



Scan Lenses (f- θ Lenses) for Nd:YAG Lasers

A family of lenses commonly used in scan systems for reading or printing documents or laser marking systems for focusing laser beam to a smaller spot. The lens must be designed such that the image height is proportional to the scan angle (Theta), not the tangent of that angle, as is usually the case.

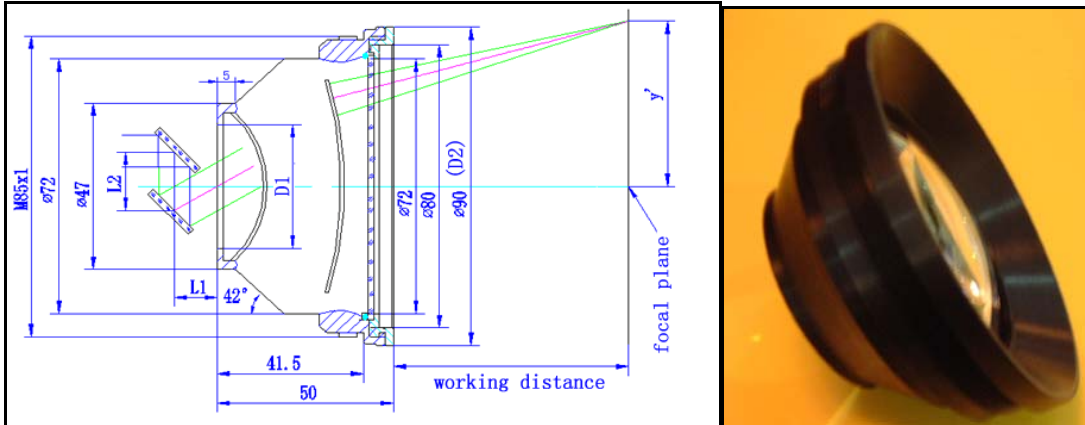


Fig. 1 (Design: L1=14.4mm, L2=22.2mm. Suitable range: L1=9.5-19.5mm, L2=16-28mm)

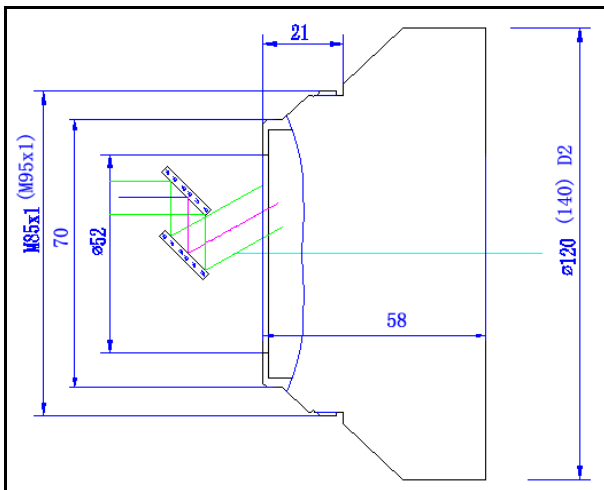


Fig. 2

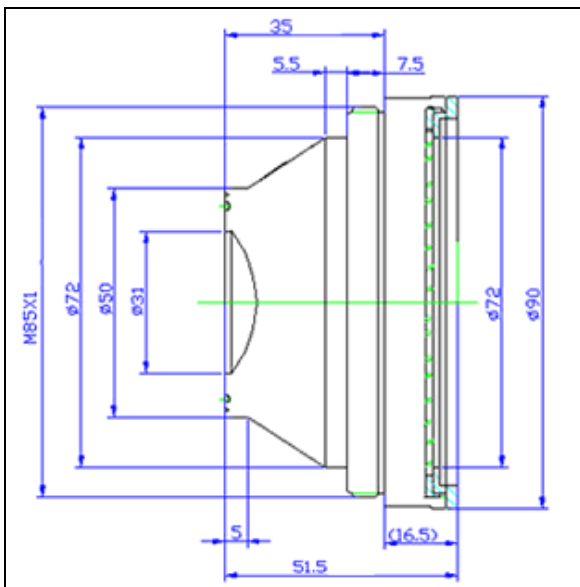


Fig. 3

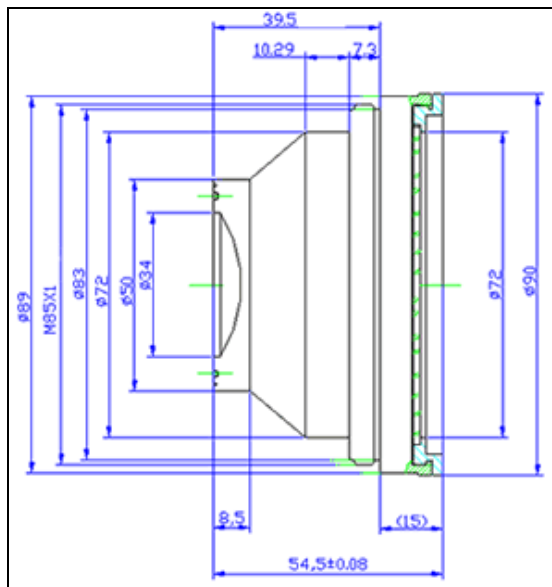


Fig. 4

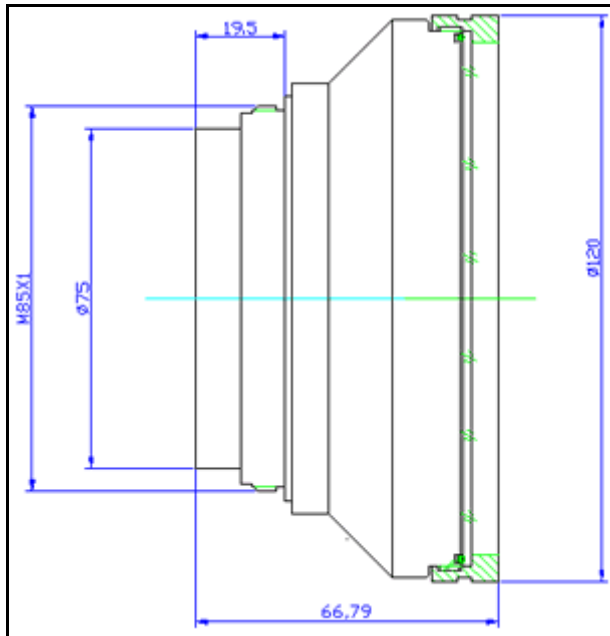


Fig. 5

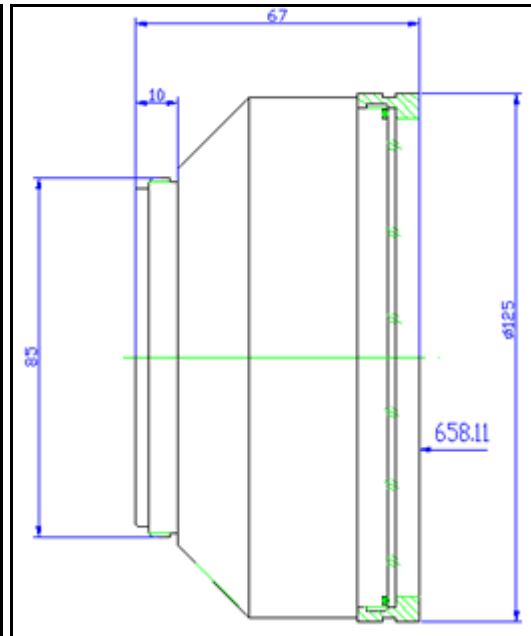


Fig. 6

Description of part Number: STY-xxxx-yyy-zzz-A

STY--- STY series YAG laser f-theta lenses

xxxx-- laser wavelength, 1064 means 1064nm, 10.6 means 10.6um.

yyy---- mark field, yyy x yyy mm

zzz---- effective focal length in mm

A----- others

Remark: The f-theta lens consists of 3 lenses and one protective glass. The coating is a di-electric layer.

