On-line camera manual library

This is the full text and images from the manual. This may take 3 full minutes for the PDF file to download.

If you find this manual useful, how about a donation of $3 to: M. Butkus, 29 Lake Ave., High Bridge, NJ 08829-1701 and send your e-mail address so I can thank you. Most other places would charge you $7.50 for a electronic copy or $18.00 for a hard to read Xerox copy.

This will allow me to continue to buy new manuals and pay their shipping costs.
It'll make you feel better, won't it?
If you use Pay Pal or wish to use your credit card,
click on the secure site on my main page.
PayPal Name Lynn@butkus.org

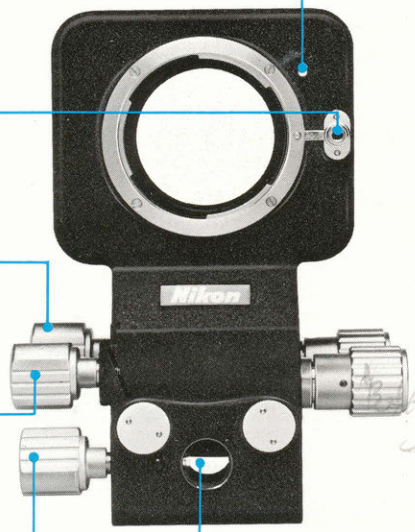
Bellows Focusing Attachment

PB-5

BUK-5.05

Nikon INSTRUCTION MANUAL

NOMENCLATURE



White indicator dot

Lens release button

Camera panel locking knob

Lens panel locking knob

Slide-copying adapter locking knob

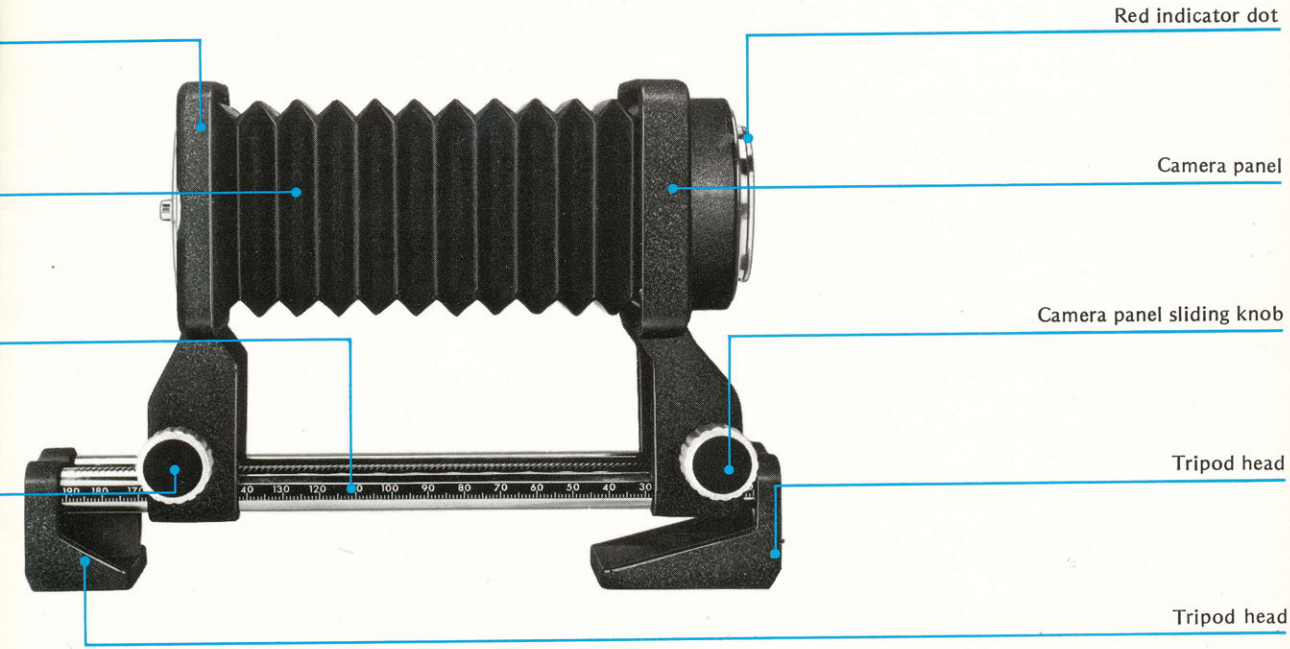
Lens panel

Bellows

Rails

Lens panel sliding knob

Slide-copying adapter socket


Red indicator dot
Camera panel
Camera panel sliding knob
Tripod head
Tripod head

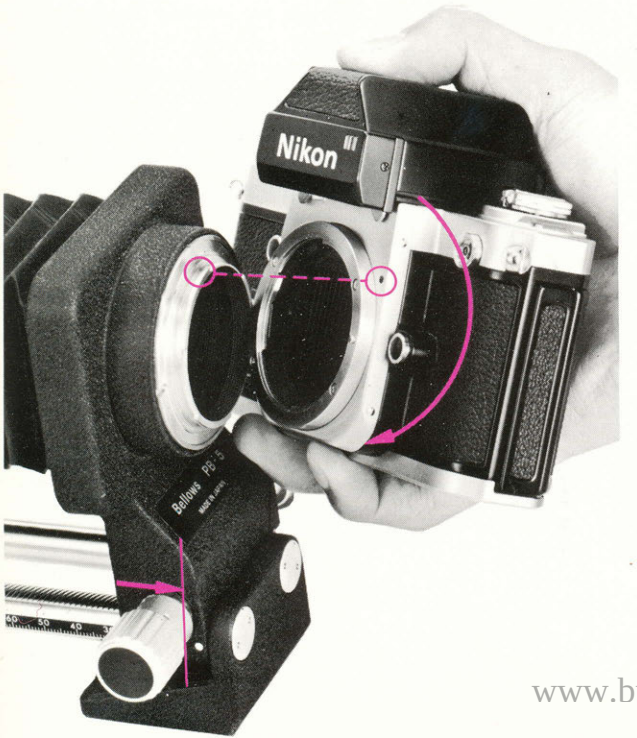
CONTENTS

FOREWORD

The PB-5 Bellows Focusing Attachment is a simplified version of the top-of-line PB-4 model. The bellows extends from 43 to 185mm for reproduction ratios ranging from 1:1.2 to 3.6X with the 50mm f/2 lens (1.6X to 4.4X when the lens is mounted in reverse using the accessory BR-2 ring). The lens panel and camera panel move independently for easy focusing and operating convenience. And the camera body can be rotated 90° for horizontal or vertical format pictures at any position on the rails.

