

## Magnification and size

Mag. (x)	IF (mm)	WD (mm)	Field of View			Model name
			H	V	D	
0.035	11	470	248	186	310	MTL-31011C-004
0.041	11	540	213	159	266	MTL-26511C-004
0.046	11	375	192	144	240	MTL-24011C-005
0.056	11	365	156	117	195	MTL-19511C-006
0.060	18.5	470	237	174	294	MTL-31018C-006
0.061	11	350	144	108	180	MTL-18011C-006
0.070	18.5	540	203	149	251	MTL-26518C-007
0.073	11	300	120	90	150	MTL-15011C-007
0.074	23	470	249	186	311	MTL-31023P-007
0.077	18.5	375	183	134	227	MTL-24018C-008
0.081	11	260	108	81	135	MTL-13511C-008
0.087	23	540	213	160	266	MTL-26523P-009
0.092	11	255	96	72	120	MTL-12011C-009
0.095	18.5	365	149	109	185	MTL-19518C-009
0.096	23	375	192	144	240	MTL-24023P-010
0.103	18.5	350	137	101	170	MTL-18018C-010
0.110	11	220	80	60	100	MTL-10011C-011
0.113	35	470	204	204	288	MTL-31035P-011
0.118	23	365	156	117	195	MTL-19523P-012
0.122	11	120	72	54	90	MTL-9011C-012
0.123	18.5	300	115	84	142	MTL-15018C-012
0.128	23	350	144	108	180	MTL-18023P-013
0.132	35	540	175	175	247	MTL-26535P-013
0.137	18.5	260	103	75	128	MTL-13518C-014
0.140	43.5	470	258	172	310	MTL-31043M58-014
0.146	35	375	158	158	223	MTL-24035P-015
0.153	23	300	120	90	150	MTL-15023P-015
0.154	18.5	255	92	67	114	MTL-12018C-015
0.164	43.5	540	221	147	265	MTL-26543M58-016
0.170	23	260	108	81	135	MTL-13523P-017
0.180	35	365	128	128	181	MTL-19535P-018
0.182	43.5	375	199	133	239	MTL-24043M58-018
0.185	18.5	220	76	56	95	MTL-10018C-019
0.185	57.3	470	263	157	306	MTL-31057V74-019
0.192	23	255	96	72	120	MTL-12023P-019
0.195	35	350	118	118	167	MTL-18035P-019
0.206	18.5	120	69	50	85	MTL-9018C-021
0.216	57.3	540	225	134	262	MTL-26557V74-022
0.223	43.5	365	162	108	195	MTL-19543M58-022
0.228	18.5	165	62	45	77	MTL-8018C-023
0.230	23	220	80	60	100	MTL-10023P-023
0.233	35	300	99	99	140	MTL-15035P-023
0.240	57.3	375	203	121	237	MTL-24057V74-024
0.242	43.5	350	149	100	180	MTL-18043M58-024
0.256	23	120	72	54	90	MTL-9023P-026
0.260	35	260	89	89	125	MTL-13535P-026
0.268	82	470	-	-	306	MTL-31082M95-026
0.284	23	165	65	49	81	MTL-8023P-029
0.285	18.5	135	50	36	61	MTL-6518C-029
0.290	43.5	300	125	83	150	MTL-15043M58-029

