

CM-1120IR Collimator Module Spec.

2018-09-16

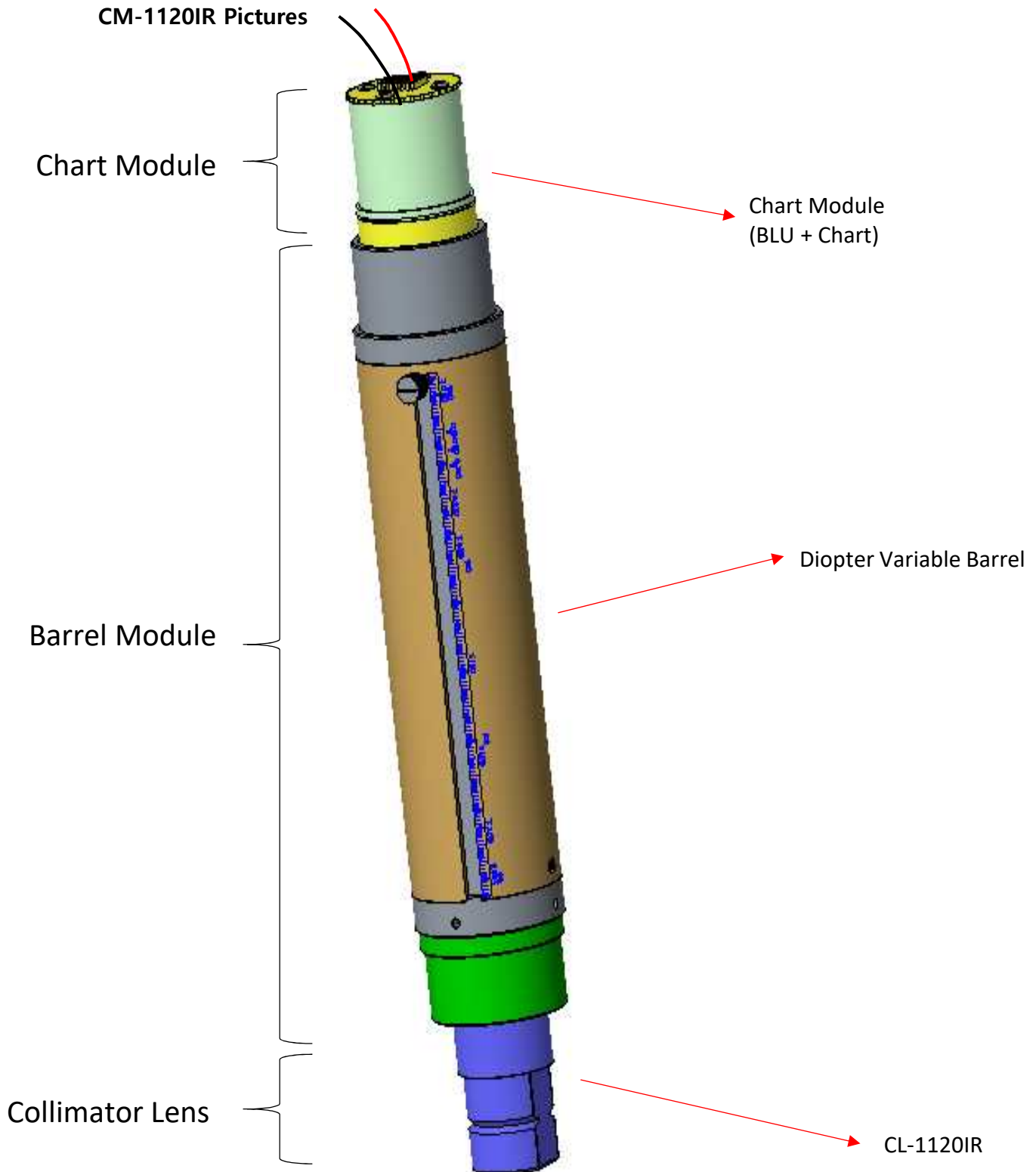
OneStone

Construction of CM-1120IR

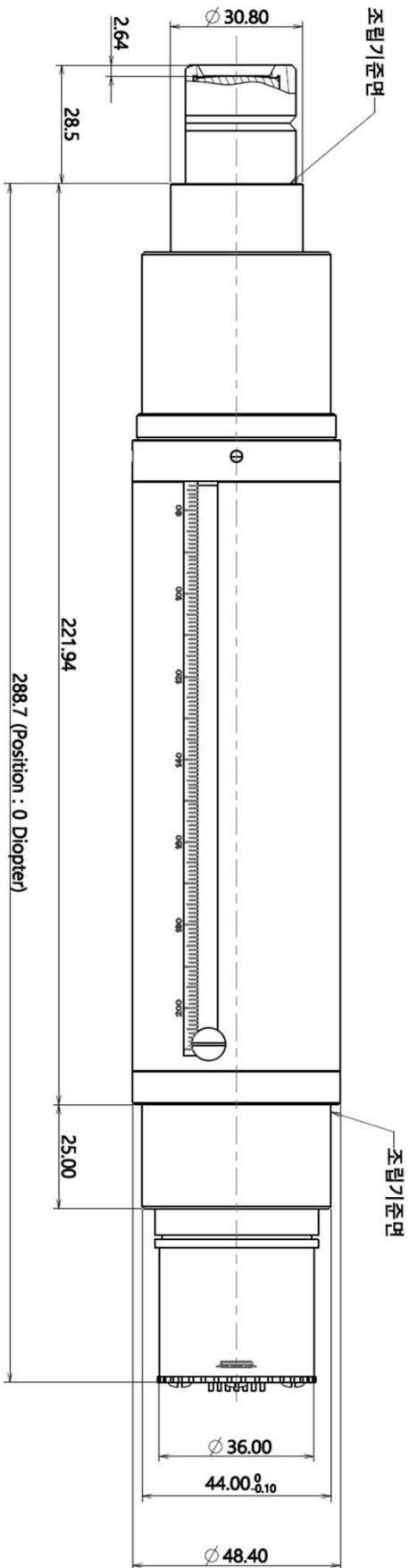
Lighting Section : Chart Module (BLU + Chart)

Collimator Lens Section : Collimator Lens (CL-1120IR), Diopter Variable Barrel (0.0D ~ 2.0D)

