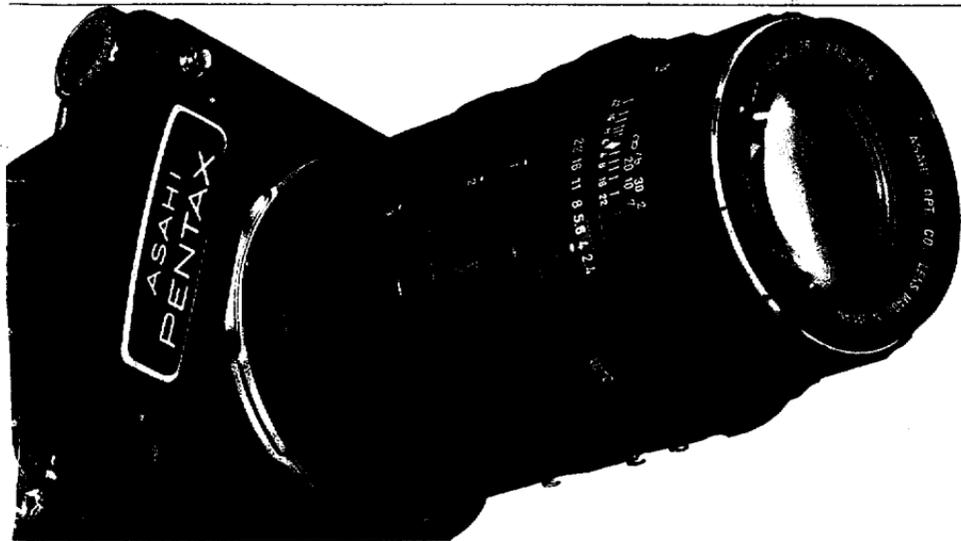


PENTAX®
6x7

AUTO EXTENSION TUBES
EXTENSION TUBES



Auto Extension Tubes (for 55mm ~ 300mm lenses)



No. 1



No. 2



No. 3

Extension Tubes (for 400mm ~ 1000mm lenses)



No. 1



No. 2

SPECIFICATIONS

Auto Extension Tubes

The Auto Extension Tubes mount to the inner bayonet of the Pentax 6x7 camera and permit automatic diaphragm operation with all 6x7 lenses from 45mm ~ 300mm focal length.

The tubes can be used individually or in any combination, permitting a wide range of close up possibilities, as indicated in Tables 1 ~ 8 of this booklet.

Usable Lenses: SMC Pentax and SMC Takumar interchangeable lenses from 55mm thru 300mm.

	No. 1	No. 2	No. 3
Length:	14mm	28mm	56mm
Weight:	75g	90g	125g

Extension Tubes

The extension tubes mount to the outer bayonet of the Pentax 6x7 camera and are designed for use with non-automatic diaphragm 6x7 lenses (i.e. all 6x7 lenses from 400mm thru 1000mm, excluding the 500mm f/4 lens).

The tubes may be used together or separately and permit the various close-up possibilities indicated in Tables 9 ~ 12.

Usable Lenses: SMC Takumar 6x7 lenses from 400mm ~ 1000mm.

	No. 1	No. 2
Length:	23mm	46mm
Weight:	110 g	150g

NOTE: The SMC Pentax 500mm lens fits to the inner bayonet mount of the 6x7 camera and will mount with the Auto Extension Tubes. Use is not recommended, however, due to image cutoff at the edges of the picture.

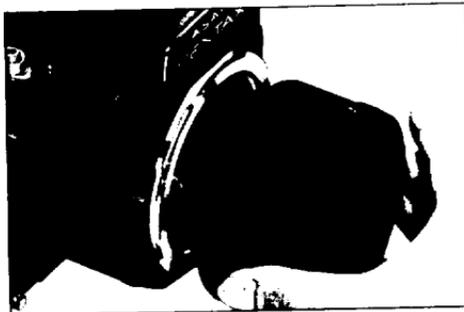
AUTO EXTENSION TUBES (Assembly)

Align the red dot of the tube to be attached directly to the camera with the red dot on body mount and turn the tube clockwise until it locks in place. Jiggle slightly to test that it is bayoneted properly. Repeat with other tubes. Mount lens to last tube in same manner.

When using the TTL Pentaprism Finder on the camera, the Lens' depth-of-field preview lever must be set to MAN. and metering stopped down in order to obtain a reading. You

may also take the photo with the lever set at MAN., but for brighter focusing and use of automatic diaphragm, set the lever back to AUTO when using three tubes or less (with more than three tubes it must be left at MAN.).

To remove the lens from the extension tubes, press the bayonet lock release on the side of the tube, turn lens counter-clockwise and slide out of mount.