Mag. (x)	IF (mm)	WD (mm)	Field of View			Model name
			H	V	D	
0.292	35	255	79	79	112	MTL-12035P-029
0.294	57.3	365	166	99	193	MTL-19557V74-029
0.313	82	540	-	-	262	MTL-26582M95-031
0.319	57.3	350	153	91	178	MTL-18057V74-032
0.322	43.5	260	112	75	135	MTL-13543M58-032
0.335	18.5	135	42	31	52	MTL-5518C-034
0.347	82	375	-	-	236	MTL-24082M95-034
0.351	35	220	66	66	93	MTL-10035P-035
0.354	23	135	52	39	65	MTL-6523P-035
0.362	43.5	255	100	67	120	MTL-12043M58-036
0.382	57.3	300	127	76	148	MTL-15057V74-038
0.390	35	120	59	59	84	MTL-9035P-039
0.410	18.5	110	34	25	43	MTL-4518C-041
0.417	23	135	44	33	55	MTL-5523P-042
0.425	57.3	260	114	68	133	MTL-13557V74-043
0.426	82	365	-	-	192	MTL-19582M95-042
0.433	35	165	53	53	75	MTL-8035P-044
0.435	43.5	220	83	55	100	MTL-10043M58-044
0.462	82	350	-	-	177	MTL-18082M95-046
0.478	57.3	255	102	61	119	MTL-12057V74-048
0.484	43.5	120	75	50	90	MTL-9043M58-048
0.509	23	110	36	27	45	MTL-4523P-051
0.527	18.5	95	27	20	33	MTL-3518C-053
0.537	43.5	165	67	45	81	MTL-8043M58-054
0.540	35	135	43	43	60	MTL-6535P-054
0.553	82	300	-	-	148	MTL-15082M95-055
0.574	57.3	220	85	51	99	MTL-10057V74-057
0.615	82	260	-	-	133	MTL-13582M95-061
0.635	35	135	36	36	51	MTL-5535P-064
0.638	57.3	120	76	46	89	MTL-9057V74-064
0.655	23	95	28	21	35	MTL-3523P-066
0.670	43.5	135	54	36	65	MTL-6543M58-067
0.692	82	255	-	-	118	MTL-12082M95-068
0.709	57.3	165	69	41	80	MTL-8057V74-072
0.776	35	110	30	30	42	MTL-4535P-078
0.788	43.5	135	46	31	55	MTL-5543M58-079
0.831	82	220	-	-	99	MTL-10082M95-082
0.884	57.3	135	55	33	64	MTL-6557V74-088
0.923	82	120	-	-	89	MTL-9082M95-091
0.964	43.5	110	38	25	45	MTL-4543M58-096
0.999	35	95	23	23	33	MTL-3535P-100
1.026	82	165	-	-	80	MTL-8082M95-103
1.040	57.3	135	47	28	55	MTL-5557V74-104
1.240	43.5	95	29	19	35	MTL-3543M58-124
1.272	57.3	110	38	23	45	MTL-4557V74-127
1.279	82	135	-	-	64	MTL-6582M95-126
1.505	82	135	-	-	54	MTL-5582M95-149
1.636	57.3	95	30	18	35	MTL-3557V74-164
1.840	82	110	-	-	45	MTL-4582M95-182

# MORITEX

Vision Creating Value

Bi Telecentric Lenses  
and Telecentric Illuminators

MTL Series  
MTI Series

Bi-Telecentric Lenses and Telecentric Illuminators

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# MORITEX

Vision Creating Value

# Bi-Telecentric Lenses

- **99** types of bi - telecentric lenses
- **13** types of parallel beam back lights

## Bi-Telecentric Lenses MTL Series

Bi-telecentric lens offered by MORITEX is cutting-edge products designed with technology proven by legacy telecentric lens.

Our bi-telecentric lens has wide range of selection and is capable of fitting to many cameras available in the market, and shows the best fit to wide range of precise measurement application.

Our unique optical design capabilities result in the tightest object and image side telecentricity in the market and enable near-zero distortion performance with the highest resolution from the center to the edge along the system FOV.

This enables an optimized measurement condition for the highest accuracy that can be easily achieved by coupling these lenses with matched telecentric backlight illuminators.

- High resolution design Designed for 3.5  $\mu$ m/pixel sensor

- Offering **15** FOVs

35mm, 45mm, 55mm, 65mm, 80mm, 90mm, 100mm, 120mm  
135mm, 150mm, 180mm, 195mm, 240mm, 265mm, 310mm

- Supporting **7** different sensor sizes Maximum sensor size 82mm

- Inspection report provided for each unit, proving that MORITEX achieves the best performance







## Telecentric Illuminators

# MTI Series



Large area telecentric illuminator for silhouette inspection, provides optimized parallel beam to best match the MTL Series.