CM-1120IR Pictures



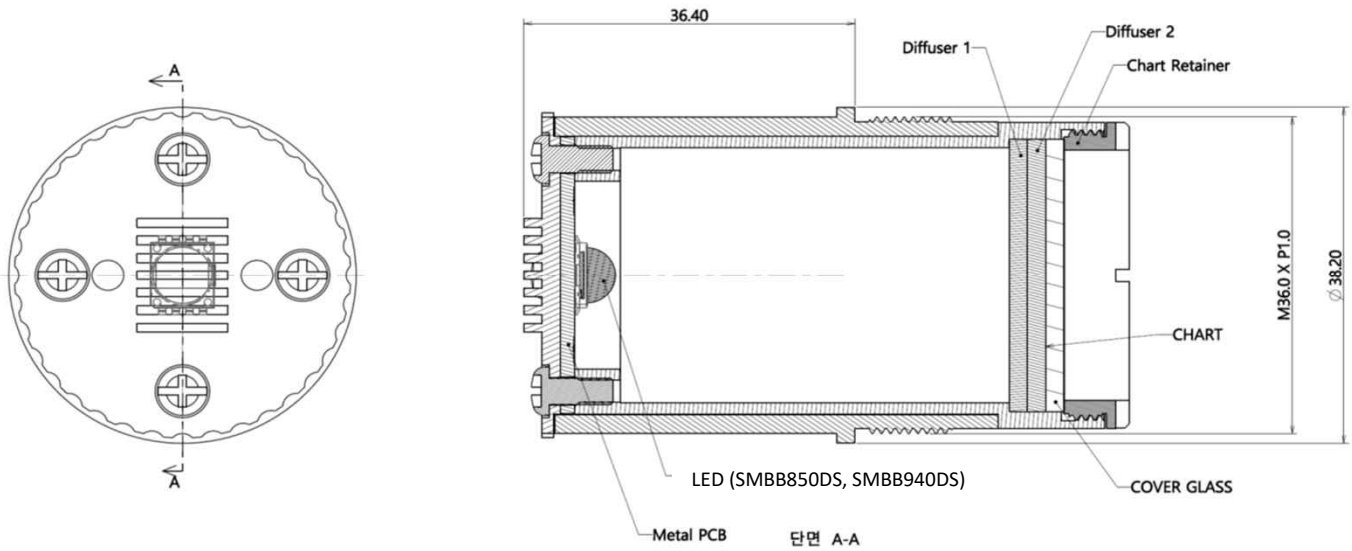
CM-1120IR Drawings



Diopter	Gradation	
	850nm	940nm
0 D	207.67	208.68
0.25 D	182.8	183.64
0.50 D	161.42	162.13
1.0 D	126.59	127.09
1.5 D	99.44	99.81
2.0 D	77.6	77.88

Weight 0.57kg

Lighting Section



LED Specification

SMBB850DS



Absolute Maximum Ratings (Tc=25°C)

Item	Symbol	Ratings	Unit
Power Dissipation	P _D	4200	mW
Forward Current	I _F	1000	mA
Pulse Forward Current	I _{FP}	(5000)	mA
Reverse Voltage	V _R	5	V
Thermal Resistance	R _{thja}	10	K/W
Junction Temperature	T _J	120	°C
Operating Temperature	T _{opr}	-40 ~ +100	°C
Storage Temperature	T _{stg}	-40 ~ +100	°C
Soldering Temperature	T _{SOL}	250	°C

‡Pulse Forward Current condition : Duty 1% and Pulse Width=10us.

‡Soldering condition : Soldering condition must be completed with 5 seconds at 250°C

Optical and Electrical Characteristics (Tc=25°C)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage	V _F		3.2	(4.2)	V	I _F =1A
	V _{FP}		4.0			I _{FP} =3A
Total Radiated Power	P _O		1400		mW	I _F =1A
			3700			I _{FP} =3A
Radiant Intensity	I _E		460		mW/sr	I _F =1A
			1200			I _{FP} =3A
Peak Wavelength	λ _p	840		860	nm	I _F =1A
Half Width	Δλ		33		nm	I _F =1A
Viewing Half Angle	θ _{1/2}		±64		deg.	I _F =100mA
Rise Time	t _r		30		ns	I _F =1A
Fall Time	t _f		30		ns	I _F =1A

‡ Radiated Power is measured by S3584-08.

‡ Radiant Intensity is measured by CIE127-2007 Condition B.

SMBB940DS

Absolute Maximum Ratings (Tc=25°C)

Item	Symbol	Ratings	Unit
Power Dissipation	PD	3800	mW
Forward Current	IF	1000	mA
Pulse Forward Current	IFP	(5000)	mA
Reverse Voltage	VR	5	V
Thermal Resistance	Rthja	10	K/W
Junction Temperature	Tj	120	°C
Operating Temperature	Topr	-40 ~ +100	°C
Storage Temperature	Tstg	-40 ~ +100	°C
Soldering Temperature	TSOL	250	°C

‡Pulse Forward Current condition : Duty 1% and Pulse Width=10us.

‡Soldering condition : Soldering condition must be completed with 5 seconds at 250°C

Optical and Electrical Characteristics (Tc=25°C)

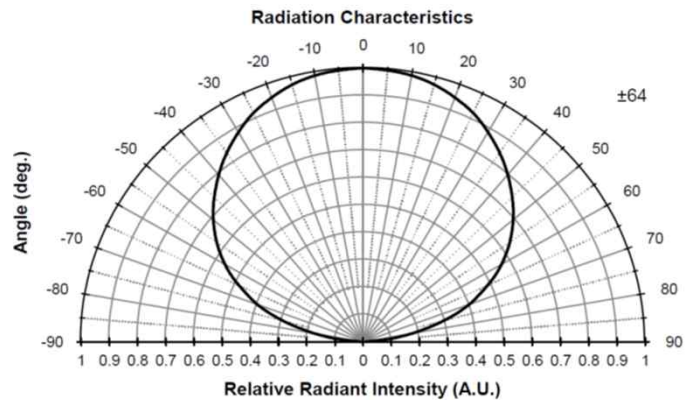
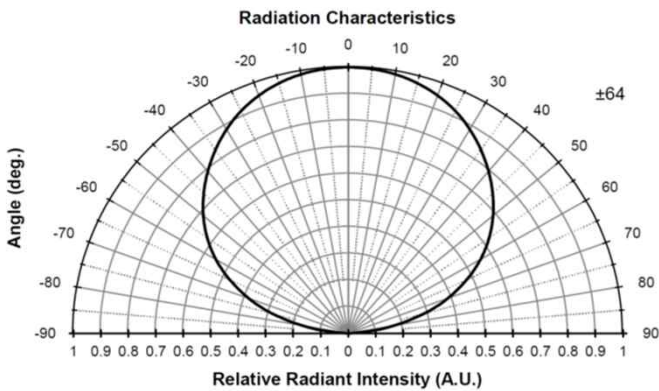
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage	Vf		3.0	(3.8)	V	IF=1A
	VFP		3.7			IFP=3A
Total Radiated Power	Po		1300		mW	IF=1A
			3100			IFP=3A
Radiant Intensity	IE		430		mW/sr	IF=1A
			1000			IFP=3A
Peak Wavelength	λ_p	930		950	nm	IF=1A
Half Width	$\Delta\lambda$		47		nm	IF=1A
Viewing Half Angle	$\theta_{1/2}$		± 64		deg.	IF=100mA
Rise Time	tr		10		ns	IF=1A
Fall Time	tf		15		ns	IF=1A

