

Canon

CANON INC. 9-9, Ginza 5-chome, Chuo-ku, Tokyo 104, Japan

U.S.A.
NEW YORK — **CANON U.S.A., INC.**
10 Nevada Drive, Lake Success, Long Island, N.Y. 11040, U.S.A.

MANHATTAN — **CANON U.S.A., INC.**
600 Third Avenue, New York, N.Y. 10016, U.S.A.

CHICAGO — **CANON U.S.A., INC.**
457 Fullerton Avenue, Elmhurst, Illinois 60126, U.S.A.

LOS ANGELES — **CANON OPTICS & BUSINESS MACHINES CO., INC.**
123 East Paularino Avenue, Costa Mesa, California 92626, U.S.A.
CANON OPTICS & BUSINESS MACHINES CO., INC.
3113 Wilshire Blvd., Los Angeles, California 90010, U.S.A.

CANADA
TORONTO — **CANON OPTICS & BUSINESS MACHINES CANADA LTD.**
3245 American Drive, Mississauga, Ontario, L4V 1B8, Canada

EUROPE, AFRICA
& MIDDLE EAST
AMSTERDAM — **CANON AMSTERDAM N.V.**
Gebouw 70, Schiphol Oost, Holland

CENTRAL &
SOUTH AMERICA
PANAMA — **CANON LATIN AMERICA, INC.**
Apartado 7022, Panamá 5, República de Panamá



Canon MACRO LENS FD 50mm F3.5 S.S.C.

INSTRUCTIONS

CANON MACRO LENS FD 50mm F3.5 S.S.C.

The Canon Macro Lens FD 50mm F 3.5 S.S.C. is specially designed, besides general photography, to facilitate close-up photography such as copying documents and pictures, and macrophotography.

The protrusion length of this lens has been increased, and 0.5-time the object can be photographed with this lens alone. With the attachment of the Life-Size Adapter it is possible to photograph subjects up to 1 : 1 or life size. Therefore, the various optical conditions demanded in close-up photography, such as spherical aberration, curvature of image plane, distortion and chromatic aberration, have been fully met by the newly designed optical system. Fur-

thermore, this lens boasts high resolving power and high contrast up to infinity in general photography. And even in macro-photography, uniformly sharp and clear images throughout the entire picture are obtainable.

For the above reasons, we highly recommend this lens for habitual use. It is lightweight because it employs a light alloy for the lens barrel. And it is designed for ideal operation with a built-in information signal mechanism for stopped-down metering and a fully automatic aperture mechanism.

	Photographing Range		Lens Protrusion Length (mm)	Page
	Photographic Magnification	Camera-to-Subject Distance (mm)		
Camera + Lens	$\infty - 0.5$	$\infty - 232$	25.8	6 - 7
Camera + Life-Size Adapter + Lens	0.5 - 1	232 - 205	51.6	8 - 9
Camera + Bellows + Lens	0.67 - 2.76	213.8 - 263.3	34.5 - 142.5	10 - 11
Camera + Macrophoto Coupler FL 55mm + Lens in reversed position + Macrohood	1.19 - 1.44	206.9 - 212.2	61.2 - 74.2	12
Camera + Bellows + Lens Mount Converter A + Extension Tube + Lens Mount Converter B + Macrophoto Coupler FL 55mm + Lens in reversed position + Macrohood	2.28 - 8.39	237.7 - 541	117.7 - 432.7	13 - 14

(Above numerical values are theoretical values).

Specifications

Use: Close-up photography, copy work, macro-photography, and general photography.

Focal length and aperture ratio: $f = 50\text{mm}$, 1:3.5

Lens composition: 6 elements in 4 components. Super Spectra Coating.

Angle of view: 46°

Aperture mechanism: Fully automatic aperture. Manually operated aperture possible. Possible to use intermediate ring, with no automatic aperture coupling mechanism, by clamping the automatic aperture lever.

Aperture scale: F3.5, 5.6, 8, 11, 16, 22, ∞ .

Depth of field scale (only in cases of F11 and F22) and infrared scale are engraved.

The "o" mark (green mark) is the aperture position when using the Servo EE Finder.

When the Life-Size Adapter is jointly used, the aperture scale becomes F5, 8, 11, 16, 22, 32.

In this case there is no depth of field scale.

Focusing: Straight advance helicoid type.

