



## Mega MML Series Compatible with 1,300,000 pixel Telecentric



### Mega MML Series

Mega MML Series lenses are small, telecentric, and coaxial. The products were developed to accurately inspect components and patterns that are becoming smaller and smaller. Former MMLs (for alignment) were designed prioritizing operational functions such as small size, long working distance, and depth of field. Mega MMLs (for inspection) were designed for precision inspections with a priority on resolution. High contrast image recognition is possible during eye inspection and image processing.

#### Features

- High NA design for mega pixel CCD (maximum NA=0.11)

Mega MML Series was designed at 4.65 $\mu$ m/pix of pixel CCD element size. As a result, NA is very large and aberration is minimal. High resolution is possible when used with regular 410,000 pixel CCDs. Mega MMLs can perform best and higher resolution can be achieved when used with 1,300,000 pixel CCDs.

- Telecentric optical design

Object side telecentric optical method is used for a high telecentric effect.

- Amazing brightness

Effective FNO is at least 6.8. Lenses are twice as bright as conventional MMLs. Image contrast is high even under poor conditions such as when using a high-speed shutter.

- Less depth

Since depth of field is very small, the lenses are hardly influenced by conditions other than the object to be inspected. Therefore, these lenses are perfect for surface observation.

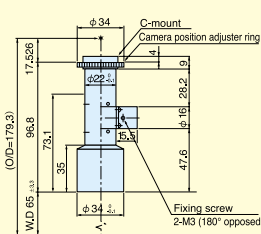
- All lenses have a uniform coaxial illumination system.

The lenses have a coaxial illumination system that is best for recognizing objects with high reflectance such as wafers and glass substrate.

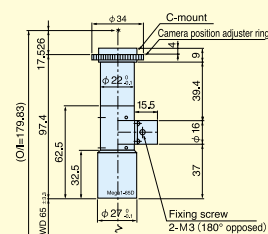
### 1,300,000 pixel CCD list

Model	Maker	No. of effective pixels	Pixel size	Cell size	H x V	Frame rate (frame/second)	Signal method	
							Digital output	Analog output
XCD-SX900	SONY	1,450,000	1/2"	4.65 $\mu$ m	1392 x 1040	7.5 pieces	IEEE-1394-1995	-
CV-M4	JAI	1,340,000	2/3"	6.7 $\mu$ m	1392 x 1040	24 pieces	EIA-644 LVDS 8bit	-
CS-3910	Tokyo Denshi Kogyo	1,340,000	2/3"	6.7 $\mu$ m	1300 x 1030	24 pieces	EIA-644 10bit	1.0Vp-p/75 $\Omega$
TM-1320-15CL	PULNiX	1,300,000	2/3"	6.7 $\mu$ m	1280 x 1024	15 pieces (30 pieces for partial reading)	8bit camera link	1.0Vp-p/75 $\Omega$

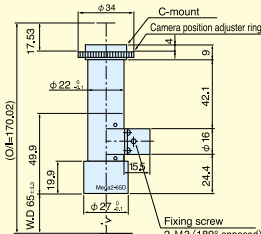
#### Mega05-65D



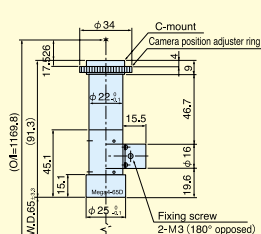
#### Mega1-65D



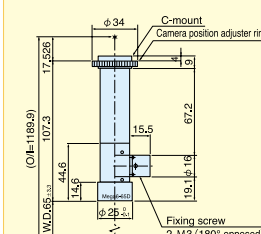
#### Mega2-65D



#### Mega4-65D



#### Mega6-65D



Product name	Magnification	Effective FNO	O/I	WD	Depth of field	Resolution	TV distortion	NA	Weight	Largest compatible CCD	Mount
Mega05-65D	x 0.5	6.8	179.3	65mm	2.2mm	9.2 $\mu$ m	-0.08% or less	0.04	120g	2/3"	C-mount
Mega1-65D	x 1	7.1	179.8	65mm	560 $\mu$ m	4.7 $\mu$ m	-0.08% or less	0.07	115g	2/3"	C-mount
Mega2-65D	x 2	10.1	170	65mm	200 $\mu$ m	3.4 $\mu$ m	-0.04% or less	0.1	100g	2/3"	C-mount
Mega4-65D	x 4	18.7	169.8	65mm	93 $\mu$ m	3.1 $\mu$ m	-0.12% or less	0.11	100g	2/3"	C-mount
Mega6-65D	x 6	26.8	189.9	65mm	59 $\mu$ m	3 $\mu$ m	-0.16% or less	0.11	105g	2/3"	C-mount

\*Depth of field is calculated assuming a horizontal 320 TV resolution using a 1/2" CCD camera. (Permissible circle of confusion on the image-formation side: 40 $\mu$ m)  
 \*Resolution indicates a theoretical resolution at a wavelength of 550nm.