



JENar™ – F-Theta Lenses and Beam Expanders



Beam Expanders

With the 1x to 4x Beam Expander and the 2x to 10x Beam Expanders, Jenoptik broadens its product range of sophisticated lenses for high precision laser material processing.

Based on an optimized engineering concept, these beam expanders are very robust and compact. Due to this particular feature there is no rotational shift of lense components – even in case of a setup change. This results in improved pointing stability. Additional advantages of these Beam Expanders are the engraved expansion and focusing scale.

In order to provide durable systems and to minimize focus shifts, highly resistant materials and fused silica are used to make them particularly suitable for high power laser applications.

Specifications

Beam Expander 1x-4x

Materials:

Entrance elements: Fused silica

Exit elements: Fused silica

Transmission: $\geq 97\%$

Mounting \varnothing : 37.6 (0/-0.1) mm or mounting thread M30x1

Weight: 0.19 kg

Recommended maximum diameter of entrance pupil

Zoom factor	\varnothing entrance pupil		
	1030... 1080 nm	532 nm	355 nm
1x	4.0 mm	4.0 mm	4.0 mm
2x	4.0 mm	4.0 mm	4.0 mm
3x	4.0 mm	4.0 mm	4.0 mm
4x	4.0 mm	4.0 mm	4.0 mm

Order Number:

017052-012-26 017052-202-26 017052-402-26

Specifications

Beam Expander 2x-10x

Materials:

Entrance elements: Fused silica

Exit elements: Highly laser resistant materials (532 nm and 1064 nm) or fused silica (355 nm)

Transmission: $\geq 96\%$

Mounting \varnothing : 37.6 (0/-0.1) mm

Weight: 0.23 kg

Recommended maximum diameter of entrance pupil

Zoom factor	\varnothing entrance pupil		
	1030... 1080 nm	532 nm	355 nm
2x	8.0 mm	8.0 mm	6.0 mm
3x	8.0 mm	7.0 mm	6.0 mm
4x	7.0 mm	6.0 mm	5.0 mm
5x	6.0 mm	5.0 mm	4.5 mm
6x	5.0 mm	4.0 mm	4.0 mm
7x	4.0 mm	4.0 mm	3.5 mm
8x	3.5 mm	3.5 mm	3.0 mm
9x	3.2 mm	3.2 mm	2.7 mm
10x	3.0 mm	3.0 mm	2.2 mm

Order Number:

017052-001-26 017052-201-26 017052-401-26

F-Theta Lenses JENar™

Well-designed beam delivery is the only way to maximize the efficiency of laser material processing (drilling, dicing, fine cutting, structuring, perforating, marking and texturing).

Jenoptik offers a wide range of standard F-Theta lenses JENar™ including designs for 1030 ... 1080 nm, 532 nm, 355 nm and 266 nm. Among them, we offer telecentric designed lenses and special wide angle lenses. Combined with appropriate scan systems our lenses allow precise imaging for highly accurate micro and macro material processing.

To meet the requirements of state-of-the-art laser material processing Jenoptik established a line of full fused silica F-Theta lenses for high-power laser material processing applications from 1064 nm down to 266 nm.

High Power / Silverline™ JENar™ F-Theta lenses are low-absorbing, diffraction-limited full fused-silica lenses that provide very high damage threshold and offer exceptionally consistent focusing over the entire scanning field.

They can manage laser powers of up to four kilowatts cw without active cooling and with minimal focal shift. Standard and customer-specific product versions are available.

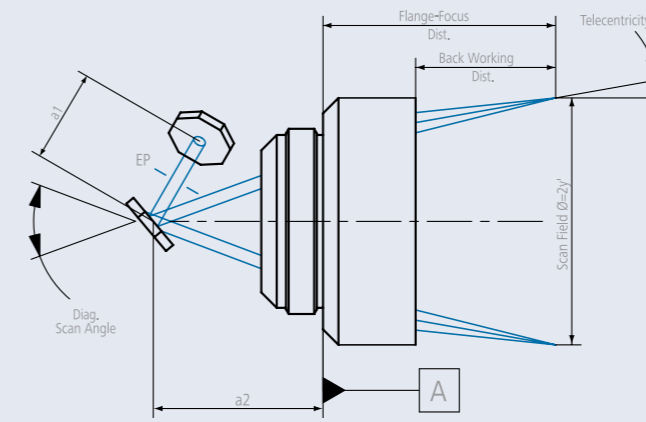
Newest Members of the product family are low-absorption broadband F-Theta lenses for high power diode laser applications.

