

# Micro-Nikkor 105mm f/4

**Nikon** INSTRUCTION MANUAL

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# NOMENCLATURE

## Micro-Nikkor Lens

Reproduction ratio scale (lens only)

Reproduction ratio scale (lens + PN ring)

Focusing ring

Meter coupling shoe

Aperture scale index

Distance scale

Depth-of-field indicators

Distance scale index

Aperture scale

Aperture-direct-readout scale

Meter coupling ridge

Aperture ring



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## FOREWORD

The Micro-Nikkor 105mm f/4 is a special telephoto lens designed for close-up photography at high reproduction ratios. It features the same optical construction as the much-acclaimed Bellows-Nikkor 105mm f/4, but with a special focusing helicoid that enables operation from infinity ( $\infty$ ) to a reproduction ratio of 1 : 2 (half life-size) without the need for any adapters. The lens offers "automatic maximum aperture indexing" (AI) with suitably equipped cameras, via the meter coupling ridge provided. The ridge and the auto diaphragm function together to permit full aperture exposure measurement; the lens is also fitted with a meter coupling shoe to permit the same operation with Nikon cameras which lack the AI facility. In terms of optical performance, the Micro-Nikkor's excellent flatness of field is a stand-out feature, enabling virtually distortion-free images at all reproduction ratios. The application of Nikon Integrated Coating (NIC) further enhances performance by increasing image contrast, while reducing flare and ghost, for outstanding color reproduction.

When the Micro-Nikkor 105mm is used with the special Auto Extension Ring PN-11 or PN-1, focusing is further extended from 1 : 2 to 1 : 1 for full life-size reproduction.

To get the best results from your Micro-Nikkor 105mm f/4, read this instruction manual carefully. Keep the manual handy for reference until you have thoroughly familiarized yourself with the lens and its operation. A few minutes of preparation will help you avoid costly mistakes.

## MOUNTING THE LENS



Position the lens in the camera's bayonet mount, aligning the mounting indexes on the camera and the lens. Twist the lens counter-clockwise until it clicks into place.

To remove, depress the lens release button on the camera and twist the lens clockwise.

**Note:** When mounting the lens on a camera with a meter coupling lever (AI type), make sure that the camera's meter coupling lever is correctly positioned; when mounting on a camera without this lever (non-AI type), conventional "manual" maximum aperture indexing is required. In both cases, refer to the camera's instruction manual.

## FOCUSING

The fully automatic diaphragm of the Micro-Nikkor enables focusing with maximum image brightness throughout the entire focusing range



of the lens. As the image is constantly viewed at the maximum aperture setting (i.e., f/4), the depth of field is minimized so that the image snaps in and out of focus rapidly and distinctly.

To focus, turn the focusing ring until the image on the focusing screen appears sharp and crisp. Via the special focusing helicoid, the Micro-Nikkor operates continuously from infinity ( $\infty$ ) to 0.47m (1.55 ft) for a reproduction ratio of 1:2.

The distance scale on the focusing ring is marked in both meters (white) and feet (yellow). These figures indicate the distance from the subject to the camera's film plane.

**Note:** The exact position of the film plane is indicated on all cameras for convenience when measuring. On Nikon F/F2 cameras, the top edge of the serial number is the exact position of the plane. On other Nikon and Nikkormat cameras, the plane is indicated by the symbol ( $\ominus$ )

## Recommended Focusing Screens

Nineteen different interchangeable focusing screens are available for F and F2 Nikon cameras to suit any type of lens or picture-taking situation. Those which are recommended for use with this Micro-Nikkor 105mm f/4 lens are listed below.

Camera	Screen	A/L	B	C	D	E	G1	G2	G3	G4	H1	H2	H3	H4	J	K/P	M	R
F		⊙	⊙			⊙			○	○			⊙	○	⊙	⊙		⊙
F2		⊙	⊙			⊙			○	○			⊙	○	⊙	⊙		⊙

⊙ = Excellent focusing

● = Acceptable focusing

The image is brilliant from edge to edge, but the center area (range-finder, microprism or cross-hair) is dim. Focus on the surrounding matte area.

