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THE CANON REFLEX CAMERAS

The Canon 35 mm. single-lens reflex cameras are of high precision, extremely versatile, incorporating a range of automatic features with a viewing system designed for accurate focusing and precise viewing. The description below refers in full to the Canon FT, FTb, FTbN, TLb and TX models; the other models show some variations which are fully described in the green pages.

An extremely wide range of interchangeable lenses from 7.5 mm. to 1,000 mm. is made for the Canon reflexes and many lenses from other manufacturers can be used with adaptors. A range of accessories and attachments permit the Canon reflex camera to be used efficiently on almost any photographic assignment.

Body Construction

The die-cast body is covered with black resilient material with exposed metal parts black enamel or satin chrome finish. The black is hinged on. The camera yields up to 36 images, $1 \times 1\frac{1}{2}$ in. (24×36 mm.) on perforated 35 mm. film. It has a permanently fitted eye-level reflex finder with built-in pentaprism giving a right-way-round view. The centre of the reflex finder area contains a circular microprism permitting ultra-fine focusing and is surrounded by a rectangle giving the area from which the CdS meter receives its light. The remainder of the finder field is a fresnel lens. The image is brilliant and evenly illuminated. The screen field covers 92 per cent of the actual picture field. The taking lens itself is used to form the finder image. In consequence the finder shows exactly the same image as will be obtained on the film, without any parallax even when wearing eye-glasses. The reflex image remains correct at any distance with any lens, including close-up supplementary lenses, extension bellows, extension tubes and other attachments.

The reflex mirror automatically returns to the precise focusing-viewing position the instant the exposure is made. Vibration from the mirror's action is practically eliminated.

A mirror locking device can hold the mirror in a retracted position to enable the ultra-wide angle 19 mm. lens to be used. An accessory shoe is fitted into the camera top.

Exposure Measurement

The pentaprism has a built-in CdS exposure meter which measures the light passing through the lens (TTL) and is cross coupled to the shutter and lens aperture. The exposure meter needle is visible in the viewfinder. Metering is at the shooting aperture on the FT and Pellix and at full aperture on the FTb, FTbN, TLb, TX and F1.

The rectangular frame in the centre part of the finder indicates the area from which the CdS photocell receives its light, so that the photographer can choose the area from which to take his exposure measurement. This avoids incorrect exposure of against the light, side-lit or contrasting subjects and ensures well balanced and correct exposure reading.

The battery-powered circuit is turned on only while the light is measured. A battery tester is built in.

Lenses

The bayonet-mounted standard lenses are interchangeable and a wide range of telephoto and wide-angle lenses is available, together with specialized lenses for macro and architectural photography as well as zoom types.

All Canon FD and FL lenses, including the zooms but excluding the 7.5 mm. fish-eye and the 35 mm. tilt and shift, have an automatic pre-set diaphragm. An internal link between the shutter release and the lens mount couples in such a way that the aperture is stopped down only during the actual exposure. At all other times it is fully open to permit viewing with maximum brilliance of the reflex screen and minimum depth of field for greatest accuracy. On Canon lenses even intermediate openings between two marked apertures can be set without disturbing the operation of the automatic diaphragm. A depth of field pre-view control is possible simply by turning the lens to manual

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control or by operating the stop-down lever, as appropriate.

The lens mount carries a depth of field indicator and the focusing scale, both in metres and in feet, as well as an infra-red mark. Focusing is effected by a helical movement which is part of the lens mount.

The Canon EX EE and EX Auto have their lens fixed with convertible type thread mount to accept a special wide-angle and telephoto front.

Shutter

The Canon reflex camera is equipped with a self-capping focal plane shutter travelling horizontally. Focal plane means that the shutter is located just in front of the film. Self-capping means that it remains closed while being tensioned, ensuring full light protection. With this type of shutter, lenses can be changed while the camera is loaded. The shutter blinds are made from rubberized cloth and fitted with a special brake mechanism to reduce mirror shock and shutter sound. The F-1 has very thin titanium blinds.

The shutter has automatic speeds on a single ring, which can be set before or after the shutter is wound; in addition, B setting for time exposures is provided with a locking facility for long time exposure.

The speeds have click stops and the speed ring can be rotated in either direction.

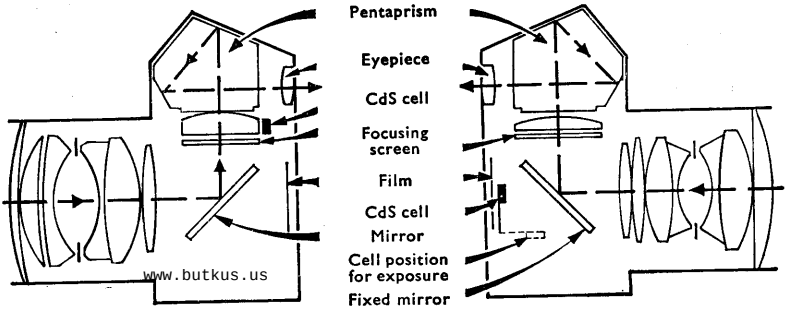
The automatic shutter speed settings are 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1/15, 1/30, 1/60, 1/125, 1/250, 1/500, 1/1000 sec. The fastest speed on the TLb is 1/500 sec. On the F1, it is 1/2000 sec.

The shutter is flash synchronized for flash bulbs and electronic flash with conventional 3 mm. co-axial contacts.

A delayed action is built into the shutter (except on TLb and TX) and will release the shutter with a maximum delay of 10 secs.

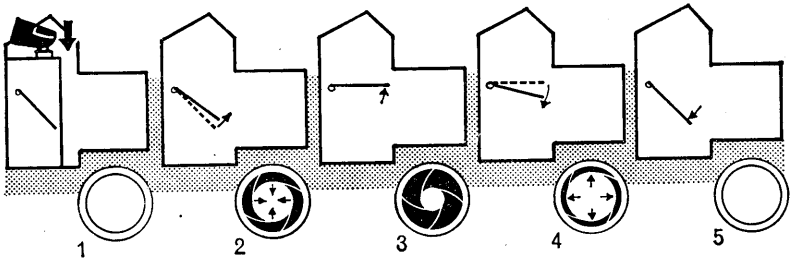
The shutter release button is conveniently placed beside the film transport lever and has a cable release screw-in thread in its centre.

A finger guard is placed around the release button and a release lock is provided to prevent accidental release.

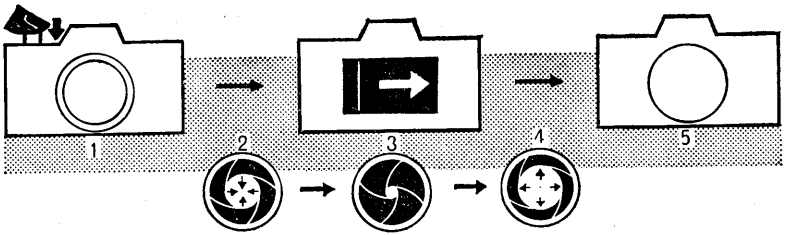


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The image formed by the lens is reflected by the mirror (a fixed pellicle in the Canon Pellix, *right*) on to the focusing screen, whence it is again reflected to the eyepiece by a pentaprism shaped to present an upright, right-way-round image. The meter cell of the Pellix reads the light falling on the film and therefore has to be moved out of the way before the picture is taken.



On all models except the Pellix, the mirror rests at a 45° angle behind the lens for viewing and focusing (1). When the shutter release is pressed, the mirror starts to rise and the diaphragm to close (2). When the mirror is fully up and the diaphragm closed to the preset aperture (3), the shutter opens. After the shutter closes, the mirror returns to its original position and the diaphragm opens fully (4, 5).



The Pellix has a fixed mirror, so the shutter release controls only the movement of the diaphragm and the shutter, ensuring that the shutter opens only after the diaphragm has closed down.

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A full single stroke of the film transport lever advances film, tensions the shutter and actuates the exposure counter. Double or blank exposures are automatically prevented and the flash does not fire before the shutter is wound.

Other Features

The exposure counter is self-setting and returns to S (= start) when a film is loaded.

The camera back swings open on its hinge, the film take-up spool is permanently fixed and a built-in quick loading device (QL) simplifies the loading procedure (not on TLb). A tripod socket is located in the camera base, centred for balance. A fold-up rewind crank permits fast rewinding of the film.

Canon Reflex Models

●THE CANON FT QL is described above and fitted as standard with the Canon FL 50 mm. *f* 1.8 lens alternatively with the 50 mm. *f* 1.4 or 55 mm., formerly 58 mm. *f* 1.2.

●THE CANON PELLIX QL has the same general features as Canon FT but uses a stationary pellicle, half transparent mirror in place of the normal instant-return mirror, and metal focal plane shutter.

●THE CANON FX is the predecessor of the FT and has the same features except that its coupled CdS exposure meter does not measure through the lens but has a separate eye on the front wall of the camera body. It uses a split image range finder in place of the microgrid.

●THE CANON FP is similar to the Canon FX but without a built-in exposure meter; a separate meter can be attached.

THE CANON EX EE is a simplified and varied version of the Canon FT camera. It has a special 50 mm. *f* 1.8 lens permanently fitted with convertible front permitting use of a 35 mm. *f* 3.5 wide-angle or 95 mm. *f* 3.5 telephoto front to replace the standard front. The electric eye TTL system permits automatic working with shutter speed pre-set. Shutter speed range 1/500 sec. to $\frac{1}{8}$ sec., B. Manual aperture setting is possible.

THE CANON EX AUTO, introduced 1974, is a EX EE with direct flash contact in accessory shoe and automatic flash control (CAT).

THE CANON F-1, introduced 1970, is the more sophisticated Canon Reflex model for the professional photographer and very advanced amateur. Designed from the beginning for a motor drive and an enormous range of accessories, it uses the newly-created high performance FD lens range. The viewfinder is interchangeable and a choice of five different finders are available. Automatic flash photography is possible. Systems of close up, copying and photomicrography have been specifically designed for the F-1.

THE CANON FTb, introduced 1971, is the successor of the model FT featuring full aperture metering and direct flash contact in accessory shoe.

THE CANON TLb, introduced 1972, is a somewhat simplified version of the model FTb. Its fastest shutter speed is 1/500 sec. and it has no delayed action release, quick load mechanism or meter switch.

THE CANON FTbN, introduced 1974, is the model FTb with shutter speeds visible in the viewfinder and, less important, the transport lever and the multipurpose lever on the camera front for stopped down metering etc. are of an improved shape, as on model EF.

THE CANON EF, introduced 1974, has an electronic brain, setting the exposure automatically, has extreme range of shutter speeds from 30 sec. to 1/1000 sec., of which the slow speeds 30 sec. to 1 sec. are electronically controlled, the others mechanically. Advanced silicon photocell gives improved meter accuracy, quicker response and wider metering range. Light emitting diode flashes while the shutter is open. Battery check, multiple exposure device.

THE CANON TX, introduced 1975, is a TLb model with hot-shoe flash contact.

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HANDLING THE CANON REFLEX

Holding

It is obvious that the camera should be held as steady as possible; the slightest shake, even if not seen in the negative, is immediately obvious on an enlargement.

FOR HORIZONTAL PHOTOGRAPHS hold the camera in the palm of both hands, the fingers gripping the front of the body, the thumbs against the back. Use thumb and middle finger of the left hand to move the lens focusing mount, and the index finger of the right hand to operate the release button. Keep the elbows pressed against the body. Either the right or the left eye may be used on the finder.

Always stand with your legs apart.

FOR VERTICAL PHOTOGRAPHS turn the camera through 90° so that the left hand presses the camera against your forehead from above. Use the thumb and the index finger to move the focusing mount. The right hand holds the camera from below with the index finger on the release button. It is of no consequence if the position of the hands is reversed; you can suit your own convenience.

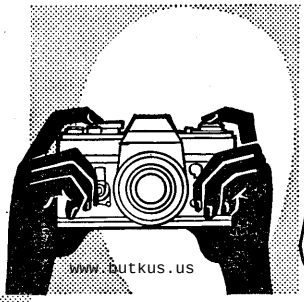
To release the shutter, press the release button with the ball of the finger. Use finger pressure only, and keep the hand and its grip on the camera steady. The actual pressing down should be slow and smooth. The slower the exposure time, the smoother must be the release. A sharp jab at the release encourages camera shake.

For slow exposures in the hand, it is advisable to rest the elbows or at least to lean the body against some support. In this way, even 1/8 sec. can be used without excessive camera movement.

Such a support is also desirable for faster exposures, as quite a lot of movement takes place inside the camera after pressing the release button. A slightly unsteady hold may thus easily lead to blurred pictures.

The use of a tripod is necessary when taking time exposures and it is also recommended for speeds slower than 1/30 sec. For upright photographs from the tripod use a

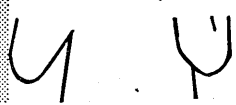
For horizontal shots (*right*) hold the camera in the palms of both hands, the fingers gripping the front of the body, and the thumbs against the back. Focus the lens with the middle finger of the left hand.



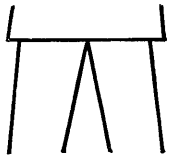
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Press the elbows close to the body,

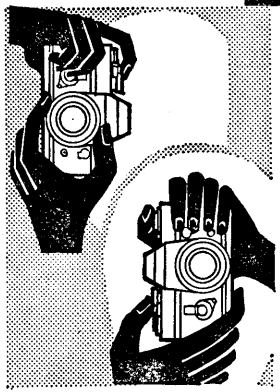


always stand with your legs well apart,

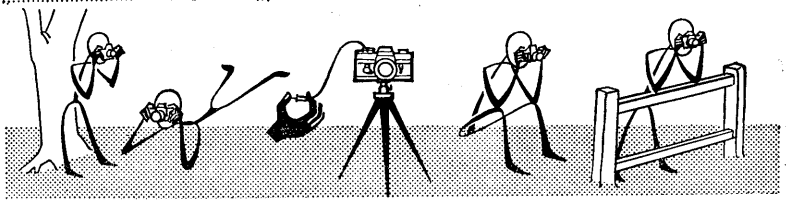


and hold quite still while you release.





For upright shots (*left*) turn the camera through 90° so that the left hand supports it from underneath. Alternatively, turn it round in the other direction, so that the left hand presses the camera against the forehead from above. In this case the thumb of the right hand presses on the release button, while the palm of the right hand supports the weight of the camera.



Above: With the Canon reflex cameras it is important to keep the camera really steady during the exposure and for a fraction of a second after pressing the release button. Whenever possible support your body against something solid, such as a tree or wall or prop up your hands against your knees or a table, particularly with slow speeds. Use a cable release for time exposures from a tripod.

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ball-and-socket head to allow changing from horizontal to vertical position.

Carrying

To be ready for quick action, it is best to carry the camera on a short strap round the neck so that it lies on your chest. Lifting it up to the eye is then a matter of a split second.

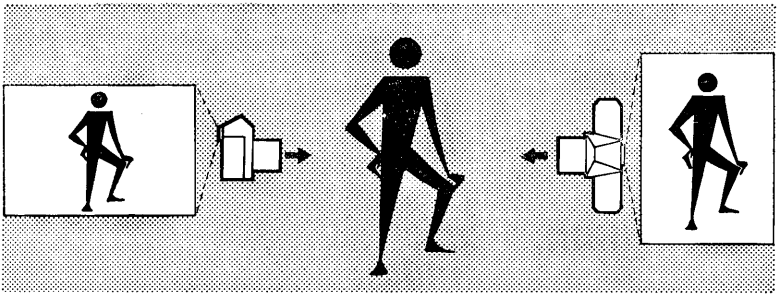
For convenience and protection, the Canon should always be carried in its ever-ready case. This case is designed to hold the camera ready for use. The flap of the case is removable when the camera is in continuous use to enable quicker working.

Viewing and Focusing

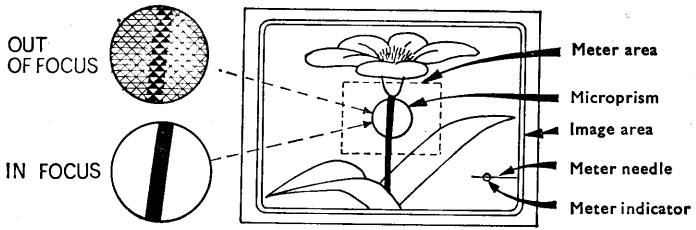
If you look through the eyepiece of the viewfinder of the Canon camera, you see on the screen the image produced by the lens and reflected via the mirror. The image is always visible except during the actual exposure. A fraction of a second before the shutter is released, the automatic pre-set iris of the lens closes down to the aperture chosen; as soon as the shutter closes, the iris opens up to full aperture. The image seen is precisely the same as will be shown on the film. It is free from any parallax. The screen is a Fresnel lined finder field and has in its centre a circular microprism section.

The distance is measured by observing the subject through the microprism centre and turning the lens focusing mount until the image appears sharply focused, that is, the line pattern of the microprism practically disappears and the centre becomes crisp and clear.

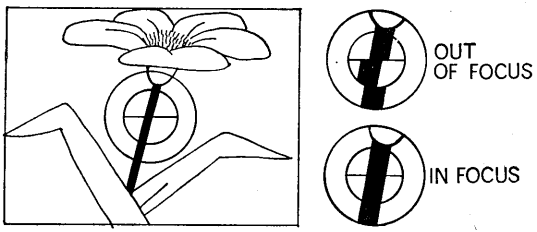
The use of the microprism centre is quite straightforward. Earlier models have in place of the microprism a split image rangefinder centre. The two displaced halves of the circle are moved together by turning the focusing mount until they are one continuous outline. The best way to arrive at critical definition is to turn the focusing mount on the lens slowly to and fro, keeping the subject within the ring.



The viewfinder of the Canon reflex cameras shows the image upright and the right way round whether the camera is held for horizontal (*left*) or vertical (*right*) shooting. With the standard lens, the image also appears in approximately natural viewing size.



The Canon FT viewfinder (*above*) has a bright line indication of the image area and a central rectangle showing the field covered by the meter. The central rangefinder is a microprism type showing a shimmering image when the lens is not properly focused. The FX and FP models (*below*) have a split-image rangefinder showing a discontinuous image when the lens is not properly focused.



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As you turn the mount, the image becomes sharper up to a certain point beyond which it again loses definition. At this "beyond" stage, turn the mount back, narrowing down the degree of movement until you arrive at the point of best definition.

