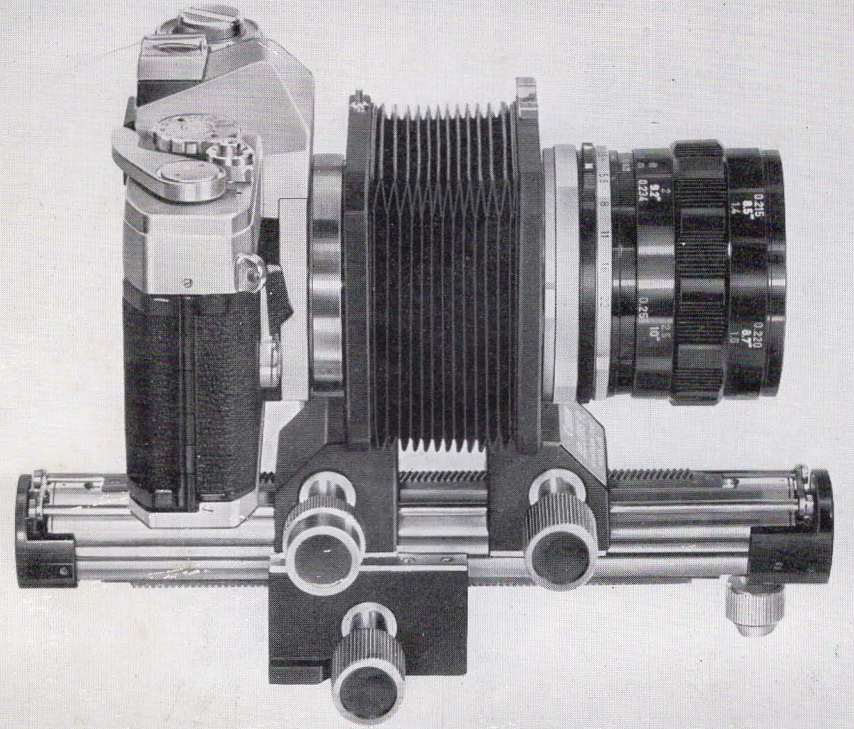

Canon

BELLOWS FL

INSTRUCTIONS

English Edition

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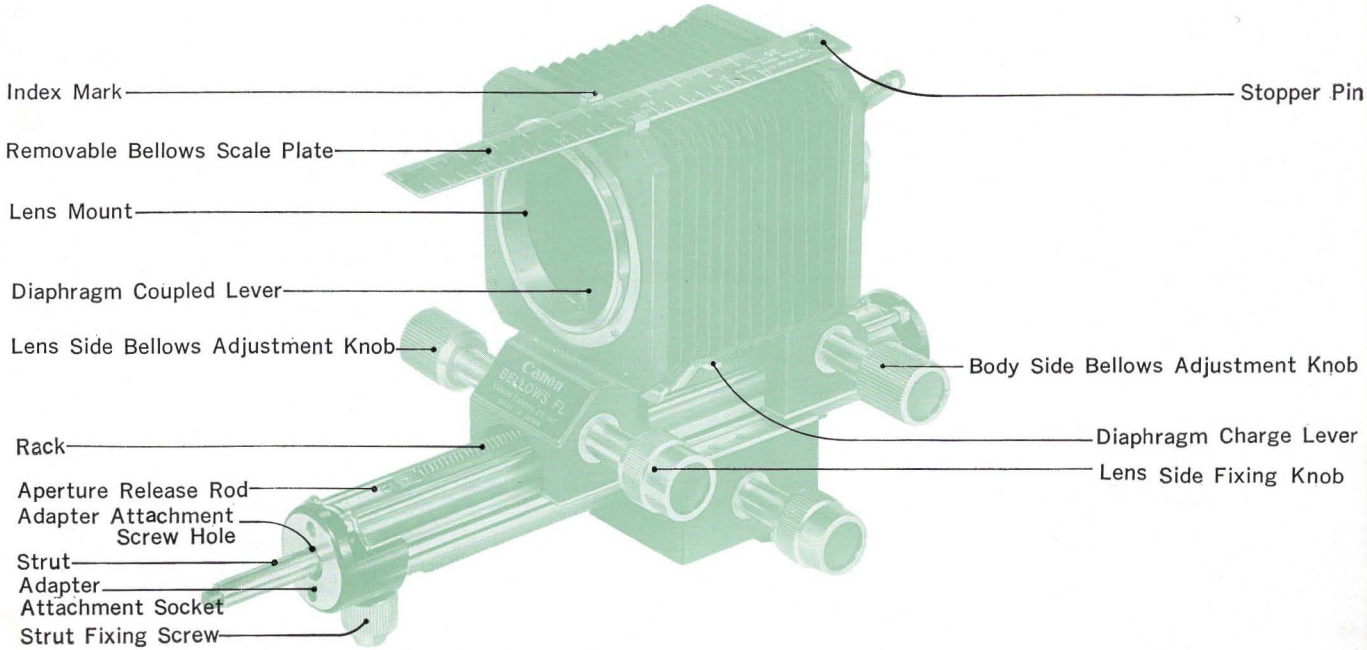
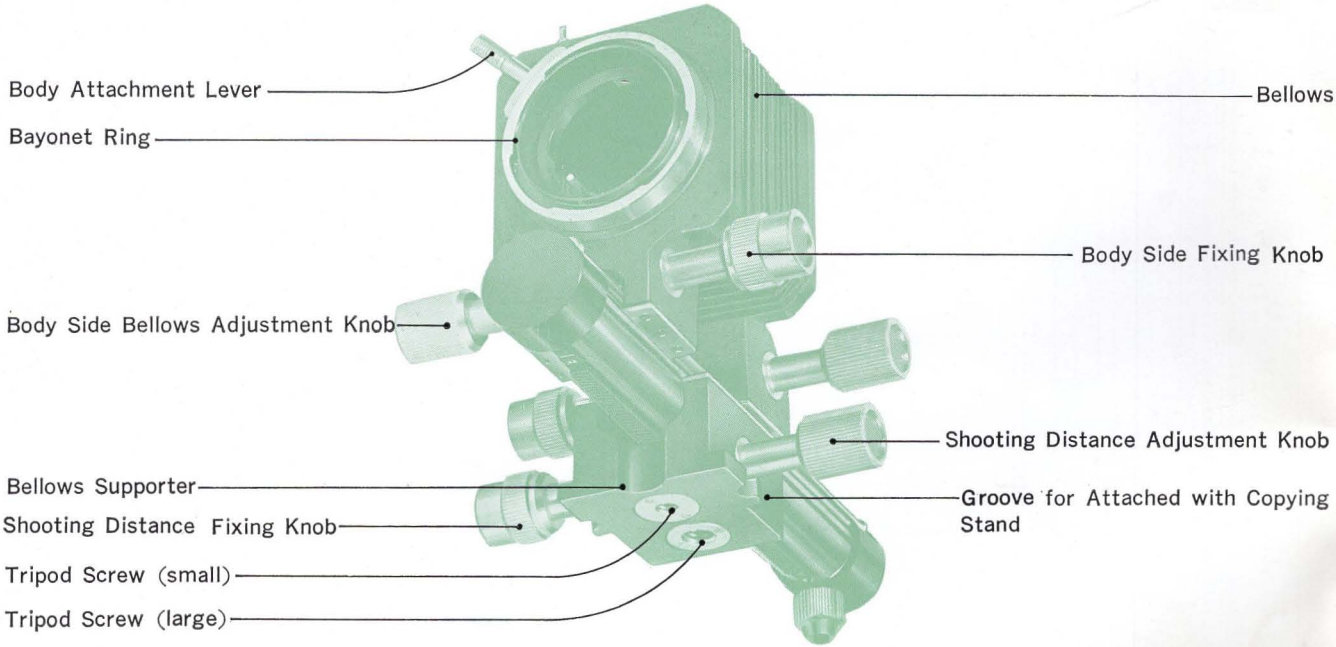
CANON BELLOWS FL

Canon Bellows FL is attached to Canon single-lens reflex cameras, Canon Pellix QL, FT QL, FX and FP for extreme close-up photography. It is a high performance bellows adjustment apparatus that has a shooting distance precision adjustment mechanism and a mechanism coupled to the diaphragm of the FL lens. In conjunction with various kinds of newly developed exclusive accessories it has greatly widened the range of macrophotography. The newly designed Macro Canon Lens FL 50mm F3.5, in particular which boasts ultra-high resolving power is indispensable in this type of photography. Together with the Bellows FL, we can confidently recommend its use.

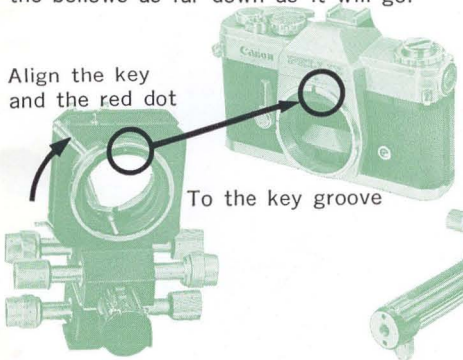
※Canon Bellows FL can be attached to CANON 7 and 7S using Mirror Box 2. It can also be attached to CANONFLEX RM, RP, R 2000 and R, but the automatic diaphragm mechanism cannot be coupled.


Index Mark
Removable Bellows Scale Plate
Lens Mount
Diaphragm Coupled Lever
Lens Side Bellows Adjustment Knob
Rack
Aperture Release Rod
Adapter Attachment Screw Hole
Strut
Adapter Attachment Socket
Strut Fixing Screw
Stopper Pin
Body Side Bellows Adjustment Knob
Diaphragm Charge Lever
Lens Side Fixing Knob


Body Attachment Lever
Bayonet Ring
Body Side Bellows Adjustment Knob
Bellows Supporter
Shooting Distance Fixing Knob
Tripod Screw (small)
Tripod Screw (large)
Bellows
Body Side Fixing Knob
Shooting Distance Adjustment Knob
Groove for Attached with Copying Stand

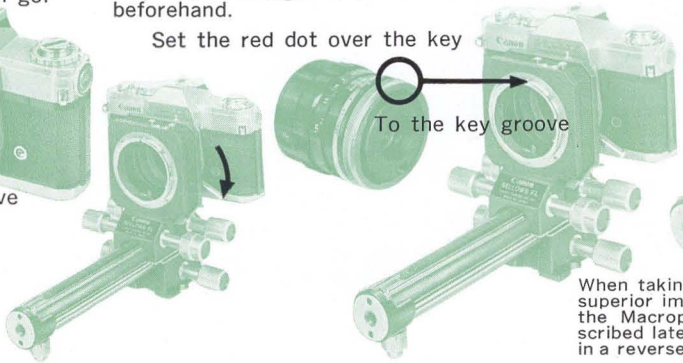
1 Attaching Bellows Onto Camera Body

Turn the body attachment lever of the bellows upwards and set the red dot of the bayonet ring directly upwards. Align the key under this red dot to the key groove of the camera and attach the bellows onto the camera. Then fix the bellows into position by turning the body attachment lever of the bellows as far down as it will go.



