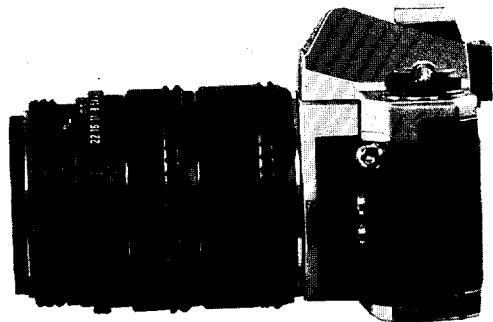


ASAHI
PENTAX

AUTO EXTENSION TUBE SET
EXTENSION TUBE SET



AUTO EXTENSION TUBE SET K

SIZE

Maximum diameter: 64.5mm

Overall length

(of No. 1 + No. 2 + No. 3): 68mm

WEIGHT

220g



No. 1



No. 2



No. 3

EXTENSION TUBE SET K

SIZE

Maximum diameter: 64.5mm

Overall length

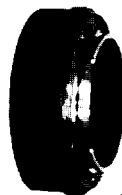
(of No. 1 + No. 2 + No. 3): 62mm

WEIGHT

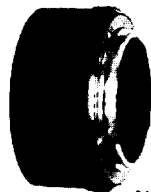
194g



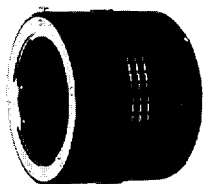
No. 1



No. 2



No. 3



50mm

Max. dia.: 63.7mm
Overall length: 61.7mm
Weight: 107g



100mm

Max. dia. 63.7mm
Overall length: 111.7mm
Weight: 143g

Magnifications for Auto Extension Tube K's, 50mm & 100mm

| Lens | 50mm | | 100mm | |
|----------------------------|----------|---------------------|----------|---------------------|
| | ∞ | Min. distance scale | ∞ | Min. distance scale |
| SMC Pentax-M 85mm f/2 | 0.59× | 0.71× | — | — |
| SMC Pentax-M 100mm f/2.8 | 0.50× | 0.63× | 1.00× | 1.13× |
| SMC Pentax Macro 100mm f/4 | 0.50× | 1.00× | 1.00× | 1.50× |
| SMC Pentax 120mm f/2.8 | 0.42× | 0.55× | 0.83× | 0.96× |
| SMC Pentax-M 135mm f/3.5 | 0.37× | 0.49× | 0.74× | 0.86× |
| SMC Pentax-M 150mm f/3.5 | 0.33× | 0.44× | 0.67× | 0.77× |
| SMC Pentax-M 200mm f/4 | 0.25× | 0.38× | 0.50× | 0.63× |
| SMC Pentax 300mm f/4 | 0.17× | 0.27× | 0.35× | 0.44× |

FUNCTION AND FEATURES

The Auto Extension Tube Set K consists of No. 1 (length 12mm), No. 2 (19mm) and No. 3 (26mm) rings. The Extension Tube Set K consists of No. 1 (9.5mm), No. 2 (19mm) and No. 3 (28.5mm) rings. As the rings in the two sets are of different lengths, you should distinguish carefully between the Auto Extension Tube rings and the Extension Tube rings when checking the close-up reference tables starting on p. 15.

The Auto Extension Tube K's, 50mm and 100mm, have the length of 50mm and 100mm respectively.

The Auto Extension Tube Set K couples to the automatic diaphragm and the full-aperture metering mechanism of the lens. Since almost all SMC Pentax interchangeable lenses do have automatic diaphragms and full-aperture

metering mechanisms, the Auto Extension Tube Set makes close-up work much more convenient.

The Extension Tube Set K is a simple connecting tube between the lens and the camera and may be more suitable for lenses without an automatic diaphragm or a full-aperture metering mechanism.

The single-lens reflex camera permits you to see in the finder the picture as it will appear on the film. The mounting of connecting tubes such as extension tubes leaves unimpaired this basic advantage — the picture to be taken is still shown accurately in the finder. Thus the SLR is particularly good for close-up work.

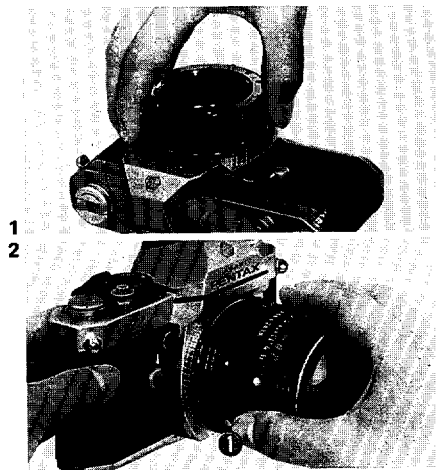
The greater the lens-to-film-plane distance, the closer the picture-taking distance can be. For further details, see the tables on pp. 15–39.

HOW TO MOUNT RINGS AND LENS

Detach the lens from the camera body as shown in Illustration 1. Select one of the extension ring according to the close-up reference tables; mount the ring on the camera just as you would a lens. The same procedure is followed if you want to use two or three rings. In this case, the order of the rings in the combination is entirely a matter of choice.

Except when the lens is reversed, the Auto Extension Tube K, 50mm or 100mm, should be used singly, never together for greater magnification.

Attach the lens on the ring as shown in Illustration 2. If you want to detach the lens or one of the rings, push the lock-release button (1) on the ring and turn the lens or the ring counterclockwise 65° . Take care not to mistake the lock-release button for the lens lock-release lever on the camera. The lock device on the ring prevents accidental detaching of the lens or ring.