The transmission is >99% at 1064nm. Two sides of the protective glass are AR-coated at 1064nm.

Wavelength 1064nm

Model	F.L. mm	WD mm	Scan area mm	Scan Angle θ_{max}	E.P. mm	Spot μm	D1 mm	D2 mm	Screw	Outline	Protective glass dia. mm
STY-1064-35-63	63	58	$\Phi 50/35 \times 35$	$\pm 22^\circ$	12	10	31	90	M85x1	Fig.1	75
STY-1064-50-80	80	91.6	$\Phi 70/50 \times 50$	$\pm 22^\circ$	12	12	31	90	M85x1	Fig.1	75
STY-1064-55-80	80	83	$\Phi 78/55 \times 55$	$\pm 25^\circ$	20	15	42	90	M85x1	Fig.1	80
STY-1064-62-100	100	107	$\Phi 87/62 \times 62$	$\pm 25^\circ$	12	14	33	90	M85x1	Fig.1	75
STY-1064-70-100-B	100	107	$\Phi 100/70 \times 70$	$\pm 28^\circ$	16	10	40	90	M85x1	Fig.1	80
STY-1064-85-130	130	145	$\Phi 120/85 \times 85$	$\pm 25^\circ$	12	14	35	90	M85x1	Fig.1	75
STY-1064-102-150	150	165	$\Phi 144/102 \times 102$	$\pm 28^\circ$	12	18	36	90	M85x1	Fig.1	75
STY-1064-110-160	160	180	$\Phi 155/110 \times 110$	$\pm 28^\circ$	12	18	36	90	M85x1	Fig.1	75
STY-1064-110-160-B	160	180	$\Phi 155/110 \times 110$	$\pm 28^\circ$	16	18	40	90	M85x1	Fig.1	80
STY-1064-110-160-C	160	180	$\Phi 155/110 \times 110$	$\pm 28^\circ$	20	18	52	120	M85x1	Fig.2	113
STY-1064-117-170	170	191	$\Phi 165/117 \times 117$	$\pm 28^\circ$	16	18	38	90	M85x1	Fig.1	80
STY-1064-130-188	188	212	$\Phi 185/130 \times 130$	$\pm 28^\circ$	12	18	36	90	M85x1	Fig.1	75
STY-1064-145-210-B	210	225.8	$\Phi 205/145 \times 145$	$\pm 28^\circ$	16	18	36	90	M85x1	Fig.1	80
STY-1064-155-210	210	236	155x155	$\pm 30^\circ$	16	18	36	90	M85x1	Fig.1	80
STY-1064-153-220	220	259	153x153	$\pm 28^\circ$	12	18	36	90	M85x1	Fig.1	75
STY-1064-175-254-B	254	277.7	$\Phi 245/175 \times 75$	$\pm 28^\circ$	15	20	36	90	M85x1	Fig.1	75
STY-1064-175-254-C	254	274	$\Phi 245/175 \times 175$	$\pm 28^\circ$	20	20	52	120	M85x1	Fig.2	113
STY-1064-205-290	290	327	$\Phi 290/205 \times 205$	$\pm 28^\circ$	16	20	38	90	M85x1	Fig.1	80
STY-1064-230-330	330	363	$\Phi 330/230 \times 230$	$\pm 28^\circ$	16	20	38	90	M85x1	Fig.1	80
STY-1064-230-330-B	330	398	$\Phi 330/230 \times 230$	$\pm 28^\circ$	15	20	38	90	M85x1	Fig.1	75
STY-1064-255-370	370	430	$\Phi 360/255 \times 255$	$\pm 28^\circ$	20	20	52	120	M85x1	Fig.2	113
STY-1064-255-380	380	420	$\Phi 360/255 \times 255$	$\pm 28^\circ$	15	20	38	90	M85x1	Fig.1	75
STY-1064-286-420	420	456	$\Phi 405/286 \times 286$	$\pm 28^\circ$	20	20	52	120	M85x1	Fig.2	113
STY-1064-300-430	430	477	$\Phi 425/300 \times 300$	$\pm 28^\circ$	20	20	52	120	M85x1	Fig.2	113
STY-1064-300-430-B	430	495	$\Phi 425/300 \times 300$	$\pm 28^\circ$	20	20	60	120	M85x1	Fig.5	113
STY-1064-360-525	525	606	$\Phi 510/360 \times 360$	$\pm 28^\circ$	20	30	52	120	M85x1	Fig.2	113
STY-1064-400-580	580	657	$\Phi 566/400 \times 400$	$\pm 28^\circ$	20	25	72	125	M85x1	Fig.6	118
STY-1064-420-590	590	650	$\Phi 595/420 \times 420$	$\pm 28^\circ$	20	25	52	140	M95x1	Fig.2	133.5
STY-1064-430-610	610	670	$\Phi 610/430 \times 430$	$\pm 28^\circ$	20	25	52	140	M95x1	Fig.2	133.5
STY-1064-450-650	650	736	$\Phi 636/450 \times 450$	$\pm 28^\circ$	20	30	52	120	M85x1	Fig.2	113

Standard *f*-Theta Lenses at 1064nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-0063/126	63.03	23.80	51.44	36x36	8.00	15.00	35.63	59.20	M39x1 or M55x1	74.54	Yes
STS-0101/126	100.12	22.00	76.88	55x55	10.00	18.00	40.00	90.00	M85x1	111.98	Yes
STS-0162/126	159.97	24.80	141.76	100x100	8.00	15.00	25.22	59.20	M39x1 or M55x1	179.93	Yes
STS-0163/126	162.41	26.80	153.84	107x107	12.00	22.00	43.30	89.00	M85x1	181.08	Yes
STS-3163/126	163.00	31.80	181.13	120x120	15.00	22.88	51.99	103.00	M85x1	186.61	Yes
STS-2163/126	163.00	27.80	158.07	106x106	20.00	29.00	66.00	128.00	M85x1	192.66	Yes
STS-0191/126	191.87	26.80	180.35	125x125	20.00	40.00	57.85	128.00	3.875"x32	220.88	Yes
STS-0202/126	201.58	19.00	132.62	90x90	30.00	43.00	84.10	132.00	M85x1	243.05	Yes
STS-3254/126	253.94	19.20	170.72	115x115	30.00	48.94	75.50	130.00	M85x1	297.18	Yes
STS-4255/126	254.00	27.20	242.88	168x168	20.00	38.00	70.06	130.00	M85x1	292.70	Yes
STS-1254/126	254.38	25.60	226.91	160x160	12.00	23.50	55.30	109.00	M85x1	306.26	Yes
STS-0300/126	300.02	25.00	261.46	175x175	20.00	35.00	78.00	128.00	M85x1	353.09	Yes
STS-0350/126	346.26	25.20	304.96	212x212	12.00	22.48	52.40	95.00	M85x1	412.17	Yes
STS-0351/126	354.10	19.60	245.87	160x160	30.00	53.50	48.50	128.00	3.875"x32	396.25	Yes
STS-0411/126	409.86	21.00	304.06	210x210	20.00	44.00	56.80	105.00	M85x1	472.77	Yes
STS-0420/126	419.98	23.60	353.53	242x242	30.00	59.45	52.00	136.00	M132x1	480.14	---
STS-0508/126	566.34	23.20	467.21	325x325	20.00	45.00	56.90	127.00	M85x1	647.59	---
STS-0635/126	653.81	22.60	528.66	370x370	25.00	75.00	48.50	133.00	M110x1	728.99	---
STS-0825/126	815.01	27.20	804.50	560x560	24.00	43.24	58.00	130.00	M102x1	888.52	Yes