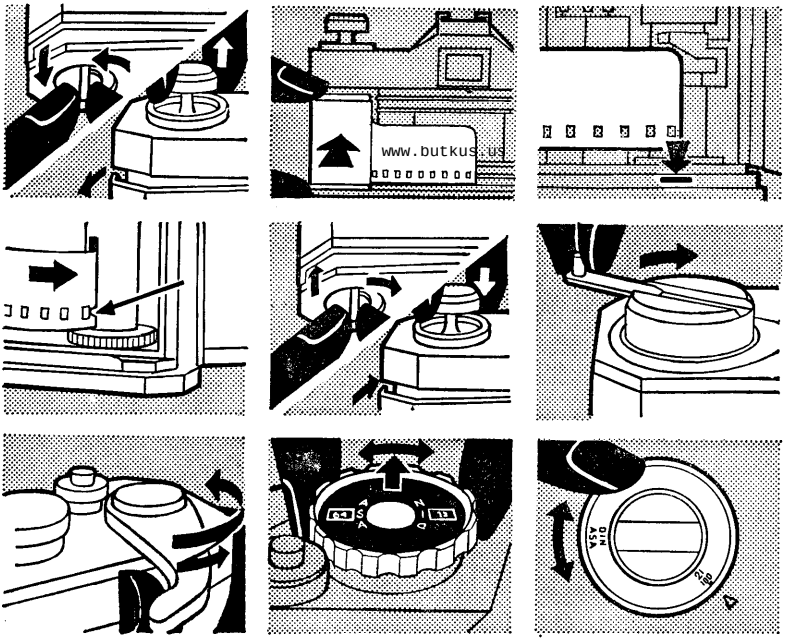
Focusing Moving Subjects

The orthodox way of focusing with the microprism may be adopted for taking photographs of subjects which are reasonably stationary. When taking subjects in motion, a different method of focusing is required. Set the distance at which you expect the subject to be at a given moment, or focus on some spot which it actually has to pass. Press the release when the subject reaches the pre-focused point. With subjects liable to react self-consciously (e.g. children) set the lens to a suitable distance, approach the subject quickly, and expose as soon as the microprism centre becomes "clear".

Alternatively, focus on some object which is at the same distance from the camera to the subject but in a different direction. When the range is found, swing round to press the release button as soon as the victim slips into the field of view of the finder. (See also quick shooting with zone focusing, page 42).

Depth of Field Preview

The precise depth of field (see page 41) can be previewed by moving the A-M ring of the FL lenses to "M" or by operating the stop-down lever. On some lenses the serrated ring with its white indicator dot (which is normally centrally on top) can be turned by a few degrees in a clockwise direction when the automatic pre-set aperture lenses close down to the selected opening. The image in the viewfinder becomes darker but you can see the extent of sharpness to the foreground and the background from the subject you have focused on. On turning the ring back to A, or on releasing the lever, the diaphragm instantly reopens.



The procedure for loading the Canon reflexes is (*top left to bottom right*)**: Open camera back and insert film cassette. Set the film to the red mark on the QL models or attach film to take-up spool. Close camera back and take up the slack film by turning the rewind crank gently clockwise. Wind on and release the shutter twice. Set the speed of the film loaded.**

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The FD lenses do not have an A-M ring; they are stopped down by pressing the stop down lever (this is the multi-purpose lever on the front of the camera body, which is also used as self-timer lever) in the direction of the lens, after having pressed down the button behind the green circle on the aperture ring of the lens and turned the green circle away from the index line. Now you can set the aperture manually. After observation turn the green circle again to the index line.

If the FD lenses are to be *used* manually push the large protruding lever on the back of the lens in an anti-clockwise direction until it stops and locks into place. On the FD 50 mm. *f* 1.8 SC lens the lever must be locked by moving the little black lever from the white dot to the L position.

For normal AE operation on the Canon EF the green circle *has* to point to the aperture index line.

Infra-Red Indicator

When working with infra-red film, the distance setting required is slightly displaced from that of normal films. For this reason a red dot is shown on the distance marking on the lens barrel with an R below it. Having focused the lens in the normal way, rotate the lens a little further until the distance shown against the normal focusing mark comes opposite to the red dot.

Film Plane Indicator

The position of the film plane is represented by a circle crossed by a line (⊖) engraved on the camera body. The precise distance between film plane and subject can be measured from this position.

Delayed Action Release

A self-timer, or delayed action release, is built into the front of the Canon camera body to the left of the lens (it is the same lever as used in the opposite direction to actuate the CdS meter). This timer permits self-portraits and is also useful for hand-held exposures with slow shutter speeds.

Main text continued on page 17 after green section.

THE CANON REFLEX: MODEL BY MODEL

These green pages deal with the individual Canon reflex models in detail.

Self-contained sections for each model cover points of loading, unloading, shooting and specific controls.

For a fuller explanation of aspects common to all Canon reflex cameras, compare these sections with the same headings in the main text.

Canon EF

Loading 4
Unloading 4
Shooting 4
Exposure Determination 4
Stopped-Down Metering 5
Battery Check and Change 5
Flash 6

Canon F1

Loading 7
Unloading 7
Shooting 7
Exposure Determination 8
Stopped-Down Metering 8
Battery Check Change 8
Flash 10
Interchangeable Viewfinder System 10
Interchangeable Focusing Screen 10

The Canon FT, FTb, FTbN TLb, TX and Pellix QL

Loading 11
Unloading 11
Shooting 12
Exposure Determination 12
Full Aperture Metering 14
Pellix Eyepiece Shutter 14
Flash 14
Checking Battery 14
Changing Battery 14

The Canon FX and FP

Loading 15
Unloading 15
Shooting 16
Exposure Metering on FX 16
Exposure Meter for FP 16
Flash 20

The Canon EX EE EX Auto

Loading 21
Unloading 21
Shooting 21
Changing Lenses 23
Checking Battery 23
Changing Battery 23

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THE CANON EF

The Canon EF is the most advanced version of the Canon Reflex range of cameras. It differs from the other models as described on pages 4 to 8 by these features:

It has an electronic brain, offering automatic exposure (AE) with variable aperture on preselecting the shutter speed, combined with an extreme range of speeds from 30 sec. to 1/1000 sec. and B. The speeds from 1 sec. to 30 sec. are electronically controlled and those from 1/2 sec. to 1/1000 sec. are mechanically controlled. The metal focal plane shutter runs vertically and the mechanical speeds (1/2 to 1/1000 sec.) will work even if the batteries should fail. The shutter accuracy is maintained from temperatures −20°C to +60°C (=−40°F to 140°F).

The silicon photocell metering offers—as compared with the traditional CdS meter—improved accuracy, greater reliability, quicker response and wider metering range: at ASA 100 EV −2 (=8 sec. at *f*1.4) to EV 18 (=1/1000 sec. at *f*16). The film speed range extends from ASA 12 to 3200.

A light emitting diode (LED) near the rewind knob flashes on and off during time exposures from 1 to 30 sec. to signal that the shutter is still open; it also acts as battery check. An automatic exposure memory lock permits locking in position the aperture shown by pressing a button.

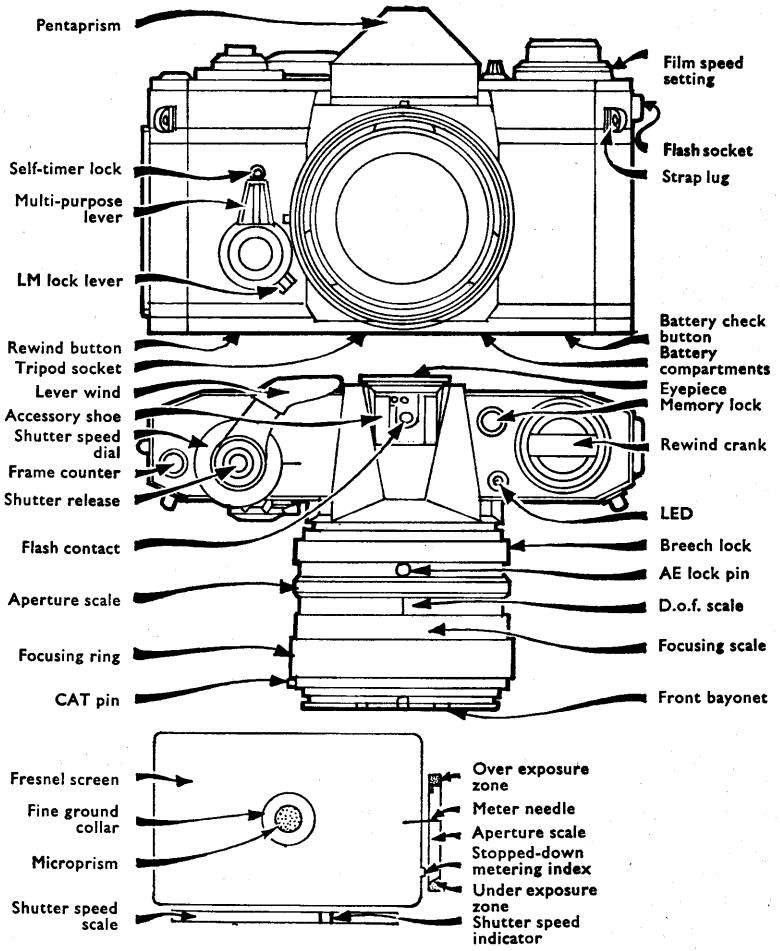
The meter reading is with emphasis on the centre (the microprism area) at full aperture with the Canon FD lenses from 15 mm. to 300 mm. and stopped down with the Canon FL or manual lenses as well as with most accessories such as bellows unit, extension tubes, microscope adaptor.

Flash photography with the Canon automatic tuning (CAT) system is possible in conjunction with the Canon Speedlite 133D when using the SSC FD lenses 50 mm. *f*1.4 or *f*1.8, 35 mm. *f*2 or *f*3.5 only. Conventional flash using either hot-shoe contact or the flash terminal on the camera body is available at 1/125 sec. and below for electronic flash and 1/15 sec. and below for flashbulbs.

The viewfinder contains in its centre a microprism rangefinder surrounded by a plain ground glass ring, while the remainder of the finder consists of ground glass with fresnel screen showing on its base the shutter speed scale and indicator and on its right-hand side the aperture scale and needle, over- and under-exposure marks and the stopped down metering mark.

A delayed action release with approx. 10 sec. delay and a multi-exposure device are built in.

The lenses fitted as standard are the FD 55 mm. *f*1.2 SSC, FD 55 mm. *f*1.2 AL SSC (aspheric lens), FD 50 mm. *f*1.4 SSC or FD 50 mm. *f*1.8 SC.


Pentaprism
Film speed setting
Flash socket
Strap lug
Self-timer lock
Multi-purpose lever
LM lock lever
Battery check button
Battery compartments
Rewind button
Tripod socket
Lever wind
Eyepiece
Memory lock
Accessory shoe
Shutter speed dial
Rewind crank
Frame counter
Shutter release
LED
Flash contact
Breech lock
AE lock pin
Aperture scale
D.o.f. scale
Focusing scale
Focusing ring
CAT pin
Front bayonet
Fresnel screen
Over exposure zone
Fine ground collar
Meter needle
Aperture scale
Microprism
Stopped-down metering index
Under exposure zone
Shutter speed scale
Shutter speed indicator

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For close-up photography, close-up lenses, extension tubes, bellows units, macrophoto coupler are available.

Other accessories include eyecup, angular finder, lens hood, copy stand, camera holder, filters, CAT coupling electronic flash, etc.

Loading (See page 18.)

1. **Open camera back.**
2. **Insert film.**
3. **Fix to take-up spool.**
4. **Close camera.**
5. **Take up film slack.**
6. **Make blind exposures.**
7. **Wind for first exposure.**
8. **Set the film speed.**

Unloading (See page 22.)

1. **Push in rewind knob.**
2. **Rewind film.**
3. **Open camera back, remove film.**

Shooting (See page 20.)

1. **Turn on the on/off switch** on the back of the top plate of the camera body.
2. **Wind film transport.**
3. **Pre-set shutter speed.**
4. **Focus and determine the picture area.**
5. **The correct aperture sets itself** (see below, "Exposure Determination").
5. **Release the shutter gently.**

Exposure Determination

Full aperture metering is possible only with the FD lenses which have built-in signal pins for this purpose. With other lenses, the stopped down method (see next page) has to be used.

1. **Set film speed** on shutter dial, by lifting up outer rim of rewind ring and turning it until the ASA speed of the film points to the white index mark, and drop ring again.
2. **Switch on meter.**
3. **Set the shutter speed required.**
4. **Point camera to the subject** and the aperture will set itself, the needle on the right-hand side of the viewfinder will indicate the aperture set. This reading will be correct for all normal light conditions,

particularly as the metering has central emphasis. To cater for extra strong contrasty subjects or flat ones, you can point the centre of the viewfinder to the particular part you require correctly exposed and press the memory lock—the button in the camera top plate between the rewind knob and the pentaprism housing. This holds the aperture measured, while you turn the camera to cover the precise section you want to photograph and then release.

You can also at any time change the shutter speed and aperture combination. If you see, for example, that the given light conditions produce a smaller aperture than anticipated, you simply turn the shutter speed ring until the indicated combination of shutter speed and aperture suits you.

Stopped-down Metering

When using lenses other than the FD series, such as FL or manual lenses and most accessories such as bellows unit, extension tubes, microscope adaptor, metering has to be carried out with the lens stopped down. Stopping down of the FL lenses is effected as described on page 14 for depth of field preview. While the lens is stopped down, adjust the aperture ring (or the shutter speed) until the meter needle in the viewfinder is aligned with the stopped-down index mark near the base of the aperture scale. Now release the stop-down lever and take the photograph.

The stop-down lever can be locked in the stopped-down position by moving the L-M lock on the base to the red L position and pushing the stop-down lever toward the lens. To unlock it after use turn the lock lever to the white dot position.

On manual lenses and accessories adjust the aperture (or shutter speed) until the needle aligns with the stopped-down index mark in the finder.

When using accessories with the FD lenses lock the aperture in the manual position (see page 16).

Battery Check and Change

To check the batteries simply depress the red battery check button in the baseplate of the camera and observe at the same time the LED red light signal in the top plate. If this light blinks on and off in quick succession, the power of the batteries is adequate; if it blinks only once or not at all, the batteries are exhausted and both need replacing.

To change the batteries, remove the two battery covers in the base of the camera by unscrewing them with the aid of a coin inserted into the cover slot. The batteries required are 1.3V PX 625 (or equivalent). Insert the batteries with the + sign towards the screw covers and replace covers.

Notes: Batteries and the camera contacts should be kept clean and free from fingermarks. If the camera is not used for long periods remove

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the batteries and keep them in a dry place. In view of the fact that both the automatic exposure and the slow shutter speeds depend on efficient batteries it is advisable to carry a spare pair of batteries with the camera at all times in the battery case supplied with the camera. Check the battery performance each time you start taking pictures.

Flash (See page 44.)

The Canon EF is synchronised for electronic flash at all speeds up to and including 1/125 sec. The Canon Speedlite 133D fits into the camera's flash hot shoe where it can be used in conjunction with the Flash Auto Ring A_2 or B_2 attached to the front of the bayonet mount of the lens with the CAT automatic tuning system (see page 48).

The camera is also synchronised for flashbulbs at all speeds up to and including 1/15 sec.

While the switch on the back of the camera has to be set to the flash sign (and the shutter to 1/125) when using the CAT system, it may be set to NORMAL for flashbulbs and the aperture has to be set manually. For manual setting of the aperture see page 14 "Depth of field preview". After using the CAT flash system turn camera off and set CAT switch to NORMAL otherwise the automatic exposure setting for the next flash shot will be incorrect.

THE CANON F-1

The Canon F-1 is a system camera designed simultaneously with a large range of accessories and new lenses. The eye-level pentaprism viewfinder is removable and can be replaced by various other types. The meter reads at full aperture.

THE LENSES FITTED as standard are the Canon FD 55 mm. *f* 1.2, FD 50 mm. *f* 1.4 or FD 50 mm. *f* 1.8.

THE FOCAL PLANE SHUTTER has very thin titanium blinds and is speeded from 1-1/2000 sec. and B. It is synchronized for electronic flash and bulbs and has special contacts for the CAT system (see page 48).

FOR CLOSE-UP PHOTOGRAPHY, close-up lenses, extension tubes and bellows, macro couplers and macro lenses are available.

OTHER ACCESSORIES range from interchangeable screens to two different motor drive units, four interchangeable viewfinders with three different meter systems, 250-exposure back, electronic remote control via TV monitor, photomicro equipment, copy stands, etc. The lens range includes every type from fish-eye to extreme long-focus with special tilt and shift, macro and fluorite types for multi-spectral photography.

Loading (See page 18 for detailed description.)

1. **Open camera back.**
2. **Insert film.**
3. **Set film to red mark.**
4. **Close camera.**
5. **Take up film slack.**
6. **Make blind exposures.**
7. **Wind for first exposure.**
8. **Set the film speed.**

Unloading (See page 22.)

1. **Push in rewind knob.**
2. **Rewind film.**
3. **Open camera back, remove film.**

Shooting (See page 20.)

1. **Wind film transport.**
2. **Pre-set the shutter speed.**
3. **Focus and determine the picture area.**
4. **Set correct aperture** by turning the aperture ring until the meter indicator in viewfinder is centred (see also below "Exposure Determination").
5. **Release the shutter gently.**

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Exposure Determination

Full aperture metering is possible only with the FD lenses, which have built-in signal pins for this purpose. With other lenses, the stopped-down method has to be used (see below).

1. **Set film speed on shutter dial** by lifting up outer rim of shutter speed dial and turn it until the speed of the film in ASA or DIN appears in the cut out window. Now drop rim.
2. **Switch meter on.**
3. **Set the shutter speed required.**
4. **Point the camera to the subject** to be photographed, placing the main part to be exposed correctly into the rectangle around the circular microprism while turning the aperture ring of the lens until the needle bisects the circular pointer. The aperture does not need to point to a specific *f*-number; between settings can be used. If the needle cannot be centred, there is either too much or too little light and a slower or faster shutter speed will have to be chosen.

   The procedure can be reversed by pre-setting the aperture required and turning the shutter speed dial until the needle and pointer are aligned. Intermediate positions on the shutter dial scale can NOT be used. Only the engraved speed from 1 sec. to 1/2000 sec. can be used with the meter. There are occasions when, during the metering, the needle-movement is slack. This is caused by changes in light intensity and is characteristic of the CdS meter.

   To extend the available light reading ability of the CdS meter the Canon Booster T Finder (see page 62) can be employed.

