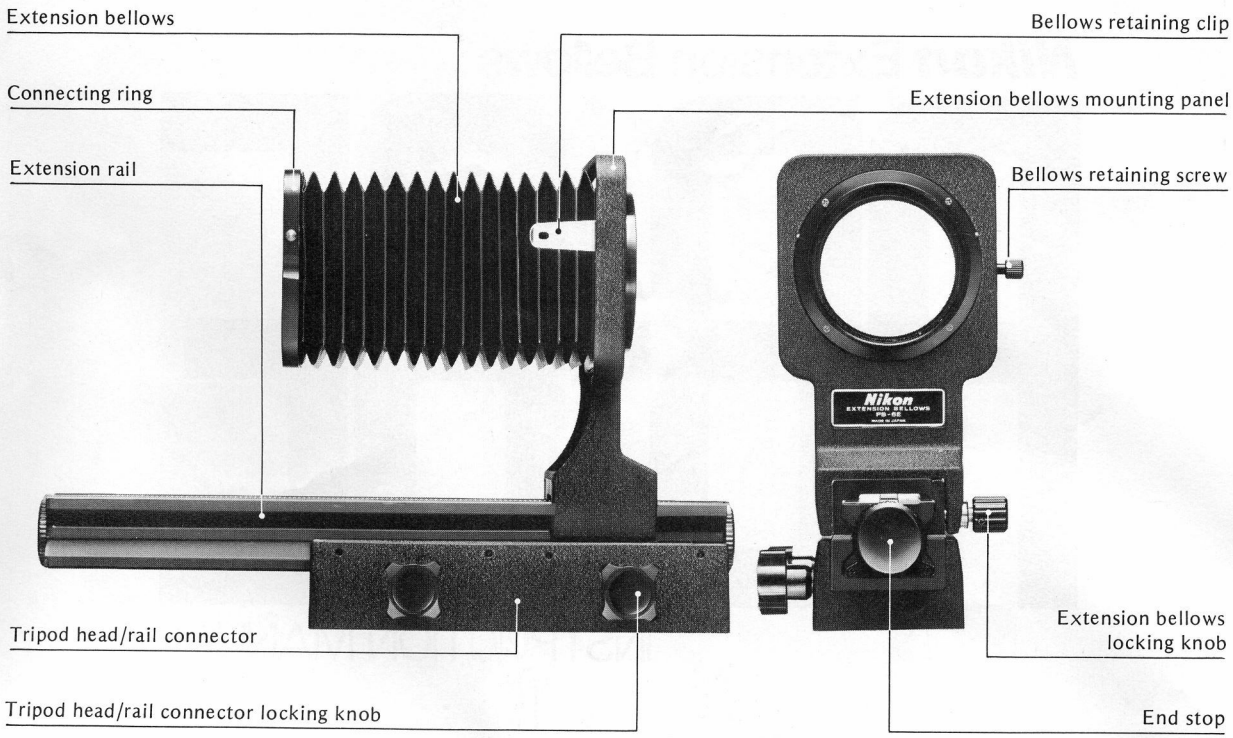
Nikon **Extension Bellows**

PB-6E

INSTRUCTION MANUAL

En

NOMENCLATURE



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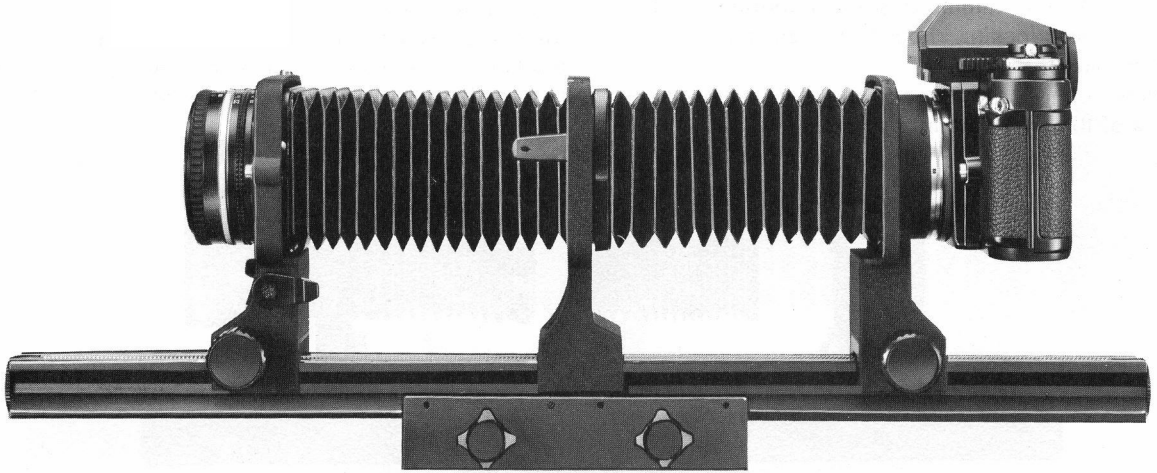
FOREWORD

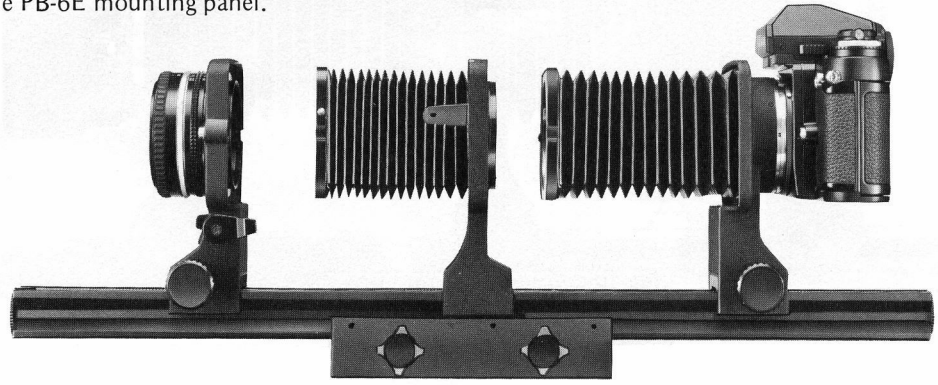
The Nikon Extension Bellows PB-6E can be connected to the Nikon Bellows Focusing Attachment PB-6 to increase the amount of extension up to 438mm. Its use permits the photographer to obtain higher magnification ratios than are possible with the bellows alone. When using both units in combination, please refer to the PB-6 instruction manual, too.



MOUNTING THE PB-6E

1. Unscrew the end-stop from the lens panel end of the PB-6 rail, disconnect the PB-6 bellows from the lens panel by loosening the bellows retaining screw, and take the lens panel completely off the rail.
2. Unscrew both end-stops from the PB-6E extension rail, loosen the locking knobs on the tripod head/rail connector, and slide it half-way off the end of the extension rail.
3. Slip the front end of the PB-6 rail into the tripod head/rail connector until the two rails meet in the center and the millimeter scale is continuous. Then tighten both locking knobs to prevent the rails from pulling apart.
4. Now connect the front of the PB-6 bellows to the back of the PB-6E mounting panel.
5. Slip the PB-6 lens panel onto the front end of the PB-6E extension rail and tighten the locking knob. Then connect the PB-6E extension bellows to the lens panel. If you want to mount the lens in the reverse position, you must reverse the lens panel on the rail. Then, connect the bellows to the front rim of the lens.
6. Finally screw the end-stops into the front of the PB-6E extension rail.
7. Don't forget to put the two extra end-stops away for safekeeping.

Note: When the PB-6/PB-6E assembly is in use, the PB-6's tripod head may be left on its rail or removed, since its function is replaced by the tripod head/rail connector of the PB-6E.