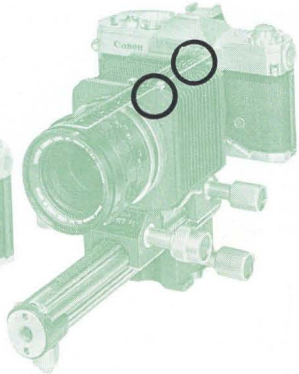
2 Attaching Lens Onto Bellows

First of all, keep the diaphragm charge lever turned downwards. Next, in the same manner as attaching a lens onto the camera, attach the lens onto the bellows, after aligning the key and the key groove, and fix it into position with the bayonet ring.
Please bear in mind that the diaphragm will not be coupled if the diaphragm charge lever is not set beforehand.



3 Attaching Bellows Scale Plate

Insert the stopper pin into the hole of the scale plate and drop the front end of the scale plate into the index mark fixture.



When taking larger than life-size pictures, superior images can be obtained by using the Macrophoto Coupler FL, which is described later on, and by attaching the lens in a reversed direction.

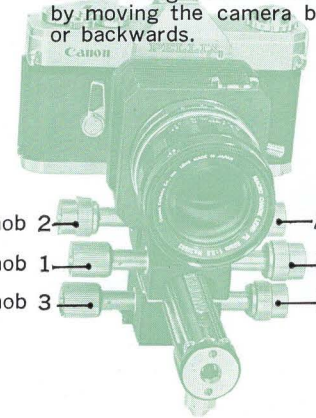
1 Adjusting of Bellows

Adjust the focus by turning the adjustment knob and extending the camera body and lens.

- In order to extend the lens side, turn adjustment knob 1
- In order to extend the camera body side, turn adjustment knob 2.
- In order to tighten, turn the fixing knobs, on the opposite side, in a clockwise direction.
- Keep the fixing knobs loose before turning the adjustment knobs.

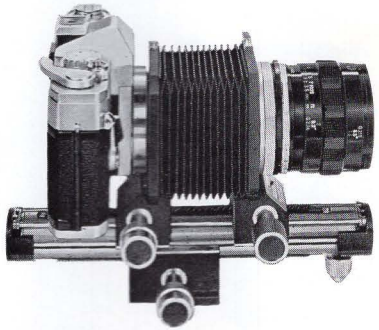
2 Adjusting of Shooting Distance

When the adjustment knob on the bellows supporter is turned after the bellows is mounted on a tripod, the entire bellows moves, including the rail, and shooting distance adjustment is possible. The bellows is fixed into position with the fixing knobs on the opposite side. Precision adjustment of the shooting distance can be performed by moving the camera body forwards or backwards.



3 Focusing and Positioning of Bellows

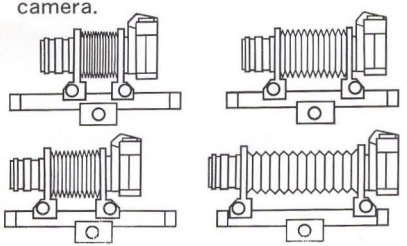
When aiming without stretching the bellows (within 10cm), make focal adjustment after moving the entire apparatus to the center Please bear in mind that if the camera is positioned at the far rear end of the bellows, the front end of the bellows will be blocked by the subject and focusing will become impossible.



4 Focusing

Refer to the chart on page 9. Magnifications, shooting distances, bellows scale, etc. corresponding to the various lenses are compiled in the chart. First, decide the magnification with which you wish to photograph. Next, set the camera position according to the shooting distance corresponding to that magnification. Then extend the lens according to the bellows scale position indicated in the same chart. Finally perform precision focusing.

* The shooting distance is measured from the film plane mark on the camera.

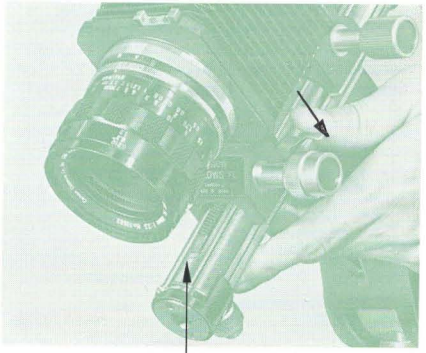


5 Diaphragm Charge Lever

The diaphragm charge lever has an automatic diaphragm coupling mechanism for FL lenses.

When the charge lever is lowered the lens aperture opens. When the shutter is released or the light measuring lever of the Pellix is moved, the diaphragm is designed so that it closes down to the pre-set aperture stop. Therefore, just as in general photography the shutter can be released after focusing is performed with the aperture at maximum opening. Aperture closing is performed with the release rod situated on the rail.

Be careful not to touch the release rod, during shooting.



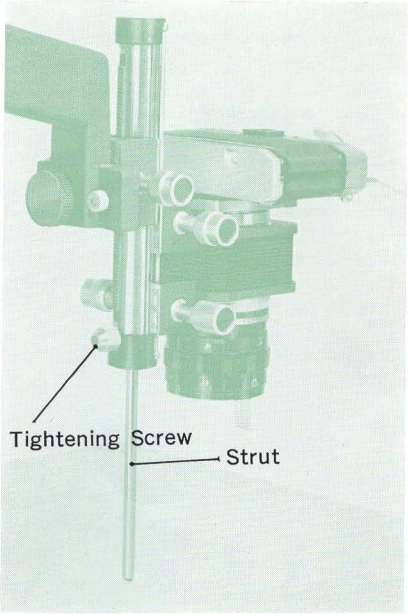
Do not touch the aperture release rod.

6 Bellows Scale

The bellows scale can also be used for exposure calculations because bellows extension lengths and magnifications are indicated on it. The figures on the top side of the chart are the magnifications when only a 50mm lens is attached onto the bellows in the normal direction. The figures on the bottom side of the chart are the magnifications when a 50mm lens is attached in a reversed direction onto the Macrophoto Coupler FL.
The minimum and maximum bellows extension lengths are 35mm and 150 mm respectively
The readings are obtained with the index mark shown in the chart.
The data differs according to the type of lens and the direction of attachment. Please refer to the chart.

7 Strut

The built-in strut is used for fixing the position of the bellows and to prevent photographic blurring.
When the strut fixing screw on the bottom side of the tip is loosened, the strut will eject with the power of the spring. Adjust the strut to the necessary length and fix into position.
When setting the position with a tripod or copying equipment, it is important that the tip of the strut should be fixed so that it is being pressed.
The strut will not hinder the movement of the bellows even though the shooting distance is decided after loosening the fixing screws. Therefore, set the position first and then move the front plate and obtain the focus.



Magnification when a 50mm lens is attached in the normal direction.

Magnification when a 50mm lens is attached in a reversed direction onto the macrophoto coupler

Lens protrusion length.

8 Attaching of Tripod

When photographing, use a tripod or copying equipment. There are two types of attachment screws for large size or small size use.

1 Effective Aperture

The focusing range is very small in close-up photography and macrophotography Therefore, use an aperture opening smaller than F5.6 as much as possible.

2 Calculation of Exposure Factor

When the lens is protruded in close-up photography and macrophotography the lens speed becomes slower than the speed figure indicated on the aperture ring. Therefore, the aperture stop obtained with the exposure meter cannot be used as it is. The exposure must be increased according to the length of attached tubes or protruding length of Bellows.

Exposure factor $B=\left(1+\frac{x'}{f}\right)^2$ or

$B=(1+\text{magnification})^2$

x denotes lens protrusion length.
f denotes focal length of lens.

Example If the bellows is extended 50mm when using a 50mm lens.

$$M=\frac{x'}{f}=\frac{50}{50}=1$$

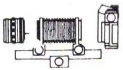
$$B=(1+1)^2=4$$

Thus, the figure obtained with the exposure meter is multiplied by 4X. In other words, the aperture is opened two stops or the exposure time is increased by 4X.

When calculating, the protrusion length of the lens can be read from the bellows scale in the case of bellows. When an extension tube is additionally used, the length of the tube is added to the extension length of the bellows when calculating.

3 How to Use the Instruction Chart and the Exposure Conversion Chart

When the photographic magnification has been decided, the exposure factor of any lens becomes the same. Therefore, please refer to the instruction chart on page 9 and the exposure conversion chart on page 15 for deciding the exposure. In the case of a 50mm lens, the magnification can be read from the bellows scale and the conversion chart can be immediately used.