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Telecentric *f*-Theta Lenses at 1064nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-0058/126	56.55	11.80	23.22	16x16	10.00	26.44	40.68	90.00	M85x1	58.43	Yes
STS-0055/126	59.69	13.60	27.94	19x19	14.00	20.10	58.00	90.00	M85x1	66.55	---
STS-0080/126	79.89	21.50	58.54	39x39	25.00	27.16	84.14	107.00	M85x1	79.45	Yes
STS-6125/126	99.25	17.60	59.86	40x40	25.00	37.36	80.40	116.00	M85x1	114.89	Yes
STS-5100/126	107.74	26.80	97.48	69x69	12.00	34.87	85.50	128.00	M85x1	137.86	Yes
STS-5365/126	162.90	19.00	106.07	73x73	20.00	61.50	114.96	154.00	M85x1	194.83	Yes
STS-5165/126	163.57	19.00	106.91	75x75	10.00	58.30	128.50	136.00	M85x1	193.54	Yes
STS-0220/126	206.71	28.40	197.38	139x139	14.00	46.00	160.00	281.00	TK267.0	289.49	---
STS-0221/126	206.71	28.40	197.38	139x139	14.00	46.00	176.68	281.00	TK267.0	274.53	Yes

Standard Fused Silica *f*-Theta Lenses at 1064nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-2175/126	163.35	25.00	137.11	94x94	20.00	30.50	110.24	150.00	M85x1	205.47	Yes
STS-3260/126	277.11	21.40	205.60	142x142	15.00	31.00	61.00	105.00	M85x1	346.07	Yes
STS-1330/126	340.00	24.40	306.60	215x215	20.00	38.50	174.60	163.00	M85x1	204.04	Yes
STS-1500/126	499.97	27.40	493.71	340x340	20.00	30.50	68.00	148.00	M85x1	571.26	Yes

Remark: FL=focal length; SA=scan angle; SAR=scan area; MI=max. input beam diameter; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Fused Silica *f*-Theta Lenses (Low Absorption) at 1064nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-2175/328	163.35	25.00	137.11	94x94	20.00	30.50	110.24	150.00	M85x1	205.47	Yes
STS-3260/328	277.11	21.40	205.60	142x142	15.00	31.00	61.00	105.00	M85x1	346.07	Yes
STS-1330/328	340.00	24.40	306.60	215x215	20.00	38.50	174.60	163.00	M85x1	204.04	Yes
STS-1500/328	499.97	27.40	493.71	340x340	20.00	30.50	68.00	148.00	M85x1	571.26	Yes

Standard Telecentric *f*-Theta Lenses - Fused Silica at 1064nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-4031/126	32.78	8.00	9.11	6x6	10.00	16.50	39.85	90.00	M85x1	28.67	---
STS-0082/126	82.00	10.00	28.35	20x20	15.00	33.00	103.14	93.80	M85x1	84.59	Yes

Remark: FL=focal length; SA=scan angle; SAR=scan area; MI=max. input beam diameter; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Telecentric *f*-Theta Lenses - Fused Silica (Low Absorption) at 1064nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
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STS-4031/328	32.78	8.00	9.11	6x6	10.00	16.50	39.85	90.00	M85x1	28.67	----
STS-0082/328	82.00	10.00	28.35	20x20	15.00	33.00	103.14	93.80	M85x1	84.59	Yes

Short Pulse Laser *f*-Theta Lenses at 1064nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-7163	163.03	24.40	138.06	95x95	10.00	27.00	44.00	89.00	M85x1	197.07	Yes

Remark: FL=focal length; SA=scan angle; SAR=scan area; MI=max. input beam diameter; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Wavelength 532nm

Model	F.L. mm	WD mm	Scan area mm	Scan Angle θmax	E.P. mm	Spot μm	D1 mm	D2 mm	Screw	Out-line
STY-532-35-63	63	58	Φ50/35x35	±22°	12	10	31	90	M85x1	Fig.1
STY-532-50-80	80	91.6	Φ70/50×50	±22°	12	12	31	90	M85x1	Fig.1
STY-532-62-100	100	107	Φ87/62×62	±25°	12	14	33	90	M85x1	Fig.1
STY-532-70-100-B	100	107	Φ100/70×70	±28°	16	10	40	90	M85x1	Fig.1
STY-532-74-120	120	132	Φ105/74×74	±25°	12	14	35	90	M85x1	Fig.1
STY-532-110-160	160	180	Φ155/110×110	±28°	15	15	36	90	M85x1	Fig.1

Part No.	EFL (mm)	Scan Angle (±°)	Scan Length (mm)	Scan Field (mm)	Ent. pupil (mm)	Avge. spot size (um)	Length (mm)	WD (mm)	Screw Thread
STY-532-70-100-WT	100	25°	87.0	70x70	14.0	12.0	50.0	100.0	M85x1
STY-532-90-120-WT	120	25°	102.0	90x90	8.0	10.8	38.85	134.0	M85x1
STY-532-100-162-WT	162	23°	132.9	100x100	7.0	-	25.2	183.4	M39/M55
STY-532-115-165-WT	165	20°	163.0	115x115	10.0	18.5	48.0	186.0	M85x1
STY-532-148-233-WT	234	26°	211.0	148x148	10.0	-	55.3	282.0	M85x1
STY-532-150-254-WT	254	25°	220.0	150x150	10.0	21.5	51.0	280.0	M85x1
STY-532-225-410-WT	410	25°	366.0	225x225	15.0	15.0	48.94	443.7	M85x1
STY-532-350-508-WT	508	25°	500.0	350x350	16.0	15.0	57.0	581.0	M85x1
STY-532-510-740-WT	740	20°	721.0	510x510	16.0	18.5	65.0	896.5	M85x1
STY-532-550-768-WT	768	28°	710.0	550x550	16.0	24.0	58.0	839.0	M102x1

Wavelength 355nm

Model	F.L. mm	WD mm	Scan area mm (round/square)	Scan Angle maxi	E.P. mm	Spot μm	D1 mm	D2 mm	Screw	Out-line
STY-355-70-100	100	122	Φ100/70×70	±25°	8	12	33	90	M85x1	Fig.3
STY-355-110-160	160	185	Φ155/110×110	±25°	8	15	33	90	M85x1	Fig.1
STY-355-110-160-B	160	187	Φ155/110×110	±25°	8	15	33	90	M85x1	Fig.4

Standard *f*-Theta Lenses at 355nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-3100/075	108.34	28.40	107.70	76x76	6.00	17.14	49.00	89	M85x1	145.95	Yes
STS-3160/075	173.90	25.00	153.15	109x109	6.00	21.10	36.75	89	M85x1	218.40	Yes
STS-3260/075	250.26	25.40	219.17	155x155	10.00	28.05	61.00	105	M85x1	309.62	Yes
STS-0257/075	269.29	19.00	183.00	130x130	4.00	13.50	47.00	900	M85x1	276.08	---
STS-1330/075	328.18	25.20	303.39	212x212	14.00	36.00	108.4	1220	M85x1	260.21	Yes
STS-0580/075	580.80	22.00	455.60	320x320	10.00	39.00	37.96	890	M85x1	671.66	Yes
STS-0815/075	831.05	21.40	624.49	440x440	14.00	25.00	62.50	900	M85x1	983.23	Yes
STS-0920/075	919.21	20.80	678.02	470x470	14.00	40.97	40.00	89	M85x1	1032.00	Yes