The PB-5 accepts accessory slide copying adapters PS-5 and PS-4.

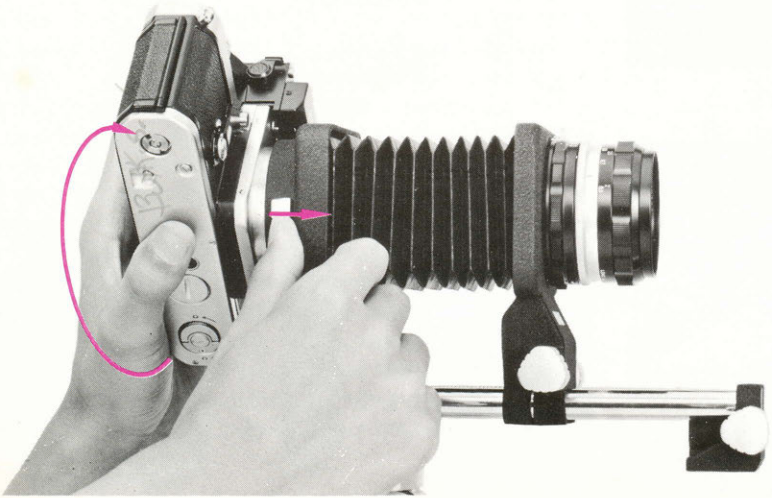
MOUNTING THE BELLOWS ON THE CAMERA



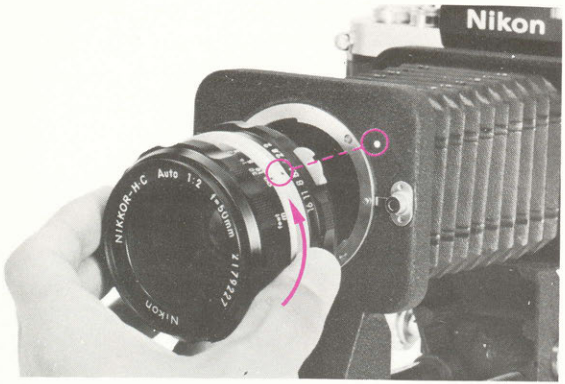
Loosen the locking knob on the camera panel and slide it back on the rails as far as it will go. Position the PB-5 in the camera's bayonet mount, lining up the red dot on the camera panel of the PB-5 with the black dot on the camera. Twist counterclockwise until it clicks into place.

The camera body can be rotated 90° for horizontal or vertical format photos at any position on the rails. Press the spring catch on the camera panel and turn the camera body counterclockwise until it clicks into place. To remove, depress the lens release button on the camera and twist the PB-5 clockwise.

Note: When used in the vertical position, the camera can be removed from the PB-5 in the normal manner regardless of the camera's position on the rails.



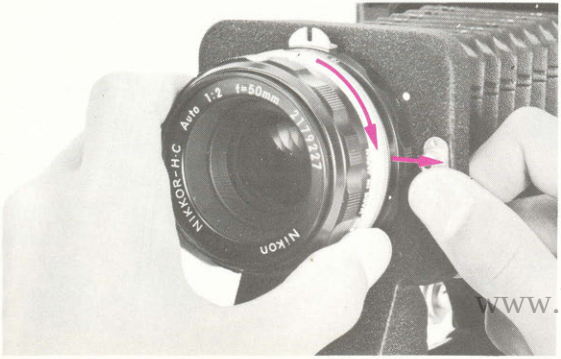
MOUNTING THE LENS

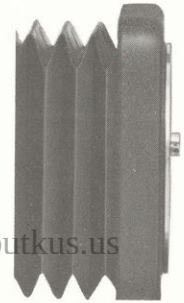


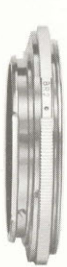
Position the lens in the bayonet mount on the lens panel, lining up the black dot on the lens with the white dot on the lens panel. Then twist the lens counterclockwise until it clicks into place.

To remove, press the lens release button on the lens panel and twist clockwise.

To mount the lens in reverse position, use the Nikon Macro Adapter Ring BR-2. The ring has a bayonet mount at one end that fits onto the PB-5, and a screw thread mount at the other to accept the lens. It can be used with any lens with 52mm attachment size.







Choosing a Lens

Though any of the Nikkor lenses from 24 to 300mm can be used with the PB-5, the Nikkor Auto 50mm f/2 and the Bellows-Nikkor 105mm f/4 are most commonly used. For critical closeups, the Micro-Nikkor-P Auto 55mm f/3.5 is an excellent choice.

For best results at reproduction ratios greater than 1:1, reverse the lens in its mount so that its front faces the film and its back is to the subject.

If the bellows extension remains the same, the shorter the focal length of the lens used, the greater the reproduction ratio. If reproduction ratio remains the same, increasing the focal length increases the lens-to-subject distance. When mounted in reverse position, short and normal focal length lenses give larger reproduction ratios than when they are mounted in normal position. The opposite is true for long lenses.

At the maximum aperture of the lens, depth of field is minimized and some marginal loss of image definition and illumination is likely to occur. Therefore the lens is usually focused at its maximum aperture, since this gives the brightest possible image on the focusing screen, then stopped down for making the exposure. However, the smallest aperture is not usually used either since this also results in image deterioration. The tables on pages 18 and 19 show the range of reproduction ratios possible with any Nikkor lens mounted on the PB-5 in either normal or reverse position and recommended lens apertures for the best results.

