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Canon

INTERCHANGEABLE LENSES

FD

INSTRUCTIONS

English Edition

Canon Interchangeable Lenses FD System

The Canon F-1 has adopted the full aperture metering system which boasts an accuracy equal to, if not better than, the stopped-down metering system employed in the Canon FT. It incorporates a transmitting mechanism for aperture signals in the lens and camera body. In order to expand the F-1 system, Canon's Optical Department, making full use of electronic computers, developed a series of high performance interchangeable lenses of the highest quality. The newly designed lenses boast high quality and preeminent performance and are clearly classified. The FD series of lenses also include special lenses. In the wide-angle lens series, lenses for every 10 degrees in angle of view were produced, while on the telephoto side, lenses for every 100mm in focal length were provided to greatly strengthen the photographic range. Besides these, aspherical lenses, fluorite lenses, and fish-eye lenses were developed. Furthermore, the use of multilayer antireflection optical coatings and the adoption of Canon's unique focusing mechanism have contributed to the strengthening of the series of FD lenses. This new group of lenses can be used not only for the Canon F-1 but also for the Canon FT and Pellix models.

FD Lens and Mount

The mount for FD lenses is that which was first marketed in 1959 for the Canonflex. Its easy-to-attach features, interchangeability with each lens, and its durability satisfy all requirements. The following are its features:

1. Interchangeability

Not only the FD series of lenses but also the FL and R lens groups and all accessories can be mounted on this mount.

2. Speedy Changing

Changing time is much less than the screw-in or bayonet mount types. For example, this mount can be changed in one-third the time required for changing a screw-in type mount. Changing operations are very easy even when interchanging large aperture or telephoto lenses.

3. Durability

Durability is guaranteed because brass is used on both the lens and camera body sides. The mount has superior corrosion-proof and abrasion-proof qualities because hard chrome plating is applied over nickel plating. The standard surface of the mount, which affects focusing, is just closely attached without a rubbing motion to prevent scratches.

FD Lenses: Full aperture metering. Coupled to automatic aperture.

FL Lenses: Stopped-down metering. Coupled to automatic aperture.

R Lenses: Stopped-down metering. Manually operated aperture.

▪ FD lenses are used on Canon FT, Pellix and FX cameras for stopped-down metering coupled to automatic aperture, and used with manually operated aperture when attached to R series of camera bodies.

Effects of Interchanging Lenses

1. Change in Angle of View and Perspective

Photographic differences according to different kinds of lenses used, is mostly due to the differences in focal lengths. Generally, this is understood as changes in angle of view or differences in perspective.

When the focal length of a lens becomes longer the image becomes larger. Since the size of the film is fixed, this is indicated by angle, and we say that an angle of view range of so many angles is photographed.

Just as it is when a subject is seen with the naked eye, the closer the lens gets to the subject, the larger becomes the photographed

28 mm　　50 mm　　200 mm

result, and distant subjects are photographed in small sizes. Therefore, changes in angle of view are compared by pictures taken of the same subject from the same position.

When photographing from the same position, as in the case of changes in angle of view, there is no difference in perspective between a wide-angle and telephoto lens. However, if the photographing distance is changed, the perspective changes even when using the same lens. In this case, however, since the angle of view of the lens is the same, the necessary subject is sometimes cut off or the degree of the blurred background changes. (When this difference in perspective by photographic distance is substituted by a lens of a different focal length, it is called perspective.)

In the case of perspective, the size of the main subject is fixed. Then this same subject

28 mm 50 mm 200 mm

is photographed using different lenses and by changing the photographing distance so that the size of the subject remains the same. In this way it is possible to express the different distances between the main subject and the background.

This distance is exaggerated when a wide-angle lens is used and subdued when a telephoto lens is used.

2. Depth of Field

The blurred range changes when the focal length of a lens changes. The focusing range becomes smaller as the focal length becomes longer. The focusing range also changes when the lens speed changes. Therefore, the various lenses should be used after understanding the characteristic of lenses such as the size of the subject, perspective, degree of blurring, and lens speed.