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Telecentric f -Theta Lenses at 355nm

Part No.	FL (mm)	SA (\pm°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-4031/075	32.04	8.00	8.90	6x6	10.00	16.50	39.85	90	M85x1	28.99	----
STS-3050/075	56.01	15.20	29.35	20x20	6.00	19.50	39.79	87	M85x1	75.89	Yes
STS-4110/075	109.38	24.20	89.79	63x63	6.00	33.07	86.00	121	M85x1	154.57	Yes
STS-4160/075	167.22	15.60	90.05	64x64	10.00	37.20	133.00	121	M85x1	264.36	Yes
STS-5256/075	256.82	14.60	124.46	86x86	6.00	24.00	173.50	138	M85x1	145.16	----

Part No.	EFL (mm)	Scan Angle (\pm°)	Scan Length (mm)	Scan Field (mm)	Ent. pupil (mm)	Average spot Size (μ m)	Length (mm)	Working Distance (mm)
STY-355-60-100-WT	100.0	25°	85.0	60x60	6.0	15.5	56.0	130.5
STY-355-76-108-WT	108.3	28.4°	107.7	76x76	6.0	-	49.0	146.0
STY-355-109-174-WT	173.9	25°	153.2	109x109	6.0	-	36.8	218.4
STY-355-112-160-WT	160.0	20°	158.0	112x112	7.0	13.5	50.0	177.79
STY-355-112-160Q-WT	160.0	29°	160.0	112x112	6.0	18	50.36	206.6
STY-355-155-250-WT	250.3	25.4°	219.2	155x155	10.0	-	61.0	309.6
STY-355-160-254-WT	254.0	25°	220.0	160x160	12.0	22.0	55.0	311.0
STY-355-130-269-WT	269.3	19.0°	183.0	130x130	4.0	-	47.0	276.1
STY-355-180-290-WT	290.0	25.5°	255.0	180x180	20.0	40.0	65.0	332.5
STY-355-250-410-WT	410.0	25°	354.0	250x250	10.0	7.0	46.8	488.2
STY-355-320-580-WT	580.0	22°	455.0	320x320	10.0	27.0	38.0	668.0
STY-355-350-580-WT	580.0	25°	495.0	350x350	15.0	24.0	46.0	689.0
STY-355-500-810-WT	810.0	28°	850.0	500x500	24.0	55.0	57.0	880.0
STY-355-440-831-WT	831.1	21.4°	624.5	440x440	14.0	-	62.5	983.2
STY-355-470-912-WT	919.2	20.8°	678.0	470x470	14.0	-	40.0	1032.0

Wavelength 266nm

Standard f -Theta Lenses at 266nm

Part No.	FL (mm)	SA (\pm°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-3100/199	101.49	29.20	100.68	73x73	5.00	17.14	49.00	89.00	M85x1	136.52	Yes
STS-3160/199	162.31	25.00	142.66	105x105	5.00	21.10	36.75	89.00	M85x1	204.47	Yes
STS-0256/199	249.50	24.20	218.90	148x148	4.00	13.50	47.00	90.00	M85x1	254.00	----

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Telecentric f -Theta Lenses at 266nm

Part No.	FL (mm)	SA (\pm°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-4030/199	30.10	14.60	15.00	10x10	6.00	12.72	55.54	47	M85x1	28.90	Yes
STS-3050/199	53.46	16.00	29.40	20x20	6.00	17.80	39.79	87	M85x1	71.70	----
STS-4105/199	99.30	21.00	72.08	50x50	5.00	26.90	86.20	121	M85x1	142.17	Yes
STS-4162/199	159.78	16.20	90.27	64x64	10.00	32.30	133.00	121	M85x1	253.67	Yes

Part No.	EFL (mm)	Scan Angle (\pm°)	Scan Length (mm)	Scan Field (mm)	Ent. pupil (mm)	Average spot Size (μ m)	Length (mm)	Working Distance (mm)
STY-266-70-100-WT	100.0	28°	95.0	70x70	5.0	8.0	49.0	137.0
STY-266-110-160-WT	160.0	28°	160.0	110x110	5.0	10.0	36.7	200.0
STY-266-90-254-WT	254.0	18°	156.0	90x90	4.0	16.0	47.0	25.0

Scan Lenses for 10.6um CO₂ Lasers

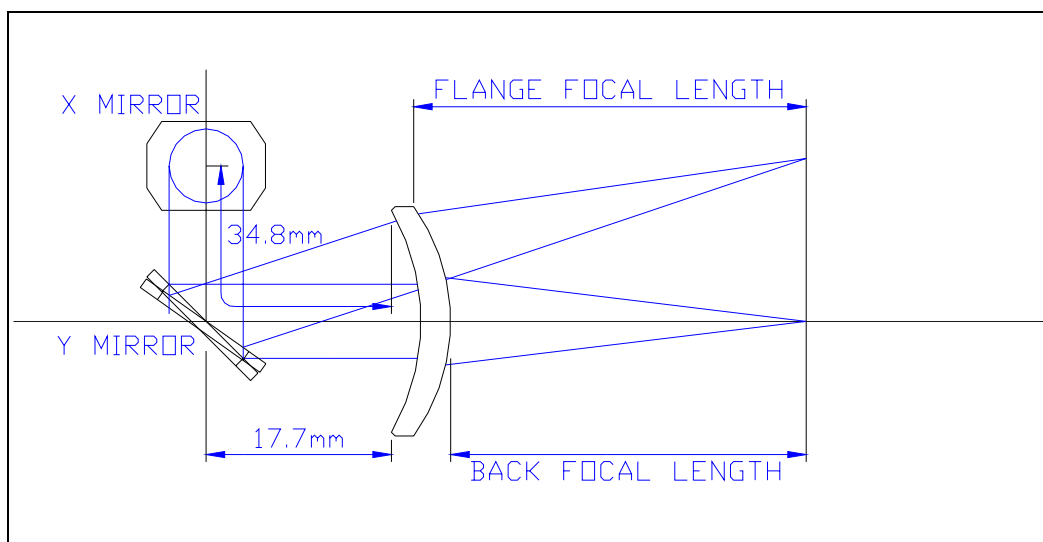
1. Single-element Scan Lenses

1) Un-mounted Single-element STSL Series Lenses

STSL scanner lenses specially designed and optimized for use in CO₂ laser 2-axis galvo-scanner systems with full beam diameters of up to 15.0mm. Mirror sets appropriate for use with beam diameters up to 15mm require an increase in mirror separation in comparison with smaller mirrors. These changed optical conditions are catered for by the STSL series. These single-element lenses are designed to represent the best achievable compromise for on-axis and off-axis aberrations, field flatness and F-theta characteristics, obtainable using single-element spherical-surface designs of (standard) 48mm diameter. The lens materials is ZnSe.



