

CLW Series Lenses

Telecentric Lenses OVERVIEW



Telecentric Lenses Technical Data Overview



Full Frame Bi-Telecentric Lens

Model	Magnification	WD (mm)	Telecentricity (°)	Distortion (%)	DOF (mm)	F#	MTF>0.3(LP/mm)	Mount	Diameter	FOV for different sensor size				
										2K Line Scan 2048x10um	4K Line Scan 4096x7um	8K Line Scan 8192x3.5um	4/3" Area Scan 18.1x13.6mm	Full Frame Area Scan 36x24mm
CLW-MP-1X-150-FF	1.0X	150	0.05	0.045	1.7	F16	60	F	80	20.48	28.67	28.67	18.1x13.6	36x24
CLW-MP-0.8X-150-FF	0.8X	150	0.05	0.05	2.6	F16	63	F	80	25.6	35.83	35.83	22.6x17	45x30
CLW-5MP-0.741-150-FF	0.741X	150	0.05	0.04	2.9	F16	65	F	90	27.64	38.69	38.69	24.3x18.2	48.6x32.4
CLW-5MP-0.641X-150-FF	0.641	150	0.65	0.03	4	F16	65	F	90	31.95	44.73	44.73	28.2x21.2	56.2x37.4
CLW-5MP-0.58X-200-FF	0.58X	200	0.05	0.065	4.8	F16	65	F	112	35.31	49.4	49.4	31x23.3	62.1x41.4
CLW-5MP-0.48X-200-FF	0.48	200	0.05	0.07	7.1	F16	65	F	112	42.67	59.73	59.73	37.71x28.33	75x50
CLW-MP-0.38X-260-FF	0.38X	260	0.04	0.05	11.6	F16	63	F	143	53.89	75.45	75.45	47.63x35.79	94.74x63.16
CLW-MP-0.288X-398-FF	0.288X	398	0.05	0.053	20.2	F16	63	F	206	71.11	99.55	99.55	62.85x47.22	125x83.33
CLW-5MP-0.245X-398-FF	0.245X	398	0.05	0.055	29	F16	65	F	206	83.59	117.02	117.02	73.88x55.51	146.94x97.96
CLW-5MP-0.2X-500-FF	0.2X	500	0.05	0.07	41	F16	65	F	310	102.4	143.35	143.35	90.5x68.	180x120
CLW-5MP-0.16X-410-FF	0.16X	410	0.066	0.095	63.5	F16	65	F	300	128	179.19	179.19	113.13x85	225x150

All lenses mount are available with F-Mount or M58-Mount.

Maximally support to Full-Frame 29 megapixels industrial camera (Diagonal=35mm), or Line Scan camera with sensor length < 44mm.

1" Bi-Telecentric Lens



Model	Coax.	Magnification	WD (mm)	Telecentricity (°)	Distortion (%)	DOF (mm)	F#	MTF>0.3(LP/mm)	Mount(17.26mm)	FOV for different sensor size (mm×mm)	
										2/3" 8.8×6.6	1" 12.8×9.6
CLW-5MP-1.0X-65-H1	N	1.0X	65	0.05	0.08	0.75	F7	>145	C/F	8.8×6.6	12.8×9.6
CLW-5MP-1.0X-65D-H1	Y	1.0X	65	0.05	0.09	0.75	F7	>145	C/F	8.8×6.6	12.8×9.6
CLW-5MP-0.6X-80-H1	N	0.6X	80	0.1	0.017	2.2	F8	>125	C/F	14.7×11	21.3×16
CLW-5MP-0.5X-65-H1	N	0.5X	65	0.07	0.02	2.54	F6	>150	C/F	17.6×13.2	25.6×19.2
CLW-5MP-0.5X-65D-H1	Y	0.5X	65	0.07	0.03	2.54	F6	>150	C/F	17.6×13.2	25.6×19.2
CLW-5MP-0.4X-110-H1	N	0.4X	110	0.1	0.085	5.2	F8	>120	C/F	22×16.5	32×24
CLW-5MP-0.4X-110D-H1	Y	0.4X	110	0.1	0.08	5.25	F8	>120	C/F	22×16.5	32×24
CLW-5MP-0.3X-200-H1	N	0.3X	200	0.1	0.045	9.2	F8	>120	C/F	29.3×22	42.7×32
CLW-5MP-0.275X-200-H1	N	0.275X	200	0.1	0.05	26	F8	>135	C/F	32×24	46.5×34.9
CLW-5MP-0.15X-250-H1	N	0.15X	250	0.061	0.023	37.8	F8	>130	C/F	58.7×44	83.3×64
CLW-5MP-0.06X-410-H1	N	0.06X	410	0.066	0.11	314.8	F12	>851	C/F	146.7×110	213.3×160