Stopped-down Metering

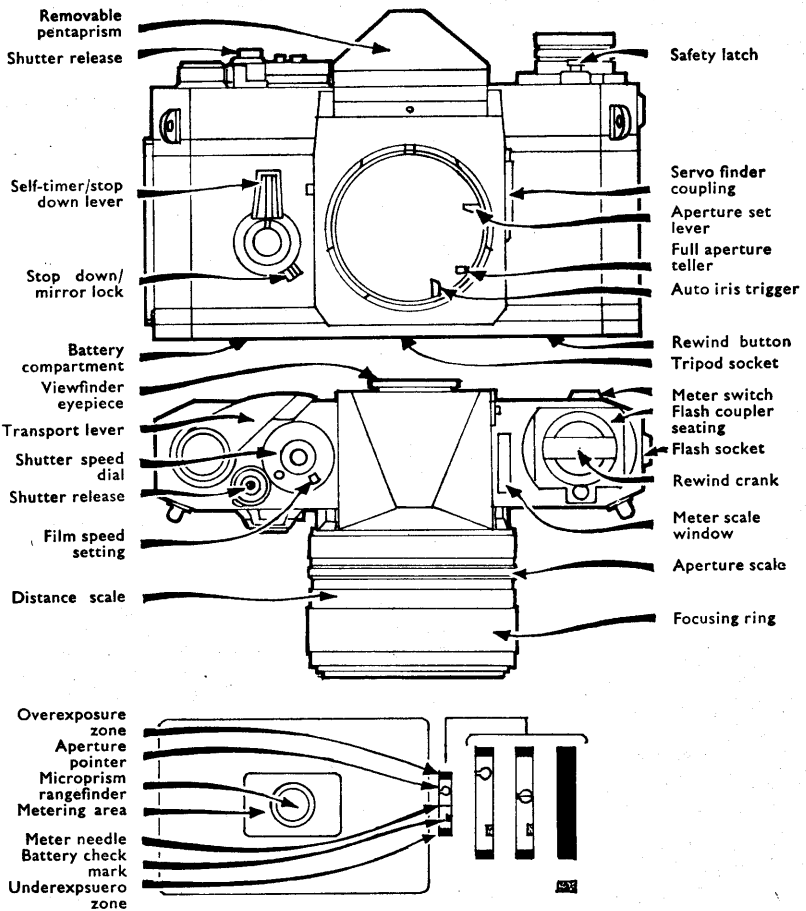
When using other than FD lenses, such as the FL types, metering has to be carried out with the lens stopped down to *f* 2.8 or smaller. Stopping down is effected by pushing the self-timer lever toward the lens. It can be held there against spring pressure or locked by setting the small lever at its base to L. To unlock the lever after use turn the lock to the white dot position. Now proceed as above Nos. 1 to 4.

Battery Check and Change

To check the power of the battery:

1. **Set film speed to 100 ASA and shutter speed to 1/2000 sec.**
2. **Set meter switch** on back of camera to C. If the needle in the viewfinder swings to the meter index, the battery's power is sufficient; if the needle stays below the index the battery needs replacing.

The battery used is a mercury No. 625 or equivalent. Its life if frequently used is about one year. To change the battery, remove the battery cover in the base of the camera by turning it to the left. Insert the battery with the + side facing outward (to the screw cover) and replace the cover. If the camera is not used for long periods remove the battery and keep it in a dry place. The battery and its contacts should be kept clean and free from fingermarks.



The Canon F-I is the standard bearer of the Canon reflex range. It is a highly sophisticated system camera with a very wide range of accessories, including motor drive, 250-exposure back, interchangeable viewfinder and metering units. The camera was introduced together with a completely new range of lenses.

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Flash

The Canon F-1 is synchronized for flashbulbs and electronic flash as well as automatic flash metering by the CAT system (see page 48).

Interchangeable Viewfinder System

The eyelevel pentaprism can be removed by pulling it backward while at the same time pressing the stopper buttons on either side of the finder. When attaching a finder slide in from the back into the attachment rails, push it forward until it locks into position with a click. Available are:

Eye level finder. This is the standard pentagonal prism finder with bright, correctly oriented parallax-free image.

Waist level finder for low position photography and copying work; has 5 × magnifier built in.

Speed finder. A universally applicable viewfinder from overhead shots to low level and copying.

Booster T Finder. This is an interchangeable viewfinder which measures very low light levels. It can read down to EV-3.5 (*f* 1.2, 15 sec.) with an ASA 100 film. It is very effective in the fields of macrophotography, night photography and photomicrography where exposures are difficult to decide. Light metering is by the stopped-down method and automatic exposure is performed with the timer. Under bright conditions you can switch over to the camera meter without removing the Booster T Finder.

Servo EE Finder. This is a full aperture light metering EE interchangeable viewfinder. With FD lenses, it is coupled to the full-aperture metering mechanism and the lens diaphragm is controlled automatically by a servo motor according to light conditions. Metering information can be read off inside the viewfinder. The light metering system is a centrally weighted average method using two CdS photocells. Power is obtained from the separate Battery Case used to power the Motor Drive Unit. Unmanned continuous EE photography for ecological and other experiments is possible through the combined use of the Motor Drive Unit and Film Chamber 250.

Interchangeable Focusing Screen

The standard focusing screen fitted to the F-1 has a microprism screen rangefinder. It can be removed by the user and replaced by any of the eight alternative screens available.

To remove the focusing screen pull it upward by inserting a fingernail in one of the two notches on the rear of the screen; remove the screen from the finder socket by lifting it by its metal edges. Insert a focusing screen with its protruding part to the front under the holder in the mirror box. Press down on the back of the screen to enable it to drop horizontally in to position.

THE CANON FT QL, FTb, FTbN, TLb, TX and PELLIX QL

The Canon FT, FTb, FTbN, TLb, TX are described on pages 4-8.

The model FT has stop down metering, while the models FTb and TLb feature in conjunction with the FD lenses full aperture metering. In addition the model FTbN shows the shutter speed in the viewfinder and has improved levers (as on EF). The model TLb and TX have 1/500 sec. as fastest shutter speed, are without delayed action release or quick load facility, nor have they the meter switch or battery tester of the FTb. The accessory shoe of the TLb is without direct flash contact.

The Canon Pellix varies from the FT only by featuring a half transparent mirror which remains stationary and projects the image both to the film and to the pentaprism. Its micro-thin "film" acts as a beam splitter, sending light to the viewfinder and the CdS meter at the same time and avoids the image blackout of the swing mirror during the exposure. It gives increased sensitivity to the CdS meter.

THE LENSES FITTED as standard were originally the Canon FL and are now the FD 50 mm. *f* 1.8 or *f* 1.4 or 55 mm. (formerly 58 mm.) *f* 1.2, all focusing down to 2 ft. (0.6 m.) and using 58 mm. screw in filters and 60 mm. push-on lens hoods.

THE FOCAL PLANE SHUTTER has speeds of 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1/15, 1/30, 1/60, 1/125, 1/250, 1/500, 1/1000 sec. and B. A delayed action release is fitted (see page 18). See variation for TLb and TX above.

FOR CLOSE-UP PHOTOGRAPHY below the minimum focusing range of 2 ft., close-up lenses, extension tubes, bellows focusing attachments and ultra-close focusing lenses are available.

OTHER ACCESSORIES include waist-level finder, booster, (not for TLb and TX), camera holder, filters, case and an extensive range of wide-angle tele, zoom and macro lenses. For instructions on changing lenses, see page 52.

Loading (See page 18 for detailed description.)

1. **Open camera back.**
2. **Insert film.**
3. **Set film to red mark.**
4. **Close camera.**
5. **Take up film slack.**
6. **Make blind exposures.**
7. **Wind for first exposure.**
8. **Set the film speed.**

Unloading (See page 22.)

1. **Push in rewind knob.**
2. **Rewind film.**
3. **Open camera back, remove film.**

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Shooting (See page 20.)

1. **Wind film transport.**
2. **Pre-set the shutter speed.**
3. **Focus and determine the picture area.**
4. **Set correct aperture** by turning the aperture ring until the meter indicator in viewfinder is centred (see also below "Exposure Determination").
5. **Release the shutter gently.**

Exposure Determination

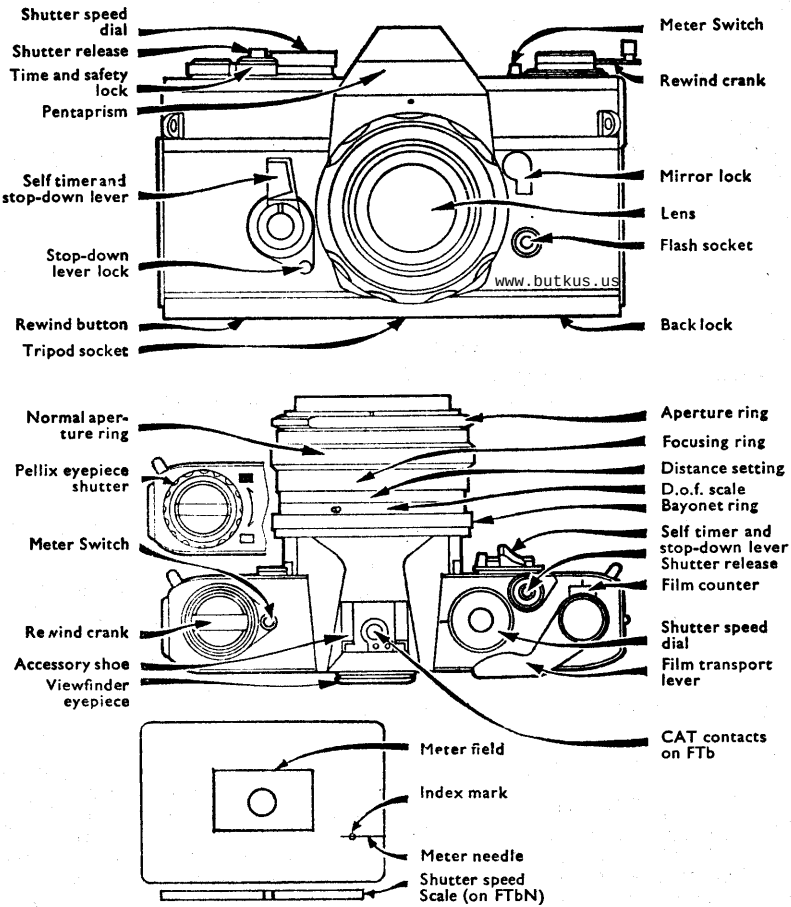
The FT and Pellix use the stopped-down metering method. The FTb, FTbN, TLb and TX use full-aperture metering with FD lenses but stopped-down metering with other lenses. The procedure is:

1. **Set film speed on shutter dial** by lifting up outer rim of shutter speed dial and turn it until the speed of the film in ASA or DIN appears in the cut out window. Now drop rim.
2. **Set the shutter speed required.**
3. **Set CdS actuating lever.** Push the large lever on the camera front towards the lens. This switches on the CdS meter of the FT and Pellix. The FTb and FTbN have a switch. Keep lever depressed or lock the lever in the meter switched on position by setting the little chromed knob on the base of the actuating lever to the L position (=lock). This latter is advisable when long telephoto lenses are used or several comparative exposure readings are taken from one subject. On returning the lock lever to its original position (white dot) the actuating lever will spring back. The TLb and TX have no lock or meter switch.
4. **Point the camera to the subject** to be photographed, placing the main part to be exposed correctly into the rectangle around the circular microprism while turning the aperture ring of the lens until the meter needle points to the O on the lower right of the reflex screen. The aperture does not need to point to a specific *f*-number; between settings can be used. If the needle cannot be centred, there is either too much or too little light and a slower or faster shutter speed will have to be chosen.

   The procedure can be reversed by pre-setting the aperture required and turning the shutter speed dial until the needles point to O in the finder. Intermediate positions on the shutter dial scale can NOT be used. Only the engraved speeds from 1 sec. to 1/1000 sec. can be used with the meter.

   There are occasions when, during the metering, the needle-movement is slack. This is caused by changes in light intensity and characteristic of the CdS meter.

   To extend the available light reading ability of the CdS meter the Canon Booster (see page 62) can be employed (not on TLb or TX).



The Pellix has a thin fixed pellicle instead of a moveable mirror. In all models, the viewfinder shows the metering area as a darker rectangle surrounding the microprism rangefinder. The meter needle and index are in the image area. The FTbN also shows the selected shutter speed on a scale below the image area.

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Full Aperture Metering

The FTb, FTbN, TLb and TX use full aperture metering with FD lenses. The procedure is:

1. **Set film speed** as 1 above.
2. **Set shutter** speed as 2 above.
3. **Point camera to subject** as 4 above.

Canon Pellix Eyepiece Shutter

If strong light reaches the unprotected eyepiece, as when using the self-timer, the eyepiece shutter of the Pellix should be closed to prevent a ghost image from reaching the film. To close the eyepiece shutter, turn the ring below the rewind knob to the black rectangle; to open it turn it to the right to the open rectangular frame.

Flash

The Canon FT, FTb, FTbN, TLb, TX and Pellix are synchronized for flash bulbs and electronic flash. The X position on the shutter speed dial indicates the most suitable setting (=1/60 sec.) for *electronic* flash. For flash operation, see page 44. The FTb can also use the Canon Auto Tuning flash system (see page 48).

Checking Battery

To make an accurate check of the battery condition of FT, FTb, FTbN and Pellix.

1. **Set film speed to 100 ASA on the shutter dial.**
2. **Set shutter speed to 1000** on FTb and FTbN, to X on others.
3. **Turn the check lever** on the base of the rewind knob on the top plate of the camera to C. If the meter needle in the finder will point to the meter index, the battery has sufficient voltage. If it does not reach the meter index its power is insufficient and the battery needs replacing.

Changing Battery

A mercury button battery is used to power the exposure meter of the Canon FT, FTb, FTbN, TLb, TX and Pellix. The battery required is a Mallory 625 or equivalent. Its life if in frequent use is about one year.

To change the battery, remove the battery cover in the side wall of the camera by turning it to the left. Insert the battery with the + side facing outwards (to the screw cover), and replace the cover.

If the camera is not used for long periods remove the battery and keep it in a dry place. The battery and its contacts should be kept clean and free from fingermarks.

THE CANON FX and FP

The Canon FX camera is as described on pages 4–8. It has, however, in place of the through-the-lens metering, a separate built-in CdS meter, and in place of the microprism rangefinding centre a split image rangefinder centre in the viewfinder. It uses conventional film loading methods.

The Canon FP camera is as the Canon FX (above) but without a built-in exposure meter.

THE LENSES FITTED as standard are the Canon FL 50 mm. *f*1.8 or *f*1.4 or the FL 55 mm. (formerly 58 mm.) *f*1.2, all focusing down to 2 ft. (0.6 m.) and using 58 mm. screw-in filters and 60 mm. push-on lens hoods.

THE FOCAL PLANE SHUTTER has speeds of 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1/15, 1/30, 1/60, 1/125, 1/250, 1/500, 1/1000 sec. and B. A delayed action release is fitted (for operation, see page 14).

FOR CLOSE-UP PHOTOGRAPHY below the minimum focusing range of 2 ft., close-up lenses, extension tubes, bellow focusing attachments and ultra-close focusing lenses are available.

OTHER ACCESSORIES include waist-level finder, camera holder, soft mat, filters, case and an extensive range of wide-angle, tele, zoom and macro lenses. For instructions on changing lenses, see page 52.

Loading (See page 18.)

1. **Open camera back.**
2. **Insert film.**
3. **Fix film to take-up spool.**
4. **Close camera.**
5. **Take up film slack.**
6. **Make blind exposures.**
7. **Wind for first exposure.**
8. **Set the film speed.** Canon FP has a film speed and type indicator which does not influence the working but acts as a reminder. The film speed reminder is built around the base of the rewind knob. In its cut out window you can see the symbols for black-and-white, colour daylight, colour artificial light and colour negative film. The ASA or DIN speed of the film placed into the camera can be indicated by turning the speed to the index mark on the camera body.

Unloading (See page 22.)

1. **Push in rewind knob.**
2. **Rewind film.**
3. **Open camera back, remove film.**

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Shooting (See page 20).

1. **Wind film transport.**
2. **Pre-set shutter speed.**
3. **Focus and determine picture area.**
4. **Set aperture.** See "Exposure Determination" below.
5. **Release the shutter gently.**

Exposure Metering on FX

The Canon FX CdS is a needle match meter coupled to the shutter dial. To use it:

1. **Set the film speed** on shutter dial by lifting up the outer rim of the shutter speed dial and turn it until the speed of the film in ASA or DIN appears in the cut-out and drop rim back.
2. **Pre-select the shutter speed.**
3. **Turn on meter switch** by turning the disc on the top of the camera back to ON.
4. **Set sensitivity switch** on the base of the rewind knob in the camera top plate to the black "L" dot in normal brightness outdoors and to the orange "H" dot in poor light outdoors or indoors.
5. **Point camera to subject.**
6. **Read off the aperture** in the cutout window in the top plate. The needle will point to the correct aperture. Use the white figures for "L" (low sensitivity) position and the orange figures for "H" (high sensitivity) position.
7. **Set aperture on lens.**

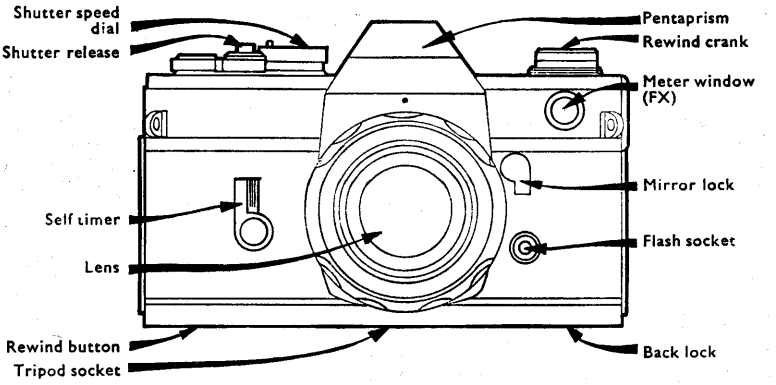
TO CHECK THE BATTERY, turn the battery switch to the "CHECK" indicator of the meter and read the meter needle position. If it points into the blue-coloured field the voltage is sufficient, if not the battery needs replacing.

TO CHANGE THE BATTERY, remove the cover in the side wall of the camera below the rewind knob by unscrewing it, remove old battery and replace by a new one (Mallory type 625) with its + sign towards the battery cover, and replace cover.

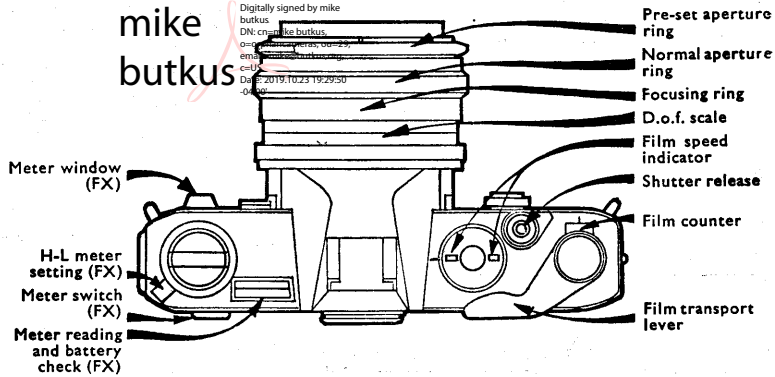
The life of a battery in frequent use is about one year. The battery and its contacts have to be kept clean and free from fingerprints. If the battery is not used for long periods, remove it from the camera and store it in a dry place.

