PC-Nikkor 28mm f/4

Nikon INSTRUCTION MANUAL

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Preset ring

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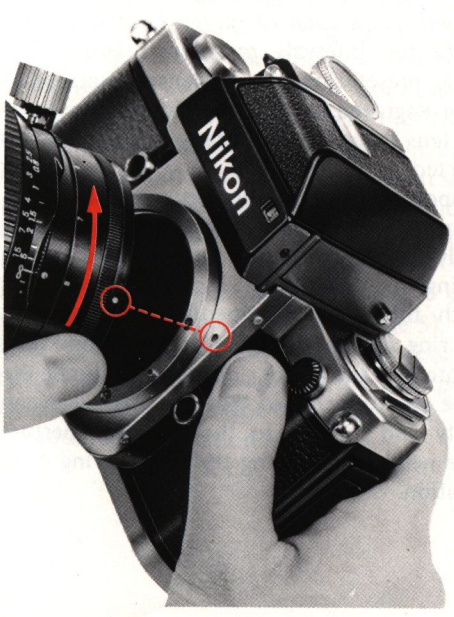
FOREWORD

The PC-Nikkor 28mm f/4 is the second retrofocus wideangle lens from Nikon offering the special lens-shifting feature for perspective control (PC) of the image. With the PC-Nikkor, the photographer can shift the lens optics up to 11mm off-center and, at the same time, rotate the lens barrel up to 360° to achieve a wide variety of perspective correction measures, and special-effects photographs. And the 28mm focal length of this lens offers a wide picture angle of 74° which, when used with a horizontal shift, provides a covering power of 92°, or almost equal to that of a 20mm lens.

The PC-Nikkor is ideally suited to architectural and commercial photography, enabling the photographer to duplicate rising, falling and shifting features generally available only with large view cameras—and the photographer has the added feature of thru-the-lens viewing and metering for greater ease of operation. To ensure minimum ghost and flare, with maximum image contrast, Nikon Integrated Coating (NIC) is applied to all air-to-glass lens surfaces.

MOUNTING THE LENS



The PC-Nikkor 28mm f/4 mounts on all Nikon F/F2 and Nikkormat series cameras. To mount the lens, position it in the camera's bayonet mount so that the mounting index dots on the lens and the camera are aligned. Then, grasp the milled surface of the mounting ring and twist the lens counterclockwise until it clicks and locks into place. (See "Stop-Down Measurement" on page 7 for metering procedures.)

To remove the lens from the camera body, press the lens release button on the camera and, keeping the button depressed, twist the lens clockwise.

To use the PC-Nikkor as a normal 28mm lens without using the perspective control feature, rotate the lens barrel so that the shift scale faces up. Then, if necessary, turn the milled shift knob until the lens optics are centered (i.e., the distance scale index line is aligned with the shift scale index dot).

SETTING THE APERTURE

The PC-Nikkor is provided with a manual diaphragm operable from f/4 to f/22 and a spring-loaded preset ring to aid in setting the diaphragm quickly to the shooting aperture; a total of eleven click-stop positions, at 1/2-stop intervals, make for precise placement of the preset ring. Also, identical sets of f/ numbers are engraved on opposite sides of the front rim of the lens to facilitate operation when the lens is used inverted.

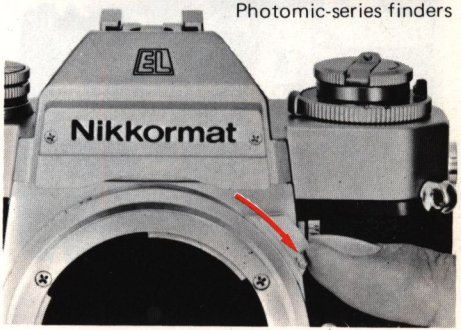
To set the aperture, the following procedure is recommended: Press the preset ring inward (i.e., toward the camera body) and turn it until the f/number setting corresponding to the desired shooting aperture is aligned with the ring's alignment index dot; then release the ring and it will spring outward and lock in place. Note that the preset ring, once set, limits the travel of the aperture ring so that the diaphragm can be set easily and quickly to the shooting aperture without the need for checking the scale during stop-down operation.