HOW TO USE THE CLOSE-UP TABLES

Depending on the requirements of the type of close-up work you are doing, you will have to first determine either (a) the picture area (b) the film-to-subject distance or (c) the magnification, then select the appropriate extension tube combination from the data given in the tables. **NOTE: Data is valid only with the lens distance scale set at minimum focus.**

when you wish to magnify or reduce a subject to a specific image size. For example, to photograph the image at half the actual subject size, use magnification 0.5X. To photograph at twice the subject size, use 2X. Look up the magnification in the table for the lens in use and use the extension tube combination indicated.

when you wish to photograph a given area. Measure the length and width of the area you wish to photograph, then refer to the picture area column of the various tables and select the lens and extension tube combination which most nearly approximates the area you wish to photograph.

when it's difficult to get close to your subject. After selecting a suitable working distance from the possibilities available, go through the film-to-subject distance column of the Close-up Tables and choose a lens that most closely approximates the required distance. As focal length also affects picture area, be sure your choice also best approximates your requirements and use the extension tube combination indicated.

Exposure Factors (loss of light entering the lens due to the addition of the extension tubes) vary according to the combination of lens and extension tube used. These are automatically compensated for when metering with the TTL Pentaprism Finder. But when external exposure meters are used, compensation is required for exposure factors as indicated in the exposure factor column of the appropriate Table.

NOTE: For magnifications greater than 1X, sharper images will be obtained by mounting the lens in reverse in conjunction with the 67mm Reverse Adaptor—see page 20.

Table 1: Pentax 45mm f/4

(distance scale at 0.37m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.22	(lens alone)	255.4 × 320.4	37.0	× 1.3
0.51	1	108.1 × 135.6	25.6	× 1.6
0.80	2	68.5 × 86.0	23.6	× 2.0
1.10	2 + 1	50.2 × 62.9	23.4	× 2.5
1.39	3	39.6 × 49.6	23.9	× 2.9
1.68	3 + 1	32.7 × 41.0	24.7	× 3.5
1.98	3 + 2	27.8 × 34.9	25.7	× 4.0
2.27	3 + 2 + 1	24.2 × 30.4	26.8	× 4.6

Table 2: Pentax 55mm f/4

(distance scale at 0.45m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.20	(lens alone)	346.9 × 276.5	45.0	× 1.2
0.45	1	153.7 × 122.5	30.7	× 1.6
0.70	2	98.7 × 78.7	27.7	× 2.0
0.95	2+1	72.7 × 58.0	27.0	× 2.4
1.20	3	57.6 × 45.9	27.1	× 2.9
1.45	3+1	47.6 × 38.0	27.7	× 3.4
1.70	3+2	40.6 × 32.4	28.5	× 3.9
1.95	3+2+1	35.4 × 28.0	29.5	× 5.0

Table 3: Takumar 75mm f/4.5 (bold letters)
Pentax Shift 75mm f/4.5 (in parentheses)

(distance scale at 0.7m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.15 (0.15)	(lens alone)	375.0 × 470.5 (359.1 × 450.5)	69.5 (70.0)	× 1.2 (1.2)
0.33 (0.34)	1	165.0 × 207.0 (161.9 × 203.1)	42.3 (44.5)	× 1.6 (1.4)
0.52 (0.53)	2	105.8 × 132.7 (104.5 × 131.1)	35.6 (38.1)	× 1.9 (1.7)
0.71 (0.71)	2 + 1	77.8 × 97.6 (77.1 × 96.8)	33.2 (35.7)	× 2.3 (2.0)
0.89 (0.90)	3	61.6 × 77.2 (61.1 × 76.7)	32.4 (35.0)	× 2.8 (2.3)
1.08 (1.09)	3 + 1	50.9 × 63.9 (50.6 × 63.5)	32.3 (35.0)	× 3.3 (2.7)
1.27 (1.27)	3 + 2	43.4 × 54.5 (43.2 × 54.2)	32.7 (35.3)	× 3.8 (3.1)
1.45 (1.46)	3 + 2 + 1	37.8 × 47.5 (37.7 × 47.3)	33.3 (36.0)	× 4.3 (3.5)

Table 4: Takumar 90mm f/2.8 (bold letters)
Pentax 90mm f/2.8 (in parentheses)

(distance scale at 0.85m)
(distance scale at 0.65m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.14 (0.20)	(lens alone)	497.1 × 396.2 (341.1 × 271.9)	83.5 (65.0)	× 1.2 (1.4)
0.29 (0.36)	1	234.5 × 186.9 (194.3 × 154.9)	50.6 (46.9)	× 1.5 (1.7)
0.45 (0.51)	2	153.4 × 122.3 (135.9 × 108.3)	41.4 (40.6)	× 1.9 (2.0)
0.61 (0.66)	2 + 1	114.0 × 90.9 (104.4 × 83.2)	37.7 (37.8)	× 2.3 (2.4)
0.76 (0.81)	3	90.7 × 72.3 (84.8 × 67.6)	36.0 (36.6)	× 2.7 (2.8)
0.92 (0.97)	3 + 1	75.3 × 60.0 (71.4 × 56.9)	35.4 (36.2)	× 3.1 (3.2)
1.07 (1.12)	3 + 2	64.4 × 51.3 (61.7 × 49.2)	35.4 (36.3)	× 3.6 (3.7)
1.23 (1.27)	3 + 2 + 1	56.2 × 44.8 (54.3 × 43.2)	35.7 (36.7)	× 4.1 (4.2)

