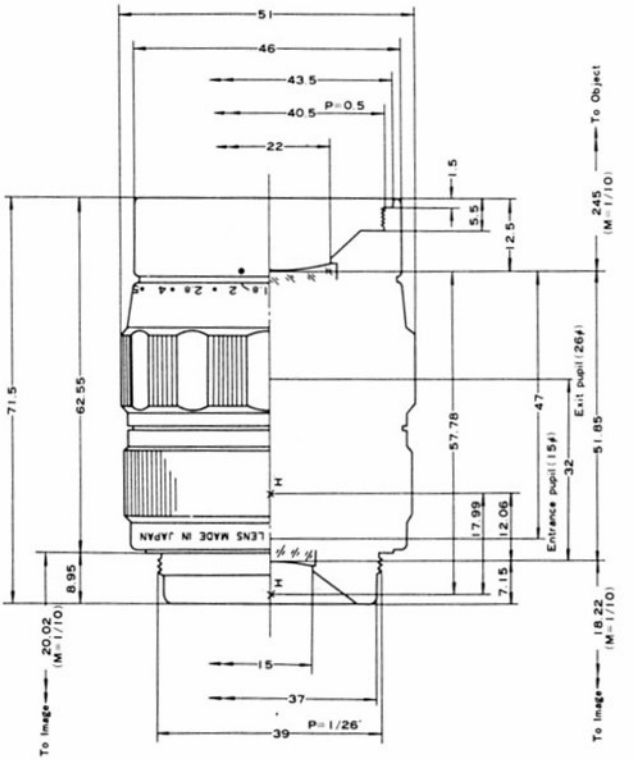
28mm f/1.8
Ultra-Micro-Nikkor

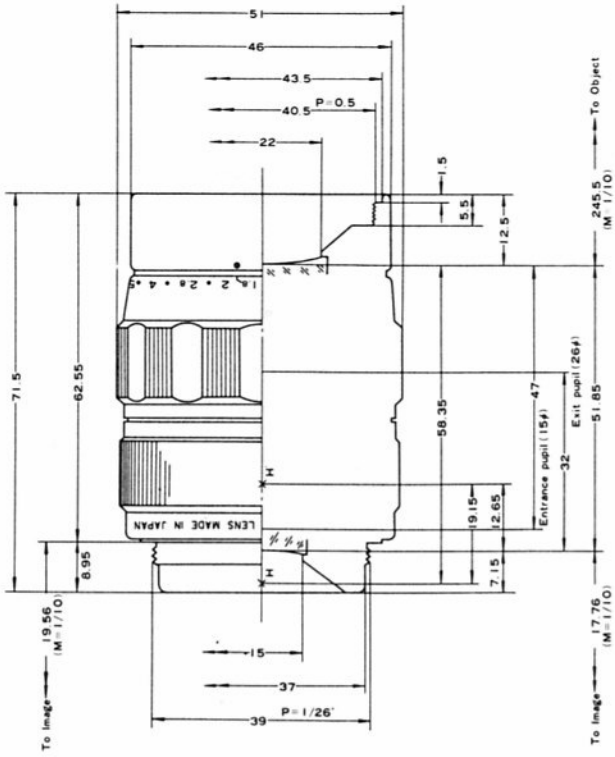
For making photomasks under the "step and repeat method." The lens mount and the working distance being the same as for the 55mm f/2 lens, permits interchangeable usage.

Focal length	27.5mm
Max. aperture	f/1.8
Construction	9 elements, 7 groups
Standard magnification	1/10X
Picture angle	7.6°
Overall working distance	315mm
Object area	40mmφ
Image area	4mmφ
Standard wavelength	546mμ (e-line)
Aperture efficiency at image corner	100% at f/1.8 (no vignetting)
Distortion	−0.06%
Aerial resolving power	700 lines
Aperture scale	1.8, 2, 2.8, 4, 5.6, 8
Mount	Screw d=39mm p=1/26"
Dimensions: max. diameter	51mm
max. length	70mm
Filter	40.5mm Screw-in
Weight	310g (10.9oz)



