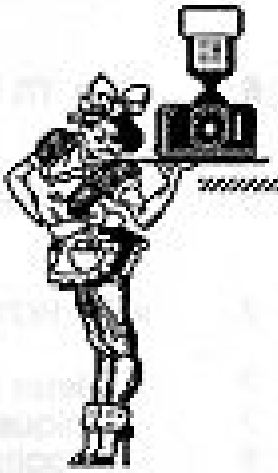
CANON'S REFERENCE GUIDE

for

THE 300TL SPEEDLITE



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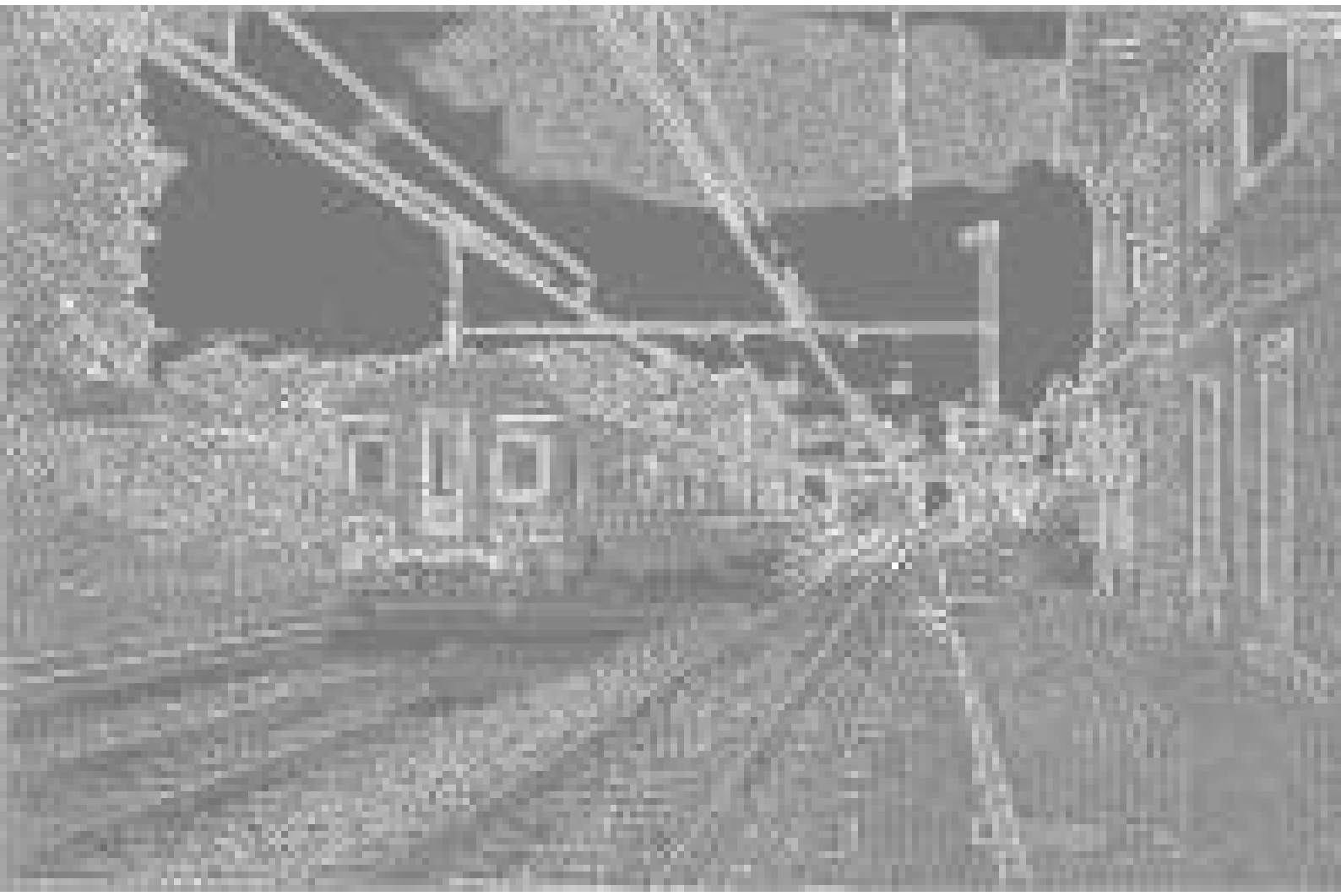

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This Reference Guide has been produced by the Canon U.S.A. Technical Department as a supplement to the instruction manual furnished with each 300TL Speedlite. While every effort has been taken to assure its accuracy, we welcome your comments and suggestions regarding its contents. We urge you to familiarize yourself with the techniques explained herein prior to usage in actual working situations.

THE 300TL CONCEPT

Canon's 300TL Speedlite, in conjunction with the T90 camera, offers an unprecedented amount of creative control in 35mm flash photography. New features such as A-TTL (Advanced Through The Lens), FEL (Flash Exposure Lock), and Second Curtain Sync combine with the T90's 1/250 flash sync speed to make a great variety of complex flash effects as simple as available light photography.

The purpose of this guide is to provide you, the photographer, with additional information above and beyond that found in the 300TL instruction manual. Whereas the manual illustrates which buttons to push, this guide serves to educate the user in the concepts of automatic flash exposure as applied to the 300TL.

The first part of the guide is a simplified technical explanation of TTL, A-TTL, and FEL. The better you understand your options, the easier it will be to select the best mode for your application.

The second section systematically covers each possible T90/300TL/FD Lens setting and shows how to operate the camera and flash with various types of lenses.

The last section covers special T90/300TL applications such as second curtain sync and multiple/off-camera flash. The usage of the T90 with studio-type strobes, with or without wireless sync, and other topics are also covered.

In order to use this guide properly, you should already be familiar with the basic operation of the T90. You should know how to set the various exposure modes and metering patterns. It is also helpful to know how to set the ISO and Exposure Compensation Index.

The T90 and 300TL are strong evidence of Canon's ongoing commitment to the technical advancement of 35mm photography. We at Canon U.S.A. want you to enjoy using your equipment. We know you will enjoy the beautiful results.

•1A• CONCEPTS OF FLASH PHOTOGRAPHY

If you own a Canon T90, chances are you're more than just a casual shooter. You rightfully expect much more than just average results from your photography. Whether you're amateur or professional, you know that the T90 gives you a tremendous amount of creative flexibility.

Since you're reading this Reference Guide, you probably own or are considering purchasing the remarkable Canon Speedlite 300TL. Before reading further, it's important to understand some basic principles of flash photography. The 300TL has been designed to take full advantage of these principles to help you get the most from flash photography.

The vital concept of all flash photography is that every flash picture is a type of "double exposure." Whenever you take a flash picture, you record not only the flash burst itself, but also the available light that was present at the time.

Since both exposures are recorded simultaneously, it follows that the amount of flash exposure can be less than, equal to, or greater than the amount of available light exposure.

In so-called "regular" flash photography, the amount of flash exposure is far greater than the amount of available light exposure; consequently, what you see on film in this case is only the flash exposure. But, as the amount of available light increases, you eventually reach the point where available light exposure equals flash exposure. In the broadest sense of the term, this is known as a "fill-in flash" situation.

What you are doing when you take a flash picture, whether you know it or not, is setting the ratio between flash exposure and available light exposure. As your photographic creativity becomes more refined, you will want more control over this ratio.

The 300TL gives you complete control of your flash photography, whether you want total automation, total manual control, or anything in between. The only limit is your imagination!

•1B• 300TL DESIGN CONCEPTS

T90 COMPONENTS USED IN FLASH PHOTOGRAPHY

The fundamental design concept of the 300TL is its full use of the features of the T90 camera and FD Lens system. The components of the T90 relating to flash photography are shown in Figure 1.

The control center of the T90 is its system of dual CPU's, or "electronic brain." All T90 and 300TL operations are ultimately regulated by this unique pair of microcomputers. The other electronic components fall into two broad categories: input and output devices.

Input devices on the T90 include the metering mode selector, the DX sensors, and the electronic input dial. Output devices include the viewfinder and external data displays plus the electronic shutter.

The DX sensors in the film chamber of the camera body read film speed and number of exposures. Pressure contacts in the body side of the lens mount read maximum aperture plus aperture control status (automatic or manual). Specially designed hot shoe contacts provide 2-way data transfer between camera and flash.

There are two metering sensors in the T90. In non-flash photography Sensor 1 above the eyepiece is used for center-weighted average and partial area metering. Sensor 2, located in the mirror chamber, is used for spot metering.

When the 300TL is used with the T90, these sensors perform additional functions. In TTL and A-TTL modes, Sensor 2 measures flash illumination reflected off the film. In FEL, Sensor 2 functions as a 2.7% spot flashmeter.

All of the above mentioned items are vital in obtaining the necessary data to achieve truly automatic flash exposure.

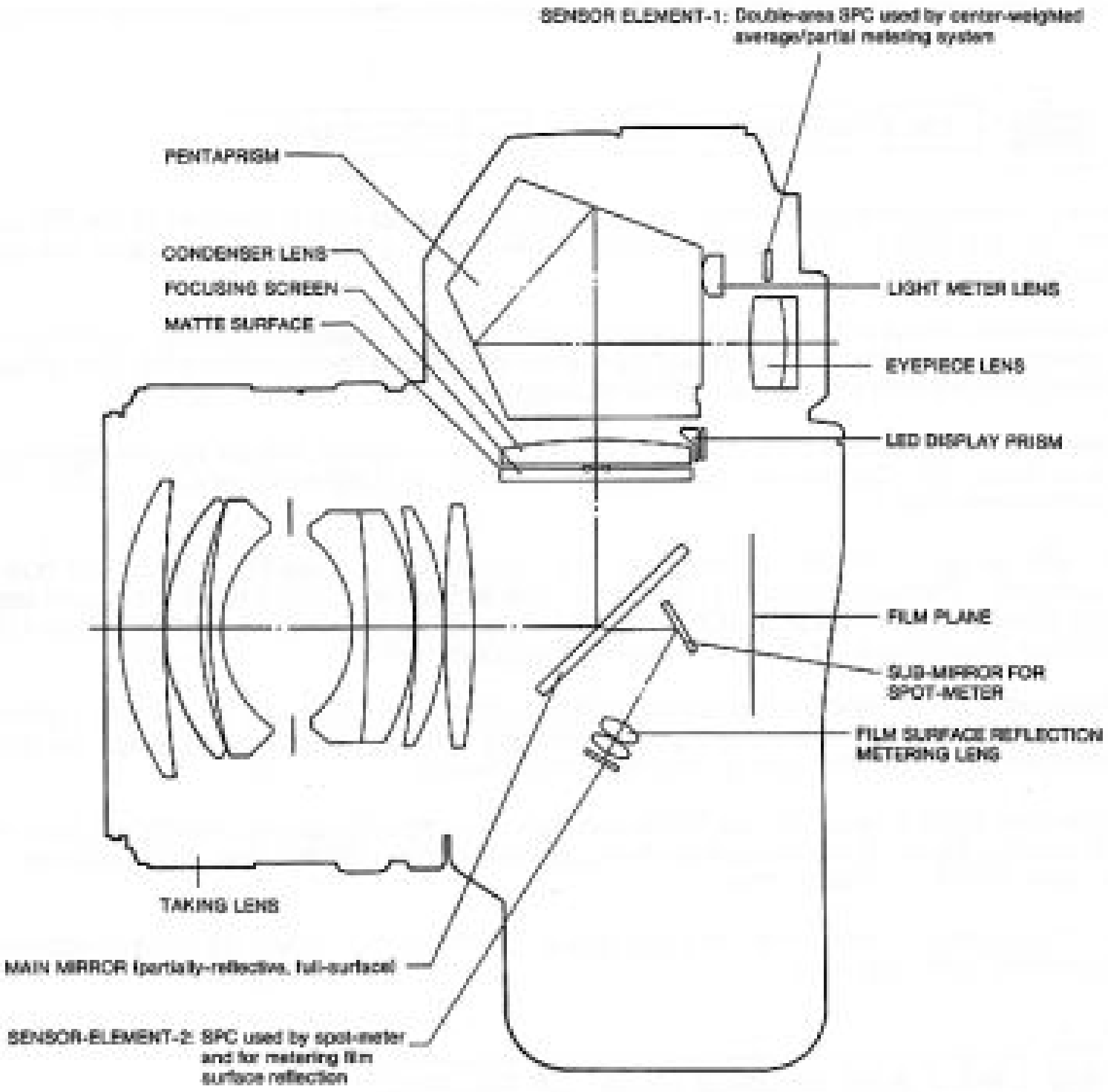
THE 3 AUTO EXPOSURE MODES OF THE 300TL

TTL- Though not marked on the 300TL, this mode allows the photographer complete control of both shutter speed and aperture while retaining automatic flash exposure. This is the only auto flash exposure mode possible when the T90 is set to manual mode.

A-TTL- The purpose of [illegible] is to provide fully automatic flash photography. Not only is A-TTL used in the "P" setting (Full Auto Mode) on the 300TL, it can also control flash exposure in Shutter Priority, Aperture Priority, and Stop-Down AE. To use an automotive analogy, A-TTL is to TTL as an automatic transmission is to a stick shift!

FEL- Flash Exposure Lock employs the abilities of spot flashmetering and the principle of AE Lock in order to provide automatic flash exposure of the subject in any situation, unaffected by the position of the subject or the reflectivity of the background.

Optical System for Finder/Light Metering System



SPC ALLOCATION	●: USED FOR METERING	○: USED FOR EXPOSURE CONTROL
METERING/CONTROL	SPC SENSOR-1	SPC SENSOR-2
CENTER-WEIGHTED AVERAGE METERING	●	
PARTIAL METERING	●	
CENTER SPOT METERING		●
A-TTL, TTL FLASH-AUTO	●	○
FE LOCK	●	●

FIGURE 1

•1C• TTL FLASH CONCEPT

The normal method of TTL flash control is to place a sensor inside the camera, aimed at the film plane. After the shutter opens and the flash exposure begins, the sensor reads the light reflected from the film and stops the flash once "correct" exposure has been achieved.

Using this method, the photographer can select any lens opening desired, within the limits of the film speed, subject distance, and flash guide number (power rating). In most cases, only a fraction of the total amount of flash energy is required. With the 300TL any unused energy is retained and made available for subsequent flash pictures.

The TTL mode works well for many normal flash pictures, and is actually desirable when both aperture and shutter speed must be controlled by the photographer. However, it is far from being perfect for all flash pictures.

For example, the TTL sensor usually reads the entire picture area, favoring the center. This means that off-center subjects could possibly receive incorrect exposure. Also, since the flash sensor only operates during the actual exposure, it is difficult to predict exposure accuracy before the photograph is taken. Another concern occurs during TTL usage in full daylight. Care must be taken when selecting the shutter speed/aperture combination in order not to overexpose the scene due to the existing light.

Last but not least, many photographers prefer some type of automation when it comes to the selection of shutter speeds and/or apertures during flash photography.

•1D• A-TTL AND FEL CONCEPTS

Canon's Product Development Center evaluated these problems and others in a comprehensive effort to provide the best possible solutions, taking full advantage of the latest microcomputer technology.

After careful consideration of the technical factors involved, combined with the clear intention to simplify the act of taking an excellent flash picture, Canon's design engineers created A-TTL (Advanced TTL) and FEL (Flash Exposure Lock).

Briefly, A-TTL and FEL use subject distance information as well as available light information to calculate exposure. This data, combined with other known information such as film speed and maximum aperture, is fed into the Main CPU before exposure. It is then applied to several built-in software programs, which vary depending on the user-selected T90 settings such as Program, Tv, Av, etc.

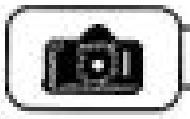
These software programs, based on analysis of thousands of actual photographs, evaluate the pre-exposure data in order to provide perfect exposure of both flash and available light. No longer does a photographer have to be an "expert" to get expert results!

There is one major difference between A-TTL and FEL. In an A-TTL setting, flash output is controlled off the film plane *during* the actual exposure. With FEL, flash output is determined *prior* to exposure in order to allow the photographer complete creative control of both the flash and available light exposure. The key point to remember is that A-TTL is quicker to operate while FEL offers the greatest degree of control. The ultimate choice for usage depends on your own particular needs.

Keep in mind that there are times when TTL Auto is preferable to either A-TTL or FEL. Part of the uniqueness of the 300TL is the fact that all three auto flash modes plus manual are available, offering incredible flexibility.

Before we discuss the various combinations of mode settings available with the 300TL and T90, we need to touch quickly on some of the basic principles of operation for both A-TTL and FEL. You may , however , want to jump ahead to section "•2A• HOW TO USE A-TTL SETTINGS" in order to go directly into flash usage. Instructions for using the 300TL as a simple TTL unit are located at the end of the section on A-TTL and FEL usage.

•1E• HOW A-TTL AND FEL WORK



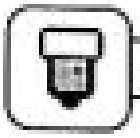
METER READING OF AVAILABLE LIGHT AND FLASH EXPOSURE LEVEL

The first step to occur in either the A-TTL or FEL setting is a center-weighted meter reading of the available light, registered as an EV (Exposure Value) in the T90. Any previously selected metering pattern is disregarded.