Table 5: Takumar 105mm f/2.4

(distance scale at 1m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.13	(lens alone)	517.5 × 412.5	100.5	× 1.3
0.27	1	258.7 × 206.2	62.4	× 1.6
0.40	2	172.5 × 137.5	50.7	× 1.9
0.53	2 + 1	129.4 × 103.1	45.6	× 2.2
0.67	3	103.5 × 82.5	43.1	× 2.6
0.80	3 + 1	86.2 × 68.7	41.8	× 3.0
0.93	3 + 2	73.9 × 58.9	41.4	× 3.5
1.07	3 + 2 + 1	64.7 × 51.6	41.4	× 3.9

Table 6: Pentax 165mm f/2.8

(distance scale at 1.6m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.13	(lens alone)	417.1 × 523.3	160.0	×1.3
0.22	1	253.8 × 318.4	112.4	×1.6
0.30	2	182.4 × 228.8	92.4	×1.9
0.39	2 + 1	142.3 × 178.6	81.8	×2.1
0.47	3	116.7 × 146.4	75.5	×2.5
0.56	3 + 1	98.9 × 124.1	71.5	×2.8
0.64	3 + 2	85.8 × 107.7	69.0	×3.1
0.73	3 + 2 + 1	75.8 × 95.1	67.4	×3.5

Table 7: Takumar 200mm f/4

(distance scale at 2.5m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.09	(lens alone)	726.5 × 579.0	253.0	× 1.3
0.16	1	418.2 × 333.3	165.2	× 1.5
0.23	2	293.6 × 234.0	130.4	× 1.8
0.30	2 + 1	226.2 × 179.5	112.3	× 2.1
0.37	3	184.0 × 146.7	101.5	× 2.4
0.44	3 + 1	155.1 × 123.6	94.5	× 2.7
0.51	3 + 2	133.0 × 106.8	89.8	× 3.0
0.58	3 + 2 + 1	118.0 × 94.0	86.5	× 3.4

Table 8: Takumar 300mm f/4

(distance scale at 5m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.07	(lens alone)	985.7×785.7	503.6	×1.3
0.11	1	608.8×485.3	341.0	×1.6
0.16	2	422.5×336.7	261.5	×1.9
0.21	2+1	328.6×261.9	222.0	×2.1
0.26	3	268.8×214.3	197.5	×2.5
0.30	3+1	227.5×181.3	180.9	×2.8
0.35	3+2	197.1×157.1	169.1	×3.1
0.40	3+2+1	174.0×138.7	160.4	×3.5

Table 9: Macro Takumar 135mm f/4

(distance scale at min. focus)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.31	(lens alone)	222.0 × 177.0	74.9	×1.9
0.41	1	166.5 × 132.7	65.4	×2.2
0.52	2	133.2 × 106.2	60.3	×2.6
0.62	2 + 1	88.5 × 111.0	57.4	×3.1
0.73	3	95.1 × 75.8	55.7	×3.5
0.76	3 + 1	91.4 × 72.9	55.3	×3.6
0.93	3 + 2	74.0 × 59.0	54.3	×4.5
1.04	3 + 2 + 1	66.6 × 53.1	54.3	×5.1

EXTENSION TUBES (for 400mm ~ 1000mm lens*)

Place the collar ring of the extension tube to be attached to the camera over the outer bayonet mount of the camera body and fix tube in place by turning ring counterclockwise as shown. Test to see if mounted properly.

To remove the lens from tube or tube from body, hold both camera and lens side firmly to prevent dropping, then loosen the appropriate collar ring and remove.

* Except 500mm f/4

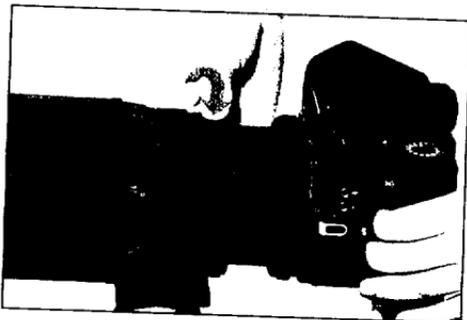
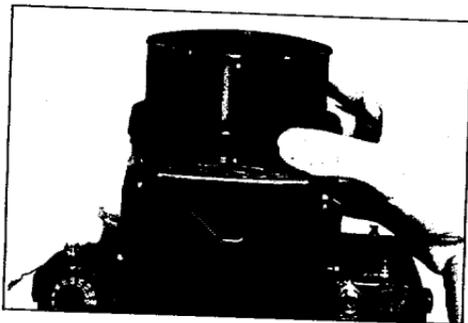


Table 10: Takumar 400mm f/4

(distance scale at 8m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.06	(lens alone)	1216.9 × 970.0	800.0	× 1.2
0.11	1	604.2 × 481.6	447.0	× 1.5
0.17	2	401.9 × 320.3	332.0	× 1.8
0.23	2 + 1	301.0 × 240.0	275.9	× 2.1

Table 11: Takumar 600mm f/4

(distance scale at 12m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.06	(lens alone)	1182.9 × 942.9	1210.5	× 1.4
0.10	1	713.8 × 569.0	804.9	× 1.7
0.14	2	511.1 × 407.4	631.0	× 2.0
0.17	2 + 1	398.1 × 317.3	535.0	× 2.3