Part no.	Focal length (mm)	Field size (mm)	Back focal length (mm)	Flange focal length (mm)	Average spot diameter (μm)
STSL-10.6-50-75	75.2	50 x 50	74.2	78.4	171
STSL-10.6-60-90	90.1	60 x 60	90.0	94.8	174
STSL-10.6-70-101	101.3	70 x 70	101.4	106.1	181
STSL-10.6-105-149	149.1	105 x 105	150.6	155.6	219
STSL-10.6-120-175	175.0	120 x 120	177.4	178.4	243
STSL-10.6-125-179	179.2	125 x 125	181.9	187.3	247
STSL-10.6-140-201	200.6	140 x 140	203.5	208.8	269
STSL-10.6-155-226	225.5	155 x 155	228.0	232.8	296
STSL-10.6-175-249	249.4	175 x 175	253.3	258.5	320
STSL-10.6-210-298	298.0	210 x 210	302.6	307.7	373
STSL-10.6-250-363	362.6	250 x 250	368.2	373.2	445
STSL-10.6-280-394	394.4	280 x 280	401.4	406.7	481
STSL-10.6-300-433	432.7	300 x 300	441.0	446.2	525
STSL-10.6-340-482	481.8	340 x 340	490.2	495.3	581
STSL-10.6-370-529	528.8	370 x 370	538.5	543.5	634
STSL-10.6-415-592	591.7	415 x 415	586.5	589.9	717
STSL-10.6-500-717	716.5	500 x 500	730.0	734.7	850
STSL-10.6-550-782	781.6	550 x 550	797.7	802.2	925
STSL-10.6-600-848	848.4	600 x 600	859.6	863.7	1000
STSL-10.6-680-978	977.6	680 x 680	993.7	997.9	1150
STSL-10.6-840-1183	1183	840 x 840	1205	1208	1390
STSL-10.6-850-1201	1201	850 x 850	1216	1220	1410
STSL-10.6-920-1285	1285	920 x 920	1317	1321	1520
STSL-10.6-1000-1409	1409	1000 x 1000	1421	1425	1650
STSL-10.6-1120-1577	1577	1120 x 1120	1593	1596	1840
STSL-10.6-1256-1746	1746	1256 x 1256	1783	1787	2040
STSL-10.6-1500-2122	2122	1500 x 1500	2173	2177	2420

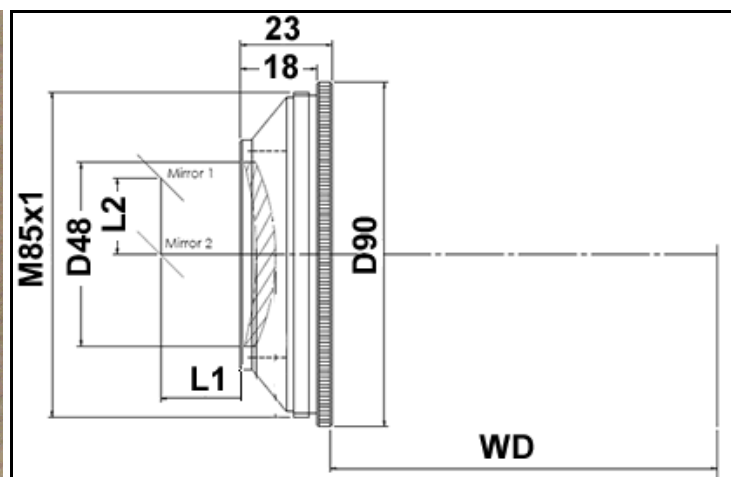


Remark:

- (1) The lenses are meniscus form; one concave and one convex surface. The concave always faces the incident beam.
- (2) The mirror locations are the same for every STSL lens, so any lens can replace any other in the cell and be correctly positioned. The field sizes given, assume an optical field angle of +/-20deg.
- (3) Focused spot diameters assume a 15mm diameter full beam (approximately 12mm $1/e^2$) and TEM₀₀ mode ($M^2 = 1$). The 'average' is the mean of 25 field positions in a quadrant.
- (4) For all STSL lenses, the diameter is 48.0 +/-0.1 mm, and the edge thickness is 3.0 +/-0.1 mm.

2) Mounted Single-element Lenses

Part no.	Focal length (mm)	Field size (mm)	WD (mm)	Average spot diameter (μm)
STSL-10.6-50-75	75.2	50 x 50	59.8	171
STSL-10.6-60-90	90.1	60 x 60	75.6	174
STSL-10.6-70-100	101.3	70 x 70	87.0	181
STSL-10.6-105-150	149.1	105 x 105	136.2	219
STSL-10.6-120-175	175.0	120 x 120	163.0	243
STSL-10.6-125-180	179.2	125 x 125	167.5	247
STSL-10.6-140-200	200.6	140 x 140	189.1	269
STSL-10.6-155-225	225.5	155 x 155	213.6	296
STSL-10.6-175-250	249.4	175 x 175	238.9	320
STSL-10.6-210-300	298.0	210 x 210	288.2	373
STSL-10.6-250-360	362.6	250 x 250	353.8	445
STSL-10.6-280-400	394.4	280 x 280	387.0	481
STSL-10.6-300-435	432.7	300 x 300	426.6	525
STSL-10.6-340-482	481.8	340 x 340	475.8	581
STSL-10.6-370-529	528.8	370 x 370	524.1	634
STSL-10.6-415-600	591.7	415 x 415	572.1	717
STSL-10.6-500-720	716.5	500 x 500	715.6	850
STSL-10.6-550-782	781.6	550 x 550	783.3	925
STSL-10.6-600-848	848.4	600 x 600	845.2	1000
STSL-10.6-680-977	977.6	680 x 680	979.3	1150
STSL-10.6-840-1150	1183	840 x 840	1190.6	1390
STSL-10.6-850-1200	1201	850 x 850	1201.6	1410
STSL-10.6-920-1285	1285	920 x 920	1302.6	1520
STSL-10.6-1000-1409	1409	1000 x 1000	1406.6	1650
STSL-10.6-1120-1577	1577	1120 x 1120	1578.6	1840
STSL-10.6-1256-1746	1746	1256 x 1256	1768.6	2040
STSL-10.6-1500-2122	2122	1500 x 1500	2158.6	2420

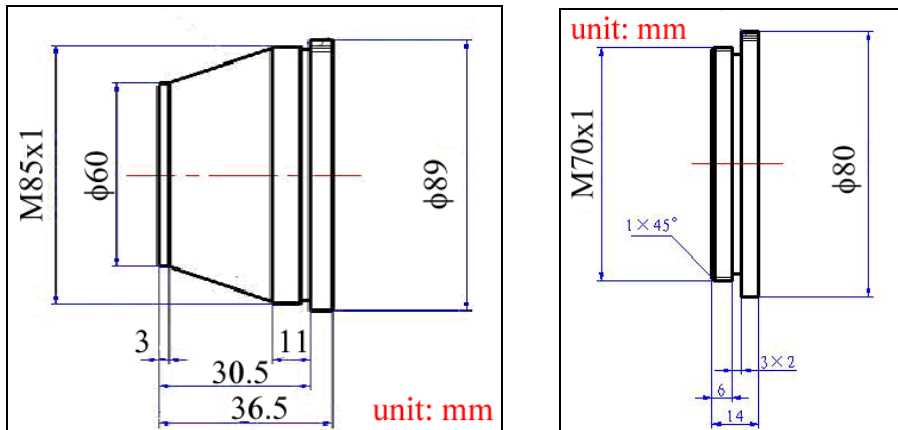


Drawings of STSL series f-theta lenses

Model	Scan area (mm)		WD (mm)	EP (mm)	Scan angle(°)	FD (mm)
	Rectangular	Round				
STDC-10.6-36	36×36	φ51	72	11	15	25
STDC-10.6-60	60×60	φ86	97	11	20	25
STDC-10.6-80	80×80	φ113	102	11	25	25
STDC-10.6-90	90×90	φ128	119	11	25	25
STDC-10.6-110	110×110	φ156	151	11	25	25
STDC-10.6-110-14	110×110	φ156	146	14	30	23
STDC-10.6-125	125×125	φ177	175	11	25	25
STDC-10.6-175	175×175	φ247	252	11	25	25
STDC-10.6-200	200×200	φ283	294	11	25	25
STDC-10.6-250	250×250	φ352	398	11	25	25
STDC-10.6-300	300×300	φ424	447	11	25	25
STDC-10.6-350A	350×350	φ497	531	11	25	25
STDC-10.6-350B	350×350	φ497	427	11	30	25
STDC-10.6-400A	400×400	φ566	608	11	25	25
STDC-10.6-400B	400×400	φ566	506	11	30	25
STDC-10.6-500A	507×507	φ718	772	11	25	25
STDC-10.6-500B	500×500	φ708	616	11	30	25

Model	EP (mm)	Scan angle(°)	Scan area (mm×mm)	Spacing# (mm)	WD (mm)	Focused beam dia. (um)	
						Center	edge
STDC-10.6-60-20	20	20	60×60	30	122.5	278	300
STDC-10.6-80-20	20	19	59×59	33	128.5	247	264
STDC-10.6-90-20	20	17	60×60	33	145.5	237	252
STDC-10.6-100-20	20	23	100x100	30	176	135	143

the distance between the two scan mirrors. The lens material is GaAs.