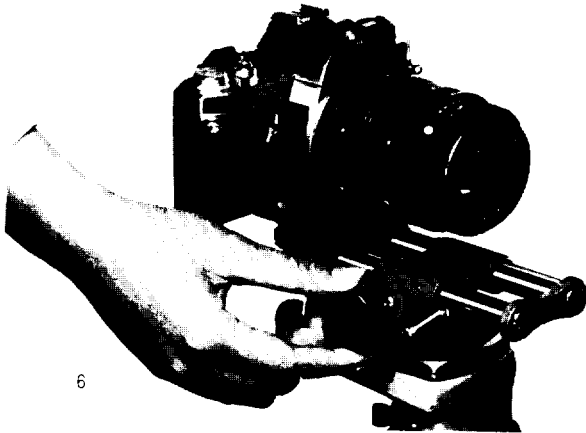
HOW TO FOCUS AND METER

When used with any of the rings of the Auto Extension Tube Set K, a lens with full-aperture metering capability stays open at full aperture. When using the Extension Tube Set K, the aperture of the lens must be set manually.

The Auto Extension Tube Set K permits full-aperture focusing and metering with the Pentax K Series cameras, just as if the lens were mounted directly on the camera.

When using the Extension Tube Set K, open the aperture completely for focusing and then stop down the aperture to the desired value for shooting. When using this extension tube set with the Pentax K Series, use a stop-down metering system.

3



6

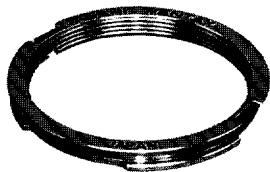
When the magnification in picture-taking increases (to more than 1/2x for example), you may be unable to focus accurately merely by turning the focusing ring of the lens. In hand-held shooting, you can move the camera away from or close to the subject to get the correct focus. If your camera is on a tripod, you can use the Critical Focuser III accessory and slide the camera backwards or forwards for easy focusing, as shown in Illustration 3.

When using any extension rings you must keep in mind that the distance and depth-of-field scales on the lens cannot be used.

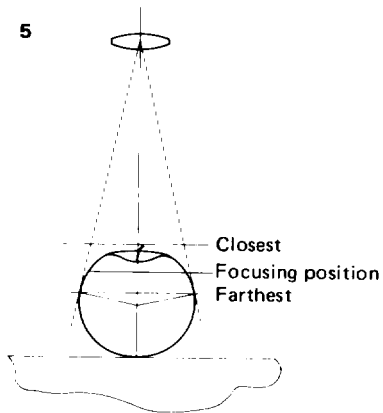
Using Screw-Mount Takumar Lenses

The extension tube can be used with the screw-mount Takumar lens through the mount adaptor K, an optional accessory shown in Illustration 4. (To mount the Takumar lens on the Pentax K Series camera, refer to the instructions on K Series cameras.) With this adaptor, the lens can be used for manual diaphragm operation and stop-down metering, instead of automatic diaphragm operation and full-aperture metering.

4



7



Depth-of-field in Close-ups

The shorter the lens-to-subject distance is, the shallower the depth-of-field becomes. You may not be able to secure adequate depth-of-field even at the standard lens' minimum aperture of $f/22$. In any event, the closer you go the more difficult exact focusing becomes.

In close-up work, the depth-of-field has the same depth in its foreground and background. Focus should thus be set at the intermediate point, as shown in Fig. 5, between the closest and farthest points of the area you are covering in your focus.

Exposure When Using a Tripod

In close-up shooting, the aperture is most often stopped down to a small opening (larger aperture number); this lengthens the lens-to-film-plane distance. Exposure time naturally becomes longer. If the shutter speed is slower than 1/30 sec, using a sturdy tripod is recommended.

When you use both the Auto Extension Tube rings No. 1 and 2 with a 50mm f/1.7 standard lens, the total focal length is 7cm, equivalent almost to the focal length of an SMC Pentax-M 135mm f/3.5 lens. In such a case, if you are hand-holding the camera shooting at 1/60 sec or more, there is a considerable possibility of camera movement. Use of a tripod is thus recommended.

Using Auto Extension Tubes K, 50mm & 100mm

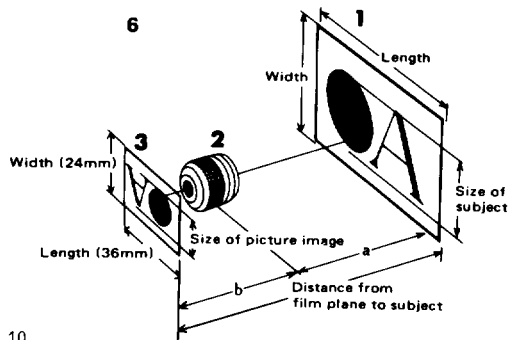
Be sure to use the Auto Extension Tube K, 50mm or 100mm, singly, never doubly for greater magnifications.

Aperture Reading in Finder of MX & KX

In the Pentax MX, KX and K2 DMD cameras, the aperture numbers of most SMC Pentax lenses are shown in the upper part of the viewfinder. When Auto Extension K rings or Extension K rings are mounted on the camera, the lens aperture numbers do not appear in the finder as the lens is moved farther out to the front.