Classification of Lenses

The angle of view of lenses changes according to focal lengths. In the case of 35mm cameras, the standard focal length is set at 50mm. Lenses with a shorter focal length are called wide-angle and those with a focal length longer than 50mm are called telephoto.

Wide-Angle Lenses

A wide angle range is photographed when using this type of lens. Because lenses in this category have a deep depth of field, they are suited for taking snapshots, in taking photographs where there is no room to back up, for photographing large groups of people, and for taking pictures of buildings. A wide-angle lens has the characteristic of exaggerating the perspective, but this can be used to advantage for taking pictures with a different effect.

The most commonly used wide-angle lens is the 35mm lens. Recently, however, the development of super-wide-angle lenses has become extensive, thereby rapidly expanding range of photography.

(In the case of lenses for single-lens reflex cameras, the optical system is protruding forwards, when compared with the focal distance, because the optical back focal distance is long. For this reason, these lenses are called retrofocus type lenses.)

Standard Lenses

These lenses have a focal length of 50mm and have the widest applicable range. They are widely used not only for snapshots of scenery and people, but also to advantage in snapshots of night scenes due to their increasingly larger apertures. They are all-round lenses which also prove their high performance in close-up photography and copy work.

Telephoto Lenses

Lenses in this category have narrow angle of view in contrast to wide-angle lenses, but they have the feature of clearly delineating distant scenes. Therefore, they are advantageous for photographing difficult-to-approach subjects, mountains, sporting events, and news events. Telephoto lenses are also widely used for portraiture and commercial photography because of their natural perspective. Generally, those lenses with focal lengths of 300mm or longer are called "long-telephoto".

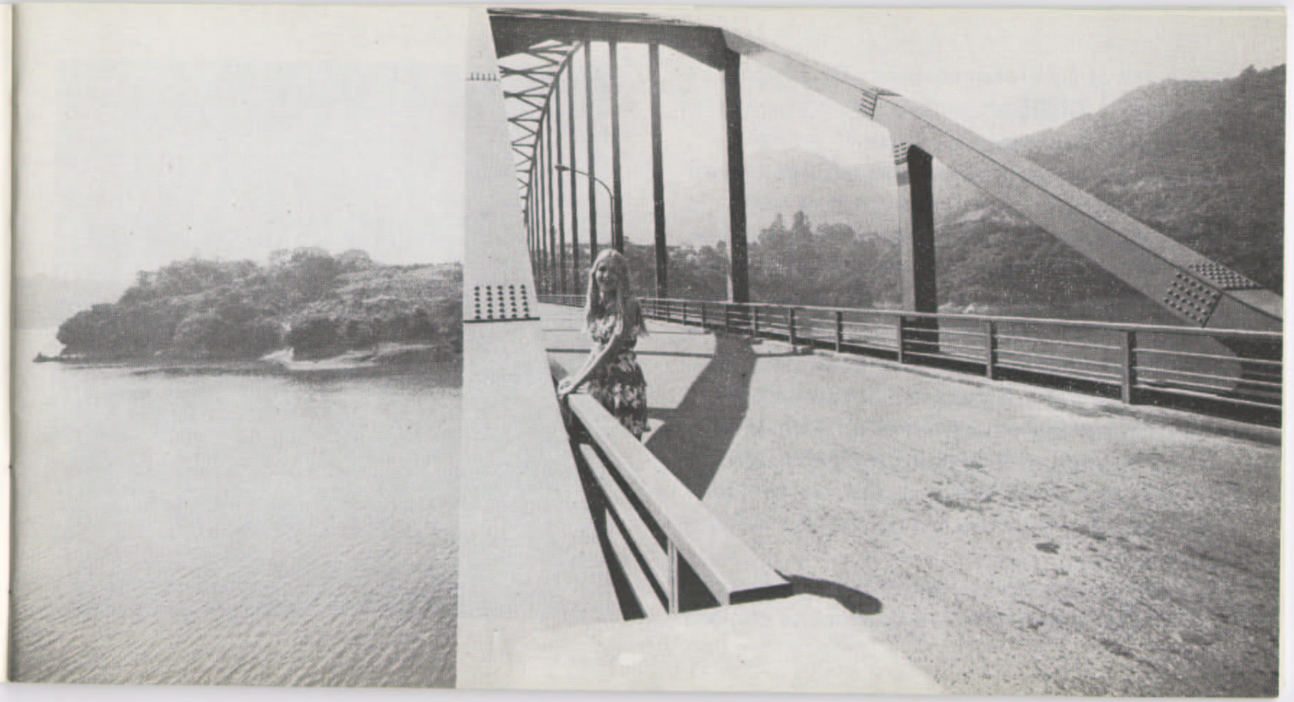
▪ "Telephoto lens" is the name for those type of lenses, among long focal point lenses, in which the length of the lens is shorter than the focal length. Generally, however, no distinction is made.