Instruction Chart 1

Data when FL lenses are in standard direction attached onto Bellows FL

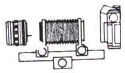
(in meters)

Lens \ Bellows FL Scale		34.5	40	50	60	70	80	90	100	110	120	130	142.5
FL35mm F3.5	Distance	158	159	162	168	175	183	191	200	209	218	227	239
	Magnification	0.97	1 12	1.41	1.69	1.97	2.25	2.53	2.81	3.09	3.37	3.65	4.01
	Field-of-View	24.7 x37 1	21.3 x32.0	17 1 x25.6	14.2 x21.3	12.2 x18.3	10.7 x16.0	9.5 x14.2	8.5 x12.8	7.8 x11.6	7 1 x10.7	6.6 x9.9	6.0 x9.0
FL35mm F2.5	Distance	160	160	164	170	177	185	193	201	210	219	229	240
	Magnification	0.97	1 13	1.41	1.69	1.97	2.25	2.54	2.82	3.10	3.38	3.66	4.01
	Field-of-View	24.7 x37.0	21.3 x32.0	17.0 x25.6	14.2 x21.3	12.2 x18.3	10.7 x16.0	9.5 x14.2	8.5 x12.8	7.8 x11.6	7 1 x10.7	6.6 x9.8	6.0 x9.0
FL50mm F3.5	Distance	216	211	208	209	213	218	224	231	239	247	255	266
	Magnification	0.67	0.78	0.97	1 16	1.36	1.55	1 74	1.94	2.13	2.33	2.52	2.76
	Field-of-View	35.9 x53.8	31.0 x46.6	24.8 x37.2	20.6 x31.0	17 7 x26.5	15.5 x23.2	13.8 x20.6	12.4 x18.6	11.3 x16.9	10.3 x15.5	9.53 x14.3	8.7 x13.0
FL50mm F1.8	Distance	206	201	197	198	202	207	214	221	228	236	244	255
	Magnification	0.67	0.77	0.97	1 16	1.36	1.55	1 74	1.94	2.13	2.32	2.52	2.76
	Field-of-View	35.9 x53.9	31.0 x46.5	24.8 x37.2	20.7 x31.0	17 7 x26.6	15.5 x23.2	13.8 x20.7	12.4 x18.6	11.3 x16.9	10.3 x15.5	9.53 x14.3	8.69 x13.0
FL50mm F1.4	Distance	198	193	189	190	194	199	206	213	220	228	236	247
	Magnification	0.67	0.78	0.97	1 16	1.36	1.55	1 74	1.94	2.13	2.33	2.52	2.76
	Field-of-View	35.9 53.8	31.0 x46.4	24.8 x37.2	20.6 x31.0	17 7 x26.5	15.5 x23.2	13.8 x20.6	12.4 x18.6	11.3 x16.9	10.3 x15.5	9.53 x14.3	8.69 x13.0
FL55mm F1.2	Distance	213	206	201	201	204	209	214	221	228	236	244	254
	Magnification	0.63	0.73	0.91	1.09	1.27	1.46	1.64	1.82	2.0	2.18	2.36	2.59
	Field-of-View	38.2 x57.4	33.0 x49.5	26.4 x39.6	22.0 x33.0	18.8 x28.3	16.5 x24.7	14.7 x22.0	13.2 x19.8	12.0 x18.0	11.0 x16.5	10.1 x15.2	9.3 x13.9

The figures in this chart have been obtained through calculation. Therefore, slight aberration cannot be avoided during actual photography.

(in meters)

Lens \ Bellows FL Scale		34.5	40	50	60	70	80	90	100	110	120	130	142.5
FL58mm F1.2	Distance	231	223	216	215	217	201	226	232	239	247	255	265
	Magnification	0.59	0.69	0.86	1.03	1.21	1.38	1.55	1 72	1.90	2.07	2.24	2.46
	Field-of-View	40.4 x60.5	34.8 x52.2	27.8 x41.8	23.2 x34.8	19.9 x29.8	17.4 x26.1	15.5 x23.2	13.9 x20.9	12.7 x19.0	11.6 x17.4	10.7 x16.1	9.77 x14.7
FL85mm F1.8	Distance	398	375	350	336	330	327	327	329	333	338	343	351
	Magnification	0.41	0.48	0.60	0.71	0.83	0.95	1.07	1 19	1.31	1.43	1.55	1 70
	Field-of-View	58.4 x87 7	50.4 x75.6	40.3 x60.5	33.6 x50.4	28.8 x43.2	25.2 x37.8	22.4 x33.6	20.2 x30.2	18.3 x27.5	16.8 x25.2	15.5 x23.3	14.1 x21.2
FL100mm F3.5	Distance	524	490	450	427	413	405	401	400	401	404	407	413
	Magnification	0.35	0.40	0.50	0.60	0.70	0.80	0.90	1.0	1 10	1.2	1.30	1.43
	Field-of-View	69.4 x104.0	59.9 x89.8	47.9 x71.9	39.9 x59.9	34.2 x51.3	29.9 x44.9	26.7 x39.9	24 x35.9	21.8 x32.7	20 x30	18.4 x27.6	16.8 x25.2
FL135mm F3.5	Distance	847	781	700	650	617	595	580	570	564	560	559	559
	Magnification	0.26	0.3	0.37	0.45	0.52	0.60	0.67	0.74	0.82	0.81	0.97	1.06
	Field-of-View	93.4 x140	80.6 x121	64.6 x96.7	53.7 x80.6	46.0 x69.1	40.3 x60.4	35.8 x53.7	32.2 x48.3	29.3 x43.9	26.9 x40.3	24.8 x37.2	22.6 x33.9
FL135mm F2.5	Distance	801	738	661	614	583	562	548	538	533	529	528	529
	Magnification	0.26	0.30	0.38	0.46	0.53	0.61	0.68	0.76	0.84	0.91	0.99	1.08
	Field-of-View	91.5 x137	78.9 x118	63.1 x94.7	52.6 x78.9	45.1 x67 7	39.5 x59.2	35.1 x52.6	31.6 x47.4	28.7 x43.1	26.3 x39.5	24.3 x36.4	22.2 x33.2
FL200mm F4.5	Distance	1535	1389	1208	1090	1009	951	908	876	851	832	818	804
	Magnification	0.18	0.20	0.26	0.31	0.36	0.41	0.46	0.51	0.56	0.61	0.67	0.73
	Field-of-View	136 x204	117 x176	93.8 x141	78.2 x117	67.0 x101	58.6 x87.9	52.1 x78.2	46.9 x70.4	42.6 x64.0	39.1 x58.6	36.1 x54.1	32.9 x49.4
FL200mm F3.5	Distance	1555	1406	1222	1103	1021	962	918	885	859	840	825	811
	Magnification	0.18	0.20	0.25	0.30	0.36	0.41	0.46	0.51	0.56	0.61	0.66	0.72
	Field-of View	137 x205	118 x177	94.5 x142	78.8 x118	67.5 x101	59.1 x88.6	52.5 x78.8	47.3 x70.9	43.0 x64.4	39.4 x59.1	36.4 x54.5	33.2 x49.8



Data when lenses are attached onto Bellows FL in reversed direction using Macrophoto Coupler FL (the helicoid of the Macrophoto Coupler is not extended at this time)

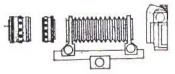
(in meters)

Lens \ Bellows FL Scale		34.5	40	50	60	70	80	90	100	110	120	130	142.5
FL35mm F3.5	Distance	199	204	213	222	231	240	250	259	269	278	288	300
	Magnification	2.78	2.93	3.21	3.50	3.78	4.06	4.34	4.62	4.90	5.18	5.46	5.18
	Field-of-View	8.6 x13.0	8.2 x12.3	7.5 x11.2	6.9 x10.3	6.4 x9.5	5.9 x8.9	5.5 x8.3	5.2 x7.8	4.9 x7.3	4.6 x6.9	4.4 x6.6	4.1 x6.2
FL35mm F2.5	Distance	206	210	220	229	238	247	257	266	276	286	295	307
	Magnification	2.95	3.10	3.39	3.67	3.95	4.23	4.51	4.79	5.08	5.36	5.64	5.99
	Field-of-View	8.1 x12.2	7 7 x11.6	7 1 x10.6	6.6 x9.8	6.1 x9.1	5.7 x8.5	5.3 x8.0	5.0 x7.5	4.7 x7 1	4.5 x6.7	4.3 x6.4	4.0 x6.0
FL50mm F3.5	Distance	224	228	235	243	251	260	268	277	286	295	304	316.0
	Magnification	1 74	1.85	2.04	2.24	2.43	2.63	2.82	3.01	3.21	3.40	3.59	3.84
	Field-of-View	13.8 x20.7	11 7 x19.5	11 7 x17.6	10.7 x16.1	9.9 x14.8	9.1 x13.7	8.5 x12.8	8.0 x12.0	7.5 x11.2	7 1 x10.6	6.7 x10.0	6.3 x9.4
FL50mm F1.8	Distance	214	218	226	233	242	250	259	268	277	286	295	306
	Magnification	1 77	1.87	2.07	2.26	2.45	2.65	2.84	3.03	3.23	3.42	3.62	3.86
	Field-of-View	13.6 x20.4	12.8 x19.2	11.6 x17.4	10.6 x15.9	9.8 x14.7	9.1 x13.6	8.4 x12.7	7.9 x11.9	7.4 x11.2	7.0 x10.5	6.6 x10.0	6.2 x9.3
FL50mm F1.4	Distance	215	219	227	236	244	253	262	271	280	289	298	310
	Magnification	2.01	2.11	2.31	2.50	2.69	2.89	3.03	3.28	3.47	3.66	3.86	4.10
	Field-of-View	12.0 x17.9	11.4 x17.0	10.4 x15.6	9.6 x14.4	8.9 x13.4	8.3 x12.5	7.8 x11 7	7.3 x11.0	6.9 x10.4	6.6 x9.8	6.2 x9.3	5.9 x8.8

(in meters)

Lens \ Bellows FL Scale		34.5	40	50	60	70	80	90	100	110	120	130	142.5
FL55mm F1.2	Distance	221	225	233	241	249	257	266	275	284	293	302	314
	Magnification	1.82	1.92	2.11	2.29	2.47	2.65	2.83	3.01	3.20	3.38	3.56	3.79
	Field-of-View	13.1 x19.7	12.5 x18.7	11.4 x17 1	10.5 x15.7	9.7 x14.6	9.1 x13.6	8.5 x12.7	8.0 x11.9	7.5 x11.3	7 1 x10.7	6.7 x10.1	6.3 x9.5
FL58mm F1.2	Distance	227	231	238	245	253	261	269	278	287	295	304	316
	Magnification	1.59	1.69	1.86	2.03	2.20	2.38	2.55	2.72	2.89	3.07	3.24	3.45
	Field-of-View	15.1 x22.6	14.2 x21.3	12.9 x19.4	11.8 x17 7	10.9 x16.3	10.1 x15.2	9.4 x14.1	8.8 x13.2	8.3 x12.4	7.8 x11 7	7.4 x11 1	7.0 x10.4
FL85mm F1.8	Distance	394	373	348	336	329	327	327	330	333	338	343	351
	Magnification	0.42	0.49	0.60	0.72	0.84	0.96	1.08	1.2	1.32	1.44	1.56	1 70
	Field-of-View	57.2 x85.7	49.5 x74.2	39.7 x59.6	33.2 x49.8	28.5 x42.7	25 x37.4	22.2 x33.3	20 x30	18.2 x27.3	16.7 x25.0	15.4 x23.1	14.1 x21 1
FL100mm F3.5	Distance	3103	1324	746	574	495	453	429	414	406	402	400	401
	Magnification	0.03	0.09	0.91	0.29	0.39	0.49	0.59	0.69	0.79	0.89	0.99	1 12
	Field-of-View	697 1 x1045.6	268.1 x402.1	126.5 x189.8	82.8 x124.2	61.5 x92.3	49.0 x73.4	40.6 x61	34.8 x52.1	30.3 x45.5	26.9 x40.4	24.2 x36.3	21.5 x32.2
FL135mm F3.5	Distance								16666	1925	1165	901	747
	Magnification								0.01	0.08	0.16	0.23	0.32
	Field-of-View								2927 x4390	290 x435	153 x229	104 x155	74 x111
FL135mm F2.5	Distance				16995	1845	1109	854	728	655	610	580	556
	Magnification				0.01	0.08	0.16	0.24	0.31	0.39	0.46	0.54	0.64
	Field-of-View				3053 x4580	286 x429	150 x225	102 x153	77.0 x115	61.9 x92.8	51 7 x77.6	44.5 x66.7	37.8 x56.7