Exposure Meter for Canon FP

This is a separate CdS meter which can be clipped over the accessory shoe of the Canon FP and couples to the shutter speed dial. It is highly sensitive, measuring EV1 to 18 (100 ASA). It has a light acceptance angle of 40°, film speeds ASA 10–800 (11–30 DIN), shutter speeds



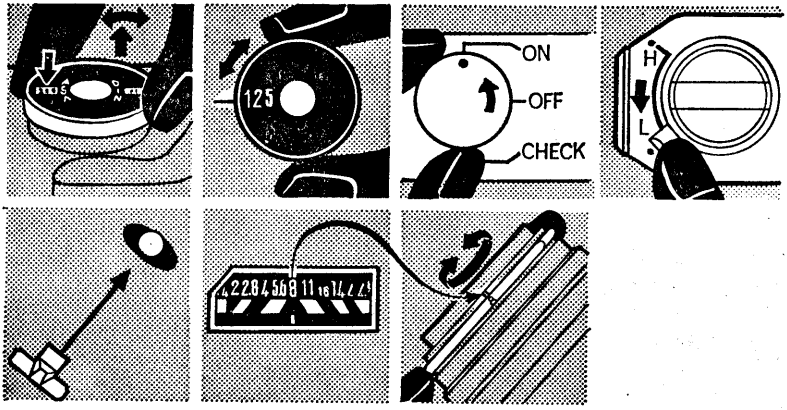
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The Canon FX and FP models preceded the FT. They have similar general features but the FX has a coupled CdS meter that does not read through the lens and the FP has no meter. A separate, attachable meter is, however, available. Both models have split-image rangefinders.

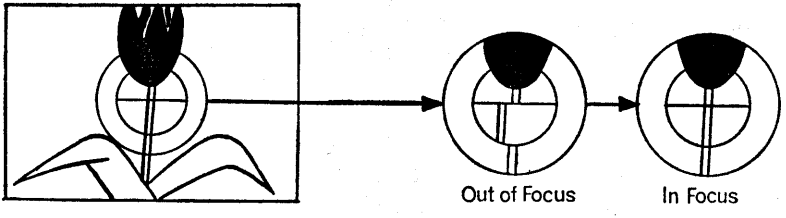
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USING THE FX METER

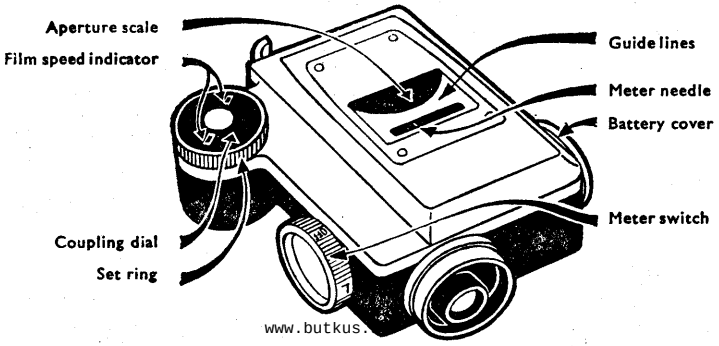


To use the meter of the Canon FX (*top row above*), set the film speed, pre-set the shutter speed, switch on the meter and set to high or low reading. Then (*bottom row*) point the camera at the subject, read off the aperture recommended and transfer the setting to the lens.

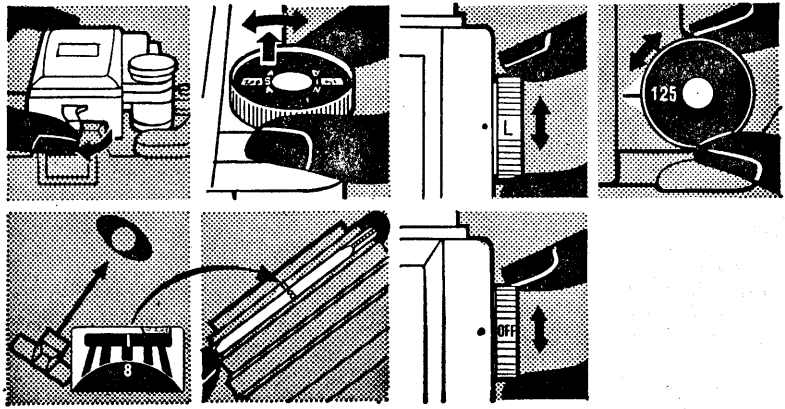
FOCUSING WITH FX, FP



The FX and FP models have a split-image rangefinder section in the focusing screen. As the lens focusing ring is turned the image in this area becomes continuous or discontinuous across the dividing line. When the image is continuous, the lens is focused on that part of the subject.



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The FP meter (*top*) fits on top of the camera and couples with the shutter speed dial. The procedure for its use is (*top row*): Attach meter, set film speed and high or low reading and set shutter speed. (*Bottom row*): Point camera at subject and read off aperture recommended. Transfer aperture reading to lens and switch off meter

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1 sec. to 1/1000 sec., apertures *f*1 to *f*22. It uses one type "650' mercury battery and has battery checker.

To attach the meter pull out the lock lever, place the meter on top of the camera so that the lock on the base of the meter goes into the camera accessory shoe and place the coupling dial directly over the shutter speed dial. Turn the lock lever and then turn the coupling dial to the left or right, when it will interlock with the shutter dial with a click. The index section between B and X to the dot of the coupling dial cannot be adjusted with the meter dial.

To use the meter:

1. **Attach meter to camera** (see above).
2. **Set film speed** in the small window in the dial by raising the outer rim until the ASA or DIN speed appears in the window and let outer rim drop back.
3. **Set sensitivity.** For ordinary daylight outdoors turn the switch on the side of the instrument to "L", for poor light outdoors or indoors set to "H". For L (low sensitivity) use the white figures for aperture reading, for H (high sensitivity) use the orange figures.
4. **Pre-select shutter speed.**
5. **Point camera towards the subject,** read the aperture to which the needle is pointing; set this aperture on the lens. The procedure can be reversed by pre-selecting the aperture on the camera lens, pointing the camera to the subject and turning the shutter speed dial until the aperture needle points to the stop pre-selected.
6. **Switch the meter off** after use.

To detach the meter, return the lock lever to the right and remove meter upwards.

TO CHECK THE BATTERY turn the on-off switch to C. If the needle swings to the right into the blue-coloured section the battery is in good order. If it stops in the white section the battery needs replacing.

TO CHANGE THE BATTERY, remove battery cover of the meter by unscrewing it, remove the battery, insert the new one, type "625" mercury, with its + sign towards the screw lid, replace lid.

The life of a battery in frequent use is about one year. The battery and its contacts have to be kept clean and free of finger marks. If the battery is not used for long periods, remove it from the meter and store it in a dry place.

Flash

The Canon FX and FP are synchronized for flash bulbs and electronic flash; the X position on the shutter speed dial indicates the most suitable setting (=1/60 sec.) for electronic flash.

THE CANON EX EE and EX AUTO

The Canon EX EE and EX Auto are simplified versions of the Canon Reflex FT model. They have electric eye (TTL) metering with automatic aperture setting visible in the viewfinder, to a pre-set shutter speed. In addition, manual setting of aperture is possible. The rear component of the standard lens is fixed permanently to the camera body.

THE LENS is a Canon EX 50 mm. *f* 1.8, a five component convertible type. The lens front can be unscrewed and be replaced by a wide-angle front component 35 mm. *f* 3.5 and telephoto components 95 mm. *f* 3.5 and 125 mm. *f* 3.5.

THE VIEWFINDER is a pentagonal prism of the aerial image type showing the picture field with 0.9 magnification. It has a microscreen centre as rangefinder. The viewfinder also shows the aperture scale with exposure needle and over and under exposure warning marks. A shockless quick return mirror is fitted.

THE SHUTTER has the speeds 1/8, 1/15, 1/30, 1/60, 1/125, 1/250 and 1/500 sec., B. A delayed action release is fitted (for operation, see page 14). The shutter is flash synchronized (see page 44). The EX Auto has in addition direct coupled flash accessory shoe with automatic flash control contact (CAT) see page 48.

FOR CLOSE-UP PHOTOGRAPHY below the minimum focusing range of 1.5 ft. close-up lenses are available.

OTHER ACCESSORIES include filters, waist-level finder, eyesight correction lenses, case, lens hood.

Loading (See page 18).

1. **Open camera back.**
2. **Insert film.**
3. **Set film to red mark.**
4. **Close camera.**
5. **Take up film slack.**
6. **Make two blind exposures.**
7. **Wind for first exposure.**
8. **Set film speed.** (Note dial is for ASA film speed only.)

Unloading (See page 22.)

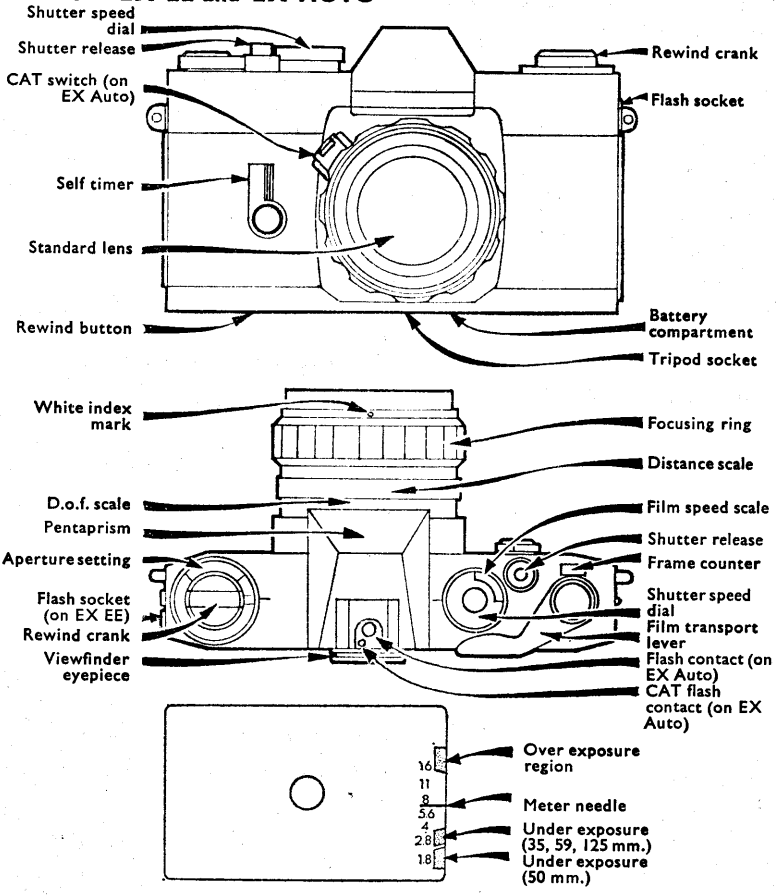
1. **Push in rewind knob.**
2. **Rewind film.**
3. **Open camera back and remove film.**

Shooting (See page 20.)

1. **Wind film transport.**
2. **Pre-set the shutter speed.**

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CANON EX EE and EX AUTO



This is a simplified version of the Canon FT with a fixed rear component lens and aperture control on top of the camera. The slowest shutter speed is 1/15 second on EX EE and 1/8 on EX Auto. The viewfinder screen is non-focusing but has a central microprism rangefinder.

3. **Focus and determine the picture area.**
4. **Set to EE** on the dial below the rewind knob. The aperture sets itself. If the exposure needle points into the field of over or under exposure—the red box above or below the aperture figures—a correct exposure cannot be obtained and a higher or lower shutter speed has to be set or flash used. The lower red box is broken to indicate the under exposure limit of the tele and wide-angle *f* 3.5 lenses. Alternatively, both shutter speed and aperture may be set manually without use of the exposure meter. The aperture is adjusted manually by turning the EE ring in the black field marked 1.8–16.
5. **Release the shutter gently.**

Changing Lenses

Unscrew the front component of the lens by turning it anti-clockwise. Set the lens mount to ∞. Screw the new lens into the thread as far as it will go. Change the shutter speed scale to a different speed whenever a lens is changed otherwise the shutter will not work correctly.

To permit the distance to be read off when using an attachment lens, set the helical focusing mount protruding from the camera body to infinity (∞). Now turn the rotating ring on the attachment lens with the distance scale engraved until ∞ points to the white dot on the front of the helical focusing mount. When you now focus in the usual way you can read off the distance to which the attachment lens has been set opposite the front white dot on the attachment lens distance scale.

Checking Battery

To check the condition of the battery:

1. **Set film speed to ASA 100.**
2. **Set shutter speed dial to 1/30.**
3. **Turn the aperture control ring to EE.**
4. **Aim camera at the sky** or bright subject. If the indicator needle in the viewfinder swings to 16 or over, the battery has sufficient power. Otherwise it has to be replaced.

Changing Battery

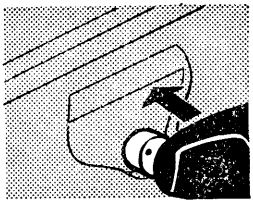
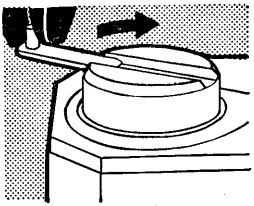
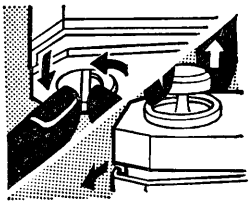
A mercury battery is used to power the exposure meter of the Canon EX EE and EX Auto. The battery required is a Mallory "625" or equivalent. Its life with regular use is about one year.

To change the battery, unscrew the battery cover on the base of the camera with a coin inserted into the slot, remove battery and replace by a new one with its + sign towards the screw cover. Replace cover.

Keep battery and contacts free from finger marks. When the camera is not being used for long periods remove battery and store in a dry place.

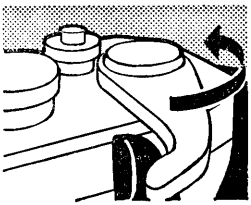
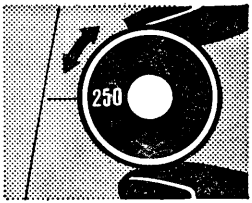
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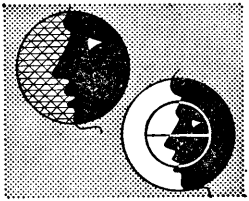
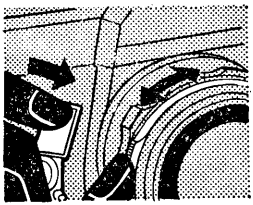
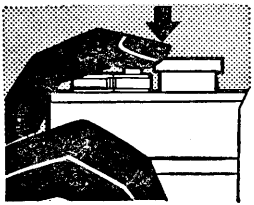
UNLOADING

To unload the Canon reflex cameras, depress the rewind button in the camera base, lift up the rewind crank and turn clockwise until all film is rewound. Open the camera back and remove the cassette.

SHOOTING

To shoot with the Canon reflex cameras, transport the film, set the shutter speed and focus the lens on the part of the subject required to be reproduced most sharply. Set aperture as determined by meter or other method, frame subject in viewfinder and press shutter release gently.

To use the delayed action release, swing the lever downwards (on EF after depressing the lock button). To bring the timer into action, press the shutter release button, and the shutter will automatically be released after about 10 sec. The delay time can be shortened if the lever is not fully pushed down but it has to be moved at least two-thirds of the way (120°) to work.

The self-timer can be set before or after winding the shutter, but it should not be used at "B" setting. Once the timer has been started, it cannot be stopped.

When using the self-timer on the Pellix camera use its eyepiece shutter (see green page 4).

There is no self-timer on the Canon TLb.

Sequence of Handling Operations

To start with we take it for granted that we have our Canon camera together with the cassette of film in front of us. Our first task is to load the camera with film.

Loading

The film should be loaded into the camera in subdued daylight or, at least, in the shadow of your body. The procedure is as follows:

1. **Open camera back.** The earlier models have a key lock in camera baseplate. The F-1, FTb, FTbN, TLb, EF, EX EE and EX Auto have a pull-up rewind knob as base lock. Additionally, the F-1 has a safety lock in front of the rewind knob that has to be depressed as the knob is pulled upward. The QL cover opens and closes with the camera back and need never be touched.
2. **Insert film.** Pull up rewind knob, place cassette with film into the film chamber (below the rewind knob) with the hollow part towards the rewind key. The mouth of the cassette with film end protruding has to point towards the fixed take-up spool of the camera. Push down rewind knob to fix the cassette into place.

3a. **Set film tip to the red mark.** Pull out the curved beginning of the film and place it over the picture aperture

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so that the film tip is above the red mark which is below the take-up spool. Hold the film with your left hand to keep it in this position.

3b. **On cameras without QL device fix film to take-up spool.** Push the end of the leader of the film into one of the slots on the take-up spool. Gently turn the film transport lever, to see that the film winds itself under the spool with the emulsion side down and the film perforations engage the teeth of the transport sprocket.

4. **Close camera.** On cameras with QL device the QL cover presses down the film when the camera is half closed. Check through the sprocket window that the film is correctly engaged with the sprocket. Close the back fully and turn the locking key and fold it up into the camera base. On Canon FTb, FTbN, TLb, F-1, EF, EX EE, and EX Auto push down rewind knob.

5. **Take up film slack.** Turn the rewind crank gently in a clockwise direction until resistance is felt, this takes up the slack of the film, particularly when the cassette is loaded with less than 36 exposures.

6. **Make two blind exposures** by transporting the film wind and releasing the shutter twice. This moves on the film leader. While doing this it is advisable to check that at the same time the film rewind knob turns in the direction against the arrow marked on it. This proves that the film winds properly out of the cassette on to the take-up spool, and for this reason one has to take up the slack as instructed under No. 5. On EF you can wind straight to No. 1 without releasing the shutter.

7. **Wind film for first exposure.** The third wind of the film transport should bring the self-setting exposure counter to No. 1.

8. **Set meter film speed.** On cameras with built-in meter set the speed of the film in the window of the shutter dial by lifting up the outer rim of the shutter speed dial and turning it until the speed of the film used in ASA or DIN appears in the appropriate cut-out of the dial. Let rim

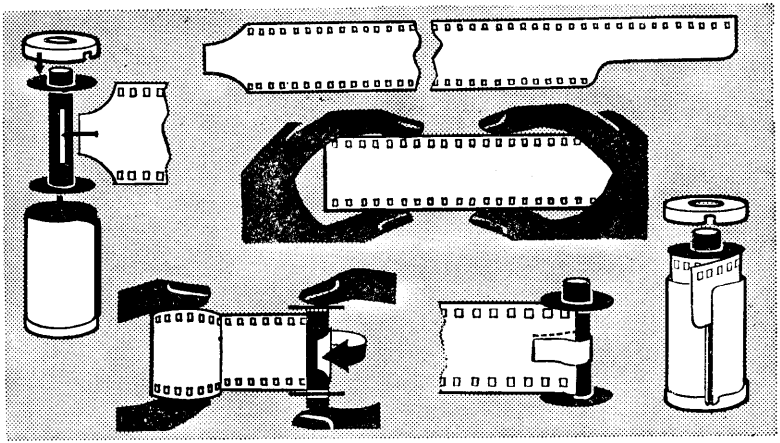
drop down. On model EF lift up the outer rim of the rewind knob and turn the ASA speed required to the white index mark and let rim drop down.