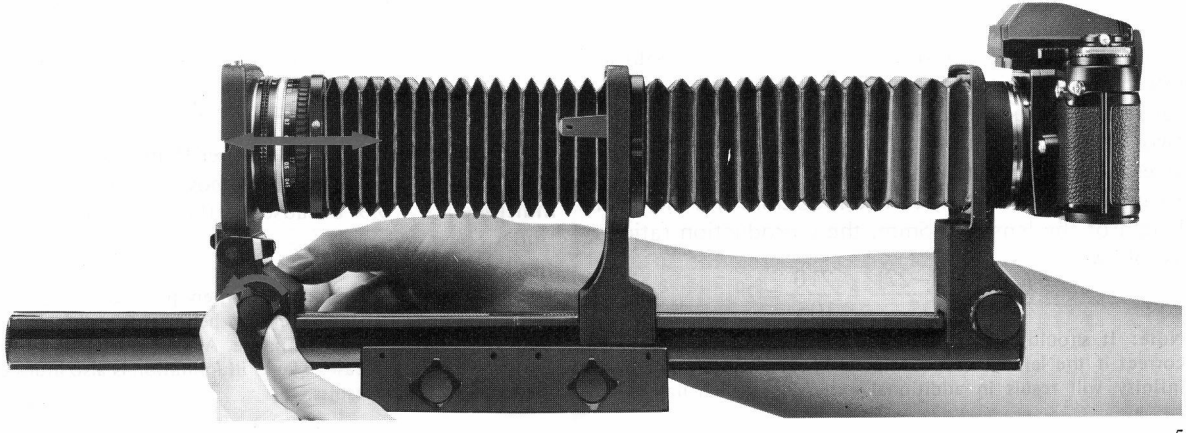


FOCUSING

With the PB-6E attached to the PB-6, reproduction ratios are almost always larger than 1X. Because the subject appears dark in the finder, the photographer may need to illuminate the subject for focusing.

Focusing can be done by moving either the lens panel, the camera panel or the subject. (The focusing ring of the lens should be turned to infinity.) To determine the size of the subject field, reproduction ratio, bellows extension and working distance (i.e., the distance between the subject plane in focus and the lens barrel), please refer to the reproduction ratio tables on page 8 ~ 10.

When the PB-6/PB-6E assembly is mounted on a tripod or a repro-copy outfit such as the accessory Nikon PF-2, PF-3 or PF-4, it is recommended to move the assembly itself for focusing after first determining the bellows' extension that will give you the desired reproduction ratio.



DETERMINING THE REPRODUCTION RATIO

To find the reproduction ratio by measuring the bellows extension (lens in the normal position)

The scale on the upper part of the PB-6E extension rail forms a continuation of the scale of the PB-6 when the two units are connected. Thus, the amount of the bellows extension is shown on the scale of the PB-6E rail. Where "X" is the value given on the scale, and "f" is the focal length of the lens used, the reproduction ratio (M) is equal to $\frac{X}{f}$

Example: When the Micro-Nikkor 55mm f/2.8 is used, and the X value on the scale is given as 385, the reproduction ratio is as follows:

$$M = \frac{385}{55} = 7$$

When the lens panel and the camera panel are both at intermediate positions on the rail, read off the numerical values on each side. Then find the difference of the two values and subtract 22mm from the result. This gives the bellows extension value.

Example: When the difference is 232mm and the focal length of the lens is 105mm, the reproduction ratio is as follows:

$$M = \frac{(232-22)}{105} = \frac{210}{105} = 2$$

Note: It should be remembered that these values are only correct if the lens in use is set at infinity; settings other than infinity will result in additional extension, which has to be added to the value given on the scale in order to determine the true bellows extension.