The especially developed anti-reflectance coating is optimized for high transmission in combination with lowest absorption values for the designated wavelength range of 900 nm to 1100 nm.



Laser Material Processing with JENar™ High Power Series

Technical parameters and properties of the F-Theta JENar™ Lens series



Type	Wavelength	Lens Order Number	Focal Length	Scan Field Diagonal	Max. Full Diagonal Scan Angle	Max. Input Beam Diameter Truncated at 1/e ² for 2-axis-scan	Focus Size at 1/e ² Intensity Level	a1 Recommended Mirror Separation	a2 2 nd Mirror to Flange	Telecentricity	Back Working Distance from last mechanical surface (incl. window)	Mounting Thread	Window Order Number for Spare Part
	[nm]		[mm]	[mm]	[°]	[mm]	[μm]	[mm]	[mm]	[°]	[mm]		
Silverline™ 1) / High Power Series ¹⁾	1030...1080	017700-025-26	160	110	40	14	22	17	40.5	5.4	183.6	M85x1	017700-415-32
		017700-026-26	255	160	36	20	25	25	37.5	7.4	303.3	M85x1	017700-415-32
	900...1100	017700-125-26	160	110	40	14	22	17	22	5.4	183.6	M85x1	017700-415-34
	355	017700-402-26	103	71	40.2	9	8	14	47	2.8	136	M85x1	017700-410-31 AP1
		017700-406-26	255	240	54.2	10	17	13	42.5	12.7	313.6	M85x1	017700-415-31
		017700-405-26	511	464	51.4	14	24	14	42	18.2	609	M85x1	017700-442-31
266	017700-601-26	103	71	40.2	9	6	14	46	2.9	133	M85x1	017700-410-32	
Standard F-Theta Lenses	1030...1080	017700-024-26	100	93	54	10	19	13	43	9.1	87	M85x1	017700-049-31
		017700-003-26	125	80	37.2	15	16	18	48	3.6	155	M85x1	017700-004-31
			125	93	43.2	15	16	18	38	5.7	155	M85x1	017700-004-31
		017700-019-26	160	170	60	10	31	13	43	17.2	178	M85x1	017700-049-31
		017700-018-26	170	170	57.4	14	24	17	41	11.7	194	M85x1	017700-004-31
		017700-017-26	255	239	53.2	20	24	25	39	15	291	M85x1	017700-004-31
		017700-022-26	347	354	57.6	16	46	17	41	18.7	404	M85x1	017700-004-31
	532	017700-009-26	350	452	71	15	45	23	25	24	392	M85x1	017700-024-31
		017700-021-26	420	420	57.1	15	55	17	41	18.8	501	M85x1	017700-004-31
		017700-209-26	100	90	53	10	10	13	43	7.8	95	M85x1	017700-049-32
		017700-202-26	102	75	43	15	7	18	36	3.2	133	M85x1	017700-004-32
			102	80	46	15	7	18	36	4.9	133	M85x1	017700-004-32
		017700-203-26	108	75	40	15	7	16	39	3.7	132	M85x1	017700-221-31
			108	86	46	15	7	16	31	5.6	132	M85x1	017700-221-31
		017700-206-26	170	160	54	14	12	17	41	11	195	M85x1	017700-004-32
017700-205-26	255	233	52.1	20	12	25	39	14.3	294	M85x1	017700-004-32		
355	017700-208-26	330	336	57.6	16	23	17	41	18.4	384	M85x1	017700-004-32	
	017700-207-26	420	420	56.6	15	27	17	41	19.3	485	M85x1	017700-004-32	
017700-401-26	53	22	24.2	10	3.5	13	46.5	1.5	64.9	M85x1	017700-475-31		

¹⁾ fused silica

The stated data are approximate values and can deviate under different conditions during customer's use. All data are subject to generally accepted manufacturing tolerances.



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JENar™: Trademark registered in EU, CN, JP, SG | Silverline™: Trademark registered in Germany

F-Theta: Registered Design in EU, CN, KR, IN, SG | Registered Utility model in DE, CN, KR, US | Patent in US, CN: US8879171B2, CN103323932

Beam Expander: German Patent pending | Registered EU-Design

It is our policy to constantly improve the design and specifications. Accordingly, the details represented herein cannot be regarded as final and binding.