Stop-Down Measurement

The PC-Nikkor lens does not couple with the Nikon F/F2 Photomic or Nikkormat series thru-the-lens meters. However, these meters can still be used to measure exposure by the stop-down method. Before mounting the PC-Nikkor lens on the camera, set the camera coupling pin as follows: For Nikon F/F2 Photomic series cameras, push the pin up into the finder with a coin or similar object; when set, 5.6 will appear in the maximum aperture indicator. For Nikkormat series cameras, push the pin to the right as far as it will go.

Once the coupling pin has been properly set, mount the PC-Nikkor on the camera (see page 5), switch the meter on in the usual way, select the desired camera shutter speed, and manually set the lens aperture ring for proper metering (for Nikkormat EL automatic operation, see instruction manual).

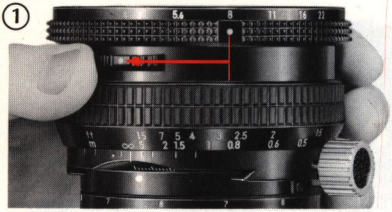
Photomic-series finders



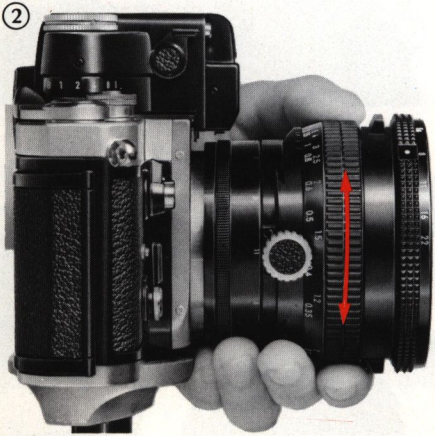
Nikkormat cameras

FOCUSING

①



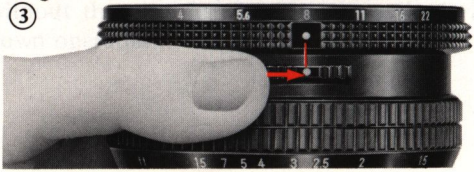
②



The aperture and preset rings of the PC-Nikkor enable focusing at full aperture for the brightest viewfinder image, with rapid setting of the diaphragm to the preset shooting aperture. Having set the preset ring to the desired aperture setting, focus as follows: Turn the aperture ring fully counterclockwise (i.e. to the f/4 setting) to open the diaphragm fully for focusing (photo 1); then turn the focusing ring until the image on the focusing screen is in sharp focus (photo 2). Before releasing the shutter, turn the aperture ring clockwise until it contacts the preset ring and can no longer be turned—the diaphragm is now at the preset shooting aperture (photo 3).

Note: The Type E focusing screen is highly recommended for use with Nikon F/F2 cameras. The vertical and horizontal lines etched on the screen help you to properly align the camera and lens for proper perspective correction of the image.

③

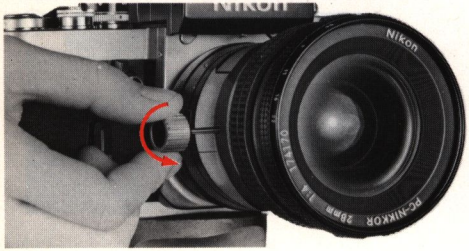


Depth of Field

Depth of field refers to the zone of acceptable focus extending in front of and behind the plane of sharpest focus. Within this zone, image blur is negligible and everything can be considered as being in sharp focus. To observe the depth of field with the PC-Nikkor lens, it is necessary to manually set the diaphragm to the required shooting aperture; for procedures, refer to "Setting the Aperture" on page 6.

Depth of field can also be determined by reading the color-coded depth-of-field indicators engraved on the lens barrel opposite the distance scale. Each pair of colored lines corresponds to an f/number of the same color engraved on the lens front rim. To find the depth of field at a particular aperture, focus the lens on the subject and then check the numbers on the distance scale opposite the colored lines that match the color of the preset shooting aperture setting. When in doubt about depth of field for a critical shooting situation, refer to the tables on pages 20 and 21 of this instruction manual.