Zoom Lenses

Zoom lenses are very convenient because a single zoom lens can be used instead of many interchangeable lenses by just changing its focal lengths.

Special Lenses

Fish-eye lenses and macro lenses which are used for special kinds of photography are included in this category.



Uses of Lenses

Changing Lenses

1. Be sure to unlock the stopped-down functioning lever lock. If the lever is pressed or is locked, the red dot appears inside the camera mount. The automatic/manual aperture lever, at the back end of the lens, cannot be connected to the coupling part on the camera body and the pre-set aperture will not function.
2. Remove the lens from the camera body by turning the bayonet ring of the lens to the left until the red dot on the lens coincides with the red dot on the camera mount.
3. Mount the lens by matching the red dot of the lens to the red dot on the camera

mount. Turn the bayonet ring to the right and fasten. Before mounting, turn the bayonet ring of the lens sufficiently to the left and align the red dot and guide lever of the lens.

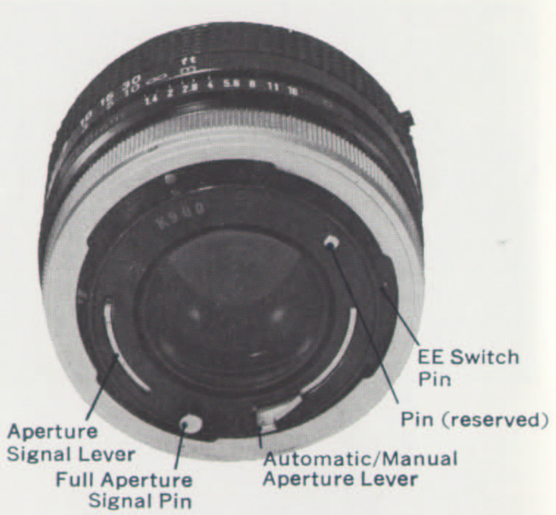
- Attach the lens quickly in the shade. The film will sometimes become foggy if the lens is left unattached.
- Whenever a lens is removed, be sure to put on the dust cap to protect the various signal levers and pins.
- When not in use for a long time, protect the mirror with a flange cap.

Lens Signals

1. Automatic/Manual Aperture Lever

This lever stops down the aperture to the pre-set position, and is of the same construction as that for the FL lenses. On all cameras after the Canon FX model, fully automatic aperture is performed with power drive from the camera side. This lever is clamped when turned counterclockwise, and can be attached to R series cameras and used with manually operated aperture.

Note: Manually operated aperture is not necessary in the case of FT and Pellix cameras because stop-down can be performed with the metering lever. However, in the case of FX and R cameras, manually operated aperture is used in close-up photography and macro-photography when an accessory is used in



between the camera body and the lens and the automatic aperture lever is no longer coupled.

2. Aperture Signal Lever

This signal transmits the pre-set f/stop to the F-1 camera body. Power drive for the match needle for full aperture metering is operated by turning the pre-set aperture ring. It performs 1 to 1 movement with the pre-set aperture ring. On the other hand, when performing Servo EE photography, the pre-set aperture position is decided on the camera side by power drive on the Servo EE Finder side.

3. Full Aperture Signal Pin

This signal transmits the full opening f/stop of the lens. This pin is used for correcting the error of full aperture metering of the F-1 camera.

4. EE Switch Pin

This pin emits a signal when the pre-set aperture ring is set at the green mark for EE use. When the lens aperture is set at this green mark, the lens can be attached only to the Canon F-1. If the lens is attached to the cameras other than the F-1, it cannot be set at the green mark.