Shooting

Practise the following operations first with an empty camera until you can do them practically automatically.

1. **Work the film transport.** A single stroke of the advance lever transports the film, operates the film counter and tensions the shutter ready for the next exposure. The lever does not swing right back but protrudes slightly behind the camera body facilitating handling the lever for subsequent transporting.
2. **Set the shutter speed.** Shutter speeds can be set before or after the shutter has been wound. All the speeds are on a single shutter speed knob on the camera top plate. The required speed is set by revolving the disc until the speed required points to the index mark where it clicks into position. The speed selector can be turned in either direction. The numbers represent fractions of seconds, e.g. 125 is 1/125 sec. When the selector is set to B (use the white dot just beyond the B index) the shutter remains open as long as the shutter release remains depressed. For long time exposures, a cable release with locking device can be used in conjunction with the B setting. Pressing the release and locking the cable while in the pressed down position, the shutter remains open until the cable release lock is undone. Alternatively, one can—while keeping the shutter depressed in B position—turn the shutter lock lever (by the release button) to L. When removing the finger pressure the shutter will remain open until the lock lever is turned to A (not on EF).
3. **Focus** and determine the picture area to obtain a sharp picture and the view you want (see page 12).
4. **Set the aperture.** The aperture for the prevailing light conditions and the shutter speed set is assessed with the built-in exposure meter (see green pages).
5. **Release the shutter gently.**

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To load standard 35 mm. cassettes, trim the required length of film at each end or use ready-trimmed refills. Push end of film into cassette spool or attach with adhesive tape. Handling the film by its edges only, wind it on to the spool in cassette, allowing an inch or two of leader to protrude. Replace cassette cap.

Unloading

After all exposures have been made, the film has to be rewound into its cassette before unloading it. The film counter automatically shows when all exposures have been used. Alternatively, when all film has been exposed, some resistance is felt when attempting to wind on. In this position it is important not to try to force the lever on but bring it back to its original position and proceed as follows:

1. **Set for rewinding** by depressing the rewind button in the base of the camera.
2. **Rewind the film.** Lift the rewind crank and turn it in a clockwise direction. After a time you feel a slight resistance which is caused by the film being pulled out from the take-up spool. Give another few turns and the film is rewound into its cassette.
3. **Open the camera back** (see Loading No. 1), take out the exposed film and close the camera back, or reload with a new film.

Cutting Off Exposed Lengths

If a film which is only partly exposed has to be processed, wind the transport lever for the next exposure and, in the darkroom or in complete darkness, open the camera and cut off with a pair of scissors the frame which lies in the film aperture. Retrim the remainder of the film (see page 23), insert it into the camera and close the camera.

It is ready for the next exposure. The self-setting exposure counter will count again from No. 0 on. Allowing for the loss of approximately three frames, a note has to be made of the number of exposures remaining.

The re-inserting can be done in daylight. In this case a total of about five frames are lost, for, after inserting and closing, two blind exposures have to be made.

Some makes of colour film which are returned to the manufacturers for processing are for technical reasons only accepted in their full length and should, therefore, not be cut.

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Multiple Exposures

If, having made one exposure you wish to make another on the same frame, press the rewind button and rewind film until the rewind button makes a $\frac{3}{4}$ of a turn, watching the red mark on the rewinding button. Now operate film advance lever while slightly holding the rewind crank and shoot in the normal way. On F-1 models, with green mark rewind only $\frac{1}{2}$ turn. On F-1 models with red mark make $\frac{7}{8}$ turn. On model EF press the multiple exposure button in the centre of the on/off switch on the camera back after having made the first exposure and while keeping the button depressed wind film transport. This will re-set the shutter without winding on film.

Changing Partly-exposed Films

To replace a partly-exposed film by another one, for instance if you want to take a few colour photographs in between some black-and-white shots, proceed as follows:

1. **Check the number of exposed frames** on the film counter.
2. **Rewind the film** but stop immediately you feel a slight resistance. This resistance comes from pulling the film end from the take-up spool. If the film is to be reloaded again, you must not pull the whole film into the cassette, otherwise the film end would have to be extracted by opening the cassette in the darkroom.
3. **Unload the re-wound film** and note the number of exposures taken on the beginning of the film. Now you can load the camera with any other type of film.

   When reloading, load the partly exposed film in the usual way (p. 16), cover the lens with a lens cap (or hold some opaque material against the lens) and, where possible as additional precaution stop fully down.

   Wind the release until the film counter has advanced by the number of frames already exposed. To be on the safe side it is advisable to allow one more frame to pass.

   The rest of the film can now be exposed in the usual way.

Film Packings for the Canon Reflex Camera

Black-and-white 35 mm. film is also available in various loose packings for loading into cassettes. This is a cheaper way of using film as you do not have to buy a new cassette every time with the film. The following packings are available.

DARKROOM REFILLS are lengths cut and trimmed for 36 exposures and have to be loaded into a cassette in total darkness (e.g.

in a darkroom, a really well darkened room or a light-tight changing bag).

BULK FILM is supplied in lengths of 18 to 200 ft., and is the most economical way of using film. A suitable length is cut off to be loaded into a cassette in total darkness. Working in total darkness for loading darkroom refills or bulk film is not difficult. It is, however, advisable to practise filling with a dummy film first in daylight before starting the darkroom work.

Handling, Winding and Trimming the Film

When handling the actual film, particular care must be taken not to touch its emulsion (matt) side. Always handle it and wind on to the centre spool of the cassette by holding the film by either side of its edge, preferably between thumb and index finger. At the same time, it is of no less importance that the spot on which the loading is done should be perfectly dry, clean and dust free.

When using bulk film in loading cassettes, the edge of the work-bench can be marked with notches or drawing-pins to indicate various distances, let us say for 12, 24, 36 exposures of film. This considerably simplifies the measuring of film lengths in the darkroom.

The film ends need trimming. At the beginning of the roll of film make either a straight or wedge-shaped cut for the centre spool of the cassette and measure off the required length of film (see table below). At the end of this make the curved cut for the take-up spool. The curved cut should start between the fifth and sixth bottom perforation—when emulsion is towards you—and must **nowhere** go through a perforation hole.

LENGTH OF FILM REQUIRED FOR ANY NUMBER OF EXPOSURES

Number of Exposures	*Length of Film Required*		*Number of Exposures*	*Length of Film Required*		*Number of Exposures*	*Length of Film Required*	
	in.	cm.		in.	cm.		in.	cm.
1	11¾	30	14	31¾	80	27	51	130
2	13⅛	34	15	33	84	28	52½	133
3	15	38	16	34½	88	29	54	137
4	16¼	41	17	36¼	92	30	55½	141
5	17¾	45	18	37¾	96	31	57	145
6	19¼	49	19	39¼	100	32	58½	148
7	20¾	53	20	40½	103	33	60	152
8	22	56	21	42	107	34	61½	156
9	23¾	60	22	43¾	111	35	63	160
10	25¼	64	23	45	114	36	64½	164
11	26¾	68	24	46½	118	37	66	167
12	28½	72	25	48	122	38	67½	171
13	30	76	26	49½	126	Including trimming		

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The ready-cut film is now spooled on the centre spool of the cartridge or cassette. While winding on, holding the film only by its edges.

Also, take care not to press too hard on the film, and don't squeeze the film-ends when drawing through the hand. Failure to take the first precaution may result in fogging, while neglect of the latter precaution may give rise to peculiar kinds of exposure effects known as "lightning flashes". These are due to electrical discharges, and appear as dark, zigzag lines running from the edge of the film towards the centre of the picture.

Loading Standard Cassettes

The majority of cassettes consist of a centre spool which is in a shell with top and bottom cover. The film leaves the shell by a light-trapped slot. The centre spool can be removed from the shell by removing either top or bottom of the cassette, according to the construction of the particular container.

Most cassettes are actually intended by their makers to be used once only, and with the film originally supplied in it. However, provided they are reasonably robustly made, and the light-trapping velvet slot is in good condition, these cassettes *can* be reloaded many times, and will give perfectly satisfactory results—*if handled carefully*.

Loading with Bulk Film or Darkroom Refills

Work in total darkness and prepare the film as described (p. 23 and 24).

1. **Open the cassette.**
2. **Fix the film to the centre spool.** If the centre spool is fitted with a film catch, thread the tapered end of the film into it. In cases where the centre spool is fitted with a spring, thread the end under it and fold it sharply back. If the centre spool is without any suitable fitting to hold the film, it has been proved best to wind a 1½ in. (4 cm.) piece of cellulose tape round the centre spool, so that on either side about ½ in. tape is used to secure the film.
3. **Wind the film on the centre spool.**
4. **Insert the centre spool into shell,** leaving the first 2 in. of film protruding through the light-trap.
5. **Close the cassette.** Where top and bottom are originally fastened by the outside label, fix the top and bottom cover to the shell, preferably with a length of cellulose tape.

FILMS AND FILTERS

There are two kinds of films available for the Canon reflex camera: black-and-white and colour.

Black-and-White Film

This produces a negative on which the colours and brightness range of the subject are translated into black and white. From it, prints or enlargements on paper or black-and-white transparencies can be made.

The black-and-white film used normally is panchromatic, i.e. it is sensitive to all colours. There is a choice of several types differing mainly in sensitivity as well as certain other characteristics.

SLOW FILMS are of low sensitivity requiring comparatively great exposure. Their main advantage is the extremely fine grain, permitting a high degree of enlargement without its granular structure becoming unpleasantly visible. Such films also yield images of the greatest sharpness. On the other hand, these slow films are not very suitable for coping with fast movement in other than exceptionally good lighting, nor for general work in poor light. Such films are rated at 40–80 ASA or 17–20 DIN.

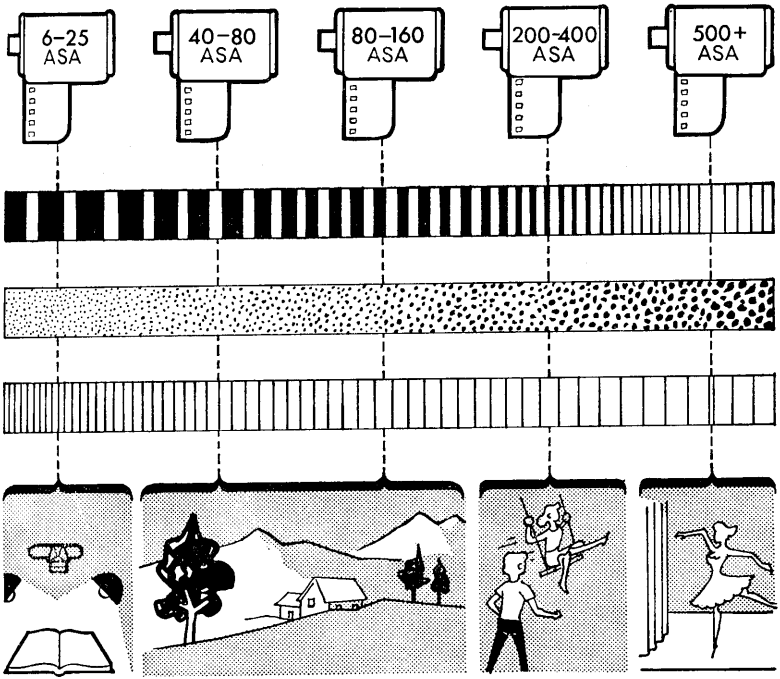
MEDIUM SPEED FILMS still yield a reasonably fine grain with good gradation. They are the most suitable material for all-round photography, other than in poor light. These films are rated at 80–160 ASA or 20–23 DIN.

FAST FILMS with somewhat coarser grain (still acceptable for reasonable degrees of enlargement) will cope with most light conditions including poor light and interiors in favourable conditions. This is the right film for the photographer who wants to be prepared for the unusual, to arrest fast movement with high shutter speeds, as well as shots in poor light. The ratings are 200–400 ASA or 24–27 DIN.

ULTRA FAST FILMS are primarily intended for high-speed sports shots in dull weather, interior snapshots in poor light, night photography and ill-lit stage pictures. These

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FILM SPEED, CONTRAST, GRAIN, RESOLVING POWER



Generally speaking, low speed goes with greatest contrast, finest grain and highest resolving power—and vice versa. The film speed in the top row points to the corresponding contrast, grain and resolving power. As the speed grows (*from left to right*) films decrease in contrast, while the graininess increases. As the speed grows, the acutance and resolution also tends to drop (i.e. the degree to which the film can sharply reproduce very fine detail). The bottom row indicates the types of subjects for which films of the various speeds are best.

films are specialist types for conditions where normal materials are totally inadequate. They should not be used for general photography.

The high speed is achieved at some cost in definition and graininess. Speed ratings range from 500–1600 ASA or 28–33 DIN.

The above speed figures are based on the latest ASA Standard for film speeds (and on the BS and DIN Standards under revision). These figures, when used on the exposure meter, give minimum correct exposures, to make the most of the versatility of the film and of the image quality. They are also the figures quoted by most film manufacturers. Sometimes films are, however, still rated according to earlier standards which in effect incorporated a generous safety factor against underexposure—by the simple process of overexposing films about 100 per cent (well within the exposure latitude of most black-and-white films). So you may come across films apparently only half as fast as others of similar type, because of this difference in ratings. The table on page 70 indicates the current film speeds to be used with the exposure meter, even if the film packing gives a lower rating.

This applies to *black-and-white negative* materials only; speed rating methods have not changed for colour films.

There is a wide range of different makes of films in all speeds on the market. Their characteristics, apart from speed, vary slightly from make to make. It is safe to say that all well-known brands are reliable and good. The best film is the one you are used to.

Professional photographers and advanced amateurs may find one or the other characteristics of a particular make, i.e. its gradation, granular structure, acutance, etc., of particular value for specific jobs.

Colour Film

These films produce an image in colour after appropriate processing, corresponding directly or indirectly to the natural colours of the subject.

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Colour film is as easy to use as black-and-white film, but needs a little more care in exposure.

Processing is more complex and is often carried out by the film maker or specially appointed processing laboratories.

There are two basic types of colour film: reversal and negative.

Colour Reversal Film

This material is also referred to as "colour slide film" or "colour transparency film". It produces a colour transparency on the actual film exposed in the camera. This transparency, when held up to the light, shows a positive image with all parts of the subject in their original colours. It can be viewed in a suitable transparency viewer with a magnifier, or it can be projected in a slide projector to give a large and brilliant picture on a screen.

Although the colour transparency is an end product, it can still be used to make:

(*a*) duplicate positive colour transparencies;

(*b*) a black-and-white negative which can then be used to produce black-and-white prints or enlargements;

(*c*) a colour negative for making colour prints and enlargements, as from colour negative film (described below);

(*d*) direct colour enlargements on colour reversal paper.

For correct colour rendering, colour reversal films have to be matched to the light by which they are to be exposed. Accordingly, some makes are available in the following types:

(*a*) daylight colour film, which will give correct colour reproduction in daylight or with blue-tinted flash bulbs;

(*b*) artificial light type colour film, which will give correct rendering by photoflood illumination, or high-power tungsten light.

Colour reversal films made for one kind of light may often be used under different light conditions with the aid of a conversion filter recommended by the manufacturer.

Different makes of colour film may yield transparencies of a slightly different characteristic colour quality, colour saturation and colour contrast. Which you prefer is very much a matter of personal taste, and you should try various makes to find the one which suits you best.

Colour Negative Film

This material is also referred to as "colour print film"

On processing, it produces a colour negative which shows a negative image of the subject in its complementary colours, e.g. blue appears yellow, red appears blue-green and so on.

These colours may sometimes be hidden under an overall orange or reddish tint.

The main purpose of the colour negative is the production of colour prints on paper. The quality is generally somewhat higher than that obtained from a positive transparency.

From the colour negatives you can make:

(*a*) any number of colour prints in varying sizes;

(*b*) direct black-and-white prints or enlargements, in the same way as from a black-and-white negative;

(*c*) positive colour transparencies for viewing or projection.

Most colour negative films are suitable for exposure by any type of light, e.g. daylight, flash or photofloods. The necessary adjustment of the colour rendering is carried out during the printing stage. Manufacturers sometimes recommend conversion filters even with colour negative films. These mainly serve to simplify the subsequent correction needed in printing.

Colour Film Speeds

The majority of colour films, reversal and negative, are rated between 25 and 80 ASA or 15 and 20 DIN, corre-

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sponding to a slow to medium speed for black-and-white material. There are also reversal films of 160 and 500 ASA for poor light conditions.

As with black-and-white films, the slower types tend to yield improved image detail, especially with negative colour film, while the fastest emulsions may show slightly reduced colour saturation and image sharpness.

The Choice of Colour Film

Making your choice between colour reversal or negative film (in spite of the various uses that can be made of either type of material) remains an individual question.

First, there is the way you want to see the result, as a colour print or as a colour transparency. The print has no doubt much to commend itself. It is easily shown, stored and carried about. The transparency calls for the aid of a viewer or projector.

Next, the all-in cost of a colour print is about three times that of the transparency. This may at times be mitigated by the fact that from unsuitable negatives no colour prints need or can be made. The transparency user, however, has additional outlay in the form of a viewer or projector with screen (in most cases both).

A final point to consider is the quality. The transparency will record each colour and its brilliance in full. Held to the light or projected on a screen, the brightness range, which may be 100 : 1, is fully or almost fully retained. It shows colours brilliant with great depth and realism. The colour print can at its best only reflect four-fifths of the light falling on it and even the darkest tones reflect about one-twentieth to one-tenth, so that the full range is no more than 16 : 1. While the colour print is, by necessity, duller than the transparency, it is only fair to say that the eye soon adjusts itself to the reduced brightness range, and subjects without great contrasts will be very satisfying.

From the point of view of convenience, reversal film has the advantage that it directly gives finished colour pictures

of high quality and is still capable of producing colour prints as well. For the maximum versatility and control in print making, however, negative film is superior.

Filters for Black-and-White Film

By its nature, a black-and-white film can only translate colour values of the subject into tones of lighter or darker grey. Mostly these correspond fairly closely to the *brightness* of the colours, but do not of course differentiate between them. In certain cases the difference between the brightness of two colours may be so slight, that both record in almost the same tone of grey.