The listed lens F# data is designed maximum F#, it can be decreased to increase DOF (depth of focus) if customer requires

2/3" Bi-Telecentric/Telecentric Lens



Model	Coax.	Magnification	WD (mm)	Telecentricity (°)	Distortion (%)	DOF (mm)	F#	MTF>0.3(LP/mm)	Mount(17.26mm)	FOV for different sensor size (mm×mm)			
										1/3" 4.8×3.6	1/2" 6.4×4.8	1/1.8" 7.13×5.37	2/3" 8.8×6.6
CLW-5MP-0.5X-65D	Y	0.5	65	0.07	0.01	2.54	F6	>150	C	9.6×7.2	12.8×9.6	14.2×10.7	17.6×13.2
CLW-5MP-0.5X-65	N	0.5	65	0.07	0.01	2.54	F6	>150	C	9.6×7.2	12.8×9.6	14.2×10.7	17.6×13.2
CLW-5MP-0.4X-110D	Y	0.4	110	0.12	0.02	5.3	F8	>130	C	12×9	16×12	17.8×13.4	22×16.5
CLW-5MP-0.4X-110	N	0.4	110	0.12	0.02	5.3	F8	>130	C	12×9	16×12	17.8×13.4	22×16.5
CLW-5MP-0.3X-110D	Y	0.3	110	0.2	0.026	8.6	F8	>135	C	16×12	21.3×16	23.7×17.9	29.3×22
CLW-5MP-0.3X-110	N	0.3	110	0.2	0.026	8.6	F8	>135	C	16×12	21.3×16	23.7×17.9	29.3×22
CLW-5MP-0.3X-178D	Y	0.3	178	0.15	0.03	9.5	F8	>120	C	16×12	21.3×16	23.7×17.9	29.3×22
CLW-5MP-0.3X-178	N	0.3	178	0.15	0.03	9.5	F8	>120	C	16×12	21.3×16	23.7×17.9	29.3×22
CLW-5MP-0.286X-178	N	0.286	178	0.24	0.13	10.5	F8	>120	C	16.7×12.5	22.3×16.7	24.9×18.7	30.7×23





