magnification Beam Expanders 633nm

Part Number	Magnification factor	Input CA (mm)	Output CA (mm)	Mounting Diameter or Thread (mm)	Diameter 1 D1(mm)	Diameter 2 D2(mm)	Length 1 L1(mm)	Length 2 L2 (mm)
FMBE633-3	3x fixed	10.0	23.0	M22*0.75	-	33.0	63.7	-
FMBE633-5	5x fixed	8.0	23.0	M22*0.75	30.0	33.0	110.0	93.0
FMBE633-8	8x fixed	11.0	23.0	M28*0.5	-	35.0	117.5	-
FMBE633-10	10x fixed	8.0	23.0	M22*0.75	30.0	33.0	146.0	129.0
FMBE633-20	20x fixed	8.0	76.0	M22*0.75	30.0	90.0	198.0	184.0
FMBE633-40	40x fixed	8.0	100.0	M22*0.75	40.0	112.0	246.0	232.0
FMBE633-50	50x fixed	10.0	81.0	M22*0.75	30.0	92.0	304.0	281.0

Subject to technical changes and availability

Standard Fixed Magnification Beam Expanders 1064nm



Beam Expander 10x for 1064nm

Part Number	Magnification factor	Input CA (mm)	Output CA (mm)	Mounting Diameter or Thread (mm)	Diameter 1 D1(mm)	Diameter 2 D2(mm)	Length 1 L1(mm)	Length 2 L2 (mm)
FMBE1064-1	1x fixed	15.5	23.0	M22*0.75	31.0	29.0	65.6	45.6
FMBE1064-1.2	1.2x fixed	16.0	23.0	M22*0.75	29.0	29.0	54.9	50.5
FMBE1064-1.5	1.5x fixed	15.0	22.0	M22*0.75	32.0	32.0	51.9	46.9
FMBE1064-1.5A	1.5x fixed	15.5	23.0	M22*0.75	25.0	29.0	44.5	35.5
FMBE1064-2T	2x fixed	3.0	4.0	M24*0.5	26.0	M24*0.5	41.0	28.0
FMBE1064-2A	2x fixed	20.0	40.0	M47*0.75	41.0	50.0	121.3	71.9
FMBE1064-2i	2x fixed	10.0	20.0	M22*0.75	26.0	26.0	42.0	28.0
FMBE1064-2-I	2x fixed	15.0	23.0	M22*0.75	29.0	31.5	45.0	31.0
FMBE1064-2.5A	2.5x fixed	10.0	23.0	M22*0.75	29.0	29.0	79.8	58.6
FMBE1064-2.5	2.5x fixed	10.0	23.0	M22*0.75	25.2	29.0	69.2	39.2
FMBE1064-3	3x fixed	10.0	23.0	M22*0.75	29.0	29.0	58.0	42.0
FMBE1064-3A	3x fixed	10.0	20.0	M22*0.75	-	26.0	60.0	44.7
FMBE1064-3-30	3x fixed	10.0	33.0	M30*1	40.0	40.0	57.0	43.0
FMBE1064-3T	3x fixed	10.0	17.0	M24*0.5	26.0	26.0	58.0	45.0
FMBE1064-4	4x fixed	10.0	22.0	M22*0.75	29.0	29.0	81.0	64.0
FMBE1064-5-30	5x fixed	10.0	32.0	M30*1	37.6	M43*0.5	84.6	77.6
FMBE1064-5i	5x fixed	10.0	16.0	M16*0.75	20.0	20.0	56.0	42.0
FMBE1064-5A	5x fixed	10.0	23.0	M22*0.75	29.0	29.0	72.0	55.0
FMBE1064-5I	5x fixed	10.0	32.0	M30*1	37.6	M43*0.5	84.6	77.6
FMBE1064-5T	5x fixed	10.0	23.0	M33*0.5	M33*0.5	M33*0.5	73.1	57.0
FMBE1064-6A	6x fixed	6.0	16.0	-	25.0	25.0	69.6	-
FMBE1064-6	6x fixed	10.0	22.0	M22*0.75	29.0	29.0	70.0	54.0
FMBE1064-6i	6x fixed	6.0	13.0	M16*0.75	20.0	20.0	71.8	56.8
FMBE1064-6-30	6x fixed	10.0	26.0	M30*1	36.0	M43*0.5	72.0	57.0
FMBE1064-6I	6x fixed	10.5	26.0	M22*0.75	32.0	32.0	89.4	79.0
FMBE1064-7	7x fixed	6.0	23.0	M22*0.75	29.0	29.0	76.4	60.4
FMBE1064-8	8x fixed	10.0	22.0	M22*0.75	29.0	29.0	76.0	58.0
FMBE1064-8-30	8x fixed	10.0	34.0	M30*1	36.0	M43*0.5	83.0	68.0
FMBE1064-10i	10x fixed	8.0	22.0	M22*0.75	29.0	29.0	70.0	52.0
FMBE1064-10-30	10x fixed	8.0	48.0	M30*1	33.0	58.0	121.0	63.5
FMBE1064-10-A	10x fixed	11.0	34.0	-	40.0	40.0	94.5	79.0
FMBE1064-12	12x fixed	6.0	13.0	M16*0.75	20.0	20.0	79.8	64.8
FMBE1064-15	15x fixed	7.5	28.0	M30*1	36.0	45.0	99.1	-
FMBE1064-20	20x fixed	8.0	28.0	M22*0.75	45.0	45.0	91.3	76.3
FMBE1064-30	30x fixed	6.0	38.0	M22*0.75	30.0	46.0	118.6	103.0
FMBE1064-30-A	30x fixed	10.0	100.0	M30*1	50.0	195.0	-	120.0
FMBE1064-40	40x fixed	1.2	50.0	-	60.0	60.0	207.2	-
FMBE1064-40-A	40x fixed	8.0	128.0	M30*1	36.0	140.5	188.8	153.0