HOW TO USE CLOSE-UP REFERENCE TABLES

1. Area to be photographed
2. Picture-taking lens
3. Picture area on film



Magnification

The magnification value equals;

$\frac{\text{Size of Picture Image}}{\text{Size of Subject}}$ that is,

$\frac{\text{Width or Length of Picture Area}}{\text{Width or Length of Area to be Photographed}}$

As the picture area of the Pentax K Series camera is 24 x 36mm, the magnification is;

$\frac{24\text{mm}}{\text{Width of Area to be Photographed}}$ OR

$\frac{36\text{mm}}{\text{Length of Area to be Photographed}}$

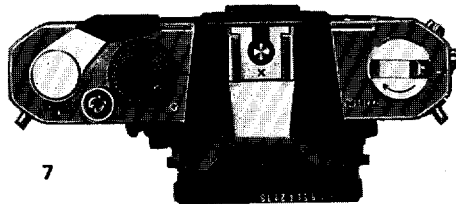
Care is required in enlarging as the enlarging multiplies the magnification ratio.

Area to be Photographed

The area to be photographed is the actual 2-dimensional measurement (width x length) of the subject when it is photographed so as to fill the entire picture area.

Distance from Film Plane to Subject

The Pentax K Series cameras do not in-



dicates the exact position of the film plane, but the position is roughly at the rear edge of the camera top, as shown in Illustration 7. The distance from the film plane to the subject can be determined from the close-up reference tables in this booklet and the distance as measured with a steel tape from the film plane to the subject.

Exposure Factors

Pentax K series cameras have a built-in TTL exposure meter which measures the light actually passing through the lens and gives the correct exposure based on that measurement. For normal photographic purposes, you need not resort to the exposure factors given in the tables if you rely on the TTL meter. However, you must keep in mind that close-up work

requires longer exposures than would be required for shooting at normal distances.

How to Use Close-up Reference Tables

There are three ways to use the close-up reference tables: you can decide the magnification first, the area to be photographed first, or the film-plane-to-subject distance first. Make your choice of one of these three methods, then check the adjacent columns.

Magnification Set First

The magnification should be determined first if you want a certain sized subject to appear as a certain size on the film.

For example, if you want a subject measuring 10cm to appear as 3cm on the film, if you are shooting with a 50mm f/1.7 lens, the magnification is $3/10 = 0.3x$. According to

Table 5, you should use the No. 1 tube and set the distance anywhere on the scale between the closest distance and the infinity marks.

To get an accurate lens extension, use the simple mathematic formula given here. In Figure 6, "a" is the distance between the subject and the first nodal point in the lens—the point at which the light enters the lens to cross the principal axis. "b" is the distance from the second nodal point—the point at which the light crossing the principal axis leaves the lens—to the film plane. "f" is the actual focal length of the lens.

"b - f," or the distance of the required lens extension, can be sought from "mf." To determine the distance between the subject

and the film plane, seek "a" from $m = \frac{f}{a - f}$
and then "b" from $b = ma$.

Focusing is done by adjusting the distance between the lens and subject.

"f"—the actual focal length of the lens—will differ slightly from its nominal or stated focal length. Ask your local Pentax Service Center or dealer if you need more details.

Area to be Photographed Set First

After you have decided the size of the area to be photographed, next determine the size this will occupy on the film. For example, if you want to photograph an area measuring 10 x 15cm with a 50mm f/1.7 lens so that it completely fills the 24 x 36mm frame of the negative, Table 5 will tell you the No. 1 exten-

sion tube must be used and the distance scale set anywhere between the closest distance and infinity marks.

Distance of Film-Plane-to-Subject Set First

If you cannot bring the lens as close to the subject as you want, determine the film-to-subject distance first. For a given magnification, this film-to-subject distance differs from one focal-length lens to another. Choose a proper lens according to the close-up tables. For close-up and macro shots from a distance, use a longer focal-length lens.

Ultra-Close-ups: Larger than Life Size

No matter which lens you use, when the actual size of the subject equals the size of the picture image on the film, "a" equals "b." Thus, "a," the distance from the subject to the

first nodal point in the lens, is equal to "b," the distance from the second nodal point to the film plane. If you want ultra-close-ups larger than life size on the film attach the lens backwards on the extension ring by using the accessory, Reverse Adaptor K 49mm or K 52mm. For details, check the close-up tables on pp. 31–39.

Lenses Best for Close-ups

In general, lens performance deteriorates and close-up focusing becomes more difficult under the following conditions: with faster lenses, with SLR wide-angle lenses having shorter focal lengths, and with telephoto lenses having shorter barrels. Particular care must be taken when shooting under these conditions.

Lenses not included in the close-up tables

are not appropriate for close-up work with extension rings. The 50mm f/1.2 and 50mm f/1.4 lenses are not suitable for close-ups of flat subjects such as documents, but it can be used for regular close-ups in which the area of the subject does not reach out to the edges of the picture format.

As the SMC Pentax Macro 50mm f/4 and 100mm f/4 lenses are especially designed for maximum performance at magnifications of 1/5–1/10x, the use of these lenses is recommended if you want critically-focused close-ups. These lenses can be used for distance shots and have a minimum of distortion. ("Distortion" is an aberration in which straight lines do not appear straight in the photograph.) They are thus most suitable for close-ups of documents.

CLOSE-UP REFERENCE TABLE

- Figures in bold face are for the Auto Extension Tubes; regular-weight figures in parentheses are for the Extension Tubes. (—) indicates that the preceding bold face figures also apply to Extension Tubes.