Model	Coax.	Magnification	WD (mm)	Telecentricity (°)	Distortion (%)	DOF (mm)	F#	MTF>0.3(LP/mm)	Mount(17.26mm)	FOV for different sensor size (mm×mm)			
										1/3" 4.8×3.6	1/2" 6.4×4.8	1/1.8" 7.13×5.37	2/3" 8.8×6.6
CLW-5MP-0.24X-150	N	0.24	150	0.03	0.03	14.6	F8	>130	C	20×15	26.6×20	29.7×22.3	36.6×27.5
CLW-5MP-0.22X-200	N	0.22	200	0.19	0.05	12.4	F6	>150	C	21.8×16.3	29×21.8	32.4×24.4	40×30
CLW-5MP-0.2X-150	N	0.2	150	0.04	0.03	21	F8	>130	C	24×18	32×24	35.6×26.8	44×33
CLW-5MP-0.22X-150	N	0.22	150	0.03	0.03	17.4	F8	>130	C	21.8×16.3	29×21.8	32.4×24.4	40×30
CLW-5MP-0.2X-178D	Y	0.2	178	0.045	0.05	15.5	F6	>130	C	24×18	32×24	35.6×26.8	44×33
CLW-5MP-0.2X-178	N	0.2	178	0.035	0.05	15.5	F6	>130	C	24×18	32×24	35.6×26.8	44×33
CLW-5MP-0.18X-178	N	0.18	178	0.03	0.06	26	F8	>125	C	26.6×20	35.5×26.6	39.6×29.8	48.8×36.6
CLW-5MP-0.18X-110D	Y	0.18	110	0.7	0.04	24	F6	>130	C	26.6×20	35.5×26.6	39.6×29.8	NA
CLW-5MP-0.18X-110	N	0.18	110	0.7	0.05	24	F6	>130	C	26.6×20	35.5×26.6	39.6×29.8	48.8×36.6
CLW-5MP-0.17X-110	N	0.17	110	0.6	0.11	23	F8	>110	C	28.2×21.2	37.6×28.2	41.9×31.6	51.8×38.8
CLW-5MP-0.16X-178	N	0.16	178	0.04	0.06	33	F8	>125	C	30×22.5	40×30	44.5×33.5	55×41.2
CLW-5MP-0.16X-200	N	0.16	200	0.4	0.056	22	F6	>180	C	30×22.5	40×30	NA	NA
CLW-5MP-0.14X-178	N	0.14	178	0.03	0.05	43	F8	>125	C	34.2×25.7	45.7×34.2	50.9×38.3	62.8×47.1
CLW-5MP-0.145X-178	N	0.145	178	0.26	0.06	33.5	F6	>150	C	44.1×33.1	33.1×24.8	NA	NA
CLW-5MP-0.12X-250	N	0.12	250	0.035	0.04	58	F8	>130	C	40×30	53.3×40	59.4×44.7	73.3×55
CLW-5MP-0.1X-250	N	0.1	250	0.035	0.05	85	F8	>130	C	48×36	64×48	71.3×53.7	88×66
CLW-5MP-0.132X-110	N	0.132	110	0.6	0.01	33	F6	>150	C	36.3×33.1	48.5×36.4	NA	NA
CLW-5MP-0.095X-208	N	0.095	208	0.37	0.06	35	F6	>180	C	50.5×37.8	67.3×50.5	NA	NA
CLW2-5MP-0.088X-120	N	0.088	120	0.04	0.022	16	F4	>100	C	54.5×40.9	72.7×54.5	81.2×60.9	∅100
CLW-5MP-0.068X-400	N	0.068	400	0.21	0.05	120	F6	>150	C	70.5×52.9	94.1×70.6	104.8×78.9	129.4×97.4
CLW2-5MP-0.06X-390	N	0.06	390	0.02	0.016	178	F8	>70	C	80×60	106.6×80	118.8×89.5	146.6×110
CLW-5MP-0.06X-400	N	0.06	400	0.24	0.04	136	F6	>150	C	80×60	106.7×80	118.8×89.5	146.7×110
CLW-5MP-0.045X-400	N	0.045	400	0.21	0.04	240	F6	>150	C	106.6×80	142.2×106.7	158.4×119.3	191.3×143.5
CLW-5MP-0.045X-535	N	0.045	535	0.026	0.05	230	F6	>150	C	106.6×80	142.2×106.7	158.4×119.3	191.3×143.5
CLW-5MP-0.05X-535	N	0.05	535	0.21	0.05	210	F6	>150	C	96×72	128×96	142.6×107.4	176×132

Max support to 2/3" camera.

The listed lens aperture data is the designed maximum aperture. It can be narrowed to increase DOF (depth of focus) if customer have special requirements.

Object-Telecentric Lens With High Resolution

-WD 65mm&110mm



Model	Coax.	Magnification	WD (mm)	Telecentricity (°)	Distortion (%)	DOF (mm)	Resolution(μm)	Mount(17.26mm)	FOV for different sensor size (mm×mm)		
									1/3" 4.8×3.6	1/2" 6.4×4.8	2/3" 8.8×6.6
CLW-MP-2X-110D	Y	2X	110	0.1	0.1	0.36	5.24	C	2.4×1.8	3.2×2.4	4.4×3.3
CLW-MP-2X-110	N	2X	110	0.1	0.1	0.36	5.24	C	2.4×1.8	3.2×2.4	4.4×3.3
CLW-MP-1.5X-110D	Y	1.5X	110	0.08	0.07	0.55	4.46	C	3.2×2.4	4.26×3.2	5.8×4.4
CLW-MP-1.5X-110	N	1.5X	110	0.08	0.07	0.55	4.46	C	3.2×2.4	4.26×3.2	5.8×4.4
CLW-MP-1X-110D	Y	1X	110	0.02	0.03	1.2	7.3	C	4.8×3.6	6.4×4.8	8.8×6.6
CLW-MP-1X-110	N	1X	110	0.02	0.03	1.2	7.3	C	4.8×3.6	6.4×4.8	8.8×6.6
CLW-MP-0.8X-110D	Y	0.8X	110	0.02	0.01	1.7	8.25	C	6×4.5	8×6	11×8.2
CLW-MP-0.8X-110	N	0.8X	110	0.02	0.01	1.7	8.25	C	6×4.5	8×6	11×8.2
CLW-MP-1X-65D	Y	1X	65	0.08	0.04	1.2	7.3	C	4.8×3.6	6.4×4.8	8.8×6.6
CLW-MP-1X-65	N	1X	65	0.08	0.04	1.2	7.3	C	4.8×3.6	6.4×4.8	8.8×6.6
CLW-MP-0.8X-65D	Y	0.8X	65	0.08	0.09	1.7	8.25	C	6×4.5	8×6	11×8.2
CLW-MP-0.8X-65	N	0.8X	65	0.08	0.09	1.7	8.25	C	6×4.5	8×6	11×8.2