5. Spare Signal Pin

- When the lens being taken off, the signal levers and pins will not move even if the aperture signal lever is moved.
- Lens bubbles decrease the speed of the lens by 1/100th or 1/1000th per cent, but at this rate it does not affect photography at all. It also will not affect the clearness and sharpness of the image.

Aperture Operations

Automatic Aperture

In the case of FD lenses, the field of view through the viewfinder can always be observed at full aperture opening, even after the aperture ring has been set at given f/stop. The aperture is stopped down to the f/stop selected by the aperture ring only for an instant when the shutter is released. Immediately after the shutter has been released, the aperture again returns to full opening and a bright field of view.

Manually Operated Aperture

The manually operated aperture is used for observing what the focusing condition are actually like when the aperture stops down, and for special photography such as close-up and macrophotography.

An FD lens has only one aperture ring. However, when it is mounted on an F-1 or FT, the diaphragm blades can be opened or closed by turning the aperture ring, after the stopped down metering lever on the front side of the camera body is pressed down and locked.
When an accessory, such as an M tube with no aperture coupling pin, is to be inserted in between the lens and camera body for photography, turn the automatic aperture lever of the lens to its opposite side position and lock it before attaching the accessory. If this is performed, the diaphragm blades can be opened or closed by turning the aperture ring, that is, by manual operation. Push the lever towards its original position for releasing it.
Proper exposures can be obtained by stopped down metering operations when using the manually operated aperture.

Lens Aperture

Set the necessary f/stop at the index mark by turning the pre-set aperture ring. Exposure volume and field-of-view adjustments are performed by this operation. In the case of F-1, proper exposures can be easily obtained by the TTL meter.

The aperture becomes darker as its f/stop gets larger. With each graduation increase, the exposure volume decreases by one-half. When the aperture is stopped down by one graduation, the exposure time must be extended by two times. And when the aperture is stopped down by two graduations, the exposure time must be extended by four times. Intermediate positions between graduations on the aperture scale can be used. FD lenses have click stops at intermediate positions between graduations on the aperture ring scale to facilitate operations. Some lenses have no relation to the one-half decrease in exposure volume between the maximum f/stop and the next f/stop. The ratio between the f/stops and exposure volumes, with f/2 as the standard, are as follows:

f/stops	1.2	1.4	1.8	2	2.5	2.8	3.5	4	5.6	8	11	16	22
exposure ratio:	3	2	1.25	1		1/2	1/3	1/4	1/8	1/16	1/32	1/64	1/128

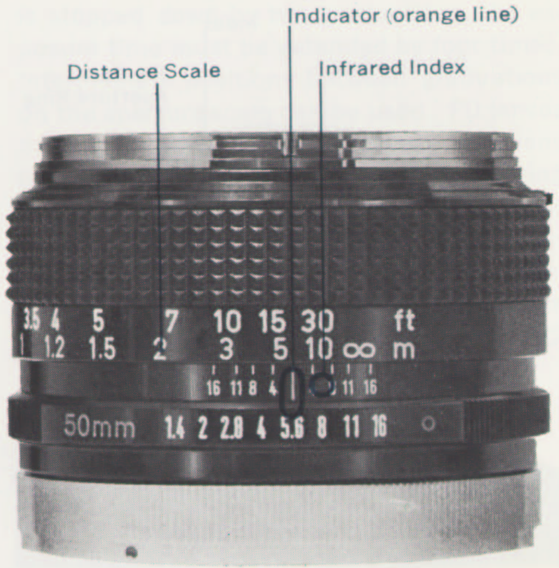
Distance Scale

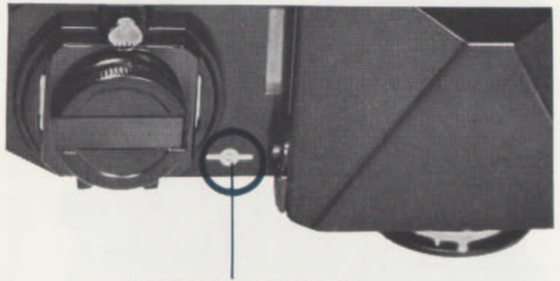
The distance scale indicates the distance between the focused subject and the film plane. The scale is necessary for checking the depth-of-field, for flash and infrared photographies.