‡ Radiated Power is measured by S3584-08.

‡ Radiant Intensity is measured by CIE127-2007 Condition B.

SMBB850DS

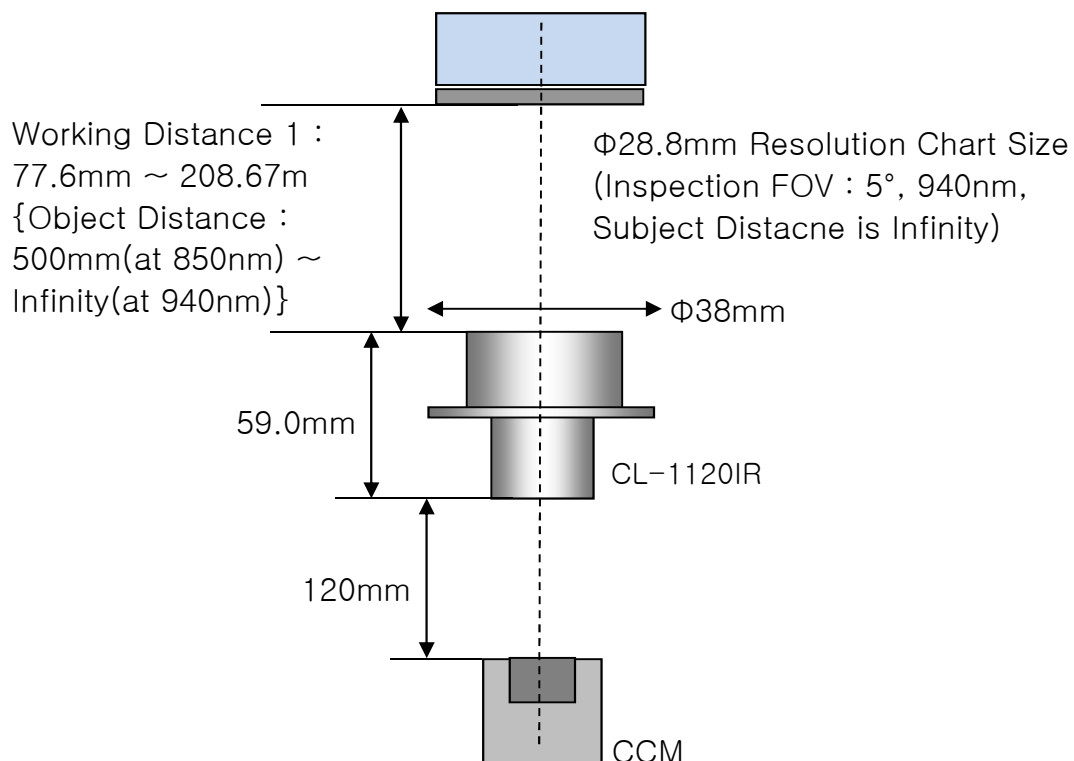
SMBB940DS



CL-1120IR Collimator Lens Specification

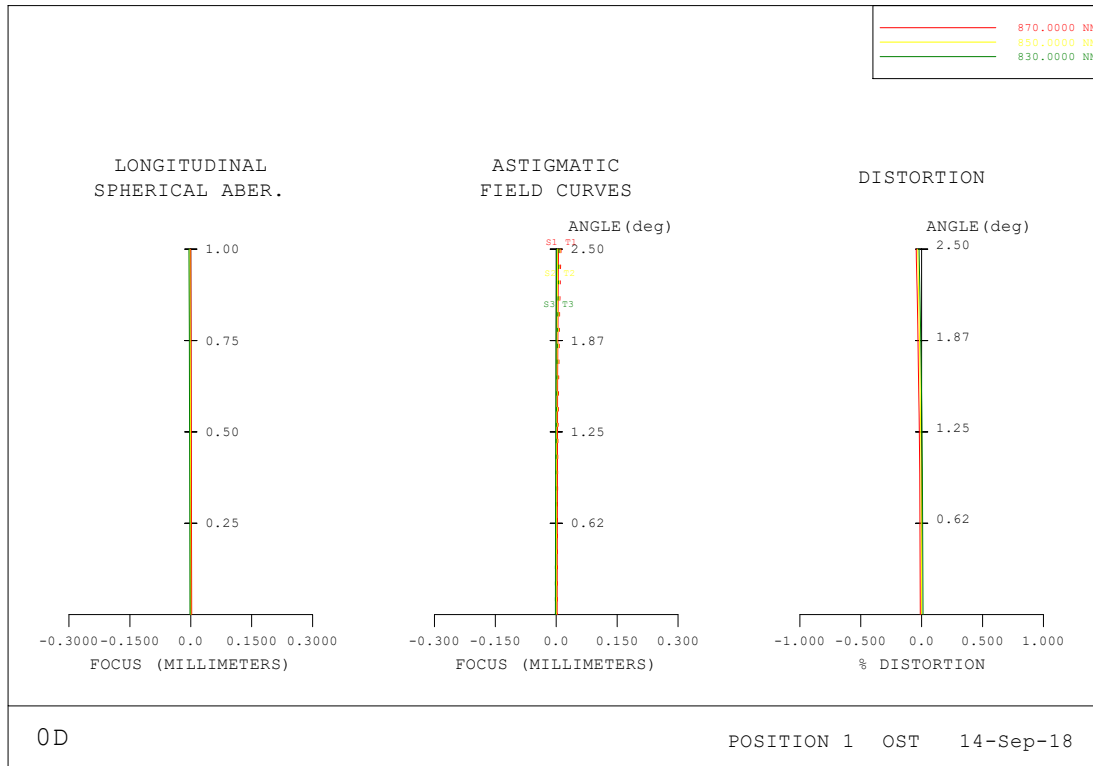
Model name	CL-1120IR (Designed by OneStone) Collimator lens of CM-1120IR
Characteristic of CL-1120IR	Inspection of only a specific 5 degree section of the full angle of the full angle of view of the camera lens.
Construction of CL-1120IR	4 Glass lenses
EFL	328.1mm(at 850nm), 329.3mm(at 940nm)
Inspectable FOV of CCM	5°
Ass'y Size	Φ38mm X L59mm
Exit Pupil Size	Φ4.5mm
Exit Pupil Position	120.0mm (Distance from camera lens to CL)
Working Distance (from CL 1st Lens R1 surface to chart)	207.7mm(at 850nm), 208.7mm(at 940nm) at Object Distance Infinity Chart Size : Φ28.7mm(at 850nm), Φ28.8mm(at 940nm)