Support camera with Megapixels resolution.

Available with Standard C-Mount

Depth of focus is calculated by permissive circle radius of confusion <20μm on the image side, we can also provide customer DOF data at specific resolution and contrast requirements.

Object-Telecentric Lens With Standard Resolution

-WD 65mm



Model	Coax.	Magnification	WD (mm)	Telecentricity (°)	Distortion (%)	DOF (mm)	Resolution(μm)	Mount(17.26mm)	FOV for different sensor size (mm×mm)		
									1/3" 4.8×3.6	1/2" 6.4×4.8	2/3" 8.8×6.6
CLW-ST-0.5X-65D	Y	0.5X	65	0.07	0.01	7	22	C	9.6×7.2	12.8×9.6	17.6×13.2
CLW-ST-0.5X-65	N	0.5X	65	0.07	0.01	7	22	C	9.6×7.2	12.8×9.6	17.6×13.2
CLW-ST-0.8X-65D	Y	0.8X	65	0.02	0.02	2	11	C	6×4.5	8×6	11×8.2
CLW-ST-0.8X-65	N	0.8X	65	0.02	0.02	2	11	C	6×4.5	8×6	11×8.2
CLW-ST-1X-65D	Y	1X	65	0.025	0.03	1.8	10	C	4.8×3.6	6.4×4.8	8.8×6.6
CLW-ST-1X-65	N	1X	65	0.025	0.03	1.8	10	C	4.8×3.6	6.4×4.8	8.8×6.6
CLW-ST-2X-65D	Y	2X	65	0.02	0.06	0.58	5.5	C	2.4×1.8	3.2×2.4	4.4×3.3
CLW-ST-2X-65	N	2X	65	0.02	0.06	0.58	5.5	C	2.4×1.8	3.2×2.4	4.4×3.3
CLW-ST-3X-65D	Y	3X	65	0.02	0.02	0.3	5.2	C	1.6×1.2	2.1×1.6	2.9×2.2
CLW-ST-3X-65	N	3X	65	0.02	0.02	0.3	5.2	C	1.6×1.2	2.1×1.6	2.9×2.2
CLW-ST-4X-65D	Y	4X	65	0.02	0.04	0.2	4.2	C	1.2×0.9	1.6×1.2	2.2×1.65
CLW-ST-4X-65	N	4X	65	0.02	0.04	0.2	4.2	C	1.2×0.9	1.6×1.2	2.2×1.65
CLW-ST-6X-65D	Y	6X	65	0.02	0.04	0.12	4	C	0.8×0.6	1.06×0.8	1.46×1.1
CLW-ST-6X-65	N	6X	65	0.02	0.04	0.12	4	C	0.8×0.6	1.06×0.8	1.46×1.1
CLW-ST-8X-65D	Y	8X	65	0.02	0.04	0.09	4.2	C	0.6×0.45	0.8×0.6	1.1×0.82
CLW-ST-8X-65	N	8X	65	0.02	0.04	0.09	4.2	C	0.6×0.45	0.8×0.6	1.1×0.82

Support 2/3" camera with over 0.45 million pixels .

Available with Standard C-Mount

Depth of focus is calculated by permissive circle radius of confusion <20μm on the image side, we can also provide customer DOF data at specific resolution and contrast requirements.