Table 12: Takumar 800mm f/4

(distance scale at 20m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.04	(lens alone)	1577.1 × 1257.1	2011.9	× 1.3
0.07	1	951.7 × 758.6	1289.0	× 1.5
0.10	2	681.5 × 543.2	978.0	× 1.7
0.13	2 + 1	530.8 × 423.1	805.6	× 1.9

Table 13: Takumar 1000mm f/8

(distance scale at 35m)

Magnification	Required extension tube combination	Picture area (mm)	Film-to-subject distance (cm)	Exposure Factor
0.03	(lens alone)	2248.0 × 1791.9	3500.1	× 1.4
0.05	1	1285.1 × 1024.3	2106.8	× 1.7
0.08	2	899.7 × 717.1	1550.6	× 2.0
0.10	2 + 1	692.1 × 551.7	1252.1	× 2.4

ACCESSORIES FOR CLOSE-UP WORK

Each of these units must be purchased separately.



FTL Pentaxium Finder

A through-the-lens, open-aperture-metering accessory finder unit which automatically couples with the shutter-dial permitting "zero method" exposure control and the option of preselecting either shutter-speed or aperture. The meter averages the total amount of light entering the lens, eliminating the need to compensate for exposure factors when using extension tubes or other close-up lens accessories. Open aperture metering permits bright viewing and focusing with automatic diaphragm lenses. Separate battery not required.



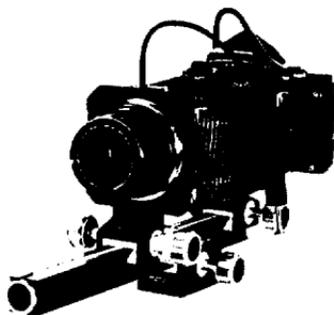
FF Pentaxium Folding Finder

A compact, folding finder unit offering ultra-bright waist-level viewing. Ideal for macrophotography, close-ups and use with super telephotos. Built-in 1.6X magnifier folds out for critical focusing and composition using full screen. The Folding Focusing Hood also shows 100% of the negative on the screen and simplifies low-angle shooting.



Find Magnifying Hood

A deluxe waist-level finder unit which completely shields the focusing screen from ambient light for crisp, clear viewing. The 1.3X magnifier is adjustable to match viewer's eyesight, permitting maximum viewing comfort. The entire focusing screen is visible with 100% of the image reproduced on the negative.



Auto Bellows

A high precision close-up and macrophoto accessory which enables you to maintain the automatic diaphragm action of the lens by means of the supplied double-cable release. Bellows has a large extension ratio and reverse lens mounting board for automatic diaphragm operation even with lens mounted in reverse. Tripod seat is also adjustable. When used in conjunction with optional Slide Copier unit permits precision copying of both 6x7-format and 35mm-format slides and film strips. Scale also provided.



A single extension tube unit which fits to the inner bayonet mount of the 6x7 camera and offers continuously variable extension for precise control of image size. Range covered equals that of the No. 2 Auto Extension Tube at minimum extension and the No. 3 Tube at maximum extension, plus everything in-between. Magnification ranges with the 105mm $f/2.4$ lens is from 0.30X - 0.63X, making it possible to frame a kingsize pack of cigarettes. Used in conjunction with the Auto Extension Tubes, high magnification close-up and copy work is possible.



This is an extremely handy copying unit which permits duplication of 35mm transparencies on 6x7 film. Used in conjunction with the Helicoid Extension Tube, 49mm Reverse Adaptor and 35mm format macro lenses, it permits high quality reproduction of 35mm color slides, making internegatives for color prints or positives from black and white slides.



49mm Reverse Adaptor

Permits 35mm-format lenses which offer a greater angle of view for close-up work, to be mounted in reverse in conjunction with the Helicoid Extension Tube for copy and close-up work in the 6x7 format. The adaptor is designed for dual-use with the following S-mount Takumar and bayonet-mount SMC Pentax 35mm-format lenses.

S-Mount: 28mm f/3.5, 35mm f/3.5, 50mm f/1.4, 50mm Macro f/4 **Bayonet Mount:** 28mm f/2, 28mm f/2.8, 28mm f/3.5, 40mm f/2.8, 50mm f/1.4 and f/1.7, Macro 50mm f/4.

(Note: With lens having the 52mm filter size, the 52-49mm Adaptor Ring must also be used.)



67mm Reverse Adaptor

This reverse adaptor ring makes it possible to mount 6x7-format 90mm, 105mm and 135mm lenses in reverse in conjunction with the Helicoid Extension Tube, Auto Extension Tubes and Auto Bellows for high quality optical reproduction when working at greater-than-life-size magnifications.