28mm f/1.8h
Ultra-Micro-Nikkor

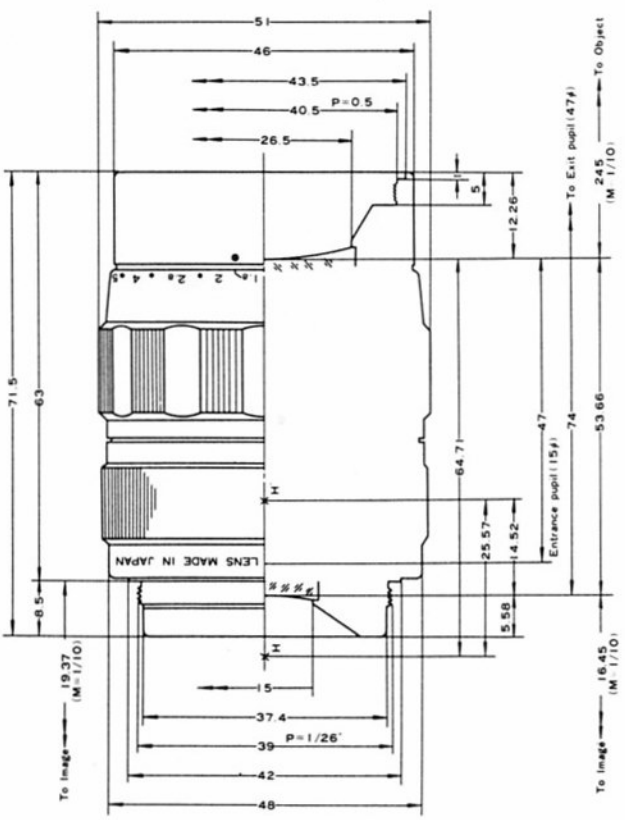
Focal length	27.6mm
Max. aperture	f/1.8
Construction	9 elements, 7 groups
Standard magnification	1/10X
Picture angle	7.6°
Overall working distance	315mm
Object area	40mmφ
Image area	4mmφ
Standard wavelength	404.7mμ (h-line) 435mμ (g-line)
Aperture efficiency at image corner	100% at f/1.8 (no vignetting)
Distortion	−0.04%
Aerial resolving power	900 lines/mm
Aperture scale	1.8–8
Mount	Screw d=39mm p=1/26"
Dimensions: max. diameter	51mm
max. length	71.5mm
Weight	310g (10.9 oz)



28mm f/1.8ew Ultra-Micro-Nikkor

The improved version of the current 28mm f/1.8 lens used for the making of photomasks under the "step and repeat method." The lens mount and the working distance are the same as that of the earlier 28mm f/1.8 lens. The image size has been enlarged from the current 4mmϕ to 8mmϕ. It possesses the same resolution as the current lens up to the image size of 7mmϕ and has the aerial resolving power of 600 lines/mm even at the image size of 8mmϕ covering the picture area of 5.6mm square.

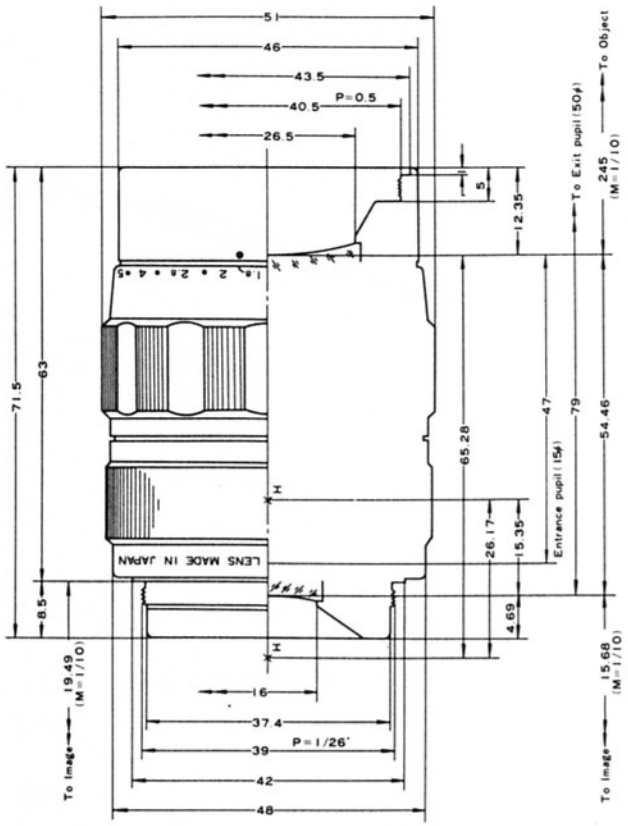
Focal length	28.2mm
Max. aperture	f/1.8
Construction	9 elements, 7 groups
Standard magnification	1/10X
Overall working distance	315mm
Object area	80mmϕ
Image area	8mmϕ
Standard wavelength	546.1mμ (e-line)
Vignetting	0% at f/1.8
Distortion	0.002%
Aerial resolving power	600 lines/mm (8mmϕ) 650 lines/mm (7mmϕ) 700 lines/mm (6mmϕ)
Aperture scale	1.8–8
Mount	d=39mm, p=1/26"
Attachment size	d=40.5mm, p=0.5mm
Weight	330g