### Straight type

LINEUP			
<b>MTI-45</b>	Lighting Area	φ45mm	
<b>MTI-65</b>	Lighting Area	φ65mm	
<b>MTI-100</b>	Lighting Area	φ100mm	
<b>MTI-120</b>	Lighting Area	φ120mm	
<b>MTI-135</b>	Lighting Area	φ135mm	
<b>MTI-150</b>	Lighting Area	φ150mm	
<b>MTI-180</b>	Lighting Area	φ180mm	
<b>MTI-195</b>	Lighting Area	φ195mm	
<b>MTI-265</b>	Lighting Area	φ265mm	

### L shape type

LINEUP			
<b>MTI-45-L</b>	Lighting Area	φ45mm	
<b>MTI-65-L</b>	Lighting Area	φ65mm	
<b>MTI-100-L</b>	Lighting Area	φ100mm	
<b>MTI-120-L</b>	Lighting Area	φ120mm	



Model Description

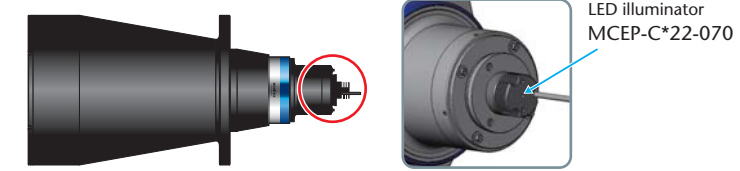
**MTI - 45 - C G - 070**  
 Lighting Area 45mm Color Green

Model name	Color	Optical specifications		Mechanical specifications		
		Lighting Area (φmm)	WD (mm)	Length *1 (mm)	Front Outer dia. (φmm)	Weight (kg)
<b>MTI-45-CG-070</b>	● Green	45	115	148.4	65	0.58
<b>MTI-45-CW-070</b>	○ White	45	115	156.4	65	0.58
<b>MTI-45-CG-070-L</b>	● Green	45	115	100 x 90 x 128.4	65	0.7
<b>MTI-65-CG-070</b>	● Green	65	140	169	86	0.76
<b>MTI-65-CW-070</b>	○ White	65	140	177	86	0.76
<b>MTI-65-CG-070-L</b>	● Green	65	140	120 x 107 x 141	86	1.1
<b>MTI-100-CG-070</b>	● Green	100	220	279	125	1.7
<b>MTI-100-CW-070</b>	○ White	100	220	287	125	1.7
<b>MTI-100-CG-070-L</b>	● Green	100	59.5	160 x 128.9 x 230.1	124	2.6
<b>MTI-120-CG-070</b>	● Green	120	175	292.9	160	3.6
<b>MTI-120-CW-070</b>	○ White	120	175	300.9	160	3.6
<b>MTI-120-CG-070-L</b>	● Green	120	175	200 x 166.6 x 256.4	160	6.1
<b>MTI-135-CG-070</b>	● Green	135	260	360.9	160	3.5
<b>MTI-135-CW-070</b>	○ White	135	260	368.9	160	3.5
<b>MTI-150-CG-070</b>	● Green	150	300	391.4	180	4.5
<b>MTI-150-CW-070</b>	○ White	150	300	399.4	180	4.5
<b>MTI-180-CG-070</b>	● Green	180	350	444.3	210	7.1
<b>MTI-180-CW-070</b>	○ White	180	350	452.3	210	7.1
<b>MTI-195-CG-070</b>	● Green	195	365	488.3	230	7.9
<b>MTI-195-CW-070</b>	○ White	195	365	496.3	230	7.9
<b>MTI-265-CG-070</b>	● Green	265	540	672.3	300	15.1
<b>MTI-265-CW-070</b>	○ White	265	540	680.3	300	15.1

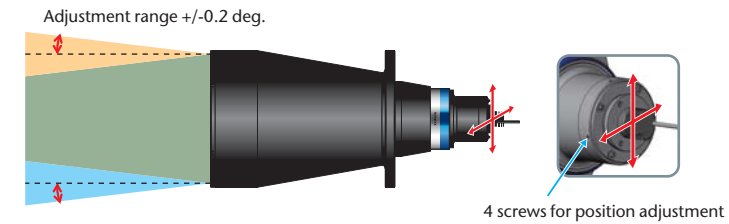
Maximum rated current is 700mA and electrical power consumption is 3W. Recommended controller is MLEP-B070W Series. Blue color and red color is production on demand basis. Constant voltage operation type is available on your request. \*1 Lens tube length includes LED illumination unit, and adjustable length allowance is 2.5mm maximum depends on LED.