To find the reproduction ratio in the Nikon F3's viewfinder (lens in any position)

Place the scale in the same place as the subject and parallel with the longer side of the viewfinder. The left end of the scale (marked "0") should be continuous with the left-hand side of the viewfinder (or the top side, if the camera is placed vertically). Look through the viewfinder, and read off the length of the area which is in sharp focus. The reproduction ratio M is as follows:

$$M = \frac{36}{\text{the length of the area read off (along the long side of the viewfinder)}}$$

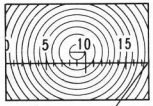
Example: When 18mm is read off as the length of the area in sharp focus, then:

$$M = \frac{36}{18} = 2$$

When using Nikon cameras other than the F, F2 or F3, the value computed in the above equation must be multiplied by 0.9 because of the difference in viewfinder coverage.

Important!

It should be remembered that when photographing at high magnification using the extension bellows, the slightest vibration will result in a blurred image. Always use a sturdy tripod and cable shutter release. Proper illumination is also indispensable for satisfactory results.



Scale

Lengthwise reading (mm)	1.5	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Reproduction ratio	24×	18	12	9	7.2	6	5.1	4.5	4	3.6	3.3	3	2.8	2.6	2.4	2.3	2.1	2	1.9	1.8	1.7	1.6	1.5		1.4		1.3		1.2		

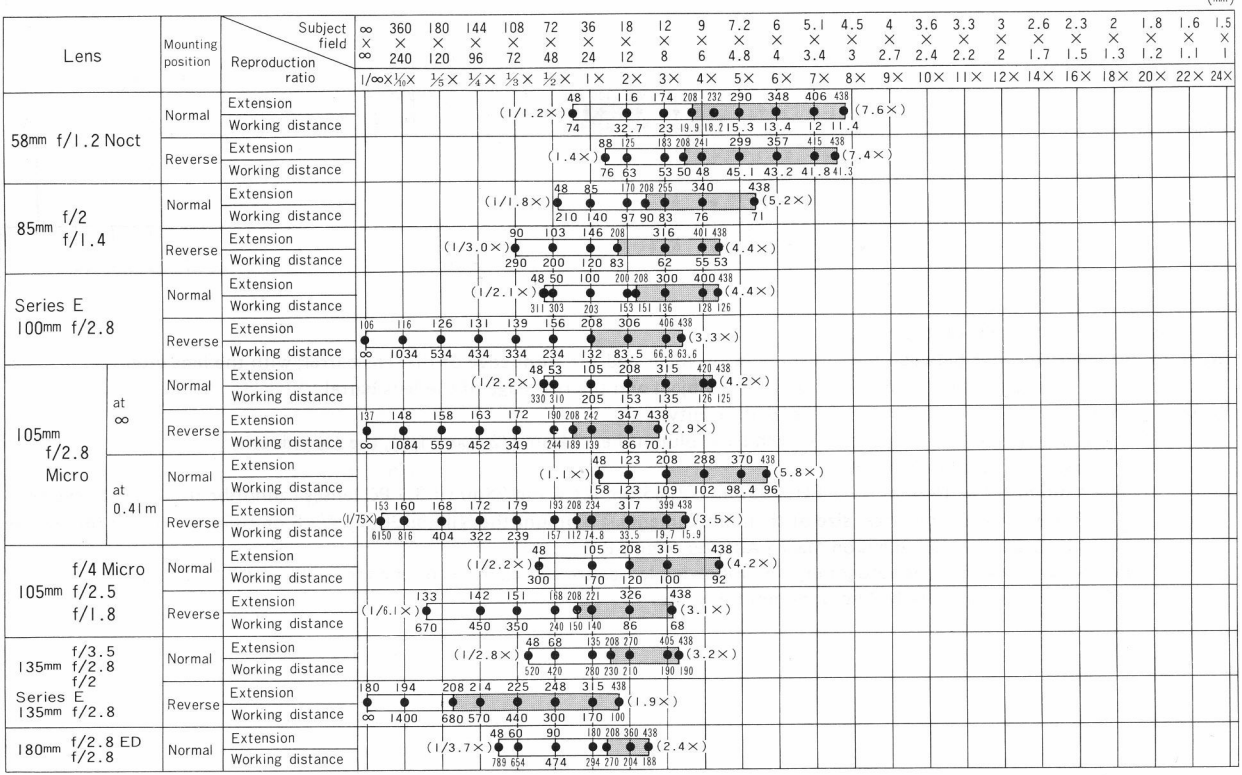
Lengthwise reading (mm)	32	33	34	35	36	37	38~42	43~48	49~55	56~65	66~80	81~102	103~144	145~240	241~380
Reproduction ratio	1.1×			1			0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2	0.1