Data when lenses are attached onto Bellows FL using Macrophoto Coupler Extended



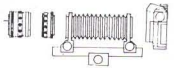
Lens \ Adapter Used		Bellows FL+ Macrophoto Coupler both extended	FL58mm F1.2	328 3.68 6.5 x9.8
FL35mm F3.5	Distance Magnification Field-of-View	313 6.18 3.9 x5.8	FL85mm F1.8	360 1.86 12.9 x19.4
FL35mm F2.5	Distance Magnification Field-of-View	320 6.36 3.8 x5.7	FL100mm F3.5	405 1.25 19.3 x29
FL50mm F3.5	Distance Magnification Field-of-View	328 4.09 5.9 x8.8	FL135mm F3.5	541 0.73 32.7 x49.1
FL50mm F1.8	Distance Magnification Field-of-View	319 4.11 5.8 x8.8	FL135mm F2.5	665 0.42 56.9 x85.4
FL50mm F1.4	Distance Magnification Field-of-View	322 4.35 5.5 x8.3	FL200mm F4.5	2753 0.08 288 x432
FL55mm F1.2	Distance Magnification Field-of-View	326 4.02 6.0 x8.9	FL200mm F3.5	2976 0.08 313 x469

Data when lenses are attached onto Macrophoto Coupler in reversed direction

(in meters)

Lens \ Adapter Used		Macrophoto + reversed Macrophoto Coupler, min. length	Coupler FL FL lens Macrophoto Coupler, max. length	FL58mm F1.2	215 1.00 24.1 x36.1	217 1.22 19.7 x29.6
FL35mm F3.5	Distance Magnification Field-of-View	171 1.81 13.3 x19.9	181 2.17 11.0 x16.6	FL85mm F1.8		685.0 0.16 146.4 219.7
FL35mm F2.5	Distance Magnification Field-of-View	177 1.98 12.1 x18.2	187 2.34 10.2 x15.4			
FL50mm F3.5	Distance Magnification Field-of-View	208.0 1.07 22.3 x33.5	212.0 1.33 18.1 x27 1			
FL50mm F1.8	Distance Magnification Field-of-View	198 1 10 21.9 x32.8	202 1.35 17.8 x26.7			
FL50mm F1.4	Distance Magnification Field-of-View	194 1.34 17.9 x26.9	200 1.59 15.1 x22.7			
FL55mm F1.2	Distance Magnification Field-of-View	202 1.20 20.1 x30.1	208 1.43 16.8 x25.1			

Data when lenses are attached onto Bellows FL using Macrophoto Coupler Extended



Lens \ Adapter Used		Bellows FL+ Macrophoto Coupler both extended		
FL35mm F3.5	Distance Magnification Field-of-View	12-5/16 6.18 1/8 x1/4	FL85mm F1.8	14-3/16 1.86 1/2 x3/4
FL35mm F2.5	Distance Magnification Field-of-View	1'0-5/8 6.36 1/8 x1/4	FL100mm F3.5	1'3-15/16 1.25 3/4 x1-1/8
FL50mm F3.5	Distance Magnification Field-of-View	12-15/16 4.09 1/4 x5/16	FL135mm F3.5	26-3/16 0.42 2-1/4 x3-3/8
FL50mm F1.8	Distance Magnification Field-of-View	12-9/16 4.11 1/4 x3/8	FL135mm F2.5	1'9-5/16 0.73 1-5/16 x1-15/16
FL50mm F1.4	Distance Magnification Field-of-View	12-11/16 4.35 3/16 x5/16	FL200mm F4.5	9'0-3/8 0.08 11-5/16 x1'5
FL55mm F1.2	Distance Magnification Field-of-View	12-13/16 4.02 1/4 x3/8	FL200mm F3.5	9'9-3/16 0.08 1'5/16 x1'6-7/16

Data when lenses are attached onto Macrophoto Coupler in reversed direction

(in feet)

Lens \ Adapter Used		Macrophoto Coupler FL + reversed FL lens Macrophoto Coupler min. length	 Macrophoto Coupler max. length	FL58mm F1.2	8-7/8 1.00 1-3/16 x7/16	8-9/16 1.22 3/4 x1-3/16
FL35mm F3.5	Distance Magnification Field-of-View	6-3/4 1.81 1/2 x13/16	7-1/8 2.17 7/16 x5/8	FL85mm F1.8		2'2 15/16 0.16 5-3/4 x8-5/8
FL35mm F2.5	Distance Magnification Field-of-View	6-15/16 1.98 1/2 x11/16	7-3/8 2.34 3/8 x5/8			
FL50mm F3.5	Distance Magnification Field-of-View	8-3/16 1.07 7/8 x3/8	8-11/16 1.33 11/16 x1-1/16			
FL50mm F1.8	Distance Magnification Field-of-View	7-13/16 1 10 7/8 x1-5/16	7-15/16 1.35 11/16 x1-1/16			
FL50mm F1.4	Distance Magnification Field-of-View	7-5/8 1.34 11/16 x1-1/6	7-7/8 1.59 5/8 x7/8			
FL55mm F1.2	Distance Magnification Field-of-View	7-7/8 1.20 13/16 x1-3/16	8-3/16 1.43 11/16 x15/16			

Data when FL lenses are in standard direction attached onto Bellows FL

(in feet)

Lens \ Bellows FL Scale (mm) / (ft)		34.5 (1-3/8)	40 (1-9/16)	50 (1-15/16)	60 (2-3/8)	70 (2-3/4)	80 (3-1/8)	90 (3-9/16)	100 (3-15/16)	110 (4-5/16)	120 (4-3/4)	130 (5-1/8)	142.5 (5-5/8)
FL35mm F3.5	Distance	6-1/4	6-1/4	6-3/8	6-5/8	6-7/8	7-3/16	7-1/2	7-7/8	8-1/4	8-9/16	8-15/16	9-7/16
	Magnification	0.97	1 12	1.41	1.69	1.97	2.25	2.53	2.81	3.09	3.37	3.65	4.01
	Field-of-View	15/16 x1-7/16	13/16 x1-1/4	11/16 x1	9/16 x13/16	1/2 x3/4	7/16 x5/8	3/8 x9/16	5/16 x1/2	5/16 x7/16	1/4 x7/16	1/4 x3/8	1/4 x3/8
FL35mm F2.5	Distance	6-5/16	6-5/16	6-7/16	6-11/16	6-15/16	7-5/16	7-5/8	7-15/16	13/16	8-5/8	9-1/16	9-7/16
	Magnification	0.97	1 13	1.41	1.69	1.97	2.25	2.54	2.82	3.10	3.38	3.66	4.01
	Field-of-View	15/16 x1-7/16	13/16 x1-1/4	11/16 x1.0	9/16 x13/16	1/2 x3/4	7/16 x5/8	3/8 x9/16	5/16 x1/2	5/16 x7/16	1/4 x7/16	1/4 x3/8	1/4 x3/8
FL50mm F3.5	Distance	8-1/2	8-5/16	8-3/16	8-1/4	8-3/8	8-9/16	8-13/16	9-1/8	9-7/16	9-3/4	10-1/16	10-1/2
	Magnification	0.67	0.78	0.97	1 16	1.36	1.55	1 74	1.94	2.13	2.33	2.52	2.76
	Field-of-View	1-7/16 x2-1/8	1-1/4 x1-13/16	15/16 x1-7/16	13/16 x1-1/4	11/16 x1-1/16	5/8 x15/16	9/16 x13/16	1/2 x3/4	7/16 x11/16	3/8 x5/8	3/8 x9/16	5/16 x1/2
FL50mm F1.8	Distance	8-1/8	7-15/16	7-3/4	7-13/16	7-15/16	8-1/8	8-7/16	8-11/16	8-15/16	9-5/16	9-5/8	10-1/16
	Magnification	0.67	0.77	0.97	1 16	1.36	1.55	1 74	1.94	2.13	2.32	2.52	2.76
	Field-of-View	1-7/16 x2-1/8	1-1/4 x1-13/16	3/4 x1-7/16	13/16 x1-1/4	11/16 x1-1/16	5/8 x5/16	9/16 x13/16	1/2 x3/4	7/16 x11/16	3/8 x5/8	3/8 x9/16	5/16 x1/2
FL50mm F1.4	Distance	7-13/16	7-5/8	7-7/16	7-1/2	7-5/8	7-7/8	8-1/8	8-3/8	8-11/16	8-15/16	8-5/16	8-3/4
	Magnification	0.67	0.78	0.97	1 16	1.36	1.55	1.74	1.94	2.13	2.33	2.52	2.76
	Field-of-View	1-7/16 x2-1/8	1-1/4 x1-13/16	3/4 x1-7/16	13/16 x1-1/4	11/16 x1-1/16	5/8 x15/16	9/16 x13/16	1/2 x3/4	7/16 x11/16	3/8 x5/8	3/8 x9/16	5/16 x1/2
FL55mm F1.2	Distance	8-3/8	8-1/8	7-15/16	7-15/16	8-1/16	8-1/4	8-7/16	8-11/16	8-15/16	9-5/16	9-5/8	10
	Magnification	0.63	0.73	0.91	1.09	1.27	1.46	1.64	1.82	2.0	2.18	2.36	2.59
	Field-of-View	1-1/2 x2-1/4	1-5/16 x1-15/16	1-1/16 x1-9/16	7/8 x1-5/16	3/4 x1-1/8	5/8 x15/16	9/16 x7/8	1/2 x3/4	1/2 x11/16	7/16 x5/8	3/8 x5/8	3/8 x9/16

The figures in this chart have been obtained through calculation. Therefore, slight aberration cannot be avoided during actual photography.

