

# Mamiya M645

## Auto Bellows Automatik-Balgengerät Soufflet macro Autofuelle Soffietto automatico Balgapparaat

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Instructions  
Bedienungsanleitung  
Instructions  
Instrucciones  
Istruzioni d'uso  
Gebruiksaanwijzing

### English

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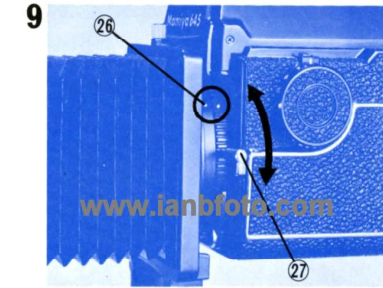
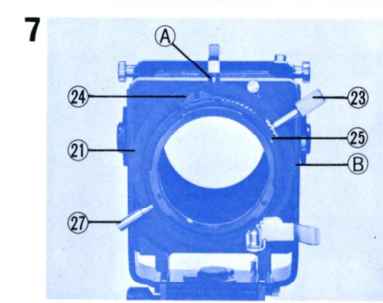
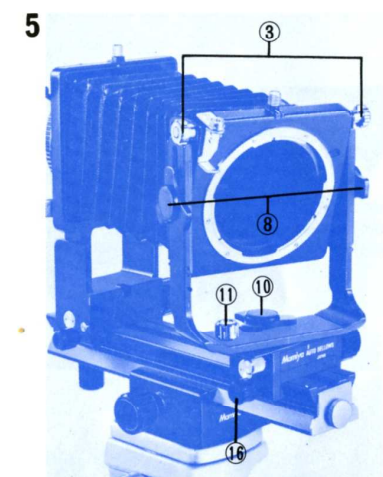
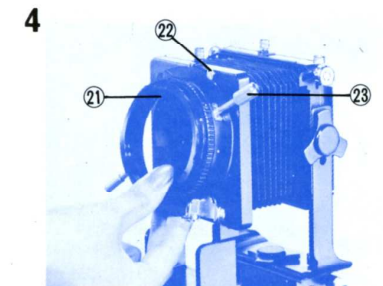
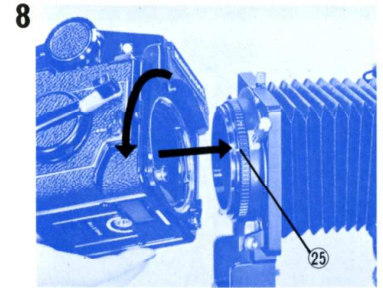
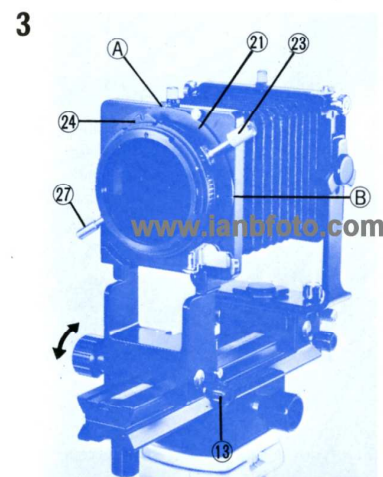
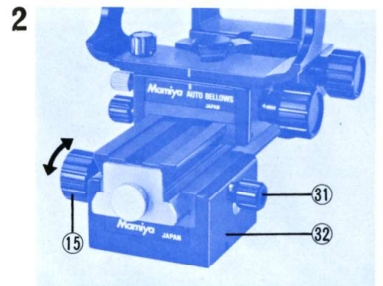
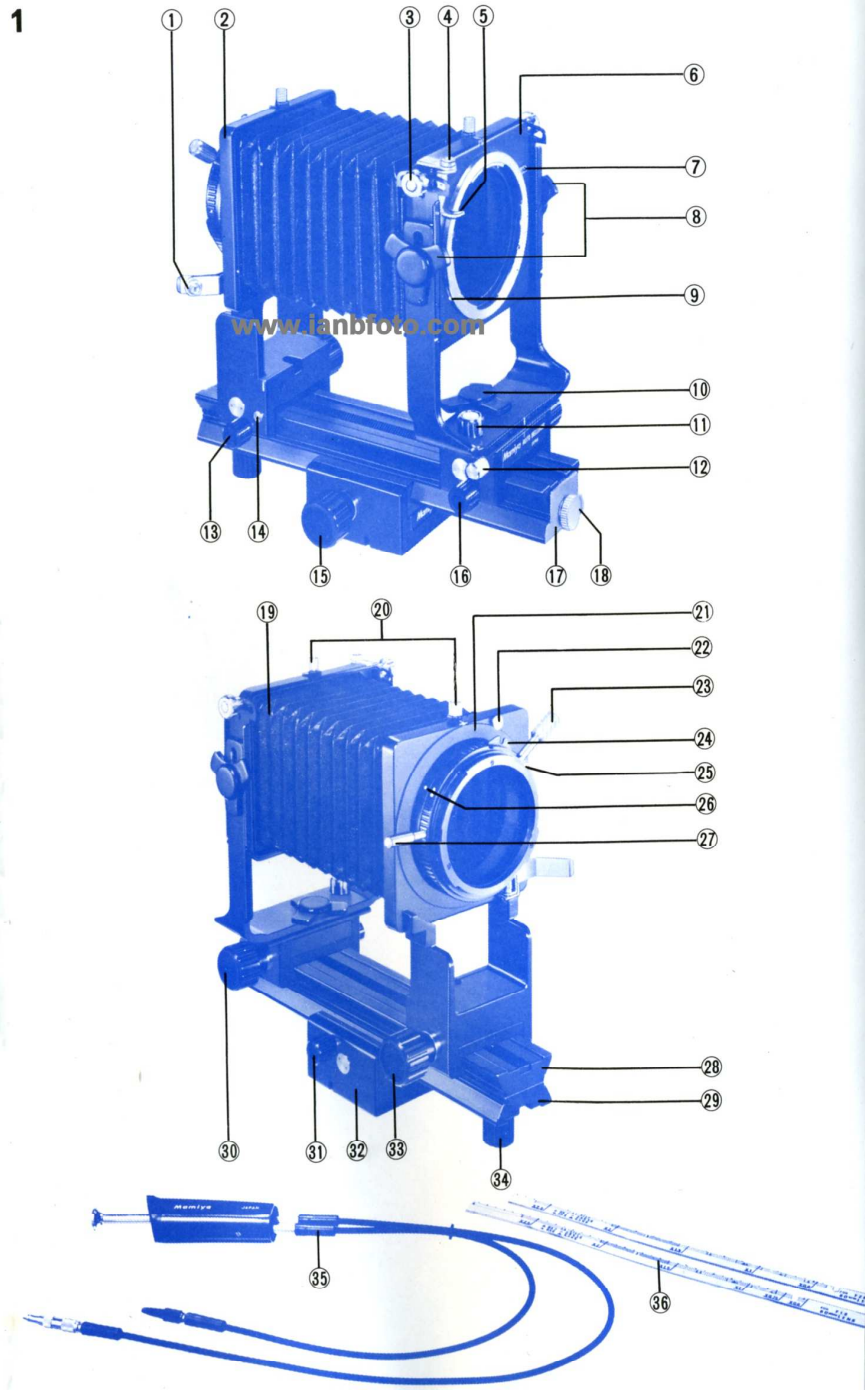
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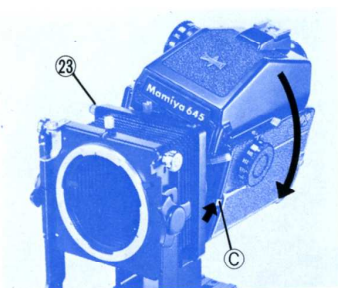
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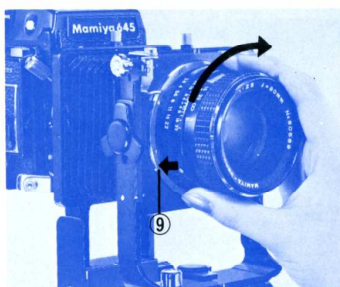
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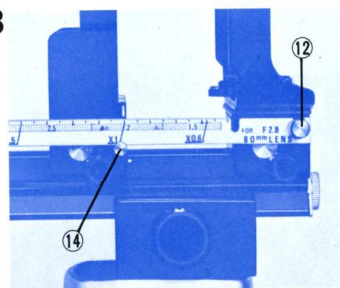
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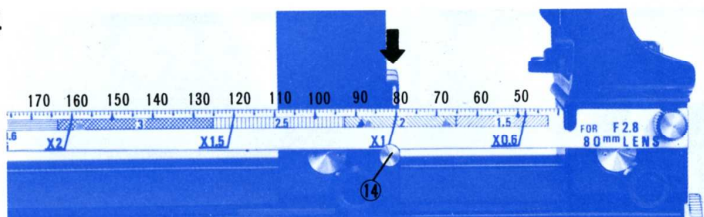
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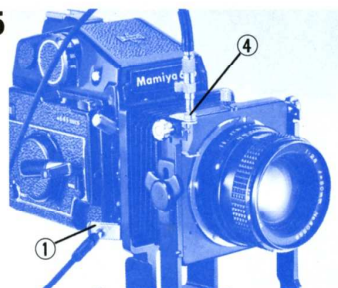
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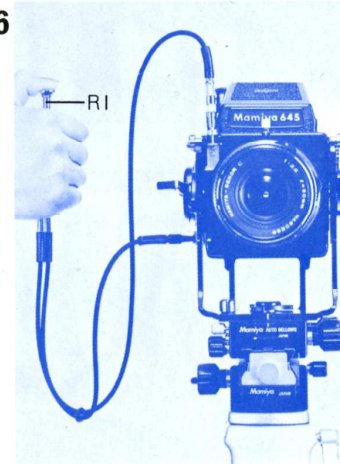
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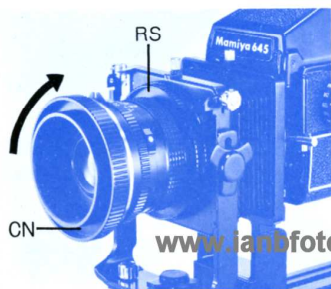
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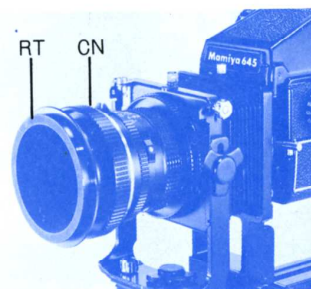
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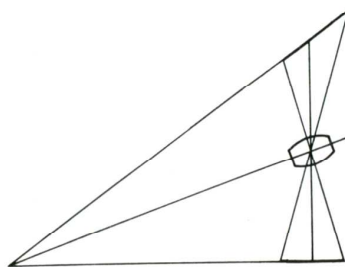
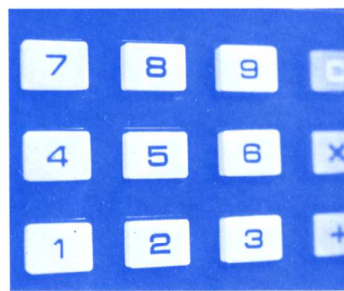
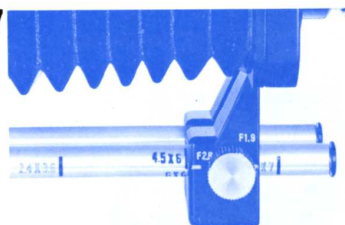


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## Special Features of the Auto Bellows

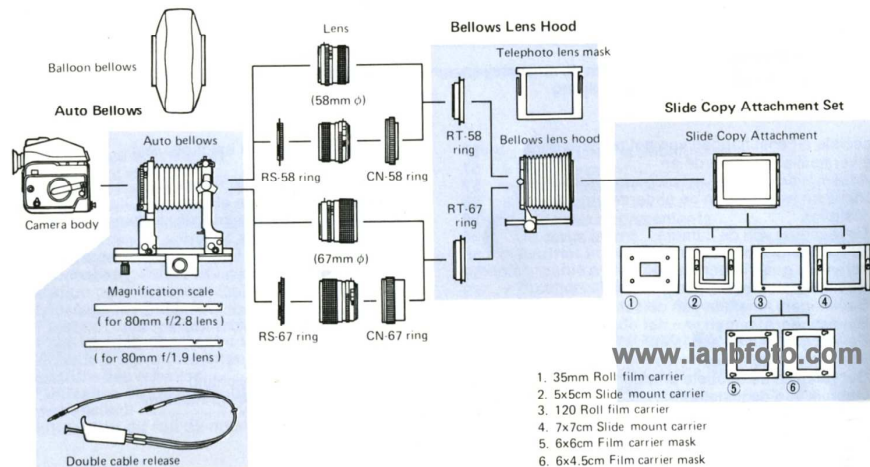
The Auto Bellows, an ingenious and high-precision close-up device, is mounted between the camera and the lens to continuously vary the magnification in close-up and macrophotography. The bellows unit may be coupled to the automatic diaphragm operation of the lens by the use of a double cable release. The front standard has the capability of movements as shift, tilt and swing. The rear standard may be rotated for easy switching from vertical to horizontal composition and vice versa. The Auto Bellows also incorporates a focusing rail for moving the bellows and camera back and forth for smooth, critical focusing and fine adjustments in composition.