The EV level is used to preset the ratio of flash exposure to available light. This Flash Exposure Level is illustrated in Graph E. From EV -4 (the low-light sensitivity threshold of the T90's available light metering system) to EV 10, the flash exposure is either greater than or equal to the available light, depending on the selected T90 exposure mode.

From EV 10 to EV 13, the flash exposure to available light ratio is gradually reduced to -1.5 EV, or in other words, a 1:3 ratio. This results in a more natural flash-fill effect as the level of available light increases. But equally as important, the usable flash to subject distance is significantly extended, increasing the T90's versatility when used with the 300TL.

It is at this point that A-TTL and FEL go their separate ways in terms of calculating flash exposure.



UNIQUE FEATURES OF A-TTL

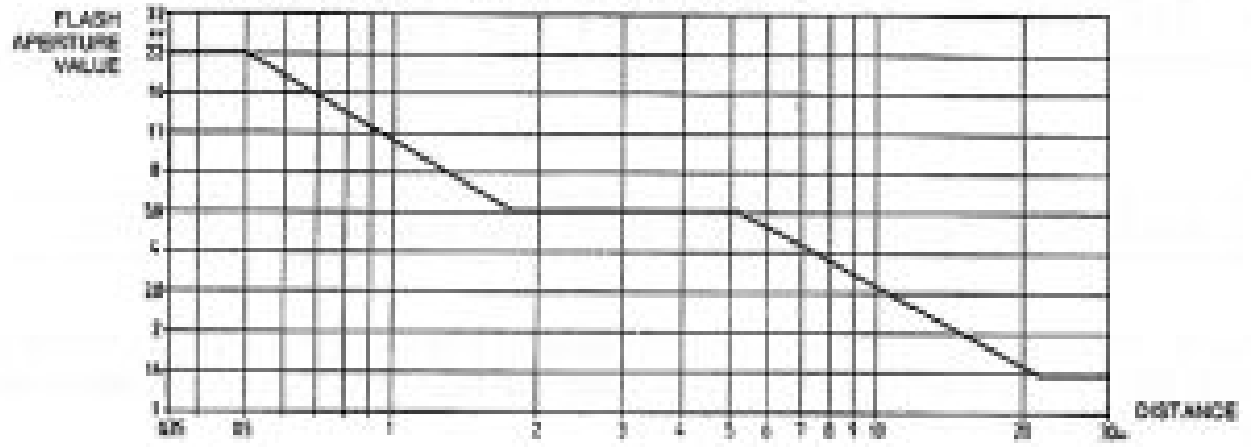
The second operation that occurs in A-TTL is either a near-infrared or visible pre-flash, emitted by the 300TL. In a direct flash situation, the Infrared Light Emitter is used. In any bounce position, the main flash tube will emit a visible, 1/20 power pre-flash. Light reflected from the subject is registered by the external sensor on the 300TL. The acceptance angle of the sensor is 14°, equivalent to the field of view of a 180mm telephoto lens, or approximately 30% of the field of view of a standard lens.

The purpose of the pre-flash is to establish the approximate subject distance and reflectivity. This data is stored in memory and used in different ways depending on the user-selected exposure mode of the T90.

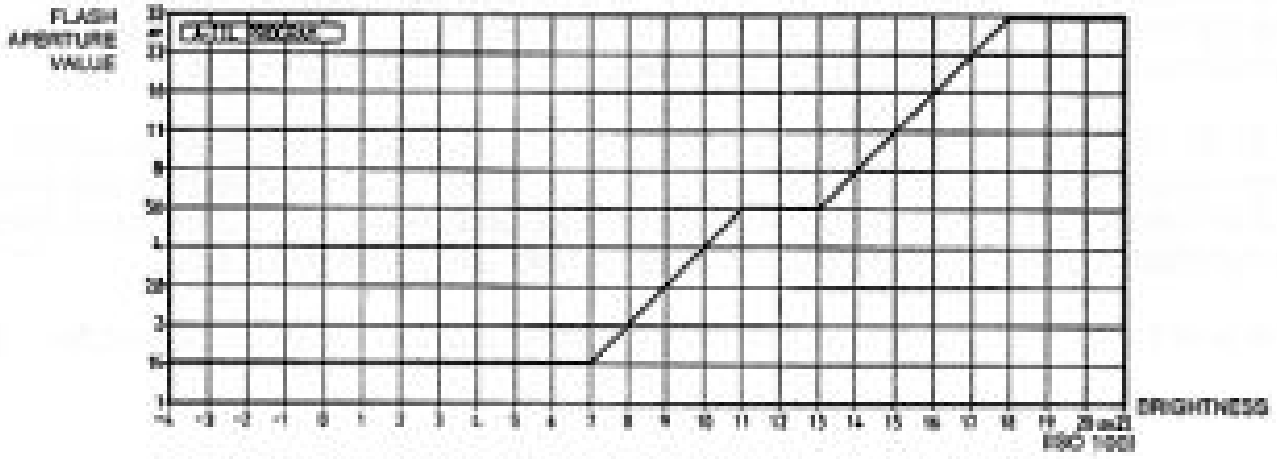
At this point the T90 knows the level of available light, the approximate subject distance, the film speed, and the maximum aperture of the lens in use. And all of this is prior to taking the exposure! The actual flash exposure is controlled based on the amount of light reflected from the film plane onto Sensor 2 after taking these factors into account.

You can adjust or "fine-tune" the A-TTL setting to suit your own needs simply by adjusting the Exposure Compensation Index or changing the ISO setting on the T90. HOWEVER, KEEP IN MIND THAT SUCH ADJUSTMENTS AFFECT YOUR AVAILABLE LIGHT EXPOSURE AS WELL AS THE FLASH EXPOSURE.

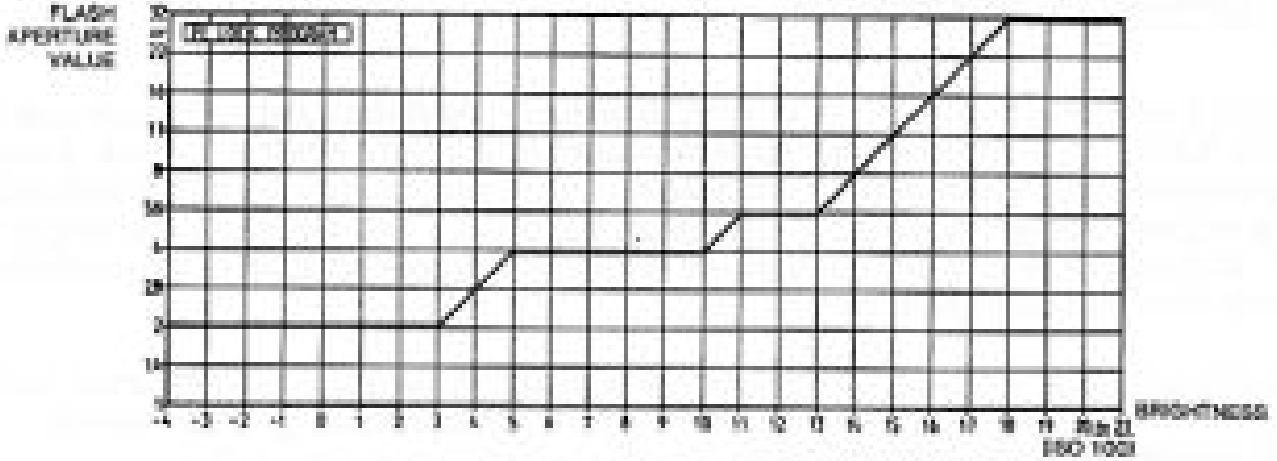
• A-TTL PROGRAM GRAPH A



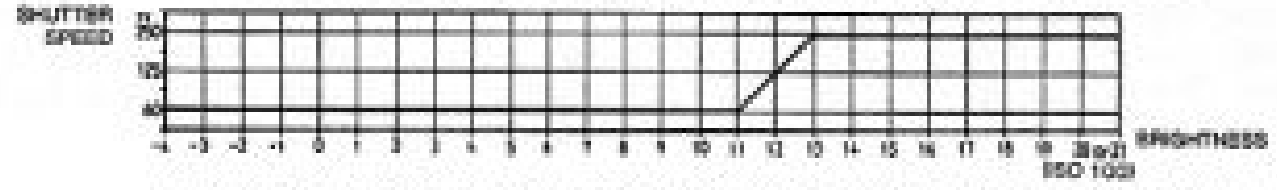
• A-TTL PROGRAM GRAPH B



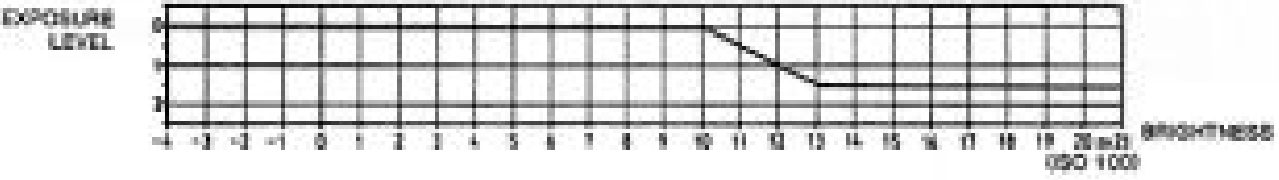
• FE LOCK PROGRAM, TTL PROGRAM GRAPH C



• PROGRAM SYNC SHUTTER SPEED SETTING GRAPH D



• FLASH EXPOSURE LEVEL CONTROL (ALL MODES) GRAPH E



UNIQUE FEATURES OF FE LOCK

After placing the spot meter area of the T90 over the main subject, FEL is initiated by pressing the T90's spot metering button. This sets the available light meter reading as well as the flash exposure level as mentioned in the previous section.

The second operation in FEL is also a pre-flash emitted by the 300TL. However, unlike A-TTL the infrared emitter is not used. Instead, the main flash head fires a 1/20 power, burst of light in the direct as well as bounce settings. Light reflected from the subject is registered by the 2.7% spot meter (Sensor 2) of the T90 and locked into memory.

FEL readings are held in memory for 30 seconds after the last camera control has been touched to allow you to remove your finger from the spot metering button. The exposure preview button on the back of the T90 can be used to extend viewing time of the exposure information without making any changes. FEL can be reset by re-pressing the spot meter button.

With FE Lock the the photographer is free to place the subject anywhere in the picture area while retaining accurate exposure. Moreover, since the flash exposure is not measured off the film, FEL is not affected by differences in film emulsion reflectance.

The manner in which the available light portion of the exposure is handled varies according to the exposure mode and metering pattern set on the T90. This is discussed in greater detail in the FEL section on usage.

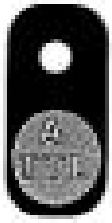
The final exposure is achieved by firing the flash at 20 times the level of the pre-flash memory reading (adjusted for flash exposure level as explained under METER READING OF AVAILABLE LIGHT AND FLASH EXPOSURE LEVEL).

FEL can be cleared under the following conditions:

1) After one picture is taken.
2) When 30 seconds have elapsed since the last camera control was touched.
3) When the "Metering/Clear" button of the T90 is pressed.
4) If the T90 or 300TL is turned off before the picture is taken.

With the above concepts in mind, we can now evaluate the finer points of selecting the most desirable exposure mode combinations of the T90 and 300TL when used with A-TTL and FEL.

MODE SET A-TTL



To use A-TTL, depress the grey Control Mode button above the Mode Set Switch. The following T90 exposure modes are usable with A-TTL: Program, Variable Shift Program, Shutter Priority, Aperture Priority, and Stop-Down AE. A-TTL cannot be used with Manual, Stop-Down-Fixed Index, or Bulb.

PROGRAM A-TTL

If you select Program or Variable Shift Program on the T90 and Mode Set A-TTL, the end result is the same as if you had set "P" on the 300TL. There is no difference between Full Auto Mode and any kind of Program A-TTL.

SHUTTER PRIORITY AND APERTURE PRIORITY A-TTL

If you want to control both shutter speed and aperture simultaneously with the 300TL, these are not the modes for you (refer to section "•2C• THE 300TL AS A SIMPLE TTL FLASH). However, if you want automatic fill-flash at all times with complete control of aperture or shutter speed, read on!

In Shutter Priority (Tv), you select the shutter speed of choice from 30" to 1/250. If you happen to set a higher speed, the camera will automatically limit it to 1/250. The camera will select the proper aperture.

Aperture Priority (Av) performs much in the same manner as Shutter Priority. The only difference is the camera now automatically selects a shutter speed from 30" to 1/250 based on the aperture you select.

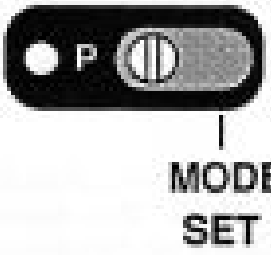
Don't expect to get similar readings in either of these two settings as you did in Program! Remember- the 300TL in Shutter and Aperture Priority A-TTL is providing fill-in flash results, no matter what the available light level! Notice that you get the same meter reading whether the flash is on or off. True fill-in flash photography requires that the available light exposure must be correct.

Pre-exposure warnings are issued under the following conditions-

1) The available light is too bright or too dark for the setting you have selected. Example: you're using ISO 100 film indoors or at night, with Shutter Priority A-TTL at 1/250, and the maximum aperture of the lens is blinking in the viewfinder display. Solution: switch to Program A-TTL if you want the T90 to control shutter and aperture; or switch the T90 to manual and select your own aperture and shutter speed (refer to section "•2C• THE 300TL AS A SIMPLE TTL FLASH").

•2A• HOW TO USE A-TTL SETTINGS

PROGRAM MODE/FULL AUTO MODE



The Full Auto Mode is the simplest and easiest to use of all modes on the 300TL. Quite simply, once you have set the selector switch on the flash to "P" and the FD Lens to "A", all settings (shutter speed, aperture, metering pattern, A-TTL, first curtain sync) are automatically controlled by the T90.

Any metering pattern or mode (except "Bulb") set on the T90 is disregarded. At the first stroke of the shutter release several steps occur. The EV level of the available light is registered by a center-weighted meter pattern, the flash to available light ratio is set, and the pre-flash is emitted.

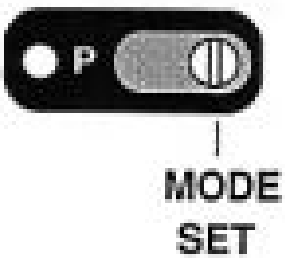
The shutter speed is automatically set between 1/60 and 1/250, based on the EV level as shown in Graph D, to prevent slow shutter speeds in lowlight situations.

The pre-flash produces an aperture value based on subject distance (see Graph A). This value is then compared with a second aperture value based on the available light (see Graph B). The T90 selects the smaller of the two apertures.

If the subject is determined to be out of range based on film speed, maximum aperture, or subject distance a pre-exposure warning is provided in the viewfinder. Both the shutter speed and aperture displays blink. At this point move closer to the subject and initiate another pre-flash. Exposure will be correct if the viewfinder display isn't blinking.

The Full Auto Mode is primarily designed for trouble-free flash photography indoors but works equally as well outdoors for totally automatic fill-in flash results.

"MODE SET" OPERATION



When you set the selector switch of the 300TL to MODE SET, you can take full advantage of all T90 exposure modes as well as all 300TL settings. As you become more experienced with flash photography, you will probably want more creative control...MODE SET is designed for this! As you start to explore the seemingly limitless combinations, you can refer to this guide to know what to expect.

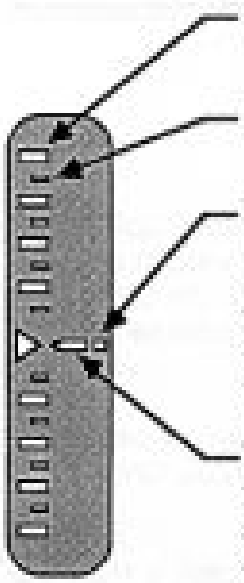
2) The subject is too far for the aperture you've selected. Example: you select f/22 in Aperture Priority for maximum depth-of-field, using ISO 64 film, and the subject is over 5 feet away. Both shutter and aperture displays are blinking. Solution: move closer or select a wider aperture.

3) The subject distance is too far for the lens you are using. Example: you're using ISO 100 film and a 70-210mm f/4.0 lens with the subject 35 feet away. Once again both displays are blinking. Solution: move closer or switch to a faster lens.

STOP-DOWN AE A-TTL

This mode is very useful when using non-FD lenses or accessories. You must set the aperture on the lens manually, then press in the depth-of-field preview lever on the T90. Select either Program, Variable Program, or Aperture Priority. A shutter speed will automatically be selected based on the available light. A pre-exposure warning will appear if the correct shutter speed is slower than 30" or faster than 1/250, or if the subject distance is too great.

Center the main subject in the spot metering area and press the spot metering button. Now, take a look at the white/blue scale on the right side of the viewfinder.

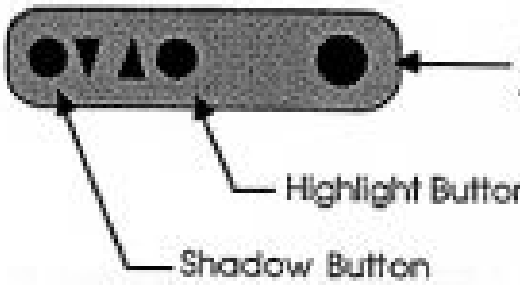


If the bar is above the triangle index, the background will be overexposed relative to the main subject. If it is below the index, the background will be underexposed. If it is lined up at the triangle index, both background and main subject will be correctly balanced.