○ = Acceptable focusing

Slight vignetting (or moire phenomenon, in the case of the microprism) affects the screen image. The image on the film, however, shows no trace of this.

□ = Not usable

■ = With these lens-screen combinations the view-finder can be used only for focusing; exposure measurement is not possible.

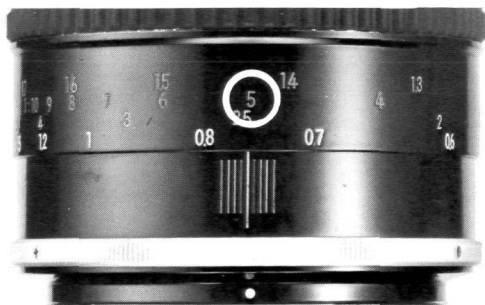
## Reproduction Ratio

The reproduction ratio is the numerical expression of the relationship between the image size (to be recorded on the film) and the actual size of the subject. For example, if the image on the focusing screen is one-fifth the actual size of the subject, the reproduction ratio is said to be 1:5, and is indicated on the reproduction ratio scale of the Micro-Nikkor 105mm f/4 by the number "5".

## FOCUSING – continued

### Focusing at Predetermined Ratio

Above the distance scale on the focusing ring are two reproduction ratio scales inscribed in orange. The inner scale, with figures from 1:10 to 1:2, represents the reproduction ratios obtained when the lens is used alone. The outer scale figures (i.e., 1:2 to 1:1) represent the ratios possible when the lens and, PN-1 or PN-11 ring, are used together. Using either of these scales, you can photograph at a predetermined ratio without calculating the distances required. To photograph at a reproduction ratio of 1:5, for example, just turn the focusing ring until the number “5” is aligned with the distance scale index; then aim at the subject and adjust your position (close to, or farther away from, the subject) until the image appears sharp and crisp on the focusing screen.





## Depth of Field

Depth of field refers to the zone of acceptable focus extending in front of and behind the plane of sharpest focus. As this zone is exceptionally shallow at high reproduction ratios, previewing is desirable before shooting. To preview, press the depth-of-field button on the camera and the lens will close to the preselected aperture to allow you to see how much background and foreground is in focus. Depth of field can also be observed by reading the color-coded indicators inscribed on the lens barrel. The pairs of colored lines on either side of the white distance scale index line correspond to  $f$ /numbers of the same color on the aperture scale. At close distances, so little is in focus that the depth-of-field tables on pages 13 ~ 14 are more useful.

## NOTES ON FOCUSING

**Camera Shake:** Close-up photography poses several problems not encountered in general photography. One of these is sensitivity to vibration—the magnification of the image is so high that even slight displacement during shooting results in a blurred image. Therefore, the use of a tripod is recommended at all times, with shutter actuated via cable release. In this respect, the convenient, 360° rotatable tripod mounting collar on the PN ring will prove useful.

**Close Working Distances:** At high reproduction ratios encountered during close-up shooting, depth of field decreases drastically. This condition can be partially compensated for by stopping down the lens. But at very close working distances, an extremely shallow depth of field is inevitable. Careful placement of the camera will be necessary to ensure that the important surfaces of the subject are in the same zone of sharpness.

# DETERMINING EXPOSURE

Camera	Close-up attachment	Exposure measurement
AI	PN-11	Full aperture
AI	PN-1	Stop-down
AI	Bellows, E2 and K rings and close-up lenses	Stop-down
non-AI	PN-11	Stop-down
*non-AI	PN-1	Full aperture
non-AI	Bellows, E2 and K rings and close-up lenses	Stop-down

\*With this combination, conventional "manual" maximum aperture indexing is required.

## With Built-in TTL Metering

The Micro-Nikkor has a fully automatic diaphragm with settings from  $f/4$  to  $f/32$ . The Micro-Nikkor couples fully to the thru-the-lens meter of any F/F2 Nikon Photomic or other Nikon/Nikkormat cameras for full aperture exposure measurement over the entire range of aperture settings. Note that when this lens is used with non-AI cameras, conventional "manual" maximum aperture indexing is required.