There a filter helps by modifying the depth of one or the other colour, and so making it show up lighter or darker than it would normally.

The commonest example is the blue sky with white clouds in a landscape. The blue is so brilliant (and the film is often excessively sensitive to it), that the clouds do not show up against it. By putting a yellow filter in front of the camera lens we can subdue or "hold back" the blue, and so making it record darker in the final print.

We can even go further and over-emphasize the effect progressively with an orange or red filter; these darken the blue so much that the sky looks almost black for a really dramatic effect.

The same considerations hold for other filter effects. For instance, the film renders a red rose in the same tone of grey as the leaves of the rose bush. With the colour contrast gone, the rose disappears in its surroundings. A green filter makes the rose darker and the leaves lighter; conversely a red filter will show up the rose as light against dark foliage. Scientifically, both filters falsify the tone rendering, but produce a more acceptable pictorial result.

In all these cases a filter *lightens objects of its own colour, and darkens objects of its complementary colour.* Apart from isolated instances in pictorial photography, such contrast control is very valuable in copying and scientific work.

All filters cut out some part of the light and thus, as a

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compensation, an increase in exposure time is necessary when using them. This is stated on most filters in the form of a filter factor indicating by how much (e.g. 2 times, 3 times) the exposure must be increased with that filter. The factors are approximate for they depend not only on the nature of the filter but also on the exact colour sensitivity of the film and on the colour of the prevailing light. The Canon models with through the lens metering, automatically allow for the factor of any filter placed over the lens.

Filters for Colour Film

The normal yellow, orange and other filters for black-and-white film must never be used with colour films, as they would give the colour picture a strong over-all colour tint.

In daylight and with daylight type film, only two filters are ever required. One is a haze filter, almost colourless but for a slight straw tinge. It is usefully employed on hazy days and in high altitudes to avoid excessive bluishness of the colour picture, especially with distant landscapes, seascapes and near water. This filter does not call for any change in exposure. On dull days, a skylight filter compensates for the excessive coldness of the colour rendering.

Either filter is also useful for colour photography with electronic flash, as it produces somewhat warmer tones.

CONVERSION FILTERS are used if a colour film, balanced for one type of light, should be used in another type of light. The film manufacturers give specific recommendations, generally in the instructions with the film.

For table of filters made for Canon reflex cameras see page 68.

The Polarizing Screen

There are times when the judicious use of reflections will enhance the pictorial effect of the picture, but they are also frequently obtrusive and undesirable. Thus highly-polished subjects are difficult to illuminate successfully so as to obtain a true photographic rendering, since they will reflect

too much light and so spoil the reproduction with a glare which obscures the detail. This difficulty can sometimes be overcome by the use of the polarizing screen.

It has the special property of suppressing so-called "polarized" light. Light reflections from glass, china, enamel, polished wooden surfaces, water, are to a large extent polarized and can, therefore, be almost extinguished by placing the polarizing filter in the proper position over the lens. This screen will prove particularly useful when taking shop-windows, furniture, photography of wet objects, etc. It is only fully effective when the photograph is taken at an angle of about 35° to the plane of the subject containing the reflection. At any other angle reflections can be reduced but may be still visible.

The Canon reflex is ideal for judging the actual effect. The filter is placed in front of the lens, and then by slowly rotating the filter one can find the best or desired result on the reflex-focusing screen. As the polarizing filter is slightly tinted, the exposure time should be increased, the factor being about three times. The Canon models with through the lens metering automatically allow for this.

The polarizing screen is in addition particularly useful in colour photography where it acts similarly to the yellow filter in black-and-white photography, i.e. it darkens a "milky" blue sky. The bluish colour cast obtained with diffused sky light is removed or at least appreciably reduced with the polarizing filter. The reduction or elimination of reflections through this filter is of course just as useful in colour pictures as it is in black-and-white.

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EXPOSURE

Exposure means—to expose the film in your camera to light. The dose of light any film needs to produce the right sort of image depends on how sensitive that film is to light. A fast film is more sensitive than a slow film.

Once your choice of film is settled, the basic condition of exposure is settled with it. You are now left with the problem of scaling the light you find in front of your camera to the amount your film needs.

Your job is to judge the light reflected from the subject you are about to photograph. Your grandfather, as an amateur photographer, used to take into account his geographical position, the time of the year, the hour of the day, the state of the sky as well as the tone of the subject itself, and by so adding one thing to another size up the light reflected from the subject. The experienced professional, of course, hardly ever worked that way. He just had a look and he knew.

Today a light meter or exposure meter does the same for any photographer. It takes a look, it measures the light and it lets you know.

In fact, it does more than that. It translates the light measured straight into terms of photographic exposure. It does so by presenting you with the choice of aperture numbers and shutter speeds, sorting them out in pairs.

Aperture and Speed

The aperture number or *f*-stop controls the *amount of light* allowed to enter through the lens. These numbers run in a series: 2–2.8–4–5.6–8–11–16; each higher stop number lets through half the light of the next lower number (next larger stop).

The shutter speed controls the *length of time* for which the lens is kept open to light. Shutter speed figures represent fractions of a second: $2=\frac{1}{2}$ second, $4=\frac{1}{4}$ second . . . $500=1/500$ second.

The actual exposure is a product of these two: "how

much" and "how long". A large amount of light striking the film for a short time may produce an image similar to that produced by a small amount of light striking the film for a long time. Hence the free choice from a series of balanced aperture-shutter combinations offered by your exposure meter: more or less open apertures paired with more or less quick shutter speeds and more or less stopped down apertures paired with more or less slow shutter speeds.

Choosing the Combination

Even though the built-in meter measures for you the correct exposure you still have one decision to face: which aperture-shutter combination to choose for any given shot. Paradoxically enough they all are right and yet one is better than the other.

Why should it be so?

Because both the aperture and the shutter also have secondary functions and effects.

The aperture not only controls the amount of light that is allowed to pass the lens—it also has a bearing on how much of the image will be sharp.

The shutter, in controlling the length of time for which the light strikes the film, will inevitably record any movement during that time as a slight or greater blur.

So you are left with three things to think of:

How fast is the action you want to catch?

How much of the scene in front of the lens has to be sharp?

Is the light good enough for either?

If there is fast action you have to choose and pre-set an appropriately fast shutter speed (p. 40) and then pair it with the stop which is right by your meter.

If the scene is to be sharp from a point close to the lens to some other point well away from it, you should choose the stop that will yield the necessary depth of field (p. 41) and then pair it with the shutter speed agreed by your meter for correct exposure.

If the light is very poor, the chances are that you may not

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be able to cope with either extremely fast or particularly deep subjects.

Yet your choice in putting shutter speed or depth of field first should still be governed by what you value most about the picture you propose to take.

Exposure nowadays is no problem at all. But to hit it off in such a way that it will produce the picture *you* want is still a matter of intelligent judgment.

Time Exposures

When the light is very weak, especially when you have to use a small stop, even the slowest shutter speed of 1 sec. may be too short. In that case, you need time exposures. Set the shutter to B and press the release button. The shutter now remains open for any length of time until you let go of the release button.

For such time exposures, the camera must be mounted on a firm support such as a tripod. It is safest to release the shutter with the help of a cable release to avoid shaking the camera. This release screws into the release button on the camera.

For long time exposures, where the shutter is to remain open for longer than you can conveniently keep the release depressed, use a cable release with a lock. To make the exposure set the shutter to B, press the cable release plunger with the locking plate lifted. The shutter will now remain open until the locking plate is depressed. On cable releases with locking screws, tighten the screw on pressing the plunger and undo the screw to close the shutter. Alternatively you can, while keeping the release button depressed at B turn its locking ring to "L" when the shutter will remain open until the ring is turned back to the A position.

Using an Exposure Meter

To get results the best exposure meter has to be used intelligently. This may look like a contradiction, since we have already said that it is an accurate light measuring

instrument. But light from all parts of the subject—highlights, shadows and middle-tones—falls on the meter, so the reading it gives us is an average one for the whole subject areas.

Meters are scaled to suit typically average subjects—i.e. subjects with average areas of light, dark and middle tones. So if you point the meter at a subject of this kind, the exposure reading will be correct.

But if the subject is not average—if there are large highlight areas and little shadow, or large shadow areas with few highlights—then you have to modify the exposure reading to obtain the best results.

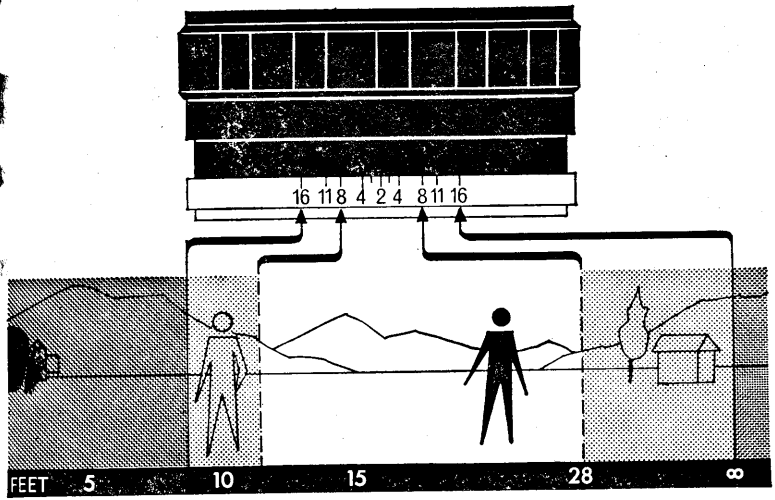
So there is more to using a meter than just pointing it at the subject and accepting without question the reading indicated. Even the TTL meters of the Canon cameras cannot cope with every subject. Exposure measurement is of the central rectangular area in the viewfinder, which should, therefore, generally be lined up on a mid-tone, and the picture reframed, if necessary, before shooting.

The usual method of using a meter is to point it directly at the subject. This gives the correct exposure reading provided the subject has an average mixture of highlights, shadows and middle tones. But if there is a large bright area, or a large dark area, the best method is to go near to the main subject and take a close-up reading. For example, if the subject is a figure against a white or dark background, by going closer you will reduce the amount of background affecting the meter and therefore get a reading in terms of a more average subject, which is what you want.

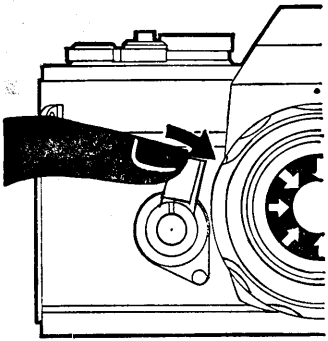
For some subjects you can take a reading from really close up, aiming the meter at the part of the subject that you want to make sure has optimum exposure. For instance, many photographers take a close-up reading of the sitter's face in portraiture; out-of-doors you can take the reading from the back of your hand instead of going up to the subject.

If you cannot go close up to a subject that needs a close-up reading, then try to find something near at hand that is

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Canon FL lenses have a depth of field scale engraved on the lens barrel behind the focusing ring. It has lines pointing to the distance scale from a set of aperture numbers each side of the focusing mark. Each pair of lines from the same aperture number indicates the nearest and furthest planes of sharp focus at that aperture. Thus, with a 50 mm. lens set to 15 ft., the depth of field extends from 8½ ft. to infinity at *f* 16 or, at *f* 8 from 12 ft. to 28 ft.



The Canon reflex cameras are fitted with a depth of field preview facility (see page 12). This allows the lens to be stopped down to the preset aperture while the camera is still set on "automatic" so that the effect of the smaller aperture can be seen on the focusing screen.

similar in tone to the subject, and on which the light falls from the same direction and take a reading from that.

When taking readings of general scenes including a good deal of sky, you have to tilt the meter down slightly to reduce the area of sky "seen" by the meter. The sky is a bright highlight, and by tipping the meter down to exclude some of it, the subject becomes "average" in tone range.

Open views, such as distant landscapes, usually have very light shadows, so you can give a shorter exposure than the meter indicates. It is usual to give half the exposure—i.e. use double the shutter speed, or use one stop smaller.

AGAINST THE LIGHT subjects are extreme cases of non-average tone range. The main lighting becomes a very bright highlight in the field of view, so if you point the meter straight at the subject it will indicate too short an exposure and give you a silhouette effect in the final picture.

This is all right if you want a silhouette. But if you want correct exposure for the subject, you should either take a close-up reading, or take a reading from the camera position and give four to eight times the exposure indicated.

COLOUR FILMS have little exposure latitude, so particularly careful reading is advisable. The meter is used in the same way as for black-and-white films.

Because of the importance of the highlights, if you are using a meter from the camera position for an against-the-light shot, it is best to only double the reading, and not multiply it four to eight times as recommended for black-and-white negative films.

Shutter Speeds and Movement

The actual shutter speed you need within a series of available aperture-speed combinations is governed by considerations of camera steadiness as well as of subject movement.

An unsteady camera hold results in camera shake, to which a small and light instrument such as the Canon reflex

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is particularly liable. Even the slightest shake will result in inferior definition of the image. Practical experience goes to show that 1/125 sec. is safe, while you have to hold the camera particularly steady when using 1/60 or 1/30 sec. Where lighting conditions make even longer exposure times essential and there is no subject movement, either support the camera on a tripod, or look round for extra support for your elbows and hands—e.g. a wall, railing, etc.

The shutter speed required to arrest movement depends of course primarily on the speed with which the subject moves. Remember, however, that parts of the subject (e.g. the legs of a runner) may move faster than the subjects as a whole; you may sometimes have to compromise and show such parts slightly unsharp. Often that is not a serious fault, as slight blurring—provided the main part of the subject is sharp—helps to emphasize the impression of movement. Other factors to consider are the distance of the subject—the farther away, the less noticeable the movement blur; the focal length of the lens—a long-focus lens in effect brings the subject nearer; and the direction of the movement. Objects moving across your field of view blur more than if they are approaching or receding.

Aperture and Depth of Field

When you focus the Canon reflex on a given object, the image of that object will be really sharp on the film. Things nearer or farther away will be gradually less and less sharp, until they are noticeably blurred. The range of distances over which objects are still acceptably sharp, before you do notice the loss of definition, is known as the depth of field.

You can control the extent of this sharp zone by the lens aperture. As you stop down the lens, the zone of sharpness grows in both directions; as you open up the lens, its depth decreases.

You can obtain the actual zone of sharpness at various apertures and distances from tables, but in practice, the most convenient way is to use the depth of field indicator on each lens.

This is a special scale marked in aperture numbers opposite the distance scale. There are two sets of such marks from the largest stop (*f* 1.2, *f* 1.4, or *f* 1.8) to the smallest (*f* 16) on each side of the focusing index (the mark that indicates the distance to which you have set the lens).

At any distance setting, the distance figures opposite each pair of aperture numbers on the depth of field scale give the near and far limits of sharpness. For example, at 10 ft. you may find the two stop values 8 on the scale (*f* 8) opposite about 7 and 17 ft.—so you have a sharp zone from 7 to 17 ft. At *f* 4, the distances opposite the stop values 4 may be 8 and 13 ft. respectively; at *f* 16 you might get a sharp zone from 6 ft. to 40 ft. You will also notice that the depth of field is greater at far distances than near ones.

Two more points on depth of field:

Firstly, the depth obtained depends also on the focal length of the lens. Short focus lenses yield more depth and tele lenses less depth.

Secondly, the sharp zones obtained by the indicator are based on a somewhat arbitrary assumption of how much blurring is acceptable. So depth of field data for different cameras with the same lens may not always agree, and you are also quite safe in rounding off figures obtained from such data. To make really big enlargements from your negatives, you can use stricter standards of sharpness by stopping down further. (For previewing of depth of field on cameras with automatic diaphragm see page 53).

Zone Focusing

With action subjects and similar occasions where you want to shoot quickly, determining sharp zones even with the depth of field indicator wastes too much time. There you need prepared settings covering given near and medium distance ranges that you can easily memorize and set on the camera. The focusing zone table (p. 67) gives such settings; then you only have to worry about keeping the subject within that zone while you shoot.

With landscapes and views, you sometimes need depth

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from infinity to the nearest possible point. Thus, by stopping down to *f* 8 and focusing on 25 ft. you get a really extended zone from infinity down to about 13 ft. But don't use this "hyperfocal distance" setting for maximum sharpness in the far distance; in that case focus on infinity (∞).

FLASH WITH THE CANON REFLEX

Flash is an efficient light source where no or insufficient daylight is available such as at night, indoors, etc., and also to fill in deep shadows in daylight. In the flashlight you carry your own private "sun" with which you can illuminate your subject or scene at any time and place.

Flash Bulbs

The flash bulb is similar to a minute electric bulb. However, when current passes through it, it lights up in an intense flash lasting usually about 1/40 to 1/60 sec. Each bulb will flash only once and has to be discarded afterwards.

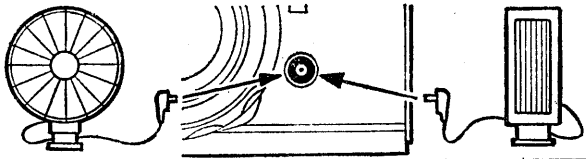
The flash bulb is inserted in a flash gun and the current of the battery fires the bulb, while a reflector fixed behind the bulb makes sure that all the light is directed towards the subject. Most flash guns incorporate a capacitor unit which increases the reliability of firing, even when the battery is nearly exhausted. The shutter speed, provided it is slower than 1/30 sec., has no effect on exposure since the flash is shorter than the exposure time. Due to the fact that focal plane shutters travel across the film and do not expose it all simultaneously except at certain speeds, the special instructions on page 44 have to be followed.

Popular-size flash bulbs are blue-tinted. These can be used for black-and-white or colour (negative or reversal) photography, either as the sole light source or as fill-in lighting by daylight.

Electronic Flash

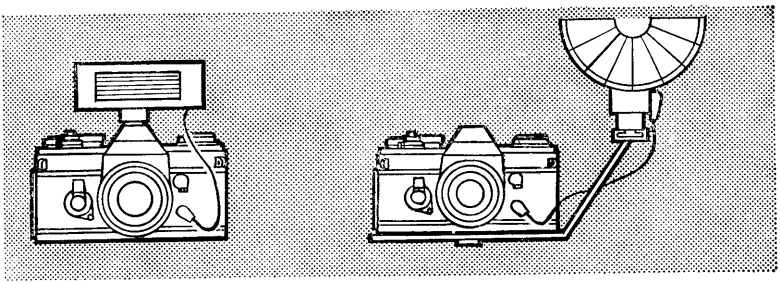
Electronic flash units utilize the discharge of a high-tension capacitor through a flash tube. The power is derived from an accumulator or battery (there are also models working from the mains electricity supply). The electronic flash outfit is somewhat bigger and heavier than the flash bulb outfit, its comparative light output equals an average flash bulb and its initial cost is higher. On the other hand, anything from 10,000 to 25,000 flashes are obtained from one

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FP	1/125 - 1/1000 or 1 - 1/30	F1, FTb, TLb	B x 1 - 1/60
M	1 - 1/30		
AG	1 - 1/30		
FP	B 1 - 1/1000 (not 1/30)	FT, PELLIX	B x 1 - 1/15
M	B 1 - 1/15		
AG	B 1 - 1/15		
FP	B 1 - 1/1000 (not 1/30)	FX, FP	B x 1 - 1/30
M	B 1 - 1/15		
AG	B 1 - 1/15		
FP			
M	1 - 1/15	EX-EE	B x 1/15 - 1/60
AG			
ALL	1/30 - 1/500	EX-AUTO	B x 1/125 - 1/500
ALL	B 1 - 1/15	EF	B x 1 - 1/125

The Canon reflexes have a single flash socket accepting 3 mm. coaxial plugs and, on later models, hot-shoe, cableless contacts. The X position on the shutter speed control of some models is the recommended setting for electronic flash and corresponds to 1/60 second.