Object-Telecentric Lens With Standard Resolution

-WD 65mm



Model	Coax.	Magnification	WD (mm)	Telecentricity (°)	Distortion (%)	DOF (mm)	Resolution(μm)	Mount(17.26mm)	FOV for different sensor size (mm×mm)		
									1/3" 4.8×3.6	1/2" 6.4×4.8	2/3" 8.8×6.6
CLW-ST-0.3X-110D	Y	0.3X	110	0.02	0.09	17	33	C	16×12	21.3×16	NA
CLW-ST-0.3X-110	N	0.3X	110	0.02	0.09	17	33	C	16×12	21.3×16	NA
CLW-ST-0.5X-110D	Y	0.5X	110	0.16	0.09	7	22	C	9.6×7.2	12.8×9.6	NA
CLW-ST-0.5X-110	N	0.5X	110	0.16	0.09	7	22	C	9.6×7.2	12.8×9.6	NA
CLW-ST-0.8X-110D	Y	0.8X	110	0.02	0.03	2.7	13.75	C	6×4.5	8×6	11×8.2
CLW-ST-0.8X-110	N	0.8X	110	0.02	0.03	2.7	13.75	C	6×4.5	8×6	11×8.2
CLW-ST-1X-110D	Y	1X	110	0.02	0.09	2.2	13.7	C	4.8×3.6	6.4×4.8	8.8×6.6
CLW-ST-1X-110	N	1X	110	0.02	0.09	2.2	13.7	C	4.8×3.6	6.4×4.8	8.8×6.6
CLW-ST-2X-110D	Y	2X	110	0.1	0.06	0.5	8	C	2.4×1.8	3.2×2.4	NA
CLW-ST-2X-110	N	2X	110	0.1	0.06	0.5	8	C	2.4×1.8	3.2×2.4	NA
CLW-ST-3X-110D	Y	3X	110	0.1	0.06	0.37	6.8	C	1.6×1.2	2.1×1.6	NA
CLW-ST-3X-110	N	3X	110	0.1	0.06	0.37	6.8	C	1.6×1.2	2.1×1.6	NA
CLW-ST-4X-110D	Y	4X	110	0.02	0.03	0.26	6.5	C	1.2×0.9	1.6×1.2	2.2×1.65
CLW-ST-4X-110	N	4X	110	0.02	0.03	0.26	6.5	C	1.2×0.9	1.6×1.2	2.2×1.65
CLW-ST-6X-110D	Y	6X	110	0.02	0.03	0.18	6.5	C	0.8×0.6	1.06×0.8	1.46×1.1
CLW-ST-6X-110	N	6X	110	0.02	0.03	0.18	6.5	C	0.8×0.6	1.06×0.8	1.46×1.1

Support 2/3" camera with over 0.45 million pixels .

Available with Standard C-Mount

Depth of focus is calculated by permissive circle radius of confusion <20μm on the image side, we can also provide customer DOF data at specific resolution and contrast requirements.

Object-Telecentric Lens

With ultra-long working distance



Model	Coax.	Magnification	WD (mm)	Telecentricity (°)	Distortion (%)	DOF (mm)	Resolution(μm)	Mount(17.26mm)	FOV for different sensor size (mm×mm)	
									1/3" 4.8×3.6	1/2" 6.4×4.8
CLW-ST-1X-150D	Y	1X	150	0.1	0.15	2.2	13.75	C	4.8×3.6	6.4×4.8
CLW-ST-1X-150	N	1X	150	0.1	0.15	2.2	13.75	C	4.8×3.6	6.4×4.8
CLW-ST-2X-150D	Y	2X	150	0.5	0.3	0.75	10.31	C	2.4×1.8	3.2×2.4
CLW-ST-2X-150	N	2X	150	0.5	0.3	0.75	10.31	C	2.4×1.8	3.2×2.4
CLW-ST-2X-200D	Y	2X	200	0.4	0.3	1	13.75	C	2.4×1.8	3.2×2.4
CLW-ST-2X-200	N	2X	200	0.4	0.3	1	13.75	C	2.4×1.8	3.2×2.4
CLW-ST-1X-250D	Y	1X	250	0.1	0.12	2.1	14.3	C	4.8×3.6	6.4×4.8
CLW-ST-1X-250	N	1X	250	0.1	0.12	2.1	14.3	C	4.8×3.6	6.4×4.8
CLW-ST-1X-300D	Y	1X	300	0.1	0.12	3.7	22	C	4.8×3.6	6.4×4.8
CLW-ST-1X-300	N	1X	300	0.1	0.12	3.7	22	C	4.8×3.6	6.4×4.8
CLW-ST-2X-300D	Y	2X	300	0.1	0.18	0.8	11	C	2.4×1.8	3.2×2.4
CLW-ST-2X-300	N	2X	300	0.1	0.18	0.8	11	C	2.4×1.8	3.2×2.4
CLW-ST-1X-420D	Y	1X	420	0.1	0.3	2.6	18.3	C	4.8×3.6	6.4×4.8
CLW-ST-1X-420	N	1X	420	0.1	0.3	2.6	18.3	C	4.8×3.6	6.4×4.8