(in feet)

Lens	Bellows FL Scale (mm) (ft)	34.5 (1-3/8)	40 (1-9/16)	50 (1-15/16)	60 (2-3/8)	70 (2-3/4)	80 (3-1/8)	90 (3-9/16)	100 (3-15/16)	110 (4-5/16)	120 (4-3/4)	130 (5-1/8)	142.5 (5-5/8)
FL58mm F1.2	Distance	9-1/8	8-3/4	8-1/2	8-7/16	8-9/16	7-15/16	8-7/8	9-1/8	9-7/16	9-3/4	10-1/16	10-7/16
	Magnification	0.59	0.69	0.86	1.03	1.21	1.38	1.55	1 72	1.90	2.07	2.24	2.46
	Field-of-View	1-9/16	1-3/8	1-1/8	15/16	13/16	11/16	5/8	9/16	1/2	7/16	7/16	7/8
		x2-3/8	x2-1/16	x1-5/8	x1-3/8	x1-3/16	x1-1/16	x7/8	x13/16	x3/4	x11/16	x5/8	x9/16
FL85mm F1.8	Distance	1'3"11/16	1'2"3/4	1'1"3/4	1' 1"1/4	1'0"5/16	1 7/8	1 7/8	1 7/8	1'1-1/8	1' 1-5/16	1' 1-1/2	1'1-13/16
	Magnification	0.41	0.48	0.60	0.71	0.83	0.95	1.07	1 19	1.31	1.43	1.55	1.70
	Field-of-View	2-5/10	1-15/16	1-9/16	1-5/16	1-1/8	15/16	7/8	13/16	3/4	11/16	5/8	9/16
		x3-7/16	x2-15/16	x2-3/8	x1-15/16	x1-11/16	x1-1/2	x1-5/16	x1-3/16	x1-1/16	x15/16	x15/16	x13/16
FL100mm F3.5	Distance	1'8-5/8	1'7-5/16	1'5-11/16	1'4-13/16	1'4-1/4	1'3-15/16	1'3-13/16	1'3-3/4	1'3-13/16	1'3-7/8	1'4-1/16	1'4-1/4
	Magnification	0.35	0.40	0.50	0.60	0.70	0.80	0.90	1.0	1 10	1.2	1.30	1.43
	Field-of-View	2-3/4	2-3/8	1-7/8	1-9/16	1-3/8	1-3/16	1-1/16	15/16	7/8	13/16	3/4	11/16
		x4-1/8	x3-9/16	x2-13/16	x2-3/8	x2-1/16	x1-3/4	x1-9/16	x1-7/16	x1-5/16	x1-3/16	x1-1/16	x15/16
FL135mm F3.5	Distance	2'9-3/8	2'6-3/4	2'3-9/16	2'1-9/16	2'0-5/16	1'11-7/16	1'10-13/16	1'10-3/16	1'10 3/16	1'10-1/16	1'10"0	1'10"0
	Magnification	0.26	0.3	0.37	0.45	0.52	0.60	0.67	0.74	0.82	0.81	0.97	1.06
	Field-of-View	3-11/16	3-3/16	2-9/16	2-1/8	1-13/16	1-9/16	1-7/16	1-1/4	1-1/8	1-1/16	15/16	7/8
		x5-1/2	x4-3/4	x3-13/16	x3-3/16	x2-3/4	x2-3/8	x2-1/8	x1-7/8	x1-3/4	x1-9/16	x1-7/16	x1-5/16
FL135mm F2.5	Distance	2'7-9/16	2'5-1/16	2'2-1/16	2'3/16	1'10-15/16	1'10-1/8	1'9-9/16	1'9-3/16	1'8-15/16	1'8-13/16	1'8-13/16	1'8-13/16
	Magnification	0.26	0.30	0.38	0.46	0.53	0.61	0.68	0.76	0.84	0.91	0.99	1.08
	Field-of-View	3-5/8	3-1/16	2-1/2	2-1/16	1-3/4	1-9/16	1-3/8	1-1/4	1-1/8	1-1/16	15/16	7/8
		x5-3/8	x4-5/8	x3-3/4	x3-1/8	x2-11/16	x2-5/16	x2-1/16	x1-7/8	x1-11/16	x1-9/16	x1-7/16	x1-5/16
FL200mm F4.5	Distance	5'0-7/16	4'6-11/16	3'1-9/16	3'6-15/16	3'3-3/8	3'1-7/16	2'11-3/4	2'10-1/2	2'9-1/2	2'8-3/4	2'8-3/16	2'7-5/8
	Magnification	0.18	0.20	0.26	0.31	0.36	0.41	0.46	0.51	0.56	0.61	0.67	0.73
	Field-of View	5-3/8	4-5/8	3-11/16	3-1/16	2-5/8	2-5/16	2-1/16	1-7/8	1-11/16	1-9/16	1-7/16	1-5/16
		x8-1/16	x6-15/16	x5-9/16	x4-5/8	x3-15/16	x3-7/16	x3-1/16	x2-3/4	x2-1/2	x2-5/16	x2-1/8	x1-15/16
FL200mm F3.5	Distance	5'1-1/4	4'7-3/8	3'0-1/8	3'7-7/16	3'4-3/16	3'1-7/8	3'0-1/8	2'10-13/16	2'9-13/16	2'9-1/16	2'8-1/2	2'7-15/16
	Magnification	0.18	0.20	0.25	0.30	0.36	0.41	0.46	0.51	0.56	0.61	0.66	0.72
	Field-of-View	5-3/8	4-5/8	3-3/4	3-1/8	2-11/16	2-5/16	2-1/16	1-7/8	1-11/16	1-9/16	1-7/16	1-5/16
		x8-1/16	x6-15/16	x5-9/16	x4-5/8	x3-15/16	x3-1/2	x3-1/8	x2-13/16	x2-9/16	x2-5/16	x2-1/8	x1-15/16

Data when lenses are attached onto Bellows FL in reversed direction using Macrophoto Coupler FL

(in feet)

Lens \ Bellows FL Scale		34.5 1-3/8	40 1-9/10	50 1-15/16	60 2-3/8	70 2-3/4	80 3-1/8	90 3-9/16	100 3-15/16	110 4-15/16	120 4-3/4	130 5-1/8	142.5 5-5/8
FL 35mm F 3.5	Distance Magnification Field-of-View	7-13/16 2.78 5/16 x1/2	8-1/16 2.93 5/16 x1/2	8-3/8 3.21 5/16 x7/16	8-3/4 3.50 1/4 x7/16	9-1/8 3.78 1/4 x3/8	9-7/16 4.06 1/4 x3/8	9-13/16 4.34 3/16 x5/16	10-3/16 4.62 3/16 x5/16	10-9/16 4.90 3/16 x5/16	10-15/16 5.18 3/16 x1/4	11-5/16 5.46 3/16 x1/4	11-13/16 5.83 3/16 x1/4
FL35mm F 2.5	Distance Magnification Field-of-View	8-1/8 2.95 5/16 x1/2	8-1/4 3.10 5/16 x7/16	8-11/16 3.39 1/4 x7/16	9-1/16 3.67 1/4 x3/8	9-3/8 3.95 1/4 x3/8	9-3/4 4.23 1/4 x5/16	10-1/8 4.51 3/16 x5/16	10-1/2 4.79 3/16 x5/16	10-7/8 5.08 3/16 x1/4	11-1/4 5.36 3/16 x1/4	11-5/8 5.64 3/16 x1/4	1'1/16 5.99 3/16 x1/4
FL50mm F3.5	Distance Magnification Field-of-View	8-13/16 1 74 9/16 x13/16	8-15/16 1.85 7/16 x3/4	9-1/4 2.04 7/16 x11/16	9-9/16 2.24 7/16 x5/8	9-7/8 2.43 3/8 x9/16	10-1/4 2.63 3/8 x9/16	10-9/16 2.82 5/16 x1/2	10-7/8 3.01 5/16 x1/2	11-1/4 3.21 5/16 x7/16	11-5/8 3.40 1/4 x7/16	11-15/16 3.59 1/4 x3/8	1-7/16 3.84 1/4 x3/8
FL50mm F1.8	Distance Magnification Field-of-View	8-7/16 1 77 9/16 x13/16	8-9/16 1.87 1/2 x3/4	8-7/8 2.07 7/16 x1/16	9-3/16 2.26 7/16 x5/8	9-1/2 2.45 3/8 x9/16	9-13/16 2.65 3/8 x9/16	10-3/16 2.84 5/16 x1/2	10-9/16 3.03 5/16 x7/16	10-7/8 3.23 5/16 x7/16	11-1/4 3.42 1/4 x7/16	11-5/8 3.62 1/4 x3/8	12-1/16 3.86 1/4 x3/8
FL50mm F1.4	Distance Magnification Field-of-View	8-7/16 2.01 1/2 x11/16	8-5/8 2.11 7/16 x11/16	8-15/16 2.31 7/16 x5/8	9-5/16 2.50 3/8 x9/16	9-5/8 2.69 3/8 x1/2	9-15/16 2.89 5/16 x1/2	10-5/16 3.03 5/16 x7/16	10-11/16 3.28 5/16 x7/16	11-1/6 3.47 1/4 x7/16	11-3/8 3.66 1/4 x3/8	11-3/4 3.86 1/4 x3/8	12-9/16 4.10 1/4 x3/8
FL55mm F1.2	Distance Magnification Field-of-View	8-11/16 1.82 1/2 x3/4	8-7/8 1.92 1/2 x3/4	9-3/16 2.11 7/16 x11/16	9-1/2 2.29 7/16 x5/8	9-13/16 2.47 3/8 x9/16	10-1/8 2.65 3/8 x9/16	10-1/2 2.83 5/16 x1/2	10-13/16 3.01 5/16 x7/16	11-3/16 3.20 5/16 x7/16	11-9/16 3.38 1/4 x7/16	11-7/8 3.56 1/4 x3/8	12-3/8 3.79 1/4 x3/8