Subject to technical changes and availability

Standard Fixed Magnification Beam Expanders 1550nm



Beam Expander 20x for 1550nm

Part Number	Magnification factor	Input CA (mm)	Output CA (mm)	Mounting Diameter or Thread (mm)	Diameter 1 D1(mm)	Diameter 2 D2(mm)	Length 1 L1(mm)	Length 2 L2 (mm)
FMBE1550-2.5	2.5x fixed	8.0	23.0	M22*0.75	28.0	34.0	65.2	55.2
FMBE1550-3	3x fixed	8.0	23.0	M22*0.75	25.0	34.0	70.6	36.4
FMBE1550-7	7x fixed	10.0	25.0	-	32.0	32.0	75.0	63.0
FMBE1550-8	8x fixed	10.0	30.0	-	36.0	36.0	85.0	72.0
FMBE1550-10	10x fixed	10.0	58.0	-	56.0	65.0	98.0	80.0
FMBE1550-20	20x fixed	7.0	49.0	M22*0.75	24.0	60.0	120.0	-

Subject to technical changes and availability

Beam Expanders Variable Magnification

- Continuous variation of magnification 2x-8x or 2x-10x.
- Fused silica or optical glass entrance lens available.
- Continuous variation of exit-beam divergence.
- Wavelengths 355nm, 405nm, 532nm, 633/780/830nm or 1064nm.
- Precise scales allow reliable settings and high repeatability.
- Maximum exit-beam diameter 31mm.
- Maximum length 166.2mm.
- Maximum diameter 42.0mm.
- Mounting diameter 37.6-0.01mm.