$\infty - 23.2\text{cm}$ (0.5-time)

When Life-Size Adapter is used:

23.2cm (0.5-time) - 20.5cm (1:1)

Photographic magnification scale: 2, 2.5, 3, 4, 5, 6, 8, 1:10.

When the Life-Size Adapter is jointly used: (green figures): 1:2, 1:1.5, 1:1.2, 1:1

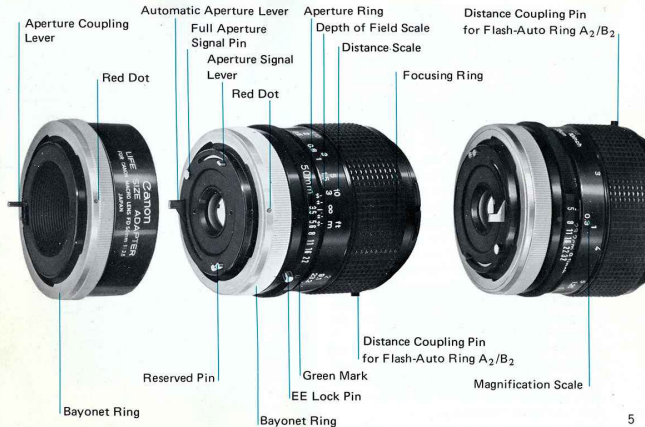
Mount: Canon FD mount (can be used on all Canon SLR cameras).
With mount tightening ring lock mechanism.

Filter diameter: 55mm

Size: $59.5\text{mm} \times 65.8\text{mm} \phi$ (2 3/8" X 2 5/8")

Weight: 310 grams (10-15/16 oz.)

Subject to alterations.



General Photography to Close-Up Photography (1/2)



- ① Macro Lens FD 50mm
F 3.5 S.S.C.
- ② Camera

Remove the dust cap from the lens. When the dust cap is detached with the mount lock mechanism, the bayonet ring cannot be turned. And even when the aperture ring is turned, the aperture blades will not function. But this does not mean a breakdown of the aperture system.

- If you wish to check the function of the aperture blades when the bayonet ring is turned, press the EE lock pin, situated under the bayonet ring and on the upper side of the positioning pin, with a small pin while turning the bayonet ring.

Align the red dots on the lens bayonet ring and camera mount section and mount the lens on the camera mount. Turn the bayonet ring clockwise, while lightly pressing the lens against the camera body, and tighten the bayonet ring.

Shooting manipulation is completely the same as



in general photography with the exception of focusing up to close-up distances. Successive photography, from infinity to 23.2cm (photographic magnification: 1/2-time), is possible with this lens. Distance scales (feet in white, meters in orange) and magnification scale (in green) are engraved on the distance ring.

The distance scales and aperture scale are engraved in two places. When the lens is mounted onto the camera, the figures positioned on the top side are used.

The "o" mark (green mark) on the aperture ring is the aperture position used only when a camera with an EE mechanism is used. The EE lock pin, right beside it, prevents the aperture ring from going over to the "o" mark when normal aperture is being used.

The magnification scale indicates the photographic magnification, that is, how large the subject will be photographed in terms of magnification. The numerical values with their numerators deleted are graduated in correspondence to the photographic distances.

For example, if you wish to photograph the subject at 1/5-time its size, then shoot at the distance indicated by 5 on the magnification scale. This would be approximately 1.25 feet or

0.4 meter.

Camera Being Used and Aperture Mechanism

- Fully automatic aperture (manually operated aperture possible), full aperture opening and stopped-down metering.

Canon F-1, FTb, TLb.

- Fully automatic aperture (manually operated aperture possible), stopped-down metering.

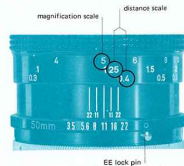
Canon FT, Pellix QL, Pellix

- Fully automatic aperture (manually operated aperture possible).

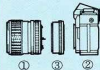
Canon FX, FP

- Manually operated aperture only.

Canonflex, R-2000, RP, RM



Close-Up Photography (1/2) and Life-Size Photography (1 : 1)



③ Life-Size Adapter

Insert a **Life-Size Adapter** in between the camera and the Canon Macro Lens.

Attaching together the Macro Lens and the Life-Size Adapter, and the Life-Size Adapter and the camera are performed in the same manner as outlined in General Photography. After attaching together the Macro Lens and the Life-Size Adapter, the Life-Size Adapter is then attached on the camera.