Schematic of CL-1120IR

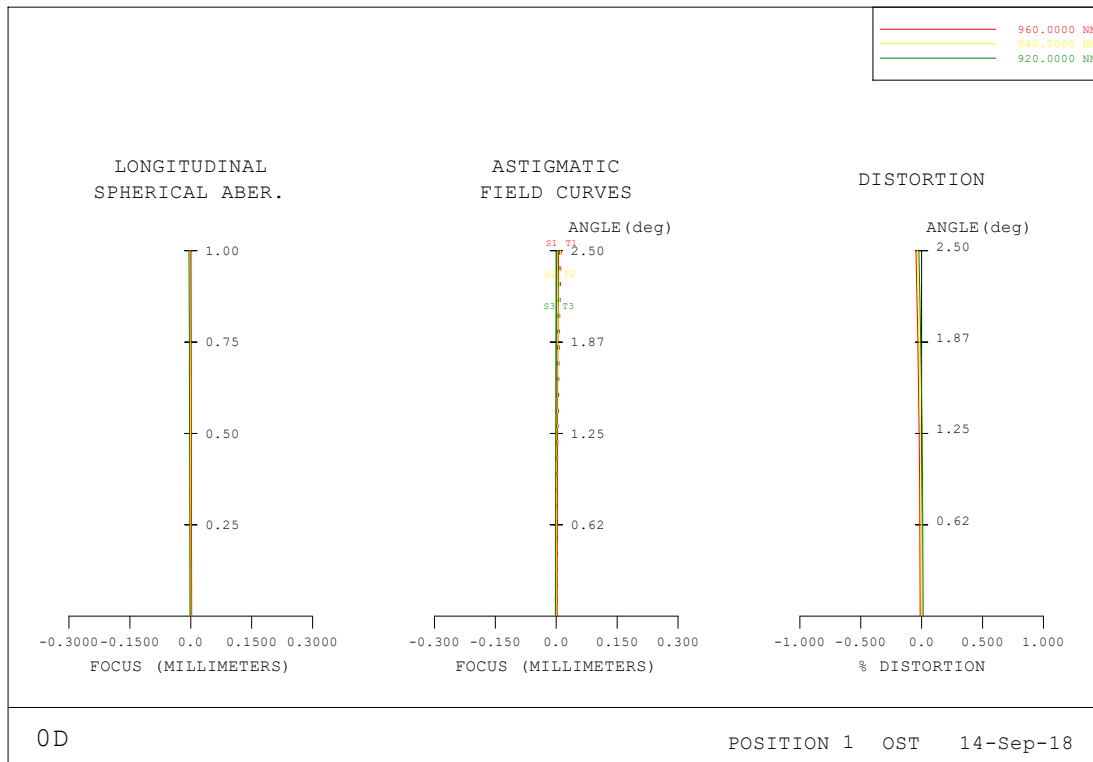


Optical Performance of CL-1120IR (Scale 0.3 0.3 1.0)

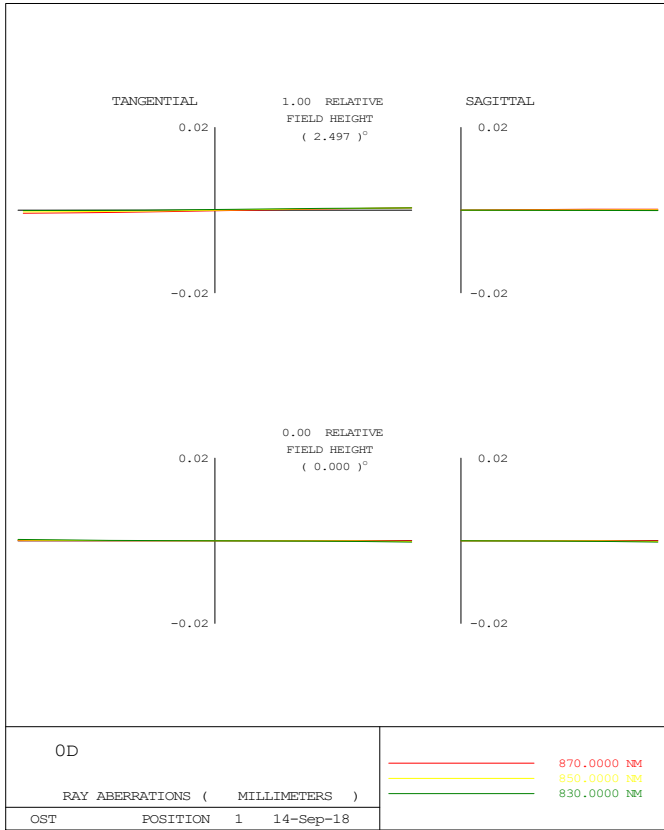
Infinity (at 850nm)