Drawings of STDC series f-theta lenses

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-9068/181	68.00	25.00	59.00	41x41	8.00	17.26	47.00	90.00	M85x1	42.00
STS-9100/181	100.00	25.00	87.00	61x61	10.00	15.67	47.00	90.00	M85x1	65.00
STS-9163/181	153.00	25.00	133.00	94x94	12.00	15.97	47.00	90.00	M85x1	150.00
STS-9254/181	254.00	25.00	221.00	156x156	12.00	17.26	47.00	90.00	M85x1	230.00

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

2. Mounted 2-element Scan Lenses

Model	WD mm	Scan area (mm)		Spot size (centre) μm	Spot size (off axis) μm	EP (mm)	Scan angle (°)	FD mm
		Rectangular	Round					
STC-10.6-40	95	36×36	51	115	135	11	20	27
STC-10.6-80	118	80×80	113	120	140	11	27	16

STC-10.6-110	145	110×110	156	210	225	16	30	17
STC-10.6-125	188	125×125	177	235	285	16	30	17
STC-10.6-175	257	175×175	247	245	300	16	30	18
STC-10.6-200	294	200×200	283	320	365	16	30	19
STC-10.6-250	360	250×250	354	330	375	16	30	20
STC-10.6-300	433	300×300	424	385	430	16	30	20
STC-10.6-350	502	350×350	495	400	450	16	30	20
STC-10.6-400	569	400×400	566	420	485	16	30	20
STC-10.6-500	803	500×500	718	460	520	16	30	21
STC-10.6-700	960	700×700	990	530	680	16	30	21

The lens material is GaAs.

STU2 Series Mounted 2-element F-theta Lenses

These doublet (STU2) and triplet scanning (STU3) lenses are intended to work with the same configuration of scanning mirrors and beam sizes as the STSL single-element lenses, but are offered at the shorter focal lengths where better performance is possible. The doublets have focal lengths from 75 to 300mm. Above 300mm the benefits of using a doublet are not great. The triplets are offered in two focal lengths, 75 and 100mm. These give diffraction limited performance and even further improvement over the corresponding doublet.

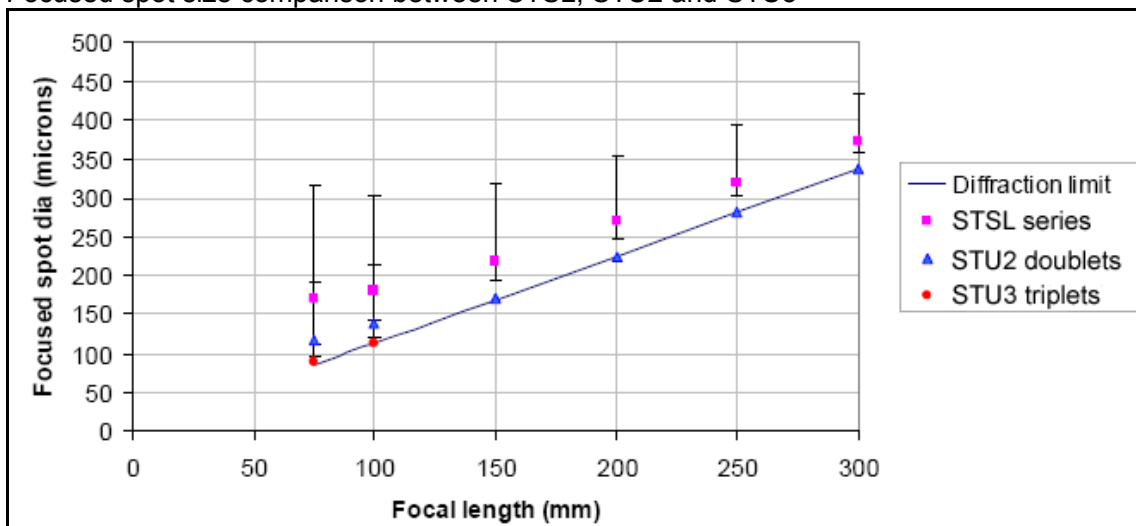
All the lenses are made from laser grade ZnSe. Each of the lenses comes in a black anodized aluminium mount and can also be fitted with a ZnSe protection window as an option.

Specifications:

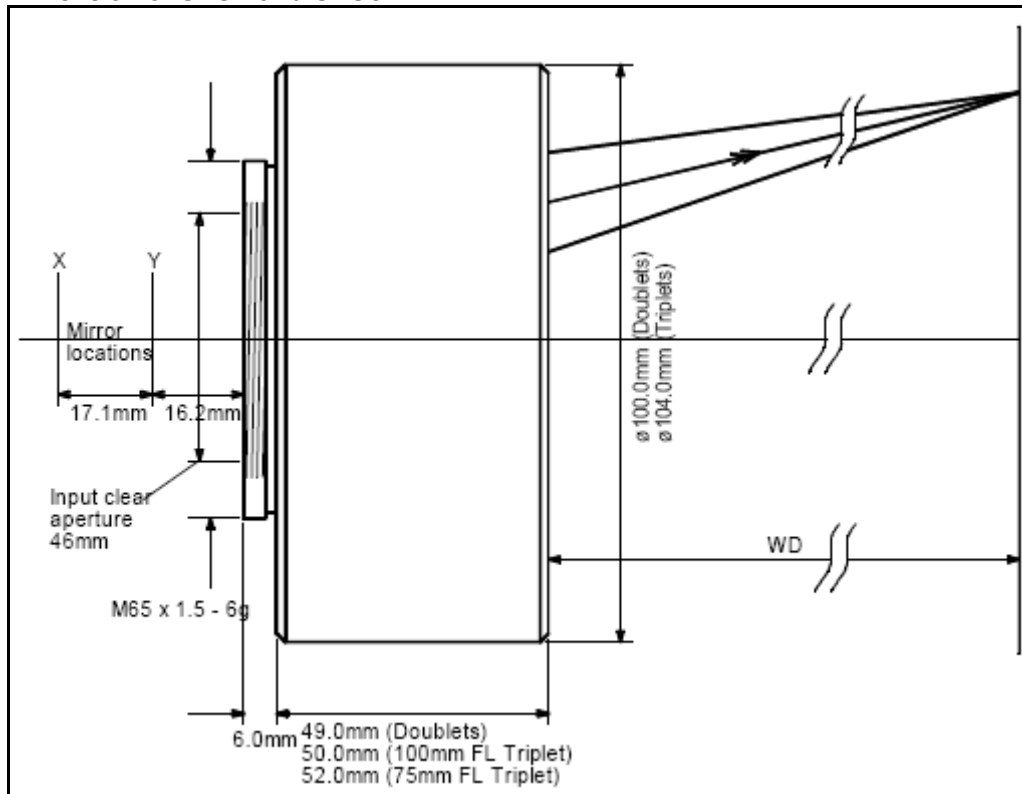
Material:	All elements and protection window made from Laser Grade ZnSe.
Mount details:	See Figure 10.51.
Beam diameter:	Up to 15mm (12mm 1/e ²)
Optical scan field:	+/-20° in X and Y.
Focal length:	Within 1%.
Absorption:	< 0.25% per element.
Transmission:	> 99.6% per element coated AR/AR for 10.6mm.
Damage threshold:	CW 3000W/mm at 10.6mm.