Now here's where the fun begins!

First a simple, but very important, rule for fill-in flash photography. Apertures (f/stops) control flash exposure. Shutter speeds determine available light or ambient exposure. With the T90, we have complete control over both flash exposure and available light using Aperture Priority FEL.

To alter the background exposure you must adjust the shutter speeds. This is accomplished by using the Highlight/Shadow buttons located on the back of the T90 (see below). In effect we are under- or overexposing the background by raising or lowering the shutter speed. You'll be able to see the actual speeds change in the viewfinder from 30" up to 1/250. Use the scale to control the amount of over- or underexposure in half-stop increments.



Once you have placed the background exposure at the desired level, you can fine tune the flash exposure if desired. This is done by setting a new aperture with the electronic input dial. Since the flash exposure was locked into memory during the pre-flash, any change in aperture after that will over- or underexpose the main subject. This allows you to adjust for

•2B• HOW TO USE THE FEL SETTING

PROGRAM FEL

Working in Program FEL can prove very useful, especially if the photographer has to work quickly with an unusual lighting situation. A good example would be of a football player wearing his helmet and a bright uniform in full sunlight. By using Program FEL it is very easy for the photographer to get a perfect exposure on the player's face.

Program FEL is similar to Program A-TTL in that the T90 automatically sets both aperture and shutter speed for you. The shutter speed range is held between 1/60 and 1/250 (refer to Shutter Speed Graph D), but aperture selection is slightly different.

The main difference between Program FEL and Program A-TTL (Full Auto Mode) is that the camera's automaticaly selected aperture is based strictly on the available light level (see Graph C). In an outdoor fill-in flash situation this is not that important, but indoors or at night, you can end up with an unnecessarily wide aperture. In this case, you can either select Program A-TTL (just switch the 300TL from Mode Set to "P"), TTL Auto, or Aperture Priority FEL (see below).

To use Program FEL, select either Program or Variable Program on the T90 and Mode Set FEL on the 300TL. Next place the spot metering zone of the T90 viewfinder over the part of the subject for which you wish to expose. Then press the spot metering button, causing the pre-flash to be emitted by the 300TL.

In the viewfinder you will now see the automatic shutter speed and aperture settings below the picture area. To the right, you will also see a white scale with a triangle index and a small, fixed dot on the right.

For proper exposure of average subjects, the dot must be lined up opposite the triangle index. If it is below the index, you'll have to move closer to the subject and press the spot metering button again. In Program FEL, it's virtually impossible for the dot to line up above the triangle index when you pre-flash, but if it does, move further from the subject if possible and try again.

APERTURE PRIORITY FEL

This particular mode takes the greatest advantage of FEL's capabilities. It provides complete and separate control of the flash exposure as well as the available light exposure. At the same time, the photographer has complete control over subject position in the picture area.

First, use the T90's input dial to select the aperture of your choice. Set the desired metering pattern for the available light. You're going to be able to adjust the available light exposure in this mode, so partial or spot metering can be very useful here.

unusually bright or dark subjects as well as unusual effects.

Note that as you adjust the aperture in this way that the shutter speed changes at the same time. In other words, the available light exposure remains the same if all you want to do is change the flash exposure.

SHUTTER PRIORITY FEL

This mode is perhaps the least useful of any FEL setting, but it can be helpful when you are switching back and forth between flash and available light photography of moving subjects. The viewfinder display looks the same as with Aperture Priority FEL. Shutter speeds are now adjusted with the electronic dial. However, you do not have the flexibility of manipulating the settings the same way as in Aperture Priority FEL.

If you use the Highlight/Shadow buttons, you'll find that the aperture is adjusted but not the shutter speed. This over- or underexposes the main subject and the background at the same time so there's usually no point in doing it.

If you adjust the shutter speed with the electronic dial, the aperture changes to maintain the correct available light exposure but you can adjust the flash exposure on the main subject.

If you pre-flash again after changing the shutter speed, it has the effect of matching the flash output to the new speed.

STOP-DOWN AE FEL

This mode can be used with any FD Lens, but it is more helpful with non-coupled accessories such as the Auto Bellows or the Vari-Extension Tubes.

To use Stop-Down AE, select Program, Variable Program, or Aperture Priority on the T90. Take the lens off of "A" (if it is an FD Lens) and set the desired aperture manually. At this point, press in the Stop-Down Lever to initiate Stop-Down AE. Set the 300TL for FEL and press the spot metering button on the T90.

The camera will lock in the correct flash exposure value for the subject area within the 2.7% spot meter area. The correct shutter speed for available light exposure is selected at the same time. To adjust the available light exposure, you can use the Highlight/Shadow buttons which will raise or lower the shutter speed. The electronic dial is disabled in this mode, but you can adjust the flash exposure by manually changing the aperture on the lens.

STOP-DOWN FIXED-INDEX FEL

Many people have never heard of the T90's Stop-Down Fixed-Index mode, so a brief explanation is in order here. You can think of SDFI as match-needle manual for the T90. To use it, set Tv mode on the T90 but set the lens aperture manually. Next activate the stop-

down lever located near the lower right corner of the lens mount. Finally, activate the meter by partially depressing the shutter release.

This lights up the white scale that was used in FEL, and allows you to adjust either shutter speed or aperture using the white bar and triangle index. The LED's below the picture area will display either OP, oo, or CL: this indicates underexposure (OPen up), correct exposure, or overexposure (CLose down). Either the scale or LED displays can be used for reference.

Another helpful feature of SDFI is the elimination of the AE lock feature found in Partial or Spot metering, thus allowing you to scan the scene for continuous readings in those metering patterns. You can also use the scale and triangle index for center-weighted average and partial metering, normally impossible in non-stop-down modes.

To use FEL with SDFI, select Tv mode on the T90 and pick your own shutter speed. Take the lens off "A" (if it's an FD Lens) and set the aperture manually. Don't forget to lock in the stop-down lever! Then press the spot metering button on the T90 for your FEL pre-flash.

The Highlight/Shadow buttons don't work in this mode. However, you can adjust the shutter speed with the electronic dial to control available light exposure. The viewfinder LED display will show the shutter speed and one of the following three symbols: HS, oo, or LS. This is an LED version of match-needle metering, indicating overexposure (Higher Speed), correct exposure, and underexposure (Lower Speed). Once again you can use the scale and triangle index as described above.

To adjust the flash exposure, simply adjust the aperture on the lens. However, keep in mind that unless you also adjust the shutter speed, your available light exposure will change. This is indicated in the viewfinder by the HS, oo, and LS symbols as described above.

•2C• THE 300TL AS A SIMPLE TTL FLASH

For all the wonderful features that A-TTL and FEL can perform in regard to balancing available light with flash, they do not easily allow the photographer to simultaneously select *both* aperture and shutter speed while retaining automatic TTL flash exposure. There are many situations where manual control of both shutter speeds and apertures is not only desirable but necessary. TTL Automatic is the one mode that delivers!

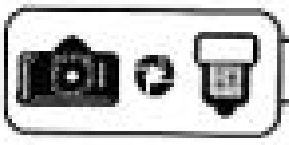
For total TTL control, the flash should be set to either A-TTL or FEL. The Program setting provides partial TTL control, which will be discussed later. The MHi and MLo settings will not provide any TTL automation.

Set the T90 to Shutter Priority and select the desired shutter speed. At this point, instead of leaving the lens on "A", manually select an aperture of your choice.

Setting the lens manually allows you to select an aperture based on the desired effect. If you need a quick recycle time, choose a larger aperture. If you're more concerned about depth-of-field, select a smaller one.

As for the shutter speeds, anything between 30" and 1/250 is available within reason. Remember to take the ambient light level into consideration, especially at slower shutter speeds, to prevent possible overexposure.

As mentioned before, placing the 300TL in Program allows only partial control of the manual settings. You can still adjust the aperture according to your needs but the shutter speed will automatically be set to 1/250. This is a very convenient setting when aperture settings are the main concern.



CONTROL OF AVAILABLE LIGHT AND FLASH EXPOSURE IN TTL AUTO

At first glance, it would appear that separate control of flash and available light exposure isn't possible with TTL Auto. However, it can be achieved with a minimum of effort on your part.

First, set the T90 to Manual or Stop-Down Fixed-Index metering, and read the available light. This step must be performed with the 300TL in the off position, otherwise the flash deactivates the camera's available light meter. You could also use a separate, hand held light meter in order to leave the flash on. The flash must be set in either Mode Set A-TTL or FEL. Also remember not to meter at any shutter speed higher than 1/250.

If you want to lighten or darken the background exposure without affecting the flash exposure, simply raise or lower the shutter speeds. This is a specific instance where the half-step shutter speeds of the T90 offer superior creative control.

If you wish to adjust the flash exposure without affecting the manually set available light exposure, use the ISO override button located on the camera body. The flash "reads" its ISO

information directly from the T90, so this adjustment can control its final output. Raise the ISO to underexpose the flash, lower it to overexpose.

PRECAUTIONS :

1) Stay within the range of the flash for the film speed and aperture you have selected. A sticker chart with the Automatic Distance Range (reproduced here) is provided when you purchase your 300TL. Place it on the top of the flash zoom head.

2) Be careful about your available light exposure when necessary. Indoors at night with a fast shutter speed is generally no problem. Outdoors during the day, you'll save youself many exposure calculation headaches by simply working in either the A-TTL or FEL modes.

ISO 100	ISO 400	24mm	35mm	50mm	85mm
f/2	f/4	4.1-41	4.9-49	5.7-57	6.6-66
f/2.8	f/5.6	2.9-29	3.5-35	4.0-40	4.6-46
f/4	f/8	2.1-21	2.5-25	2.9-29	3.3-33
f/5.6	f/11	1.6-15	1.7-17	2.0-20	2.3-23
f/8	f/16	1.6-10	1.6-12	1.6-14	1.6-16
f/11	f/22	1.6-7.2	1.6-7.8	1.6-10	1.6-12

AUTOMATIC DISTANCE RANGE (FT.)

OTHER WAYS TO USE TTL AUTO

Although Manual is probably the most practical mode of the T90 for TTL Auto flash, there are many other ways to achieve it. Here is a brief review of the possibbilities:

T90 : Set to Program, Variable Program, or Av
FD Lens : Manual
300TL : Set to Program, A-TTL, or FEL

RESULTS : In any combination of the above, you will get TTL Auto at fixed shutter speed of 1/250.

T90 : Set to Program, Variable Program, Av, Tv, or Stop-Down AE
FD Lens : Automatic (except in Stop-Down mode)
300TL : Mode Set with no control mode selected

RESULTS : In any of these combinations, the available light exposure will be set as if there were no flash. Flash exposure will be TTL Auto at the aperture indicated in the viewfinder or on the lens. Notice that in either the Program or Variable Program modes the shutter speeds will be limited from 1/60 up to 1/250.

T90 : Set to Program, Variable Program, Av, Tv, Stop-Down AE, Stop-Down Fixed-Index
FD Lens : Automatic (except Stop-Down mode)
300TL : Mode Set, FEL

RESULTS : In any of these combinations, IF YOU FORGET TO PUSH THE SPOT METERING BUTTON BEFORE YOU TAKE THE PICTURE, you will get TTL Auto at the aperture indicated in the viewfinder or on the lens.

TTL Auto is also very effective for use with bellows or other accessories where there is no coupling between the lens and the body. As long as the lens can be manually stopped down, TTL Auto is possible.

So the next time you need to shoot an indoor event with action stopping shutter speeds, select TTL Auto. Need a quick recycle time along with it? Choose a larger aperture! TTL Auto puts you in control.

•2D• MANUAL FLASH WITH THE 300TL

In some cases, automatic flash may not be suitable for your subject. If, for instance, the subject's surroundings are bright white with strong reflections or if the main subject is small with a dark or distant background, the automatic flash exposure may be affected by the contrasting background. Incorrect exposure can be avoided in such cases by using the Manual Hi or Lo modes.

In the MHI or MLo modes, you must calculate the aperture from the Guide Number Chart. A copy of the chart is reproduced here, but you can also use the sticker that is supplied with the 300TL. If you have already attached the Automatic Distance Range sticker to the top of the 300TL, place the Guide Number sticker on the bottom of the main flash head. While it is set in the 24mm position, use a sharp knife or razor blade to cut the sticker where it goes over the crack in the zoom head.

GUIDE NUMBER CHART (ft.)

G.No. (MANUAL HI)

ISO / f	25	50	64	100	200	400	800	1000	1600
24 mm	41	58	65	82	116	164	232	259	328
35 mm	49	69	78	98	138	196	277	310	392
50 mm	57	80	91	114	161	228	322	360	456
85 mm	65	92	104	131	185	262	370	414	524

G.No. (MANUAL Lo) = G.No. (MANUAL Hi) ÷ 4

The formula is Aperture = Guide Number divided by shooting distance. If you use MLo, divide the Guide Number by 4. Refer to the lens for shooting distance information.

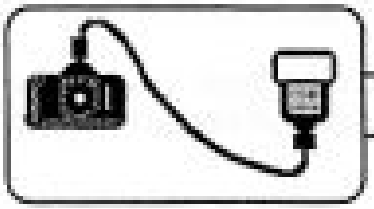
The 300TL instruction manual suggests that you set the T90 to Aperture Priority when using MHi or MLo. You are then recommended to set the aperture calculated from the Guide Number. This has the effect of forcing the shutter speed to 1/250, while allowing you to use the electronic dial to set the aperture.

Although this particular set-up is desirable in many instances, there are several other ways to use the T90 when the flash is set to Manual. For example, if you wish to control both shutter speed and aperture, set the T90 to manual mode. The difference here is that you set the shutter speed with the electronic dial and adjust the aperture on the lens. If you are used to other cameras, this will be a very familiar operation to you.

We don't recommend using Program, Variable Program, or Shutter Priority with MHI or MLo. You won't damage anything if you do...it's just not very productive. In the Program modes, the shutter speed is forced to 1/250 and the aperture is forced to its minimum setting. In Shutter Priority, you control the shutter speed with the electronic dial, but the aperture once again is forced to the minimum (f/16, f/22, or f/32 depending on the lens). In both cases, the viewfinder display will be flashing at f/32.

Stop-Down AE operates the same as Aperture Priority when you're using MHI or MLo. By the same token, Stop-Down Fixed-Index works the same as regular Manual mode. Remember, the available light metering is disconnected as long as the 300TL is left on MHI or MLo.

•3• SPECIAL T90/300TL APPLICATIONS



OFF CAMERA AND MULTIPLE FLASH PHOTOGRAPHY

In order to maintain TTL Automatic flash exposure with the T90, when used with up to four 300TL and/or ML2 Speedlites off camera, a series of dedicated accessories are available. These include: the TTL Hot Shoe Adapter, Connecting Cords 60 & 300, the TTL Distributor, and the Off Camera Shoe Adapter.

The TTL Hot Shoe Adapter is always placed in the hot shoe of the T90 and is powered by a lithium battery. This adapter stabilizes and regulates the electrical signals from the off camera Speedlite(s). It also allows the T90 to control the flash duration of each unit, thus controlling flash exposure.

The Off Camera Shoe Adapter accepts the 300TL or ML2 Speedlite, and is connected to the TTL Hot Shoe Adapter by either the Connecting Cord 60 (2 ft. coiled cord) or 300 (9.8 ft. straight cord).

The TTL Distributor accepts up to four Connecting Cords, one of which must be attached to the TTL Hot Shoe Adapter.

Utilizing 300TL units off-camera in conjunction with the T90 creates, in effect, a very portable yet effective lighting system. However, the flash units operate somewhat differently when used with the off-camera accessories.

The first thing you will notice is the lack of any pre-flash functions when using the off-camera accessories. Both the A-TTL and FEL features of the flash are disabled since flash exposure can't be guaranteed in these modes for off-camera or multiple flash photography. The subject distance information provided by the pre-flash in A-TTL can only be guaranteed correct when measured by one flash...on camera. The FEL situation is even more complex, since it depends on the flash being aimed at the same place for both pre-flash and actual exposure.

Simple TTL Auto exposure is often more accurate in off-camera and multiple flash situations. Accordingly, it is available for precisely these situations with the 300TL.

You can select just about any exposure mode on the T90 according to the desired effect. Please refer to the section "•2C• THE 300TL AS A SIMPLE TTL FLASH" for details on the various camera settings.

You'll find that in daylight fill-flash situations, the Program, Shutter Priority, and Aperture Priority modes of the T90 will be the easiest to use since they automatically balance the light. In low light situations, you'll probably prefer setting the T90 to Manual and selecting your own shutter speeds and apertures.

LIGHTING RATIO CONTROL

One topic that arises when multiple flash is involved is the lighting ratio between flashes. In the T90/300TL system, there is no discrete switching or camera control to achieve this. However, you can control lighting ratios by adjusting the placement of the Speedlites.

For example, you can create beautiful rim lighting by skimming the light from one of the flashes off the side or top of the subject. The effect will be more pronounced the closer you place the "skim flash" to the subject.