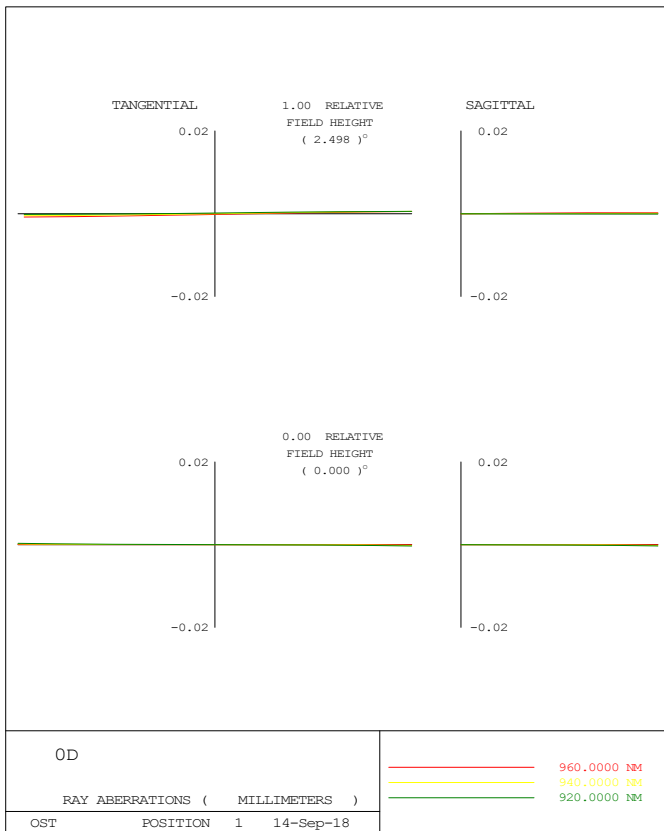
Infinity (at 940nm)



Optical Performance of CL-1120IR (Scale ± 0.01)



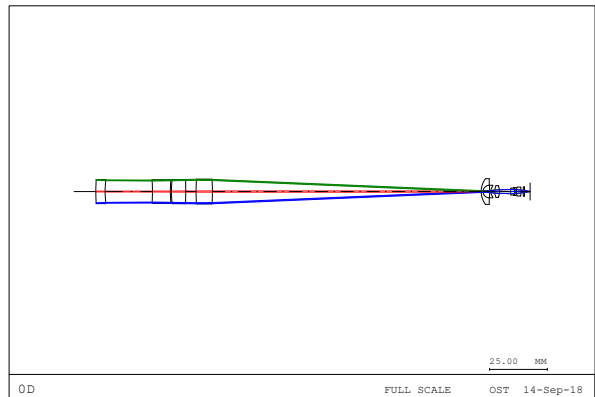
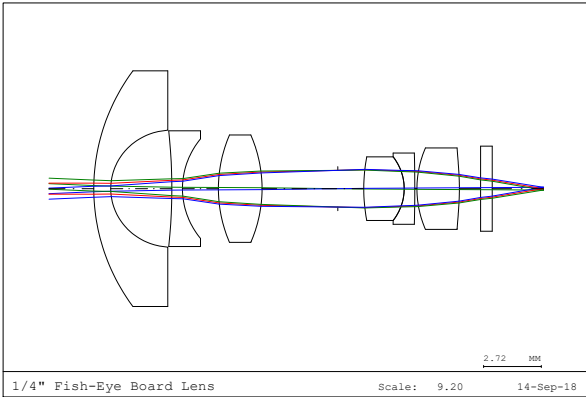
Infinity (at 850nm)



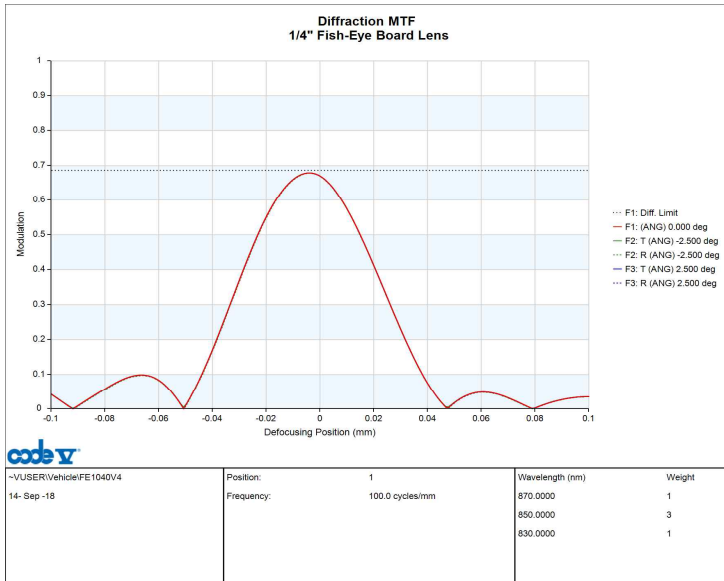
Infinity (at 940nm)

MTF Analysis for FOV 180° Lens of A-Company (at 850nm)

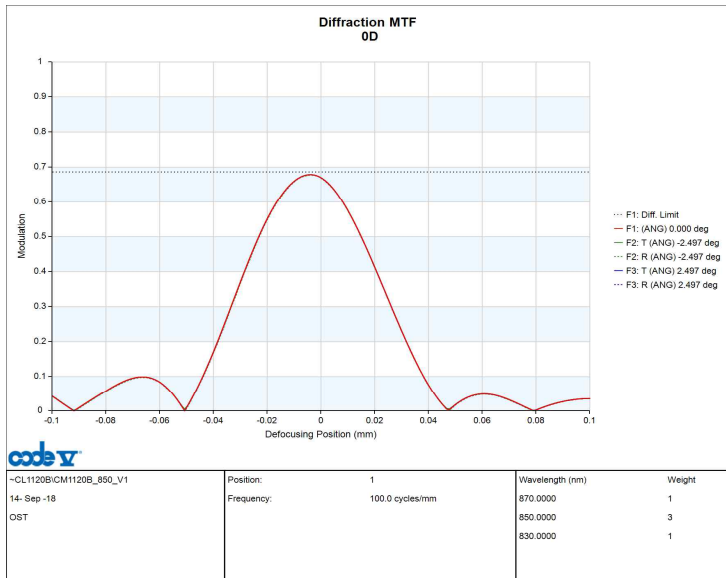
0 degree



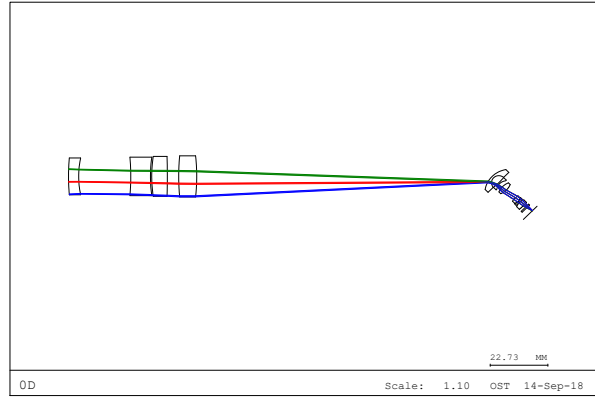
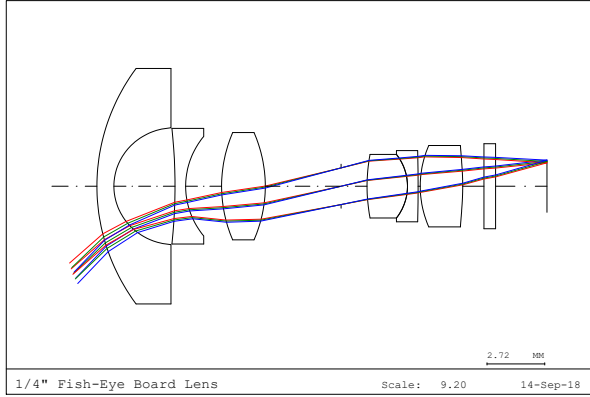
Only Camera Lens