Beam Expander with a variable expansion factor 2x-8x for 1064nm

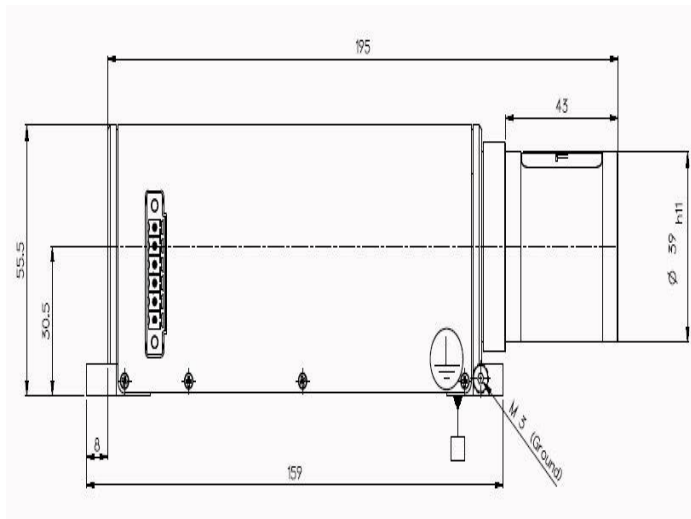
Standard Variable Magnification Beam Expander

Part Number	Wavelength (nm)	Magnification factor	Maximum Entrance Beam Diameter at $1/e^2$ (mm)	Lens Element	Entrance Lens Material
VMBE355	355	2x-8x variable	3.4	4	Fused silica
VMBE405	405	2x-8x variable	6.0	4	Optical glass
VMBE532-1	532	2x-8x variable	4.0	4	Fused silica
VMBE532-2	532	2x-8x variable	8.0	4	Optical glass
VMBE633	633	2x-8x variable	8.0	4	Optical glass
VMBE780	780	2x-8x variable	8.0	4	Optical glass
VMBE830	830	2x-8x variable	8.0	4	Optical glass
VMBE1064-1	1064	2x-8x variable	4.0	4	Fused silica
VMBE1064-2	1064	2x-8x variable	8.0	4	Optical glass
VMBE1064-3	1064	2x-10x variable	8.0	4	Optical glass

Subject to technical changes and availability

Beam Expanders Motorized Magnification

- Continuous variable magnification 2x-8x.
- Fused silica or optical glass designs.
- Continuous variation of exit-beam divergence.
- Wavelengths 340-360nm, 515-540nm or 1030-1080nm.
- Software running on the Windows™ platform (XP, Win7).
- Reduce machine set up times by automatic change of magnification.
- Maintains laser-protection class during readjustment of the beam expander.
- All in one design, controller integrated.
- CE and ROHS conform.
- IP20.
- Max. Exit-beam diameter 31mm.
- 10 individual pre-sets for magnification and divergence.
- Pointing stability < 0.5mrad.
- Fast adjustment from 2x to 8x in about 5 sec.
- Mechanical dimensions: length 203mm, width 58mm, height 55.5mm.
- Mechanical interface via high-precision holes 6^{H7} (recommended) or mounting diameter 39_{h11}.
- Different electronic interfaces: SubD9/ RS232, USB 2.0, Phoenix Contact/RS232.
- Baud rate: 9600 bit/sec.
- Power Input 7-12V, Phoenix Contact 7-24V.
- Max. Entrance – beam diameter = 31mm/zoom factor.



Motorized Beam Expander Data



Motorized Beam Expander with Phoenix Contact Interface

Standard Motorized Beam Expander (Excelitas)

Part Number	Wavelength (nm)	Maximum Entrance Beam Diameter at 1/e ² (mm)	Lens Element	PC Interface	Entrance Lens Material
MBE3-1	340-360	6.0	4	SubD9/RS232	Fused Silica
MBE3-2	340-360	6.0	4	Phoenix Contact/RS232	Fused Silica
MBE3-3	340-360	6.0	4	USB 2.0	Fused Silica
MBE5-1	515-540	8.0	4	SubD9/RS232	Fused Silica
MBE5-2	515-540	8.0	4	Phoenix Contact/RS232	Fused Silica
MBE5-3	515-540	8.0	4	USB 2.0	Fused Silica
MBE10-1	1030-1080	8.0	4	SubD9/RS232	Fused Silica
MBE10-2	1030-1080	8.0	4	Phoenix Contact/RS232	Fused Silica
MBE10-3	1030-1080	8.0	4	USB 2.0	Fused Silica
MBE532-1	532	8.0	4	SubD9/RS232	Optical Glass
MBE532-2	532	8.0	4	Phoenix Contact/RS232	Optical Glass
MBE532-3	532	8.0	4	USB 2.0	Optical Glass
MBE1064-1	1064	8.0	4	SubD9/RS232	Optical Glass
MBE1064-2	1064	8.0	4	Phoenix Contact/RS232	Optical Glass
MBE1064-3	1064	8.0	4	USB 2.0	Optical Glass