28mm f/1.8hw
Ultra-Micro-Nikkor

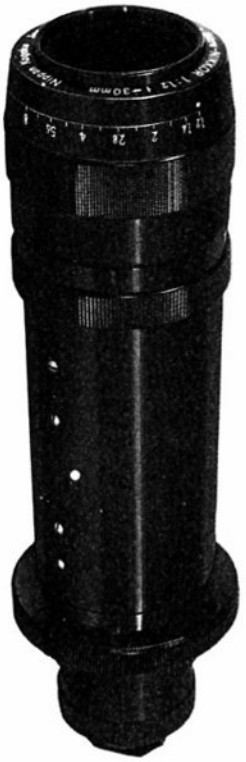
Used for performing a number of reduced printings onto a glass plate applied with photo-resist for the making of chrome masks from the intermediate negative plate. Similar to the 28mm f/1.8e lens, the image size is enlarged to 8mmϕ. The resolving power for an image area of 6mmϕ is over 900 lines/mm, and for image areas of 7mmϕ and 8mmϕ, it is 800 lines/mm and 750 lines/mm, respectively. As the aberration of this lens has been corrected along the g- and h-lines, photography can be made by using both the g- and h-lines simultaneously to compensate for the insufficient sensitivity of the photo-resist.

Focal length	28.0mm
Max. aperture	f/1.8
Construction	9 elements, 7 groups
Standard magnification	1/10X
Overall working distance	315mm
Object area	80mmϕ
Image area	8mmϕ
Standard wavelength	435.8μ (g-line)
	404.7mμ (h-line)
Vignetting	0% at f/1.8
Distortion	0.003%
Aerial resolving power	750 lines/mm (8mmϕ)
	800 lines/mm (7mmϕ)
	900 lines/mm (6mmϕ)
Aperture scale	1.8–8
Mount	d=39mm, p=1/26"
Attachment size	d=50.5mm, p=0.5mm
Weight	330g