Table 1: 28mm f/2, f/2.8 & f/3.5

(Distance scale at 0.3m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.13(—) | Not used | 179 × 269(—) | 302(—) | × 1.2(—) |
| 0.56(0.47) | 1 | 43 × 65 (51 × 77) | 152(160) | × 1.8(1.7) |
| 0.80(—) | 2 | 30 × 45 (—) | 144(—) | × 2.3(—) |
| 1.05(1.14) | 3 | 23 × 34 (21 × 32) | 142(143) | × 2.7(2.9) |

Table 2: 35mm f/3.5

(Distance scale at 0.35m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.13(--) | Not used | 183 × 274(--) | 350(--) | × 1.2(--) |
| 0.47(0.40) | 1 | 51 × 76 (59 × 89) | 169(180) | × 1.8(1.7) |
| 0.68(--) | 2 | 36 × 54 (--) | 154(--) | × 2.3(--) |
| 0.88(0.95) | 3 | 27 × 41 (25 × 38) | 150(149) | × 2.8(2.9) |

Table 3: M 35mm f/2 & f/2.8

(Distance scale at 0.3m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.17(--) | Not used | 142 × 213(--) | 300(--) | × 1.2(--) |
| 0.51(0.44) | 1 | 47 × 70 (55 × 82) | 173(182) | × 1.8(1.7) |
| 0.71(--) | 2 | 34 × 51 (--) | 161(--) | × 2.2(--) |
| 0.91(0.98) | 3 | 26 × 39 (24 × 36) | 157(--) | × 2.6(2.8) |

Table 4: 40mm f/2.8

(Distance scale at 0.6m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|---------------|------------------|---------------------------------|----------------------------------|-----------------|
| 0.08(—) | Not used | 295×443(—) | 600(—) | ×1.1(—) |
| 0.37(0.31) | 1 | 65×97 (77×116) | 213(232) | ×1.7(1.6) |
| 0.54(—) | 2 | 45×67 (—) | 185(—) | ×2.1(—) |
| 0.71(0.77) | 3 | 34×51 (31×47) | 173(171) | ×2.5(2.6) |
| 0.83(0.77) | 1+2 | 29×43 (31×47) | 170(171) | ×2.8(2.6) |
| 1.00(—) | 1+3 | 24×36 (—) | 168(—) | ×3.3(—) |
| 1.17(1.23) | 2+3 | 21×31 (20×29) | 169(170) | ×3.8(4.0) |

As the 50mm f/1.4 and 50mm f/1.2 lenses are not suitable for ultra-close-ups (larger than life size) unless the Reverse Adapter is used,

the table lists only a few examples of when to use which tubes. However, a combination of No. 1, 2 and 3 tubes is possible.

Table 5: 50mm f/1.2, f/1.4 & f/1.7

(Distance scale at 0.45m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.15(—) | Not used | 158 × 237(—) | 450(—) | × 1.3(—) |
| 0.38(0.34) | 1 | 63 × 94 (72 × 108) | 256(273) | × 1.9(1.7) |
| 0.52(—) | 2 | 46 × 69 (—) | 228(—) | × 2.2(—) |
| 0.65(0.70) | 3 | 37 × 55 (34 × 51) | 214(211) | × 2.6(2.8) |
| 0.75(0.70) | 1 + 2 | 32 × 48 (34 × 51) | 209(211) | × 2.9(2.8) |
| 0.88(—) | 1 + 3 | 27 × 41 (—) | 205(—) | × 3.4(—) |
| 1.02(1.07) | 2 + 3 | 23 × 35 (23 × 34) | 204(204) | × 3.8(4.0) |
| (1.25) | 1 + 2 + 3 | (19 × 29) | (207) | × (4.7) |

Table 6: 55mm f/1.8

(Distance scale at 0.45m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0. 17(—) | Not used | 139×209(—) | 449(—) | × 1.4(—) |
| 0. 38(0.34) | 1 | 63×94 (70×105) | 279(302) | × 1.9(1.8) |
| 0. 51(—) | 2 | 47×71 (—) | 251(—) | × 2.2(—) |
| 0. 63(0.68) | 3 | 38×57 (35×53) | 236(240) | × 2.6(2.7) |
| 0. 72(0.68) | 1+2 | 33×50 (35×53) | 230(240) | × 2.9(2.7) |
| 0. 84(—) | 1+3 | 29×43 (—) | 225(—) | × 3.3(—) |
| 0. 97(1.01) | 2+3 | 25×37 (24×36) | 223(231) | × 3.8(3.9) |
| (1.18) | 1+2+3 | (20×30) | (225) | ×(4.6) |

Table 7: 85mm f/1.8 & f/2

(Distance scale at 0.85m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.13(—) | Not used | 191 × 287(—) | 839(—) | × 1.3(—) |
| 0.27(0.24) | 1 | 90 × 135(101 × 151) | 492(542) | × 1.7(1.7) |
| 0.35(—) | 2 | 69 × 103(—) | 424(—) | × 2.0(—) |
| 0.43(0.46) | 3 | 56 × 84 (52 × 78) | 384(388) | × 2.3(2.6) |
| 0.49(0.46) | 1 + 2 | 49 × 74 (52 × 78) | 365(388) | × 2.5(2.6) |
| 0.57(—) | 1 + 3 | 42 × 63 (—) | 347(—) | × 2.8(—) |
| 0.65(0.69) | 2 + 3 | 37 × 55 (35 × 53) | 335(333) | × 3.2(3.6) |
| 0.71 | 50 mm | 34 × 51 | 330 | × 3.4 |
| (0.79) | 1 + 2 + 3 | (30 × 45) | (324) | × (3.8) |