REPRODUCTION RATIOS

(mm)

Lens	Mounting position	Subject field / Reproduction ratio	∞ 360 180 144 108 72 36 18 12 9 7.2 6 5.1 4.5 4 3.6 3.3 3 2.6 2.3 2 1.8 1.6 1.5
			∞ 240 120 96 72 48 24 12 8 6 4.8 4 3.4 3 2.7 2.4 2.2 2 1.7 1.5 1.3 1.2 1.1 1
			1/∞× 1/10× 1/5× 1/4× 1/3× 1/2× 1× 2× 3× 4× 5× 6× 7× 8× 9× 10× 11× 12× 14× 16× 18× 20× 22× 24×
20mm f/2.8	Reverse	Extension	84 106 127 147 167 188 208 229 269 310 351 392 433 439 (22.3×)
		Working distance	(4.9×) 37.7 36.9 36.4 36.1 35.8 35.5 35.4 35.2 35.0 34.8 34.6 34.5 34.4 34.4
20mm f/3.5	Reverse	Extension	78 87 108 128 148 169 189 208 210 230 271 312 352 393 434 438 (22.2×)
		Working distance	(4.5×) 38 37.6 36.9 36.4 36.1 35.8 35.5 35.4 35.4 35.2 35 34.8 34.6 34.5 34.4 34.4
24mm f/2.8 f/2	Reverse	Extension	83 111 135 160 184 208 233 257 282 330 379 428 438 (18.4×)
		Working distance	(3.9×) 39.8 38.4 37.6 37 36.6 36.2 35.9 35.7 35.5 35.2 35 34.9 34.8
28mm f/3.5 f/2.8 f/2 f/3.5 PC	Normal	Extension	48 84 (2.9×)
		Working distance	(1.7×) 7.3 0
	Reverse	Extension	83 105 133 162 191 208 219 248 276 305 334 391 438 (15.7×)
		Working distance	(3.3×) 42.3 40.7 39.2 38.3 37.6 37.3 37.1 36.7 36.4 36.1 35.9 35.5 35.3
Series E 28mm f/2.8	Normal	Extension	48 58 86 115 144 173 202 208 230 237 (8.2×)
		Working distance	(1.7×) 13.8 10.9 6.1 3.7 2.3 1.3 0.61 0.49 0.10
	Reverse	Extension	72 100 129 158 187 208 215 244 273 302 331 388 438 (15.7×)
		Working distance	(3.0×) 43.0 40.7 39.3 38.3 37.6 37.2 37.1 36.7 36.4 36.1 35.9 35.6 35.3
35mm f/2 f/1.4	Normal	Extension	48 72 108 154 (4.3×)
		Working distance	(1.3×) 18.6 9.6 3.6 0
	Reverse	Extension	89 141 177 208 249 285 321 357 393 438 (12.3×)
		Working distance	(2.6×) 47.6 42.5 40.7 39.6 38.6 38 37.5 37.1 36.8 36.4
35mm f/2.8 f/2.8 PC Series E 35mm f/2.5	Normal	Extension	48 72 108 144 180 208 252 288 324 360 396 438 (12.2×)
		Working distance	(1.3×) 24.2 15.2 9.1 6.2 4.4 3.4 2.3 1.7 1.1 0.8 0.4 0.1
	Reverse	Extension	83 105 141 177 208 249 285 321 357 393 438 (12.3×)
		Working distance	(2.4×) 48.5 45.5 42.5 40.7 39.6 38.6 38 37.5 37.1 36.8 36.4
f/1.8、f/2 50mm f/1.4、f/1.2 f/1.8 AF Series E 50mm f/1.8	Normal	Extension	48 103 155 208 258 310 361 413 438 (8.5×)
		Working distance	(1/1.1×) 64 34.3 25.7 21.3 18.8 17.1 15.9 15 14.6
	Reverse	Extension	78 106 158 208 261 313 364 416 438 (8.4×)
		Working distance	(1.1×) 69 59 51 46.5 43.8 42.1 40.9 40 39.6
f/2.8 Micro 55mm f/3.5 Micro f/1.2	Normal	Extension	48 110 165 208 275 330 440 438 (8.0×)
		Working distance	(1/1.1×) 65 29.1 19.9 16.1 12.6 10.8 8.5 8.5
	Reverse	Extension	92 120 175 208 230 285 340 395 438 (7.6×)
		Working distance	(1.5×) 71 61 52 48.8 47.3 44.5 42.7 41.4 40.6