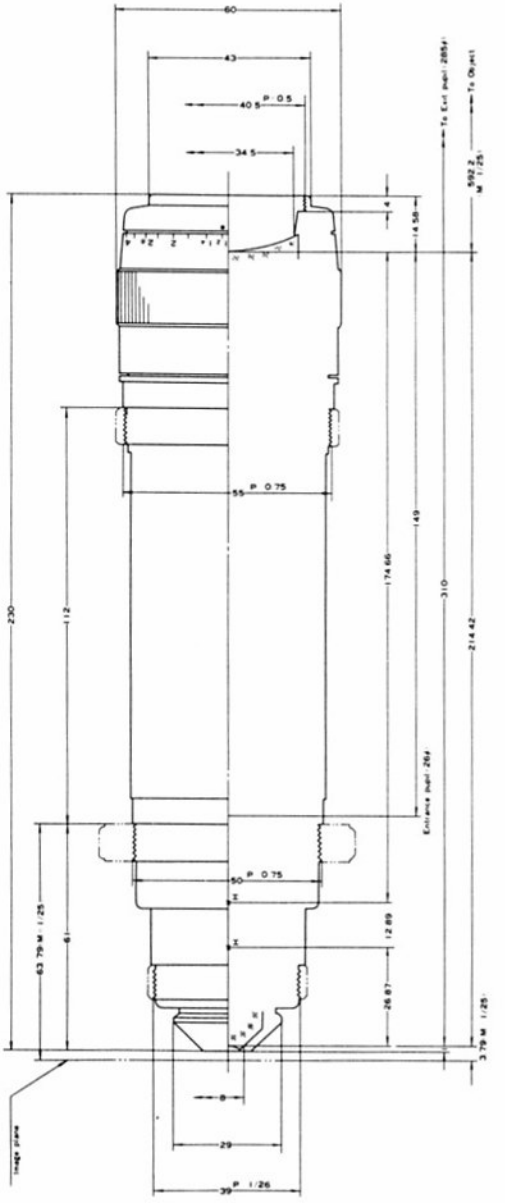


30mm f/1.2
Ultra-Micro-Nikkor

This lens, developed in 1964, offers ultra-high resolution which reaches the maximum theoretical limit of 1,250 lines/mm throughout its entire 2mm diameter image area. The design and manufacturing standards of this lens have won high acclaim throughout the world.



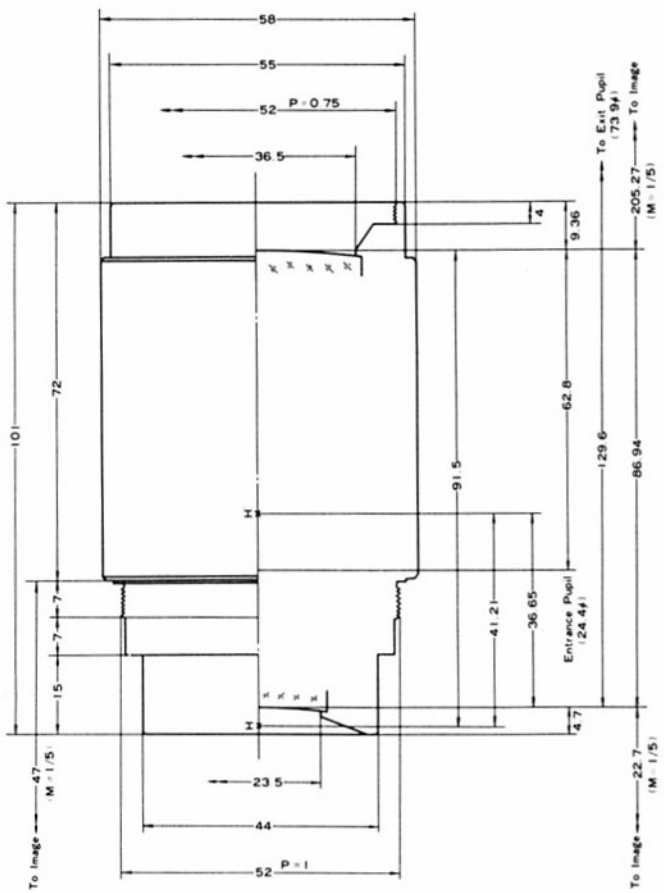
Focal length	29.5mm
Max. aperture	f/1.2
Construction	9 elements, 6 groups
Standard magnification	1/25X
Picture angle	3.8°
Overall working distance	810mm
Object area	50mmφ
Image area	2mmφ
Standard wavelength	546mμ (e-line)
Aperture efficiency at image corner	100% at f/1.2 (no vignetting)
Distortion	−1.3%
Aerial resolving power	1,250 lines/mm
Aperture scale	1.2, 1.4, 2, 2.8, 4, 5.6, 8
Mount	Screw d=50mm p=0.75mm
Dimensions: max. diameter	60mm
max. length	230mm
Filter	40.5mm Screw-in
Weight	800g (1.76 lb)



Ultra-Micro-Nikkor
50mm f/1.8e

A lens newly developed for photorepeaters. It has a large image area of 14mm in diameter even at the reduction of 1/5X and is capable of covering the picture plane of 10mm square. In addition, since it has a high resolving power of more than 600 lines/mm within the image area of 12mm in diameter, a higher quality performance exceeding that of the Ultra-Micro-Nikkor 55mm f/2 (e-line) lens can be obtained.