FOCUSING

When the PB-5 is mounted between the camera and the lens, the automatic diaphragm control of the Nikkor Auto lens is lost. To focus on the brightest possible image on the focusing screen, open up the lens to its maximum aperture by turning the aperture ring counter-clockwise as far as it will go. However, if the accessory Extension Ring E2 is attached to the lens, semi-automatic diaphragm control is possible.

The PB-5 has two knurled knobs on the left hand side to control the back-and-forth movement of the camera panel or lens panel. The locking knobs on the right hand side are used to lock the assembly securely when focusing is completed. An additional knob located at the front end of the PB-5 is used to clamp the slide copying adapter in place.

Focusing can be done in two ways. First, lock the camera panel in place by tightening the locking knob on the right side. Then turn the knurled knob on the left side to move the lens panel back and forth along the rails until the subject is in sharp focus. Retighten the locking knob to lock the lens panel in position especially when the PB-5 is used in the vertical position.

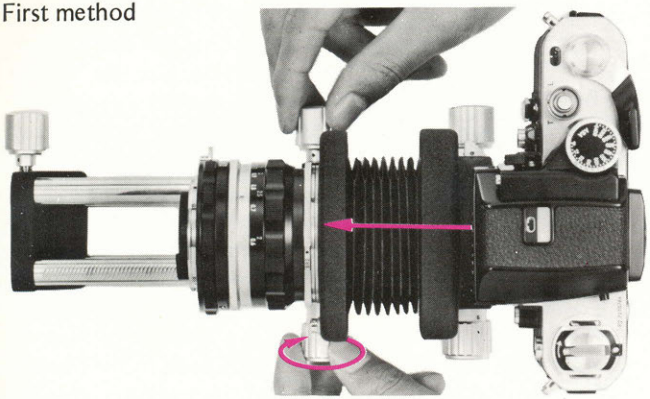
An alternate method is to lock the lens panel in place at the extreme front end of the rails and move the camera panel backward until the subject is in focus. This method is faster, since lens-to-subject distance remains unchanged. It is also useful when the lens must be brought very close to the subject to focus sharply.

Close-ups and macrophotography pose several problems not encountered in general photography. One of these is sensitivity to vibration: the magnification of the image on the film makes even slight image displacement prominent and results in a blurred image. For best results, mount the entire set-up on a rigid tripod or support, and use a cable release to trip the shutter.

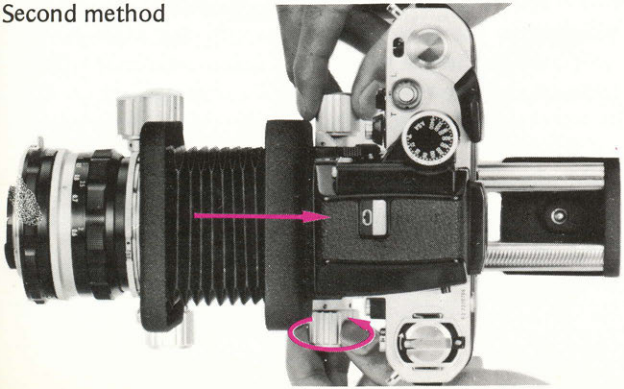
An unbalanced set-up may result in vibration. To avoid this, the PB-5 has an extra tripod socket beneath the lens panel so that the set-up can be balanced on a tripod even when a long lens is used or when the set-up is shifted forward.

Note: Type B, E or M focusing screen is recommended when the PB-5 is used with the Nikon F or F2, since the central range-finder area of the standard Type A screen blacks out at apertures smaller than f/4.5. If the Nikkormat is used, focus on the matte area surrounding the central focusing circle.

First method



Second method



DETERMINING THE REPRODUCTION RATIO

Reproduction ratio is the ratio of the image size recorded on film to the actual size of the subject. At life-size magnification, for example, it is 1 : 1. Furthermore, the subject and image sizes are proportional to their respective distances from the lens. If lens-to-film distance increases, lens-to-subject distance decreases.

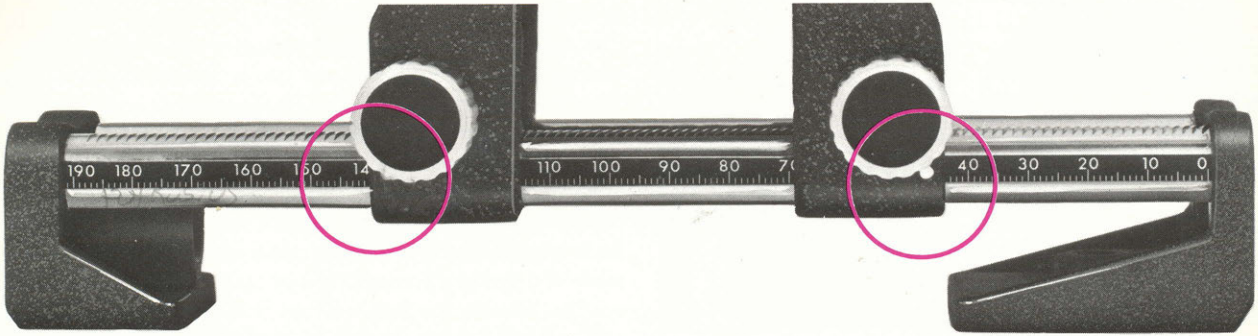
You can find out the reproduction ratio for a particular lens-to-film distance using the PB-5's millimeter scale engraved on the rail. The scale can also be used to pre-adjust the bellows to give a desired reproduction ratio.