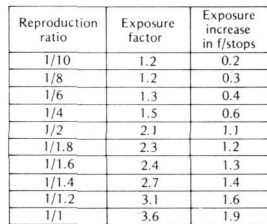
When close-up attachments such as a PN ring or bellows are used, the exposure measurement method is shown in the table on the left. When the lens is mounted in the reverse position, the stop-down method should be used. See the instruction manual supplied with your camera or Photomic viewfinder for details.

**Caution:** When the stop-down method is used at small apertures, a finder eyecup should be attached to the eyepiece to ensure complete exclusion of stray light.

## Without TTL Metering

At close ranges (reproduction ratios greater than 1:10), the amount of light reaching the film decreases as the lens-to-film distance increases. When non-TTL measurement is used for this range, the result is underexposed photographs unless compensation has been made for this decrease. (When the Micro-Nikkor 105mm f/4 lens is used with the Photomic or Nikon/Nikkormat TTL meter it is not necessary to make compensations, since the meter is designed to give an accurate reading of the amount of light reaching the film.)

The table at right gives the exposure factors (compensation values) with exposure increase in f/stops for non-TTL exposure measurement at reproduction ratios greater than 1:10.



Reproduction ratio	Exposure factor	Exposure increase in f/stops
1/10	1.2	0.2
1/8	1.2	0.3
1/6	1.3	0.4
1/4	1.5	0.6
1/2	2.1	1.1
1/1.8	2.3	1.2
1/1.6	2.4	1.3
1/1.4	2.7	1.4
1/1.2	3.1	1.6
1/1	3.6	1.9

Insert this table into the memo holder at the back of your camera for easy reference.

# CLOSE-UP TABLES

## Photographic Ranges with Other Close-up Attachments

(cm)

Close-up attachment	Lens in normal position			Lens in reverse position		
	Reproduction ratio	Subject field	Focused distance	Reproduction ratio	Subject field	Focused distance
E2 Ring	1/7.5-1/1.6	18.0 x 27.0- 3.8 x 5.7	101-44.1			
* K Ring Set	1/18.1-1/1.1	43.4 x 65.2- 2.5 x 3.8	212-41.9			
PN Ring	1/5.7-1/3.7	13.7 x 20.6- 8.8 x 13.3	260-202			
Bellows PB-4, PB-5	1/2.4-1.8	5.9 x 8.8- 1.4 x 2.0	50.8-45.3	1/3.8-1.6	9.2 x 13.8- 1.5 x 2.2	63.9-44.3
Close-Up Lens No. 0	1/13.4-1/1.7	32.3 x 48.4- 4.0 x 6.0	156-42.9			
Close-Up Lens No. 1	1/6.4-1/1.4	15.4 x 23.1- 3.4 x 5.2	82.7-39.7			
Close-Up Lens No. 2	1/3.2-1/1.1	7.7 x 11.6- 2.7 x 4.0	49.1-35.4			
** Repro-Copy Outfit PF-2, PF-3	1/6-1/2	14.4 x 21.6- 4.8 x 7.2	85.3-41.9			

(in.)

Close-up attachment	Lens in normal position			Lens in reverse position		
	Reproduction ratio	Subject field	Focused distance	Reproduction ratio	Subject field	Focused distance
E2 Ring	1/7.5-1/1.6	7.1 x 10.6- 1.5 x 2.2	39.8-17.4			
* K Ring Set	1/18.1-1/1.1	17.1 x 25.7- 1.0 x 1.5	83.3-16.5			
PN Ring	1/5.7-1/3.7	5.4 x 8.1- 3.5 x 5.2	102-79.4			
Bellows PB-4, PB-5	1/2.4-1.8	2.3 x 3.5- 0.55 x 0.79	20.0-17.8	1/3.8-1.6	3.6 x 5.4- 0.58 x 0.88	25.1-17.4
Close-Up Lens No. 0	1/13.4-1/1.7	12.7 x 19.1- 1.6 x 2.4	61.5-16.9			
Close-Up Lens No. 1	1/6.4-1/1.4	6.1 x 9.1- 1.4 x 2.0	32.6-15.6			
Close-Up Lens No. 2	1/3.2-1/1.1	3.0 x 4.6- 1.1 x 1.6	19.3-14.0			
** Repro-Copy Outfit PF-2, PF-3	1/6-1/2	5.7 x 8.5- 1.9 x 2.8	33.5 16.5			

\* The first values are for the K1 ring used alone and the second ones for all five rings used together.