Table 8: 100mm f/2.8

(Distance scale at 1.0m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|---------------|------------------|---------------------------------|----------------------------------|-----------------|
| 0.13(—) | Not used | 190×285(—) | 1000(—) | ×1.4(—) |
| 0.25(0.22) | 1 | 97×146(108×162) | 628(671) | ×1.8(1.7) |
| 0.32(—) | 2 | 76×114(—) | 545(—) | ×2.1(—) |
| 0.39(0.41) | 3 | 62×93 (58×87) | 495(482) | ×2.4(2.5) |
| 0.44(0.41) | 1+2 | 55×82 (58×87) | 470(482) | ×2.7(2.5) |
| 0.51(—) | 1+3 | 47×71 (—) | 446(—) | ×3.0(—) |
| 0.58(0.60) | 2+3 | 42×62 (40×60) | 429(424) | ×3.4(3.5) |
| 0.63 | 50 mm | 38×57 | 420 | ×3.6 |
| (0.70) | 1+2+3 | (34×51) | (411) | ×(4.0) |
| 1.13 | 100 mm | 21×32 | 399 | ×6.9 |

Table 9: 120mm f/2.8

(Distance scale at 1.2m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.13(-) | Not used | 187×281(- -) | 1202(-) | ×1.5(-) |
| 0.23(0.21) | 1 | 105×158(115×173) | 805(853) | ×1.9(1.8) |
| 0.29(-) | 2 | 84×126(- -) | 705(-) | ×2.2(- -) |
| 0.35(0.37) | 3 | 69×104(65×98) | 641(623) | ×2.5(2.6) |
| 0.39(0.37) | 1+2 | 62×93 (65×98) | 609(623) | ×2.7(2.6) |
| 0.45(- -) | 1+3 | 54×81 (- -) | 575(- -) | ×3.0(-) |
| 0.50(0.53) | 2+3 | 48×72 (46×69) | 551(544) | ×3.3(3.5) |
| 0.55(-) | 50 mm | 44×66 (- -) | 538(-) | ×3.6(-) |
| (0.60) | 1+2+3 | (40×60) | (523) | ×(4.0) |
| 0.96 | 100 mm | 25×37 | 492 | ×6.7 |

Table 10: Zoom 45mm ~ 125mm f/4

(Distance scale at 1.5m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.04(—) | Not used | 651×976(—) | 1501(—) | ×1.0(—) |
| 0.28(0.19) | 1 | 87×130(126×189) | 340(418) | ×1.3(1.2) |
| 0.42(—) | 2 | 57×86 (—) | 287(—) | ×1.5(—) |
| 0.56(0.57) | 3 | 43×64 (42×63) | 264(263) | ×1.7(1.8) |
| 0.66(0.57) | 1+2 | 37×55 (42×63) | 255(263) | ×1.9(1.8) |
| 0.80(—) | 1+3 | 30×45 (—) | 249(—) | ×2.1(—) |

Table 11: 135mm f/2.5 & f/3.5

(Distance scale at 1.5m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.11 (—) | Not used | 215 × 322 (—) | 1499 (—) | × 1.4 (—) |
| 0.20 (0.18) | 1 | 119 × 179 (132 × 198) | 977 (1045) | × 1.7 (1.7) |
| 0.25 (—) | 2 | 95 × 143 (—) | 846 (—) | × 2.0 (—) |
| 0.30 (0.32) | 3 | 79 × 118 (74 × 111) | 762 (740) | × 2.2 (2.3) |
| 0.34 (0.32) | 1 + 2 | 70 × 105 (74 × 111) | 719 (740) | × 2.4 (2.3) |
| 0.39 (—) | 1 + 3 | 61 × 92 (—) | 673 (—) | × 2.7 (—) |
| 0.45 (0.46) | 2 + 3 | 54 × 81 (52 × 78) | 640 (631) | × 2.9 (3.0) |
| 0.48 | 50 mm | 49 × 74 | 622 | × 3.2 |
| (0.53) | 1 + 2 + 3 | (45 × 67) | (602) | × (3.5) |
| 0.85 | 100 mm | 28 × 42 | 551 | × 5.6 |

Table 12: SMC Pentax-M 135mm f/3.5

(Distance scale at 1.5m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|---------------|------------------|---------------------------------|----------------------------------|-----------------|
| 0.12(—) | Not used | 206×308(—) | 1500(—) | ×1.5(—) |
| 0.21(0.19) | 1 | 117×175(128×192) | 1012(1074) | ×2.0(1.9) |
| 0.26(—) | 2 | 93×140(—) | 886(—) | ×2.3(—) |
| 0.31(0.33) | 3 | 77×116(73×110) | 805(783) | ×2.6(2.7) |
| 0.35(0.33) | 1+2 | 69×104(73×110) | 764(783) | ×2.8(2.7) |
| 0.40(—) | 1+3 | 60×90 (—) | 720(—) | ×3.2(—) |
| 0.45(0.47) | 2+3 | 53×80 (51×77) | 688(678) | ×3.6(3.7) |
| 0.49 | 50 mm | 49×74 | 670 | ×3.9 |
| (0.54) | 1+2+3 | (44×67) | (650) | ×(4.3) |
| 0.86 | 100 mm | 28×42 | 600 | ×7.3 |