### Beam angle adjustment function

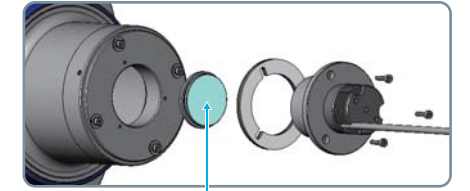
The telecentric illuminators for the bi-telecentric lenses have a beam angle adjustment function so that the beam angle can be fine tuned when the LED lamp is replaced. This enables optimum position adjustment.



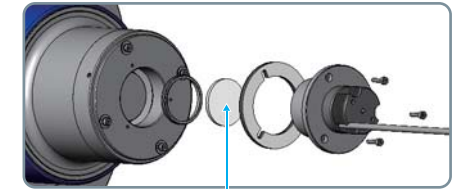
Utilizes the special features of a telecentric lens to make it possible to adjust beam angle irradiation by up to 0.2 degrees by changing the position of the LED element.



### Filter insertion function

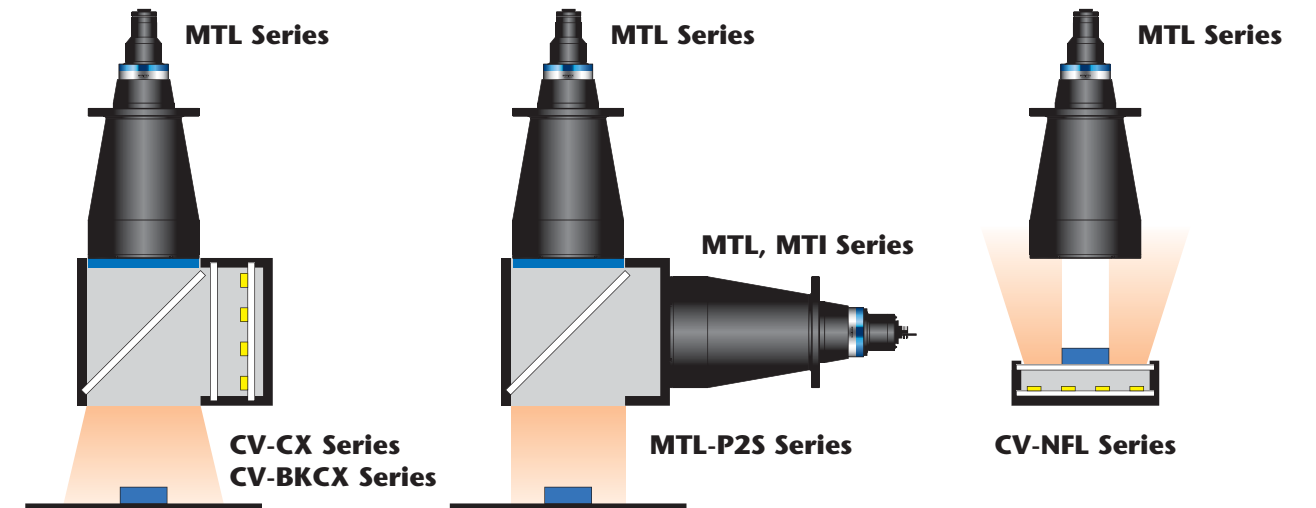


Compatible with most ND filters, color filters and edge filters sold in stores, etc.(M25.5xP0.75)



Achieve even more uniform images by inserting a diffuser. (Non white light illumination MTI\*\*\*-CW-070 available as an optional product) \*Some measurement accuracy will be affected. Contact us if you would like to use a diffuser.