Macrophotography with the lens mounted reversed is made possible by the use of an optional accessory Reverse Ring. Combining the Auto Bellows with the Bellows Lens Hood, Slide Copy Attachment and a film carrier makes possible the duplication of slides or strip film with formats of 35mm, 4 x 4cm, 6 x 4.5cm, 6 x 6cm and 6 x 7cm. For close-ups with a shorter bellows extension, the Balloon bellows, an optional accessory, is more suitable for tilt and shift movements.

## Names of Parts (Fig. 1)

- |   |                                     |
|---|-------------------------------------|
| 1. Cable Release Socket (Camera)        | 19. Bellows                         |
| 2. Rear Standard                        | 20. Bellows Frame Lock Screws       |
| 3. Tilt Lock Screw                      | 21. Camera Mounting Ring            |
| 4. Cable Release Socket (Lens)          | 22. Mount Ring Securing Pin         |
| 5. Depth-of-Field Preview Lever         | 23. Revolving Mount Lock Screw      |
| 6. Front Standard                       | 24. Meter Coupler                   |
| 7. Lens Release Lever                   | 25. Camera Mount Alignment Mark     |
| 8. Rise/Fall Lock Knobs                 | 26. Alignment Dot for Meter Setting |
| 9. Lens Mount Alignment Dot             | 27. Meter Setting Lever             |
| 10. Shift Lock Knob                     | 28. Upper Rail                      |
| 11. Swing Lock Screw                    | 29. Lower Rail                      |
| 12. Magnification Scale Attaching Screw | 30. Front Standard Drive Knob       |
| 13. Rear Standard Lock Screw            | 31. Focusing Rail Lock Screw        |
| 14. Magnification Scale Holding Pin     | 32. Tripod Platform                 |
| 15. Focusing Rail Drive Knob            | 33. Rear Standard Drive Knob        |
| 16. Front Standard Lock Screw           | 34. Focusing Rail Connecting Screw  |
| 17. Clamp Plate                         | 35. Double Cable Release            |
| 18. Clamp Plate Lock Screw              | 36. Magnification Scale             |

## System Chart of Auto Bellows and its Related Accessories



## Functions and Operations of Parts

Before attempting to shoot your first series of close-ups, acquaint yourself with the proper method of use by attaching and manipulating the Auto Bellows without loading film in your camera.

### Focusing Rail (Fig. 2)

Turn the Focusing Rail Drive Knob (15) after loosening the Focusing Rail Lock Screw (31) to move the bellows back and forth. When not mounted on a tripod, set the Tripod Platform (32) at the front end of the Focusing Rail for maximum stability.

### Camera Mounting Section (Fig. 3)

Turn the Rear Standard Drive Knob (33) after loosening the Rear Standard Lock Screw (13) to extend the Bellows.

The Camera Mounting Ring (21) can be turned about 90° after loosening the Lock Screw (23). Matching the Alignment Mark (A) on the Ring (21) with the central Alignment Line on the Rear Standard sets the camera in a horizontal position. Matching the Alignment Mark (B) with the central Alignment Line sets the camera in a vertical position.

The Meter Setting Lever (27) is used for engaging the Meter Coupler (24) with the Coupling Pin of the PD Prism Finder or the CdS Prism Finder.

When attaching the camera, set the Camera Mounting Ring (21) to position the Alignment Mark (A) at the top as shown in the photograph and turn the Meter Setting Lever (27) to a position opposite the Lock Screw (23) to set the Meter Coupler (24) at the top. Otherwise, the camera attachment may be difficult.

The Camera Mounting Ring (21) may be detached from the Rear Standard (2). Loosen the Lock Screw (23) and remove the lower section of the ring (21) while rocking the ring. Then, detach the ring from the Securing Pin (22). (Fig. 4)

When attaching the ring, push in the lower section of the ring after inserting the outer ridge of the ring beneath the Securing Pin (22). If it is more convenient to attach the ring (21) on the camera first, follow the above procedure in attaching and detaching the ring.

### Lens Mounting Section (Fig. 5)

Turning the Front Standard Drive Knob (30) after loosening the Front Standard Lock Screw (16) moves the Front Standard back and forth. Tilts and other movements may be done by operating the Front Standard and the struts.

#### Tilt:

Loosen the Tilt Lock Screws (3) on both sides and move the Front Standard for tilting the board (up to 15° to the front or back).

#### Rise/Fall:

Loosen the Rise/Fall Lock Knobs (8) on both sides and move the Front Standard (6) up and down for the rising or falling of the board (12.5mm up and down).

#### Shift:

Loosen the Shift Lock Knob (10) and move the struts left and right for the shift of the Front Standard (15mm left and right).

#### Swing:

Loosen the Swing Lock Screw (11) and turn the struts around the Shift Lock Knob (10) for swinging the Front Standard (15° left and right).

The center (normal positions) of these movements are indicated by marks and click-stops. In normal close-up picture-taking, set all the moving sections at their center positions.

## Preparing for Photography

### Mounting on Tripod

Attach the Tripod Platform of the Focusing Rail on a tripod. The Tripod Platform has two tripod sockets — regular 1/4-inch and European 3/8-inch sockets. A large and sturdy tripod is recommended.

### Attaching Camera

1. Detach the lens from the camera and turn the Coupling Pin of the PD Prism Finder or the CdS Prism Finder to the extreme left, if you want to use these built-in exposure meter finders. (Fig. 6)

2. Match the Alignment Mark (A) of the Camera Mounting Ring (21) with the central Alignment Line of the Rear Standard and fasten the Lock Screw (23). Place the Meter Setting Lever (27) in opposite of the lock screw to position the Meter Coupler (24) at the top. Otherwise, the camera attachment may be difficult. (Fig. 7)

3. Match the Alignment Mark (25) on the ring with the Alignment Dot on the camera body to engage the ring and the camera and turn the camera in the direction of the arrow (as shown in the photograph) until it stops. By this operation, the camera is mounted in a horizontal position on the Auto Bellows. (Fig. 8)

If you desire to set a vertical position, loosen the Lock Screw (23) slightly and turn the camera to match the Alignment Mark (B) on the ring with the central Alignment Line of the Rear Standard. Then, tighten the lock screw.

4. Moving the Meter Setting Lever (27) up and down engages the Coupling Pin of the exposure meter finder in the fork of the Meter Coupler (24) of the Camera Mounting Ring. After checking the engagement, move the setting lever again so a white dot on the ring matches with the Alignment Dot (26). (Fig. 9)

When using lenses with focal lengths longer than 80mm (as 110mm and 150mm lenses), match a green dot on the ring with the Alignment Dot (26). The white and green dot positions have click-stops. For a convenience in handling, similar white and green dots are also indicated on the opposite side on the ring.

★ When using the Prism Finder or the Waist-Level Finder that do not incorporate an exposure meter, the above operations are not necessary.

### Detaching Camera (Fig. 10)

To detach the camera from the Auto Bellows, turn the camera in the direction of the arrow as shown in the photograph until it stops, while also pushing the Lens Release Button (C) on the camera.

★ Fasten the Lock Screw (23) firmly. When pushing the button (C), keep the Setting Lever (27) angled upward.

★ In the vertical camera position, it is not possible to detach the camera. Return the camera in a horizontal position for detaching.

★ You may also detach the Mounting Ring (21) together with the camera body from the Rear Standard first, loosening the Lock Screw (23). This method is particularly useful when the camera is in the vertical position.

### Attaching Lens (Fig. 11)

Match the Lens Mount Alignment Dot (9) on the Front Standard with the Alignment Dot on the lens barrel and turn the lens barrel clockwise until it stops.

### Detaching Lens (Fig. 12)

Turn the lens barrel counterclockwise until it stops while pushing the Lens Release Lever (7) on the Front Standard.

### Attaching Scale (Fig. 13)

Select either one of the two scales according to the lens used (80mm f/1.9 or 80mm f/2.8).

Loosen fully the Scale Attaching Screw (12) and fit the notch at the **front end** of the scale on the screw from below. Then, fit the rear section of the scale on the Holding Pin (14) and fasten the screw (12). Fit the **second notch** on the screw when the lens is mounted reversed by using the RS Ring.

When mounting lenses other than 80mm lenses, use either of the scales for reading the extension of the bellows. In this case, use the first notch at the front end even with the lens mounted reversed. The extension lengths on the Close-Up Photography Table are based upon a formula in which the first notch is fitted on the Scale Attaching Screw.

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### Reading Scales (Fig. 14)

Read the scale at the indicator above the Holding Pin (14).

1. The upper scale shows the lens extension in millimeters. For applications of the lens extension, see "Using Close-Up Photography Table" on the last section. Unlike other scales described below, this scale is valid for all lenses.

2. The lower numbers show image magnifications (the length of a side of the subject image on film divided by the length of a side of the actual subject) when using an 80mm lens. Extending the bellows so that the indicator matches with the "X1" mark provides a life-size (1:1) magnification.

3. The intermediate scale shows the exposure compensation values for an 80mm lens which is necessary when metering with a hand-held exposure meter. The exposure compensation values are indicated by the numbers corresponding to the steps in the shutter speed or aperture calibrations. Each step has a different pattern for easier reading. Within the range of the same pattern, the compensation value remains the same. For example, when the indicator is within the "Step 2" range, set the shutter speed slower by two steps, open up the aperture larger by two steps, or set the shutter speed slower by one step and open up the aperture larger by one step, than the exposure value indicated correct by the hand-held exposure meter. In close-up work, the smaller the aperture the better for sharper photographs. Thus, the exposure compensation should be mainly done by varying the shutter speeds and the aperture is only varied for a half-step compensation. The exposure compensation values on the scale is not applicable to the case in which the lens is mounted reversed. The compensation in this case should be done according to the Close-Up Photography Table. Also refer to the Close-Up Photography Table for the correct exposure compensation with lenses other than 80mm lenses. The exposure compensation is not necessary when using through-the-lens metering with the PD Prism Finder or the CdS Prism Finder.

4. The green, blue, black and red triangular marks from front to rear of the scale show the correct extension lengths for duplicating the 6 x 7 cm, 6 x 6cm, 6 x 4.5cm and 35mm slides and strip film, respectively. The shorter side of the original picture format is fully photographed on the shorter side of the 6 x 4.5cm format of the Mamiya M645 camera in this duplication. These marks are applicable only for 80mm lenses.

### Using Double Cable Release

The Double Cable Release has two tips — a plunger in the silver tip protrudes first and then a plunger in the black tip projects. Thus, the shutter is released after the lens aperture is fully stopped down at a preset value (aperture). Set the A.M. Lever on the lens barrel at "A" (automatic diaphragm) for the automatic diaphragm operation with the Double Cable Release and the Auto Bellows.

### Attaching Double Cable Release (Fig. 15)

1. Screw the silver head into the Cable Release Socket (Lens) (4).

2. Screw the black head into the Cable Release Socket (Camera) (1).

Take the following precautions before using:

1. Set the lens aperture at the minimum aperture and cock the shutter by winding the Film Advance Crank of the camera.

2. Push the release button (R1) of the Double Cable Release while looking at the aperture blades through the lens. (Fig. 16)

By pushing the button partway down, the aperture blades are stopped down to the minimum. Pushing down the button farther (the release pressure is a little stronger) releases the shutter. If the shutter is released before the lens aperture is completely stopped down to the minimum, adjust the Double Cable Release according to the following procedure.