After attachment, the Canon Macro Lens is in a 180° turned condition as compared to its condition when the Life-Size Adapter is not used. The distance scales and the aperture scale can be observed from the top, but these scales are those positioned on the opposite side when only the Macro Lens is attached onto the camera.



Life-Size Adapter



Photographic distance: 23.2cm (1/2-time) to 20.5cm (1:1). The aperture scale starts with F5. For example, if you wish to photograph the subject at the ratio of 1:1.2, set the focusing ring at magnification 1:1.2 (distance indication: 20.7cm or 8.2 inch) and set the camera at the approximate photographic distance position. Look into the viewfinder and move the camera forwards or backwards to obtain a sharp focus. Then press the shutter release button. The subject will be exposed on the film at the ratio of 1:1.2.



magnification scale

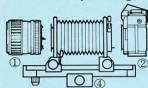
Precautions for Close-up Photography and Macro Photography

- ① In general, lenses have the characteristic of having shallow focusing ranges (depth of field) in close-up photography and life-size photography. Therefore, photograph after closing down the aperture to f/8 or f/11 as much as possible. It is necessary to make the depth of field deep to some degree. However, if the aperture is closed down too much, a diffraction phenomenon arises and the image-forming performance slightly deteriorates.
- ② As the magnification increases, the light volume on the film surface becomes insufficient. Therefore, when the lighting cannot be increased, the

shutter speed is made slower. As a result of the slowing down of the shutter speed the problem of blurring, due to camera movement, arises. But this can be solved with the joint use of a tripod, copy stand, flash unit or cable release. In cases when you do not have a cable release, the selftimer can be utilized.

- ③ In the case of larger than life-size macro photography, higher image-forming performance can be obtained by mounting the lens in reversed position.
- ④ When using a slow shutter speed of one second to approximately 50 or 60 seconds, the film sensitivity deteriorates due to the film characteristic. Therefore, correct the exposure according to the characteristic of the film.

**Close-Up (2/3), Life-Size (1 : 1)
and Macrophotography (2.7)**



④ Bellows FL

Macrophotography with the use of **Bellows FL**.
Camera + Bellows FL + Macro Lens

Photographic magnification: 0.67 to 2.76 times

The attaching method is the same as outlined in the preceding section.

During use, keep the focusing ring of the lens set at infinity(∞).

Focusing is performed with the two bellows adjusting knobs on the Bellows FL. After focusing is completed, fix it into position with the knobs on the opposite side.

Minute adjustments of the entire bellows for camera-to-subject distances is performed with the camera-to-subject distance adjusting knob located in the tripod attachment section.

For detailed information on the use of the bellows, please refer to the instruction manual



for Bellows FL.

Camera Being Used and Aperture Mechanism

- Coupled stopped-down aperture (manually operated aperture possible), stopped-down metering.

Canon F-1, FTb, TLb, FT,
Pellix QL, Pellix

- Manually operated aperture only
Canonflex, R-2000, RP, RM

When the Canon Macro Lens is used jointly with Bellows R or Bellows M, photography is performed with manually operated aperture on all models of Canon SLR cameras.



Life-Size Photography (1 : 1) and Macrophotography



ated aperture cannot be performed without the attachment of the macrohood.

Macrophotography with the use of Macrophoto Coupler FL 55mm.

Macrohood + lens in reversed position + Macrophoto Coupler FL 55mm + camera

Photographic magnification: 1.19–1.44



In macrophotography, image delineation sometimes becomes poor due to a breakdown in the aberration balance of the lens. The larger the magnification becomes in macrophotography the closer comes the subject to the front end of the lens. This raises the problems of lighting and lens protection. To solve these problems, Macrophoto Coupler FL 55mm is used, and the lens is attached in reversed position.

Set the focusing ring of the macro lens at infinity and turn the automatic aperture lever to manual lock position to set the lens in manually operable condition.