SHIFT AND ROTATION MOVEMENT



The front part of the PC-Nikkor shifts up to 11mm from the center in a plane parallel to the film, and the whole lens mount rotates through a full 360°. By combining the parallel shift with the rotation movement of the lens, an infinite variety of adjustments can be made.

To shift the lens, turn the knurled shift knob. The knob should always be turned so that it is facing away from the direction in which the lens is to be shifted. The shift scale shows the degree of shift in millimeters. When the shift scale is facing upward, the lens can be shifted 11mm to the right of center. In order to shift the lens in other directions, simply rotate the whole lens mount, stopping at one of the 12 click-stop settings provided at 30° intervals, or choosing a desired intermediate position. By combining these two movements, the lens can be shifted up to 11mm from the center in any direction.

Maximum Permissible Shift

Depending on the direction of shift, however, there is a maximum permissible shift, beyond which distortion may occur in the picture corners, because the film format is rectangular while image area produced by the lens is circular. The amount of shift permissible without distortion is indicated in millimeters at each click-stop on the lens barrel. Shifting beyond these limits is possible, nonetheless, if you take care to compose so that any distortion will occur in unimportant parts of the picture. The diagrams at right show the limits based on the direction of shift.

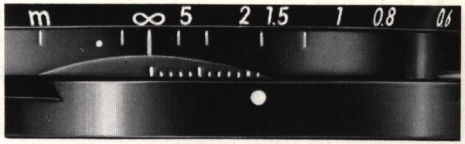


Diagram 1

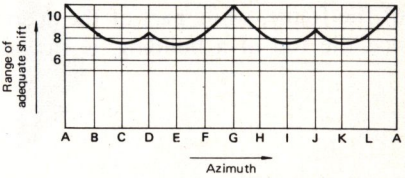
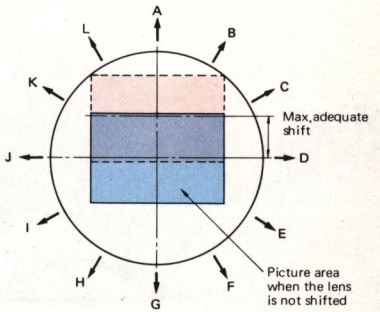


Diagram 2



FRAMING

As long as the camera is held in a position parallel to the subject when shooting, it reproduces scenes more or less as the eye sees them, with no unpleasant perspective distortion. However, shooting from this position often produces unbalanced composition, since the camera is usually used close to ground level. Much unwanted foreground is included in the lower half of the frame, while part of the main subject, for instance the top of a building, is excluded (Fig. 1).

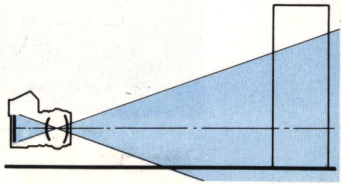


Fig.1

Inevitably, the camera must be tilted in order to include the top of the building and minimize the foreground (Fig. 2). But with the camera tilted, the plane of the film is no longer parallel to the subject, and because the image size varies according to subject distance, the nearer parts of the subject are reproduced on a scale larger than those farther away. The sides of the building appear to converge, as if the building were leaning back or falling. Similar distortion occurs in horizontal lines when photographing a long line of buildings at an angle.

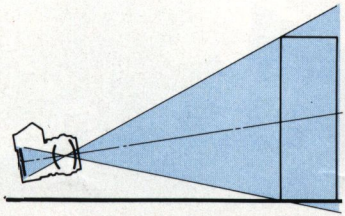


Fig.2

FRAMING — continued

The PC-Nikkor's shift and rotation movements enable you to create balanced composition without tilting the camera, so that the film remains parallel to the plane of the subject (Fig. 3).

To photograph a tall building, hold the camera parallel to the plane of the building. Rotate the lens mount until the milled knob points downward, and sight the subject on the focusing screen. Now turn the milled knob until all of the building is visible and unwanted foreground area is trimmed away, checking to be sure that the adjustment is within the permissible shift area (see page 11).