(the helicoid of the Macrophoto Coupler is not extended at this time)

(in feet)

Lens \ Bellows FL Scale (mm)(ft)		34.5 1-3/8	40 1-9/16	50 1-15/16	60 2-3/8	70 2-3/4	80 3-1/8	90 3-9/16	100 3-15/16	110 4-15/16	120 4-3/4	130 5-1/8	142.5 5-5/8
FL58mm F1.2	Distance Magnification Field-of-View	8-15/16 1.59 5/8 x7/8	9-1/8 1.69 9/16 x13/16	9-3/8 1.86 1/2 x3/4	9-5/8 2.03 7/16 x11/16	9-15/16 2.20 7/16 x5/8	10-1/4 2.38 3/8 x5/8	10-9/16 2.55 3/8 x9/16	10-15/16 2.72 3/8 x1/2	11-5/16 2.89 5/16 x1/2	11-5/8 3.07 5/16 x7/16	11-15/16 3.24 5/16 x7/16	1'-7/16 3.45 1/4 x7/16
FL85mm 1.8	Distance Magnification Field-of-View	1'3-1/2 0.42 2-1/4 x3-3/8	1'2-11/16 0.49 1-15/16 x2-15/16	1 1-11/16 0.60 1-9/16 x2-3/8	1'1-1/4 0.72 1-5/16 x1-15/16	1'-15/16 0.84 1-1/8 x1-11/16	1-7/8 0.96 15/16 x1-1/2	1-7/8 1.08 7/8 x1-5/16	1-15/16 1.2 13/16 x1-3/16	1'1-1/8 1.32 11/16 x1-1/16	1'1-5/16 1.44 11/16 x15/16	1'1-1/2 1.56 5/8 x15/16	1'1-13/16 1 70 9/16 x13/16
FL100mm F 3.5	Distance Magnification Field-of-View	10'2-3/16 0.03 2-3/4 x3'5-3/16	4'4-1/8 0.09 10-9/16 x1'3-13/16	2'5-3/8 0.91 4-15/16 x7-1/2	1'10-5/8 0.29 3-1/4 x4-7/8	1'7-1/2 0.39 2-7/16 x3-5/8	1'5-13/16 0.49 1-15/16 x2-7/8	1'4-7/8 0.59 1-5/8 x2-3/8	1'4-5/16 0.69 1-3/8 x2-1/16	1'3-15/16 0.79 1-3/16 x1-13/16	1'313/16 0.89 1-1/16 x1-9/16	1'3-3/4 0.99 15/16 x17/16	1'3-13/16 1 12 7/8 x1-1/4
FL135mm F 2.5	Distance Magnification Field-of-View								18yd8-1/8 0.01 3yd 7-1/4 x3yd2'4-13/16	6'3-13/16 0.08 11-7/16 1'5-1/8	3'9-7/8 0.16 6-1/16 9-1/16	2'11-1/2 0.23 4-1/8 6-1/8	2'5-7/16 0.32 2-15/16 4-3/8
FL135mm F 2.5	Distance Magnification Field-of-View				18yd1'9-1/8 0.01 3yd1-3/16 x5yd5/16	6'5/8 0.08 11-1/4 x1'4-7/8	3'7-11/16 0.16 5-7/8 x8-7/8	2'9-5/8 0.24 4-1/16 x6-1/16	2'4-11/16 0.31 3-1/16 x4-1/2	2'1-13/16 0.39 2-7/16 x3-5/8	2-1/16 0.46 2-1/16 x3-1/16	1'8-13/16 0.54 1-3/4 x2-5/8	1'9-7/8 0.64 1-1/2 x2-1/4

Exposure calculation chart : Exposure factor and aperture conversion figures corresponding to photographic magnification (M)

M	Exposure factor	Aperture adjustment (F stop to be opened)		M	Exposure factor	Aperture adjustment (F stop to be opened)		M	Exposure factor	Aperture adjustment (F stop to be opened)	
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				

Figures obtained with the exposure meter can be compensated with the above chart.
The compensated shutter speed can be obtained by multiplying the shutter speed with the exposure factor.
M denotes magnification.

4 Actual Compensation

In macrophotography and close-up photography better photographs can be obtained with the aperture closed down as much as possible. Therefore, in exposure compensation, make adjustment with the shutter speed. The shutter speed to be compensated can be obtained by multiplying the exposure factor

For example, if you should obtain the figures F8, 1/8 sec. with the exposure meter when shooting the subject at life-size, you would calculate 1/8 sec. x4 = 1/2 sec. because the exposure factor is 4. Therefore, the correct exposure in this case would be F8, 1/2 sec.

Both the aperture stops and shutter speeds are indicated in multiple relation so that one graduation is 2X. Therefore, the same result as opening the aperture one stop can be obtained by slowing down the shutter speed one graduation.

5 Measuring Light with Canon Pellix

Consideration of the exposure factor is absolutely unnecessary when using the Canon Pellix because it is a TTL light measuring type camera.

However when the subject is to be shot under dark conditions or when the subject is black, set the aperture at maximum opening and make adjustments with the shutter dial. After that, convert the necessary aperture stop and shutter speed from the already set shutter speed and make resettings.

Exposure Ratio of Aperture Stops
(F2 is the standard)

Aperture Stops	1.2	1.4	1.8	2	2.8	3.5	4	5.6	8	11	16	22
Exposure Ratio	0.3	0.5	0.8	1	2	3	4	8	16	32	64	128

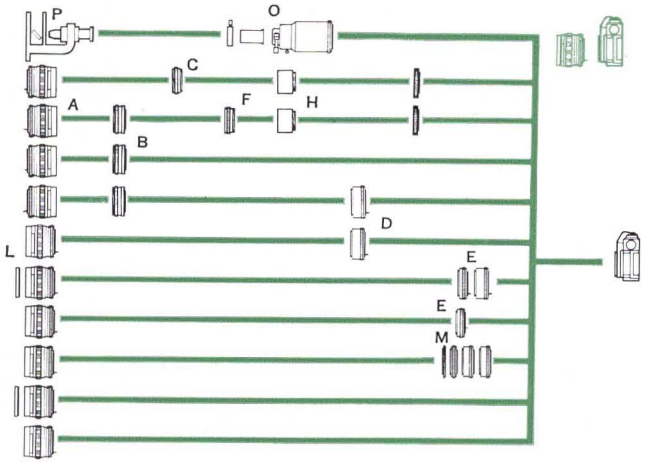
6 Simple Directions for Photography

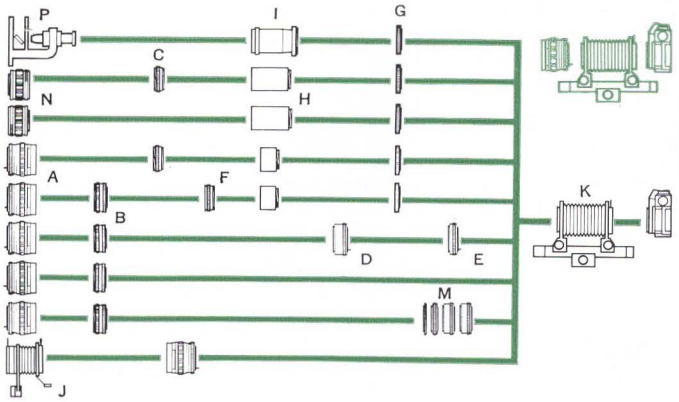
1. Refer to the chart, and from the column of the lens to be used,
- Decide the Photographic magnification.
- Decide the camera position according to the shooting distance.
- Read the bellows scale and protrude the lens.
- Perform precision focusing.
(In the case of 50mm lens, first set the focus and then immediately read the magnification from the bellows scale.)

2. Measure the exposure with the exposure meter
3. Read the exposure factor and adjustment degree from the exposure conversion chart.
- Adjust the aperture stop or the shutter speed.

Macrophotography may seem complicated, but by using the chart it is simpler than expected.
Please use it effectively.

Combinations and Uses of Close-up Accessories





A: FL Lens

B: Macrophoto Coupler FL

C: Macrophoto Coupler

D: Life-Size Adapter

E: Extension Tube FL

F: Mount Converter B

G: Mount Converter A

H: Extension Tube

I: Microphoto Hood

J: Slide Duplicator

K: Bellows FL

L: Close-up Lens

M: Extension Tube M

N: Screw-in Type Lens (Rangefinder type)

O: Photomicro Unit F

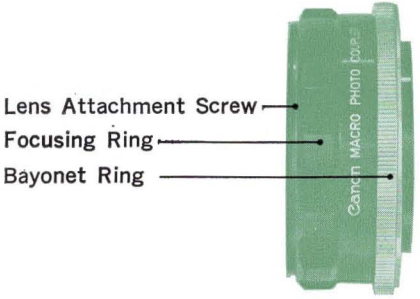
P: Microscope

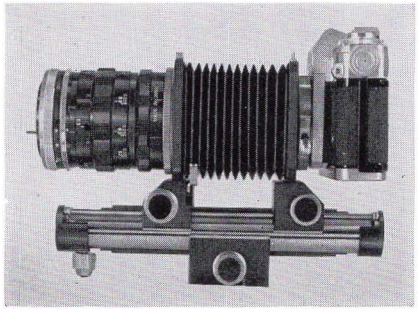
MACROPHOTO COUPLER FL 48mm
MACROPHOTO COUPLER FL 58mm

The macrophoto couplers are attachments for attaching lenses in a reversed direction when performing larger than life-size macrophotography. This attachment also comparatively maintains the lens performance in extreme close-up photography.

These couplers have the same bayonet rings as the FL lenses and can be mounted on such FL mounts as Bellows FL, FX and Pellix.

- Macrophoto Coupler FL 48mm is used in conjunction with lenses with a 48mm screw diameter such as the FL 50mm F1.8 lens.
- Macrophoto Coupler FL 58mm is used in conjunction with lenses with a 58mm screw diameter such as the FL50mm F1.4 lens and macro lens FL50mm F3.5.
- When attaching the couplers onto the lens, screw them onto the front part of the lens.