Table 13: M 150mm f/3.5, 150mm f/4

(Distance scale at 1.8m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.11(—) | Not used | 229×344(—) | 1802(—) | ×1.5(—) |
| 0.19(0.17) | 1 | 130×195(144×216) | 1193(1278) | ×1.9(1.8) |
| 0.23(—) | 2 | 104×156(—) | 1036(—) | ×2.2(—) |
| 0.28(0.29) | 3 | 86×129(82×123) | 934(908) | ×2.5(2.6) |
| 0.31(0.29) | 1+2 | 77×116(82×123) | 882(908) | ×2.7(2.6) |
| 0.36(—) | 1+3 | 67×101(—) | 826(—) | ×3.0(—) |
| 0.41(0.42) | 2+3 | 59×89 (57×85) | 785(773) | ×3.4(3.5) |
| 0.44 | 50 mm | 55×82 | 761 | ×3.6 |
| (0.49) | 1+2+3 | (50×75) | (735) | ×(4.0) |
| 0.77 | 100 mm | 31×47 | 663 | ×6.7 |

Table 14: 200mm f/4

(Distance scale at 2.0m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|---------------|------------------|---------------------------------|----------------------------------|-----------------|
| 0.13(—) | Not used | 181×271(—) | 2001(—) | × 1.7(—) |
| 0.19(0.18) | 1 | 124×186(133×199) | 1546(1615) | × 2.0(2.0) |
| 0.23(—) | 2 | 105×158(—) | 1394(—) | × 2.3(—) |
| 0.26(0.28) | 3 | 91×137(87×131) | 1284(1252) | × 2.5(2.6) |
| 0.29(0.28) | 1+2 | 83×125(87×131) | 1223(1252) | × 2.7(2.6) |
| 0.32(—) | 1+3 | 74×111(—) | 1155(—) | × 3.0(—) |
| 0.36(0.37) | 2+3 | 67×101(65×97) | 1101(1085) | × 3.2(3.3) |
| 0.38 | 50 mm | 63×94 | 1069 | × 3.4 |
| (0.42) | 1+2+3 | (57×86) | (1033) | × (3.7) |
| 0.63 | 100 mm | 38×57 | 913 | × 5.8 |

Table 15: 300mm f/4

(Distance scale at 4m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|---------------|------------------|---------------------------------|----------------------------------|-----------------|
| 0.09(-) | Not used | 255 × 382(- -) | 3996(- -) | × 1.7(-) |
| 0.14(0.13) | 1 | 177 × 265(189 × 283) | 3070(3212) | × 2.0(1.9) |
| 0.16(-) | 2 | 150 × 225(- -) | 2754(-) | × 2.2(- -) |
| 0.18(0.19) | 3 | 131 × 196(125 × 187) | 2523(2455) | × 2.4(2.5) |
| 0.20(0.19) | 1 + 2 | 119 × 179(125 × 187) | 2393(2455) | × 2.6(2.5) |
| 0.23() | 1 + 3 | 107 × 160(- -) | 2246() | × 2.9(-) |
| 0.25(0.26) | 2 + 3 | 96 × 144(93 × 139) | 2128(2092) | × 3.1(3.2) |
| 0.27 | 50 mm | 90 × 135 | 2059 | × 3.3 |
| (0.29) | 1 + 2 + 3 | (83 × 124) | (1975) | × (3.6) |
| 0.44 | 100 mm | 55 × 82 | 1682 | × 5.5 |

Table 16: Macro 50mm f/4

(Distance scale at 0.234m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.50(—) | Not used | 48 × 72 (—) | 234(—) | × 2.3(—) |
| 0.73(0.68) | 1 | 33 × 49 (35 × 53) | 213(215) | × 3.2(3.0) |
| 0.86(—) | 2 | 28 × 42 (—) | 209(—) | × 3.7(—) |
| 1.00(1.05) | 3 | 24 × 36 (23 × 34) | 208(208) | × 4.3(4.5) |
| 1.10(1.05) | 1 + 2 | 22 × 33 (22 × 34) | 208(208) | × 4.7(4.5) |
| 1.23(—) | 1 + 3 | 19.5 × 29 (—) | 210(—) | × 5.4(—) |
| 1.37(1.41) | 2 + 3 | 17.5 × 26 (17 × 25.5) | 214(213) | × 6.4(6.1) |
| 1.47 | 50 mm | 16.3 × 24.5 | 215 | × 6.6 |

Table 17: Macro 100mm f/4

(Distance scale at 0.45m)

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.50(—) | Not used | 48 × 72(—) | 450(—) | × 2.5(—) |
| 0.62(0.60) | 1 | 39 × 58(40 × 60) | 424(428) | × 2.9(2.5) |
| 0.69(—) | 2 | 35 × 52(—) | 415(—) | × 3.2(—) |
| 0.76(0.79) | 3 | 31 × 47(31 × 46) | 408(407) | × 3.5(3.9) |
| 0.81(0.79) | 1 + 2 | 29 × 44(31 × 46) | 405(407) | × 3.7(3.9) |
| 0.88(—) | 1 + 3 | 27 × 41(—) | 402(—) | × 4.0(—) |
| 0.95(0.98) | 2 + 3 | 25 × 38(25 × 37) | 401(401) | × 4.3(4.9) |
| 1.00 | 50 mm | 24 × 36 | 401 | × 4.5 |
| (1.07) | 1 + 2 + 3 | (22 × 33) | (401) | × (4.9) |
| 1.50 | 100 mm | 16 × 24 | 418 | × 7.4 |

HOW TO USE REVERSE ADAPTORS K, 49mm & 52mm

8



When using the Reverse Adaptor K, 49mm or 52mm (see Illustration 8), screw it into the SMC Pentax lens. Then, reversing the lens, attach the Reverse Adaptor to the Auto Extension Tube K or the Extension Tube K, as shown in Illustration 9. In this case, note that the manual diaphragm and stop-down metering mechanism will operate instead of the automatic diaphragm and full-aperture metering mechanism.