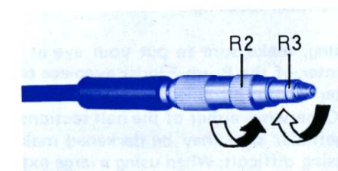
### Adjusting Method

1. Detach the silver tip of the cable release from the socket (4).

2. Turn the ring (R2) on the silver tip in the direction of the arrow as shown in the photograph, and it is loosened.

3. Then, turn the tip (R3) in the direction of the arrow as shown in the photograph, and the plunger will come out. The longer plunger projection stops down the aperture faster. It may not cause trouble if the plunger is projecting a little from the head when the release button of the cable release is not pushed down.

4. After adjusting the length of the plunger, turn the ring (R2) in the reverse direction of the arrow to fix the tip.



### Using Focusing Rail

The focusing operation is easily done because the Auto Bellows and camera may be moved back and forth on the focusing rail, instead of moving the tripod. It is especially convenient for focusing when the magnification is determined first.

### Photographing Wide Subjects

The Auto Bellows may also be moved to the left and right by attaching the Upper and Lower Rails at right angles. This method is utilized, for example, in panoramic photography for photographing a wide subject in a number of picture

## Picture-Taking with Auto Bellows

### Focusing

1. Set the A.M. Lever of the lens barrel at "A" (automatic diaphragm) and the distance scale at infinity ( $\infty$ ) position.
2. Make sure that the movement sections on the Front Standard are set at their center (normal) positions.
3. Turn the Front Standard Drive Knob (30) to move the Front Standard at the front end of the Focusing Rail and fasten the Front Standard Lock Screw (16), preventing the accidental detachment of the Front Standard from the Focusing Rail because there is no stop at the front end of the rail.
4. Determine first either the "Magnification", "Area to be covered" or "Lens-to-subject distance" and read the extension length on the Close-Up Photography Table. Extend the bellows so that the indicator mark matches with a predetermined value on the scale.
5. Set the camera position according to the lens-to-subject distance shown on the Close-Up Photography Table. Then, turn the Focusing Rail Drive Knob (15) to move the bellows back and forth for focusing. If it is allowable to change the magnification, move the Front Standard Drive Knob (30) for focusing. The focusing ring on the lens may also be used for the final critical focusing.

Note:

In focusing, make sure to put your eye at the exact center of the Prism Finder eyepiece or at the center of the magnifier of the Waist-Level Finder. Otherwise, either of the half sections of the rangefinder spot may be darkened making the focusing difficult. When using a large exten-

frames all with the same magnification.

1. Loosen fully the Focusing Rail Connecting Screw (34) and pull the Upper Rail to detach it. (Fig. 17)
2. Combine the Upper and Lower Rails at right angles and again fasten the Connecting Screw (34). Use either of the two screw holes at center and rear end of the Upper Focusing Rail. (Fig. 18)
3. Detaching the Clamp Plate (17) by loosening the Clamp Plate Lock Screw (18) makes it easy to set the Upper and Lower Rails at right angles only by loosening the Focusing Rail Connecting Screw (34) a little.

sion of the bellows in macrophotography and also using the movements of the Front Standard it may be impossible to focus with the rangefinder spot or microprism section. In this case, focus with the groundglass section around the rangefinder spot and microprism. In macrophotography and in using the Front Standard movements it is easier to focus with the No. 2 Matte or No. 3 Checker focusing screen. You may be able to focus easier by using the Angle Finder or the Magnifier.

### Exposure Determination

In determining exposure the PD Prism Finder or the CdS Prism Finder with the through-the-lens metering capability are convenient. Metering with these meter finders and the Auto Bellows is done by stopped-down aperture mode, instead of the full-aperture metering.

#### Exposure Determination by TTL Metering

1. Move the Meter Setting Lever (27) to align a white or green dot with the Alignment Dot (26). The white dot is for the 80mm and shorter focal length lenses and the green dot for the lenses with longer focal lengths.

Note: Make sure that the Coupling Pin of the exposure meter finder engages in the fork of the Meter Coupler of the Camera Mounting Ring.

2. Turn the aperture ring of the lens to set the aperture within a range of f/8 to f/22. The larger the magnification the shallower the depth-of-field in close-up and macrophotography. Thus, the smaller the aperture the better for sharp photographs.

3. Attach the Double Cable Release and turn on the meter switch on the finder.

4. Push the button of the Double Cable Release partway down. While retaining the release button at its partway-down position, turn the shutter speed dial on the finder for metering while looking through the finder eyepiece. The correct exposure is indicated when the green LED lamp at the center lights up in the PD Prism Finder or when the meter needle is set at center of the metering bracket in the CdS Prism Finder.

If the correct exposure is not indicated even with the slowest shutter speed and when it is difficult to read the meter needle of the CdS Prism Finder in a dim light situation, open up the aperture or brighten up the lighting on the subject.

Instead of pushing the button of the Double Cable Release, you may also push the Depth-of-Field Preview Lever (5) below the Cable Release Socket (4) for stopped-down aperture metering. Taking the finger off the lever returns it to its original position and opens up the aperture fully. You may also stop down the aperture for metering by setting the A.M. Lever at "M" (manual).

\* In metering, the stray light entering through the finder eyepiece may hinder the correct exposure determination. In macrophotography especially a slight stray light will be a great influence on the exposure determination. Put your eye as close as possible to the eyepiece to prevent stray light which will cause an underexposure reading when it enters through the eyepiece.

\* When metering with the CdS Prism Finder, be sure to set the shutter speed dial on the camera body at the same value as indicated on the finder dial. For further details in using the meter finders, read the instructions of the finders.

\* When using the 70mm lens with a built-in leaf shutter, set the shutter speed ring of the lens at the "F" (focal-plane shutter) position.

### Exposure Determination with Hand-Held Exposure Meters

Be sure to compensate for the bellows extension for the exposure value indicated to be correct by your hand-held exposure meter. When using an 80mm lens, the exposure compensation factor is described earlier in the "Reading Scales" section. When using lenses other than the 80mm standard lenses, see the Close-Up Photography Table for each lens.

### Shutter Release

Be sure that all the above operations are completed before actually tripping the shutter. Pushing the Double Cable Release button gently but fully after winding the film stops down the aperture and releases the shutter.

\* Hold the Double Cable Release button pressed until the exposure is completed. If you hand off the button before the shutter completes the exposure, the aperture diaphragm open untimingly resulting an overexposure. It is, however, not necessary to keep pushing the release button if the A.M. Lever of the lens is set at "M" (manual). Thus, setting the lever at "M" is recommended when the extremely slow shutter speeds are used.

\* Locking up the reflex mirror by actuating the Mirror Lock-Up Lever on the camera before pushing the release button minimizes possible camera shake to produce sharper photographs.

## Utilizing Camera Movements

You can control the shapes of the picture images and the planes in sharp focus by changing the position and direction of the lens with the movements mechanism. Figure 1 shows a movement for varying the area to be photographed up and down or left and right for framing without moving the position of the subject or the camera, or, for photographing the subject without deforming the shape of the subject plane. For eliminating the deformation, keep the subject plane parallel to the film plane.

Figure 2 shows a movement for focusing on the subject plane which is slanted to the film plane, providing a greater depth-of-field. When the subject plane is on the Line A-B, slant the lens so that the extended line of the Lens Mount Plane L-M meets with the extended lines of the Line A-B and the Film Plane D-E at the point of intersection C for getting the sharpest focus on the Line A-B. (Strictly speaking, the lens slant angle is not formed by the Lens Mount Plane against the Point C but by the Plane L', the primary plane of the lens as against the Point C.)

Stopping down the aperture smaller increases the depth-of-field to the front and rear of the Line A-B.

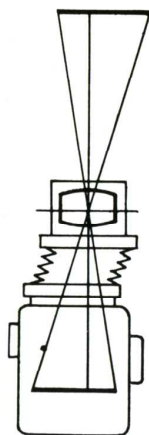


Fig. 1

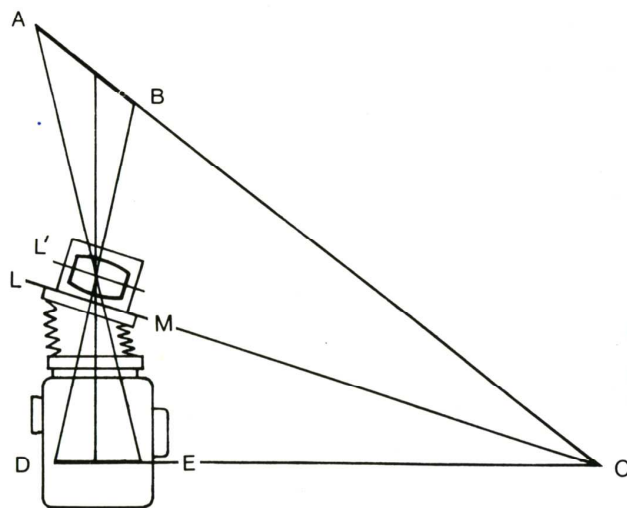


Fig. 2

In utilizing the movements, be careful of vignetting at the picture edges. The degree of vignetting varies according to the bellows extensions, lens slant angles and movement lengths. Look through the finder and confirm the possible vignetting while stopping down the aperture. Take "safety margins" against vignetting to get good results.

Use the Waist-Level Finder and the No.2 Matte or No. 3 Checker focusing screen in utilizing the movements. You may find it easier with the large finder image and a more comfortable picture-taking posture.

When the extension is small it is difficult to utilize the movements with the standard bellows. Interchange the standard bellows with the Balloon Bellows available as an option.

### Interchanging Bellows. (Fig. 19)

Loosen the Bellows Frame Lock Screws (20) and pull the bellows frame upward after taking out the upper section of the frame. In attaching the bellows, fit the small holes on the bellows frames onto the small pins on the bottom of the bellows frames, push in the upper frame sections and fasten the locking screws.

## Photographing with Lens Reversed

For macrophotography with magnifications larger than life size, mounting the lens reversed by the use of the Reverse Ring, an optional accessory, provides better lens performance for more image quality.

The Reverse Ring comes in two types — the RS-67 ring for the 67mm $\phi$  filter size and the RS-58 ring for the 58mm $\phi$  filter size of lens.

### Mounting RS Ring and Lens

1. Fit the RS Ring on the Front Standard (6) by aligning the Alignment Dot on the ring with the Alignment Dot (9) and turn the ring clockwise until it stops. (Fig. 20)
2. Turn the Adjusting Ring (A) of the RS Ring counterclockwise to loosen it a little.
3. Screw the lens into the RS Ring.
4. If the red dot at top center of the lens is not located exactly on the top, turn the lens counterclockwise and loosen or fasten the Adjusting Ring (A) to set the lens so that the red dot stops right at the top. (Fig. 21)

\* It is also possible to screw the RS Ring into

the lens first and then attach the ring on the Front Standard of the bellows. In this case, turn the Adjusting Ring (A) so that the red dot at top center of the lens matches with the "Mamiya" mark on the rear of the RS Ring.

5. When using an 80mm lens, fit the second notch of the scale onto the Scale Attaching Screw (12). When using other lenses, fit the first notch on the screw.

6. For metering, set the A.M. Lever of the lens at "M" (manual). The Double Cable Release will not couple to the bellows when the lens is mounted reversed.

7. For other operations, follow the procedure as if the lens was normally mounted on the bellows.

### Detaching RS Ring and Lens

1. Turn the lens counterclockwise and detach it from the RS Ring.
2. While pushing the Lens Release Lever (7) of the Lens Board, turn the RS Ring counterclockwise until it stops and detach it from the Front Standard.

## Slide Duplicating



The duplication of slides and strip film with formats of 35mm, 4 x 4 cm, 6 x 4.5cm, 6 x 6cm and 6 x 7cm may be easily done by the use of the Auto Bellows, Bellows Lens Hood, and Slide Copy Attachment Set.



When using an 80mm f/1.9 or f/2.8 lens, the original photograph may be duplicated on the full frame of the Mamiya M645 (6 x 4.5cm) by simply extending the bellows so that the indicator mark aligns with either of the triangular marks showing the picture formats of the original photographs.

When duplicating the originals such as 35mm with large magnifications it is necessary to use the RS Ring for mounting the lens reversed and the CN Ring for connecting the lens and the Bellows Lens Hood.

### Using Film Carriers and Carrier Masks

#### When Duplicating Slide Mounted in Frame

Use the 7 x 7cm Slide Mount Carrier for 6 x 6cm and 6 x 4.5cm slides mounted in a frame. Use the 5 x 5cm Slide Mount Carrier for 35mm and 4 x 4cm slides mounted in a frame. Attach 6 x 7cm slides directly on the Copy Attachment without using a carrier.