If you must exceed the permissible shift adjustment in order to include all of the desired subject, try to compose the picture so that any peripheral distortion will occur in unimportant areas, such as sea, sky or earth. Use the same technique to make adjustments for horizontal and diagonal subjects.

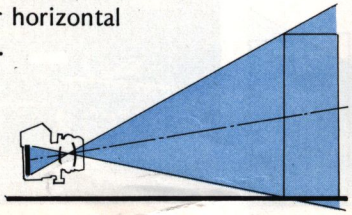
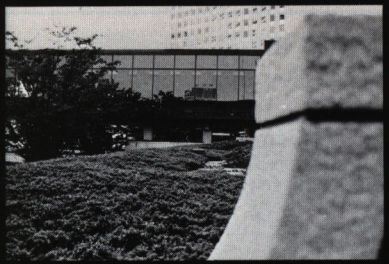


Fig.3

a



b

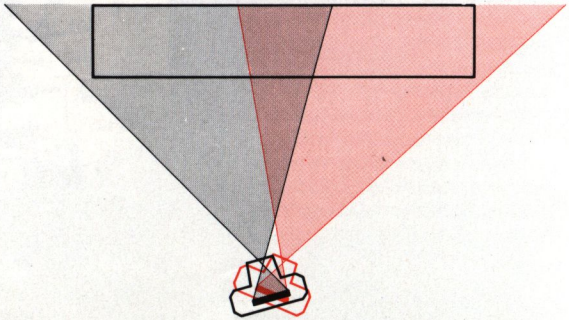
Getting around an obstacle

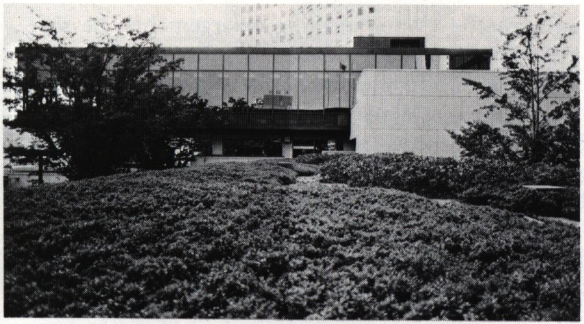
a. Wall obstructs complete view of subject building.
b. Convergence of horizontal lines when camera mounted with an ordinary lens is tilted sideways to avoid wall.
c. Horizontal lines perspectively controlled with PC-Nikkor, by simply keeping camera parallel to front surface of building and shifting lens laterally. (If frame cuts top of building, rotate lens obliquely until subject is in full view.)

c

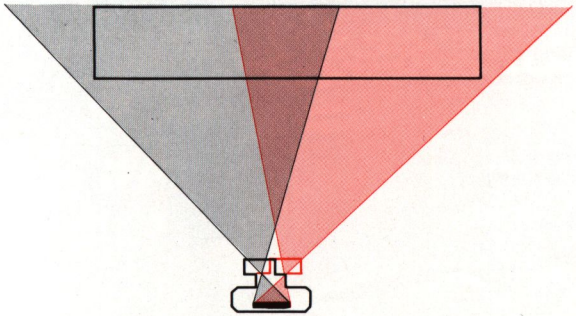
PANORAMAS

The shift movement of the PC-Nikkor can also be used for making panoramic pictures by joining exposures. Its advantage over the normal lens mounted on panoramic equipment is that it enables you to maintain exactly the same film plane in both exposures so that the finished photographs will match exactly. With the ordinary lens, the camera must be moved after the first exposure in order to take in a new arc of the horizon. This movement changes the film plane, so that vertical and horizontal lines in the subject make new and different angles with the film. As a result, no two photographs will ever match perfectly when joined.





To take panoramic shots, place the lens in normal position, shift scale facing upward, and operate the milled shift knob to shift the lens as far to the left as possible. Compose, focus, and shoot. Without moving the camera, wind the film advance lever to advance the film one frame, and rotate the lens mount through 180° so that the shift scale faces straight down. Now make the second exposure.