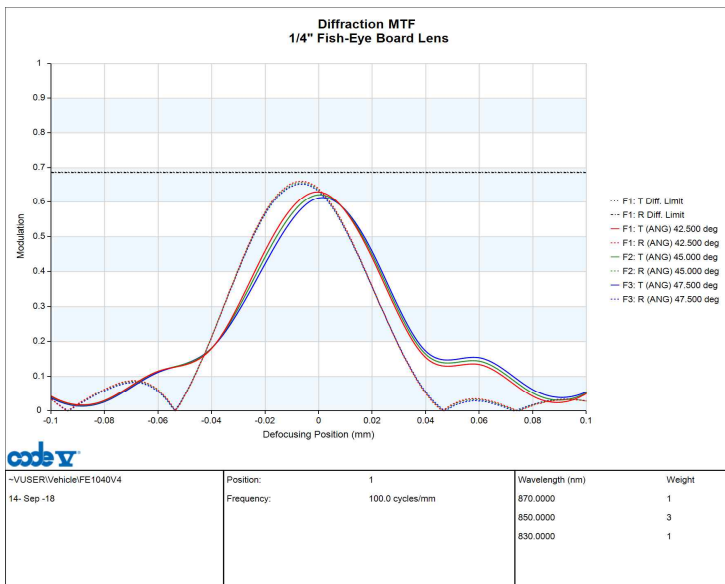
CL-1120IR + Camera Lens



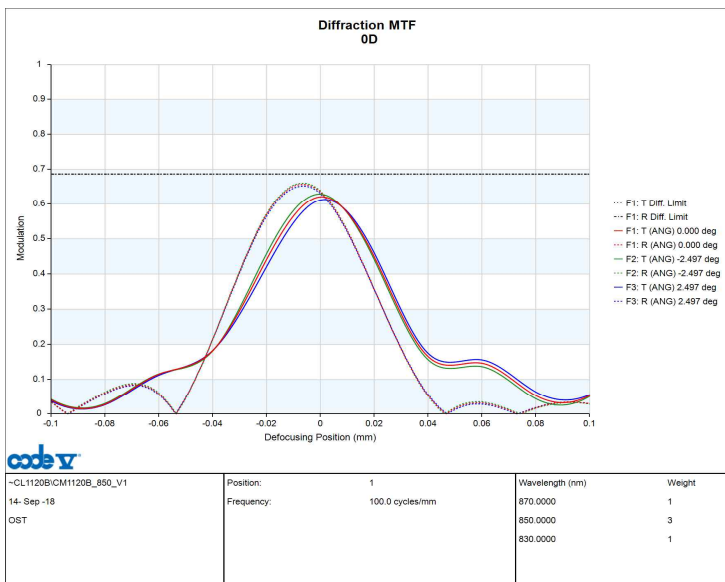
90 degree



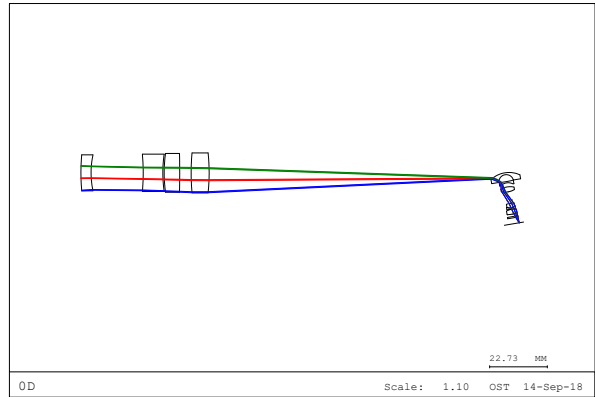
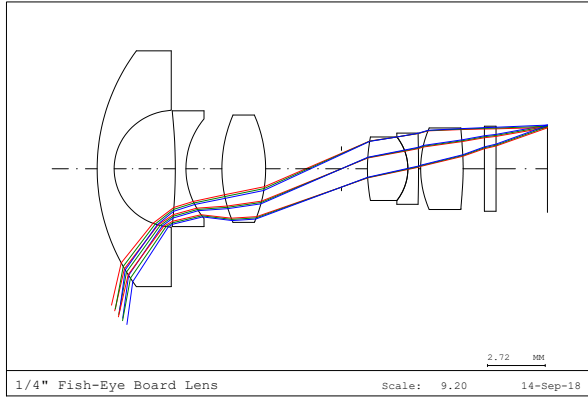
Only Camera Lens