#### Attaching Slide Mounted in Frame on Carrier

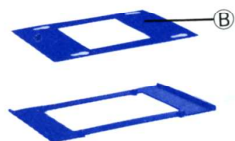


7 x 7cm

5 x 5cm

Open the Slide Mount Holders (A), put the slide on the carrier with the emulsion surface (the dull side) of the film upward, and lock it with the holders. Attaching the carrier on the Copy Attachment directs the emulsion surface toward the light source.

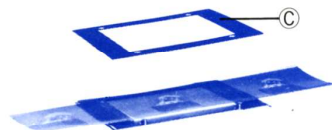
#### When Duplicating Strip Film



Use the 120 Roll Film Carrier for 6 x 7cm strip film. For 6 x 6cm format, fit the holes of the 6 x 6cm Film Carrier Mask (B) on the pins on rear of the 120 Roll Film Carrier and move the mask so that the pins fit into the narrower sections of the holes. For 6 x 4.5cm format, fit the 6 x 4.5cm Film Carrier Mask on the 120 Roll Film Carrier in the same manner.

Use the 35mm Roll Film Carrier for 35mm Strip film.

#### Inserting Strip Film in Film Carrier



Put the film on the Film Carrier between the pins with the emulsion surface upward and fit the pins of the carrier into the holes of the Film Retaining Plate (C).

#### Attaching Slide Copy Attachment

1. Attach the camera and an 80mm f/1.9 or f/2.8 lens on the Auto Bellows and the Bellows Lens Hood on the front of the lens.

2. Insert the Slide Copy Attachment from above in the Mask Guide (A) of the Bellows Lens Hood and push the attachment down until it stops. (Fig. 22)

3. Pull the Knob (B) forward to open the Slide Copy Attachment.

4. With the Slide Mount Carrier, insert the carrier from above but beneath the Retaining Springs in both sides of the Copy Attachment. When inserting it, the Slide Mount Holders of the carrier should be facing forward and a small hole on the carrier should be placed above. (Fig. 23)

With the 6 x 7cm slide mounted in a frame, insert the slide into the Copy Attachment without using a carrier.

With the Roll Film Carrier, simply insert the carrier into the Copy Attachment with the Film Retaining Plate facing forward. No orientation is necessary as to the top and the base.

5. Push the front section of the Copy Attachment up to lock it.

★ When advancing the strip film from one frame to the next, open up the Copy Attachment, make a space between the carrier and the retaining plate and move the strip film in order to prevent any accidental scratches on the film. (Fig. 24)

When duplicating a 35mm original on the full frame of 6 x 4.5cm of the Mamiya M645, use the optional accessory RS Ring and CN Ring. Use the RS-67 and the CN-67 Rings for an 80mm f/1.9 lens, and the RS-58 and CN-58 Rings for an 80mm f/2.8 lens.

1. Attach the lens reversed on the Auto Bellows after attaching the RS Ring on the lens.

2. Fit the CN Ring into the lens by aligning the red dot on the ring with the Alignment Dot on the lens and turn the ring clockwise until it stops. (Fig. 25)

(For detaching the ring, turn the ring counter-clockwise while pushing the release lever located at the opposite side of the ring from the red dot.)

3. Detach the RT Ring of the Bellows Lens Hood and screw it into the CN Ring until it stops. (Fig. 26)

4. Attach the Bellows Lens Hood on the RT Ring and fasten with the locking screw.

#### Focusing

1. Extend the Auto Bellows so that the indicator mark aligns with the triangular mark on the scale which corresponds to the format of the original slide and fasten with the lock screw.

2. Extend the Bellows Lens Hood so that the indicator mark aligns with the picture format indication on the scale bar for rough focusing. The alignment with an f/1.9 lens is by the orange indicator and with an f/2.8 lens by the white indicator. (Fig. 27)

3. Adjust the extension of the Bellows Lens Hood while looking through the finder for critical focusing. After focusing, fasten the extension locking screw.

★ The triangular marks on the scale of the Auto Bellows are color-coded as shown on the scale — green for 6 x 7cm, blue for 6 x 6cm, black for 6 x 4.5cm and red for 35mm formats. These marks are applicable only for 80mm lenses.

★ The triangular marks provide “safety margins” in duplicating the originals. At this mark the image is slightly larger than life-size. This is to prevent the slide mount edges from cutting into the duplicate. If necessary, you may further adjust the Auto Bellows extension to vary the magnification by shifting the extension a little from the designated triangular mark.

Also you may blow up a portion of the original by the larger magnifications and utilizing the shift movement of the Front Standard. When using the shift movement, be careful not to vignette the picture edges.

#### Lighting

As a light source, available light (sunlight) or artificial lighting such as the photoflood lamp

lighting and electronic flash are often utilized in slide duplicating. Available light may produce better results. Some experimenting is recommended.

#### With B & W Film

When using available light, set the Diffusion Plate of the Copy Attachment toward the window.

When using a photoflood lamp, be sure to keep an adequate distance between the lamp and the attachment to prevent adverse effects of heat on film and uneven illumination. A better method is to place a smooth white cardboard in front of the attachment and to illuminate it with the lamp from the camera side. The light reflected from white cardboard will generally produce soft, even illumination.

#### With Color Film

With daylight type color film, direct sunlight, electronic flash or a blue photoflood lamp designed for color film are suitable. With other types of the light source, be sure to use the proper light balancing filters. Even with the sunlight, light balancing filters are necessary in the morning and evening and in shadows.

#### Exposure Determination

With the PD Prism Finder or the CdS Prism Finder, the correct exposure is acquired by following the meter indications.

With a hand-held exposure meter, the following method should be utilized:

1. After completing the picture-taking preparations and setting the adequate light source, detach the Bellows Lens Hood from the lens while retaining the original film on the lens hood. (Detach the RT Ring and attach it on the Bellows Lens Hood.)

2. Face the Bellows lens Hood to the light source and meter the brightness of the film plane of the original film by setting a hand-held exposure meter at rear of the lens hood. In this exposure measurement, keep the same light-to-lens hood distance as the hood is set on the lens. Otherwise the exposure reading may vary. With an incident/reflected light exposure meter, set the meter at the reflected light mode.

3. The exposure value indicated by the exposure meter should be compensated by the bellows extension. For details, see the “Reading Scales” section on p.6. For exposure compensation with lenses other than 80mm lenses, see the Close-Up Photography Table.

★ When using an electronic flash as the light source, make test shots and keep notes to acquire the data on the correct exposure and determine exposure according to the data for later copies.

Using Close-Up Photography Table

Choose the "Image magnification", "Area to be covered" or "Lens-to-subject distance" first, according to your purpose, then look up the Close-up Photography Table to find the suitable extension length for your lens. The all values on the table may vary slightly unless you set the lens focusing ring to the infinity mark.

The "lens-to-subject distance" represents the distance from the front of the lens barrel to the subject.

**Determining Magnification First**

If you want to photograph the subject at a certain size (inches or millimeters) on film, the magnification is determined first. The magnification is the size of the subject image on the film divided by the size of the actual subject.

For example, if you want a life-size picture with an 80mm lens, the Close-Up Photography Table shows that the extension length is 80.1mm and the area to be covered is 1-5/8" x 2-3/16" (4.2cm x 5.6cm). Extend the bellows so that the indicator mark matches with the "X1" mark (equivalent to an extension of 80mm) on the scale.

**Determining Area First**

If you want to photograph the subject in a certain area, measure first the longer or shorter side of the actual subject and refer to the "Area to be covered" in the Close-Up Photography Table.

For example, when photographing an area of about 2" x 2-3/4" (5 x 7cm) with an 80mm lens, the extension is 64mm and the magnification is 0.8X as shown on the Close-up Photography Table. Then, extend the bellows so that the indicator mark aligns with the 64mm graduation on the uppermost scale.

**Determining Distance First**

If you cannot approach the subject as desired and the picture-taking distance is limited, determine the lens-to-subject distance first. The distance varies with the focal length of the lenses.

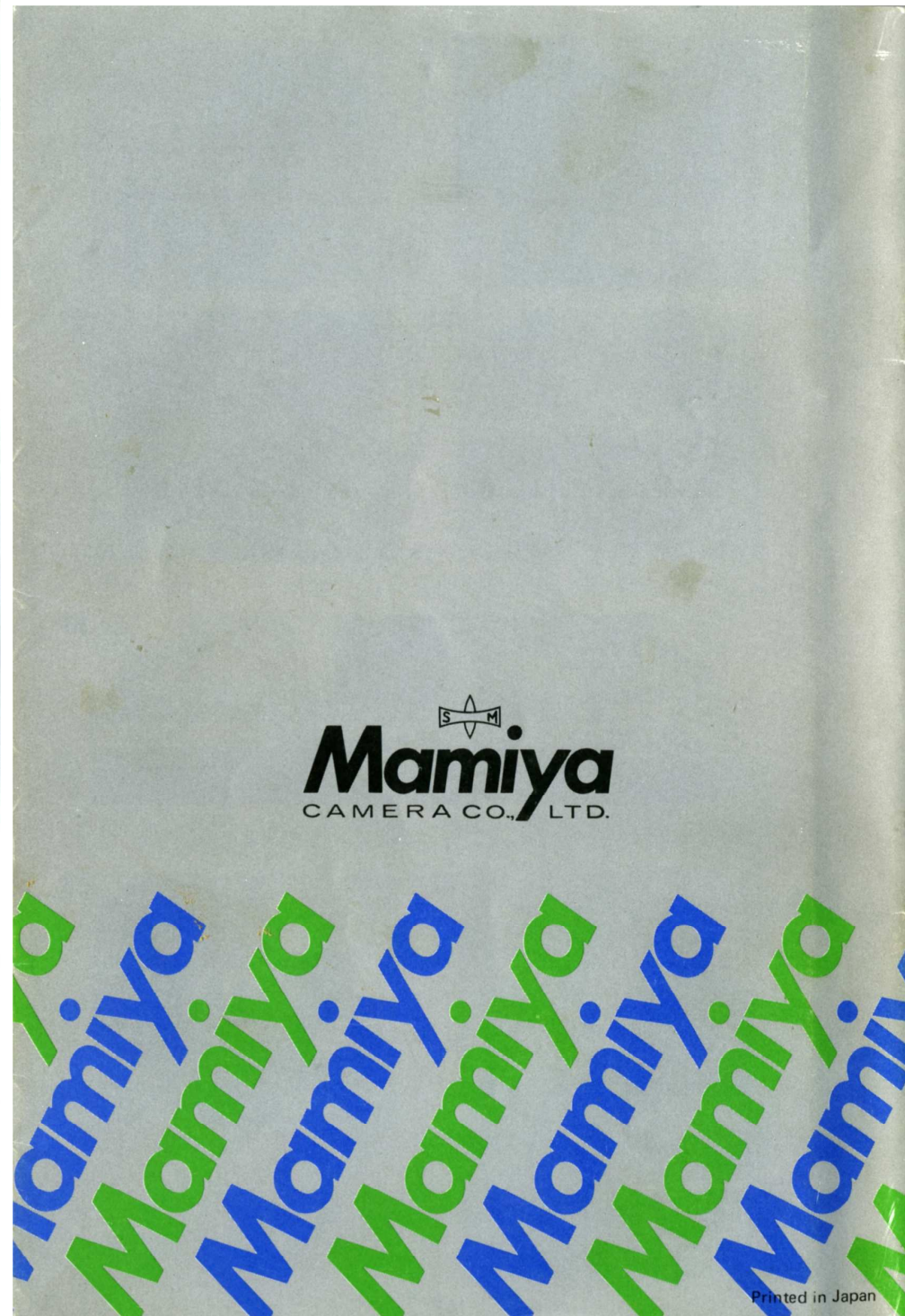
Thus, select an adequate focal length lens by referring to the Close-Up Photography Table. If the distance is longer, choose the lens with a longer focal length.

The values in the "Extension" columns on all of the tables indicate the scale readings on the scale attached to the Auto Bellows.

To obtain the real extension lengths, add factors shown below to the numbers listed in the table. In case of the 110mm f/2.8, subtract the following number from the number in the table.

- 80mm f/4.0 Macro: +48.5mm
- 55mm f/2.8: +62.1mm
- 70mm f/2.8: +43.7mm
- 110mm f/2.8: -14.0mm

When the lens is in a reversed position, the values on the "Lens-to-subject distance" indicate the distance from the lens flange to the subject.