Flash units can be used on the accessory shoe fitted over the pentaprism (*left*). It is usually preferable, however, to place the flash to one side of the camera on a flash bracket (*right*) or extension lead.

tube. The flash duration is extremely short (1/700 to 1/2000 sec.) and will arrest the fastest movements. The cost of an individual exposure is negligible.

Electronic flash is universally suitable for black-and-white, negative colour and also for daylight type reversal colour films. It can be used for fill-in lighting by daylight.

Canon Reflex Flash Synchronisation

The Canon reflex camera has a standard 3 mm. co-axial flash terminal on the front of the camera body accepting any regular flash unit. The FTb, EX AUTO and EF also have a direct flash contact plus contacts for the Canon Auto Tuning system in the accessory shoe. As the F-1 has no accessory shoe, similar contacts are contained in a Flash Coupler fitting over the rewind knob. A Flash Coupler without contacts is available for ordinary flash photography.

ON CANON EF

Flash bulbs of all types can be used with speeds 1 to 1/15 sec.
Electronic flash can be used with B, 1 to 1/125 sec.

ON CANON F-1, FTb AND TLb

Focal plane class flash bulbs (FP) can be used with all speeds of 1/125 sec. and faster and 1/30 sec. and slower.
M class flash bulbs can be used with 1/30 sec. and slower.
MF class (AG1, AG3, M2, Cube) flash bulbs can be used with 1/30 sec. and slower.
Electronic flash can be used with 1/60 sec. and slower.

ON CANON FT AND PELLIX

Focal plane class flash bulbs (FP) can be used with all speeds except 30 (1/30 sec.) and X.
M class flash bulbs can be used with B, 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1/15 sec.
*AG*1, *PF5 and Cube* flash bulbs as for M class.
Electronic flash can be used with X, B, 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1/15 sec.

ON CANON FX AND FP

Focal plane class flash bulbs (FP) can be used with all speeds except 30 (1/30 sec.) and X.
M class flash bulbs can be used with B, 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1/15 sec.
*AG*1, *PF5 and Cube* flash bulbs as for M class.
Electronic flash can be used with X, B, 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, 1/15, 1/30 sec.

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The "X" on the above Canon reflex camera shutter speed dials represents the standard flash speed setting of 1/60 sec. for *electronic* flash (*not* flash bulbs), which is actually equivalent to a very short exposure, consisting of the flash duration of the electronic flash.

ON CANON EX EE

Electronic flash can be used with 1/60 sec. or slower.

Flash bulbs of all types can be used with 1/15 sec. or slower.

ON CANON EX AUTO

Electronic flash can be used with 1/125, 1/250, 1/500 sec.

Flash bulbs of all types can be used with speeds 1/30, 1/60, 1/125, 1/250, 1/500 sec.

Exposure Guide Numbers

There is a convenient way of working out exposures with flash, and this is by means of a guide number. When you buy flash bulbs you will always find the guide number for any speed of film printed on the packet.

To find the correct aperture to use, divide the guide number by the distance between the flash and the subject. For instance, suppose you find that the guide number of the bulb with the film in use is 160. If you then want to take a photograph at a distance of 10 ft. from the subject, divide 160 by 10=16. Therefore, the correct aperture to use is *f* 16. Alternatively, if you want to use an aperture of *f* 8 for any reason, then the correct flash distance is 160÷8=20. So the flash must be 20 ft. from the subject.

See also table of flashbulbs with their guide numbers on page 68.

Synchro-Sunlight

If you want to use flash in conjunction with daylight, e.g. to lighten deep shadows, the exposure time is taken for the sunlit side of the subject and the aperture used according to this reading. Now take the flash guide number for the shutter speed pre-selected, increased by half and divide it by the aperture to be used. The result is the flash-to-subject distance for a normal fill-in light. With daylight colour film, use only blue flash bulbs or electronic flash.

Example: Exposure meter reading at 1/30 sec.—*f* 16.
Guide number for the flash at 1/30 sec.—120.
The guide number increased by half is 180. Divide 180 by 16=11.

That means that the flashgun should be 11 ft. from the subject. It is advisable to use an extension cable between camera and flashgun. This enables you to place the flash farther away from or closer to the subject than the camera.

CANON AUTO TUNING (CAT) allows the exposure meter needles visible in the viewfinder of the Canon F-1, FTb, FTbN, EX Auto and EF to be used to set the correct aperture for the focused distance and the state of charge of the capacitors in the special flashguns available for this system. CAT is at present available for the Canon Speedlite 133D and the FD 50 mm. *f* 1.4, FD 50 mm. *f* 1.8 and FD 35 mm. *f* 2 and *f* 3.5 lenses.

The Speedlite 133D is attached to the EF and FTb accessory shoe or to the Flash Coupler L to fit over the rewind knob of the F-1. The appropriate Flash Auto Ring is connected to the front of the camera lens, ensuring that it engages the stud on the focusing ring. The cable from the Auto Ring plugs into the flash unit. The procedure is then as follows:

1. Set the Auto Ring indicator to the appropriate lens marking.
2. Set the camera shutter speed dial to 1/60 sec. (on EF to 1/125).
3. Switch on the Speedlite. DO NOT switch on the camera meter. On model EF set CAT switch to the flash symbol.
4. When the capacitors in the Speedlite are partly charged the exposure meter needle swings upward. Focus the subject and the needle moves.
5. Turn the aperture ring until the pointer lines up with the needle. The aperture is then correctly set for the distance, film speed and state of charge of the flashgun capacitors. On model EF the camera's AE control adjusts the aperture automatically.

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USING ALTERNATIVE LENSES

The field of view covered by the standard lens is ideal for the majority of subjects. Occasionally, however, a greater or reduced field of view has distinct advantages. There are also advantages in using lenses specially designed for certain types of work. There are several such specialized lenses (see page 54) for the Canon reflex, which provides facilities for swift interchange of lenses.

Wide-Angle Lens

A wide-angle lens is a lens of shorter focal length. It sees and reproduces more of the subject in front of the camera than does the standard lens.

Such a wide-angle lens has definite advantages in cases where the practicable distance between camera and subject is limited and the standard lens cannot record the whole of the subject. The wide-angle lens is, therefore, primarily used for architectural photography and interiors.

In view of its short focal length, the depth of field covers a particularly wide zone, even at full aperture. It can, therefore, be employed with advantage as a quick-shooting lens for general purposes where accurate focusing or distance-setting would be inconvenient (e.g. through insufficient time).

To get a large image, even of a near subject, you have to go really close to it. Near objects then tend to dwarf more distant ones, and the resulting picture shows pronounced perspective effects. In this way, the wide-angle lens can be used to emphasize perspective.

Wide-angle lenses made for the Canon reflex camera are listed in the lens table on pages 54 and 56.

Telephotography

A tele lens on the other hand has a smaller angle of view than the standard lens. It is of longer focal length, and reproduces less of the subject in front of the camera than the standard lens does, but on a larger scale.

Such a lens is particularly suitable for subjects that are difficult to approach closely, such as animals, children,

architectural detail, sports events, etc. In photographing distant views without near foreground, it brings the subject nearer. It also permits a greater camera-to-subject distance in portraiture, producing a more pleasing and subdued perspective.

At the same time, its lesser depth of field concentrates definition on the portrait, avoiding a sharp background which would detract from the main object.

Long focus lenses made for the Canon reflex camera are listed in the lens table on page 54 and 56.

Special Purpose Lenses

These are lenses not normally employed for general photography. They serve a definite specialized purpose such as ultra close-up, macro, or ultra wide-angle photography.

Zoom Lenses

A zoom lens is so constructed that its focal length is infinitely variable within stated limits. It does away with the necessity for changing the lens when a different focal length is required and facilitates exact framing of the subject. Once focused, the Canon reflex zoom lenses (see page 54) remain in sharp focus at all settings of the zoom control. Both zooming and focusing are one-handed operations.

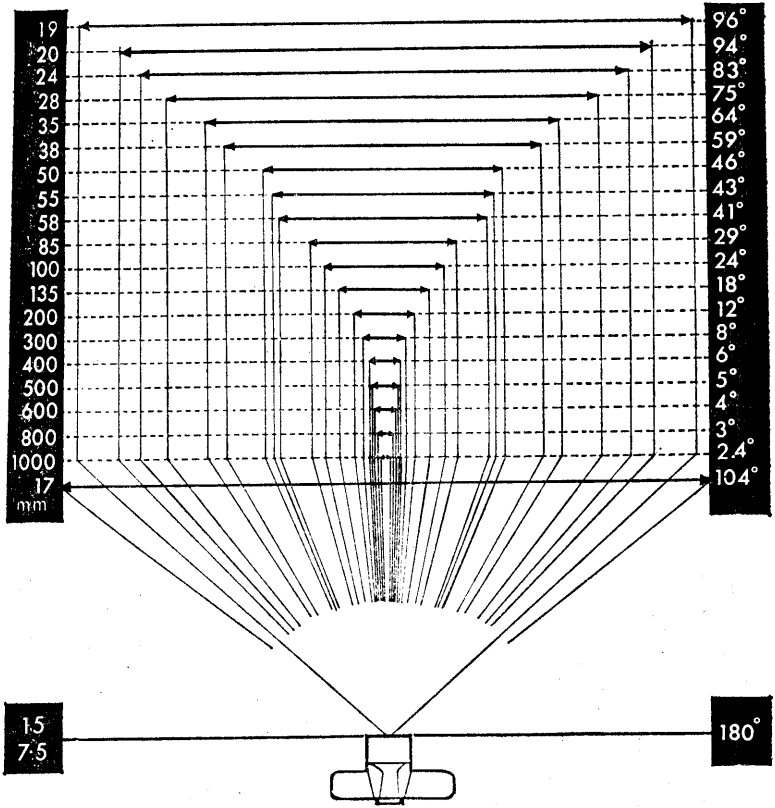
The zoom lens does not, however, entirely outmode lenses of a fixed focal length because its definition, covering power, contrast and flatness of field, while good, does not usually reach that of the fixed focal length Canon lenses. Furthermore, the zoom lens is bulky, heavy and costly, and generally of a less wide maximum aperture than fixed focal length lenses.

Alternative Standard Lenses

The standard Canon lenses distinguish themselves mainly through different maximum apertures.

The tables on pages 54 and 56 gives full details of lenses specially designed for the Canon reflex cameras. It should be mentioned that other makers produce lenses which can be used on the Canon reflex.

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Lenses available for the Canon reflex cameras over the range of focal lengths from 7·5 to 1,200 mm. with angles of view from 180° to 2.1°. The arrowed lines above compare with angles of view (*right*) for each focal length (*left*).

Lens Changing

The Canon reflex lenses are in a quick change bayonet mount. To remove the lens from the camera turn the bayonet ring on the rear of the lens mount to the left as far as it will go and lift out the lens from the body.

To fit a lens to the camera body make sure that its bayonet ring is turned to the left to have the red dot in line with the guide pin in the back of the lens. Match the red dot of the lens to that on the camera body flange, and turn the bayonet ring to the right to its definite stop.

Change lenses in the shade or subdued light. The CdS meter must remain switched off while the lens is changed otherwise the aperture coupling to the lens will not engage. Protect the lens—once it has been removed from the camera —with a lens rear cover to avoid damage to the protruding aperture pin.

Mirror Lock

When using the 19 mm. Canon lens, the mirror has to be locked into the up position because the lens sits deep in the camera body and would interfere with the mirror. The mirror lock may also be used for sequences of photo-micrography and for copying work with manual aperture setting to reduce any vibration to an absolute minimum. No mirror lock is fitted to Canon EE EX or TLb (where one cannot use a 19 mm. lens) or to the Pellix (where the 19 mm. lens *can* be used).

TO LOCK THE MIRROR in the up position, turn the milled lever on the right-hand side of the lens mount on the camera body upwards. On Model EF set the stop down lever to the stop down position and take the reading of the meter and turn the LM lock lever to the orange M position. This will lock mirror up.

TO UNLOCK THE MIRROR simply turn the milled lever downwards as far as it will go, when the mirror will return to its normal operating position. To unlock mirror on EF model simply push LM lever away from M.

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Protect the lens with its cap when the mirror is in the up position because strong sunlight can in time damage the shutter.

Focusing and Depth of Field

Focusing with a wide-angle or telephoto lens is the same as when using a standard lens. The reflex screen enables the image to be focused accurately. At the same time, the reflex screen shows the exact field of view of the particular lens used. There is no parallax error, nor are supplementary finders required. The only exception is the 19 mm. lens which is provided with its own separate finder.

The alternative lenses have their own depth of field indicator. This works in the same way as with the standard lens.

Lens and Aperture Control Systems

THE CANON FD SERIES of lenses originally designed for the Canon F-1 provide full aperture metering on the F-1 and all subsequent models. They can also be used on the earlier models with stopped down metering system. The FD series is characterized by highest optical performance, highest image sharpness throughout the entire focusing range, new floating mechanism for high resolution and contrast even in close-up work, multilayer anti reflection coating, compact design. They are gradually replacing the original series of Canon FL lenses.

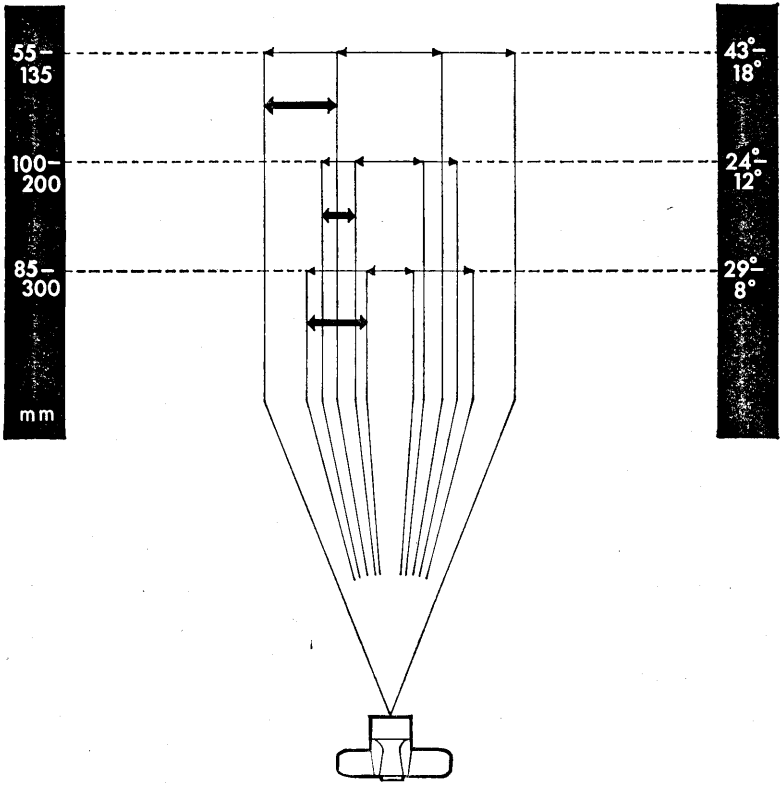
THE CANON FL SERIES of lenses designed for the earlier Canon models are fitted with the automatic pre-set aperture, a design which closes down the diaphragm automatically to the pre-selected aperture when the shutter release is depressed. The diaphragm automatically reopens immediately after the shutter has been released. Consequently, the finder image is at its maximum brightness at all times except during the actual exposure. At the same time the minimum depth of field is available which aids accurate focusing. Manual aperture control is also usable on these lenses.

INTERCHANGEABLE LENSES FD

Lens	Type	Angle of view	Aperture system	Magnification	Lens Elements	Minimum aperture	Nearest focus feet	Nearest focus metres	Attachment size (mm.) Cap size	Attachment size (mm.) Filter size	Hood
Fish Eye 7.5 mm. f 5.6	Special	180°	Manual	0.15×	11	22	—	—	Built-in	Excl.	—
[1]FD 15 mm. f 2.8	Super wide-angle	180°	Automatic	0.3×	10	16	1	0.3	Excl.	Built-in	Built-in
FD 17 mm. f 4	Super wide-angle	104°	Automatic	0.34×	11	22	0.9	0.25	72	75	—
FD 20 mm. f 2.8	Super wide-angle	94°	Automatic	0.4×	10	22	0.9	0.25	72	75	Excl. screen
FD 24 mm. f 2.8	Super wide-angle	83°	Automatic	0.48×	9	16	1	0.3	55	C-55	BW-55B
FD 24 mm. f 1.4	Super wide-angle	83°	Automatic	0.48×	10	2	1	0.3	72	75	Excl. screen
FD 28 mm. f 3.5	Wide-angle	75°	Automatic	0.56×	7	16	1.5	0.4	55	C-55	BW-55B
FD 28 mm. f 2.8	Wide-angle	75°	Automatic	0.56×	7	22	1	0.3	55	55	BPW-55W
FD 35 mm. f 3.5	Wide-angle	64°	Automatic	0.7×	6	16	1.5	0.4	55	C-55	BW-55A
[3]TS 35 mm. f 2.8	(Tilt & Shift)	79°/62.6°	Manual	0.7×	—	22	1	0.3	58	C-58	Excl.
FD 35 mm. f 2	Wide-angle	62°	Automatic	0.7×	9	16	1	0.3	55	C-55	BW-55A
FL 50 mm. f 3.5	Macro	46°	Automatic	1×	4	22	9.2	0.234	58	60	S-60
[2]FD 50 mm. f 1.8	Standard	46°	Automatic	1×	6	16	2	0.6	55	C-55	BS-55
[2]FD 50 mm. f 1.4	Standard	46°	Automatic	1×	7	16	1.5	0.45	55	C-55	BS-55
FD 55 mm. f 1.2	Standard	43°	Automatic	1.1×	7	16	2	0.6	58	C-58	BS-58
FD 55 mm. f 1.2 AL	Standard	43°	Automatic	1.1×	8	16	2	0.6	58	C-58	BS-58
FL 85 mm. f 1.8	Long focus	29°	Automatic	1.7×	6	16	3.5	1	—	—	—
FD 100 mm. f 2.8	Telephoto	24°	Automatic	2×	5	22	3.5	1	55	C-55	BT-55
FD 135 mm f 3.5	Telephoto	18°	Automatic	2.7×	4	22	5	1.5	55	C-55	BT-55
FD 135 mm. f 2.5	Telephoto	18°	Automatic	2.7×	6	22	5	1.5	58	C-58	Built-in
FD 200 mm. f 4	Telephoto	12°	Automatic	4×	6	22	8	2.5	55	C-55	Built-in
FD 200 mm. f 2.8	Telephoto	12°	Automatic	4×	5	22	6	1.8	—	72	Built-in
FD 300 mm. f 5.6	Super-telephoto	8.3°	Automatic	6×	6	22	13	4	58	C-58	Built-in
FLF 300 mm. f 2.8	Super-telephoto	8.5°	Manual	6×	6	32	10	3	48	—	Clamp on
FD 35-70 mm. f 2.8-3.5	Zoom	64°–31°	Automatic	0.7–1.4×	10	22	3.5	1	55	—	—
FL 55–135 mm. f 3.5	Zoom	43°–18°	Automatic	1.1–2.7×	5	22	6	2	58	C-58	S-60
FD 100–200 mm. f 5.6	Zoom	24°–12°	Automatic	2–4×	8	22	8	2.5	55	C-55	Built-in
FD 85–300 mm. f 4.5	Zoom	29°–8°	Automatic	1.7–6×	15	22	8	2.5	77	Excl.	Built-in
[3]FL 400 mm. f 5.6	Super-telephoto	6.2°	Automatic	8×	7	32	—	4.5	48	82	Excl. 82
[3]FL 600 mm. f 5.6	Super-telephoto	4.1°	Automatic	12×	5	32	—	10	48	114	Built-in
[3]FL 800 mm. f 8	Super-telephoto	3.1°	Automatic	16×	7	32	—	17	48	114	Built-in
FL 1200 mm. f 11	Super-telephoto	2.1°	Manual	24×	6	64	—	37	48	114	Built-in

[1] Used with normal mirror position.
[2] Equipped with a coupling pin to Canon Auto Tuning System.
[3] Front component interchangeable type. Focusing adapter (1-component, 2-element, FL automatic diaphragm with A-M ring). Filter is of insertion type with holder.
*FD Lens Hoods are of Bayonet mount.