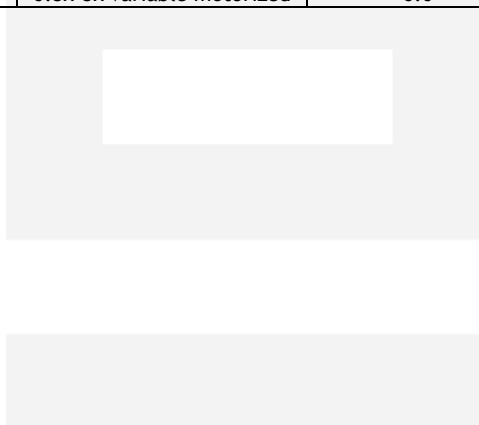
Subject to technical changes and availability

Standard Motorized Beam Expander (Other)

Part Number*	Wavelength(nm)	Magnification factor	Input CA (mm)	Output CA (mm)	Length (mm)
MBE266	266	1x-8x variable motorized	12.0	32.0	151.0
MBE355	355	1x-8x variable motorized	12.0	32.0	153.0
MBE1550	1550	0.5x-5x variable motorized	6.0	40.4	225.9

Subject to technical changes and availability

* PC interface RS 232.



Nd:YAG Crystals (Standard Rods)

Elecsys provides Nd:YAG laser rods with AR coatings for pulsed high energy and power operation.

- Made up of Nd:YAG material.



Nd:YAG Laser Rods

Specifications	Standards
Nd Doping Level	0.8% or 1.1%
Diameter Tolerance	+0./-0.05mm
Length Tolerance	+1/-0.5mm
Orientation	<111> crystalline direction
Clear Aperture	> 90% of diameter
Surface Flatness at 633nm	$\lambda/10$
Surface Quality	10-5 scratch/dig
Parallelism	< 10 arcsec
Perpendicularity	<5 arc min for Plano/Plano ends
Chamfers	0.1mm @ 45°
Coating	Both sides coated AR@1064 nm, R<0.2%, AOI = 0°
Barrel Grooving	All dia 6.35, 8, 10, 12 mm rods with barrel grooving.

Standard Nd:YAG Laser Rods

Part Number	Diameter (mm)	Length (mm)	Doping (%)	Wedge of the Ends, (°)
NYR-065-3	3	65	0.8	0/0
NYR-065-3A	3	65	1.1	0/0
NYR-065-4	4	65	0.8	3/3 Parallel
NYR-065-4A	4	65	1.1	3/3 Parallel
NYR-080-4	4	80	1.0	0/0
NYR-085-6	6.35	85	1.1	3/3 Parallel
NYR-085-8	8	85	1.1	3/3 Parallel
NYR-085-10	10	85	1.1	3/3 Parallel
NYR-085-12	12	100	0.8	3/3 Parallel
NYR-085-12A	12	100	1.1	3/3 Parallel
NYR-110-3.5	3.5	110	0.7	0/0
NYR-120-3	3	120	0.9	0/0
NYR-165-8	8	165	1.0	0/0

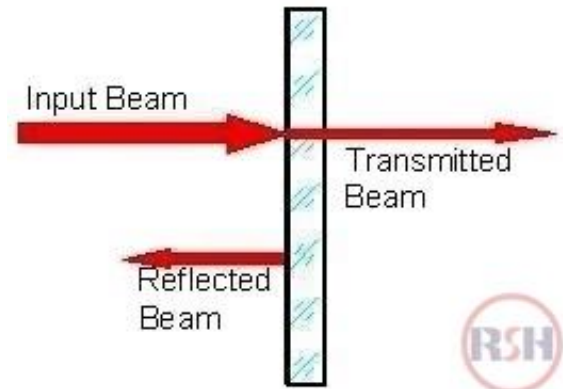
Subject to technical changes and availability

Nd:YAG Laser Optics

Laser Output Couplers

An Output Coupler is a partially reflecting dielectric mirror used in a laser cavity. It transmits a part of the circulating intra-cavity power for generating a useful output from the laser.