It's beyond the scope of this guide to seriously become involved in all the possibilities of multiple flash. We suggest that you experiment to discover what is most suitable for your applications.

GENERAL PRECAUTIONS

Here are some general precautions to take when using off-camera or multiple 300TL's with the T90:

1) Check the battery in the TTL Hot Shoe Adapter before shooting. Canon ships this unit with a plastic guard between the CR2025 battery and its contact. This guard must be removed before use. If you attempt to shoot with a dead or disconnected battery, the Speedlites will not fire at all.

2) If any one of the Speedlites is set for manual operation (MHi or MLo), all of them will shift to manual, and there will be no warning in the viewfinder.

3) Visually check the ready light of each flash before firing. The charge completion signal (lightning bolt) in the viewfinder will illuminate even if only one Speedlite is fully charged.

4) If you use flash units other than the 300TL or ML2 in the Off Camera Shoe Adapters, *proper automatic exposure* cannot be guaranteed. However, if the flash units use thyristor circuitry, it is possible to obtain accurate, non-TTL exposures. It's recommended that the units in use have only one center contact or Canon dedication. Otherwise it is advisable to place tape over the existing four rear contacts on the Off Camera Shoe Adapter to prevent any damage.

Since a thyristor circuit basically acts as an off switch, each flash controls its own output based on its automatic setting coupled with the flash distance from the subject.

Simply select an automatic range of your choice on the flash(es). Most provide a minimum of two or three auto settings. With the T90 set in Shutter Priority, manually set the lens to the same aperture as selected on the flash(es). Each flash will independently control its output based on its own circuitry and distance from the subject for correct exposure.

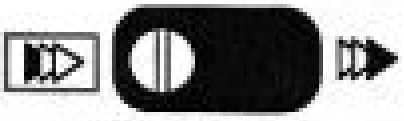
5) If you plan to use an external flashmeter to check exposures, remember to have the T90 loaded with film. Otherwise the readings will be off by as much as 2 stops due to the camera basing the flash output on light reflecting off the black pressure plate rather than the film emulsion.

6) Along with A-TTL and FEL, Second Curtain Sync is also disabled during off-camera or multiple flash.

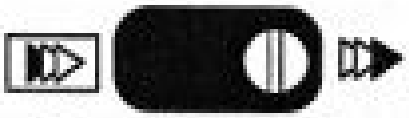
SECOND CURTAIN SYNC

Some photographers like to experiment with flash at slow shutter speeds. Artistic blur can be created by moving the subject, the camera, or both while using flash to create a sharp frozen image somewhere in the frame. With the T90 and 300TL, it's easy to work with this technique in both A-TTL and FEL when used with Aperture or Shutter Priority.

Second Curtain Sync combines with flash, available light, and movement to create unique and distinctive photographs, and at the same time solves a tricky problem encountered in this type of work. To use Second Curtain Sync, simply flip the switch above the on/off control to the right (see below).



First Curtain Sync



Second Curtain Sync

When in this position, the flash doesn't fire until just before the shutter starts to close. Therefore, subject blur during slow shutter speeds appears BEHIND the direction of movement, not ahead as in first curtain sync. This is a much more natural depiction of motion or movement.

To get the maximum effect from this technique, select a very slow speed such as 1/15 or slower. You can use faster shutter speeds, but the effect is not as noticeable. In fact, any Program setting on the flash or T90 overrides Second Curtain Sync so be sure to stay in either the Tv or Av modes.

Although Second Curtain Sync is disabled when the 300TL is used off camera, that doesn't mean you can't use it in multiple flash setups. In such a case, use the on-camera 300TL as the master flash and set up the other flash units with slave units. Of course your flash exposure control will have to be manual whenever non-300TL or ML2 Speedlites are used.

BOUNCE FLASH PHOTOGRAPHY

Pointing the flash head towards a wall or ceiling, in order to illuminate the subject with light reflected off of that surface, is called bounce flash. Because the light is reflected, a loss of light volume is unavoidable. On the other hand, there will be no dark shadows, and a softer more natural lighting effect is possible.

The 300TL's zoom head swivels 90° upwards, 180° to the left, and 90° to the right in any combination. Click stops are provided for extra convenience. To swivel the flash horizontally, first slide the bounce latch upwards and then rotate the flash head left or right.

With bounce flash photography, it is necessary to set the flash head so that the subject is not illuminated directly by the 300TL. If you only tilt the flash up a few degrees, exposure will not be uniform. The easiest way to use bounce flash is to tilt the flash head up 90° and bounce the illumination off the ceiling.

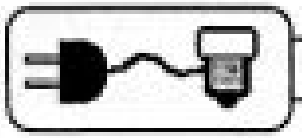
The surface off which the illumination is bounced should preferably be white or nearly white, fairly large, and highly reflective. If the surface is colored, the subject may turn out to be tinted by that color. The color may also be disappointing if the surface is a poor reflector. A very high ceiling does not make a good surface for bounce flash; a better solution would be to bounce the flash off a white card reflector.

Many photographers make their own card reflectors and attach them to the main flash head with tape or a strong rubber band. This technique works quite well for subjects within 10 feet. Generally, the picture will be brighter and higher in contrast the closer the flash is to the reflector.

The A-TTL and FEL modes of the 300TL are ideal for bounce flash photography, because they eliminate the difficult exposure calculations and time delays involved in lesser systems. In these modes, the main flash head outputs a 1/20 power pre-flash during bounce operation, instead of the full power test flash that other TTL flashes require.

Moreover, the T90 can immediately inform you as to the required aperture and/or shutter speed, or warn you if your setting is not correct. This is perfect for fast moving situations when you don't have time to change anything.

If you decide to take the picture, you don't have to wait at all for the 300TL to recycle from the pre-flash. In many cases, this can be the crucial difference between getting a good exposure versus a poor one or worse yet, getting nothing while you're waiting for the ready light after a full power test flash!



ALTERNATIVE POWER SOURCES

The 300TL is normally powered by four 1.5 volt AA alkaline batteries. One set of batteries is good for between 100-700 flashes, at recycling times from 0.2-13 seconds at normal temperatures. Recycling times increase as temperatures decrease. Despite these limitations, alkalines are probably the most economical choice for most situations. However, if you have need for more power or faster recycling time, there are some alternatives you should know about.

Rechargeable AA nickel-cadmium (Nicd) batteries are recommended for use in low temperatures, because they exceed the performance of alkalines when the thermometer falls below freezing. Even in normal temperatures the recycling time is about half compared to alkalines.

But for heavy use under all conditions, you may want to consider an external battery pack. Canon does not manufacture such an item for the 300TL, but they are available from several manufacturers. Please check with your local dealer for availability.

USING THE T90 WITH OTHER ELECTRONIC FLASH UNITS

The T90 can be used with any electronic flash unit that can be attached to it, either directly through the hot shoe, Canon's off camera flash system, or through a PC contact adapter. Of course only the 300TL and Macrolite ML2 offer TTL flash exposure capability.

However, severe damage can result if non-Canon flash units are improperly used. This next section explains the precautions you must take when using electronic flashes other than the 300TL.

OTHER CANON SPEEDLITES AND NON-CANON DEDICATED FLASHES

With shoe mounted flash units, the T90 can use all previously introduced dedicated Canon Speedlites in the T-Series and A-Series, as well as the bracket-mounted 533G and 577G. Basic operation is the same with the T90 as with the older cameras for which these units were originally designed.

With the exception of the 299T, 199A, 577G, and 533G, sync speed cannot be set higher than 1/90 in normal operation, but there is a way to get around this. If you cover the 4 small contacts in the hot shoe with electrical tape, you lose dedication, but you can still have automatic flash exposure and set any shutter speed you want, including 1/250. Of course you will also need to set the aperture manually according to the flash setting. Don't set the shutter higher than 1/250, or you'll lose synchronization.

These comments also apply to non-Canon flash units that are dedicated "for Canon."

NON-DEDICATED HOT SHOE FLASHES

These flashes are particularly dangerous when improperly used with the T90 or any other camera with a dedicated hot shoe. If you look at the hot shoe contact on one of these flash units, you'll probably discover that it is much wider and usually rounder than the narrow, blade contact of a Canon dedicated Speedlite.

If you drag the flash over the small contacts in the T90 shoe, you run the risk of shorting out hundreds of volts into a circuit that is designed to deal with very small voltage levels. The net result is that you can burn out the integrated circuits in the T90, necessitating expensive repairs. This is definitely not a warranty situation, either, because it's not a fault with the camera. If you want to avoid this problem, once again it becomes a good idea to cover the small contacts in the hot shoe.

FLASHES WITH PC CONTACTS

You undoubtedly have discovered that the T90 does not possess a built-in PC contact. Don't waste your time getting upset about this, because it's never going to change. If you require the use of a PC outlet, several styles of Hot-Shoe-to-PC adapters are available from most photo retailers.

As a precaution when using an adapter, always unplug the strobe unit prior to installation or removal of the adapter to prevent damage to the T90's circuitry. Please contact the nearest Canon Regional Office listed in the back of this guide for further suggestions regarding this subject.

WIRELESS REMOTE SYNC

This type of remote flash operation is commonly used by professional photographers at many indoor sporting events in order to achieve maximum color quality. At the same time, high shutter speeds are often required to minimize ghost images caused by available light levels that are nearly equal to the flash.

The T90 is particularly well suited for this type of work due to its top sync speed of 1/250. Since this is a *true* 1/250, ideally 4.00 milliseconds, two precautions must be observed.

First, make a film test for synchronization at 1/250, 1/180, and 1/125. This is required due to the variable delays induced by the wireless transmitter which is attached to the PC socket adapter of the T90. If a dark line appears in the bottom portion of the frame, then the shutter speed selected is too fast for that particular wireless device. Either slow the T90's shutter speed down 1/2 step or have the wireless device modified to operate at a *true* 1/250.

Second, be aware that certain studio-type electronic flashes can be slower than others in two areas...the time to reach peak output and total flash duration. This shows up as under-exposure, and can also end up being combined with lack of sync when wireless remotes are used.

The bottom line on wireless sync is that it pays to make a film test under the exact conditions in which the equipment will be used. In this way you can avoid unpleasant surprises when an important job is on the line.

Our intent with this Guide has been to provide you with the necessary information to fully understand the design concepts behind the T90/300TL system.

We hope this knowledge will assist you in utilizing unique features such as A-TTL, FEL, and Second-Curtain Sync, found within the 300TL Speedlite.

As specific photographic situations arise, we're confident you'll continue to refer to this Guide for help. However, no guide can answer every question you as an individual might have. If you have any further questions or need assistance, please contact your nearest Regional Office listed below.

With Canon's unsurpassed system and your skill and creativity comes the power to create striking new images never before obtainable with a 35mm camera. As we said before, we know you'll enjoy the results!

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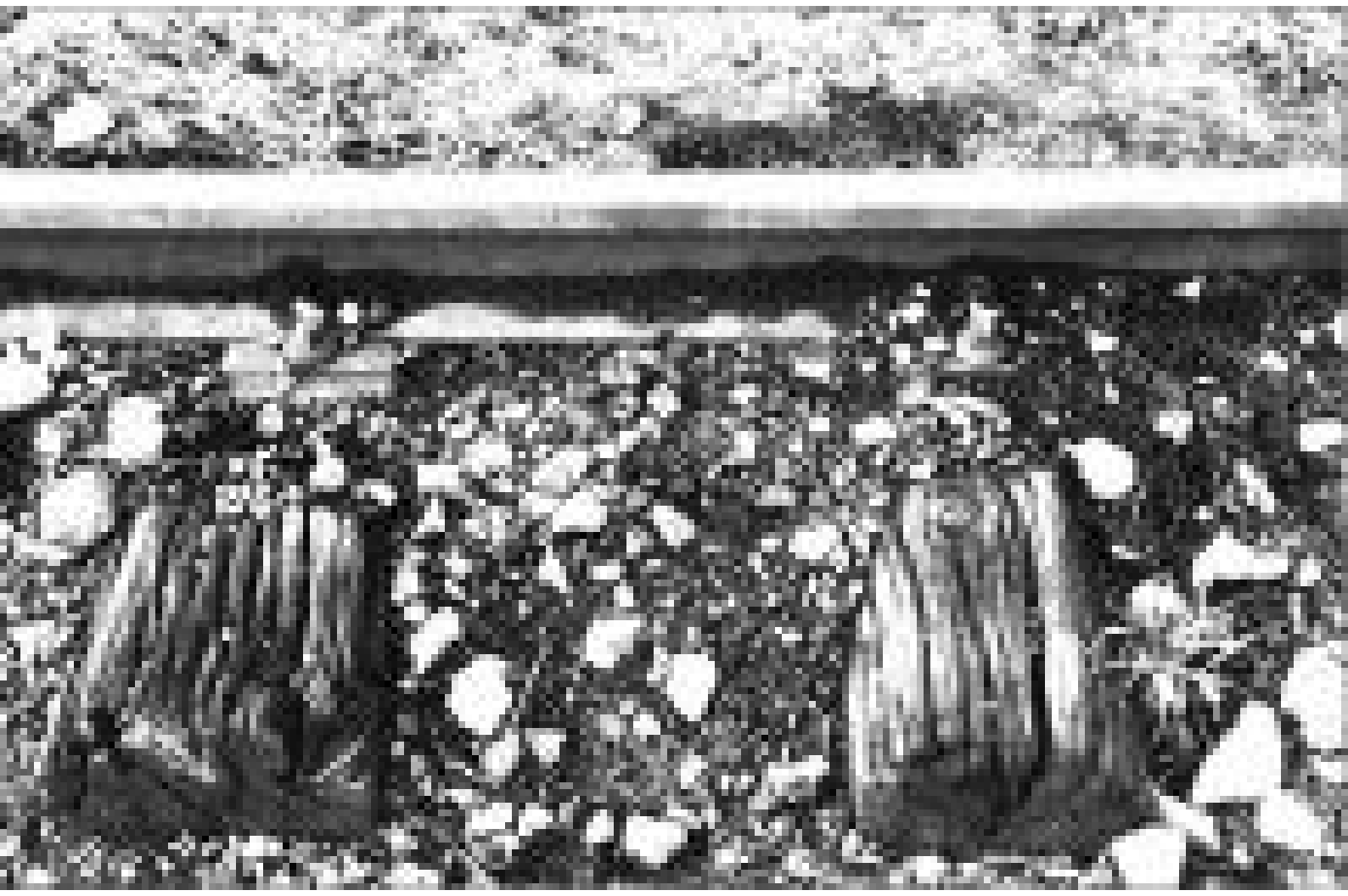
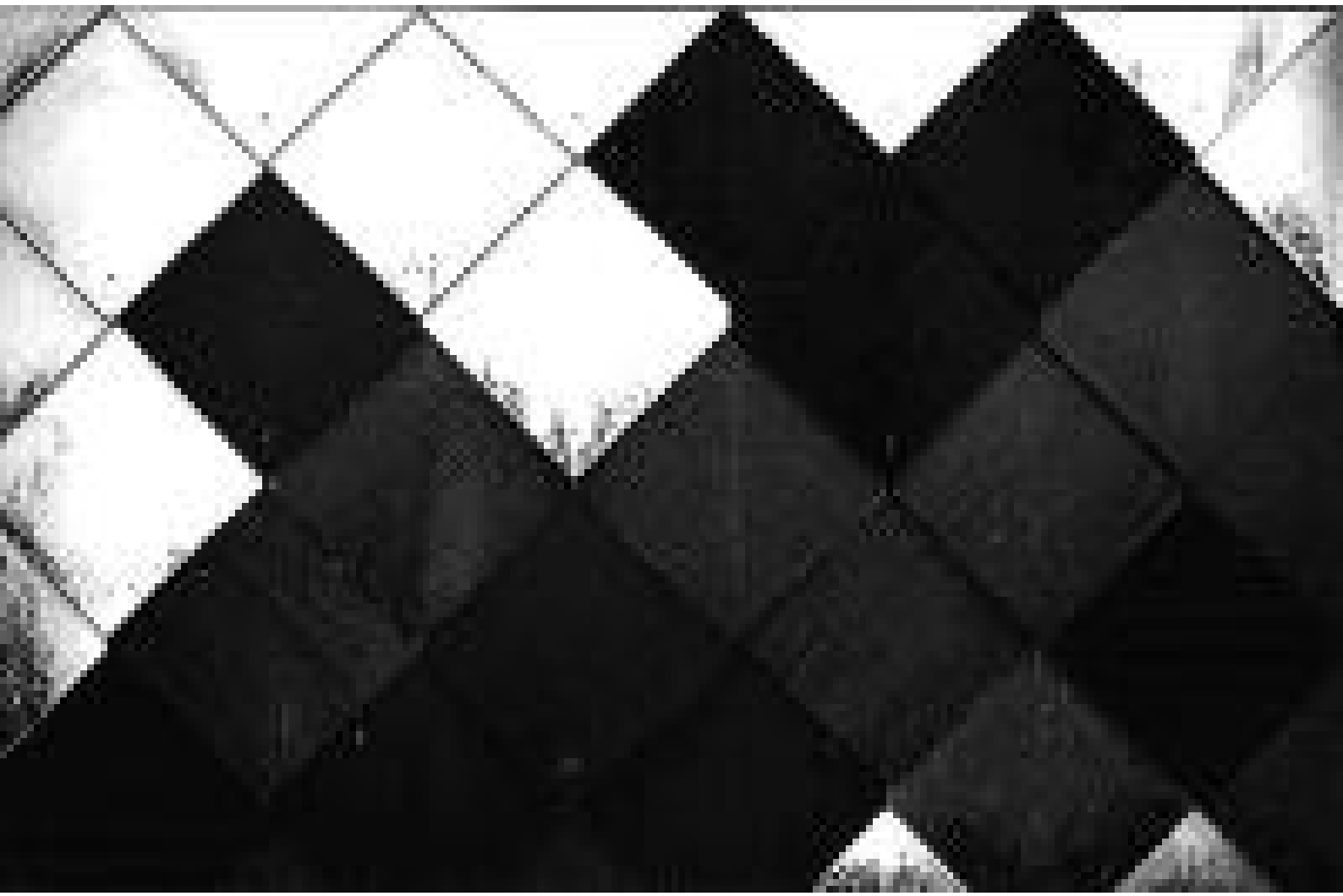
Bldg. B-2, 1050 Ala Moana Blvd., Honolulu, Hawaii 96814, Tel. (808) 521-0361





Christian Rollinger's

Canon

Photo Page

Operating Instructions

Contents

1.0.0. General note

The M 601 is a compact high-performance amateur enlarger of professional quality. It takes negatives from 8 x 11 mm up to $2^1/_4 \times 2^1/_4$ inches (6 x 6 cm). The basic enlarger is usable as it stands for black-and-withe work and requires no further accessories. Suitable accessories however adapt the M 601 to colour enlarging and to copying. Section 9.0.0. gives a brief practical summary of enlarging hints for the beginner.