To determine the reproduction ratio, set the distance scale on the lens being used at infinity. Focus on the subject, then read off the numbers on the scale which appear next to the outer edges of the camera panel and lens panel. Subtract the smaller number from the larger one to find the actual bellows extension in mm and consult the table on pages 20 and 21 to find the reproduction ratio for the lens in use at that amount of bellows extension. For example, if the outer edge of the lens panel is at 140mm and the outer edge of the camera panel is at 44mm, the bellows extension equals 140 − 44 = 96mm. If the lens used is the 50mm f/2 mounted in reverse position, the table gives 2.5X as the reproduction ratio.

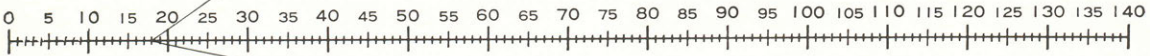
By reversing the above procedure, the reproduction ratio can be predetermined. After consulting the table, adjust the PB-5's camera and lens panels to give the correct amount of bellows extension for the desired reproduction ratio. Then focus by moving the subject or move the entire assembly back and forth until the subject is in sharp focus.

Another simple method of determining reproduction ratio is by using the scale on the opposite page. Place the scale in the same plane as the subject, look through the camera viewfinder and read off the length of the area which is in sharp focus. Divide this number into 36 or 24 (depending on whether the camera is used in the horizontal or vertical position). The result will be the reproduction ratio. For example, if the horizontal scale image which is in focus is 18mm in length, the reproduction ratio will be 36/18 = 2X. For quick reference use the table on the opposite page to find the reproduction ratio at any scale coverage.

Note: When using a Nikkormat camera, the reproduction ratio obtained by this method must be multiplied by 0.9 owing to its smaller viewfinder area.

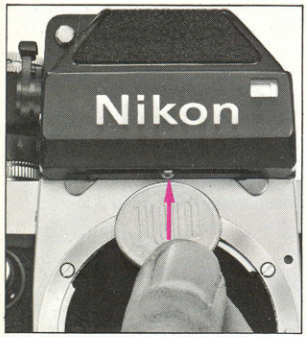


Scale



Lengthwise reading (mm)	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	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	39~42	43~48	49~55	56~65	66~80	81~103	104~144	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



Nikon F or F2-series cameras

Nikkormat cameras

With built-in TTL meter

The insertion of the PB-5 between the lens and the camera breaks the linkage of the lens diaphragm to the thru-the-lens meters of the Photomic-series finders or Nikkormat cameras. However, these meters can still be used to measure exposure via the stop-down method. With the Photomic finders, first push the coupling pin up into the Photomic finder with a coin or similar object. With the Nikkormat FT$_N$ or the Nikkormat EL camera, push the camera's coupling pin to the right as far as it will go. Mount the lens/bellows assembly on the camera and switch on the meter in the usual way. The next procedure for each camera is as follows:

Nikon F2 Photomic and Nikkormat FT$_N$ cameras

Select the desired shutter speed and stop down the lens manually until the meter needle in the viewfinder is centered.

Nikon F2S Photomic camera

Select the desired shutter speed and stop down the lens manually until the two signal lights glow.

Nikkormat EL camera

Set the shutter speed dial at "A" (Automatic) and turn the aperture ring until the black needle in the viewfinder indicates a shutter speed appropriate to the subject.

When non-TTL meter is used

If a separate light meter is used, exposure compensation is necessary at reproduction ratios greater than 1 : 10.

The graphs on pages 22 to 25 show exposure factors and exposure corrections in f-stops for any Nikkor lens at any aperture. Readjust the lens diaphragm according to the indicated numbers.

To calculate exposure compensation in terms of shutter speed rather than f-stops find the exposure factor from the graphs and multiply it by the exposure time. For example, if normal exposure at 1 : 1 reproduction ratio with the 50mm f/2 is 1/8 second, the corrected exposure will be 1/8 multiplied by 4, or 1/2 second.

Note: When using a lens of retrofocus or telephoto type, the difference in pupillary magnification must be taken into account to establish the correct exposure. The pupillary magnification is the ratio of the exit pupil diameter to that of the entrance pupil. The following formula is used to calculate the exposure factor when a retrofocus or telephoto type lens is used in normal position:

$$\text{Exposure factor} = (1 + M/\Psi)^2$$

(where Ψ = pupillary magnification)

When the lens is in reverse position:

$$\text{Exposure factor} = 1/\Psi^2\ (1 + \Psi M)^2$$

To avoid complicated calculations, use the graphs on pages 22 to 25 to determine correct exposure in aperture values. The graphs are computed to take into account the pupillary magnification.

Eyepiece Magnifier

Fits the threaded eyepiece of the Nikon F or F2, Nikkormat or Photomic-series finder. Magnifies the central finder area 2X for greater accuracy in viewing and focusing.

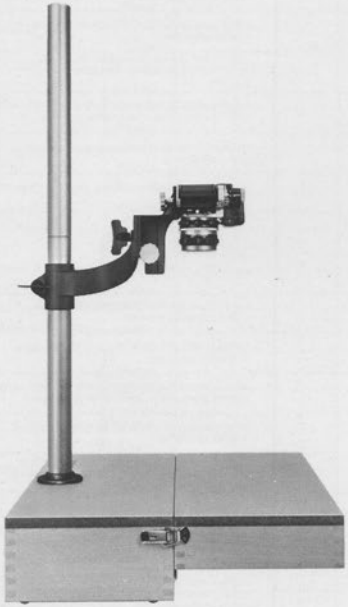
Right-Angle Viewing Attachment

Screws into the threaded eyepiece of the Nikon F or F2, Nikkormat or Photomic-series finder and offers the same advantages as the waist-level finder.

6X Focusing Finder

This finder magnifies the entire viewing field six times for pinpoint focusing in closeups, macrophotography and other applications where critical focusing is essential. Eyesight adjustment from −5 to +3 diopters is possible.

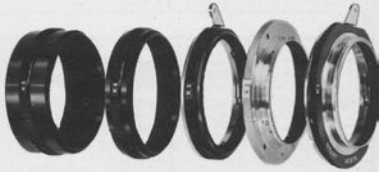
Repro-Copy Outfit PF-2
Sturdy and convenient set-up for copying documents, books and other small objects which are more or less flat.