▪ The correct position of the scale is in the center of each value. For example, the correct position of a two-digit value is the center of the two figures.

Infrared Index " · "

For infrared photography, correction of the distance scale is necessary because the focal point slightly deviates from ordinary photography. Focus first in the ordinary manner, then adjust that distance scale to the infrared mark " · " in red. For instance, if the distance





scale reads 10m after focusing, merely shift the 10 scale to " · " position. The position of " · " on the F-1 is based on using film with the highest wave-length sensitivity figure of 800mμ, such as Kodak IR 135 film and Wratten 87 filter.

Film Plane Indicator

In case the focusing is done by actual measurement, measure the distance from the film plane indicator and interpret the measured distance on the distance scale.

Depth-of-Field Scale

The depth-of-field scale indicates the range of subjects which will be in focus sharply on the film. This range will vary with the following factors: The depth-of-field will be deeper the smaller the f/stop, the further the distance of the subject, and/or the shorter the lens focal length. The depth-of-field will be shallower the larger the f/stop, the nearer the distance of the subject, and/or the longer the lens focal length. For example, if the lens used is 50mm and the subject has been focused at a distance of 3m (10′), with an f/8 value read off from both indexes on either side of the indicator (orange line), the depth-of-field is from approximately 2.3m (8′) to 4.3m (14′).

50mm Lens f/8
Depth-of-field 2.3-4.3m (8′-14′)
Focused at 3m (10′)

50mm Lens f/16
Depth-of-field 1.9-7.6m (6′-25′)
Focused at 3m (10′)

If the aperture is closed down to f/16, the picture will become sharp between 1.9m (6′) to 7.6m (25′) from the camera. This range will vary with the f/stop selected.

- In the case of Canon FD lenses, you can see the actual sharpness through the viewfinder by pressing the stopped-down functioning lever.
- Although air bubbles may sometimes be seen in a lens, they do not affect the resolution power or the sharpness of the picture.

FD Lens Mount (FL and R Series Lenses)

All Canon FD and FL lenses which have the FD and FL mounts can be used with the Canon F-1, except the FLP 38mm F2.8.

- It is also possible to attach and use all the R lenses for Canonflex use. However, as the pre-set aperture mechanism differs, pictures must be taken by controlling the aperture manually.

Distance Signal Pin for Flash Coupling Adaptor

The distance signal pin is for automatic flash when using Canon Speedlite 133D. It is attached on the three lenses of Canon FD 50mm F1.4, FD 50mm F1.8 and FD 35mm F2. When the flash coupling adaptor is attached, it transmits the revolving degree of the focusing ring, in otherwords, the photographing distance to the meter.

Therefore, the exposure can be decided inside the viewfinder, without the guide number calculations, according to the match-needle system by turning aperture ring.

Function of Canon F-1 and FD Lenses

Canon Lens Fish Eye 7.5mm F 5.6

It is a retrofocus fish-eye lens with an equal distance shooting system that covers an angle-of-view of 180 degrees. The size of the lens is the same as ordinary lenses and boasts high performance and superior operational characteristics. It has an 8-component, 11-element construction and 6 built-in filters.

Canon Lens TS 35mm F 2.8 AL

A special lens for strengthening the F-1 system in which shift and tilt are simultaneously possible. With this lens, perspective correction can be made by shifting, the unique function of controlling the depth-of-field by tilting the lens. An AL lens is used to eliminate flare for positively raising the lens performance.

Macro Canon Lens FL 50mm F 3.5 (With Lifesize Adapter)

Macro Canon Lens FL50mm F3.5 is an extremely versatile lens with high resolution power. It can be used in any situation from general to ultra close-up photograph ···used as a regular camera lens and also used for special situation photography such as photo copying or for life-size or greater than life-size images of minute subjects. Made lightweight—for easy handling.