Part no	Field size (mm sq)	Focal length (mm)	Average focused spot dia (mm)	Standard deviation of spot dia (mm)	Working distance, WD no window(mm)	Working distance, WD with window(mm)	Max. Fq error X axis(%)	Max. Fq error Y axis(%)
STU2-10.6-50-75	50	75.0	118	25	60.27	62.03	-2.4	-2.4
STU2-10.6-70-100	70	100.0	139	22	87.57	89.34	-1.5	-1.4
STU2-10.6-105-151	105	151.4	171	0	149.06	150.84	0.9	0.9
STU2-10.6-140-200	140	200.0	225	0	213.94	215.73	1	1
STU2-10.6-175-250	175	250.0	282	0	261.36	263.17	1.3	1.3
STU2-10.6-210-300	210	300.0	338	0	312.06	313.87	1.5	1.5

Focused spot size comparison between STSL, STU2 and STU3



Dimension of STU2 and STU3



Part No.	EFL (mm)	Scan Field (mm)	Average Spot Size (um)	Beam Dia. (mm)	Mir. Sep. (mm)	2nd Mir. to Lens Mount (mm)	Max. Input Angle (deg.)	90% CA (mm)	Working Distance (mm)
SL2-10.6-35-60G	60	35X35	100	14	13	25	20	45	55
SL2-10.6-50-80G	80	50X50	118	14	13	25	20	45	76
SL2-10.6-70-122G	122	70X70	158	14	13	25	20	46	130
SL2-10.6-110-170G	170	110X110	170	14	13	25	20	54	185
SL2-10.6-140-220G	220	140X140	224	14	13	20	20	53	239
SL2-10.6-175-275G	250	175X175	239	14	13	25	20	51	305
SL2-10.6-210-300G	300	210X210	387	14	20	20	20	86	330
SL2-10.6-250-360G	360	250X250	465	14	20	20	20	86	393
SL2-10.6-300-420G	420	300X300	570	14	20	20	20	86	465
SL2-10.6-350-485G	485	350X350	822	14	20	30	20	87	528
SL2-10.6-F420G-20	420	300X300	505	20	30	30	20	78	470
SL2-10.6-110-150Z	150	110X110	170	14	13	27	20	64	159
SL2-10.6-140-200Z	200	140X140	224	14	13	27	20	69	215
SL2-10.6-175-250Z	250	175X175	239	14	13	27	20	78	270
SL2-10.6-F300Z-20	300	210X210	387	14	20	20	20	86	327
SL2-10.6-250-360Z	360	250X250	489	14	20	20	20	98	393
SL2-10.6-300-420Z	420	300X300	502	16	20	26	20	101	460
SL2-10.6-400-560Z	560	400X400	905	14	20	26	20	93	590

- Material: G-GaAs (transmit 10.6um only)
- Material: Z-ZnSe (transmit both 10.6um and visible)

Standard f -Theta Lenses for CO₂ 10.6 μ m (Flat field type - 2 element version)

Part No.	FL (mm)	SA (\pm°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-9102/181	100.00	25.00	87.00	61x61	10.00	18.50	47.00	90.00	M85x1	65.00
STS-9160/181	159.90	25.00	142.00	100x100	12.00	18.50	47.00	90.00	M85x1	160.00

Remark: FL=focal length; SA=scan angle; SAR=scan area; MI=max. input beam diameter; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

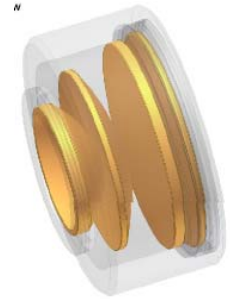
Telecentric f -Theta Lenses for CO₂ 10.6 μ m

Part No.	FL	SA	SL	SAR	MI	AS	Length	MO	MT	WD
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	(mm)	(\pm°)	(mm)	(mm x mm)	(mm)	(mm)	(mm)	(mm)		(mm)
STS-9105/181	106.00	20.00	72.00	50x50	10.00	37.37	66.00	120.00	M85x1	131.40
STS-9260/181	158.80	18.00	98.00	69x69	12.00	37.37	124.50	130.00	M85x1	227.30

3. F-theta scan lenses for CO₂ laser - Triple element made of ZnSe

Part No.	Wave-length (um)	EFL(mm)	WD (mm)	Mirror Scanning angle	Scanning area(mm ²)	Entrance beam size (mm)	Mirrors separation (a2-a1) (mm)	Last mirror to first lens(a1) (mm)	Focused spot size (um)	Connection thread	Total length (mm)
SL3-9.4-50-80W	9.4	80	89.4	+/- 25	50X50	14	18	18	84.5	M85X1	39.20
SL3-9.4-60-105Z	9.4	105	60.1	+/- 25	60X60	14	18	21	88.5	M85X1	86
SL3-10.6-50-80W	10.6	80	89.4	+/- 25	50X50	14	18	18	84.5	M85X1	39.20
SL3-10.6-60-105Z	10.6	105	60.1	+/- 25	60X60	14	18	21	88.5	M85X1	86



STU3 Series Scan Lenses

- focal lengths 75 and 100mm respectively
- the 75mm focal length lens is also nearly telecentric (see below) with the focused beam less than 5° to the normal diffraction limited performance over the entire image plane
- virtually zero F-theta error
- can be fitted with a protective window

Part No.	Wavelength (um)	EFL (mm)	Scan area (mm)	Entrance (mm)	Spot dia. (mm)
STU3-10.6-50-75	10.6	75	50x50	15	89
STU3-10.6-70-100	10.6	100	70x70	15	113

Scan Lenses for other Wavelengths

Standard *f*-Theta Lenses for 808nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-0101/094	97.53	28.00	75.71	53x53	10	18.00	40.00	90.00	M85x1	108.90	Yes
STS-0163/094	158.28	27.60	156.21	108x108	12	20.80	43.30	89.00	M85x1	176.42	Yes
STS-2163/094	158.88	26.80	150.05	103x103	20	29.00	66.00	128.00	M85x1	187.26	Yes
STS-0202/094	196.85	19.00	130.88	90x90	30	43.00	83.10	132.00	M85x1	237.41	Yes
STS-3254/094	248.66	19.20	168.83	115x115	30	47.93	75.50	130.00	M85x1	290.03	Yes
STS-0300/094	294.17	25.00	258.39	175x175	20	35.00	78.00	128.00	M85x1	346.21	Yes
STS-0400/094	397.87	21.40	303.07	213x213	20	33.00	53.00	118.00	M85x1	486.87	---
STS-0420/094	410.93	25.20	374.59	250x250	30	54.64	52.00	136.00	M132x1	468.59	---
STS-0555/094	556.24	21.40	426.26	290x290	25	40.00	65.40	130.00	M85x1	628.87	---
STS-0635/094	636.51	25.60	594.02	415x415	30	58.25	48.50	133.00	M110x1	709.51	---
STS-0825/094	803.55	28.00	642.68	450x450	30	54.00	58.00	130.00	M102x1	875.96	Yes