Focal length	49.5mm
Max. aperture	f /1.8 (fixed)
Construction	9 groups, 12 elements
Standard magnification	1/5 X
Picture angle	13.1°
Overall working distance	315 mm
Object area	70mmϕ
Image area	14mmϕ
Standard wavelength	546.1mμ (e-line)
Aperture efficiency at image corner	100% at f/1.8 (no vignetting)
Distortion	0.004%
Aerial resolving power	500 lines/mm (at 14mmϕ)
	600 lines/mm (at 12mmϕ)
Mount	Screw-in 52mm p=1mm
Dimensions: max. diameter	58mm
max. length	101mm
Attachment size	Screw-in 52mm p=0.75mm
Weight	642g



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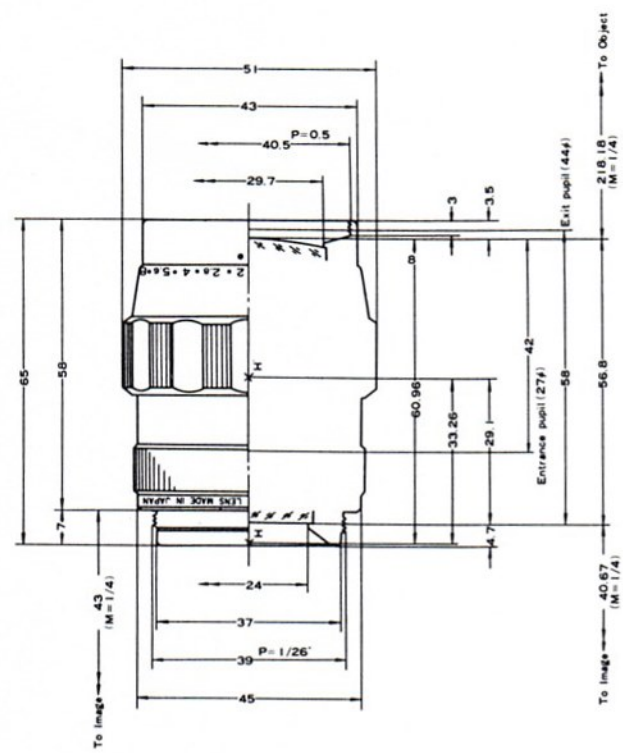
KCL 8903-insert 03(E) NEX-159 Printed in Japan

55mm f/2
Ultra-Micro-Nikkor

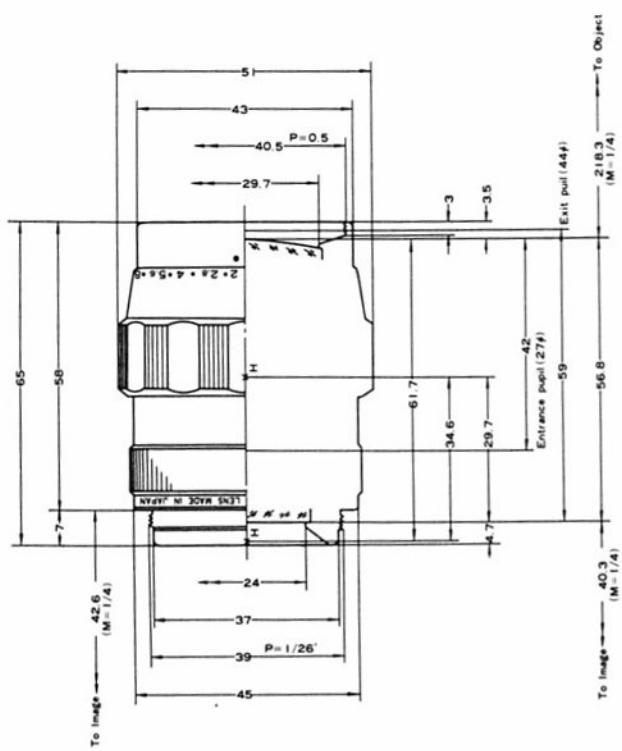
For making photomasks under the "step and repeat method," on an extremely wide plane of 12mm in diameter with a magnification of 1/4X. The lens mount and working distance are the same as for the 28mm f/1.8.

Focal length	55.8mm
Max. aperture	f/2
Construction	8 elements, 6 groups
Standard magnification	1/4X
Picture angle	9.8°
Overall working distance	315mm
Object area	48mmϕ
Image area	12mmϕ
Standard wavelength	546mμ (e-line)
Aperture efficiency at image corner	100% at f/2 (no vignetting)
Distortion	0.00%
Aerial resolving power	500 lines/mm
Aperture scale	2, 2.8, 4, 5.6, 8
Mount	Screw d=39mm p=1/26"
Dimensions: max. diameter	51mm
max. length	65mm
Filter	40.5mm Screw-in
Weight	325g (11.5oz)