\*\* The figures shown here represent the ranges obtained with the subject on the baseplate, using the lens without any close-up attachment.

# DEPTH-OF-FIELD TABLES

(m)

Focused distance	Depth of field							Reproduction ratio
	4	5	8	11	16	22	32	
0.47	0.469–0.471	0.469–0.471	0.468–0.472	0.468–0.472	0.467–0.473	0.466–0.474	0.464–0.477	1/1.98
0.50	0.499–0.501	0.499–0.501	0.498–0.502	0.497–0.503	0.496–0.504	0.494–0.506	0.492–0.509	1/2.35
0.55	0.549–0.552	0.548–0.552	0.547–0.553	0.546–0.554	0.544–0.556	0.542–0.559	0.538–0.563	1/2.90
0.6	0.598–0.602	0.597–0.603	0.596–0.604	0.595–0.606	0.592–0.608	0.589–0.612	0.584–0.617	1/3.43
0.7	0.697–0.703	0.696–0.704	0.694–0.707	0.691–0.709	0.687–0.713	0.683–0.719	0.675–0.727	1/4.45
0.8	0.795–0.805	0.794–0.806	0.791–0.810	0.787–0.813	0.782–0.819	0.775–0.827	0.765–0.840	1/5.45
1	0.992–1.01	0.990–1.01	0.984–1.02	0.978–1.02	0.968–1.03	0.957–1.05	0.939–1.07	1/7.40
1.2	1.19–1.21	1.18–1.22	1.17–1.23	1.17–1.24	1.15–1.25	1.13–1.28	1.11–1.31	1/9.33
1.5	1.48–1.52	1.47–1.53	1.46–1.54	1.44–1.56	1.42–1.59	1.39–1.63	1.35–1.70	1/12.2
2	1.96–2.04	1.95–2.05	1.92–2.09	1.89–2.12	1.85–2.18	1.80–2.26	1.72–2.40	1/17.0
3	2.91–3.10	2.88–3.13	2.82–3.21	2.76–3.30	2.66–3.45	2.55–3.66	2.39–4.08	1/26.5
7	6.48–7.62	6.36–7.79	6.03–8.36	5.73–9.02	5.30–10.4	4.87–12.7	4.28–20.6	1/64.7
∞	82.9–∞	66.4–∞	41.6–∞	30.3–∞	20.9–∞	15.2–∞	10.5–∞	1/∞