(mm)


Lens
Mounting position
Subject field
Reproduction ratio
∞ 360 180 144 108 72 36 18 12 9 7.2 6 5.1 4.5 4 3.6 3.3 3 2.6 2.3 2 1.8 1.6 1.5
× ×
∞ 240 120 96 72 48 24 12 8 6 4.8 4 3.4 3 2.7 2.4 2.2 2 1.7 1.5 1.3 1.2 1.1 1
1/∞× 1/10× 1/5× 1/4× 1/3× 1/2× 1× 2× 3× 4× 5× 6× 7× 8× 9× 10× 11× 12× 14× 16× 18× 20× 22× 24×
58mm f/1.2 Noct
Normal
Extension
Working distance
(1/1.2×) 48 116 174 208 232 290 348 406 438 (7.6×)
74 32.7 23 19.9 18.2 15.3 13.4 12 11.4
Reverse
Extension
Working distance
(1.4×) 88 125 183 208 241 299 357 415 438 (7.4×)
76 63 53 50 48 45.1 43.2 41.8 41.3
85mm f/2 f/1.4
Normal
Extension
Working distance
(1/1.8×) 48 85 170 208 255 340 438 (5.2×)
210 140 97 90 83 76 71
Reverse
Extension
Working distance
(1/3.0×) 90 103 146 208 316 401 438 (4.4×)
290 200 120 83 62 55 53
Series E 100mm f/2.8
Normal
Extension
Working distance
(1/2.1×) 48 50 100 200 208 300 400 438 (4.4×)
311 303 203 153 151 136 128 126
Reverse
Extension
Working distance
106 116 126 131 139 156 208 306 405 438 (3.3×)
∞ 1034 534 434 334 234 132 83.5 66.8 63.6
105mm f/2.8 Micro
at ∞
Normal
Extension
Working distance
(1/2.2×) 48 53 105 208 315 420 438 (4.2×)
330 310 205 153 135 126 125
Reverse
Extension
Working distance
137 148 158 163 172 190 208 242 347 438 (2.9×)
∞ 1084 559 452 349 244 189 139 86 70.1
at 0.41m
Normal
Extension
Working distance
(1.1×) 48 123 208 288 370 438 (5.8×)
158 123 109 102 98.4 96
Reverse
Extension
Working distance
(1/75×) 153 160 168 172 179 193 208 234 317 399 438 (3.5×)
6150 816 404 322 239 157 112 74.8 33.5 19.7 15.9
105mm f/4 Micro f/2.5 f/1.8
Normal
Extension
Working distance
(1/2.2×) 48 105 208 315 438 (4.2×)
300 170 120 100 92
Reverse
Extension
Working distance
(1/6.1×) 133 142 151 168 208 221 326 438 (3.1×)
670 450 350 240 150 140 86 68
135mm f/3.5 f/2.8 f/2 Series E 135mm f/2.8
Normal
Extension
Working distance
(1/2.8×) 48 68 135 208 270 405 438 (3.2×)
520 470 280 230 210 190 190
Reverse
Extension
Working distance
180 194 208 214 225 248 315 438 (1.9×)
∞ 1400 680 570 440 300 170 100
180mm f/2.8 ED f/2.8
Normal
Extension
Working distance
(1/3.7×) 48 60 90 180 208 360 438 (2.4×)
789 654 474 294 270 204 188