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**English**

**Close-Up Photography Table  
for Mamiya M645 Auto Bellows**

E : Extension  
M : Magnification  
D : Lens-to-subject distance  
A : Area to be covered  
C : Exposure compensation value (Step)

Note:  
Set the Magnification Selector Button of the 80mm f/4 Macro to "S" in the close-up photography to obtain the best possible result.

**Español**

**Tabla para fotografiar primeros planos  
para Mamiya M645 Autofuelle**

E : Extensión  
M : Aumento  
D : Distancia objetivo-objeto  
A : Superficie a cubrir  
C : Valor de compensación de exposición (Paso)

Nota:  
Para obtener los mejores resultados posibles en fotografía de primeros planos colocar el botón selector de ampliación del macro-objetivo de 80 mm f/4 en "S".

**Deutsch**

**Nahaufnahme-Tabellen  
für Mamiya M645 Automatik-Balgengerät**

E : Auszug  
M : Vergrößerung  
D : Aufnahmeabstand  
A : Objektfeld  
C : Verlängerungsfaktor (Stufen)

Notiz:  
"Um bei Nahaufnahmen mit dem Mamiya-Sekor 1 : 4/80mm MAKRO bestmögliche Ergebnisse zu erzielen, ist es notwendig, den Vergrößerungsindikator am vorderen Objektivring auf "S" zu stellen."

**Italiano**

**Tabella di regolazione per le macroriprese  
per Mamiya M645 Soffietto Automatico**

E : Estensione del soffietto automatico  
M : Fattore d'ingrandimento lineare  
D : Distanza fra obiettivo e soggetto  
A : Campo di ripresa coperto  
C : Compensazione della esposizione (in valori d'esposizione)

Nota:  
Per assicurare migliori risultati nelle riprese ravvicinate, impostate su "S" il selettore d'ingrandimento dell'obiettivo 1 : 4/80 mm Macro.

**Français**

**Table de macrophotographie  
pour Mamiya M645 Soufflet Macro**

E : Tirage  
M : Grossissement  
D : Distance objectif-sujet  
A : Surface couverte  
C : Valeur de compensation d'exposition

Note:  
Afficher le sélecteur de grossissement sur la position S se trouvant sur l'objectif 80mm f/4 afin d'obtenir un rendu optimal dans les prises de vue macrophotographiques.

**Nederlands**

**Close-up tabellen  
voor Mamiya M645 Balgapparaat**

E : Verlenging  
M : Vergroting  
D : Lens/onderwerp-afstand  
A : Bestreken oppervlak  
C : Belichtingscompensatie waarde (Stop)

N.B.  
Om bij close-up fotografie een zo goed mogelijk resultaat te verkrijgen, dient U de vergrotingskeuzeschakelaar van het F4/80mm macro-objectief op stand "S" te zetten.

Normal · Normalstellung · Normal · Normal · Normale · Normaal

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**80 mm f/1.9**

| E       | M    | D      | A           | C   |
|---------|------|--------|-------------|-----|
| 48.0mm  | 0.60 | 15.8cm | 6.9cm×9.3cm | 1.5 |
| 64.1mm  | 0.80 | 12.5cm | 5.2cm×7.0cm | 1.5 |
| 80.1mm  | 1.00 | 10.5cm | 4.2cm×5.6cm | 2.0 |
| 96.1mm  | 1.20 | 9.1cm  | 3.5cm×4.7cm | 2.5 |
| 112.1mm | 1.40 | 8.2cm  | 3.0cm×4.0cm | 2.5 |
| 120.1mm | 1.50 | 7.8cm  | 2.8cm×3.7cm | 2.5 |
| 128.1mm | 1.60 | 7.5cm  | 2.6cm×3.5cm | 3.0 |
| 144.1mm | 1.80 | 6.9cm  | 2.3cm×3.1cm | 3.0 |
| 160.1mm | 2.00 | 6.5cm  | 2.1cm×2.8cm | 3.0 |
| 176.1mm | 2.20 | 6.1cm  | 1.9cm×2.6cm | 3.5 |
| 178.7mm | 2.23 | 6.1cm  | 1.9cm×2.5cm | 3.5 |

**55 mm f/2.8**

| E       | M    | D     | A           | C   |
|---------|------|-------|-------------|-----|
| 48.0mm  | 0.87 | 6.9cm | 4.8cm×6.5cm | 1.5 |
| 55.4mm  | 1.00 | 6.0cm | 4.2cm×5.6cm | 1.5 |
| 66.4mm  | 1.20 | 5.1cm | 3.5cm×4.7cm | 1.5 |
| 77.5mm  | 1.40 | 4.4cm | 3.0cm×4.0cm | 2.0 |
| 83.1mm  | 1.50 | 4.2cm | 2.8cm×3.7cm | 2.0 |
| 88.6mm  | 1.60 | 3.9cm | 2.6cm×3.5cm | 2.0 |
| 99.7mm  | 1.80 | 3.5cm | 2.3cm×3.1cm | 2.0 |
| 110.7mm | 2.00 | 3.2cm | 2.1cm×2.8cm | 2.5 |

**80 mm f/2.8**

| E       | M    | D      | A           | C   |
|---------|------|--------|-------------|-----|
| 48.0mm  | 0.60 | 17.6cm | 6.9cm×9.3cm | 1.5 |
| 64.0mm  | 0.80 | 14.3cm | 5.2cm×7.0cm | 1.5 |
| 80.1mm  | 1.00 | 12.3cm | 4.2cm×5.6cm | 2.0 |
| 96.1mm  | 1.20 | 10.9cm | 3.5cm×4.7cm | 2.5 |
| 112.1mm | 1.40 | 10.0cm | 3.0cm×4.0cm | 2.5 |
| 120.1mm | 1.50 | 9.6cm  | 2.8cm×3.7cm | 2.5 |
| 128.1mm | 1.60 | 9.3cm  | 2.6cm×3.5cm | 3.0 |
| 144.1mm | 1.80 | 8.7cm  | 2.3cm×3.1cm | 3.0 |
| 160.1mm | 2.00 | 8.3cm  | 2.1cm×2.8cm | 3.0 |
| 176.1mm | 2.20 | 7.9cm  | 1.9cm×2.6cm | 3.5 |
| 178.7mm | 2.23 | 7.8cm  | 1.9cm×2.5cm | 3.5 |

**70 mm f/2.8**

| E       | M    | D      | A           | C   |
|---------|------|--------|-------------|-----|
| 48.0mm  | 0.67 | 13.1cm | 6.2cm×8.4cm | 1.5 |
| 57.5mm  | 0.80 | 11.3cm | 5.2cm×7.0cm | 1.5 |
| 71.8mm  | 1.00 | 9.5cm  | 4.2cm×5.6cm | 2.0 |
| 86.2mm  | 1.20 | 8.3cm  | 3.5cm×4.7cm | 2.0 |
| 100.5mm | 1.40 | 7.4cm  | 3.0cm×4.0cm | 2.5 |
| 107.7mm | 1.50 | 7.1cm  | 2.8cm×3.7cm | 2.5 |
| 114.9mm | 1.60 | 6.8cm  | 2.6cm×3.5cm | 2.5 |
| 129.3mm | 1.80 | 6.3cm  | 2.3cm×3.1cm | 2.5 |

**80 mm f/4 Macro**

| E       | M    | D      | A           | C   |
|---------|------|--------|-------------|-----|
| 48.0mm  | 0.60 | 15.2cm | 6.9cm×9.4cm | 1.5 |
| 64.1mm  | 0.80 | 11.8cm | 5.2cm×7.0cm | 2.0 |
| 80.1mm  | 1.00 | 9.8cm  | 4.2cm×5.6cm | 2.0 |
| 96.1mm  | 1.20 | 8.5cm  | 3.5cm×4.7cm | 2.5 |
| 112.1mm | 1.40 | 7.6cm  | 3.0cm×4.0cm | 2.5 |
| 120.0mm | 1.50 | 7.2cm  | 2.8cm×3.7cm | 3.0 |
| 128.0mm | 1.60 | 6.8cm  | 2.6cm×3.5cm | 3.0 |
| 144.0mm | 1.80 | 6.3cm  | 2.3cm×3.1cm | 3.0 |
| 160.0mm | 2.00 | 5.8cm  | 2.1cm×2.8cm | 3.5 |
| 175.9mm | 2.20 | 5.5cm  | 1.9cm×2.6cm | 3.5 |
| 178.7mm | 2.23 | 5.4cm  | 1.9cm×2.5cm | 3.5 |

**110 mm f/2.8**

| E       | M    | D      | A            | C   |
|---------|------|--------|--------------|-----|
| 48.0mm  | 0.44 | 33.3cm | 9.5cm×12.8cm | 1.0 |
| 55.0mm  | 0.50 | 30.1cm | 8.3cm×11.2cm | 1.5 |
| 66.0mm  | 0.60 | 26.4cm | 6.9cm×9.3cm  | 1.5 |
| 88.0mm  | 0.80 | 21.8cm | 5.2cm×7.0cm  | 2.0 |
| 110.0mm | 1.00 | 19.1cm | 4.2cm×5.6cm  | 2.5 |
| 132.0mm | 1.20 | 17.2cm | 3.5cm×4.7cm  | 2.5 |
| 154.0mm | 1.40 | 15.9cm | 3.0cm×4.0cm  | 3.0 |
| 165.0mm | 1.50 | 15.4cm | 2.8cm×3.7cm  | 3.0 |

|          |      |        |                 |     |
|----------|------|--------|-----------------|-----|
| 138.4 mm | 2.50 | 2.7 cm | 1.7 cm × 2.2 cm | 2.5 |
| 166.1 mm | 3.00 | 2.3 cm | 1.4 cm × 1.9 cm | 3.0 |
| 178.7 mm | 3.23 | 2.1 cm | 1.3 cm × 1.7 cm | 3.0 |

### 150 mm f/3.5

| E        | M    | D       | A                 | C   |
|----------|------|---------|-------------------|-----|
| 48.0 mm  | 0.33 | 58.0 cm | 12.6 cm × 17.0 cm | 1.0 |
| 58.2 mm  | 0.40 | 50.3 cm | 10.4 cm × 14.0 cm | 1.0 |
| 72.8 mm  | 0.50 | 43.0 cm | 8.3 cm × 11.2 cm  | 1.5 |
| 87.3 mm  | 0.60 | 38.1 cm | 6.9 cm × 9.3 cm   | 1.5 |
| 116.4 mm | 0.80 | 32.1 cm | 5.2 cm × 7.0 cm   | 2.0 |
| 145.5 mm | 1.00 | 28.4 cm | 4.2 cm × 5.6 cm   | 2.5 |
| 178.7 mm | 1.23 | 25.7 cm | 3.4 cm × 4.6 cm   | 3.0 |

|          |      |        |                 |     |
|----------|------|--------|-----------------|-----|
| 143.6 mm | 2.00 | 5.9 cm | 2.1 cm × 2.8 cm | 3.0 |
| 158.0 mm | 2.20 | 5.6 cm | 1.9 cm × 2.6 cm | 3.0 |
| 172.4 mm | 2.40 | 5.3 cm | 1.7 cm × 2.3 cm | 3.0 |
| 178.7 mm | 2.49 | 5.2 cm | 1.7 cm × 2.3 cm | 3.5 |

### 210 mm f/4.0

| E        | M    | D        | A                 | C   |
|----------|------|----------|-------------------|-----|
| 48.0 mm  | 0.23 | 113.8 cm | 18.1 cm × 24.4 cm | 1.0 |
| 83.8 mm  | 0.40 | 74.8 cm  | 10.4 cm × 14.0 cm | 1.5 |
| 104.7 mm | 0.50 | 64.3 cm  | 8.3 cm × 11.2 cm  | 1.5 |
| 125.7 mm | 0.60 | 57.3 cm  | 6.9 cm × 9.3 cm   | 2.0 |
| 167.6 mm | 0.80 | 48.6 cm  | 5.2 cm × 7.0 cm   | 2.0 |
| 178.7 mm | 0.85 | 46.9 cm  | 4.9 cm × 6.6 cm   | 2.5 |

|          |      |         |                 |     |
|----------|------|---------|-----------------|-----|
| 176.0 mm | 1.60 | 15.0 cm | 2.6 cm × 3.5 cm | 3.0 |
| 178.7 mm | 1.62 | 14.8 cm | 2.6 cm × 3.5 cm | 3.0 |