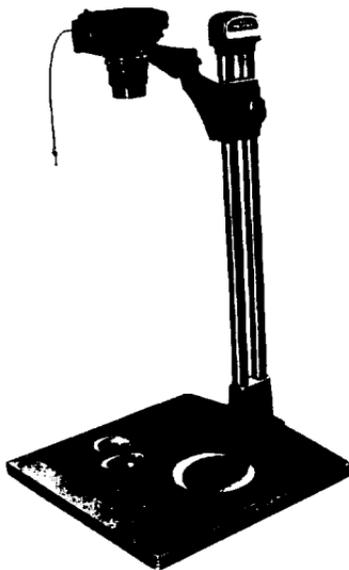


Magnifier

Enlarges the image in the center of the focusing screen to 2X for critical focusing. The magnifier eyepiece has built-in diopter adjustment to meet the individual requirements of eyeglass wearers. The top is hinged, allowing it to be raised out of the way for a final check of overall composition.

Large Copying Stand

A rigid copying unit with metal supports and a wooden baseboard to offer the degree of support needed for the 6x7 camera. A highly convenient device for copy work and macro-photography when camera and lens are used in conjunction with extension tube, bellows and other close-up units.





Attaches to the eyepiece of the standard and TTL pentaprism finders for low-angle photography. The image is both laterally correct and unreversed. The entire focusing screen, as well as the exposure meter indicator needle of the Pentaprism Finder, is visible. The adjustable eyepiece accepts the accessory Eyecup.





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06288 ENG

2/86 Printed in Japan

PENTAX[®]

67

標準

オート接写リング・接写リングの使い方

AUTO EXTENSION TUBES

EXTENSION TUBES

使用説明書
Operating Manual

オート接写リングは、45～300mmの67レンズと組み合わせると自動絞りが連動します。1号、2号、3号を自由に組み合わせて接写撮影ができます。なお、TTLペンタプリズムを使用しても絞り込み測光になります。

外爪接写リングは、レフレックス1000mmなどの外爪バヨネットレンズ用でオート接写リングと同様に1号と2号を組み合わせても使用できます。

- 接写表はお手持ちのレンズに合わせてご利用ください。
- SMCペンタックスM*400mmF4ED(IF)、500mmF5.6、M*800mmF6.7ED(IF)レンズは、画面四すみが暗くなったり、ケラレが出るので接写リングは使えません。

Auto Extension Tubes

The Auto Extension Tubes mount to the inner bayonet of the 67 camera and permit automatic diaphragm operation with 67 interchangeable lenses of 45mm - 300mm focal length. The tubes can be used individually or in any combination as per the close-up tables. The automatic diaphragm function can be used up to a combination of any of two Auto Extension tubes. Please set the Depth of field preview lever on the lens to MAN., when three or more Auto Extension Tubes are used at the same time.

Note: Do not use the Auto Extension tubes with the SMC Pentax M* 400mm f/4, 500mm f/5.6 or M* 800 f/6.7 lens. Image cut-off or vignetting at the edges of the picture may occur.

Extension Tubes

The Extension Tubes mount to the outer bayonet of the 67 camera for use with lenses of 600mm - 1000mm to shorten the minimum focusing distance. The tubes can be used together or individually as per the close-up table.

仕様 SPECIFICATIONS

オート接写リング

使用カメラ——ペンタックス67
使用レンズ——67用の45～300mmレンズ
厚み・重さ——1号=14mm・75g
 2号=28mm・90g
 3号=56mm・125g

外爪接写リング

使用カメラ——ペンタックス67
使用レンズ——67用の600～1000mmレンズ
 [M* 800mm F6.7を除く]
厚み・重さ——1号=23mm・110g
 2号=46mm・150g

Auto Extension Tubes:

Usable lenses: SMC Pentax and Takumar 67 interchangeable lenses of 45mm - 300mm (Except M* 800mm f/6.7)

	No. 1	No. 2	No. 3
Length:	14mm	28mm	56mm
Weight:	75g	90g	125g

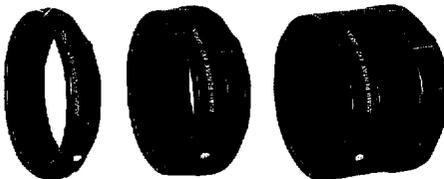
Extension Tubes:

Usable lenses: SMC Takumar 67 interchangeable lenses of 600mm - 1000mm

	No. 1	No. 2
Length:	23mm	46mm
Weight:	110g	150g

オート接写リング

Auto Extension Tubes (Inner bayonet)



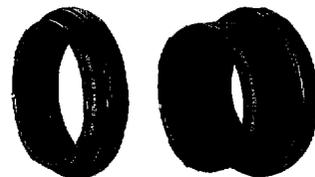
No. 1

No. 2

No. 3

外爪接写リング

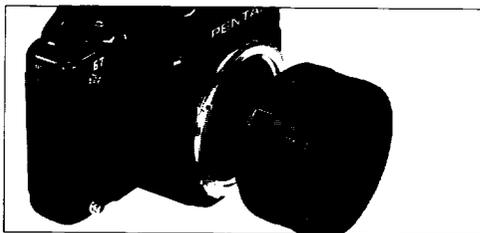
Extension Tubes (Outer bayonet)



No. 1

No. 2

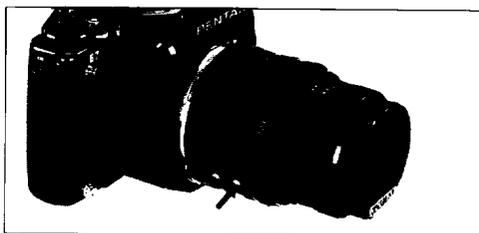
1



オート接写リングの場合

1. オート接写リングとボディの赤点を合わせてはめ込み、オート接写リングを右に止まるまで回します。カチッと音がして、ロックされます。同様にオート接写リングにレンズを取り付けます。
2. オート接写リングからレンズを外すには、写真のようにオート接写リングのロックボタンを押しながら、レンズを左に回します。

2



Attaching the Auto Extension Tubes

Insert one of the tubes aligning red dots of the tube and body mount and turn the tube clockwise until it locks in place. Twist it slightly to confirm the extension tube is locked securely. 67 inner bayonet mount lenses attach to the tube in the same manner.