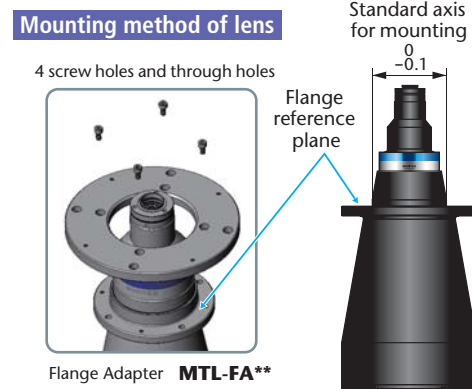
### Other illuminators



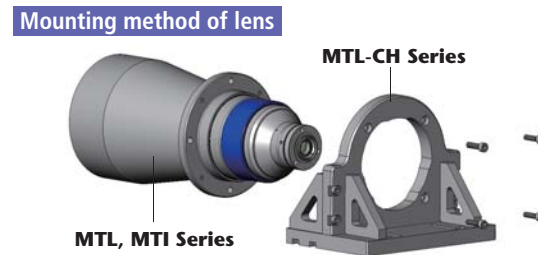
FOV Type	Model name		
	★ Simulated Coaxial Box illumination	★ Half Mirror Unit	★ Narrow Back Light
35	<b>CV-CX-94X60X58</b> □	<b>MTL-P2S45</b> *1	<b>CV-NFL-51X51</b> □
45	<b>CV-CX-120X84X79</b> □	<b>MTL-P2S45</b> *2	<b>CV-NFL-51X51</b> □
55	<b>CV-CX-120X84X79</b> □	<b>MTL-P2S65</b> *3	<b>CV-NFL-63X60</b> □
65	<b>CV-CX-120X84X79</b> □	<b>MTL-P2S65</b>	<b>CV-NFL-63X60</b> □
80	<b>CV-BKCX-100</b> □-B	<b>MTL-P2S100</b>	<b>CV-NFL-83X75</b> □
90	—	—	<b>CV-NFL-100X96</b> □
100	<b>CV-BKCX-100</b> □-B	<b>MTL-P2S100</b>	<b>CV-NFL-100X96</b> □
120	<b>CV-BKCX-135</b> □-B	<b>MTL-P2S135</b>	<b>CV-NFL-150X146</b> □
135	<b>CV-BKCX-135</b> □-B	<b>MTL-P2S135</b>	<b>CV-NFL-150X146</b> □
150	<b>CV-BKCX-195</b> □-B	<b>MTL-P2S150</b>	<b>CV-NFL-150X146</b> □
180	<b>CV-BKCX-195</b> □-B	<b>MTL-P2S195</b>	<b>CV-NFL-230X230</b> □
195	<b>CV-BKCX-195</b> □-B	<b>MTL-P2S195</b>	<b>CV-NFL-230X230</b> □
240	—	—	<b>CV-NFL-230X230</b> □
265	—	—	—
310	—	—	—

★ Made-to-order products. □ indicates the illumination color. \* Please be noted the resolution may be decreased when to connect with MTL Series. \*1 Connect with MTL-P35-ADR when using MTL-35 Series. \*2 Connect with MTL-P45-ADR when using MTL-45 Series. \*3 Connect with MTL-P55-ADR when using MTL-55 Series.