- Either made up of UV Grade Fused Silica or BK7 glass.
- A low transmission output coupler leads to a low laser threshold.
- Damage Threshold:
BK7: >3 J/cm², 8 nsec pulse, 1064nm typical.
UVFS: >6 J/cm², 8 nsec pulse, 1064 nm typical



Output Coupler Technical Aspect

Specifications	Standards
S1 Surface Flatness at 633nm	$\lambda/10$
S1 Surface Scratch-Dig	20-10
S2 Surface Flatness at 633nm	$\lambda/10$ typical
S2 Surface Scratch-Dig	20-10
Diameter Tolerance	+0/-0.12mm
Thickness Tolerance	± 0.25 mm
Parallelism	30 arcsec
Chamfer	0.3 mm at 45° typical
Clear Aperture	> 85% of diameter
Angle Of Incidence (AOI)	0°
Back Side Anti-reflection Coated	R<0.20%

Standard Laser Output Couplers 1064nm

Part Number	Material	Diameter (mm)	Thickness (mm)	Surface 1 Reflectivity
OCFS-12.7-3-65 (or OCB7-12.7-3-65)	UVFS or BK7	12.7	3	PR 65 $\pm$ 3%
OCFS-12.7-3-80 (or OCB7-12.7-3-80)	UVFS or BK7	12.7	3	PR 80 $\pm$ 3%
OCFS-12.7-3-85 (or OCB7-12.7-3-85)	UVFS or BK7	12.7	3	PR 85 $\pm$ 3%
OCFS-12.7-3-95 (or OCB7-12.7-3-95)	UVFS or BK7	12.7	3	PR 95 $\pm$ 3%
OCFS-19.9-5-30 (or OCB7-19.9-5-30)	UVFS or BK7	19.05	9.5	PR 30 $\pm$ 3%
OCFS-19.9-5-70 (or OCB7-19.9-5-70)	UVFS or BK7	19.05	9.5	PR 70 $\pm$ 3%
OCFS-19.9-5-80 (or OCB7-19.9-5-80)	UVFS or BK7	19.05	9.5	PR 80 $\pm$ 3%
OCFS-19.9-5-85 (or OCB7-19.9-5-85)	UVFS or BK7	19.05	9.5	PR 85 $\pm$ 3%
OCFS-20-6-80 (or OCB7-20-6-80)	UVFS or BK7	20	6.35	PR 80 $\pm$ 3%
OCFS-20-6-85 (or OCB7-20-6-85)	UVFS or BK7	20	6.35	PR 85 $\pm$ 3%
OCFS-25-6A-85 (or OCB7-25-6A-85)	UVFS or BK7	25.4	6.35	PR 85 $\pm$ 3%
OCFS-25-6-25 (or OCB7-25-6-25)	UVFS or BK7	25.4	6	PR 25 $\pm$ 3%
OCFS-25-6-80 (or OCB7-25-6-80)	UVFS or BK7	25.4	6	PR 80 $\pm$ 3%
OCFS-25-6-85 (or OCB7-25-6-85)	UVFS or BK7	25.4	6	PR 85 $\pm$ 3%
OCFS-50-4-50 (or OCB7-50-4-50)	UVFS or BK7	50	4	PR 50 $\pm$ 3%

Subject to technical changes and availability

Contact a Elecsys sales representative for Technical Data Sheet.



Output Coupler & Rear Mirror

Laser Rear Mirrors

- High reflectivity ($R > 99.8\%$) coatings are applied on Laser rear mirrors.
- The UV FS substrates are suggested for pulsed and CW high power fundamental Nd:YAG laser application.
- Either made up of UV Grade Fused Silica or BK7 glass.
- Damage Threshold:
BK7: $> 2 \text{ J/cm}^2$, 8 nsec pulse, 1064nm.
UVFS: $> 5 \text{ J/cm}^2$, 8 nsec pulse, 1064nm.