### 300 mm f/5.6

| E        | M    | D        | A                 | C   |
|----------|------|----------|-------------------|-----|
| 48.0 mm  | 0.16 | 240.7 cm | 25.9 cm × 35.0 cm | 1.0 |
| 59.9 mm  | 0.20 | 203.5 cm | 20.6 cm × 28.0 cm | 1.0 |
| 119.9 mm | 0.40 | 128.5 cm | 10.4 cm × 14.0 cm | 2.0 |
| 149.9 mm | 0.50 | 113.6 cm | 8.3 cm × 11.2 cm  | 2.0 |
| 178.7 mm | 0.60 | 103.9 cm | 7.0 cm × 9.4 cm   | 2.5 |

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### 80 mm f/1.9

| E        | M    | D      | A               | C   |
|----------|------|--------|-----------------|-----|
| 90.0 mm  | 1.12 | 9.6 cm | 3.7 cm × 5.0 cm | 2.0 |
| 96.1 mm  | 1.20 | 9.1 cm | 3.5 cm × 4.7 cm | 2.0 |
| 112.1 mm | 1.40 | 8.2 cm | 3.0 cm × 4.0 cm | 2.5 |
| 120.1 mm | 1.50 | 7.8 cm | 2.8 cm × 3.7 cm | 2.5 |
| 128.1 mm | 1.60 | 7.5 cm | 2.6 cm × 3.5 cm | 2.5 |
| 144.1 mm | 1.80 | 6.9 cm | 2.3 cm × 3.1 cm | 2.5 |
| 160.1 mm | 2.00 | 6.5 cm | 2.1 cm × 2.8 cm | 3.0 |
| 176.1 mm | 2.20 | 6.1 cm | 1.9 cm × 2.6 cm | 3.0 |
| 192.2 mm | 2.40 | 5.8 cm | 1.7 cm × 2.3 cm | 3.5 |
| 200.2 mm | 2.50 | 5.7 cm | 1.7 cm × 2.2 cm | 3.5 |
| 208.2 mm | 2.60 | 5.6 cm | 1.6 cm × 2.2 cm | 3.5 |
| 220.7 mm | 2.76 | 5.4 cm | 1.5 cm × 2.0 cm | 3.5 |

### 80 mm f/2.8

| E        | M    | D       | A               | C   |
|----------|------|---------|-----------------|-----|
| 72.0 mm  | 0.90 | 13.2 cm | 4.6 cm × 6.2 cm | 2.0 |
| 80.0 mm  | 1.00 | 12.3 cm | 4.2 cm × 5.6 cm | 2.0 |
| 96.0 mm  | 1.20 | 10.9 cm | 3.5 cm × 4.7 cm | 2.5 |
| 112.1 mm | 1.40 | 10.0 cm | 3.0 cm × 4.0 cm | 2.5 |
| 120.1 mm | 1.50 | 9.6 cm  | 2.8 cm × 3.7 cm | 2.5 |
| 128.1 mm | 1.60 | 9.3 cm  | 2.6 cm × 3.5 cm | 3.0 |
| 144.1 mm | 1.80 | 8.7 cm  | 2.3 cm × 3.1 cm | 3.0 |
| 160.1 mm | 2.00 | 8.3 cm  | 2.1 cm × 2.8 cm | 3.0 |
| 176.1 mm | 2.20 | 7.9 cm  | 1.9 cm × 2.6 cm | 3.5 |
| 192.1 mm | 2.40 | 7.6 cm  | 1.7 cm × 2.3 cm | 3.5 |
| 200.1 mm | 2.50 | 7.5 cm  | 1.7 cm × 2.2 cm | 3.5 |
| 202.7 mm | 2.53 | 7.4 cm  | 1.6 cm × 2.2 cm | 3.5 |

### 80 mm f/4 Macro

| E        | M    | D       | A               | C   |
|----------|------|---------|-----------------|-----|
| 48.0 mm  | 1.20 | 13.0 cm | 3.5 cm × 4.7 cm | 2.5 |
| 63.6 mm  | 1.40 | 12.0 cm | 3.0 cm × 4.0 cm | 2.5 |
| 71.6 mm  | 1.50 | 11.7 cm | 2.8 cm × 3.7 cm | 2.5 |
| 79.6 mm  | 1.60 | 11.3 cm | 2.6 cm × 3.5 cm | 3.0 |
| 95.6 mm  | 1.80 | 10.8 cm | 2.3 cm × 3.1 cm | 3.0 |
| 111.5 mm | 2.00 | 10.3 cm | 2.1 cm × 2.8 cm | 3.0 |
| 127.5 mm | 2.20 | 10.0 cm | 1.9 cm × 2.6 cm | 3.5 |
| 143.5 mm | 2.40 | 9.7 cm  | 1.7 cm × 2.3 cm | 3.5 |
| 151.5 mm | 2.50 | 9.5 cm  | 1.7 cm × 2.2 cm | 3.5 |
| 159.5 mm | 2.60 | 9.4 cm  | 1.6 cm × 2.2 cm | 4.0 |
| 175.4 mm | 2.80 | 9.2 cm  | 1.5 cm × 2.0 cm | 4.0 |
| 178.7 mm | 2.84 | 9.1 cm  | 1.5 cm × 2.0 cm | 4.0 |

### 55 mm f/2.8

| E        | M    | D      | A               | C   |
|----------|------|--------|-----------------|-----|
| 48.0 mm  | 1.99 | 3.2 cm | 2.1 cm × 2.8 cm | 3.0 |
| 59.7 mm  | 2.20 | 3.0 cm | 1.9 cm × 2.6 cm | 3.0 |
| 70.8 mm  | 2.40 | 2.8 cm | 1.7 cm × 2.3 cm | 3.0 |
| 76.3 mm  | 2.50 | 2.7 cm | 1.7 cm × 2.2 cm | 3.5 |
| 81.8 mm  | 2.60 | 2.6 cm | 1.6 cm × 2.2 cm | 3.5 |
| 92.9 mm  | 2.80 | 2.4 cm | 1.5 cm × 2.0 cm | 3.5 |
| 104.0 mm | 3.00 | 2.3 cm | 1.4 cm × 1.9 cm | 3.5 |
| 115.1 mm | 3.20 | 2.2 cm | 1.3 cm × 1.8 cm | 4.0 |
| 126.1 mm | 3.40 | 2.1 cm | 1.2 cm × 1.7 cm | 4.0 |
| 131.7 mm | 3.50 | 2.0 cm | 1.2 cm × 1.6 cm | 4.0 |
| 148.3 mm | 3.80 | 1.9 cm | 1.1 cm × 1.5 cm | 4.5 |
| 159.4 mm | 4.00 | 1.8 cm | 1.0 cm × 1.4 cm | 4.5 |
| 178.7 mm | 4.35 | 1.7 cm | 1.0 cm × 1.3 cm | 4.5 |

### 70 mm f/2.8

| E        | M    | D      | A               | C   |
|----------|------|--------|-----------------|-----|
| 48.0 mm  | 1.28 | 7.9 cm | 3.3 cm × 4.4 cm | 2.0 |
| 56.9 mm  | 1.40 | 7.4 cm | 3.0 cm × 4.0 cm | 2.5 |
| 64.1 mm  | 1.50 | 7.1 cm | 2.8 cm × 3.7 cm | 2.5 |
| 71.2 mm  | 1.60 | 6.8 cm | 2.6 cm × 3.5 cm | 2.5 |
| 85.6 mm  | 1.80 | 6.3 cm | 2.3 cm × 3.1 cm | 3.0 |
| 100.0 mm | 2.00 | 5.9 cm | 2.1 cm × 2.8 cm | 3.0 |
| 114.3 mm | 2.20 | 5.6 cm | 1.9 cm × 2.6 cm | 3.0 |
| 128.7 mm | 2.40 | 5.3 cm | 1.7 cm × 2.3 cm | 3.5 |
| 135.9 mm | 2.50 | 5.2 cm | 1.7 cm × 2.2 cm | 3.5 |
| 143.1 mm | 2.60 | 5.1 cm | 1.6 cm × 2.2 cm | 3.5 |
| 157.4 mm | 2.80 | 4.9 cm | 1.5 cm × 2.0 cm | 3.5 |
| 171.8 mm | 3.00 | 4.7 cm | 1.4 cm × 1.9 cm | 4.0 |
| 178.7 mm | 3.10 | 4.6 cm | 1.3 cm × 1.8 cm | 4.0 |

### 110 mm f/2.8

| E        | M    | D       | A               | C   |
|----------|------|---------|-----------------|-----|
| 124.0 mm | 1.00 | 19.1 cm | 4.2 cm × 5.6 cm | 2.5 |
| 146.0 mm | 1.20 | 17.2 cm | 3.5 cm × 4.7 cm | 2.5 |
| 168.0 mm | 1.40 | 15.9 cm | 3.0 cm × 4.0 cm | 3.0 |
| 178.7 mm | 1.50 | 15.4 cm | 2.8 cm × 3.7 cm | 3.0 |

Close-Up Photography Table for Mamiya M645 Auto Bellows

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80 mm f/1.9 (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                     | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|--|------------------------------------|
| 48.0mm    | 0.60          | 6-7/32"<br>(15.8cm)      | 2-23/32" x 3-21/32"<br>(6.9cm x 9.3cm) | 1.5                                |
| 64.1mm    | 0.80          | 4-29/32"<br>(12.5cm)     | 2-1/16" x 2-3/4"<br>(5.2cm x 7.0cm)    | 1.5                                |
| 80.1mm    | 1.00          | 4-1/8"<br>(10.5cm)       | 1-21/32" x 2-7/32"<br>(4.2cm x 5.6cm)  | 2.0                                |
| 96.1mm    | 1.20          | 3-19/32"<br>(9.1cm)      | 1-3/8" x 1-27/32"<br>(3.5cm x 4.7cm)   | 2.5                                |
| 112.1mm   | 1.40          | 3-7/32"<br>(8.2cm)       | 1-3/16" x 1-9/16"<br>(3.0cm x 4.0cm)   | 2.5                                |
| 120.1mm   | 1.50          | 3-1/16"<br>(7.8cm)       | 1-3/32" x 1-15/32"<br>(2.8cm x 3.7cm)  | 2.5                                |
| 128.1mm   | 1.60          | 2-15/16"<br>(7.5cm)      | 1-1/32" x 1-3/8"<br>(2.6cm x 3.5cm)    | 3.0                                |
| 144.1mm   | 1.80          | 2-23/32"<br>(6.9cm)      | 29/32" x 1-7/32"<br>(2.3cm x 3.1cm)    | 3.0                                |
| 160.1mm   | 2.00          | 2-9/16"<br>(6.5cm)       | 13/16" x 1-3/32"<br>(2.1cm x 2.8cm)    | 3.0                                |
| 176.1mm   | 2.20          | 2-13/32"<br>(6.1cm)      | 3/4" x 1-1/32"<br>(1.9cm x 2.6cm)      | 3.5                                |
| 178.7mm   | 2.23          | 2-13/32"<br>(6.1cm)      | 3/4" x 31/32"<br>(1.9cm x 2.5cm)       | 3.5                                |

80 mm f/2.8 (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                     | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|--|------------------------------------|
| 48.0mm    | 0.60          | 6-15/16"<br>(17.6cm)     | 2-23/32" x 3-21/32"<br>(6.9cm x 9.3cm) | 1.5                                |
| 64.0mm    | 0.80          | 5-5/8"<br>(14.3cm)       | 2-1/16" x 2-3/4"<br>(5.2cm x 7.0cm)    | 1.5                                |
| 80.1mm    | 1.00          | 4-27/32"<br>(12.3cm)     | 1-21/32" x 2-7/32"<br>(4.2cm x 5.6cm)  | 2.0                                |
| 96.1mm    | 1.20          | 4-9/32"<br>(10.9cm)      | 1-3/8" x 1-27/32"<br>(3.5cm x 4.7cm)   | 2.5                                |
| 112.1mm   | 1.40          | 3-15/16"<br>(10.0cm)     | 1-3/16" x 1-9/16"<br>(3.0cm x 4.0cm)   | 2.5                                |
| 120.1mm   | 1.50          | 3-25/32"<br>(9.6cm)      | 1-3/32" x 1-15/32"<br>(2.8cm x 3.7cm)  | 2.5                                |
| 128.1mm   | 1.60          | 3-21/32"<br>(9.3cm)      | 1-1/32" x 1-3/8"<br>(2.6cm x 3.5cm)    | 3.0                                |
| 144.1mm   | 1.80          | 3-7/16"<br>(8.3cm)       | 29/32" x 1-7/32"<br>(2.3cm x 3.1cm)    | 3.0                                |
| 160.1mm   | 2.00          | 3-9/32"<br>(8.3cm)       | 13/16" x 1-3/32"<br>(2.1cm x 2.8cm)    | 3.0                                |
| 176.1mm   | 2.20          | 3-1/8"<br>(7.9cm)        | 3/4" x 1-1/32"<br>(1.9cm x 2.6cm)      | 3.5                                |
| 178.7mm   | 2.23          | 3-1/16"<br>(7.8cm)       | 3/4" x 31/32"<br>(1.9cm x 2.5cm)       | 3.5                                |