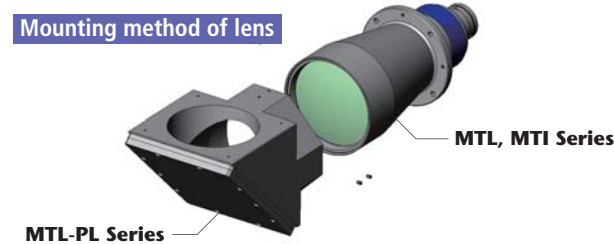
**Flange Adapter**  
MTL-FA Series



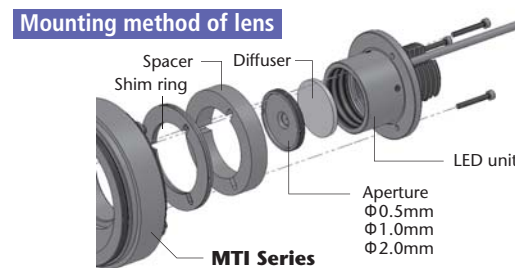
**Clamping Holder**  
MTL-CH Series



**Mirror Unit**  
MTL-PL Series



**Apertures for Lighting**  
MTI-APS



FOV Type	Model name			
	Flange Adapter	Clamping Holder	★Mirror Unit	Apertures for Lighting
35	—	—	MTL-PL45 <sup>*2</sup>	MTI-APS
45	—	—	MTL-PL45 <sup>*3</sup>	
55	—	—	MTL-PL65 <sup>*4</sup>	
65	—	—	MTL-PL65	
80	—	—	MTL-PL80	
90	MTL-FA100 <sup>*1</sup>	MTL-CH100 <sup>*1</sup>	—	
100	MTL-FA100 <sup>*1</sup>	MTL-CH100 <sup>*1</sup>	MTL-PL100	
120	MTL-FA135 <sup>*1</sup>	MTL-CH135 <sup>*1</sup>	MTL-PL135	
135	MTL-FA135 <sup>*1</sup>	MTL-CH135 <sup>*1</sup>	MTL-PL135	
150	MTL-FA150 <sup>*1</sup>	MTL-CH150 <sup>*1</sup>	MTL-PL150	
180	MTL-FA180 <sup>*1</sup>	MTL-CH180 <sup>*1</sup>	MTL-PL180	
195	MTL-FA195	MTL-CH195	MTL-PL195	
240	MTL-FA265	MTL-CH265	MTL-PL265	
265	MTL-FA265	MTL-CH265	MTL-PL265	
310	—	MTL-CH310	—	

★ Made-to-order products.  
\* Please be noted the resolution may be decreased when to connect with MTL Series.  
\*1 Can not be connected with MTL-IF82 Series.  
\*2 Connect with MTL-P35-ADR when using MTL-35 Series.  
\*3 Connect with MTL-P45-ADR when using MTL-45 Series.  
\*4 Connect with MTL-P55-ADR when using MTL-55 Series.

Customizing example

Customizing is available for your specific needs.

**Two FOVs type of lens**  
MTL-W Series (Under development)



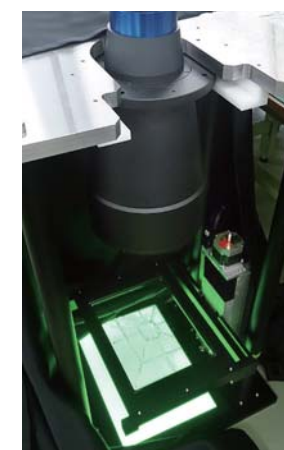
Model name	WD (mm)	IF (mm)	Mag.A	Mag.B
MTL-10011C-012W056	110	11	x0.12	x0.56
MTL-15011C-008W014	200	11	x0.075	x0.141

**Coaxial Illumination type of lens**  
MTL-D Series (Under development)



Model name	
MTL-3518C-053-D	MTL-3543M58-124-D
MTL-4518C-041-D	MTL-4543M58-096-D
MTL-5518C-034-D	MTL-5543M58-079-D
MTL-6518C-029-D	MTL-6543M58-067-D
MTL-8018C-023-D	MTL-8043M58-054-D
MTL-3523P-066-D	MTL-3557V74-164-D
MTL-4523P-051-D	MTL-4557V74-127-D
MTL-5523P-042-D	MTL-5557V74-104-D
MTL-6523P-035-D	MTL-6557V74-088-D
MTL-8023P-029-D	MTL-8057V74-072-D
MTL-3535P-100-D	
MTL-4535P-078-D	
MTL-5535P-064-D	
MTL-6535P-054-D	
MTL-8035P-044-D	

Quality Assurance



Inspection report data provided for every single unit.

- [Lens]
- Telecentricity measurement
  - Distortion measurement
  - MTF measurement

- [Illuminator]
- Parallelism
  - Uniformity testing

• MTF (Modulation Transfer Function) is spatial frequency. It indicates contrast degradation of B/W pattern at 1mm area on image surface when B/W pattern chart with continuously changing spatial frequency and this is a characteristics evaluation method of reproducibility of the contrast. This method provides the quality of image forming and contrast at same time, and inspected area covers from center to the edges.