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The three zoom lenses for the Canon reflexes cover the ranges of focal lengths shown on the left. The lighter arrows indicate the angles of view (marked on the right) and the heavier arrows the focal length range of each lens.

Lens	Type	Angle of view	Pre-set aperture release mechanism	Magnification	Lens element	Minimum aperture	Nearest focus feet	Nearest focus metres	Attachment size (mm.) Cap size	Attachment size (mm.) Filter size	Hood
FL 19 mm. *f* 3.5R	Super-wide angle	96°	A-M ring	0.38×	11	16	1.75	0.5	80	Series No. 9	—
FL 28 mm. *f* 3.5	Super-wide-angle	75°	A-M ring	0.56×	7	16	1.5	0.4	60	58	W-60-B
FL 35 mm. *f* 2.5	Wide-angle	64°	Aperture release ring	0.7×	7	16	1.5	0.4	60	58	W-60
FL 35 mm. *f* 3.5	Wide-angle	64°	A-M ring	0.7×	6	16	1.5	0.4	50	48	W-50
*FLP 38 mm. *f* 2.8	Wide-angle	59°	Aperture release ring	0.76×	3	16	3	0.8	60	48	—
FL 50 mm. *f* 3.5	Standard (Macro)	46°	A-M ring	1×	4	22	9.2 in.	0.234	60	58	S-60
FL 50 mm. *f* 1.8	Standard	46°	A-M ring	1×	6	16	2	0.6	50	48	S-50
FL 50 mm *f* 1.4	Standard	46°	A-M ring	1×	7	16	2	0.6	60	58	S-60
FL 55 mm. *f* 1.2	Standard	43°	A-M ring	1.1×	7	16	2	0.6	60	58	S-60
FL 85 mm. *f* 1.8	Long-focus	29°	Aperture release ring	1.7×	5	16	3.5	1	60	58	T-60
FL 100 mm. *f* 3.5	Telephoto	24°	Aperture release ring	2×	5	22	3.5	1	50	48	T-50
FL 135 mm. *f* 3.5	Telephoto	18°	A-M ring	2.7×	4	22	5	1.5	50	48	T-50
FL 135 mm. *f* 2.5	Telephoto	18°	Aperture release ring	2.7×	6	16	5	1.5	60	58	T-60
FL 200 mm. *f* 3.5	Telephoto	12°	Aperture release button	4×	7	22	8	2.5	60	58	Built-in
FL 200 mm. *f* 4.5	Telephoto	12°	A-M ring	4×	5	22	8	2.5	50	48	Built-in
FL 55–135 mm. *f* 3.5	Zoom	43°–18°	Aperture release button	1.1–2.7×	13	22	7	2	60	58	S-60
FL 100–200 mm. *f* 5.6	Zoom	24°–12°	A-M ring	2–4×	8	22	8	2.5	57	55	Built-in
FL 85–300 mm. *f* 5	Zoom	29°–8°	Aperture release button	1.7–6×	15	22	12	4	75	72	Built-in
R 300 mm. *f* 4	Long-telephoto	8°	Manual	6×	5	22	5	1.5	Special	48	Special
R 400 mm. *f* 4.5	Long-telephoto	6°	Manual	8×	5	22	10.2	3.1	Special	48	Special
R 600 mm. *f* 5.6	Extra-long-focus	4°	Manual	12×	2	32	20	6.4	Special	48	Special
R 800 mm. *f* 8	Extra-long-focus	3°	Manual	16×	2	32	44.3	13.5	Special	48	Special
R 1000 mm. *f* 11	Extra-long-focus	2.4°	Manual	20×	2	32	69	21	Special	48	Special
FL-F 300 mm. *f* 5.6	Long-telephoto	8°	A-M ring	6×	7	22	13	4	60	58	Built-in
FL-F 500 mm. *f* 5.6	Long-telephoto	5°	Pre-set release button	10×	6	22	33	10	106	95	Built-in
EX 35 mm. *f* 3.5	Wide-angle	64°	Automatic	0.7×	9	16	1	0.3	48	50	W-50
EX 50 mm. *f* 1.8	Standard	46°	Automatic	1×	6	16	1.5	0.45	48	50	S-50
EX 95 mm. *f* 3.5	Telephoto	26°	Automatic	1.9×	9	16	4.5	1.3	62	65	T-65
EX 125 mm. f. 3.5	Telephoto	20°	Automatic	2.5×	7	16	4.5	1.3	62	65	T-65

* FLP 38 mm. *f* 2.8 is for use with Pellix QL.

For lenses longer than 300 mm., there are no distance scales. The shortest focusing distance is listed in the table for reference.

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THE CANON R SERIES of long telephoto lenses from 300 mm. to 5,200 mm. may be used with the Canon reflex camera in conjunction with the R Bellows and have manual aperture setting only.

Long Range Telephoto Lenses

The "R" range of lenses has to be used in conjunction with the R-bellows on the Canon reflex cameras, all with manual aperture setting and no distance scale: R 300 mm. *f* 4, 6× magnification; R 400 mm. *f* 4.5, 8× magnification; R 600 mm. *f* 5.6, 12× magnification; R 800 mm. *f* 8, 16× magnification; R 1,000 mm. *f* 11, 20× magnification as compared with the 50 mm. standard lens.

CLOSE-UPS WITH THE CANON REFLEX

The single-lens reflex camera is particularly suitable for close-up photography. When working with supplementary lenses, extension tubes, extension bellows, etc., the precise area covered as well as the exact definition can be controlled on the reflex focusing screen. Parallax, which makes close-up work with almost any other type of camera at least very difficult, or necessitates extensive auxiliary attachments, simply does not exist in the Canon reflex cameras.

The standard Canon reflex lens of 50 mm. focuses down to 24 in. and at this distance covers a field of approximately 12×8 in., i.e. a ratio of reproduction of 1 : 8. For workings at closer range, supplementary lenses, extension tubes, bellows attachment or special optical systems are available.

Supplementary Lenses

For working closer than the standard lens permits, there are two close-up lenses primarily designed for use with the standard lenses of 50, 55 or 58 mm. and one intended for the Canon Zoom FL 55–135 mm. *f*3.5 lens. The supplementary lens does not interfere with the automatic aperture of the main lens, nor is there any increase in exposure required when using them. Lens No. 450 gives the lower magnification and No. 240 gives the higher.

Two lenses may be screwed into each other and used together to get an increased effect. This is, however, not recommended when using zoom lenses because it will cause vignetting of the picture corners. The tables on pages 68–69 give the working range and subject area.

A close-up lens No. 1800 is used in conjunction with the Zoom FL 55–135 mm. lens. See table on page 69.

The close-up lenses Nos. 240, 450 and 1800 represent the shortest lens front to subject distances of 240 mm., 450 mm. and 1800 mm. with the lens set to infinity.

Filters and lens hoods intended for the camera lens can be screwed on to the front of the supplementary lens.

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Extension Tubes

For work at closer range than the above close-up lenses permit, extension tubes can be used. The FL tubes are for use with automatic aperture setting.

The 15 mm. FL 15 Tube gives a ratio of reproduction with the standard lens of approximately 1 : 2.5 to 1 : 3.5 covering a subject size of approximately 3×4.5 in., the exposure increase being about 1.6 to 2.2×.

The 25 mm. FL 25 tube gives a ratio of reproduction with the standard lens of approximately 1 : 1.7 to 1 : 2.25 covering a subject size of approximately 2×3 in., the exposure increase being about 2× to 2.8×.

The exposure factor is automatically measured in Canon TTL metering models.

The extension tubes can be combined with close-up lenses to obtain a ratio of reproduction down to 1 : 1.

M series extension tubes are simple intermediate rings for use with manually operated aperture. There are three tubes M5 of 5 mm., M10 of 10 mm. and M20 of 20 mm. length.

Bellows Attachment

The Canon FL and M Bellows offer a continuously variable extension with a minimum of 35 mm. and a maximum of 135 mm. extension. In conjunction with a 50 mm. lens its range is between a ratio of reproduction of 0.7× to 3×.

The FL bellows are fitted with aperture coupling while the M bellows are for manual aperture setting. A slide duplicator can be fitted to the FL model.

Macrophoto Coupler FL

The Macrophoto Coupler allows the lens to be attached to the camera with the rear of the lens facing front. Some lenses give better definition when used that way round for close-range work. The coupler adds 31 mm. extension for focusing and can be used in conjunction with the extension tubes or bellows. Naturally, macro lenses are specially designed for close-range work and do not use the coupler.

Lenses for Close-up Work

The Canon Macro FL 50 mm. lens is designed for the full range of photography from w to 1 : 1.

The Canon FLM 100 mm. *f* 4 lens is designed for use with the FL bellows for photography down to 1 : 1.

Microphotography Attachment

The micro photography hood is a telescopic connecting tube between microscope and camera with bellows and lens mount converter for photomicrography. The exposure in the Canon TTL models even with these attachments is still automatically given.

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CANON REFLEX ACCESSORIES

In addition to the accessories and attachments described in the general text, e.g. filters, close-up lenses, extension tubes, bellows, and microphoto hood, there are many other accessories available.

Camera Holder

The camera holder R4-2 is a camera cradle to attach the Canon reflex firmly to a tripod or copying stand. It is particularly useful when working with long focal length lenses. It enhances the steadiness and balance of the camera on its support and permits easy changing from horizontal to vertical working position.

Waist Level Finder (Angle Finder)

The waist level finder is a right-angle finder which can be connected to the eyepiece of the pentaprism finder permitting observation of the subject from above the camera at right angles to the lens direction. It is intended for low-angle and waist-level photography and is also useful for copying and close-up work.

Copying Stand

The copying stand 3F consists of a baseboard and upright column with a sliding arm to which a camera holder is connected. This allows the camera to be used in the vertical position for copying as well as close-up macro and photomicrography. A variation of the stand is available without baseboard but with metal fittings for attachment to a table, desk, etc.

Lens Mount Converter

The converter A permits Canon screw-mounted lenses and extension tubes to be used on the Canon reflex camera FL mount, and similarly screw extension tubes can be connected with the A converter to the Canon FL or R bellows.

Lens Hood

A lens hood is recommended to prevent stray light from outside the picture area entering the lens. This could produce glare and reflections and thus reduce the brilliancy of the image.

Lens hoods for all Canon lenses are available except the 19 mm. ultra wide-angle and the FPL 38 mm. *f* 2.8 lens for the Pellix camera.

Lens Caps, Rear Lens Caps and Body Caps

These protect and keep lens and camera body dustfree when handled or stored separately.

Eyepiece Correction Attachments

Ground to specific powers, these attachments enable wearers of glasses to focus and view without glasses. Available in corrections +1.5, 0, —2.5, —4 dioptres.

Softomat

These are Canon soft focus lens attachments. They are mounted on the lens in the same way as filters and consist of an optical flat glass coated with a film of tiny dots. There are two degrees of softening, the No. 1 soft mat for moderate and No. 2 for stronger softening effect. They are used for special pictorial effects in landscape and portrait photography. The soft mat can also be used in conjunction with an enlarger lens.

Canon Booster

The Canon Booster is an auxiliary meter that can be attached to the Canon FTb, FTbN, FT and Pellix for exposure measurement under extremely poor available lighting conditions. It amplifies the light electrically. It increases the measuring range to induce the faint value of EV-3.5 in the Canon reflex FT (with unaided TTL meter EV+3) and EV—4.5 in the Pellix (with unaided TTL meter EV+1). It is useful in cases where the normal exposure meter will no longer register such as extremely dark subjects, moonlight,

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etc., and for high-power close-up photography and micro-photography.

The Canon Booster has a CdS sensing element, its shutter speed dial is calibrated for the FT model from 30 sec. to 1/60 sec., on the Pellix model from 60 sec. to 1/30 sec. The film speed scale is 25–12, 800 ASA (15–36 DIN). Needle window and shutter speed scale are illuminated by push button. It uses two 1.3 V "625" batteries and an additional one for illumination of needle window and shutter speed scale. It has a battery check combined with the on-off switch of the instrument. It is mounted on the accessory shoe of the camera and secured by a fixing lever. Electrical connection to the CdS meter is made by a connecting cable plugging into the battery chamber of the camera. The measuring system to obtain the exposure time is by matching the needle to the 0 (zero) point.

Motor Drive Unit

The Motor Drive Unit for Canon F-1 is a precision made powered film advance apparatus which allows short interval photography of three exposures per second, and other intervals up to one exposure per minute, continuous photography of 36 exposures and single-frame photography. Powered by a choice of external battery magazines.

Film Chamber 250

The film Chamber 250 is an exclusive long-length roll film magazine designed for the Canon F-1 camera to take a maximum capacity of 250 exposures. With the combined use of the Motor Drive Unit, it is effective for shooting sports events, news photography and scientific research.

Motor Drive MF

A variation of the motor drive unit has no timer, but shoots at 3.5 frames a second. The grip is detachable and houses the power unit. Interval timers can be attached to increase the range. The Motor Drive MF can be used with the Film Chamber 250 and Servo EE Finder for remote automatic-exposure photography.

CARE OF THE CAMERA

Storage

When not in use, the camera should be protected from damp and dust, preferably in its case and, as an additional precaution, inserted into a polythene bag.

Care should be taken to see that the camera is not kept in abnormally high or low temperatures—normal room temperature is best.

Take the precaution of removing any batteries because, however well made these may be, there is always a risk of deterioration and corrosion.

Exercise

Cameras (like most mechanical instruments) need to be exercised regularly to keep them in good condition. Store your camera where you can get at it easily and put it through its normal operations at least once a month:

1. Set the shutter release and fire several times.
2. Turn to a slow shutter speed and again set the shutter release and fire. Also operate delayed action divice.
3. Examine the exposure meter for correct operation.
4. Check film transport.
5. Check the rangefinder or pentaprism viewfinder.

These exercises will keep the mechanism in good order, retaining the natural qualities of the lubricant—thus ensuring the camera is ready for instant use when required.

Running Test After Storage

Before embarking on a holiday where your camera will be your constant companion or, on an important assignment, make a few trial exposures. It is advisable to test the camera at least four weeks prior to your departure to give time for a test film to be exposed and processed. This will avoid a possibly spoiled holiday record.

Keeping the Interior Clean

When your camera is used on the beach, or other conditions where dust or sand can easily infiltrate into the

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mechanism, take the precaution of putting the instrument with its case into a polythene or other container so that flying dust, sand, etc. particles are prevented from entering the camera. This applies particularly, of course, if it is laid down on a sandy beach. Furthermore, avoid leaving the camera in such a position that direct sunlight is allowed to fall upon it. This could ruin a camera.

Small chips of film can easily damage the mechanism, therefore always make sure that the inside of your camera is spotless. Check your camera every time it is loaded with film.

Treating the Camera With Care

Your camera is a fine, precision instrument. It has been produced with great care and attention to detail. Do not allow it to be swung by its shoulder strap, thrown into the back of a car, nor treat as if it were as robust as a battleship. If you protect the camera against possible damage due to a knock, you will be amply repaid by years of excellent and trouble-free service.

Coping with Tropical Conditions

High and widely varying temperatures with low humidity, as occur in desert regions and dry seasons, and very high humidity in rainy seasons, call for special precautions to protect the life and continued good performance of the camera. These conditions also cause the growth of moulds on organic matter. Sand, dust and insects may present problems.

The camera should be kept dry and clean. Leather parts should be wax polished, metal parts lightly greased. Never leave the camera unnecessarily exposed to heat. Always keep it in its case. The lens should be covered with the lens cap when not in use. Outer lens surfaces have to be kept clean, dirt and grit removed with an air-blower and by tapping. Wipe the lens surface with cotton wool or open mesh fabric (butter muslin) when required.

Store photographic equipment in an airtight metal box

or a tin which should be sealed with adhesive (e.g. medical) tape. In a humid atmosphere, add some desiccating agent, e.g. silica gel.

Condensation on the lens may occur when the camera is moved from a cool place into humid heat; this has to be removed before use and the whole camera carefully wiped before re-storing.

Films should not be kept longer than six months in their original airtight tins (tropical packing) at continual temperatures of 90°F (32°C). At continual 100°F (38°C), the life of most films is limited to a month or two. Keep films for as short as possible a time in the camera.

Films should be processed as soon as possible after exposure—within a week or two or, in very hot humid climates, within a few days. Keep the film in an airtight container with desiccant (to absorb moisture). If possible, keep in a refrigerator, but only if you can dry out the exposed film and the container is sealed.