80 mm f/4 Macro (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                     | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|--|------------------------------------|
| 48.0mm    | 0.60          | 6"<br>(15.2cm)           | 2-23/32" x 3-11/16"<br>(6.9cm x 9.4cm) | 1.5                                |
| 64.1mm    | 0.80          | 4-21/32"<br>(11.8cm)     | 2-1/16" x 2-3/4"<br>(5.2cm x 7.0cm)    | 2.0                                |
| 80.1mm    | 1.00          | 3-27/32"<br>(9.8cm)      | 1-21/32" x 2-7/32"<br>(4.2cm x 5.6cm)  | 2.0                                |
| 96.1mm    | 1.20          | 3-11/32"<br>(8.5cm)      | 1-3/8" x 1-27/32"<br>(3.5cm x 4.7cm)   | 2.5                                |
| 112.1mm   | 1.40          | 3"<br>(7.6cm)            | 1-3/16" x 1-9/16"<br>(3.0cm x 4.0cm)   | 2.5                                |
| 120.0mm   | 1.50          | 2-27/32"<br>(7.2cm)      | 1-3/32" x 1-15/32"<br>(2.8cm x 3.7cm)  | 3.0                                |
| 128.0mm   | 1.60          | 2-11/16"<br>(6.6cm)      | 1-1/32" x 1-3/8"<br>(2.6cm x 3.5cm)    | 3.0                                |
| 144.0mm   | 1.80          | 2-15/32"<br>(6.3cm)      | 29/32" x 1-7/32"<br>(2.3cm x 3.1cm)    | 3.0                                |
| 160.0mm   | 2.00          | 2-9/32"<br>(5.8cm)       | 13/16" x 1-3/32"<br>(2.1cm x 2.8cm)    | 3.5                                |
| 175.9mm   | 2.20          | 2-5/32"<br>(5.5cm)       | 3/4" x 1-1/32"<br>(1.9cm x 2.6cm)      | 3.5                                |
| 178.7mm   | 2.23          | 2-1/8"<br>(5.4cm)        | 3/4" x 1"<br>(1.9cm x 2.5cm)           | 3.5                                |

55 mm f/2.8 (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                    | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|---------------------------------------|------------------------------------|
| 48.0mm    | 0.87          | 2-23/32"<br>(6.9cm)      | 1-7/8" x 2-9/16"<br>(4.8cm x 6.5cm)   | 1.5                                |
| 55.4mm    | 1.00          | 2-3/8"<br>(6.0cm)        | 1-21/32" x 2-7/32"<br>(4.2cm x 5.6cm) | 1.5                                |
| 66.4mm    | 1.20          | 2-3/32"<br>(5.1cm)       | 1-3/8" x 1-27/32"<br>(3.5cm x 4.7cm)  | 1.5                                |
| 77.5mm    | 1.40          | 1-23/32"<br>(4.4cm)      | 1-3/16" x 1-9/16"<br>(3.0cm x 4.0cm)  | 2.0                                |
| 83.1mm    | 1.50          | 1-21/32"<br>(4.2cm)      | 1-3/32" x 1-15/32"<br>(2.8cm x 3.7cm) | 2.0                                |
| 88.6mm    | 1.60          | 1-17/32"<br>(3.9cm)      | 1-1/32" x 1-3/8"<br>(2.6cm x 3.5cm)   | 2.0                                |
| 99.7mm    | 1.80          | 1-3/8"<br>(3.5cm)        | 29/32" x 1-7/32"<br>(2.3cm x 3.1cm)   | 2.0                                |
| 110.7mm   | 2.00          | 1-1/4"<br>(3.2cm)        | 13/16" x 1-3/32"<br>(2.1cm x 2.8cm)   | 2.5                                |
| 138.4mm   | 2.50          | 1-1/16"<br>(2.7cm)       | 21/32" x 7/8"<br>(1.7cm x 2.2cm)      | 2.5                                |
| 166.1mm   | 3.00          | 29/32"<br>(2.3cm)        | 9/16" x 3/4"<br>(1.4cm x 1.9cm)       | 3.0                                |
| 178.7mm   | 3.23          | 13/16"<br>(2.1cm)        | 1/2" x 21/32"<br>(1.3cm x 1.7cm)      | 3.0                                |

70 mm f/2.8 (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                    | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|---------------------------------------|------------------------------------|
| 48.0mm    | 0.67          | 5-5/32"<br>(13.1cm)      | 2-7/16" x 3-5/16"<br>(6.2cm x 8.4cm)  | 1.5                                |
| 57.5mm    | 0.80          | 4-7/16"<br>(11.3cm)      | 2-1/16" x 2-3/4"<br>(5.2cm x 7.0cm)   | 1.5                                |
| 71.8mm    | 1.00          | 3-3/4"<br>(9.5cm)        | 1-21/32" x 2-7/32"<br>(4.2cm x 5.6cm) | 2.0                                |
| 86.2mm    | 1.20          | 3-9/32"<br>(8.3cm)       | 1-3/8" x 1-27/32"<br>(3.5cm x 4.7cm)  | 2.0                                |
| 100.5mm   | 1.40          | 2-29/32"<br>(7.4cm)      | 1-3/16" x 1-9/16"<br>(3.0cm x 4.0cm)  | 2.5                                |
| 107.7mm   | 1.50          | 2-25/32"<br>(7.1cm)      | 1-3/32" x 1-15/32"<br>(2.8cm x 3.7cm) | 2.5                                |
| 114.9mm   | 1.60          | 2-11/16"<br>(6.8cm)      | 1-1/16" x 1-3/8"<br>(2.6cm x 3.5cm)   | 2.5                                |
| 129.3mm   | 1.80          | 2-15/32"<br>(6.3cm)      | 29/32" x 1-7/32"<br>(2.3cm x 3.1cm)   | 2.5                                |
| 143.6mm   | 2.00          | 2-5/16"<br>(5.9cm)       | 13/16" x 1-3/32"<br>(2.1cm x 2.8cm)   | 3.0                                |
| 158.0mm   | 2.20          | 2-7/32"<br>(5.6cm)       | 3/4" x 1-1/32"<br>(1.9cm x 2.6cm)     | 3.0                                |
| 172.4mm   | 2.40          | 2-3/32"<br>(5.3cm)       | 21/32" x 29/32"<br>(1.7cm x 2.3cm)    | 3.0                                |
| 178.7mm   | 2.49          | 2-1/16"<br>(5.2cm)       | 21/32" x 29/32"<br>(1.7cm x 2.3cm)    | 3.5                                |

110 mm f/2.8 (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                     | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|--|------------------------------------|
| 48.0mm    | 0.44          | 1-1/8"<br>(33.3cm)       | 3-3/4" x 5-1/32"<br>(9.5cm x 12.8cm)   | 1.0                                |
| 55.0mm    | 0.50          | 1-1/27/32"<br>(30.1cm)   | 3-9/32" x 4-13/32"<br>(8.3cm x 11.2cm) | 1.5                                |
| 66.0mm    | 0.60          | 10-13/32"<br>(26.4cm)    | 3-23/32" x 3-21/32"<br>(6.9cm x 9.3cm) | 1.5                                |
| 88.0mm    | 0.80          | 8-19/32"<br>(21.8cm)     | 2-1/16" x 2-3/4"<br>(5.2cm x 7.0cm)    | 2.0                                |
| 110.0mm   | 1.00          | 7-17/32"<br>(19.1cm)     | 1-21/32" x 2-7/32"<br>(4.2cm x 5.6cm)  | 2.5                                |
| 132.0mm   | 1.20          | 6-25/32"<br>(17.2cm)     | 1-3/8" x 1-27/32"<br>(3.5cm x 4.7cm)   | 2.5                                |
| 154.0mm   | 1.40          | 6-1/4"<br>(15.9cm)       | 1-3/16" x 1-9/16"<br>(3.0cm x 4.0cm)   | 3.0                                |
| 165.0mm   | 1.50          | 6-1/16"<br>(15.4cm)      | 1-3/32" x 1-15/32"<br>(2.8cm x 3.7cm)  | 3.0                                |
| 176.0mm   | 1.60          | 5-29/32"<br>(15.0cm)     | 1-1/32" x 1-3/8"<br>(2.6cm x 3.5cm)    | 3.0                                |
| 178.7mm   | 1.62          | 5-13/32"<br>(14.8cm)     | 1-1/32" x 1-3/8"<br>(2.6cm x 3.5cm)    | 3.0                                |

150 mm f/3.5 (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                       | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|--|------------------------------------|
| 48.0mm    | 0.33          | 1'-10-27/32"<br>(58.0cm) | 4-31/32" x 6-11/16"<br>(12.6cm x 17.0cm) | 1.0                                |
| 59.2mm    | 0.40          | 1'-7-13/16"              | 4-3/32" x 5-1/2"                         | 1.0                                |

210 mm f/4.0 (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                     | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|--|------------------------------------|
| 48.0mm    | 0.23          | 3'-8-13/16"<br>(113.8cm) | 7-1/8" x 9-19/32"<br>(18.1cm x 24.4cm) | 1.0                                |
| 83.8mm    | 0.40          | 2'-5-7/16"               | 4-3/32" x 5-1/2"                       | 1.5                                |

300 mm f/5.6 (Normal)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                          | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|---|------------------------------------|
| 48.0mm    | 0.16          | 7'-10-3/4"<br>(240.7cm)  | 10-3/16" x 1'-1-25/32"<br>(25.9cm x 35.0cm) | 1.0                                |
| 59.9mm    | 0.20          | 6'-8-1/8"                | 8-1/8" x 1'-1-1/32"                         | 1.0                                |

|         |      | (50.3cm)                | (10.4cm×14.0cm)                        |     |
|---------|------|-------------------------|--|-----|
| 72.8mm  | 0.50 | 1' 4-15/16"<br>(43.0cm) | 3-9/32" × 4-13/32"<br>( 8.3cm×11.2cm)  | 1.5 |
| 87.3mm  | 0.60 | 1' 3"<br>(38.1cm)       | 2-3/4" × 3-21/32"<br>( 6.9cm× 9.3cm)   | 1.5 |
| 116.4mm | 0.80 | 1' 5/8"<br>(32.1cm)     | 2-1/16" × 2-3/4"<br>( 5.2cm× 7.0cm)    | 2.0 |
| 145.5mm | 1.00 | 11-3/16"<br>(28.4cm)    | 1-21/32" × 2-7/32"<br>( 4.2cm× 5.6cm)  | 2.5 |
| 178.7mm | 1.23 | 10-1/8"<br>(25.7cm)     | 1-11/32" × 1-13/16"<br>( 3.4cm× 4.6cm) | 3.0 |

|         |      | (14.9cm)                | (10.4cm×14.0cm)                        |     |
|---------|------|-------------------------|--|-----|
| 104.7mm | 0.50 | 2' 1-5/16"<br>(64.3cm)  | 3-9/32" × 4-13/32"<br>( 8.3cm×11.2cm)  | 1.5 |
| 125.7mm | 0.60 | 1' 10-9/16"<br>(57.3cm) | 2-23/32" × 3-21/32"<br>( 6.9cm× 9.3cm) | 2.0 |
| 167.6mm | 0.80 | 1' 7-1/8"<br>(48.6cm)   | 2-1/16" × 2-3/4"<br>( 5.2cm× 7.0cm)    | 2.0 |
| 178.7mm | 0.85 | 1' 6-15/32"<br>(46.9cm) | 1-15/16" × 2-19/32"<br>( 4.9cm× 6.6cm) | 2.5 |

|         |      | (20.5cm)                 | (20.6cm×26.0cm)                       |     |
|---------|------|--------------------------|---------------------------------------|-----|
| 119.9mm | 0.40 | 4' 2-19/32"<br>(128.5cm) | 4-3/32" × 5-1/2"<br>(10.4cm×14.0cm)   | 2.0 |
| 149.9mm | 0.50 | 3' 8-23/32"<br>(113.6cm) | 3-9/32" × 4-13/32"<br>( 8.3cm×11.2cm) | 2.0 |
| 178.7mm | 0.60 | 3' 4-29/32"<br>(103.9cm) | 2-3/4" × 3-11/16"<br>( 7.0cm× 9.4cm)  | 2.5 |