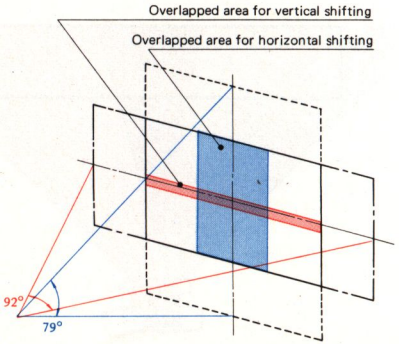
PANORAMAS—continued

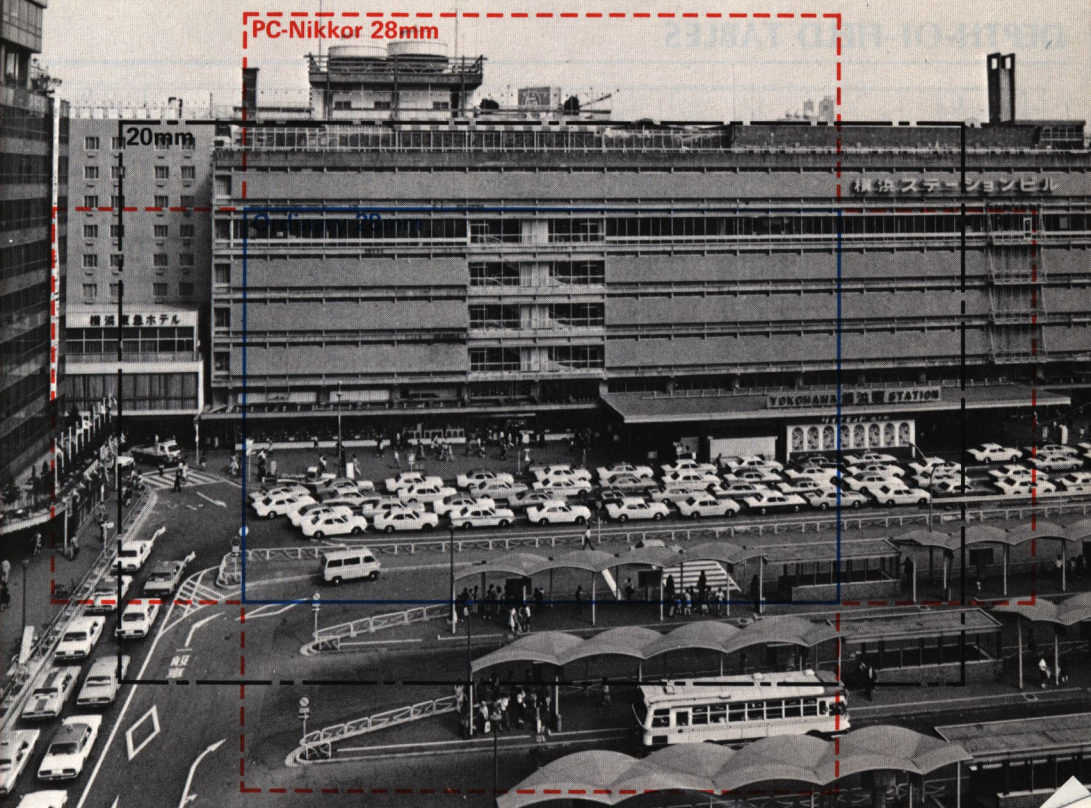
These two exposures together cover a horizontal angle of 92° without turning the camera, 8°30' more than the range of a 20mm wideangle lens, and with the added advantage of larger image size. The table below gives a comparison of the angles of various wideangle lenses and the PC-Nikkor panorama range. In making a vertical panorama, a 79° vertical angle can be covered using the extreme rise and fall shifts, with the camera still in the horizontal position. The overlapping area is least when two pictures are matched vertically.

When making enlargements, be sure that the negative is absolutely parallel to the easel to prevent distortions. All of the focusing adjustments on the enlarger should be maintained constant from one exposure to the next. When the prints are removed from the washer, insert them in a rotary dryer facing the same direction.