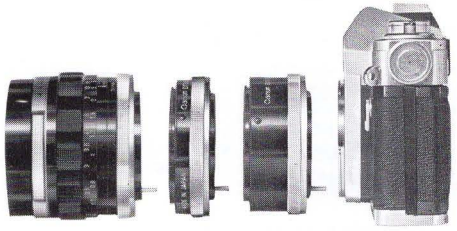


- When attaching the couplers onto the camera side, they are attached with the bayonet ring in the same manner as lenses.
- Attachments that can be used in conjunction with the couplers include: Bellows FL, Life-Size Adapter Lens Mount Converter B, Extension Tube FL, etc. Large magnification photography is possible with the use of these attachments.
- Focal adjustment is performed with the revolving helicoid which has an extension length of 13mm.
- The aperture is set manually because the lens is attached in reversed direction.
- Please refer to the magnification and conversion charts.
- Connect the Macrophoto Coupler onto the front part of the lens by using the filter screw
- The lens extension length for calculating the photographic magnification by adding the focal point adjustment extension volume to the length. (Refer to page 26)

CANON EXTENSION TUBES FL

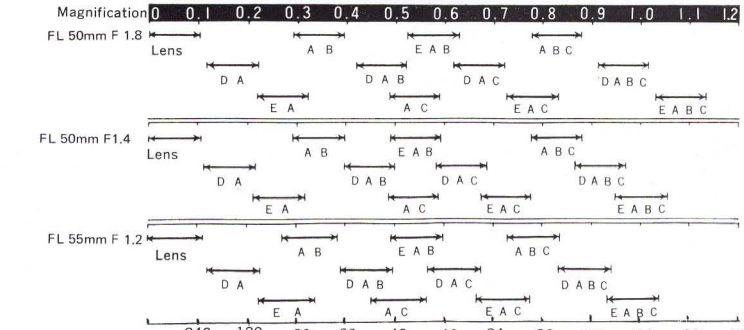
Canon Extension Tubes FL 15 and FL 25 are intermediate tubes which are coupled to the automatic diaphragm of FL lenses for close-up photography and have widths of 15mm and 25mm respectively By attaching them onto Canon FT QL, Canon Pellix QL, Canon FX, close-up photography can be performed with the automatic diaphragm just as in ordinary photography

When a combination of these two types of extension tubes and a close-up lens are attached to an FL standard lens, continuous close-up photography up to life size becomes possible. It is very advantageous for shooting close-ups of small flowers and tiny insects. The FL tubes can also be connected to bellows and other types of tubes used as an auxiliary for large-magnification macrophotography



A Lens
B FL 15
C FL 25
D Close-up Lens 450
E Close-up Lens 240

FL 50mm F 1.8 Lens+FL Tubes+Close-up Lens (240 & 450)



Picture Area (mm)	240 × 360	120 × 180	80 × 120	60 × 90	48 × 72	40 × 60	34 × 51	30 × 45	27 × 40	24 × 36	22 × 33	20 × 30
Exposure Factor	1.2	1.4	1.7	2	2.25	2.6	2.9	3.2	3.6	4	4.4	4.8
Aperture Adjustment Degree (opening volume)	1/4 Aperture	1/2	3/4	1	1-1/4	1-1/4	1-1/2	1-3/4	1-3/4	2	2	2-1/4

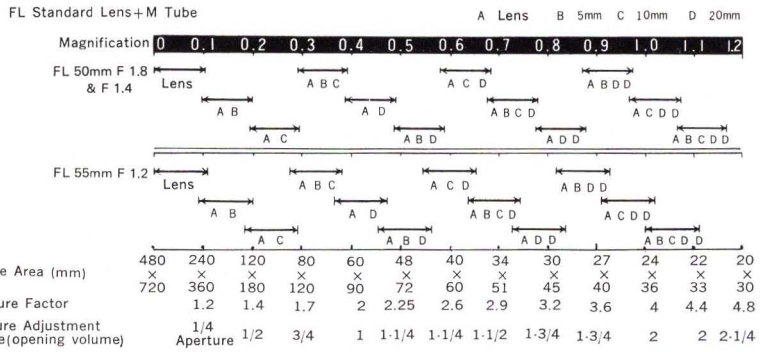
CANON EXTENSION TUBE M

Canon Extension Tube M is a simple intermediate tube that is connected in between a Canon SLR camera and FL or R lenses for close-up photography using a manually operated diaphragm. M tubes are available in three different widths of 5mm, 10mm and 20mm. One set of M tubes is composed of four M tubes which include one each of 5mm and 10mm tubes and two 20mm tubes.

According to various combinations the lengths can be changed every 5mm from 5mm up to 55mm. By connecting these extension tubes to standard FL or R lenses (focal lengths of 50mm and 58mm respectively) continuous close-up photography up to life size is possible. Furthermore, this photographic magnification can also be changed according to various combinations with a close-up lens.

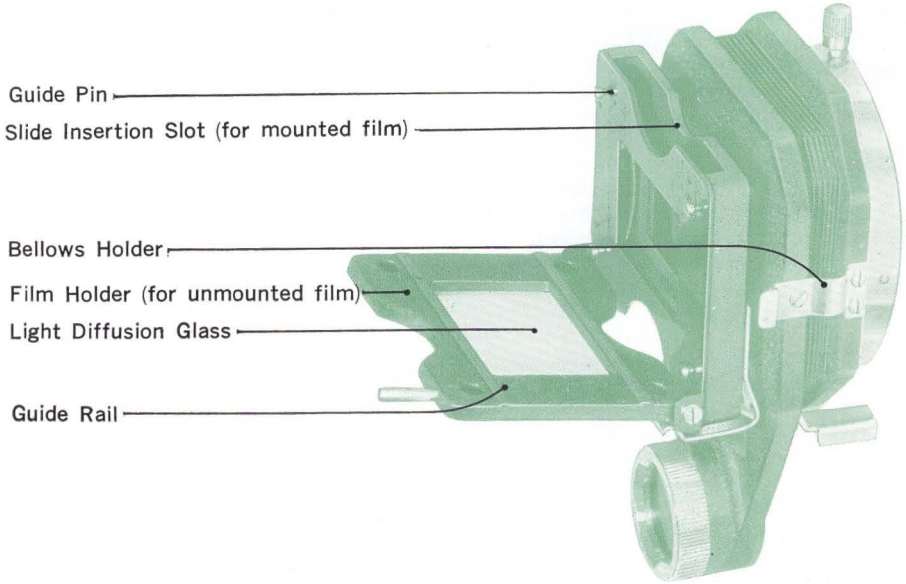
It is very advantageous for shooting insects and flowers outdoors.

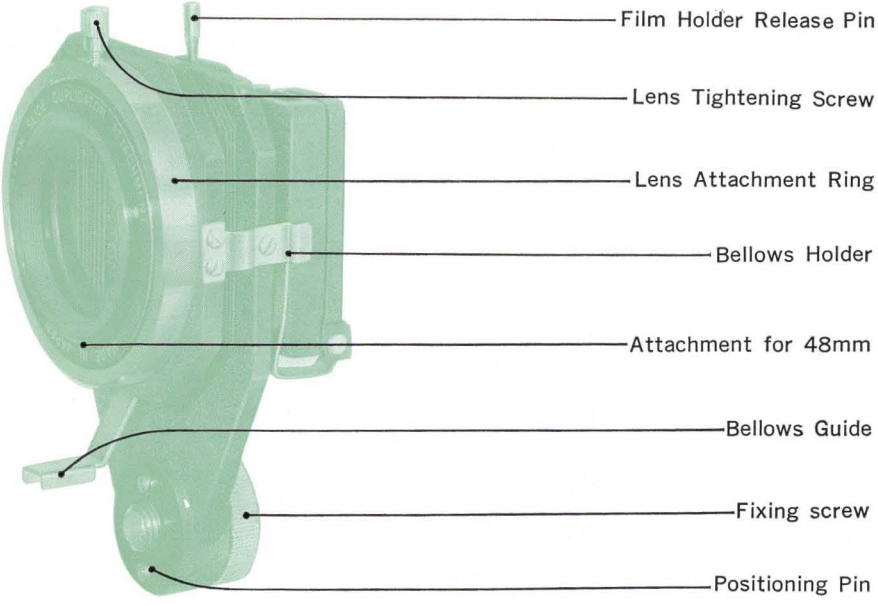
M tubes can also be connected to Bellows and Lens Mount Converters to be used as an auxiliary for even larger magnification macrophotography



CANON SLIDE DUPLICATOR

The Canon Slide Duplicator is an apparatus which is attached to the tip of Bellows FL and is used for duplicating color slides (or black and white slides) at approximately life size. This apparatus is convenient because both slides with or without mounts can be used.

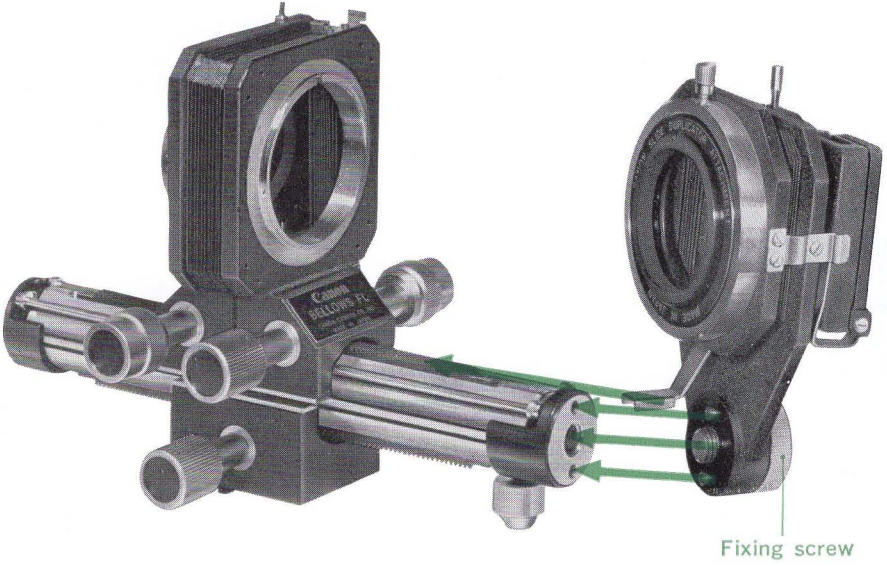




Lenses that can be used:

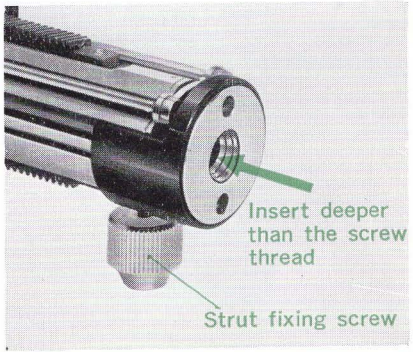
(1) FL 50mm F 1.4 and Macro FL 50mm F3.5 lenses.