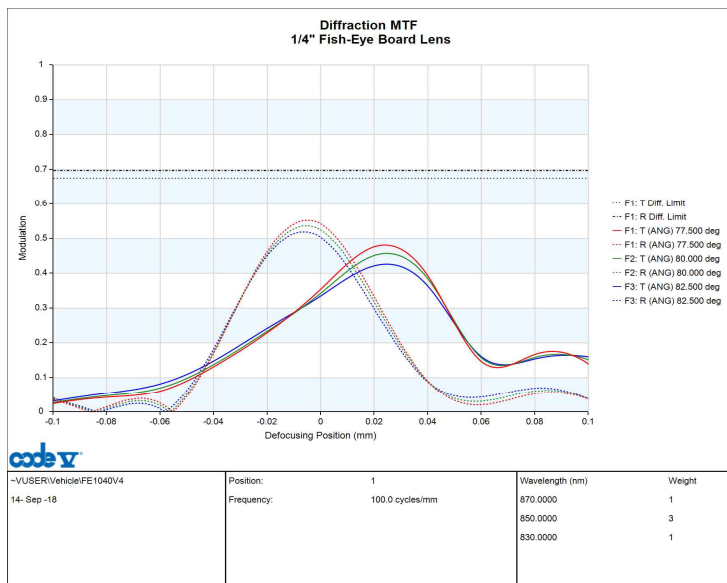
CL-1120IR + Camera Lens



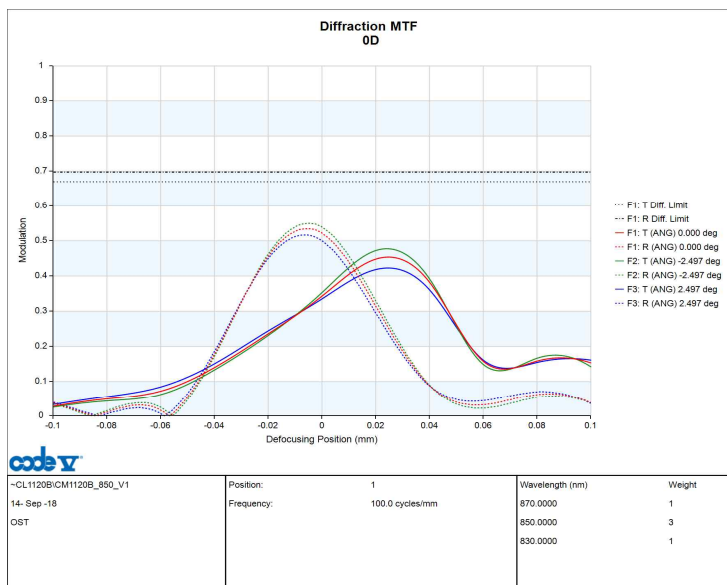
160 degree



Only Camera Lens



CL-1120IR + Camera Lens



The Chart Size of CL-1120IR (FOV=5.0°, 850nm)

Object Distance : Real shooting distance with camera

Working Distance : Distance from 1st Lens R1 vertex of CL to chart.

※ This table is based on the FOV of camera lens.

PCM Module	
FOV	5

Object Distance (Object ~ PCM)	Working Distance (Chart ~ Relay Lens)	Chart Size (Φ, mm)	Diopter
1.00E+100	207.67	28.66	0.00D
10000	199.60	27.96	0.08D
8000	198.94	27.90	0.08D
6000	198.17	27.83	0.09D
5000	197.25	27.75	0.10D
4500	187.47	26.90	0.20D
4000	182.80	26.49	0.25D
3500	179.55	26.21	0.29D
3000	175.32	25.84	0.33D
2800	173.25	25.66	0.36D
2600	170.90	25.45	0.38D
2400	168.21	25.22	0.42D
2200	165.08	24.95	0.45D
2000	161.42	24.63	0.50D
1800	157.08	24.25	0.56D
1600	151.83	23.79	0.63D
1400	145.36	23.23	0.71D
1300	141.53	22.89	0.77D
1200	137.20	22.52	0.83D
1100	132.27	22.09	0.91D
1000	126.59	21.59	1.00D
900	119.98	21.01	1.11D
800	112.21	20.34	1.25D
667	99.44	19.22	1.50D
600	91.62	18.54	1.67D
500	77.60	17.32	2.00D

The Chart Size of CL-1120IR (FOV=5.0°, 940nm)

Object Distance : Real shooting distance with camera

Working Distance : Distance from 1st Lens R1 vertex of CL to chart.

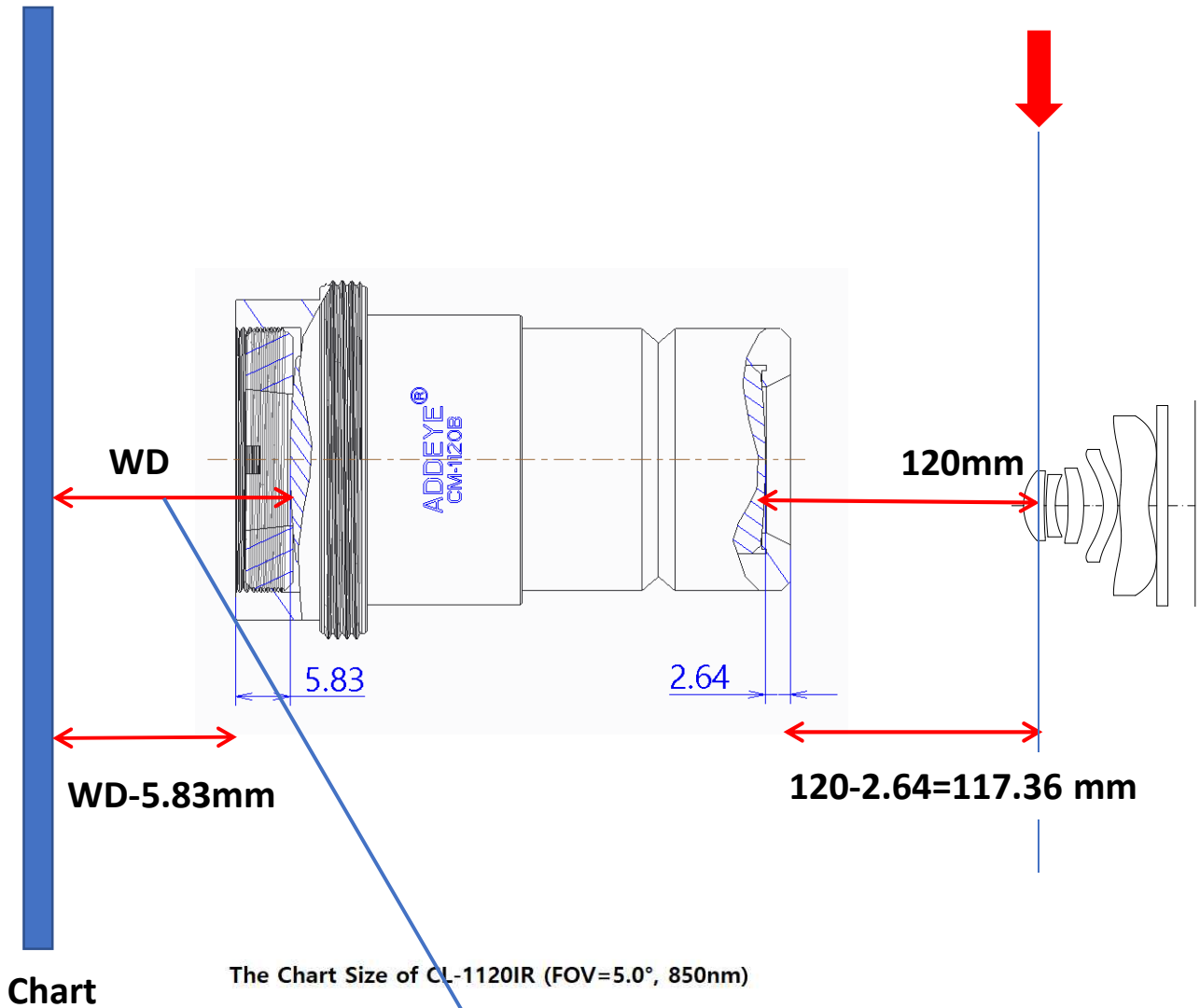
※ **This table is based on the FOV of camera lens.**