Especially suitable industrial robot with manipulator movement

Support 1/2" camera with over 0.45 million pixels

Available with Standard C-Mount

Depth of focus is calculated by permissive circle radius of confusion <20μm on the image side, we can also provide customer DOF data at specific resolution and contrast requirements.

Telecentric Light Source/ Parallel Light Source



Model	Output Beam Diameter (mm)	Color				LED Rated Power
		/W(430-680nm)	/R(630nm)	/G(520nm)	/B(460nm)	
CLW-LIT-20	20	✓	✓	✓	✓	1W/3W(Standard 1W)
CLW-LIT-50	50	✓	✓	✓	✓	1W/3W(Standard 1W)
CLW-LIT-70	70	✓	✓	✓	✓	1W/3W(Standard 1W)
CLW-LIT-90	90	✓	✓	✓	✓	1W/3W(Standard 1W)
CLW-LIT-120	120	✓	✓	✓	✓	1W/3W(Standard 1W)
CLW-LIT-200	200	✓	✓	✓	✓	1W/3W(Standard 1W)

Telecentric lens cooperate with LIT series telecentric illuminator, can remove diffused back-illumination introduced border confuse, and increase profile measurement accuracy.

We recommend the green light for high precision measurement, so that you can get the best telecentricity, minimum optical distortion and the highest resolution!

Installation Note: The telecentric illuminator and lens should be kept in the same axis, the higher be parallelism the better the result.

Optical path steering prism



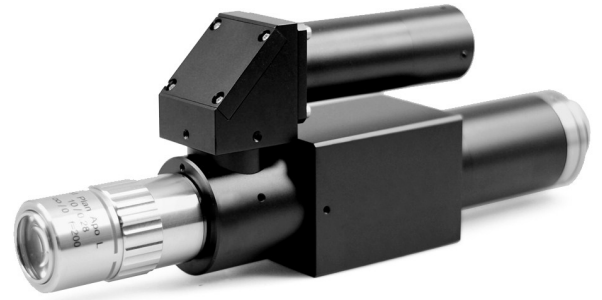
Model	Mount Size	Internal optical path	Single minimum pitch
CLW-LTT90	∅16	20	10
CLW-LTT905	∅16	20	5
CLW-LTT90D30	∅30	26.5	5
CLW-LTT90D34	∅34	32	12

Model	Mount Size	Internal optical path	Single minimum pitch
CLW-LTN3	∅16	33.5	3

Model	Mount Size	Internal optical path	Single minimum pitch
CLW-LTTN3L(R)	∅16	33.5	3
CLW-LTTN1.5L(R)	∅16	33.5	1.5

Change the path direction; The prisms can be satisfied with different mechanical structures; achieve minimum distance between two lenses.

Microscope Image Module



Main Body	Main Body Magnification	Coaxial (Yes or No)	Operating Wavelength	Mount	Maximally compatible CCD size
CLW-MCSMZ	0.5X	Y	436-656nm	C-Mount	2/3"

Supporting Objective	Magnification	N.A	WD (mm)	Resolution(μm)	DOF(μm)	Maximally compatible CCD size
CLW-MCS-5	5X	0.14	34	2.3	28	2/3"
CLW-MCS-10	10X	0.28	34	1.2	7	2/3"
CLW-MCS-20	20X	0.42	20	0.79	3.1	2/3"
CLW-MCS-50	50X	0.55	13	0.6	1.8	2/3"
CLW-MCS-100	100X	0.7	6	0.47	1.1	2/3"

Using apochromatic microscope objective lenses, excellent apochromatic design ensure perfect image quality with ultra-long working distance.

With coaxial illuminating; Max support to 2/3" CCD.

For more information, please contact our sales representatives or visit our website at: <http://www.conrastech.com>.

All product specifications are certified accurate at time of printing.

DT: 2017-06-001



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