### 80 mm f/1.9 (Reverse)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                   | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|--------------------------------------|------------------------------------|
| 90.0mm    | 1.12          | 3-25/32"<br>(9.6cm)      | 1-15/32" × 1-31/32"<br>(3.7cm×5.0cm) | 2.0                                |
| 96.1mm    | 1.20          | 3-19/32"<br>(9.1cm)      | 1-3/8" × 1-27/32"<br>(3.5cm×4.7cm)   | 2.0                                |
| 112.1mm   | 1.40          | 3-7/32"<br>(8.2cm)       | 1-3/16" × 1-9/16"<br>(3.0cm×4.0cm)   | 2.5                                |
| 120.1mm   | 1.50          | 3-1/16"<br>(7.8cm)       | 1-3/32" × 1-15/32"<br>(2.8cm×3.7cm)  | 2.5                                |
| 128.1mm   | 1.60          | 2-15/16"<br>(7.5cm)      | 1-1/32" × 1-3/8"<br>(2.6cm×3.5cm)    | 2.5                                |
| 144.1mm   | 1.80          | 2-23/32"<br>(6.9cm)      | 29/32" × 1-7/32"<br>(2.3cm×3.1cm)    | 2.5                                |
| 160.1mm   | 2.00          | 2-9/16"<br>(6.5cm)       | 13/16" × 1-3/32"<br>(2.1cm×2.8cm)    | 3.0                                |
| 176.1mm   | 2.20          | 2-13/32"<br>(6.1cm)      | 3/4" × 1-1/32"<br>(1.9cm×2.6cm)      | 3.0                                |
| 192.2mm   | 2.40          | 2-9/32"<br>(5.8cm)       | 21/32" × 29/32"<br>(1.7cm×2.3cm)     | 3.5                                |
| 200.2mm   | 2.50          | 2-1/4"<br>(5.7cm)        | 21/32" × 7/8"<br>(1.7cm×2.2cm)       | 3.5                                |
| 208.2mm   | 2.60          | 2-7/32"<br>(5.6cm)       | 5/8" × 7/8"<br>(1.6cm×2.2cm)         | 3.5                                |
| 220.7mm   | 2.76          | 2-1/8"<br>(5.4cm)        | 19/32" × 25/32"<br>(1.5cm×2.0cm)     | 3.5                                |

### 80 mm f/2.8 (Reverse)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                  | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|-------------------------------------|------------------------------------|
| 72.0mm    | 0.90          | 5-3/16"<br>(13.2cm)      | 1-13/16" × 2-7/16"<br>(4.6cm×6.2cm) | 2.0                                |
| 80.0mm    | 1.00          | 4-27/32"<br>(12.3cm)     | 1-21/32" × 2-7/32"<br>(4.2cm×5.6cm) | 2.0                                |
| 96.0mm    | 1.20          | 4-9/32"<br>(10.9cm)      | 1-3/8" × 1-27/32"<br>(3.5cm×4.7cm)  | 2.5                                |
| 112.1mm   | 1.40          | 3-15/16"<br>(10.0cm)     | 1-3/16" × 1-9/16"<br>(3.0cm×4.0cm)  | 2.5                                |
| 120.1mm   | 1.50          | 3-25/32"<br>(9.6cm)      | 1-3/32" × 1-15/32"<br>(2.8cm×3.7cm) | 2.5                                |
| 128.1mm   | 1.60          | 3-21/32"<br>(9.3cm)      | 1-1/32" × 1-3/8"<br>(2.6cm×3.5cm)   | 3.0                                |
| 144.1mm   | 1.80          | 3-7/16"<br>(8.7cm)       | 29/32" × 1-7/32"<br>(2.3cm×3.1cm)   | 3.0                                |
| 160.1mm   | 2.00          | 3-9/32"<br>(8.3cm)       | 13/16" × 1-3/32"<br>(2.1cm×2.8cm)   | 3.0                                |
| 176.1mm   | 2.20          | 3-1/8"<br>(7.9cm)        | 3/4" × 1-1/32"<br>(1.9cm×2.6cm)     | 3.5                                |
| 192.1mm   | 2.40          | 3"<br>(7.6cm)            | 21/32" × 29/32"<br>(1.7cm×2.3cm)    | 3.5                                |
| 200.1mm   | 2.50          | 2-15/16"<br>(7.5cm)      | 21/32" × 7/8"<br>(1.7cm×2.2cm)      | 3.5                                |
| 202.7mm   | 2.53          | 2-29/32"<br>(7.4cm)      | 5/8" × 7/8"<br>(1.6cm×2.2cm)        | 3.5                                |

### 80 mm f/4 Macro (Reverse)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                  | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|-------------------------------------|------------------------------------|
| 48.0mm    | 1.20          | 5-1/8"<br>(13.0cm)       | 1-3/8" × 1-27/32"<br>(3.5cm×4.7cm)  | 2.5                                |
| 63.6mm    | 1.40          | 4-23/32"<br>(12.0cm)     | 1-3/16" × 1-9/16"<br>(3.0cm×4.0cm)  | 2.5                                |
| 71.6mm    | 1.50          | 4-19/32"<br>(11.7cm)     | 1-3/32" × 1-15/32"<br>(2.8cm×3.7cm) | 2.5                                |
| 79.6mm    | 1.60          | 4-7/16"<br>(11.3cm)      | 1-1/32" × 1-3/8"<br>(2.6cm×3.5cm)   | 3.0                                |
| 95.6mm    | 1.80          | 4-1/4"<br>(10.8cm)       | 29/32" × 1-7/32"<br>(2.3cm×3.1cm)   | 3.0                                |
| 111.5mm   | 2.00          | 4-1/16"<br>(10.3cm)      | 13/16" × 1-3/32"<br>(2.1cm×2.8cm)   | 3.0                                |
| 127.5mm   | 2.20          | 3-15/16"<br>(10.0cm)     | 3/4" × 1-1/32"<br>(1.9cm×2.6cm)     | 3.5                                |
| 143.5mm   | 2.40          | 3-13/16"<br>(9.7cm)      | 21/32" × 29/32"<br>(1.7cm×2.3cm)    | 3.5                                |
| 151.5mm   | 2.50          | 3-3/4"<br>(9.5cm)        | 21/32" × 7/8"<br>(1.7cm×2.2cm)      | 3.5                                |
| 159.5mm   | 2.60          | 3-11/16"<br>(9.4cm)      | 5/8" × 7/8"<br>(1.6cm×2.2cm)        | 4.0                                |
| 175.4mm   | 2.80          | 3-5/8"<br>(9.2cm)        | 19/32" × 25/32"<br>(1.5cm×2.0cm)    | 4.0                                |
| 178.7mm   | 2.84          | 3-19/32"<br>(9.1cm)      | 19/32" × 25/32"<br>(1.5cm×2.0cm)    | 4.0                                |

### 55 mm f/2.8 (Reverse)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|-----------------------------------|------------------------------------|
| 48.0mm    | 1.99          | 1-1/4"<br>(3.2cm)        | 13/16" × 1-3/32"<br>(2.1cm×2.8cm) | 3.0                                |
| 59.7mm    | 2.20          | 1-3/16"<br>(3.0cm)       | 3/4" × 1-1/32"<br>(1.9cm×2.6cm)   | 3.0                                |
| 70.8mm    | 2.40          | 1-3/32"<br>(2.8cm)       | 21/32" × 29/32"<br>(1.7cm×2.3cm)  | 3.0                                |
| 76.3mm    | 2.50          | 1-1/16"<br>(2.7cm)       | 21/32" × 7/8"<br>(1.7cm×2.2cm)    | 3.5                                |
| 81.8mm    | 2.60          | 1-1/32"<br>(2.6cm)       | 5/8" × 7/8"<br>(1.6cm×2.2cm)      | 3.5                                |
| 92.9mm    | 2.80          | 15/16"<br>(2.4cm)        | 19/32" × 25/32"<br>(1.5cm×2.0cm)  | 3.5                                |
| 104.0mm   | 3.00          | 29/32"<br>(2.3cm)        | 9/16" × 3/4"<br>(1.4cm×1.9cm)     | 3.5                                |
| 115.1mm   | 3.20          | 7/8"<br>(2.2cm)          | 1/2" × 23/32"<br>(1.3cm×1.8cm)    | 4.0                                |
| 131.7mm   | 3.50          | 25/32"<br>(2.0cm)        | 15/32" × 5/8"<br>(1.2cm×1.6cm)    | 4.0                                |
| 159.4mm   | 4.00          | 23/32"<br>(1.8cm)        | 13/32" × 9/16"<br>(1.0cm×1.4cm)   | 4.5                                |
| 178.7mm   | 4.35          | 21/32"<br>(1.7cm)        | 13/32" × 1/2"<br>(1.0cm×1.3cm)    | 4.5                                |

### 70 mm f/2.8 (Reverse)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                  | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|-------------------------------------|------------------------------------|
| 48.0mm    | 1.28          | 3-1/8"<br>(7.9cm)        | 1-5/16" × 1-23/32"<br>(3.3cm×4.4cm) | 2.0                                |
| 56.9mm    | 1.40          | 2-29/32"<br>(7.4cm)      | 1-3/16" × 1-9/16"<br>(3.0cm×4.0cm)  | 2.5                                |
| 64.1mm    | 1.50          | 2-25/32"<br>(7.1cm)      | 1-3/32" × 1-15/32"<br>(2.8cm×3.7cm) | 2.5                                |
| 71.2mm    | 1.60          | 2-11/16"<br>(6.8cm)      | 1-1/32" × 1-3/8"<br>(2.6cm×3.5cm)   | 2.5                                |
| 85.6mm    | 1.80          | 2-15/32"<br>(6.3cm)      | 29/32" × 1-7/32"<br>(2.3cm×3.1cm)   | 3.0                                |
| 100.0mm   | 2.00          | 2-5/16"<br>(5.9cm)       | 13/16" × 1-3/32"<br>(2.1cm×2.8cm)   | 3.0                                |
| 114.3mm   | 2.20          | 2-7/32"<br>(5.6cm)       | 3/4" × 1-1/32"<br>(1.9cm×2.6cm)     | 3.0                                |
| 128.7mm   | 2.40          | 2-3/32"<br>(5.3cm)       | 21/32" × 29/32"<br>(1.7cm×2.3cm)    | 3.5                                |
| 135.9mm   | 2.50          | 2-1/16"<br>(5.2cm)       | 21/32" × 7/8"<br>(1.7cm×2.2cm)      | 3.5                                |
| 171.8mm   | 3.00          | 1-27/32"<br>(4.7cm)      | 9/16" × 3/4"<br>(1.4cm×1.9cm)       | 4.0                                |
| 178.7mm   | 3.10          | 1-13/16"<br>(4.6cm)      | 1/2" × 23/32"<br>(1.3cm×1.8cm)      | 4.0                                |

### 110 mm f/2.8 (Reverse)

| Extension | Magnification | Lens-to-subject distance | Area to be covered                  | Exposure compensation value (Step) |
|-----------|---------------|--------------------------|-------------------------------------|------------------------------------|
| 124.0mm   | 1.00          | 7-17/32"<br>(19.1cm)     | 1-21/32" × 2-7/32"<br>(4.2cm×5.6cm) | 2.5                                |
| 146.0mm   | 1.20          | 6-25/32"<br>(17.2cm)     | 1-3/8" × 1-27/32"<br>(3.5cm×4.7cm)  | 2.5                                |
| 168.0mm   | 1.40          | 6-1/4"<br>(15.9cm)       | 1-3/16" × 1-9/16"<br>(3.0cm×4.0cm)  | 3.0                                |
| 178.7mm   | 1.50          | 6-1/16"<br>(15.4cm)      | 1-3/32" × 1-15/32"<br>(2.8cm×3.7cm) | 3.0                                |