Specifications	Standards
S1 Surface Flatness at 633nm	$\lambda/10$
S1 Surface Scratch-Dig	20-10
S2 Surface Quality	Commercial Polish or Uncoated
Diameter Tolerance	$+0/-0.12\text{mm}$
Thickness Tolerance	$\pm 0.25\text{mm}$
Parallelism	30 arcsec
Chamfer	0.3 mm at 45° typical
Clear Aperture	$> 85\%$ of diameter
Angle Of Incidence (AOI)	0°
Reflectivity	$R > 99.8\%$

Standard Laser Rear Mirrors 1064nm

Part Number	Substrate Type	Substrate Material	Diameter (mm)	Thickness (mm)
RMFS-12.7-6-127CX (or RMB7-12.7-6-127CX)	127cm Convex	UVFS or BK7	12.7	6.35
RMFS-12.7-6-127CX (or RMB7-12.7-6-70CX)	70cm Convex	UVFS or BK7	12.7	6.35
RMFS-19-9.5 (or RMB7-19-9.5)	Plano	UVFS or BK7	19.05	9.5
RMFS-19-9.5-1MCC (or RMB7-19-9.5-1MCC)	1M Concave	UVFS or BK7	19.05	9.5
RMFS-19-9.5-1MCX (or RMB7-19-9.5-1MCX)	1M Convex	UVFS or BK7	19.05	9.5
RMFS-19-9.5-2MCX (or RMB7-19-9.5-2MCX)	2M Convex	UVFS or BK7	19.05	9.5
RMFS-20-5 (or RMB7-20-5)	Plano	UVFS or BK7	20	5
RMFS-25-6A (or RMB7-25-6A)	Plano	UVFS or BK7	25.4	6.35
RMFS-25-6 (or RMB7-25-6)	Plano	UVFS or BK7	25.4	6
RMFS-25-9.5 (or RMB7-25-9.5)	Plano	UVFS or BK7	25.4	9.5
RMFS-25-9.5-1MCX (or RMB7-25-9.5-1MCX)	1M Convex	UVFS or BK7	25.4	9.5
RMFS-25-9.5-1MCC (or RMB7-25-9.5-1MCC)	1M Concave	UVFS or BK7	25.4	9.5
RMFS-25-9.5-2MCC (or RMB7-25-9.5-2MCC)	2M Concave	UVFS or BK7	25.4	9.5

Subject to technical changes and availability

Contact a Elecsys sales representative for Technical Data Sheet.

Beam Bender Mirror

The Beam Bender is used to provide an adjustable means to divert a laser beam through a 90° angle.

Elecsys offers Beam Bender as per the below specifications:

Diameter: 50mm OR 50.8mm.

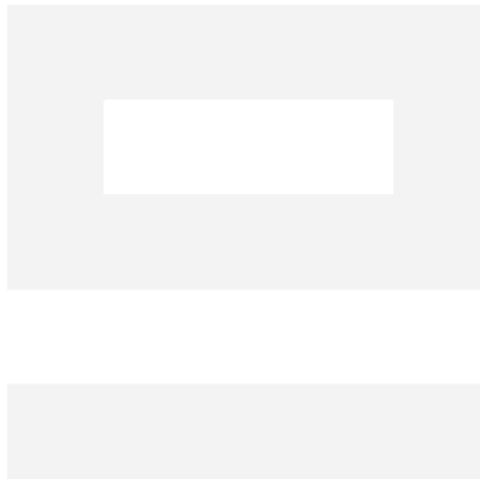
Thickness: 9.5mm or 10mm

Surface 1: HR @ 1064nm, $T_{\text{average}} > 85\%$ @ 400-700nm, 45° RAN, R > 99%

Surface 2: Broadband AR @ 400-700nm, 45° RAN



Beam Bender Mirror



Contact Address

Elecsys Engineering Co.

3K12, Sector-3, Behind Deaf and Dumb School,
Vaishali Nagar, Ajmer, Rajasthan
305001 India

Phone: +91-95292-36688, **WhatsApp:** +91-95304-07600, **Skype:** elecsys

E-mail: sales@elecsys.com, elecsys@outlook.com

URL: www.elecsys.com, www.elecsys.in