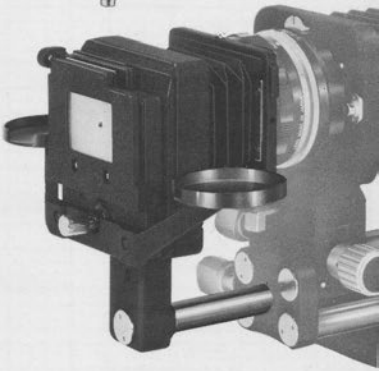


Extension Ring Set K
Consists of five rings used in various combinations between the PB-5 and lens to provide extra extensions ranging from 5.8 to 46.6mm.

Extension Ring E2
Used with the PB-5 to increase lens-to-film distance. Offers semi-automatic diaphragm control for easier focusing and composing and also serves as a lens hood.

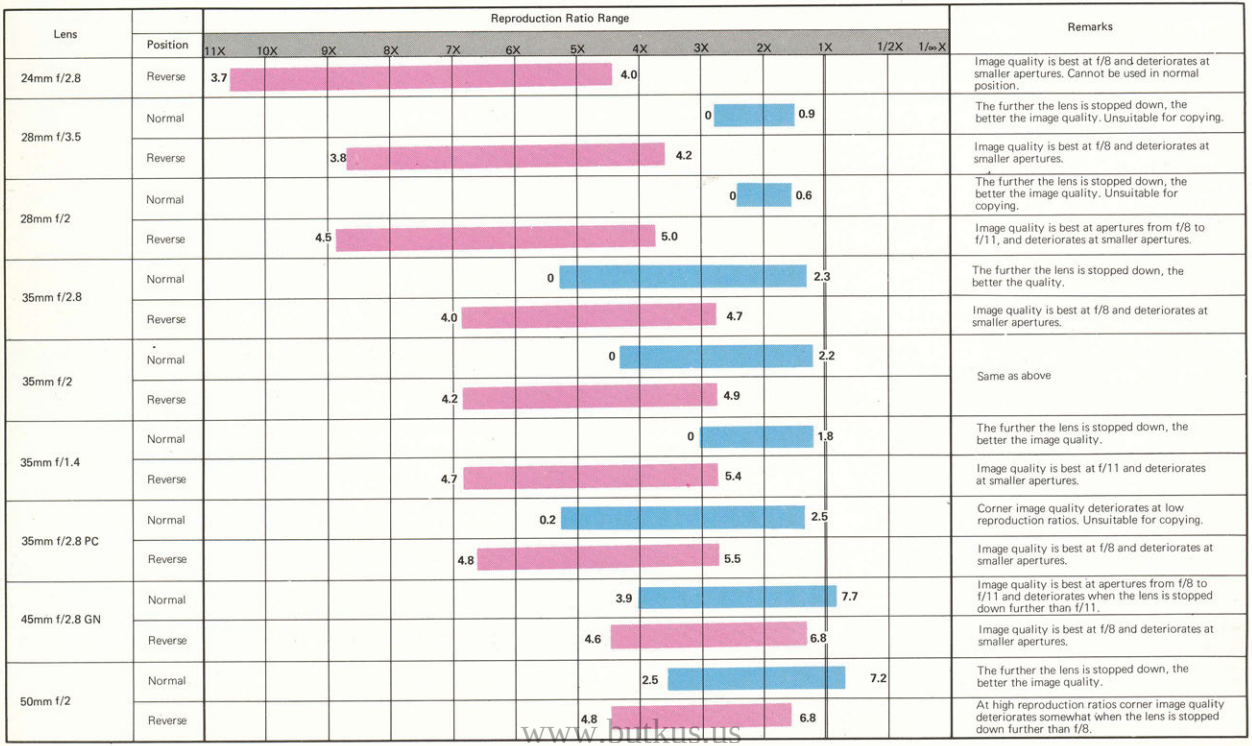
Slide Copying Adapters PS-4 & PS-5
Both attach to the front of the PB-5 for duplicating 35mm transparencies. The PS-4 (shown below) provides horizontal and vertical shifts which facilitate cropping.





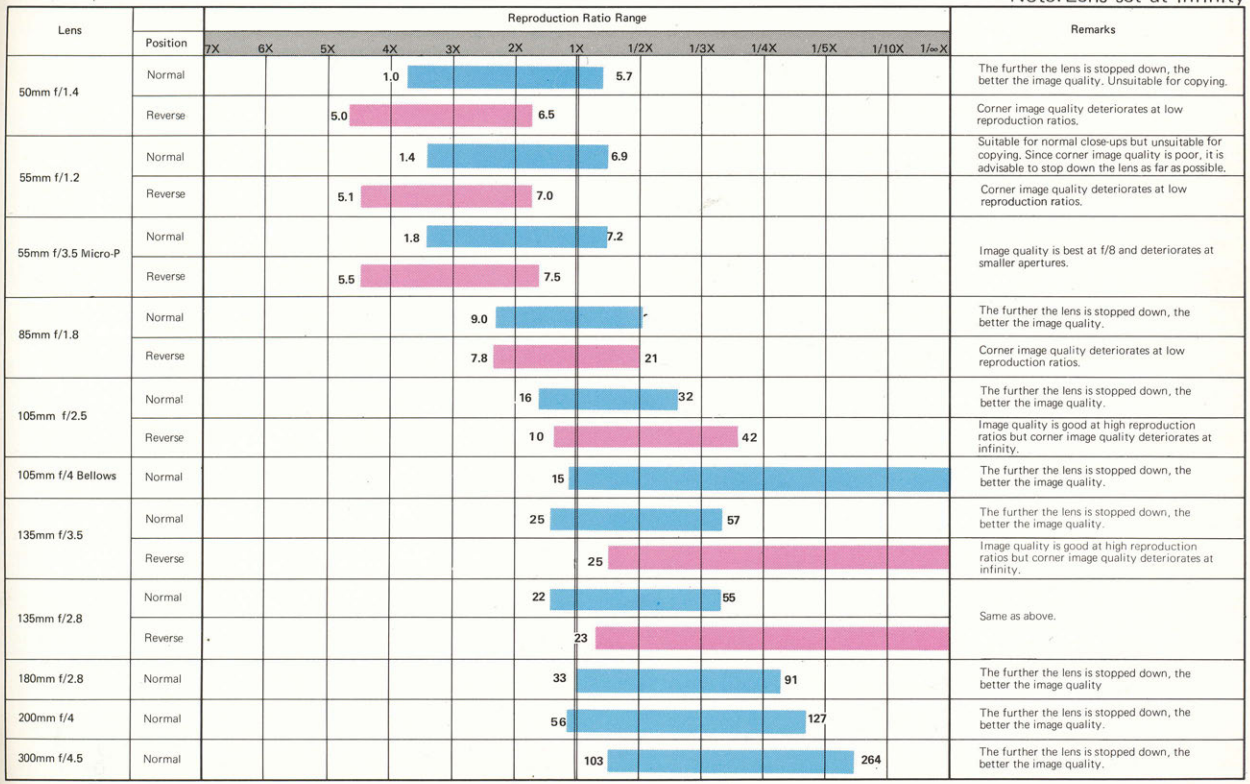
REPRODUCTION RATIOS OBTAINABLE WITH PB-5