# DEPTH-OF-FIELD TABLES – continued

Focused distance	Depth of field							(ft)
	4	5.6	8	11	16	22	32	Reproduction ratio
1.55	1'6-9/16"–1'6-5/8"	1'6-1/2"–1'6-5/8"	1'6-1/2"–1'6-5/8"	1'6-1/2"–1'6-11/16"	1'6-7/16"–1'6-11/16"	1'6-3/8"–1'6-3/4"	1'6-5/16"–1'6-13/16"	1/2.01
1.75	1'8-15/16"–1'9"	1'8-7/8"–1'9-1/16"	1'8-7/8"–1'9-1/16"	1'8-13/16"–1'9-1/8"	1'8-3/4"–1'9-3/16"	1'8-11/16"–1'9-1/4"	1'8-9/16"–1'9-7/16"	1/2.72
2	1'11-7/8"–2' 1/16"	1'11-7/8"–2'1/16"	1'11-13/16"–2'1/8"	1'11-3/4"–2' 3/16"	1'11-5/8"–2'5/16"	1'11-1/2"–2'7/16"	1'11-5/16"–2'11/16"	1/3.53
2.5	2'5-13/16"–2'6-1/8"	2'5-3/4"–2'6-3/16"	2'5-5/8"–2'6-5/16"	2'5-9/16"–2'6-7/16"	2'5-5/16"–2'6-5/8"	2'5-1/8"–2'6-7/8"	2'4-3/4"–2'7-3/8"	1/5.07
3	2'11-11/16"–3'1/4"	2'11-5/8"–3'5/16"	2'11-7/16"–3'1/2"	2'11-1/4"–3'11/16"	2'10-15/16"–3'1-1/16"	2'10-5/8"–3'1-1/2"	2'10"–3'2-1/4"	1/6.57
4	3'11-7/16"–4'1/2"	3'11-1/4"–4'11/16"	3'10-15/16"–4'1-1/16"	3'10-9/16"–4'1-7/16"	3'10"–4'2-3/16"	3'9-1/4"–4'3-1/16"	3'8-3/16"–4'4-11/16"	1/9.52
5	4'11-1/8"–5'7/8"	4'10-3/4"–5'1-1/4"	4'10-1/4"–5'1-13/16"	4'9-11/16"–5'2-1/2"	4'8-11/16"–5'3-3/4"	4'7-9/16"–5'5-5/16"	4'5-13/16"–5'8-1/8"	1/12.4
7	6'10-3/16"–7'1-7/8"	6'9-7/16"–7'2-5/8"	6'8-7/16"–7'3-7/8"	6'7-3/16"–7'5-7/16"	6'5-1/4"–7'8-3/16"	6'3"–7'11-3/4"	5'11-5/8"–8'6-3/8"	1/18.3
10	9'8-1/8"–10'4"	9'6-11/16"–10'6"	9'4-9/16"–10'9"	9'2"–11'0"	8'10-1/16"–11'7"	8'5-11/16"–12'3"	7'11-1/4"–13'8"	1/27.0
20	18'8"–21'6"	18'3"–22'2"	17'7"–23'3"	16'10"–24'10"	15'8"–27'11"	14'6"–32'9"	12'11"–46'7"	1/56.1
∞	272'–∞	194'–∞	136'–∞	99'4"–∞	68'6"–∞	50'0"–∞	34'7"–∞	1/∞

## FEATURES/SPECIFICATIONS

**Focal length:** 105mm

**Maximum aperture:** f/4

**Lens construction:** 5 elements in 3 groups

**Picture angle:** 23°20'

**Distance scale:** Graduated in meters and feet from 0.47m (1.55 ft) to infinity ( $\infty$ )

**Aperture scale:** f/4 ~ f/32

**Diaphragm:** Fully automatic

**Reproduction ratios:** Scales provided; 1 : 10 to 1 : 2 for lens only; 1 : 2 to 1 : 1 for lens plus PN-1 or PN-11 ring

**Exposure measurement:** Via full-aperture method; meter coupling ridge provided for AI cameras and meter coupling shoe for non-AI cameras

**Lens hood:** Slip-out type built into front of lens

**Tripod mounting:** Via socket in tripod mounting collar of PN ring; collar rotatable to permit vertical and horizontal format picture-taking; click-stops provided at each 90° of rotation; collar locking screw provided

**Attachment size:** 52mm (P=0.75)

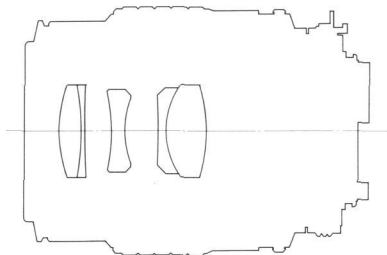
**Mount:** Nikon F mount

**Dimensions:** 74.5mm $\phi$  x 104mm long (overall); 96mm extension from flange

**Weight:** 500g

**Accessories included:** 52mm snap-on front lens cap; rear lens cap LF-1

**Optional accessories:** 52mm screw-in filters; flexible lens pouch No. 55; hard lens case CL-33A, plastic lens case CP-2; flexible lens pouch No. 56 (with PN ring attached); hard lens case CL-35A (with PN ring attached)





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