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Telecentric *f*-Theta Lenses for 808nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-0053/094	56.33	11.00	21.61	14x14	10.00	17.50	55.15	90.00	M85x1	69.12	Yes
STS-0075/094	76.78	9.80	26.40	19x19	10.00	32.60	45.00	70.00	TK60	103.63	---
STS-0080/094	79.55	21.20	58.15	39x39	25.00	27.70	83.40	107.00	M85x1	79.53	Yes
STS-5100/094	105.63	26.80	96.39	68x68	12.00	35.00	85.50	126.00	M85x1	135.25	Yes

Standard *f*-Theta Lenses for 980nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-0101/094	99.46	28.00	75.71	53x53	10.00	18.00	40.00	90.00	M85x1	111.17	Yes
STS-0163/094	161.38	27.60	156.21	108x108	12.00	20.80	43.30	89.00	M85x1	179.88	Yes
STS-2163/094	162.00	26.80	150.05	103x103	20.00	29.00	66.00	128.00	M85x1	191.26	Yes
STS-0202/094	200.40	19.00	130.88	90x90	30.00	43.00	83.10	132.00	M85x1	241.65	Yes
STS-3254/094	253.12	19.20	168.83	115x115	30.00	47.93	75.50	130.00	M85x1	295.61	Yes
STS-0300/094	298.52	25.00	258.39	175x175	20.00	35.00	78.00	128.00	M85x1	351.32	Yes
STS-0400/094	400.16	21.40	303.07	213x213	20.00	33.00	53.00	118.00	M85x1	489.16	---
STS-0420/094	419.58	25.20	374.59	250x250	30.00	54.64	52.00	136.00	M132x1	478.65	---
STS-0555/094	565.20	21.40	426.26	290x290	25.00	40.00	65.40	130.00	M85x1	638.85	---
STS-0635/094	649.59	25.60	594.02	415x415	30.00	58.25	48.50	133.00	M110x1	724.17	---
STS-0825/094	812.18	28.00	642.68	450x450	30.00	54.00	58.00	130.00	M102x1	885.11	Yes

Remark: FL=focal length; SA=scan angle; SAR=scan area; MI=max. input beam diameter; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Telecentric *f*-Theta Lenses for 980nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-0053/094	57.39	11.00	21.61	14x14	10	17.50	55.15	90.00	M85x1	70.56	Yes
STS-0075/094	78.18	9.80	26.40	19x19	10	32.60	45.00	70.00	TK60	105.56	---
STS-0080/094	80.96	21.20	58.15	39x39	25	27.70	83.40	107	M85x1	81.30	Yes
STS-5100/094	107.19	26.80	96.39	68x68	12	35.00	85.50	126	M85x1	137.17	Yes

Standard *f*-Theta Lenses at 633nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-0155/123	154.63	11.00	59.28	40x40	15.00	40.00	50.00	70.00	No thread	192.00

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Standard *f*-Theta Lenses at 633nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-0075/123	74.79	10.40	27.00	19X19	10.00	31.00	45.00	70.00	No thread	100.30
STS-1088/093	87.48	15.80	48.22	34X34	7.00	34.00	55.00	98.00	TK87	116.61
STS-0093/123	89.02	17.00	51.96	36X36	16.00	34.00	62.05	83.00	No thread	113.37
STS-1100/123	100.59	12.00	42.16	30X30	10.00	53.30	92.00	155.00	TK145	221.34
S4FLT1114/093	156.06	20.00	108.80	77X77	10.00	53.30	92.00	155.00	TK145	223.27
STS-0200/123	203.55	15.00	105.79	75X75	20.00	116.50	93.95	142.00	TK133	235.97

Standard *f*-Theta Lenses at 670nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-1088/093	87.96	15.80	48.50	34X34	7.00	34.40	55.00	98.00	TK87	116.27
STS-1114/093	157.32	20.00	109.65	77X77	10.00	53.30	92.00	155.00	TK145	223.00
STS-040/093	157.47	19.60	107.73	76X76	5.00	53.40	90.00	155.00	TK145	225.22

Remark: FL=focal length; SA=scan angle; SAR=scan area; MI=max. input beam diameter; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Colour Corrected *f*-Theta Lenses AT 808+940 nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-8163	162.95	26.40	150.67	102X102	20.00	22.00	90.50	106	M86X1	153.63	Yes

Telecentric Colour Corrected *f*-Theta Lenses at 450-650nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-0061/065	60.52	15.00	31.81	22X22	5.00	25.60	48.50	59.00	TK52	75.61

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Telecentric Colour Corrected *f*-Theta Lenses at 405-650nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-4375	80.00	11.00	20.00	14X14	6.00	95.10	88.00	59.00	TK52	22.50

Standard *f*-Theta Lenses at 405nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-3160/173	175.86	25	154.76	110x110	6.00	21.10	36.75	89	M85x1	220.73	Yes
STS-0375/173	375.32	31	420.36	300x300	10.00	35.50	48.00	116	M92x1	447.46	----
STS-0580/173	594.12	22	466.36	326x326	10.00	39.00	37.96	89	M85x1	686.46	Yes

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Telecentric *f*-Theta Lenses at 405nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-8050/173	55.03	22.80	42.10	29x29	7.50	16.20	52.00	90.00	M85x1	67.20	----

f-Theta Lens for Mask Imaging for Excimer Laser at 248nm

Part No.	FL (mm)	SA (±°)	Magnification	SAR (mm x mm)	MI (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-4200/198	221.10	14.00	0.33	200X200	10X10	38.6	88	M85x1	303.60

Remark: FL=focal length; SA=scan angle; SAR=scan area; MI=max. input beam diameter; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Standard *f*-Theta Lenses for Excimer Laser at 193nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)
STS-4056/198	56	18.8	25X25	7	15	34	87	M85X1	71.36	Yes
STS-4057/198	66.24	19.2	30X30	7	15	34	87	M85X1	83.78	Yes

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Standard *f*-Theta Lenses at 1550nm

Part No.	FL (mm)	SA (±°)	SL (mm)	SAR (mm x mm)	MI (mm)	AS (mm)	Length (mm)	MO (mm)	MT	WD (mm)	PW
STS-3100/008	100.1	22.0	76.9	55x55	10.0	18.0	40.0	90.0	M85	112.0	Yes
STS-2250/008	277.1	21.4	205.6	142x142	15.0	31.0	61.0	105.0	M85	346.1	Yes
STS-5163/008	163.1	18.8	104.0	73x73	15.0	32.2	183.32	135.0	M85	155.4	Yes

Remark: FL=focal length; SA=scan angle; SL=scan length; SAR=scan area; MI=max. input beam diameter; AS=aperture stop; MO=max. outside diameter; MT=mounting thread; WD=working distance; PW=protective windows.

Model	F.L. mm	WD mm	Scan area mm	Scan Angle θ_{max}	E.P mm	Spot μm	D1 m m	D2 mm	Screw	Outline
STY-1550-110-160	160	180	$\Phi 155/110 \times 110$	$\pm 28^\circ$	12	18	36	90	M85 \times 1	Fig. 1

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When you select a f-theta lens, you need to consider the following factors:

1. When the marking field increases, the focal length will be longer and the focused beam diameter will be larger.
2. When the diameter is larger, the power density on the workpiece will be lower. Thus you may need higher laser power.
3. When the laser power is higher, the laser beam quality may be worse and then the focused beam diameter will be larger.

Thus you should choose a proper f-theta lens according to a reasonable marking field. In order to meet various application requirements such as large field and small field, you may buy a few lenses with different marking fields to achieve good marking quality.