Note: Lens set at infinity



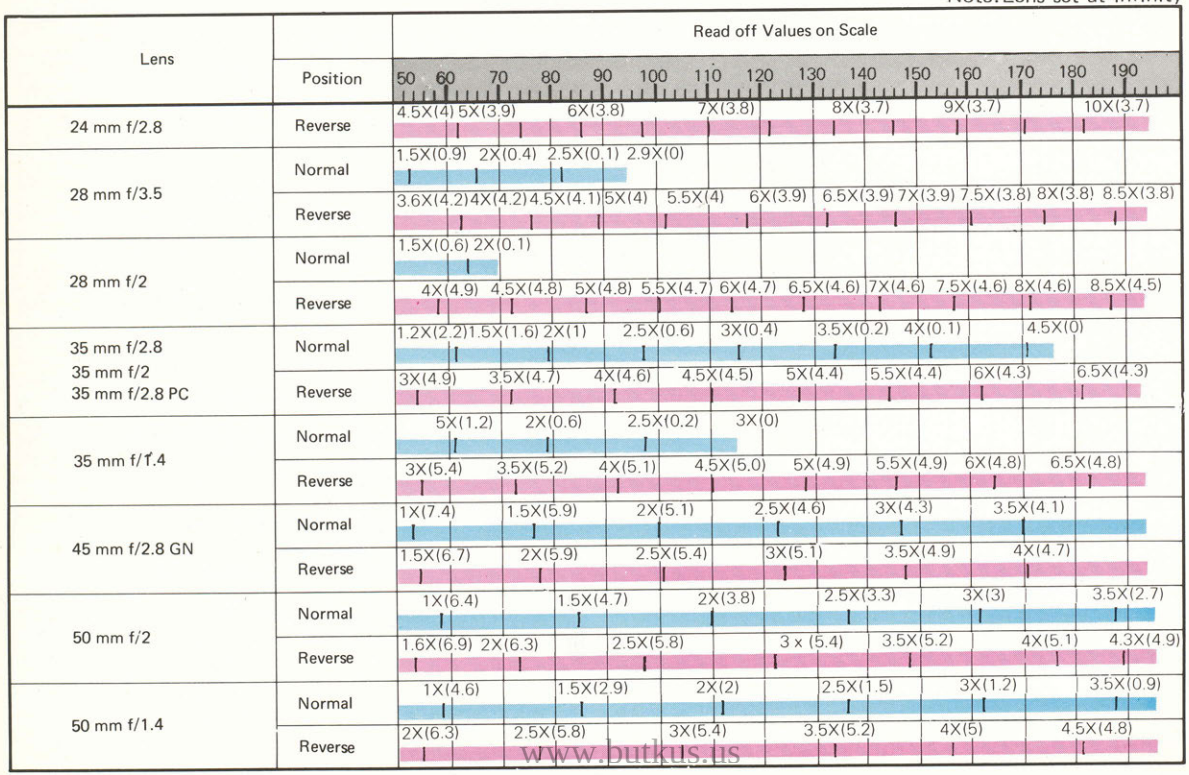
Note: Figures at both ends of the lines indicate working distance in cm — distance between subject and front edge of the lens barrel.