PCM Module	
FOV	5

Object Distance	Working Distance	Chart Size (Φ, mm)	Diopter
1.00E+100	208.68	28.77	0.00D
10000	200.55	28.06	0.08D
8000	199.89	28.00	0.08D
6000	199.11	27.93	0.09D
5000	198.19	27.85	0.10D
4500	188.34	26.99	0.20D
4000	183.64	26.58	0.25D
3500	180.37	26.30	0.29D
3000	176.11	25.93	0.33D
2800	174.03	25.74	0.36D
2600	171.67	25.54	0.38D
2400	168.95	25.30	0.42D
2200	165.81	25.03	0.45D
2000	162.13	24.71	0.50D
1800	157.75	24.32	0.56D
1600	152.47	23.86	0.63D
1400	145.97	23.30	0.71D
1300	142.12	22.96	0.77D
1200	137.77	22.58	0.83D
1100	132.80	22.15	0.91D
1000	127.09	21.65	1.00D
900	120.45	21.07	1.11D
800	112.64	20.39	1.25D
667	99.81	19.27	1.50D
600	91.96	18.58	1.67D
500	77.88	17.35	2.00D

How to set Collimator Lens

The entrance pupil position(EPP) of Camera module lens.
(Not necessarily the same EPP and 1st lens vertex of CM lens)



The Chart Size of CL-1120IR (FOV=5.0°, 850nm)

Object Distance : Real shooting distance with camera

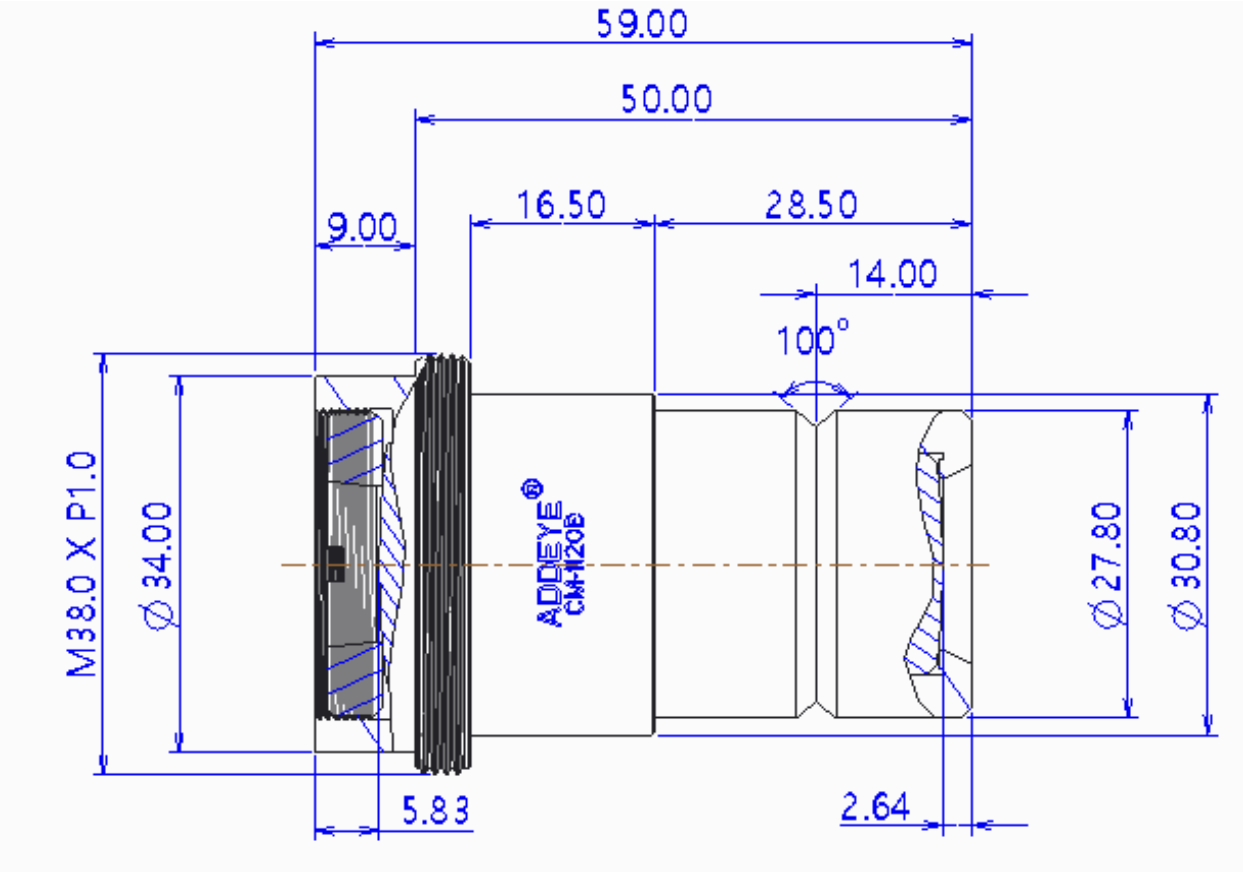
Working Distance : Distance from 1st Lens R1 vertex of CL to chart.

※ This table is based on the FOV of camera lens.

PCM Module	
FOV	5

Object Distance (Object ~ PCM)	Working Distance (Chart ~ Relay Lens)	Chart Size (Φ, mm)	Diopter
1.00E+100	207.67	28.66	0.00D
10000	199.60	27.96	0.08D
8000	198.94	27.90	0.08D
6000	198.17	27.83	0.09D
5000	197.25	27.75	0.10D

CL-1120IR Drawings



CL-1120IR Picture