(2) FL 50mm F1.8 can be connected to the duplicator with the use of an adapter

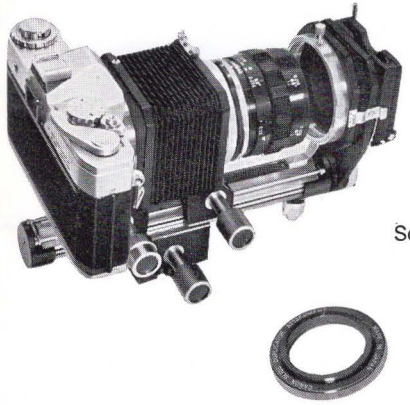


ATTACHING

1 Push the strut, at the tip of Bellows FL, deeper than the screw thread and tighten. Then align the parts shown in the diagram and securely fix them with the fixing screw.

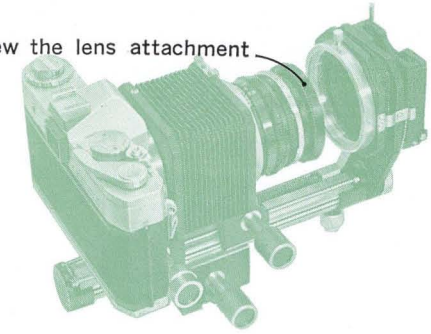


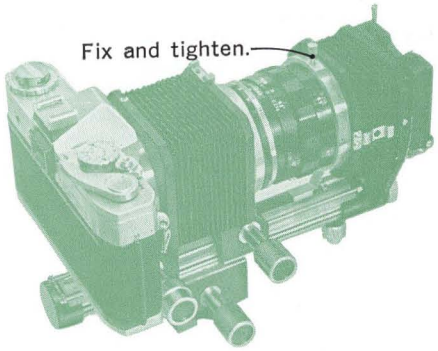
2 Attach the camera body and standard lens to Bellows FL.



3 Remove the bellows holder of the duplicator, stretch the bellows, attach the ring to the tip of the lens and fix into position with the tightening screw

In the case of FL 50mm F1.8, screw the attachment onto the tip and fix it to the attachment ring.





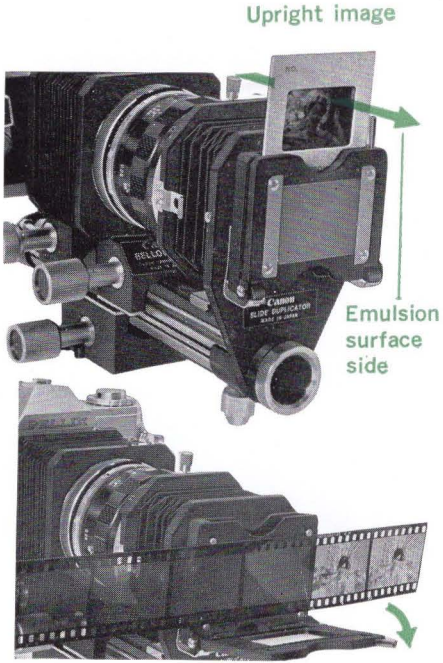
ADJUSTING OF BELLOWS

First, obtain the shooting distance from the chart according to the magnification desired and set the position of the body. Next, extend the lens by setting it to the magnification of the bellows scale.

INSERTING OF FILM

In the case of mounted film, insert the film into the slide insertion slot with the emulsion side facing the light diffusion glass and the image in an upright direction. Then look through the viewfinder and check to see whether the film has been correctly inserted. Also perform precision focusing.

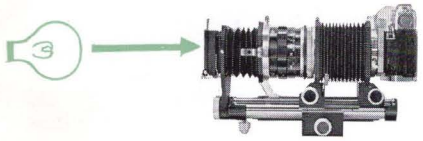
* When the slide has been inserted too deeply it can be pushed up from the bottom. Horizontal adjustment can also be made for approximately 2mm by inserting the forefinger and the thumb into the grooves on the top and bottom of the mount.



In the case of unmounted film, open the film holder set the film along the four guide pins, and close the holder The direction of the film is exactly the same as in the case of mounted film.

The function of the film holder is to apply uniform illumination. Therefore, be sure to close it when photographing. Always keep it clean in order to prevent unevenness of the picture.

ILLUMINATION AND LIGHT SOURCE



Illuminate by placing the light source on the side of the diffusion glass. When duplicating black and white film, such light sources as flood lamp, fluorescent lamp or natural daylight can be used. When duplicating color film, use the same film as its original or select the best light source for its film to get natural color reproduction

Light Source / Film Type	Flood Lamp	Natural Daylight Against Frosted glass	White Fluorescent
Daylight Type	Convert color temperature with CCB filter	◎	Compensate with CC filter
Tungsten Type	◎	Convert color temperature with CCA filter	Compensate with CC filter

◎ Can be used as light source as is.
CCB Color conversion filter B
CCA Color conversion filter A
CC Color compensating filter

When using the light source of white fluorescent lamp, refer to the 'Compensating Data'' issued by Kodak or Ansco.

※The combinations of tungsten type and flood lamp, and daylight type and white fluorescent lamp are best for good color reproduction.

※Color temperature conversion of tungsten type film is difficult and so the use of daylight type film is recommended.

※When using a color temperature conversion filter make the exposure compensation according to the filter factor besides compensation with photographic magnification.

※ Unevenness arises on the slide according to the temperature of the light source. Therefore, always keep the aperture smaller than F 5.6.
※ When using unmounted film be careful that strong light does not enter the slide insertion slot.

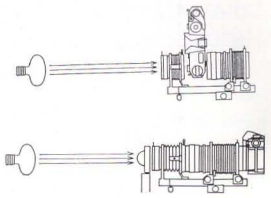
EXPOSURE

In slide duplication, the light passing through the film is photographed. Therefore, when measuring the exposure in the ordinary method, the figure obtained sometimes cannot be used as it is due to the density of the film. When using the Canon Slide Duplicator, the light measured with the Pellix is the most accurate and, moreover, there is no need for exposure factor compensation. In the case of FX or FP, the film surface is measured with an exclusive exposure meter and then compensated with the exposure factor In this way an accurate exposure is obtained.

1. Measuring the film surface.
Disconnect the duplicator and the lens, contract the bellows of the duplicator and set. When measuring, place the light receiving section of the FX or FP exposure meter as close as possible to the film surface. Compensate the obtained figure with the exposure factor. Using this method, the correct exposure corresponding to the density of the film can be obtained.

2. Ordinary measuring method.
The exposure is measured in front of the light diffusion glass, when using a light infiltrating type exposure meter, the light is measured by facing the meter toward the light source, and this figure is compensated with the exposure factor
When using a reflecting type exposure meter, the reflecting light of the standard reflector plate is measured at the same position. The aperture is then farther, opened by 0.5~1 stop, and this figure is compensated with the exposure factor In either case, experience and sixth sense is necessary regarding the density of the film.

3. Exposure factor compensation.
Please use the following chart.



Classification / Lens	Bellows FL Scale	50	60	70	80	90
Shooting Distance (mm)	FL 50mm F 3.5	208	209	213	218	224
	FL 50mm F 1.8	197	198	202	207	217
	FL 50mm F 1.4	189	190	194	199	206
	(FL 55mm F 1.2)	(201)	(201)	(204)	(209)	(214)
Magnification		0.97 (0.91)	1.16 (1.09)	1.36 (1.27)	1.55 (1.46)	1.74 (1.64)
Exposure Factor		3.9 (3.6)	4.7 (4.3)	5.6 (5.1)	6.5 (6.0)	7.5 (7)
Aperture Adjustment (degree of opening)		2 stops (1-3/4)	2-1/4 (2)	2-1/2 (2-1/4)	2-3/4 (2-1/2)	3 (2-3/4)

Figures inside parentheses are for 55mm F1.2 use.
Keep the distance scale of the lens set at infinity.

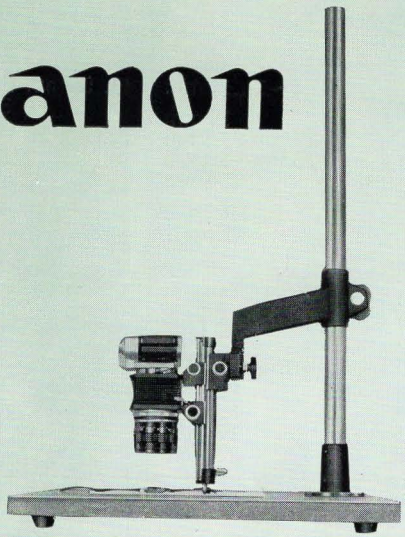
PRECAUTIONS

- When the percentage of magnification becomes large, the slightest movement will blur the duplicated film. Always use a cable release when shooting.
- Automatic aperture does not couple with lenses for Canonflex. In this case also, attach after pushing down the charge lever
- The camera cannot be changed to a vertical position because this Canon Slide Duplicator has a coupled diaphragm mechanism.
- In the case of macrophotography set the distance ring of the lens at infinity.
- In macrophotography cornering off partially appears in the viewfinder but this will not affect the photographed image.
- In close-up photography and macrophotography the use of incident ray type exposure meter is recommended.

Chart for calculating photographic magnification

LENS PROTRUSION LENGTHS FOR VARIOUS ATTACHMENTS			Lengths of protrusion when the FL lens is in reversed direction
Bellows FL		34.5~142.5mm	FL 50mm F 3.5 35.45mm
Extension Tube FL15		15mm	
Macrophoto Coupler FL	48mm	24mm+13mm	FL 50mm F 1.8 32.62mm
	58mm	20mm+13mm	
Mount Converter A		2.8mm	FL 50mm F 1.4 49.02mm
Mount Converter B		13.2mm	
Extension Tube	6mm	6mm	FL 55mm F 1.2 45.76mm
	9mm	9mm	
	12mm	12mm	
	25mm	25mm	
	50mm	50mm	
	75mm	75mm	
	100mm	100mm	
	150mm	150mm	
	170mm	170mm	
	200mm	200mm	

Canon



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