REPRODUCTION RATIOS — continued

(mm)

Subject field	∞ × ∞	360 × 240	180 × 120	144 × 96	108 × 72	72 × 48	36 × 24	18 × 12	12 × 8	9 × 6	7.2 × 4.8	6 × 4	5.1 × 3.4	4.5 × 3	4 × 2.7	3.6 × 2.4	3.3 × 2.2	3 × 2	2.6 × 1.7	2.3 × 1.5	2 × 1.3	1.8 × 1.2	1.6 × 1.1	1.5 × 1
Reproduction ratio	1/∞×	1/10×	1/5×	1/4×	1/3×	1/2×	1×	2×	3×	4×	5×	6×	7×	8×	9×	10×	11×	12×	14×	16×	18×	20×	22×	24×

Lens	Mounting position		Values (left to right)
200mm f/4	Normal	Extension	48, 67, 100, 208, 400, 438
		Working distance	(1/4.2×) 1200, 920, 720, 520, 420, 420 (2.2×)
	Reverse	Extension	395, 415, 435, 438
		Working distance	∞, 2034, 1034, 966 (1/4.7×)
200mm f/4 IF Micro	Normal	Extension	48, 50, 67, 100, 200, 208, 400, 438
		Working distance	(1/4.2×) 990, 957, 754, 557, 357, 349, 257, 248 (2.2×)
	Reverse	Extension	282, 302, 322, 332, 349, 382, 438
		Working distance	∞, 2034, 1034, 834, 634, 434, 291 (1/1.3×)

[ ] = With PB-6 alone.

[shaded] = With PB-6 and PB-6E together.

Working distance: Distance between the subject plane in focus and the front edge of the lens barrel; with the lens mounted in reverse, the distance is between the subject and the rear edge of the lens barrel.

Notes: 1) Reproduction ratios are those obtained at infinity.

2) If more than one lens is included in each lens column (i.e., 24mm f/2.8 and f/2), the reproduction ratios apply only to the first lens (i.e., 24mm f/2.8).

3) The 180mm f/2.8, 180mm f/2.8 ED, 135mm f/2, 85mm f/1.4 and 28mm f/3.5 PC lenses cannot be used in the reversed position because of the larger size of their attachments. To mount the Nikkor 20mm f/2.8 or 105mm f/1.8 in the reversed position, use the optional Nikon Macro Adapter Ring BR-5.

4) For close-up and macrophotography, the following lenses are especially recommended: 55mm f/2.8 Micro, 105mm f/2.8 Micro, 200mm f/4 IF Micro, 50mm f/1.8, etc.

SPECIFICATIONS

Bellows extension: With PB-6:
48mm ~ 208mm
With PB-6 and PB-6E:
83mm ~ 438mm

Reproduction ratio: With PB-6 and 50mm f/1.8:
1/1.1 ~ 4X (lens in normal position)
1.1~3.9X (lens in reverse position)
With PB-6, PB-6E and 50mm f/1.8:
1.6X ~ 8.5X (lens in normal position)
2.1X ~ 8.4X (lens in reverse position)

Composition: Extension rail, extension bellows and tripod head/rail connector

Dimensions: 82mm (W) x 155mm (H) x 230mm (L)

Weight: Approx. 800g

Nikon

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