Caution: Extreme care is necessary when taking panoramic shots to avoid camera movement, since even a slight movement between exposures will result in some distortion and photographs will not join exactly. For best results mount the camera on a tripod.

Nikkor lens		Horizontal picture angle	Vertical picture angle
20mm f/4		83°30'	61°30'
24mm f/2.8		74°	53°
28mm f/2		64°	45°
35mm f/1.4		53°	37°
28mm PC	Vertical connection	64°	79°
	Horizontal connection	92°	45°




PC-Nikkor 28mm
20mm
横浜ステーションビル
横浜東急ホテル
YOKOHAMA STATION

DEPTH-OF-FIELD TABLES

f/ / ft	4	5.6	8	11	16	22	Reproduction ratio
1	11-11/16"– 1'5/16"	11-9/16"– 1'7/16"	11-3/8"– 1'5/8"	11-3/16"– 1'7/8"	10-15/16"– 1'1-3/8"	10-9/16"– 1'2-1/16"	1/7.12
1.2	1'1-7/8"– 1'2-7/8"	1'1-11/16"– 1'3-1/8"	1'1-7/16"– 1'3-1/2"	1'1-1/8"– 1'3-15/16"	1'11/16"– 1'4-7/8"	1'3/16"– 1'6-1/8"	1/9.28
1.5	1'5-1/8"– 1'6-15/16"	1'4-13/16"– 1'7-5/16"	1'4-3/8"– 1'8"	1'3-7/8"– 1'8-15/16"	1'3-1/8"– 1'10-11/16"	1'2-3/8"– 2'1-3/8"	1/12.5
2	1'10-3/8"– 2'1-7/8"	1'9-3/4"– 2'2-3/4"	1'9"– 2'4-1/4"	1'8-1/16"– 2'6-3/8"	1'6-3/4"– 2'10-13/16"	1'5-7/16"– 3'6-5/8"	1/17.8
2.5	2'3-5/16"– 2'9-1/4"	2'2-7/16"– 2'10-13/16"	2'1-3/16"– 3'1-9/16"	1'11-13/16"– 3'5-5/8"	1'9-7/8"– 4'3-1/4"	1'8"– 6'1/8"	1/23.2
3	2'8-1/8"– 3'5-1/16"	2'6-13/16"– 3'7-5/8"	2'5-1/16"– 4'1/8"	2'3-3/16"– 4'7-3/8"	2'9/16"– 6'2-15/16"	1'10-1/8"– 11'2"	1/28.5
4	3'5"– 4'10-1/16"	3'2-13/16"– 5'3-9/16"	3'0"– 6'2-3/16"	2'9"– 7'10-3/8"	2'5-1/8"– 14'9"	2'1-5/8"– ∞	1/39.1
5	4'1-1/4"– 6'5-5/16"	3'10"– 7'3-5/8"	3'6"– 9'2-1/16"	3'1-7/8"– 13'7"	2'8-11/16"– 82'1"	2'4-1/4"– ∞	1/49.7
7	5'3-7/8"– 10'4"	4'10-3/8"– 12'11"	4'3-13/16"– 20'6"	3'9-9/16"– 83'6"	3'2-1/16"– ∞	2'8"– ∞	1/71.0
15	8'9-11/16"– 54'7"	7'6-15/16"– ∞	6'3-7/16"– ∞	5'2-3/8"– ∞	4'3/4"– ∞	3'2-15/16"– ∞	1/156
∞	20'7"– ∞	14'9"– ∞	10'5"– ∞	7'8-3/16"– ∞	5'4-9/16"– ∞	4'0"– ∞	1/∞