2.0.0. Assembly

2.1.0. Checking out the outfit

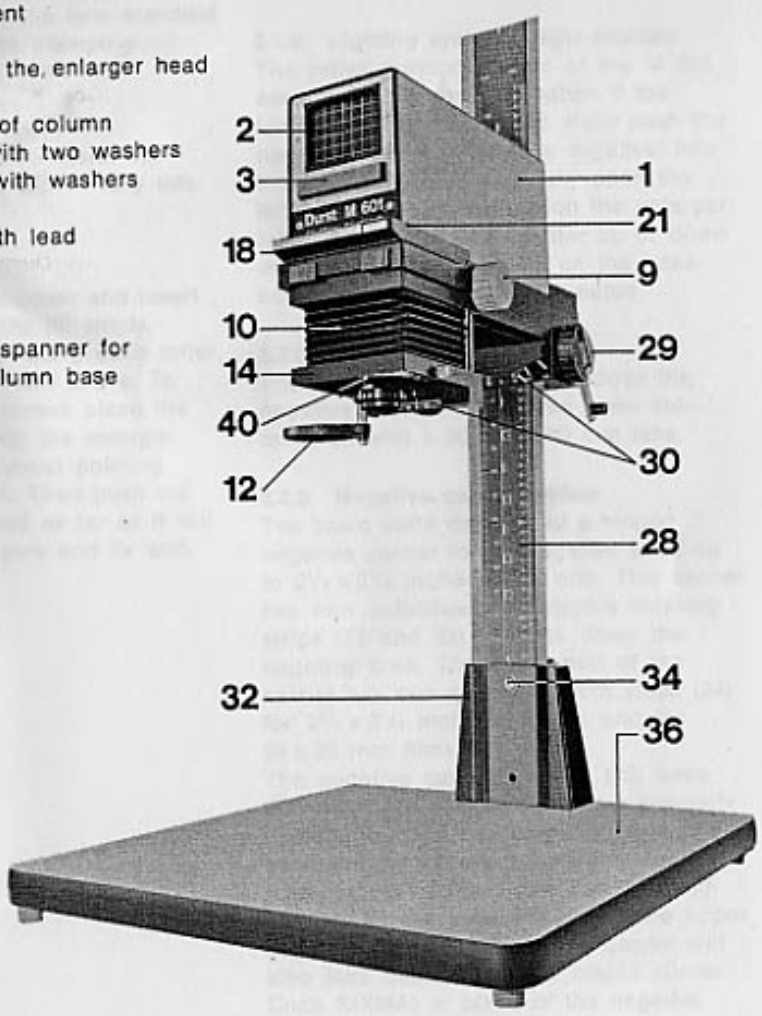
The Durst M 601 is shipped in a special protective container. Before assembly, carefully clean all components with a soft cloth.

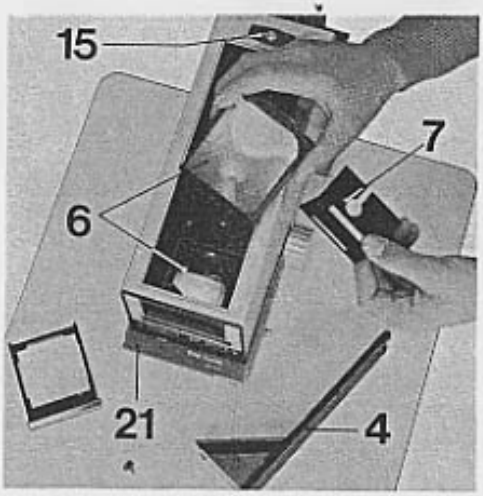
Note: Remove the enlarger head carefully from its packing; do not allow the filter drawer to drop out.

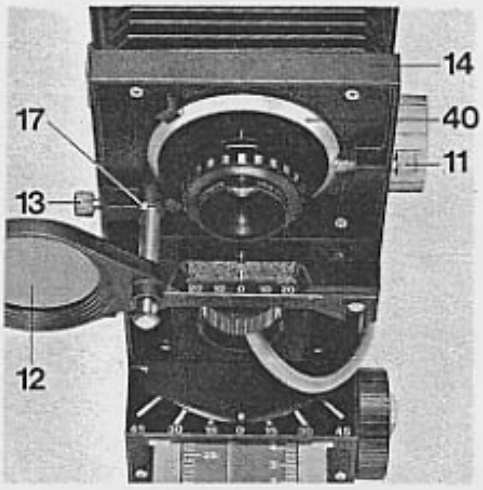
First check that all components are there. To make the assembly instructions clearer, all items and all significant operational controls are numbered. The separate parts supplied from which the complete enlarger is assembled, are in addition marked ●.

2.2.0. Components and controls

- 1. Enlarger head
- 2. Viewing screen for copying
- 3. Filter drawer
- 4. Lamphouse cover with deflecting mirror
- 5. Locking knob for enlarger head
- 6. Condenser lenses
- 7. Retaining bracket for the condenser lenses, with securing screw
- 8. Locking knob for lens standard
- 9. Focusing knob
- 10. Bellows
- 11. Milled screw to secure the lens
- 12. Red filter
- 13. Milled clamping screw holding the red filter
- 14. Lens standard
- 15. Latch of lamphouse cover
- 16. Cross-head screw for adjusting the focusing mechanism
- 17. Hole for red filter shaft
- 18. Negative carrier
- 19. Top section of negative carrier
- 20. Bottom section of negative carrier
- 21. Opening bar for raising the top section of negative carrier
- 22. Front controls for negative carrier masking strips
- 23. Side controls for negative carrier masking strips
- 24. Adjustable film stops
- 25. Upper and lower glass plates
- 26. Retaining strips
- 27. Push-button key to close the top section of the negative carrier
- 28. Column with carriage
- 29. Knob with fold-out crank for vertical adjustment
- 30. Tilt scales
- 31. Bearing bolt for the enlarger head
- 32. Column base
- 33. Clamping knob of column
- 34. Threaded bolt with two washers
- 35. Securing bolts with washers
- 36. Baseboard
- 37. Lamp holder with lead
- 38. Switch in lead
- 39. Mains plug
- 40. Lens panel
- 41. Hexagonal bolt spanner for securing the column base







of the holder for the red filter into the appropriate hole (17) in the lens standard (14) and secure with the clamping screw (13).

2.3.6. Negative carrier
Push the negative carrier — with the opening bar (21) at the top — fully into the enlarger head.

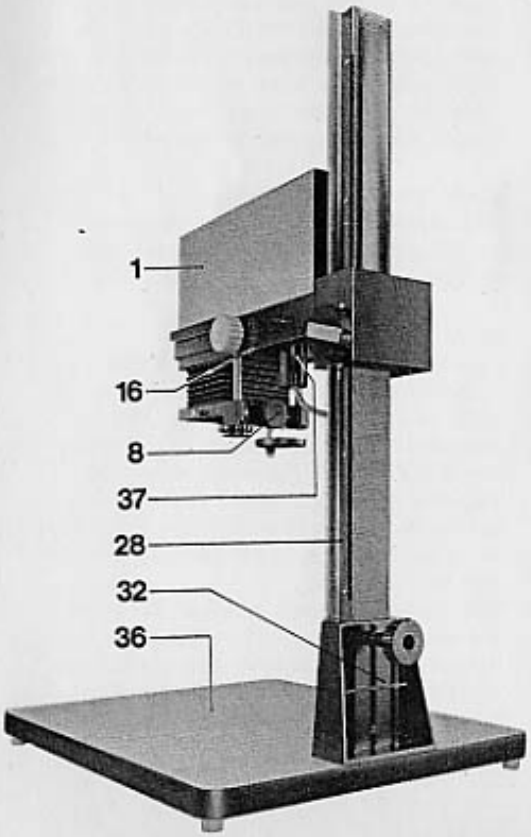
2.3.7. Condenser
Remove the lamphouse cover and insert the two condenser lenses (6) singly, with their curved sides facing each other, into the enlarger head from above. To secure the condenser lenses place the retaining bracket (7) into the enlarger head with the round cut-out pointing horizontally to the back. Then push the retaining bracket forward as far as it will go against the condensers and fix with the securing screw.

3.0.0. Features

3.1.0. Lighting system - light sources
The reflex lighting system of the M 601 ensures fully even illumination if the lamp is carefully adjusted. Fully push the negative carrier (without a negative) into the enlarger head. Now fully open the lens aperture and switch on the enlarger lamp. Adjust the lamp holder up or down until the projected image on the baseboard appears evenly illuminated.

3.2.0. Condenser system
The condenser is mounted above the negative carrier. It ensures even illumination with a 50 or 75-80 mm lens.

3.3.0. Negative carrier system
The basic outfit consists of a hinged negative carrier for all negative sizes up to $2^1/_4 \times 2^1/_4$ inches (6 x 6 cm). This carrier has four individually adjustable masking strips (22 and 23) to mask down the negative area. The lower part of the carrier has two adjustable film stops (24) for $2^1/_4 \times 2^1/_4$ inch (6 x 6 cm) and for 24 x 36 mm films.
The negative carrier glasses (25) keep the negatives completely flat. A specially coated negative carrier glass (available separately) to prevent Newton's rings (Order Code SIXGLA AN) can be fitted in place of the regular glass of the upper negative carrier section. The carrier will also take glassless metal masks (Order Code SIXMA) in place of the negative



2.3.0. Assembly

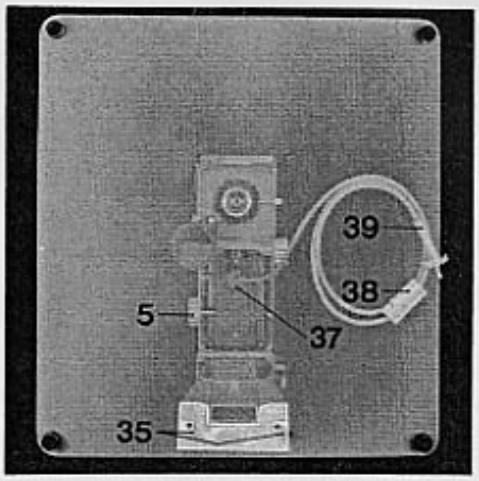
2.3.1. Baseboard and column
Place the baseboard (36) with the rubber feet downwards on the table. Then locate the column (28) over the holes with the bracing ribs of the base to the rear. Place the washers over the bolts (35) and push the latter through the holes of the baseboard and the column base and screw tight with the aid of the hexagonal bolt spanner supplied.

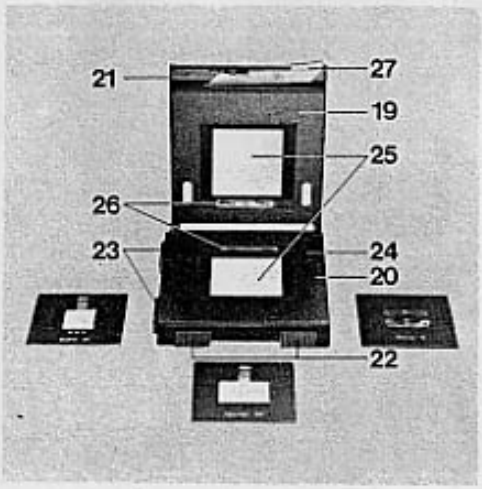
2.3.2. Enlarger head
Place the enlarger head (1) over the bearing bolt (31) and secure with the locking knob (5) at the left hand side of the enlarger head. The engagement stop of the enlarger head should slide into the groove on the supporting arm; the locking knob can then be pulled tight.

2.3.3. Lens
Screw the lens fully into the panel (40). Insert the panel together with the lens into the lens standard (14), locating it so that the aperture scale is visible from the front. Secure with the milled screw (11).

2.3.4. Lamphouse
Remove the lamphouse cover (4) and screw an opal lamp (up to 150 watts) into the lamp fitting.

2.3.5. Red filter
To fit the red filter (12), push the shaft





carrier glasses. These metal masks are available for all negative sizes from 8 x 11 mm to $2^1/_4$ x $2^1/_4$ inches (6 x 6 cm). For glassless enlarging of 24 x 36 mm and $2^1/_4$ x $2^1/_4$ inch (6 x 6 cm) negatives use the SIVOMA 35 or SIVOMA 66 mask inserts respectively in place of the upper negative carrier glass.
For inserting single negatives the negative carrier is removed from the enlarger head. On pushing the carrier into the head the upper and lower halves are pressed together to prevent movement of the negative.
To insert film strips, slightly raise the opening bar (21) of the negative carrier. This locks the top of the carrier open. The film strip can now be pushed in from the front. It is accurately located when it abuts the guide pins. These guides are adjustable: the front position is for 24 x 36 mm negatives, and the rear position is for $2^1/_4$ x $2^1/_4$ inch or 6 x 6 cm films.
To close the negative carrier press the key on the opening bar.
Always insert the negatives into the negative carrier with the emulsion side (the mat side) downwards.

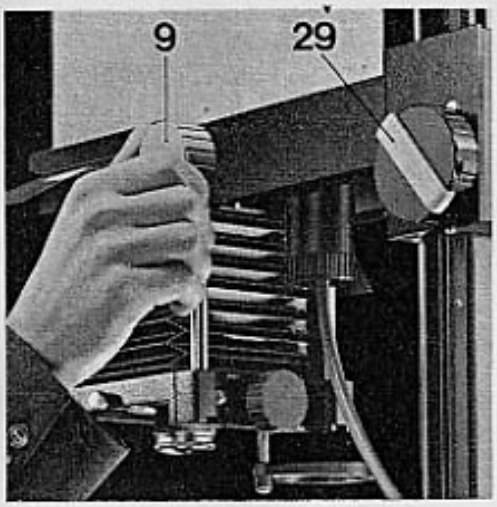
3.4.0. Magnification
Adjust the magnification by raising or lowering the enlarger head. The higher the head, the larger the image. To move the enlarger head, turn the knob (29) or the crank which swings out of the knob for rapid adjustment.
If the column protrudes into the projected image when making part enlargements at high magnifications, the distance from the optical axis to the column can be increased by pulling out the enlarger head up to the red mark. The head can be pulled forward on releasing the locking knob (5).

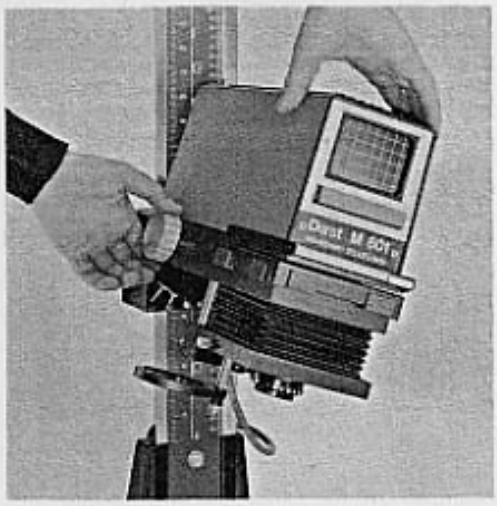
Magnification factors

with 80 mm lens	9.9 x lin.
with 50 mm lens	15.5 x lin.

3.5.0. Focusing
Focus by turning the knob at the right of the enlarger head. This operation is essential before making an enlargement. Place the masking frame on the baseboard and insert a sheet of white paper (not enlarging paper) of the same size and thickness as the enlarging paper to be used. Fully open the lens aperture. Switch on the lamp. Adjust the required image size, then focus. After focusing it may be necessary to readjust the image size (and to refocus once more afterwards).