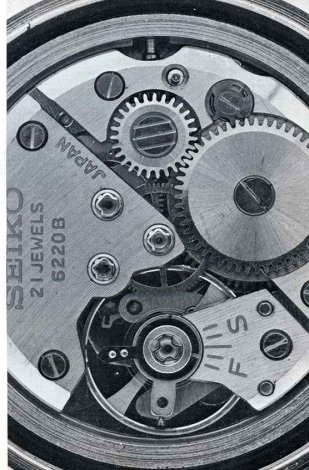
Next, attach the macrohood onto the macro lens using the bayonet ring. The attachment of the macrohood releases the mount lock mechanism of the bayonet ring. Therefore, manually oper-

Screw the screw mount of Macrophoto Coupler FL 55mm into the front end of the macro lens. Then connect the bayonet section of the Coupler with the camera.

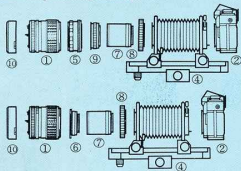
Under this system, the subject can be magnified larger than when using the Life-Size Adapter. However, the aperture mechanism must be operated manually.

When you wish to slightly increase the magnification under this method, magnification can be adjusted to some extent by turning the focusing ring of Macrophoto Coupler or by inserting Extension Tube M in between the camera and the Macrophoto Coupler.

The Macrophoto Coupler can be attached directly to the bellows. In this case, photographic magnification becomes much greater.



Macrophotography



- ⑤ Macrophoto Coupler 55mm
- ⑦ Extension Tube
- ⑧ Lens Mount Converter A
- ⑨ Lens Mount Converter B
- ⑩ Macrohood

There are two methods.

(1) Camera + (bellows) + Lens Mount Converter A + extension tube + Lens Mount Converter B + Macrophoto Coupler FL 55mm + macro lens + macrohood.

(2) Camera + bellows + Lens Mount Converter A + extension tube + Macrophoto Coupler 55mm + macro lens + macrohood.

Both the (1) and (2) methods obtain the same results.



Attach the macrohood to the lens, after setting at manual aperture control and screw the screw mount of Macrophoto Coupler FL 55mm or Macrophoto Coupler 55mm into the front end of the macro lens. Attach Lens Mount Converter B onto the bayonet mount side of Macrophoto Coupler FL 55mm (Lens Mount Converter B is unnecessary when attaching Macrophoto Coupler 55mm).

Make additional attachments in the order of extension tube, Lens Mount Converter A, bellows and camera.

Focusing is performed with the bellows when a bellows is used. When a bellows is not used, focusing is performed with the focusing ring of Macrophoto Coupler FL 55mm.

When using the screw-in type Macrophoto Coupler 55mm, a bellows must be jointly used. Otherwise, focusing, corresponding to changes in photographic magnification, cannot be performed.

In high magnification photography it is necessary, as we previously pointed out in the Close-Up Photography and Macrophotography Section, to close down the aperture to f/8 or f/11 and jointly use a tripod, copy stand, flash unit or

cable release to prevent blurring due to camera movement. In this case, the aperture control of all cameras is manually operated.

Methods for Deciding Exposures

1. When using a through-the-lens (TTL) system camera.

When using a TTL system camera, decide the exposure according to the built-in exposure meter in all types of photography.

When using a bellows or an extension tube in between the lens and camera, the actual f/number becomes much darker. In the case of TTL system metering, there is no problem whatsoever in measuring the actually darkened light volume.

When using a camera with an exposure meter other than the TTL type, the bellows or extension tube inserted in between the lens and camera greatly affect the measuring value. In this case, remove only the camera and close in on the subject and measure the exposure. Then perform the exposure corrections outlined in the following Separate Exposure Meter Section.

When measuring exposures with a TTL system camera, keep your eye closely fixed to the eyepiece of the camera to prevent the effects of light entering in reverse direction from the viewfinder.

2. When using a Separate Exposure Meter.

When the protrusion length of the lens is increased, due to the use of the Life-Size Adapter, a bellows or extension tube, and the exposure is to be decided with the use of a separate exposure meter, corrections are performed by the following equation.

$$M = \frac{X'}{f} \dots\dots (1) \quad B = (1 + M)^2 \dots\dots (2)$$

- M..... Photographic magnification
- f..... Focal length of lens
- X'..... Extension length of accessory
(See Chart 2 for extension lengths of accessories)
- B..... Exposure factor

When using only Bellows FL and the Macro Lens, just read the magnification on the scale attached to Bellows FL. The above equations are unnecessary.

The aperture adjustment volume is obtained by applying this magnification to the corresponding magnification on the exposure conversion chart (Chart 1).