Standard Lenses

Canon Lens FD 50mm F 1.8

After several improvements of reputed Canon FL 50mm F 1.8 lens, its image plane is highly regarded for its excellency. Especially, it not only has superior angle-of-view from midway to the outer edges, but It is an all-round lens with stabilized delineation power even during close-up photography.

Canon Lens FD 50mm F 1.4

This lens uses the optical system of the world-renowned FL 50mm F1.4 standard lens. Its high resolving power and high contrast delineation power are outstanding.

Canon Lens FD 55mm F 1.2

This lens uses the optical system of the FL 55mm F1.2 standard lens. It is more advanced than the 50mm F1.4, and boasts the fastest speed among the series of FD lenses. Despite its large aperture, it is highly reputed for its high contrast and resolving power at full aperture opening.

Canon Lens FD 55mm F 1.2 AL

A perfect standard lens adopting an aspherical surface. With the adoption of an aspherical surface, flare elimination is extremely high despite the large aperture of F 1.2, and good contrast pictures are available even at full aperture opening during night photograph. A stabilized image is obtainable at all distances.

Telephoto Lenses

Canon Lens FD 100mm F 2.8

This is a fast 100mm lens that inherits the high performances of Canon FL 100mm F 3.5 lens. Its telephoto ratio is very small, and its overall length is 57mm, which is the size of standard lenses. The various aberration corrections are almost perfect to offer preeminent image-forming capabilities.

Canon Lens FD 135mm F 3.5

3-component, 4-element construction.
This is a high performance, small size, lightweight 135mm popular type lens. It is designed for telephotography for taking sports pictures, portraitures and mountain scenes.

Canon Lens FD 135mm F 2.5

This lens was made as a result of improving the optical system of the FL 135mm F2.5 lens. It possesses the fastest f/stop among the FD telephoto lenses. The telephoto ratio of this lens is a short 0.98. Flare correction is perfect because the secondary spectrum of the chromatic aberration on the axis was greatly reduced.

Canon Lens FD 300mm F 5.6

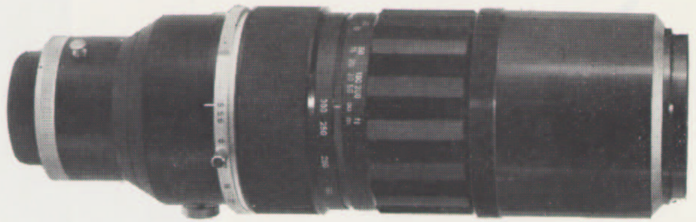
This lens is an improved version of the FL 200mm F3.5 lens. Its overall length is very short, having a telephoto ratio of only 0.86. Its chromatic aberrations, especially its secondary aberration fluctuations, have been optically solved for obtaining high contrast and uniform quality images.

Canon Lens FD 200mm F 4

This lens was developed for the purpose of turning a long focal length lens of 300mm into a high performance, compact lens which would be most convenient and advantageous for telephotography. The telephoto ratio of this lens was shortened to 0.72 without use of special material. With a tripod attachment holder and a built-in lens hood.

Zoom Lenses

Canon Zoom Lens FD 100-200mm F 5.6



Canon Zoom Lens FL 85–300mm F 5

5-component, 8-element construction (with built-in hood). An all-round zoom lens for photographing scenery and taking snapshots. The magnification of this lens is changed by just pulling out the lens, according to the optical correction system, making it very convenient for taking snapshots.