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Table 18: 28mm f/2.8, M 28mm f/3.5

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 1.78(—) | Not used | 13.5×20.2(—) | 139(—) | × 5.6(—) |
| 2.20(2.11) | 1 | 10.9×16.3(11.3×17.0) | 148(146) | × 7.7(7.3) |
| 2.45(—) | 2 | 9.8×14.7(—) | 154(—) | × 9.2(—) |
| 2.78(2.70) | 3 | 8.6×12.9(8.9×13.3) | 162(160) | ×11.3(10.7) |
| 2.87(2.70) | 1+2 | 8.3×12.5(8.9×13.3) | 164(160) | ×11.9(10.7) |
| 3.12(—) | 1+3 | 7.7×11.5(—) | 170(—) | ×13.7(—) |
| 3.45(3.36) | 2+3 | 6.9×10.4(7.1×10.7) | 179(177) | ×16.2(15.5) |
| 3.54 | 50 mm | 6.8×10.2 | 181 | ×17.0 |
| 3.79(—) | 1+2+3 | 6.3× 9.5(—) | 188(—) | ×19.1(—) |
| 5.30 | 100 mm | 4.5× 6.8 | 229 | ×34.6 |

Table 19: 28mm f/3.5

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 1.90(—) | Not used | 12.7×19.0(—) | 154(—) | × 6.4(—) |
| 2.32(2.23) | 1 | 10.4×15.5(10.8×16.1) | 164(162) | × 8.7(8.2) |
| 2.56(—) | 2 | 9.4×14.0(—) | 169(—) | × 10.2(—) |
| 2.81(2.90) | 3 | 8.5×12.8(8.3×12.4) | 175(178) | × 11.8(12.4) |
| 2.99(2.90) | 1+2 | 8.0×12.1(8.3×12.4) | 180(178) | × 13.1(12.4) |
| 3.23(—) | 1+3 | 7.4×11.1(—) | 186(—) | × 14.9(—) |
| 3.48(3.57) | 2+3 | 6.9×10.3(6.7×10.1) | 193(195) | × 16.9(17.6) |
| 3.90(—) | 1+2+3 | 6.2× 9.2(—) | 204(—) | × 20.5(—) |

Table 20: 35mm f/2.8

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 1.18() | Not used | 20.4 × 30.6(-) | 158(—) | × 3.5(—) |
| 1.52(1.45) | 1 | 15.8 × 23.7(16.5 × 24.8) | 163(162) | × 4.9(4.5) |
| 1.72(-) | 2 | 13.9 × 20.9(-) | 167(—) | × 5.8(—) |
| 1.99(1.92) | 3 | 12.0 × 18.0(12.5 × 18.7) | 174(172) | × 7.2(6.8) |
| 2.06(1.92) | 1 + 2 | 11.6 × 17.4(12.5 × 18.7) | 176(172) | × 7.5(6.8) |
| 2.26(-) | 1 + 3 | 10.6 × 15.9(-) | 181(-) | × 8.7(—) |
| 2.54(2.46) | 2 + 3 | 9.4 × 14.2(9.7 × 14.6) | 189(187) | × 10.4(9.9) |
| 2.61 | 50 mm | 9.2 × 13.8 | 191 | × 10.8 |
| 2.81(—) | 1 + 2 + 3 | 8.5 × 12.8(—) | 197(—) | × 12.2(—) |
| 4.04 | 100 mm | 5.9 × 8.9 | 236 | × 22.2 |

Table 21: 35mm f/3.5

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|---------------|------------------|---------------------------------|----------------------------------|-----------------|
| 1.40(—) | Not used | 17.1 × 25.7(—) | 153(—) | × 4.7(—) |
| 1.74(1.67) | 1 | 13.8 × 20.6(14.3 × 21.5) | 160(158) | × 6.3(5.9) |
| 1.94(—) | 2 | 12.3 × 18.5(—) | 165(—) | × 7.3(—) |
| 2.14(2.22) | 3 | 11.2 × 16.8(10.8 × 16.2) | 170(172) | × 8.4(8.8) |
| 2.29(2.22) | 1 + 2 | 10.5 × 15.7(10.8 × 16.2) | 174(172) | × 9.3(8.8) |
| 2.49(—) | 1 + 3 | 9.6 × 14.5(—) | 180(—) | × 10.5(—) |
| 2.69(2.76) | 2 + 3 | 8.9 × 13.4(8.7 × 13.0) | 186(188) | × 11.9(12.4) |
| 2.83 | 50 mm | 8.5 × 12.7 | 190 | × 12.8 |
| 3.03(—) | 1 + 2 + 3 | 7.9 × 11.9(—) | 196(—) | × 14.4(—) |
| 4.26 | 100 mm | 5.6 × 8.5 | 236 | × 25.1 |