To dismount the lens from the extension tube, turn the lens counter-clockwise while pressing the lens lock release button.

Note: Since the open aperture metering system does not function with the TTL Pentaprism finder, the depth-of-field preview lever of the lens must be set to Man. for stopped down metering. When using two tubes or less, the automatic diaphragm still functions at the AUTO setting. When using three tubes or more, always set the lever to MAN. In this case, focusing should be done at open aperture and the aperture ring should be set at your desired aperture for exposure metering and shooting.

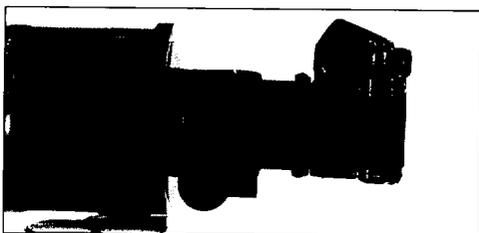
3



外爪接写リングの場合

3. 外爪接写リングの締め付けリングを回して接写リング先端の白点と締め付けリングの白点を合わせて、白点を上にした状態でボディにはめ込みます。締め付けリングを右に回し固定します。レンズにも同様に取り付けてください。
4. 外すときは、レンズや外爪接写リングの締め付けリングを左に回して緩め、白点が上にきた位置で外します。

4



Attaching the Extension Tubes

After positioning the white dot on the fastener ring facing upward, attach the tube to the outer bayonet mount and mount by turning the fastener ring. Then, attach the camera with tube to the lens set on a sturdy tripod. Make sure that the tube is mounted securely before you take your hands off.

To remove the lens or tube, hold both the camera and lens firmly to prevent dropping, then turn the fastener ring.

接写表の使い方 CLOSE-UP TABLES

接写の目的に合わせて、写る範囲・フィルム面から被写体までの距離・撮影倍率のいずれかを先に決め、該当する接写リングをご利用ください。接写表の数値はすべて、各レンズの最短距離目盛りでの値です。

倍率を先に決める場合

ある大きさの被写体をフィルム上で約何センチに写したいという場合には倍率を先に決めてください。

例えば、10cmの被写体をフィルム上で3cmに写したい場合は、倍率 = $3 / 10 = 0.3$ 倍になります。

写る範囲を先に決める場合

写す範囲が決まっている場合は、写す範囲の長辺および短辺を満足する組み合わせを接写表の「写る範囲」から選んでください。

被写体までの距離を先に決める場合

被写体に近づけない場合などは、被写体までの距離を先に決めて、接写表の「フィルム面から被写体までの距離」から組み合わせを探してください。なお、被写体までの距離はレンズの焦点距離によって異なりますから、適当なレンズを探してください。

露出倍数

TTLペンタプリズムを使用して露出を測れば、そのまま撮影できます。従って接写表にある露出倍数は必要ありませんが、スポットメーターなどの単独露出計を使用する場合には接写表の露出倍数を参考にして、露出を多くかけるようにしてください。

接写撮影の注意

一般に明るいレンズほど、また焦点距離の短い広角レンズや逆に長い超望遠レンズほど、接写の倍率が高くなるに従って、ピント性能が悪くなります。

垂直平面の複写撮影で、特にピント性能を重視する場合には、マクロレンズの使用をお勧めします。

These table may be used in three different ways, depending on whether you start with the magnification, picture area or the film-to-subject distance.

A. When starting with Magnification:

For example, if you want to photograph a subject of 10cm in size to be 3cm on the film, the magnification is $3\text{cm}/10\text{cm} = 0.3\text{X}$. Select the appropriate lens and extension tube combination from the close-up tables.

B. When starting with Picture area:

When you wish to photograph a given area. Measure the length and width of the area, then refer to the picture area column of the tables to select the appropriate lens and extension tube combination.

C. When starting with distance from film to subject:

When it is difficult to get close to the subject, select the lens and extension tube combination referring the film-to-subject distance column of the tables.

Exposure Factors

The further the lens moves forward, the greater the distance between lens and film plane, and the less amount of light reaching the film. Therefore exposure must be increased to compensate for the loss of light. This is called "exposure factor". When exposure factor is "X2", either the shutter speed or the lens opening must be slowed/ increased by one stop.

Since the Pentax 67 TTL Pentaprism measures the light coming through the lens, you may disregard the exposure factor when using it on the camera body.