Canon FL 400mm F 5.6

Canon FL 600mm F 5.6

Canon FL 800mm F 8

Canon FL 1200mm F 11

Lens Cases

Table of Interchangeable Lenses FD for Canon F-1 and Other Canon SLR Cameras

Lens	Type	Angle of View	Aperture System	Manually Operated Aperture	Lens Construction	Minimum Aperture
Fish Eye 7.5mm F5.6	Special	180°	Manual	—	8-11	22
FD 17mm F4	Super-wide-angle	104°	Automatic	Possible	9-11	22
FD 24mm F2.8	Super-wide-angle	83°	Automatic	Possible	8-9	16
FD 28mm F3.5	Super-wide-angle	75°	Automatic	Possible	7-7	16
FD 35mm F3.5	wide-angle	64°	Automatic	Possible	6-6	16
TS 35mm F2.8AL	(Tilt Shift)	62.6°/(79° Shift)	Manual	—	8-10	22
*FD 35mm F2	Wide-angle	62°	Automatic	Possible	8-9	16
FLM 50mm F3.5	Macro	46°	Automatic	Possible	3-4	22
*FD 50mm F1.8	Standard	46°	Automatic	Possible	4-6	16
*FD 50mm F1.4	Standard	45°	Automatic	Possible	6-7	16
FD 55mm F1.2	Standard	43°	Automatic	Possible	5-7	16
FD 55mm F1.2AL	Standard	44°	Automatic	Possible	6-8	16
FD 85mm F1.8	Long focus	29°	Automatic	Possible	4-6	16
FD 100mm F2.8	Telephoto	24°	Automatic	Possible	5-5	22
FD 135mm F3.5	Telephoto	18°	Automatic	Possible	3-4	22
FD 135mm F2.5	Telephoto	18°	Automatic	Possible	5-6	22
FD 200mm F4	Telephoto	12°	Automatic	Possible	5-6	22
FD 300mm F5.6	Long-telephoto	8.3°	Automatic	Possible	5-6	22
FD 55-135mm F3.5	Zoom	43-18°	Automatic	Possible	11-15	22
FD 100-200mm F5.6	Zoom	24-12°	Automatic	Possible	5-8	22
FL 85-300mm F5	Zoom	29-8°	Automatic	Possible	9-15	22
**FL 400mm F5.6	Long-telephoto	6.2°	Automatic	Possible	5-7	32
**FL 600mm F5.6	Long-telephoto	4.1°	Automatic	Possible	4-5	32
**FL 800mm F8	Long-telephoto	3.1°	Automatic	Possible	5-7	32
**FL 1200mm F11	Long-telephoto	2.1°	Manual	—	4-6	64

*Equipped with a coupling pin to Canon Automatic Tuning System.

**Front component interchangeable type. Focusing adapter (1-component, 2-element, FL automatic diaphragm, with A-M ring). Filter is of insertion type with holder.

Number of elements in chart are totals.

Distance Scale		Attachment		Hood	Coating	Case	Length (mm)	Weight (g)	lbs.-oz.
In meter	In feet	Filter	Cap						
—	—	Built-in	Exclusive	—	Super Spectra	Exclusive	67.8	380	13⅜
∞3- 0.25	∞10- 0.9	72	75	—	Spectra	I	56	490	1-1¼
3- 0.3	10- 1	55	C-55	BW-55B	Spectra	C	52.5	410	1-½
3- 0.4	10- 1.5	55	C-55	BW-55B	Spectra	C	43.0	290	8¼
3- 0.4	10- 1.5	55	C-55	BW-55A	Spectra	C	49.0	325	11⅜
3- 0.3	10- 1	58	C-58	Exclusive	Spectra	Exclusive	72	—	—
3- 0.3	10- 1	55	C-55	BW-55A	Spectra	C	60	420	13⅜
—	—	—	—	—	Spectra	—	—	—	—
5- 0.234	20- 9.2	—	—	—	Spectra	—	—	—	—
10- 0.6	30- 2	55	C-55	BS-55	Spectra	C	44.5	305	10⅞
10- 0.45	30- 1.5	55	C-55	BS-55	Spectra	C	49	370	14
10- 0.6	30- 2	58	C-58	BS-58	Super Spectra	I	52.5	565	1-3¾
10- 0.6	30- 2	58	C-58	BS-58	Super Spectra	I	55	605	1-6⅛
10- 0.6	30- 2	—	—	—	Spectra	—	—	—	—
20- 1	60- 3.5	—	—	—	Spectra	—	—	—	—
10- 1	30- 3.5	55	C-55	BT-55	Spectra	D	57.0	430	1-½
30- 1.5	100- 5	55	C-55	BT-55	Spectra	E	83.0	480	1-4⅜
30- 1.5	100- 5	58	C-58	Built-in	Spectra	E	91	670	1-8
30- 2.5	100- 8	55	C-55	Built-in	Spectra	J	133	725	1-9¾
50- 4	200-13	58	C-58	Built-in	Spectra	Exclusive	173	1155	2-10
30- 2	100- 6	58	C-58	BS-58	Spectra	—	—	—	—
30 -2.5	100- 8	55	C-55	Built-in	Spectra	Exclusive	173.0	820	2-13
50- 4	100-12	72	75	Built-in	Spectra	Exclusive	273.5	1840	4-1
30- 4.5	—	48	82	Exclusive 82	Spectra	Exclusive	338	—	—
50-10	—	48	114	Built-in	Spectra	Exclusive	448	—	—
50-17	—	48	114	Built-in	Spectra	Exclusive	508	—	—
-37	—	48	114	Built-in	Spectra	Exclusive	748	—	—