For example, if the protrusion index mark

position of Bellows FL is 1.5X, then read the aperture adjusting volume of 2-3/4 from photographic magnification 1.5 on the exposure conversion chart, and open the aperture by 2-3/4 stops. If the measured value of the exposure meter is f/11, the aperture after correction would be f/4-1/4 when the aperture is opened by 2-3/4 stops.

When the protrusion length of the lens is increased by attaching an extension tube onto a bellows, the magnification and exposure factor are obtained by the above-mentioned equations. But if the exposure conversion chart (Chart 1) is used, it is not necessary to calculate exposure factor equation (2).

For example, in the case of:
Macro lens in reversed position + Macrophoto Coupler FL 55mm (extension length...0) + Lens Mount Converter B + Extension Tube 50mm + Lens Mount Converter A + Bellows FL

In the case of extension length 100mm:

$$\text{Photographic magnification } M = \frac{41.2 + 20 + 13.2 + 50 + 2.8 + 100}{50} = 4.5$$

Obtain aperture adjustment volume 5 corresponding to 4.5-times magnification from the exposure conversion chart.

When using flash, correction is also necessary according to the protrusion length of the accessories being used. But in this case, the numerical value obtained by the flash guide number is used instead of the value measured with the separate exposure meter. The following expression is used for obtaining the numerical value using the guide number.

$$\text{Aperture stop} = \frac{\text{Guide number}}{\text{Shooting distance}}$$

Correct this obtained aperture stop according to photographic magnification. Please refer to the Flash Instruction Manual for detailed information.

(Chart 1)

Exposure Convection Chart: Exposure factor and aperture conversion value in relation to photographic magnification (M)

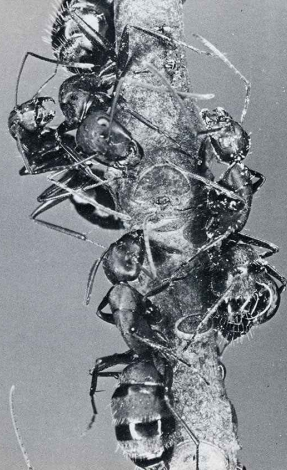
Photo-graphic Magnification	Exposure Factor	Aperture Adjustment Volume (Opening f/stop)		Photo-graphic Magnification	Exposure Factor	Aperture Adjustment Volume (Opening f/stop)		Photo-graphic Magnification	Exposure Factor	Aperture Adjustment Volume (Opening f/stop)	
0.1	1.21	0.28	1/4	3.2	17.64	4.14	4 1/4	6.8	60.84	5.93	6
0.2	1.44	0.53	1/2	3.4	19.36	4.28	4 1/4	7.0	64.00	6.00	6
0.3	1.69	0.76	3/4	3.5	20.25	4.34	4 1/4	7.2	67.24	6.07	6
0.4	1.96	0.97	1	3.6	21.16	4.40	4 1/2	7.4	70.56	6.14	6 1/4
0.5	2.25	1.17	1 1/4	3.8	23.04	4.53	4 1/2	7.5	72.25	6.18	6 1/4
0.6	2.56	1.36	1 1/4	4.0	25.00	4.64	4 3/4	7.6	73.96	6.21	6 1/4
0.7	2.89	1.53	1 1/2	4.2	27.04	4.76	4 3/4	7.8	77.44	6.28	6 1/4
0.8	3.24	1.70	1 3/4	4.4	29.16	4.87	4 3/4	8.0	81.00	6.34	6 1/4
0.9	3.61	1.85	1 3/4	4.5	30.25	4.92	5	8.2	84.64	6.40	6 1/2
1.0	4.00	2.00	2	4.6	31.36	4.97	5	8.4	88.36	6.47	6 1/2
1.2	4.84	2.27	2 1/4	4.8	33.64	5.07	5	8.5	90.25	6.50	6 1/2
1.4	5.76	2.53	2 1/2	5.0	36.00	5.17	5 1/4	8.6	92.16	6.53	6 1/2
1.5	6.25	2.64	2 3/4	5.2	38.44	5.27	5 1/4	8.8	96.04	6.59	6 1/2
1.6	6.76	2.76	2 3/4	5.4	40.96	5.37	5 1/4	9.0	100.00	6.64	6 3/4
1.8	7.84	2.97	3	5.5	42.25	5.40	5 1/2	9.2	104.04	6.70	6 3/4
2.0	9.00	3.17	3 1/4	5.6	43.56	5.45	5 1/2	9.4	108.16	6.76	6 3/4
2.2	10.24	3.36	3 1/4	5.8	46.24	5.53	5 1/2	9.5	110.25	6.78	6 3/4
2.4	11.56	3.53	3 1/2	6.0	49.00	5.62	5 1/2	9.6	112.36	6.81	6 3/4
2.5	12.25	3.61	3 1/2	6.2	51.84	5.70	5 3/4	9.8	116.64	6.87	6 3/4
2.6	12.96	3.70	3 3/4	6.4	54.76	5.78	5 3/4	10.0	121.00	6.92	7
2.8	14.44	3.85	3 3/4	6.5	56.25	5.81	5 3/4				
3.0	16.00	4.00	4	6.6	57.76	5.85	5 3/4				