3.6.0. Correcting converging verticals
To correct unwanted converging verticals the enlarger head of the M 601 and the lens standard (14) can be tilted in the appropriate directions. To do this, slack off the locking knob (5) of the

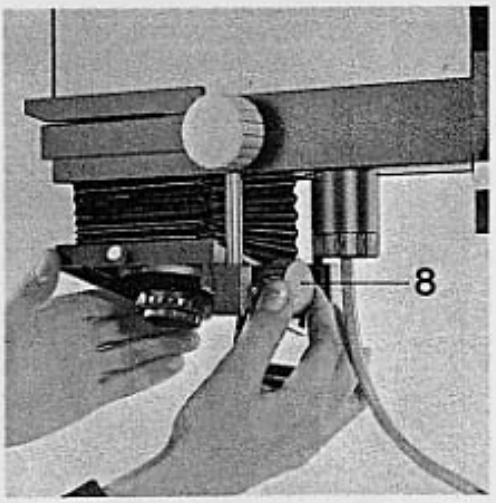




enlarger head and the locking knob (8) on the lens standard. Now incline the enlarger head and lens standard to get the vertical lines of a projected image parallel. Tighten the locking knobs in this position for making the enlargements. The scales on the carriage and on the lens standard show the exact degree of inclination for repeat settings.

3.7.0. Filter drawer — heat filter
The filter drawer (3) takes 3 x 3 inch (75 x 75 mm) colour filters. When using the glassless SIXMA negative mask inserts, place a SIXCALO heat filter in the filter drawer.

3.8.0. Red filter
The red filter (12) allows observation of the image with the light switched on and black-and-white enlarging paper in position in the masking frame.

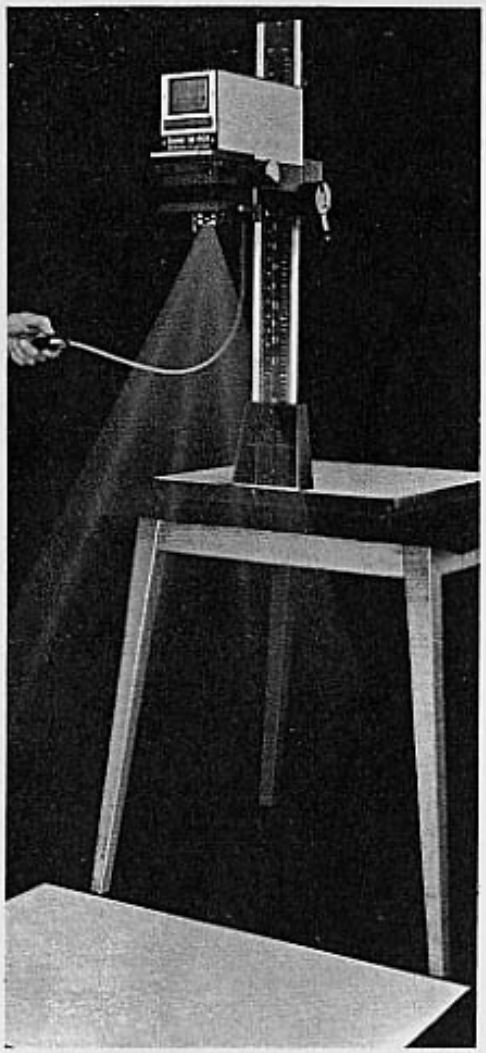


with the locking knob. Stabilise the baseboard with suitable weights to prevent the enlarger from tipping over. For projection on the wall slack off the locking knob and swing the enlarger head through 90°. The enlarger head engages in the horizontal position. Then tighten the locking knob again.

When estimating exposure times for giant enlargements, remember that the light intensity on the projection surface decreases in proportion to the square of the distance. (For example, with a normal exposure time of 10 seconds, doubling the distance increases the exposure to 40 seconds or four times what it was before.) The exposure time can be reduced by opening the lens aperture; however the lens does not necessarily produce the sharpest image at full aperture.

4.5.0. Distortion control

Converging verticals are caused by tilting the camera when taking the picture. If for instance you shoot a high building from street level by pointing the camera up against the sky, the verticals will converge in the negative. If unwanted, this effect can be corrected by tilting the enlarger head and the lens standard. To keep the image sharp overall with the enlarger head tilted, stop down the



4.0.0. Operation and applications

4.1.0. Clean negatives

Dust and fingerprints on the negatives show up disturbingly in enlargements. So always clean dirty or soiled negatives before enlarging. Remove adhering dust with a camel hair or antistatic brush. Fingerprints can be removed by gently wiping with a fluffless cloth. Clean off obstinate dirt with a suitable film cleaning solution. The negatives must be completely dry before they are inserted in the negative carrier. Clean negatives very carefully to avoid scratching the emulsion surface.

4.2.0. Enlarging exposure

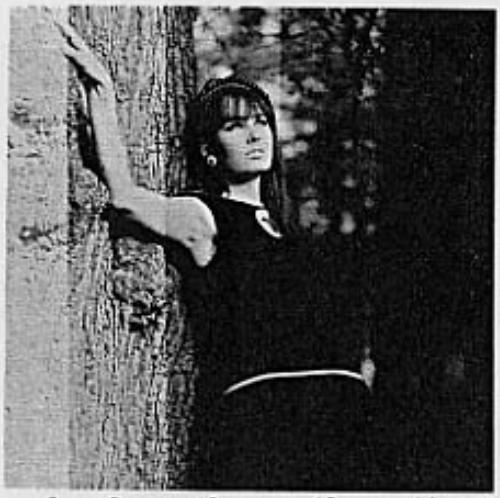
After some practice it becomes easy to estimate the correct exposure time required with reasonable accuracy. An average value is about 10 seconds. But with bigger enlargements an exposure test is advisable: Focus the image, and stop down the lens by two stops. Cover the enlarging paper in the masking frame with a sheet of card. Switch off the enlarger lamp and swing the red filter out of the light path. Withdraw the card to expose a 1 inch wide strip for 2 seconds. Withdraw the card further, an inch at a time, to make another four to five test exposures. Each of these successive exposures increases the exposure of the previous strip by the next exposure time. This yields a test print of progressively exposed strips, with the first strip having received the longest time. From this it is easy to establish the optimum exposure for the full enlargement. Such a test print thus ensures correctly exposed enlargements.

4.3.0. Cropping

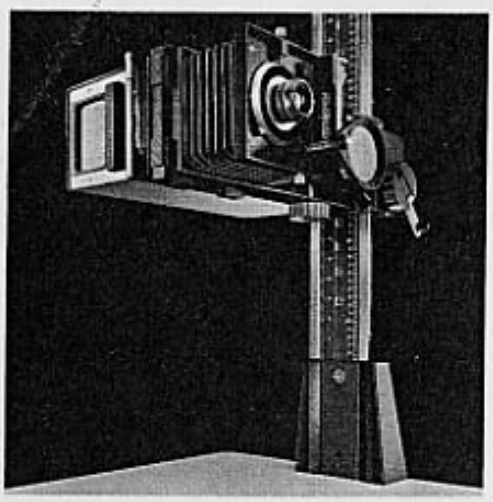
Even an expert photographer does not always manage to frame the image exactly during the camera exposure. Only enlarging permits really exact framing. In this way you can often obtain several different interesting enlargements from one negative. Mask down the required image area with the masking strips of the negative carrier and the sliding masks of the paper holder.

4.4.0. Giant enlargements

For big enlargements and for part enlargements on the baseboard set the column in such a way that its lower hole lines up with the hole in the column base. That way you obtain the maximum magnification on the baseboard.
For giant enlargements project on the floor or on a wall. For floor projection remove the locking knob of the column to allow the column and enlarger head to be turned through 180°, then refix



6 8 10 12 14 sec.



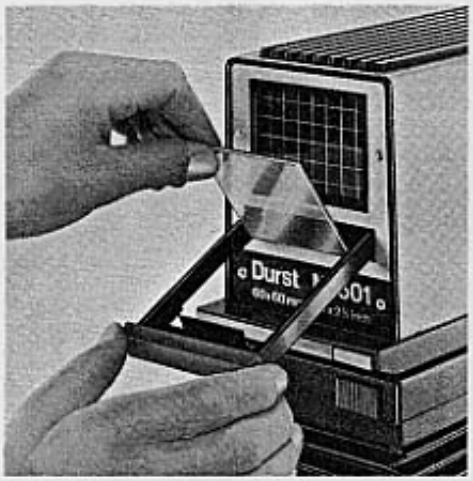
move the enlarger head up or down on the column to bring the required object area within the frame lines on the ground glass screen of the copying adapter.
Focus the image at the maximus lens aperture, but stop down the lens by at least two stops for the exposure.
The original must be evenly illuminated. Check the evenness of illumination with an exposure meter. For optimum illumination use the CAMFLUD 2 or CAMFLUD 4 lighting unit. This consists of two (CAMFLUD 2) of four (in the case of the CAMFLUD 4) lamp holders mounted on two chrome-plated supporting arms fixed directly on the baseboard or the table underneath. The lamp holders take floodlamps up to 150 watts and can be adjusted laterally as well as tilted vertically.

4.7.0. Colour enlarging

4.7.1. The Durst CLS 66 Colour Mixing Head
For perfect colour enlargements we recommend the use of the Durst CLS 66 colour mixing head which was specially designed for the Durst M 601. Equipped with a CLS 66, the Durst M 601 becomes a colour enlarger to meet fully professional standards.
To fit the CLS 66, remove the lamphouse cover, the opal lamp and the condenser. Now mount the CLS 66 colour mixing head on the enlarger head in place of the lamphouse cover and secure with the locking strips so that it forms a complete unit with the M 601.

4.7.2. Separate filters
The filter drawer of the M 601 takes 3 x 3 inch (75 x 75 mm) colour filters for colour enlargements without the colour mixing head.

4.7.3. Colour Analyser
Time wasting trial enlargements are reduced to a minimum by using the Durst COLORNEG ® Analyser.
This electronic colour analyser measures the colour balance of the negative and the exposure time. The photocell unit of the COLORNEG Analyser is precisely mounted on the M 601 in a hole provided for the purpose.



lens by two stops or more for increased depth of focus. This method of distortion correction is limited by the depth of focus of the lens and the varying degree of exposure across the image being corrected. With the enlarger head tilted, the projected image is brighter at one side of the paper than at the other. To compensate this effect, shade this part of the image during the exposure.

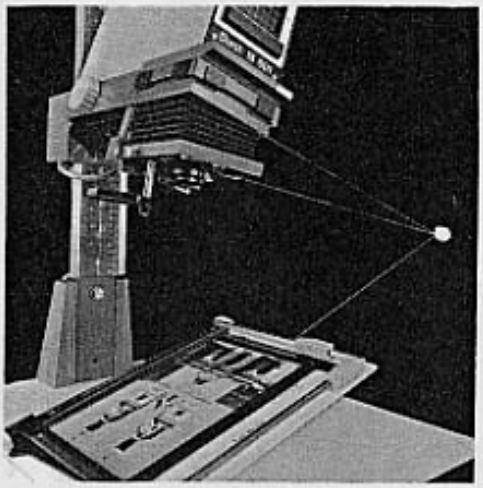
4.6.0. Copying

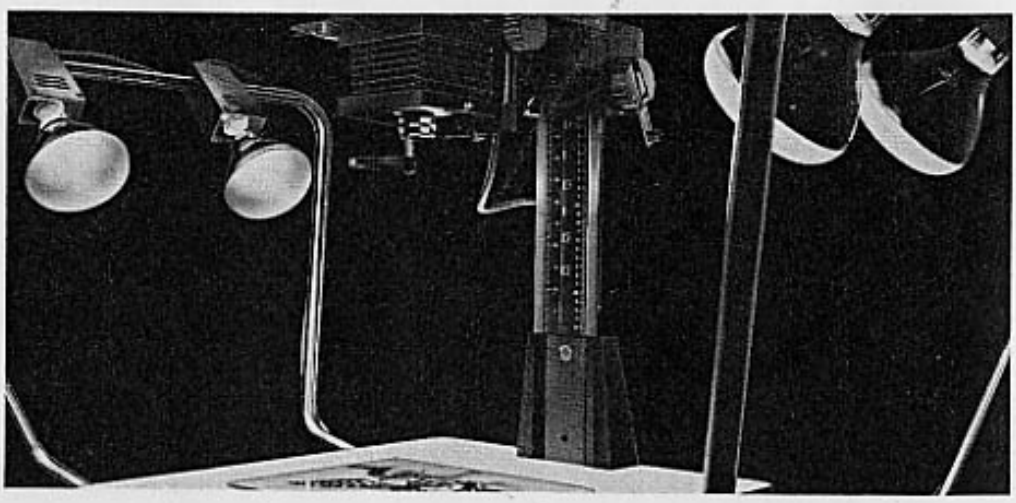
For copying flat or solid originals you need the URNOV copying adapter and the CAMFLUD 2 or CAMFLUD 4 lighthing unit. The lighting system of the M 601 can be converted to a reflex viewing system for viewing the original on the baseboard. To do this, remove the lamphouse cover, withdraw the mirror mounted in the guides in the cover, turn the mirror through 90° and reinsert. Pull the viewing window out of the enlarger head and replace the lamphouse cover. The deflecting mirror now permits sharp focusing of the original to be copied. It also shows the limits of the field of view and permits a check on the evenness of illumination.

The URNOV copying adapter goes into the enlarger head in place of the negative carrier. The URNOV adapter consists of a rigid frame with a ground glass screen carrying format frame lines and a convenient guide rod. Load a plate holder with a sheet film or a plate, push it, with the darkslide downwards, underneath the ground glass screen, and lock in position. The guide rod carries a clip which engages the darkslide to allow this to be pulled out for the exposure or pushed back again afterwards. The exposure itself is made by switching the copying lamps on and off.

For copying photographs and other objects with a range of tones or grey values use a medium speed film of medium contrast. For copying line drawings, printed texts etc. a high-contrast process film is recommended.

To adjust the field of view taken in,





5.0.0. Accessories

5.1.0. Negative carrier masks

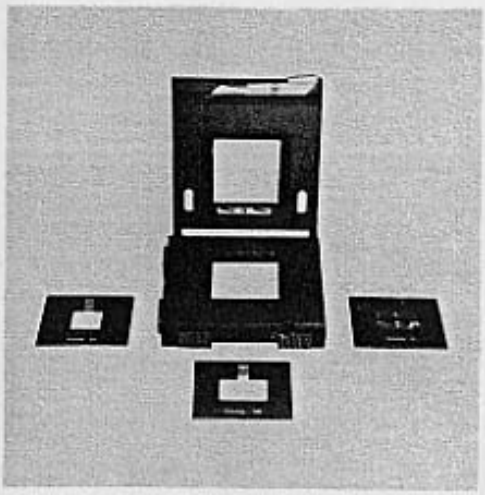
The glassless SIXMA mask inserts go in the negative carrier in place of the lower negative carrier glass. They are available in all standard image formats from 8 mm to $2^1/_4 \times 2^1/_4$ inches (6 x 6 cm).

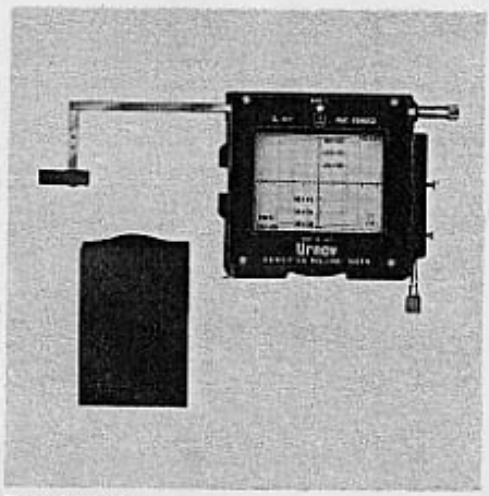
5.2.0. Copying adapter

The URNOV copying adapter consists of a closed frame with ground glass screen. Plate holders and sheet film inserts for $2^1/_2 \times 3^1/_2$ inch (6.5 x 9 cm) negatives and reducing adapters for $1^3/_4 \times 2^1/_4$ inch (4.5 x 6 cm) plates and sheet films are available separately.

5.3.0. Darkroom lamp

The PENCO darkroom lamp is suitable for mounting on the wall or standing on the bench. Five interchangeable filters — white, orange, ruby, olive and deep green — are mounted in a rotating turret to permit simple selection of the required darkroom illumination for all black-and-white and colour materials. A heat filter prevents fading of the safelight filters.