55mm f/2h
Ultra-Micro-Nikkor

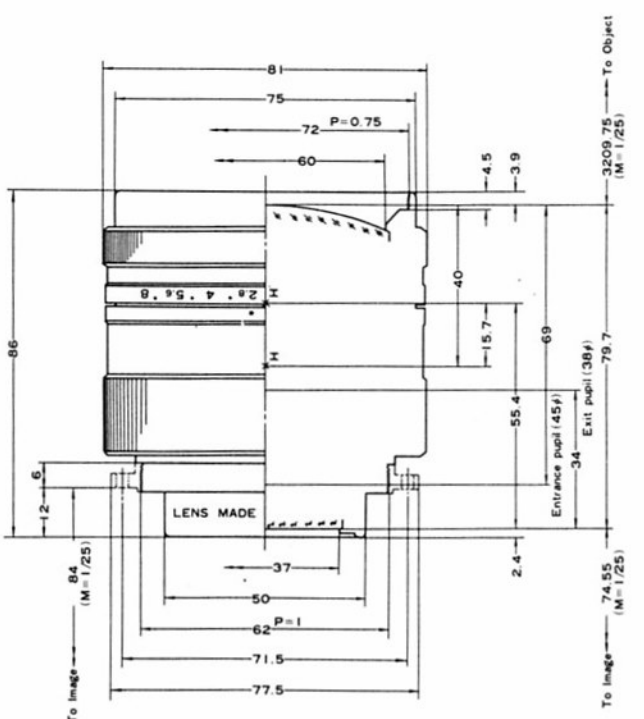
Focal length	55.8mm
Max. aperture	f/2
Construction	8 elements, 6 groups
Standard magnification	1/4X
Picture angle	8.2°
Overall working distance	315mm
Object area	40mmϕ
Image area	10mmϕ
Standard wavelength	404.7mμ (h-line)
	435mμ (g-line)
Aperture efficiency at image corner	100% at f/2 (no vignetting)
Distortion	+0.01%
Aerial resolving power	650 lines/mm
Aperture scale	2–8
Mount	Screw
	d=39mm p=1/26"
Dimensions: max. diameter	51mm
max. length	65mm
Weight	325g (11.5oz)



125mm f/2.8
Ultra-Micro-Nikkor

An improved version of the previous 105mm f/2.8 lens for making photomasks with the "one shot method." The picture plane of this lens has been enlarged to match the size of the semiconductor wafer and covers a range of 28mm in diameter.

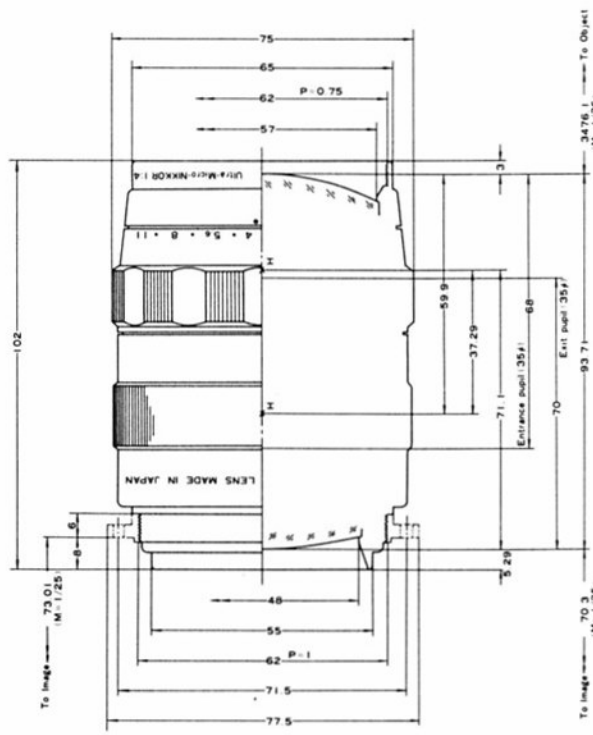
Focal length	125mm
Max. aperture	f/2.8
Construction	7 elements, 6 groups
Standard magnification	1/25X
Picture angle	12.3°
Overall working distance	3,364mm
Object area	700mmϕ
Image area	28mmϕ
Standard wavelength	546mμ (e-line)
Aperture efficiency at image corner	100% at f/2.8 (no vignetting)
Distortion	−0.3%
Aerial resoving power	400 lines/mm
Aperture scale	2.8, 4, 5.6, 8
Mount	Screw d=62mm p=1mm Adapter plate o.d.=77.5mm
Dimensions: max. diameter	81mm
max. length	86mm
Filter	72mm Screw-in
Weight	695g (1.53 lb)



135mm f/4
Ultra-Micro-Nikkor

For making photomasks with the "one shot method" or making an intermediate negative plate which is used for making photomasks under the "step and repeat method." The standard magnification of 1/25X features the large original size of 88 to 113cm square.