Note: Lens set at infinity



REPRODUCTION RATIOS AT DIFFERENT BELLOWS EXTENSIONS

Note: Lens set at infinity

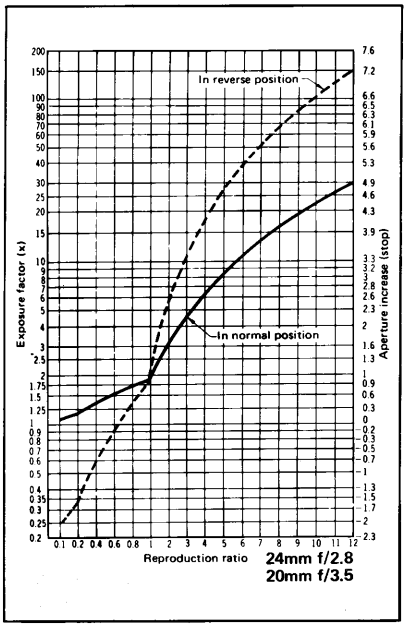


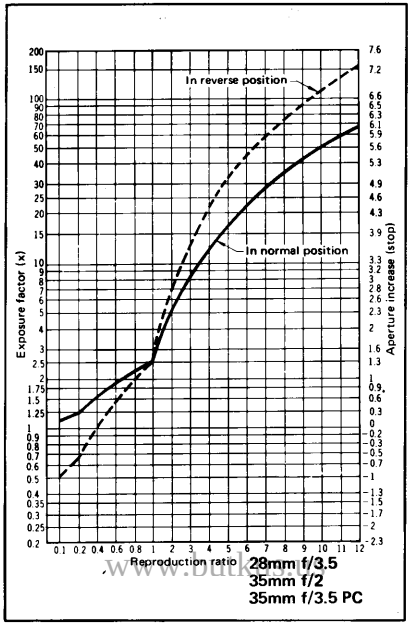
Note: Lens set at infinity

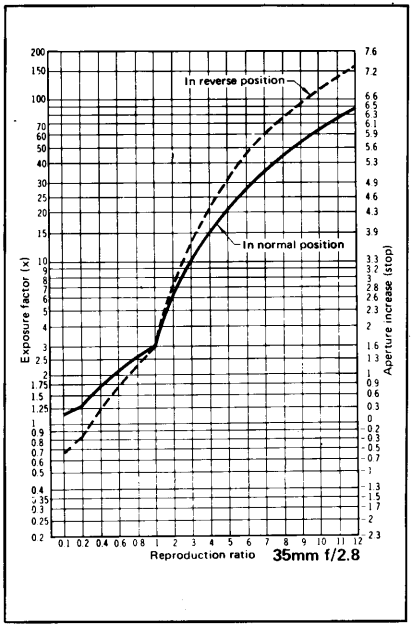
Lens	Position	Read off Values on Scale
		50 60 70 80 90 100 110 120 130 140 150 160 170 180 190
55 mm f/1.2 55 mm f/3.5 Micro-P	Normal	1X(5.1) 1.5X(3.2) 2X(2.3) 2.5X(1.8) 3X(1.4) 3.3X(1.2)
	Reverse	2X(6.4) 2.5X(5.8) 3X(5.5) 3.5X(5.3) 4X(5)
85 mm f/1.8	Normal	0.6X(18) 0.8X(16) 1X(14) 1.2X(12) 1.4X(11) 1.6X(10) 1.8X(9.8) 2X(9.3)
	Reverse	0.6X(16) 0.8X(14) 1X(12) 1.2X(11) 1.4X(10) 1.6X(9.2) 1.8X(8.6) 2X(8.1)
105 mm f/2.5	Normal	0.4X (33) 0.6X(24) 0.8X(20) 1X(17) 1.2X(15) 1.4X(14) 1.6X(13) 1.8X(12)
	Reverse	0.4X(30) 0.6X(21) 0.8X(17) 1X(14) 1.2X(12) 1.4X(11) 1.6X(10)
105 mm f/4 Bellows	Normal	0.2X(60) 0.4X(33) 0.6X(25) 0.8X(20) 1X(18) 1.2X(16) 1.3X(15)
135 mm f/3.5 135 mm f/2.8	Normal	0.4X(46) 0.6X(35) 0.8X(29) 1X(26) 1.2X(24) 1.3X(23)
	Reverse	∞ 0.2X(74) 0.4X(41) 0.6X(29) 0.8X(24)
180 mm f/2.8	Normal	0.3X(7.5) 0.4X(5.7) 0.5X(5.1) 0.6X(4.5) 0.7X(4.1) 0.8X(3.8) 0.9X(3.5) 1X(3.3)
200 mm f/4	Normal	0.3X(101) 0.4X(84) 0.5X(74) 0.6X(68) 0.7X(63) 0.8X(60) 0.9X(57)
300 mm f/4.5	Normal	0.15X(254) 0.2X(204) 0.3X(154) 0.4X(129) 0.5X(114) 0.6X(104)

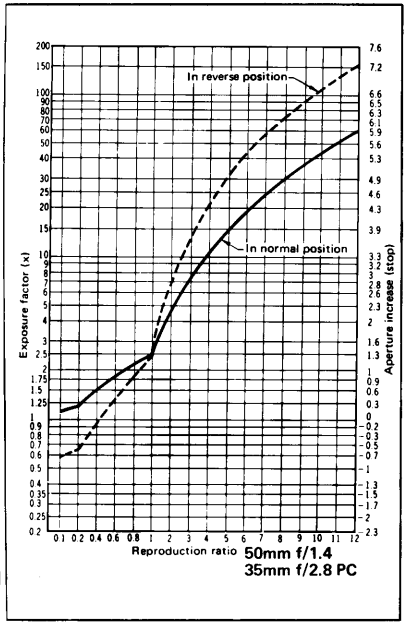
Figures in parentheses indicate distance from the subject plane in focus to the lens barrel edge in cm.