NOTE:

- It is the optical characteristics of most lenses that reversing them will give greater resolution when taking close-ups of higher than 1X magnification. In such a case, please use the 67mm Reverse Adapter.
- When accurate focusing is required, the use of the Macro 135mm f/4 lens is recommended.

表 1

レンズ Lenses	倍率 Magnification	接写リングの 組み合わせ Extension tube combination	写る範囲 Picture Area [mm]	フィルム面から 被写体までの距離 Film-to-subject distance [cm]	露出倍数 Exposure factors
SMC PENTAX 45mm F4 (距離目盛 0.37m) Distance scale at 0.37m)	0.22	用いない場合 (lens alone)	255.4×320.4	37.0	×1.3
	0.51	1	108.1×135.6	25.6	×1.6
	0.80	2	68.5×86.0	23.6	×2.0
	1.10	2+1	50.2×62.9	23.4	×2.5
	1.39	3	39.6×49.6	23.9	×2.9
	1.68	3+1	32.7×41.0	24.7	×3.5
	1.98	3+2	27.8×34.9	25.7	×4.0
	2.27	3+2+1	24.2×30.4	26.8	×4.6
SMC PENTAX 55mm F4 (距離目盛 0.35m) Distance scale at 0.35m)	0.33	用いない場合 (lens alone)	166.7×209.1	35.0	×1.5
	0.58	1	94.9×119.1	29.1	×1.9
	0.83	2	66.4×83.3	27.6	×2.4
	1.08	2+1	51.0×64.0	27.4	×2.9
	1.33	3	41.4×52.0	27.8	×3.4
	1.58	3+1	34.9×43.8	28.5	×4.0
	1.83	3+2	30.1×37.8	29.5	×4.7
	2.08	3+2+1	26.5×33.2	30.5	×5.4
SMC PENTAX 75mm F4.5 (距離目盛 0.70m) Distance scale at 0.70m)	0.15	用いない場合 (lens alone)	375.0×470.5	70.0	×1.2
	0.33	1	165.0×207.0	42.3	×1.6
	0.52	2	105.8×132.7	35.6	×1.9
	0.71	2+1	77.8×97.6	33.2	×2.3
	0.89	3	61.6×77.2	32.4	×2.8
	1.08	3+1	50.9×63.9	32.3	×3.3
	1.27	3+2	43.3×54.5	32.7	×3.8
	1.45	3+2+1	37.8×47.5	33.3	×4.3

表 2

レンズ Lenses	倍率 Magnification	接写リングの 組み合わせ Extension tube combination	写る範囲 Picture Area [mm]	フィルム面から 被写体までの距離 Film-to-subject distance [cm]	露出倍数 Exposure factors
SMC PENTAX SHIFT 75mm F4 (距離目盛 0.70m) Distance scale at 0.70m)	0.15	用いない場合 (lens alone)	359.1×450.5	70.0	×1.2
	0.34	1	161.9×203.1	44.5	×1.4
	0.53	2	104.5×131.1	38.1	×1.7
	0.71	2+1	77.1×96.8	35.7	×2.0
	0.90	3	61.1×76.7	35.0	×2.3
	1.09	3+1	50.6×63.5	34.9	×2.7
	1.27	3+2	43.2×54.2	35.3	×3.1
	1.46	3+2+1	37.7×47.3	36.0	×3.5
SMC PENTAX 90mm F2.8 (距離目盛 0.65m) Distance scale at 0.65m)	0.20	用いない場合 (lens alone)	271.9×341.1	65.0	×1.4
	0.36	1	154.9×194.3	46.9	×1.7
	0.51	2	108.3×135.9	40.6	×2.0
	0.66	2+1	83.2×104.4	37.8	×2.4
	0.81	3	67.6×84.8	36.6	×2.8
	0.97	3+1	56.9×71.4	36.2	×3.2
	1.12	3+2	49.2×61.7	36.3	×3.7
	1.27	3+2+1	43.2×54.3	36.7	×4.2
SMC TAKUMAR 90mm F2.8 (距離目盛 0.85m) Distance scale at 0.85m)	0.14	用いない場合 (lens alone)	405.7×509.0	85.0	×1.2
	0.29	1	189.0×237.1	50.9	×1.5
	0.45	2	123.2×154.5	41.5	×1.9
	0.60	2+1	91.4×114.6	37.7	×2.2
	0.76	3	72.6×91.1	36.1	×2.6
	0.91	3+1	60.2×75.6	35.4	×3.1
	1.07	3+2	51.5×64.6	35.4	×3.5
	1.22	3+2+1	44.9×56.4	35.7	×4.0