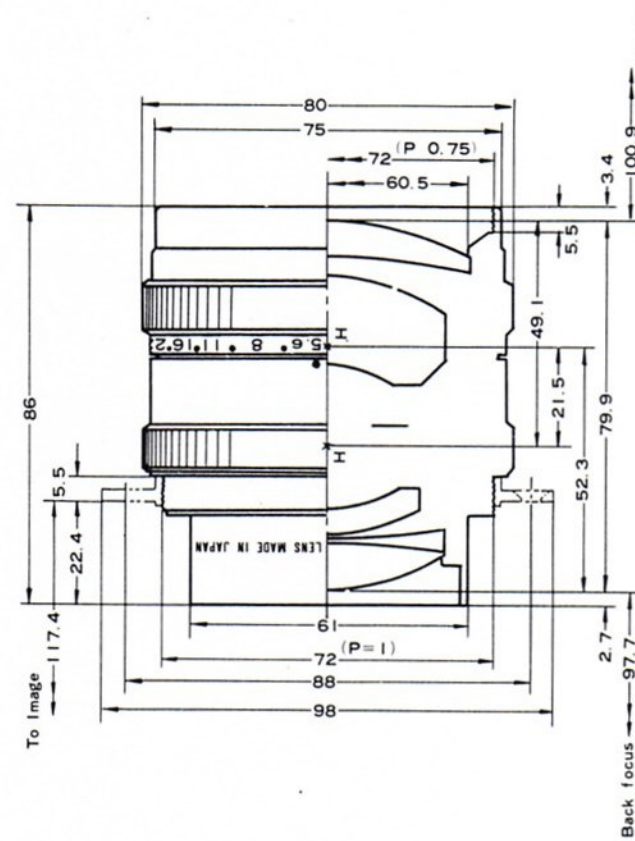
Focal length	136mm
Max. aperture	f/4
Construction	7 elements, 4 groups
Standard magnification	1/25X
Picture angle	20° at f/4, 25.5° at f/5.6
Overall working distance	3,640mm
Object area	1,250mmϕ (at f/4) 1,600mmϕ (at f/5.6)
Image area	50mmϕ (at f/4) 64mmϕ (at f/5.6)
Standard wavelength	546mμ (e-line)
Aperture efficiency at image corner	100% at f/4 (no vignetting)
Distortion	+0.02% (at 50mmϕ) −0.03% (at 64mmϕ)
Aerial resolving power	330 lines/mm (at f/4) 200 lines/mm (at f/5.6)
Aperture scale	4, 5.6, 8, 11
Mount	Screw d=62mm p=1mm Adapter plate o.d.=77.5mm
Dimensions: max. diameter	75mm
max. length	102mm
Filter	62mm Screw-in
Weight	750g (1.65 lb)



150mm f/5.6
Micro-Nikkor

Recently, films with a width of 70mm are being used for microfilming of large-sized originals, such as blueprints and weather charts, which have entries of small letters. This lens, developed for such microfilming, has high resolution over such a large picture area. The lens also meets the requirements in the fields of photoengraving and electronic industry.

Focal length	150mm
Max. aperture	f/5.6
Construction	6 elements, 4 groups
Standard reproduction	1/10X
Range of reproduction ratio	1/30X–1/5X
Picture angle	41°
Image area	64mm X 95.5mm
Overall working distance	1,815mm
Correction wavelength range	400mμ–650mμ
Vignetting	0% at f/8
Distortion	0.1%
Resolution	150 lines at f/8 (at 546mμ e-line)
Aperture scale	5.6, 8, 11, 16, 22
Mount	Screw (d=72mm p=1mm) & adapter plate (o.d.=98mm)
Dimensions: max. diameter	80mm
max. length	86mm
Weight	600g (1.32 lb)



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