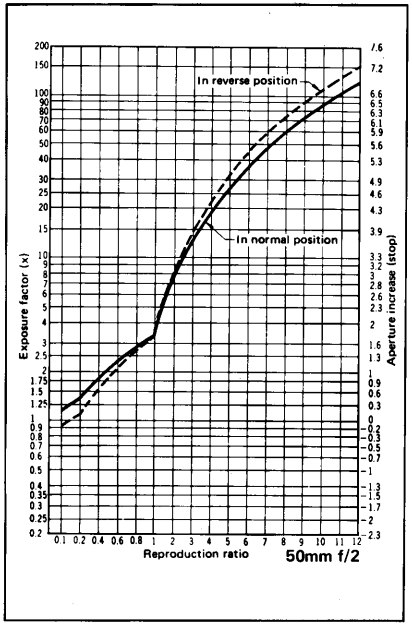
EXPOSURE FACTORS

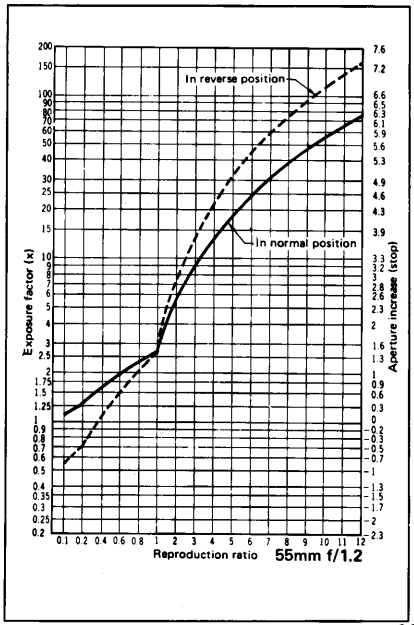




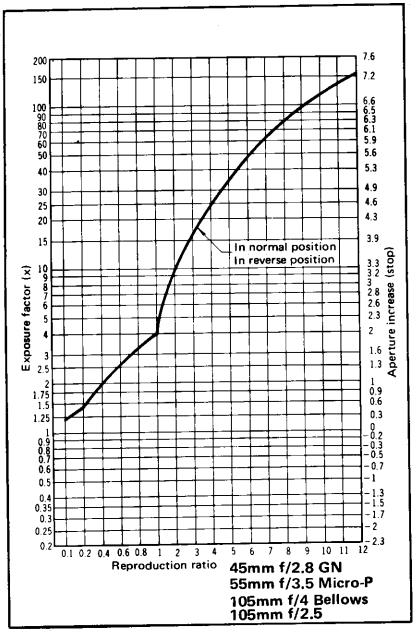



In reverse position
In normal position
Exposure factor (x)
Aperture increase (stop)
Reproduction ratio
0.1 0.2 0.4 0.6 0.8 1 2 3 4 5 6 7 8 9 10 11 12
50mm f/1.4
35mm f/2.8 PC

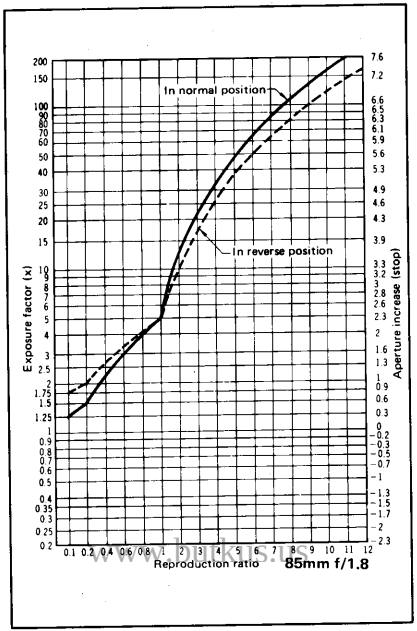

In reverse position
In normal position
Exposure factor (x)
Aperture increase (stop)
Reproduction ratio
0.1 0.2 0.4 0.6 0.8 1 2 3 4 5 6 7 8 9 10 11 12
50mm f/2


In reverse position
In normal position
Exposure factor (x)
Aperture increase (stop)
Reproduction ratio
0.1 0.2 0.4 0.6 0.8 1 2 3 4 5 6 7 8 9 10 11 12
55mm f/1.2

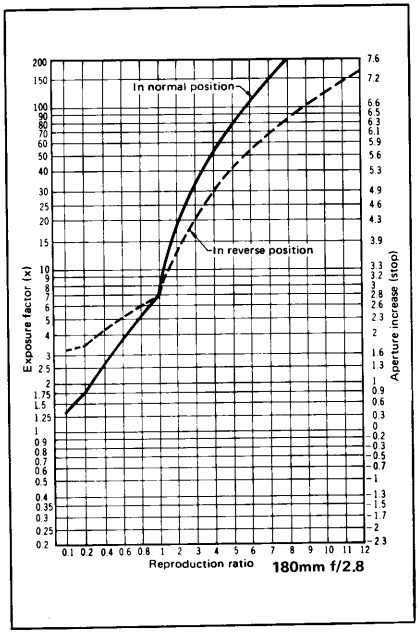
EXPOSURE FACTORS — continued



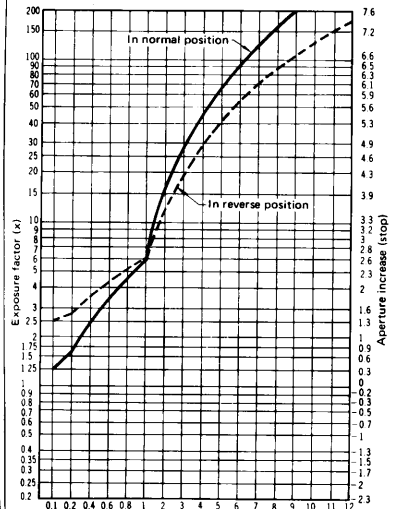
45mm f/2.8 GN
55mm f/3.5 Micro-P
105mm f/4 Bellows
105mm f/2.5



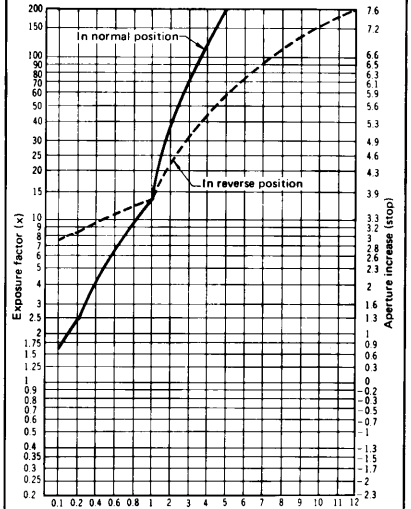
85mm f/1.8



180mm f/2.8



135mm f/2.8
135mm f/3.5



200mm f/4
300mm f/4.5

Bellows Extension:	43mm to 185mm; this represents reproduction ratio from 1 : 1.2 to 3.6X with 50mm f/2 in normal position and from 1 : 1.6 to 4.4X in reverse position
Usable Lenses:	24mm f/2.8 through 300mm f/4.5, plus Zoom-Nikkor Auto 43—86mm f/3.5
Dimensions:	209mm x 109mm x 144mm
Weight:	950g