Accessories

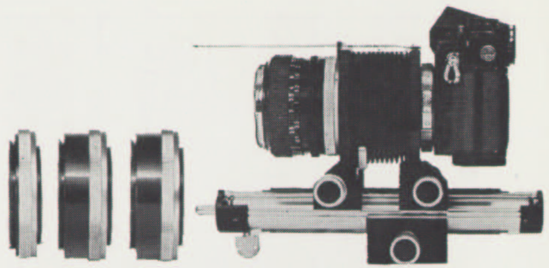
▪ Canon Bellows FL

A high grade bellows with an automatic aperture coupling mechanism. It is used for macrophotography, from life-size to three times magnification, with the use of a standard lens. A slide duplicating apparatus can be attached to this bellows.

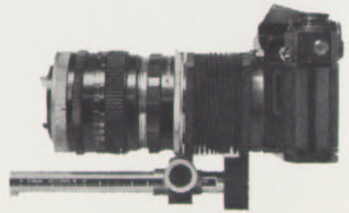
▪ Canon Extension Tubes M

Canon Extension Tubes M make possible easy close-up photography. The M are of the manually operated series.

▪ Canon Bellows M



Canon Bellows FL



Canon Bellows M

▪ Canon Camera Holder F

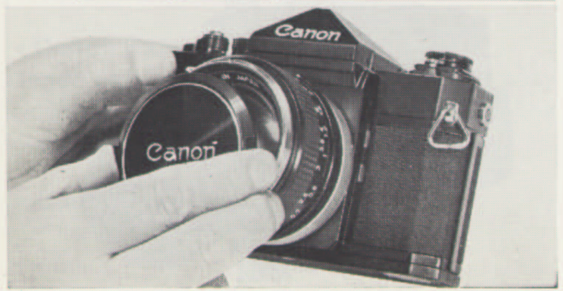
The use of Camera Holder F is recommended for telephotography and slow speed photography. It holds the camera in a stable, center of gravity position, and changing the camera to a horizontal or vertical position can be easily performed. The use of a cable release, at this time, is effective.

▪ Canon Cable Release

Cable releases of three different lengths are available.

▪ Close-Up Lenses (Screw-in Type 48mm, 55mm and 58mm)

Screw diameters for all lenses available. Classified into two kinds of 450 and 240 according to close-up distance.



▪ Lens Hood

Always use a lens hood when photographing. It is especially effective when photographing against the light.

With the exception of built-in hoods, all hoods are of the bayonet type. They are attached to the front of the lens by turning clockwise. They can also be used for covering the lens by attaching to the front of the lens in reverse direction and by turning counterclockwise.

▪ Lens Cap

With the exclusion of exclusive caps, all caps are of the clip-on type. They are attached by using the inner threads on the lens used for attaching filters. They are attached or detached by depressing the knobs on both sides. They can also be attached on double-screw filters.

Precautions

1. Perform the interchanging of lenses quickly and by avoiding direct sunlight.
2. Be careful not to damage the mount sections, and keep them covered when not in use.
3. Remove dust from the lens surface with a clean and soft brush. Remove stains by lightly wiping with a clean cotton cloth slightly soaked in alcohol. Scratches will result if the lens is wiped with pressure or when dust is still on the lens.
4. Do not keep the lenses in hot or humid places. Use a desiccating agent when storing in a damp place.