表 3

レンズ Lenses	倍率 Magnification	接写リングの 組み合わせ Extension tube combination	写る範囲 Picture Area [mm]	フィルム面から 被写体までの距離 Film-to-subject distance [cm]	露出倍数 Exposure factors
SMC PENTAX 105mm F2.4 距離目盛 1.0m Distance scale at 1.0m	0.13	用いない場合 (lens alone)	412.5×517.5	100.0	×1.3
	0.27	1	206.2×258.7	62.4	×1.6
	0.40	2	137.5×172.5	50.7	×1.9
	0.53	2+1	103.1×129.4	45.6	×2.2
	0.67	3	82.5×103.5	43.1	×2.6
	0.80	3+1	68.7×86.2	41.8	×3.0
	0.93	3+2	58.9×73.9	41.4	×3.5
	1.07	3+2+1	51.6×64.7	41.4	×3.9
SMC PENTAX 165mm F2.8 距離目盛 1.60m Distance scale at 1.60m	0.13	用いない場合 (lens alone)	417.1×523.3	160.4	×1.3
	0.22	1	253.8×318.4	112.4	×1.6
	0.30	2	182.4×228.8	92.4	×1.9
	0.39	2+1	142.3×178.6	81.8	×2.1
	0.47	3	116.7×146.4	75.5	×2.5
	0.56	3+1	98.9×124.1	71.5	×2.8
	0.64	3+2	85.8×107.7	69.0	×3.1
	0.73	3+2+1	75.8×95.1	67.4	×3.5
SMC PENTAX LS 165mm F4 距離目盛 1.60m Distance scale at 1.60m	0.13	用いない場合 (lens alone)	430.2×539.7	160.0	×1.4
	0.21	1	256.6×321.9	110.3	×1.7
	0.30	2	182.8×229.4	90.0	×2.1
	0.39	2+1	142.0×178.2	79.4	×2.5
	0.47	3	116.1×145.6	73.2	×2.9
	0.56	3+1	98.2×123.2	69.3	×3.4
	0.65	3+2	85.0×106.7	66.8	×3.9
	0.73	3+2+1	75.0×94.1	65.3	×4.4

表 4

レンズ Lenses	倍率 Magnification	接写リングの 組み合わせ Extension tube combination	写る範囲 Picture Area [mm]	フィルム面から 被写体までの距離 Film-to-subject distance [cm]	露出倍数 Exposure factors
SMC PENTAX 200mm F4 (距離目盛 1.50m Distance scale at 1.50m)	0.19	用いない場合 (lens alone)	293.7×368.5	150.0	×1.5
	0.26	1	213.7×268.1	122.4	×1.8
	0.33	2	167.9×210.7	107.1	×2.0
	0.40	2+1	138.3×173.5	97.8	×2.3
	0.47	3	117.6×147.5	91.7	×2.5
	0.54	3+1	102.2×128.3	87.5	×2.8
	0.61	3+2	90.4×113.5	84.6	×3.1
	0.68	3+2+1	81.1×101.7	82.6	×3.4
SMC PENTAX 300mm F4 (距離目盛 5.0m Distance scale at 5.0m)	0.07	用いない場合 (lens alone)	785.7×985.7	500.0	×1.3
	0.11	1	485.3×608.8	341.0	×1.6
	0.16	2	336.7×422.5	261.5	×1.9
	0.21	2+1	261.9×328.6	222.0	×2.1
	0.26	3	214.3×268.8	197.5	×2.5
	0.30	3+1	181.3×227.5	180.9	×2.8
	0.35	3+2	157.1×197.1	169.1	×3.1
	0.40	3+2+1	138.7×174.0	160.4	×3.5
SMC PENTAX MACRO 135mm F4 (距離目盛 0.75m Distance scale at 0.75m)	0.31	用いない場合 (lens alone)	177.0×222.0	75.0	×1.9
	0.41	1	132.7×166.5	65.4	×2.2
	0.52	2	106.2×133.2	60.3	×2.6
	0.62	2+1	88.5×111.0	57.4	×3.1
	0.73	3	75.8×95.1	55.7	×3.5
	0.76	3+1	72.9×91.4	55.3	×3.6
	0.93	3+2	59.0×74.0	54.3	×4.5
	1.04	3+2+1	53.1×66.6	54.3	×5.1



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Printed in Japan.

表 5

レンズ Lenses	倍率 Magnification	接写リングの 組み合わせ Extension tube combination	写る範囲 Picture Area (mm)	フィルム面から 被写体までの距離 Film-to-subject distance (cm)	露出倍数 Exposure factors
SMC TAKUMAR 600mm F4 (距離目盛 12.0m) Distance scale at 12.0m)	0.06	用いない場合 (lens alone)	942.9×1182.9	1200.0	×1.4
	0.10	1	569.0×713.8	804.9	×1.7
	0.14	2	407.4×511.1	631.0	×2.0
	0.17	2+1	317.3×398.1	535.0	×2.3
SMC TAKUMAR 800mm F4 (距離目盛 20.0m) Distance scale at 20.0m)	0.04	用いない場合 (lens alone)	1257.1×1577.1	2000.0	×1.3
	0.07	1	758.6×951.7	1289.0	×1.5
	0.10	2	543.2×681.5	978.0	×1.7
	0.13	2+1	423.1×530.8	805.6	×1.9
SMC REFLEX TAKUMAR 1000mm F8 (距離目盛 35.0m) Distance scale at 35.0m)	0.03	用いない場合 (lens alone)	1791.9×2248.0	3500.0	×1.4
	0.05	1	1024.3×1285.7	2106.8	×1.7
	0.08	2	717.1×899.7	1550.6	×2.0
	0.10	2+1	551.7×692.1	1252.1	×2.4



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02-9110