Table 22: 40mm f/2.8

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 1.06(—) | 2 | 22.6 × 33.9(—) | 169(—) | × 3.5(—) |
| 1.29(1.23) | 3 | 18.6 × 27.9(19.5 × 29.3) | 171(170) | × 4.4(4.1) |
| 1.35(1.23) | 1 + 2 | 17.8 × 26.7(19.5 × 29.3) | 172(170) | × 4.7(4.1) |
| 1.52(—) | 1 + 3 | 15.8 × 23.7(—) | 176(—) | × 5.4(—) |
| 1.75(1.69) | 2 + 3 | 13.7 × 20.6(14.2 × 21.3) | 182(180) | × 6.5(6.2) |
| 1.81 | 50 mm | 13.3 × 19.9 | 183 | × 6.8 |
| 1.98(—) | 1 + 2 + 3 | 12.1 × 18.2(—) | 188(—) | × 7.7(—) |
| 3.01 | 100 mm | 7.9 × 12.0 | 224 | × 14.6 |

The 50mm f/1.4 close-up lens is not suited for ultra-close-up (approx. life size). Therefore, use it for a magnification of more than 1.5x.

Table 23: M 50mm f/1.4

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|----------------------|-------------------------|--|---|------------------------|
| 0.91(0.86) | 1 | 26.3 × 39.4(27.8 × 41.7) | 197(198) | × 2.7(2.5) |
| 1.05(—) | 2 | 22.8 × 34.3(—) | 197(—) | × 3.2(—) |
| 1.19(1.24) | 3 | 20.2 × 30.3(19.4 × 29.1) | 198(199) | × 3.7(3.9) |
| 1.29(1.24) | 1 + 2 | 18.7 × 28.0(19.4 × 29.1) | 200(199) | × 4.1(3.9) |
| 1.42(—) | 1 + 3 | 16.9 × 25.3(—) | 203(—) | × 4.6(—) |
| 1.56(1.61) | 2 + 3 | 15.4 × 23.1(14.9 × 22.4) | 207(208) | × 5.2(5.5) |
| 1.66 | 50 mm | 14.5 × 20.7 | 210 | × 5.7 |
| 1.80(—) | 1 + 2 + 3 | 13.4 × 20.0(—) | 215(—) | × 6.4(—) |
| 2.64 | 100 mm | 9.1 × 13.6 | 249 | × 11.3 |

Note: When using SMC Pentax 50mm f/1.4 lens, magnification will increase by some 5 to 10%.

Table 24: 50mm f/1.7

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|---------------|------------------|---------------------------------|----------------------------------|-----------------|
| 1.04(0.95) | 1 + 2 | 23.0 × 34.5(25.3 × 38.0) | 204(204) | × 3.9(3.6) |
| 1.18(—) | 1 + 3 | 20.3 × 30.5(—) | 206(—) | × 4.5(—) |
| 1.31(1.31) | 2 + 3 | 17.6 × 26.4(18.3 × 27.4) | 209(208) | × 5.3(5.1) |
| 1.41(—) | 50 mm | 17.0 × 25.6(—) | 210(—) | × 5.5(—) |
| 1.54(—) | 1 + 2 + 3 | 15.5 × 23.3(—) | 214(—) | × 6.2(—) |
| 2.30(—) | 100 mm | 10.1 × 15.2(—) | 245(—) | × 11.0(—) |

Table 25: 55mm f/1.8

| | | | | |
|------------|-----------|--------------------------|----------|------------|
| 1.05(—) | 1 + 3 | 22.8 × 34.3(—) | 223(—) | × 4.1(—) |
| 1.17(1.22) | 2 + 3 | 20.4 × 30.7(19.7 × 29.6) | 225(226) | × 4.6(4.8) |
| 1.26(—) | 50 mm | 19.0 × 28.6(—) | 226(—) | × 5.0(—) |
| 1.39(—) | 1 + 2 + 3 | 17.3 × 26.0(—) | 229(—) | × 5.5(—) |
| 2.14(—) | 100 mm | 11.2 × 16.8(—) | 257(—) | × 9.7(—) |

Caution: It is meaningless to reverse the Macro 100mm f/4 lens and use it with the three extension tubes, No. 1, No. 2 and No. 3, or the 100mm extension tube, for greater magnifications. In this case, you will obtain a magnification of less than 1X.

Table 26: M-Macro 50mm f/4

| Magnification | Tubes to be used | Area to be photographed (in mm) | Film-to-subject distance (in mm) | Exposure factor |
|---------------|------------------|---------------------------------|----------------------------------|-----------------|
| 0.82(0.78) | 1 | 29.1 × 43.7(30.9 × 46.4) | 209(211) | × 3.3(3.2) |
| 0.96(—) | 2 | 25.0 × 37.5(—) | 208(—) | × 4.1(—) |
| 1.10(1.14) | 3 | 21.9 × 32.9(21.0 × 31.5) | 208(208) | × 4.7(4.9) |
| 1.19(1.14) | 1 + 2 | 20.1 × 30.2(21.0 × 31.5) | 209(208) | × 5.1(4.9) |
| 1.33(—) | 1 + 3 | 18.0 × 27.1(—) | 212(—) | × 5.8(—) |
| 1.46(1.51) | 2 + 3 | 16.4 × 24.6(15.9 × 23.8) | 215(217) | × 6.4(6.7) |
| 1.56 | 50 mm | 15.4 × 23.1 | 218 | × 6.9 |
| 1.70(—) | 1 + 2 + 3 | 14.1 × 21.2(—) | 222(—) | × 7.7(—) |
| 2.53 | 100 mm | 9.5 × 14.2 | 255 | × 13.0 |

Note: When using SMC Pentax Macro 50mm f/4 lens, magnification will increase by some 13 to 27%. 39



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