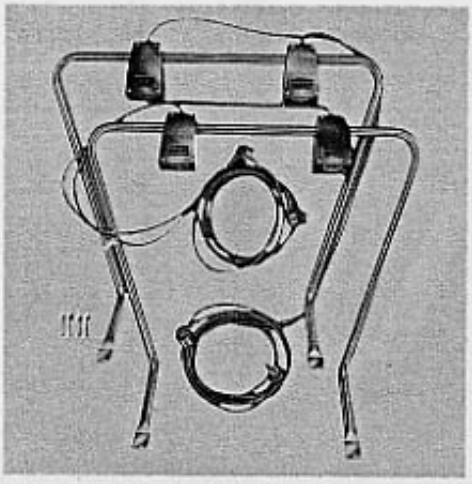
Durst URNOV

Durst Pentacolor

5.4.0. Lens panels
For the various lens focal lengths and lens threads are available the corresponding lens panels.

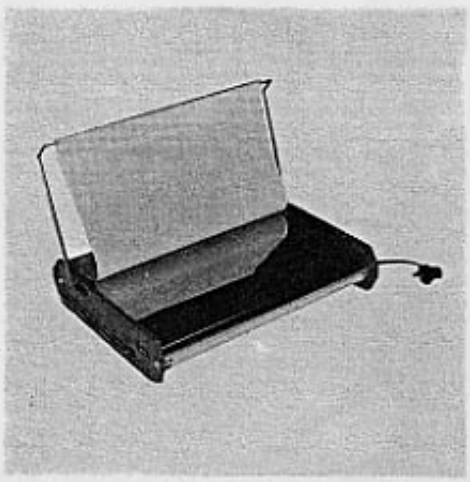
Lens panels	Lenses
SETOPLA 2825	f=50 mm lenses with M 25 thread
SETOPLA 2839	f=50 mm lenses with M 39 thread
LAPLA 25	f=60-80 mm lenses with M 25 thread
LAPLA 32	f=60-80 m lenses with M 32,5 thread
LAPLA 39	f=60-80 mm lenses with M 39 thread

5.5.0. Copying lighting unit
The CAMFLUD 2 and CAMFLUD 4 copying lighting units are ideal for even and glare-free illumination. Two chrome-plated supporting arms each with one or two lamp holders (CAMFLUD 2 or CAMFLUD 4 respectively) are mounted directly on the baseboard or on the table underneath. The lamp holders take flood lamps up to 150 watts and can move sideways or tilt up and down.



Durst Camflud

5.6.0. The Durst DUTRO universal print drier
This double sided drier has an adjustable thermostat for precise temperature control while drying colour prints.



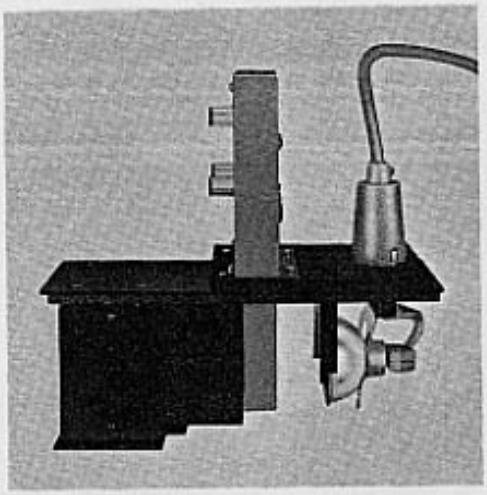
Durst Dutro

6.0.0. The Durst colour system

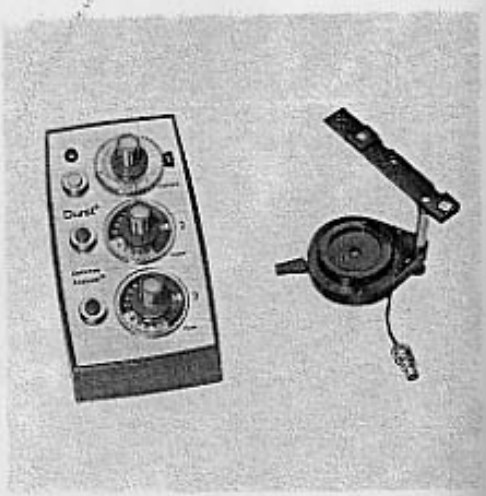
6.1.0. The CLS 66 colour mixing head
With fade-proof dichroic filters. Permits infinitely variable subtractive filter control A 100 watt 12 volt tungsten-halogen lamp is used as a diffused-light source.

6.2.0. Transformer
This transformer is required for working with the Durst CLS 66. It reduces the mains voltage to the optimum operating voltage of the CLS 66. This ensures maximum burning life of the lamp; also it provides light of an optimum colour temperature for the colour enlarging paper and avoids overheating.

6.3.0. Colour Analyser
The Durst COLORNEG Analyser permits rapid and precise filter selection when enlarging colour negatives.
After calibrating with a standard negative this analyser measures both the density of the colour negative (to determine the exposure time) and the colour balance to establish the required filtration. Colour balance measurements are carried out by turning two knobs. The required filtering value is read off when a signal lamp lights up, and set directly on the colour mixing head.



Durst CLS 66



Durst Colorneg Analyser

6.4.0. Processing timer

The programming COLTIM timer can be used for all film and colour processing work. The total running time of 30 minutes can be subdivided into any desired programmed time intervals.

6.5.0. COMASK multiple exposure paper holder

With this paper holder for paper sizes up to 7 x 9½ inches (18 x 24 cm) you can expose the following combinations:

1 enlargement
7 x 9½ inches (18 x 24 cm), or

2 enlargements
4¾ x 7 inches (12 x 18 cm), or

4 enlargements
3½ x 4¾ inches (9 x 12 cm), or

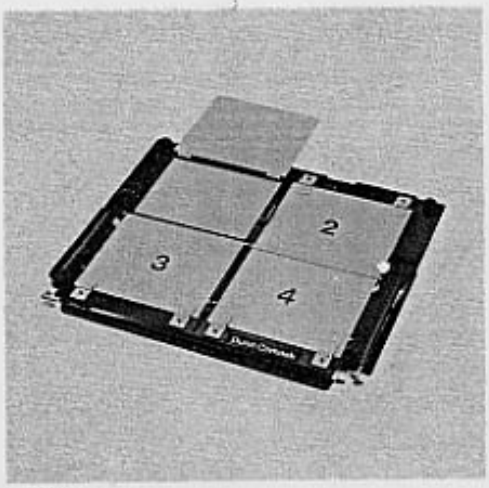
1 enlargement
4¾ x 7½ inches (12 x 18 cm), plus

2 enlargements
3½ x 3¾ inches (9 x 12 cm).

6.6.0. The Durst CODRUM daylight processing drum

This drum can be used for daylight processing of all colour papers up to 8 x 10 inches or 18 x 24 cm. The processing solutions are also changed by daylight.

Durst Coltim

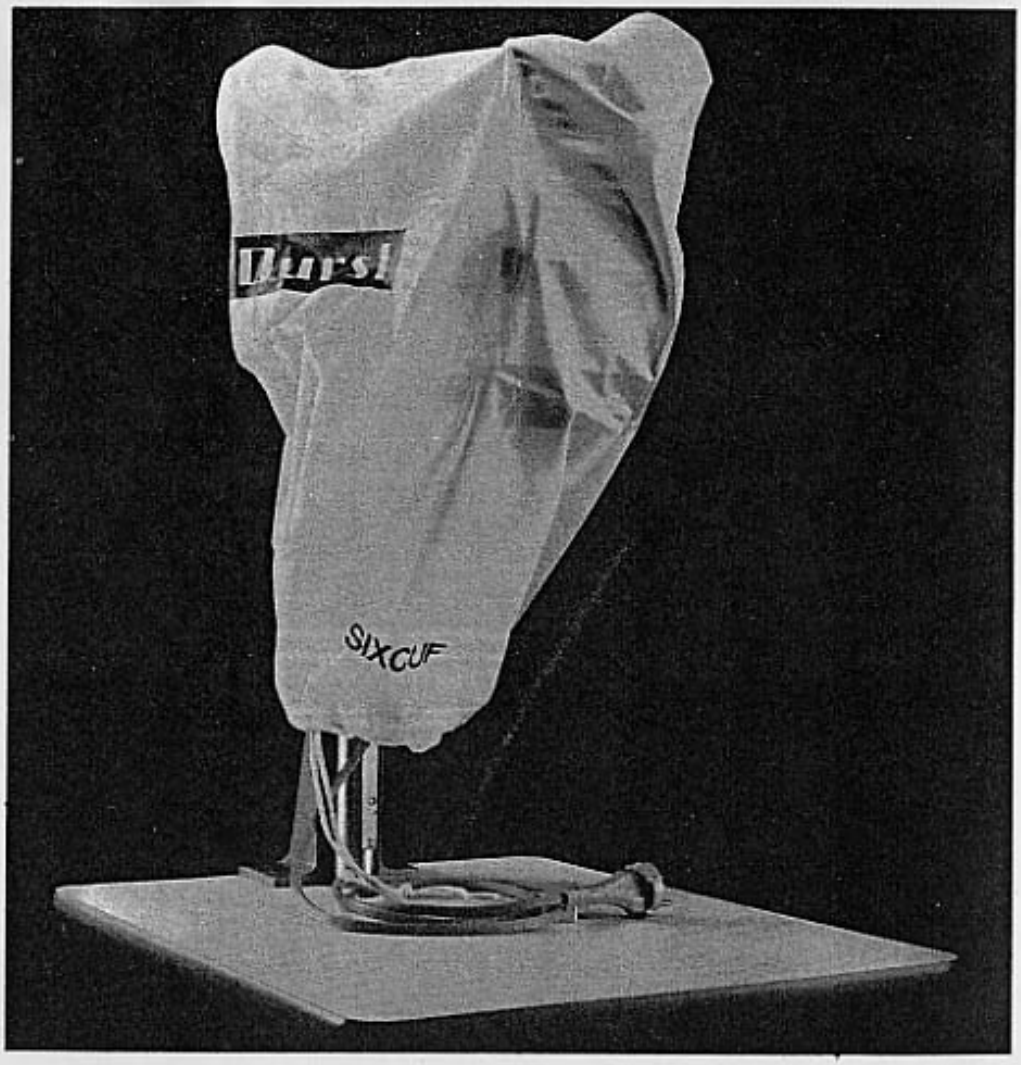


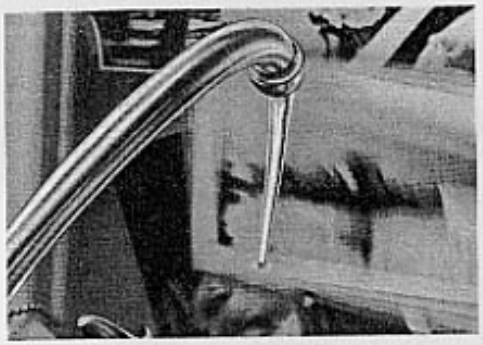
Durst Comask

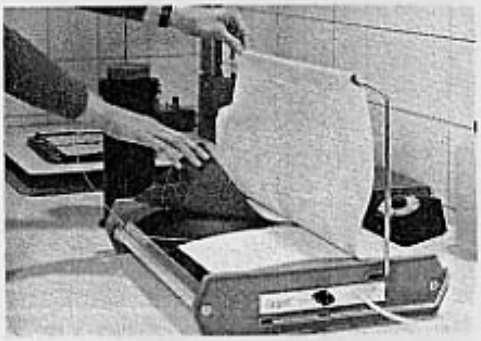
Durst Codrum

7.0.0. Maintenance
As already noted, dust is a nuisance in enlarging. When the enlarger is not in use, either store it in a closed cupboard or cover it with the SIXCUF dust cover. However, for flawless enlargements it is still advisable to clean the condensers and lens with a fluffless cloth before every enlarging session. From time to time lubricate the enlarger column with vaseline or mineral oil.

8.0.0. Storage
The M 601 is very compact and therefore easy to store. After use, the enlarger can be dismantled into the parts in which it was supplied. So keep the foam plastic box for storage.







5. Develop the exposed enlargements as indicated by the paper manufacturer. Usually a development time of 1½-2 minutes is recommended. Gently move the print in the developer to bring constantly fresh solution into conctact with the print surface.

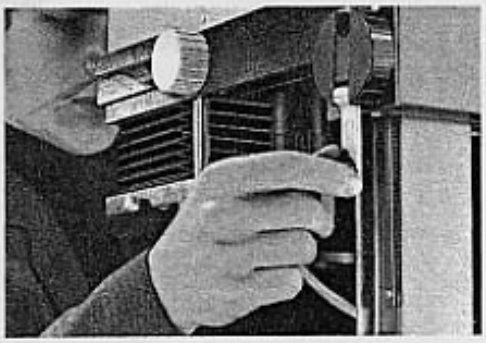
6. Use forceps to lift the print out of the developing dish, dip it for a few seconds in a water rinse (centre dish), then place in the fixer with the emulsion side down. Keep it there for about 10 minutes, moving the print from time to time to dissolve away all unexposed silver salts. White light can be switched on once the print has been in the fixer for half a minute.

7. Wash the print for about an hour in running water or in at least 8 changes of water. The washing time can be appreciably reduced by a hypo eliminator bath.

8. Wipe off excess water and place the enlargement on a clean towel, leaving it to dry overnight. For glossy prints dry the paper in a glazer, which is also suitable for rapid drying (about 10 minutes).

9. Now you have the finished print. You can be quite proud of your masterpiece. Do not miss the opportunity to control the pictorial impact of your own prints during enlarging.

Canon



9.0.0. Simple enlarging step by step

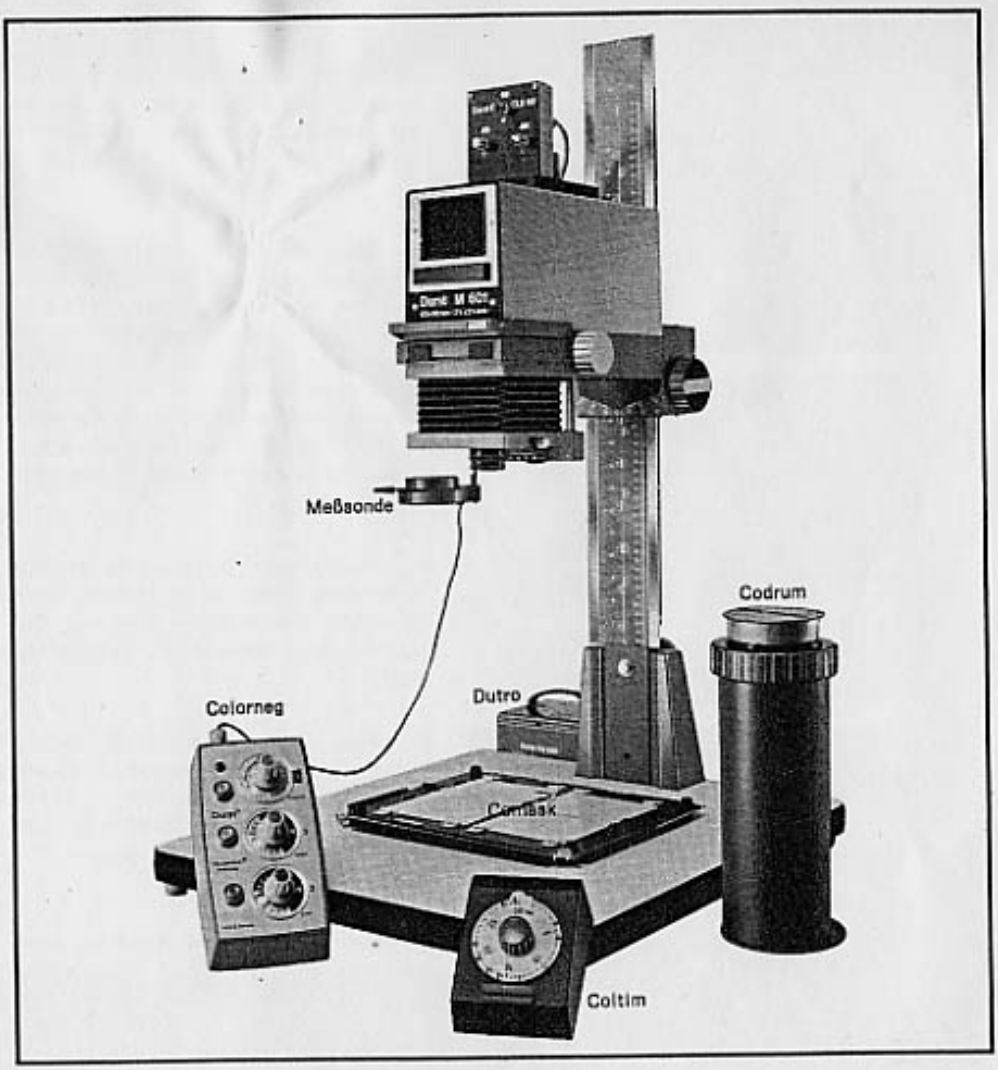
1. Place the negative with the emulsion side downwards in the negative carrier. (Inserting it with the emulsion side up yields laterally reversed pictures.) Switch on the darkroom lamp (orange safe light).

2. Fully open the lens aperture and raise or lower the enlarger head on the column to bring the projected negative or the part of it you want to the required size on the masking frame.

3. Accurately focus the projected image for maximum sharpness. Stop down the lens to obtain an exposure time of about 10 seconds for a properly exposed print. Switch off the enlarger lamp and put a sheet of enlarging paper (emulsion side up) in the masking frame. The masking strips produce a white margin on the print, hold the paper flat and can be adjusted to crop the picture in any way you want.

4. Expose by switching the enlarger lamp on and off. Find the correct exposure by a stepped exposure series on a test sheet. Develop this test print for the time recommended by the paper manufacturer. The test should then include a correctly exposed strip to indicate the required exposure time.