(Chart 2)

Thickness and Extension Length of Various Accessories

(for calculation of photographic magnification)

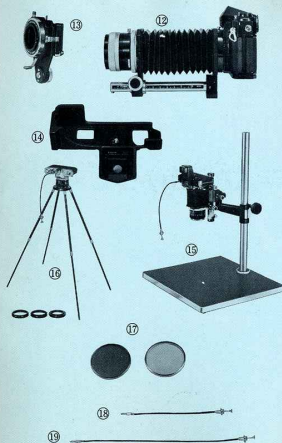
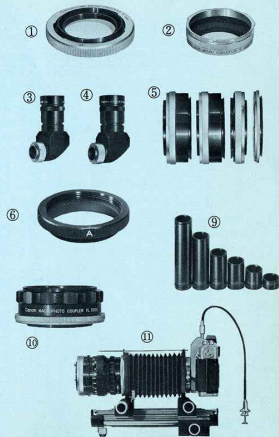
Item	Thickness + Extension Length (mm)
Bellows FL	34.5—142.5
Bellows M	33 —145
Extension Tubes	M5 5
	M10 10
	M20 20
Macrophoto Coupler FL 55mm	20 — 33
Lens Mount Converter A	2.8
Lens Mount Converter B	13.2
Extension Tubes	6mm 6
	9mm 9
	12mm 12
	25mm 25
	50mm 50
	75mm 75
	100mm 100
	150mm 150
	170mm 170
	200mm 200
FD 50mm F3.5 S.S.C. in reversed position	41.2
Life-Size Adapter	25



Accessories

Accessories for increasing performance of Canon Macro Lens FD 50mm F3.5 S.S.C. in close-up photography, copy work and macrophotography.

- ① Lens Mount Converter A
- ② Lens Mount Converter B
- ③ Angle Finder A-2
- ④ Angle Finder B
- ⑤ Extension Tube M Set (M5, M10, M20, M20mm)
- ⑥ Extension Tube A (6mm)
- ⑦ Extension Tube B (9mm)
- ⑧ Extension Tube C (12mm)
- ⑨ Extension Tubes for macrophotography (25mm, 50mm, 75mm, 100mm, 150mm, 200mm)
- ⑩ Macrophoto Coupler FL 55
- ⑪ Bellows FL



- ⑫ Bellows M (Handy-type)
- ⑬ Slide Duplicator
- ⑭ Camera Holder F
- ⑮ Copy Stand 4
- ⑯ Handy Stand F
- ⑰ 55mm Filters
- ⑱ Canon Release 30
- ⑲ Canon Release 50

Extension Tubes

Extension Tubes FL 15 and FL 25 are accessories exclusively developed for Canon Lens FL 50 mm F3.5. The two extension tubes cannot be used by connecting them together.



FUNDAMENTAL USES OF CANON MACRO LENS FD 50mm F3.5 S.S.C.

General and Close-up
Photographies



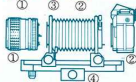
- ① Lens
- ② Camera
- ③ Life-Size Adapter

Close-up, and 1 : 1
Photographies



- ④ Bellows FL
- ⑤ Macrophoto Coupler FL 55mm
- ⑥ Lens Mount Converter B

Close-up,
1 : 1 and Macrophotographies

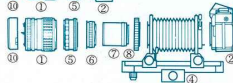


- ⑦ Extension Tube
- ⑧ Lens Mount Converter A
- ⑨ Macrophoto Coupler 55mm
- ⑩ Macrohood

1 : 1 and Macrophotographies



Macrophotography



Macrophotography