f/ / m	4	5.6	8	11	16	22	Reproduction ratio
0.3	0.293–0.308	0.290–0.311	0.286–0.316	0.282–0.323	0.274–0.335	0.266–0.351	1/6.95
0.35	0.339–0.362	0.335–0.367	0.329–0.375	0.322–0.386	0.312–0.405	0.300–0.433	1/8.72
0.4	0.385–0.417	0.379–0.424	0.371–0.436	0.362–0.452	0.347–0.482	0.332–0.525	1/10.5
0.5	0.474–0.530	0.464–0.543	0.451–0.565	0.435–0.595	0.413–0.655	0.389–0.749	1/14.0
0.6	0.560–0.647	0.546–0.669	0.526–0.704	0.504–0.755	0.472–0.863	0.439–1.05	1/17.5
0.8	0.726–0.894	0.700–0.940	0.666–1.02	0.628–1.14	0.574–1.43	0.523–2.11	1/24.5
1	0.882–1.16	0.843–1.24	0.791–1.39	0.735–1.64	0.660–2.37	0.591–5.39	1/31.5
1.5	1.24–1.92	1.16–2.17	1.06–2.71	0.954–3.97	0.825–19.4	0.714–∞	1/48.9
2	1.55–2.87	1.42–3.48	1.27–5.18	1.12–13.7	0.942–∞	0.796–∞	1/66.3
5	2.82–24.4	2.41–∞	1.98–∞	1.63–∞	1.27–∞	1.01–∞	1/171
∞	6.27–∞	4.51–∞	3.18–∞	2.34–∞	1.64–∞	1.22–∞	1/∞

CLOSE-UP TABLE

●—inch ●—cm

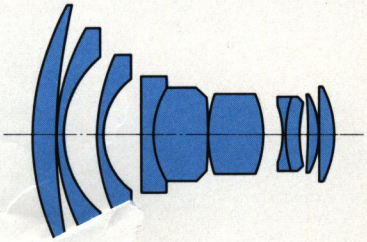
Close-up attachments	Lens in normal position		
	Reproduction ratio	Subject field	Focused distance
E2 Ring	1/2.1—1/1.6	1.9 x 2.9—1.5 x 2.2 4.9 x 7.4—3.8 x 5.7	6.7—7.3 16.9—15.6
* K Ring Set	1/4.9—1.8	4.7 x 7.0—0.53 x 0.79 11.9 x 17.8—1.4 x 2.0	9.6—6.3 24.4—15.9
Bellows Attachment PB-4, PB-5	1.5—2.2	0.63 x 0.94—0.43 x 0.65 1.6 x 2.4—1.1 x 1.7	5.9—6.8 15.9—17.2
** Repro-Copy Outfit Model PF-2	1/26—1/6.9	24.8 x 37.1—6.6 x 9.8 62.9 x 94.3—16.7 x 25.0	33.5—11.8 85.0—30.0

* The first values are for K1 ring used alone; the second values 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.

FEATURES/SPECIFICATIONS

Type of lens: Wideangle perspective control lens
Focal length: 28mm
Maximum aperture: f/4
Lens construction: 10 elements in 8 groups
Picture angle: 74° (normal shooting); 92° (panorama shooting)
Distance scale: Graduated in meters and feet from 0.3m (1 ft) to infinity (∞).
Recommended focusing screen: Nikon Type E screen (matte Fresnel field with central matte spot and etched vertical and horizontal lines) for Nikon F/F2 cameras
Aperture scale: f/4 ~ f/22
Diaphragm: Manual type with preset ring for convenience when setting the diaphragm to the shooting aperture
Exposure measurement: Stop-down method; meter coupling prong not provided
Lens shift: Special mount enables up to 11mm off-center shift for perspective control; shift adjustments via milled knob at side of lens; shift scale provided with graduations at 1mm intervals
Lens rotation: Lens optics rotate 360° for perspective control adjustments in any direction; click-stops provided at each 30° of rotation; maximum permissible shift values engraved at each click-stop position
Attachment size: 72mm (P=0.75mm)
Filters: 72mm screw-in
Mount: Nikon F mount
Dimensions: 78mm dia. x 68mm long
Weight: 410g
Accessories included: Rear protective cap; front 72mm screw-in lens cap; hard lens case CL-34A and case carrying strap



Nikon

NIPPON KOGAKU K.K.

Printed in Japan (75.8.A) &-1