Durst-Colorsystem



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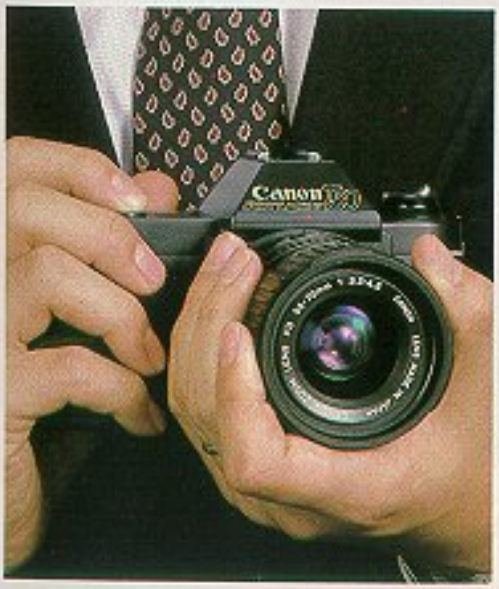
AUTOFOCUS

Snapshot Zoom

Capturing special moments from day to day.



What is a snapshot? It's a scene that catches your eye or an event that catches your heart. It's capturing a special mood or a fleeting expression. Because even a contemplative picture like this often requires spur-of-the-moment camera work, you need a responsive lens. Simply put, nothing meets these needs better than Canon's FD 35—70mm f/3.5-4.5 zoom. A lens which quickly displays its versatility, it moves from a 35mm wide-angle shot to a 70mm portrait in just moments. That way, you can photograph the whole group, or, without moving, zoom in on one special person. The lens's compact size makes it easy to take a series of shots in rapid succession, or to take "blind" shots holding the camera at waist level or overhead. Use the telephoto when you want some distance between yourself and camera-shy subjects. You'll also appreciate the extra flexibility you'll get from using this lens with a power winder.

FD35—70mm f/3.5-4.5, 1/125 sec. at f/5.6, ISO64

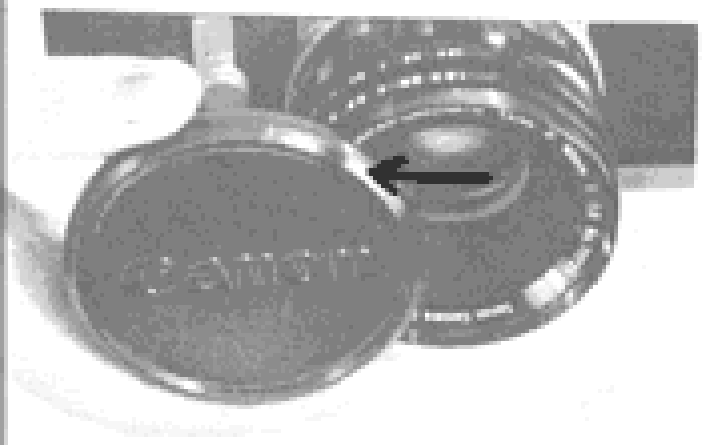
YOUR

Canonflex RM

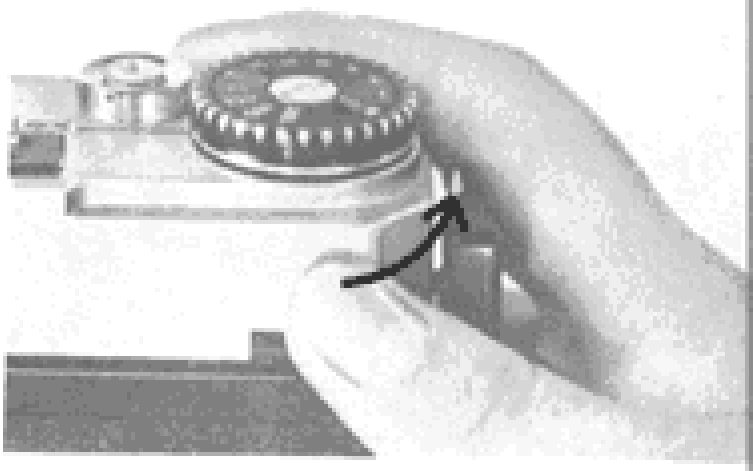
with BUILT-IN EXPOSUER METER

Order of Photography

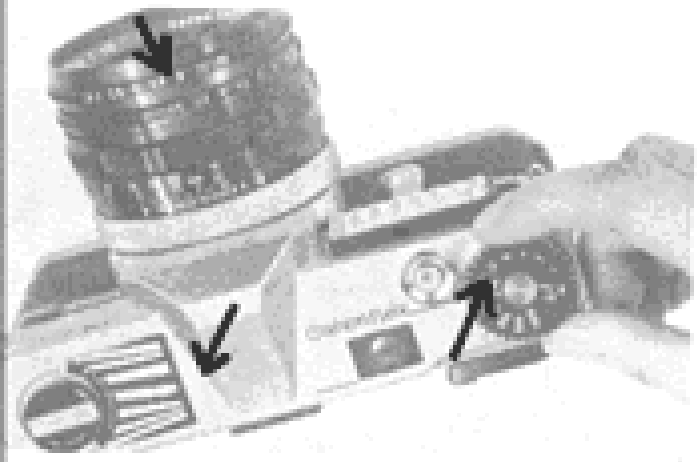
Please exercise following steps carefully before shooting the first film.



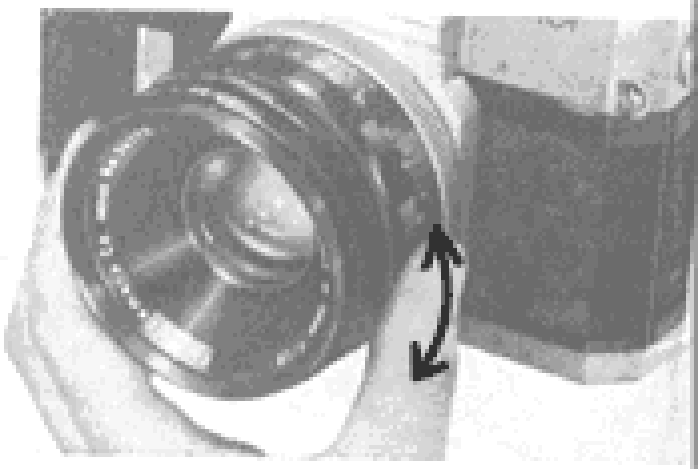
1. Open the camera leather case and take off the lens cap.



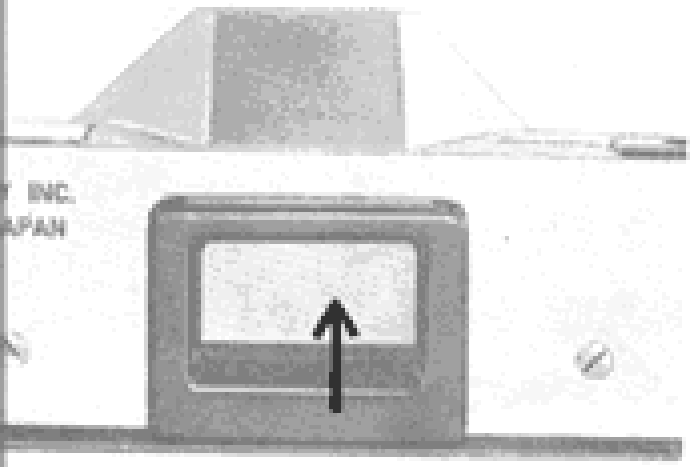
2. Wind the lever.



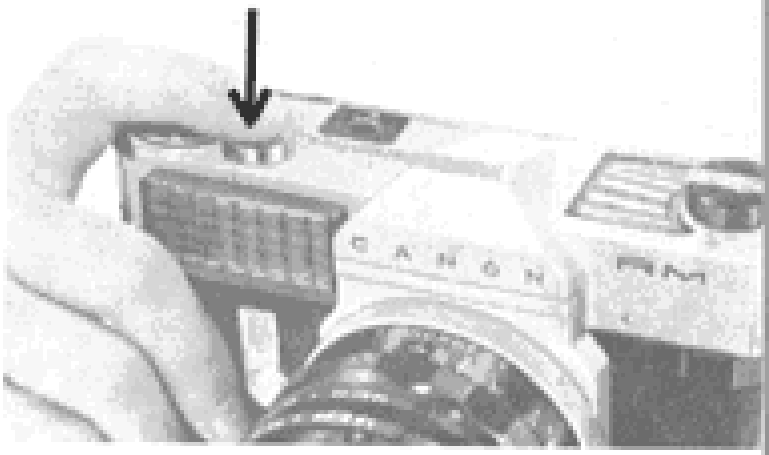
3. Shutter speed and aperture setting.



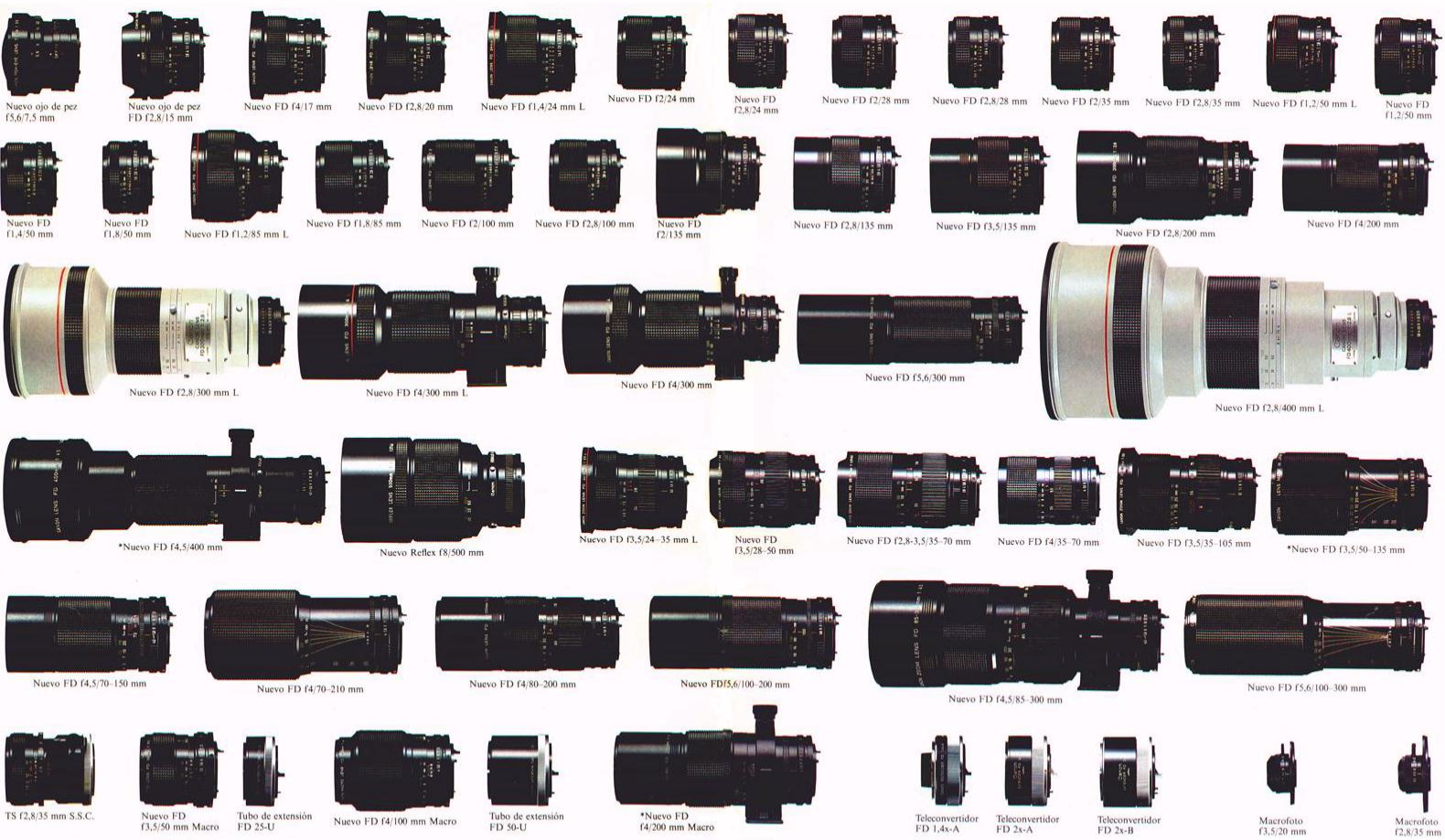
4. Focusing



5. Composing the picture



6. Shutter release

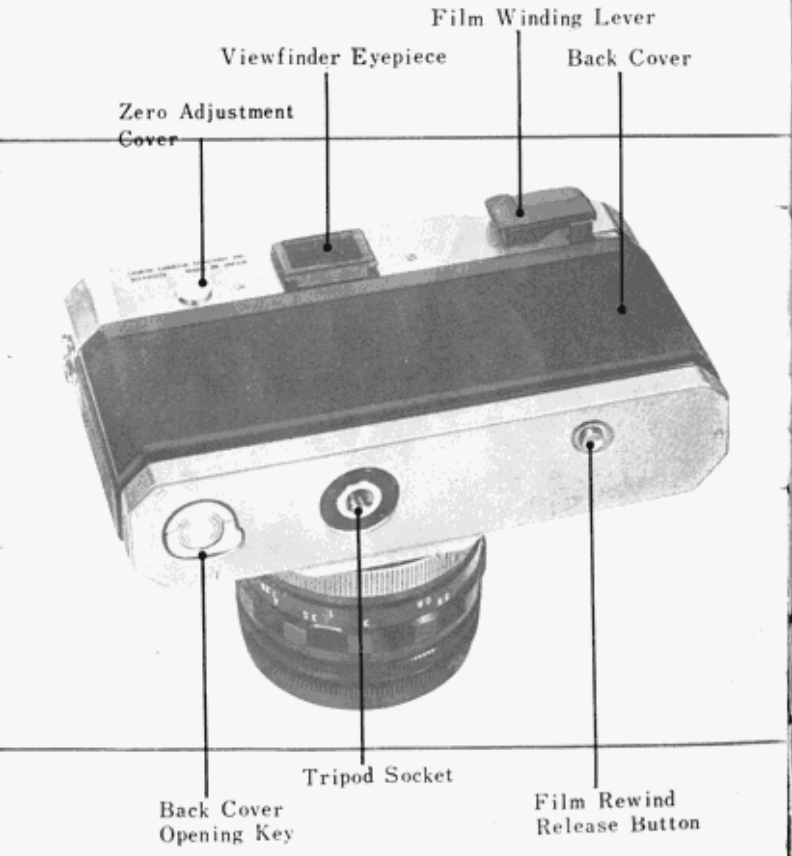


Nuevo ojo de pez f5,6/7,5 mm
Nuevo ojo de pez FD f2,8/15 mm
Nuevo FD f4/17 mm
Nuevo FD f2,8/20 mm
Nuevo FD f1,4/24 mm L
Nuevo FD f2/24 mm
Nuevo FD f2,8/24 mm
Nuevo FD f2/28 mm
Nuevo FD f2,8/28 mm
Nuevo FD f2/35 mm
Nuevo FD f2,8/35 mm
Nuevo FD f1,2/50 mm L
Nuevo FD f1,2/50 mm
Nuevo FD f1,4/50 mm
Nuevo FD f1,8/50 mm
Nuevo FD f1,2/85 mm L
Nuevo FD f1,8/85 mm
Nuevo FD f2/100 mm
Nuevo FD f2,8/100 mm
Nuevo FD f2/135 mm
Nuevo FD f2,8/135 mm
Nuevo FD f3,5/135 mm
Nuevo FD f2,8/200 mm
Nuevo FD f4/200 mm
Nuevo FD f2,8/300 mm L
Nuevo FD f4/300 mm L
Nuevo FD f4/300 mm
Nuevo FD f5,6/300 mm
Nuevo FD f2,8/400 mm L
*Nuevo FD f4,5/400 mm
Nuevo Reflex f8/500 mm
Nuevo FD f3,5/24–35 mm L
Nuevo FD f3,5/28–50 mm
Nuevo FD f2,8-3,5/35–70 mm
Nuevo FD f4/35–70 mm
Nuevo FD f3,5/35–105 mm
*Nuevo FD f3,5/50–135 mm
Nuevo FD f4,5/70–150 mm
Nuevo FD f4/70–210 mm
Nuevo FD f4/80–200 mm
Nuevo FD f5,6/100–200 mm
Nuevo FD f4,5/85–300 mm
Nuevo FD f5,6/100–300 mm
TS f2,8/35 mm S.S.C.
Nuevo FD f3,5/50 mm Macro
Tubo de extensión FD 25-U
Nuevo FD f4/100 mm Macro
Tubo de extensión FD 50-U
*Nuevo FD f4/200 mm Macro
Teleconvertidor FD 1,4x-A
Teleconvertidor FD 2x-A
Teleconvertidor FD 2x-B
Macrofoto f3,5/20 mm
Macrofoto f2,8/35 mm

Estos cuatro magníficos teleobjetivos se representan aquí a una escala más reducida que los demás objetivos.

*Nuevo FD f4,5/500 mm L
Nuevo FD f4,5/600 mm
Nuevo FD f5,6/800 mm L
FL f11/1200 mm S.S.C.

* Indica que este objetivo estará a la venta en un futuro próximo



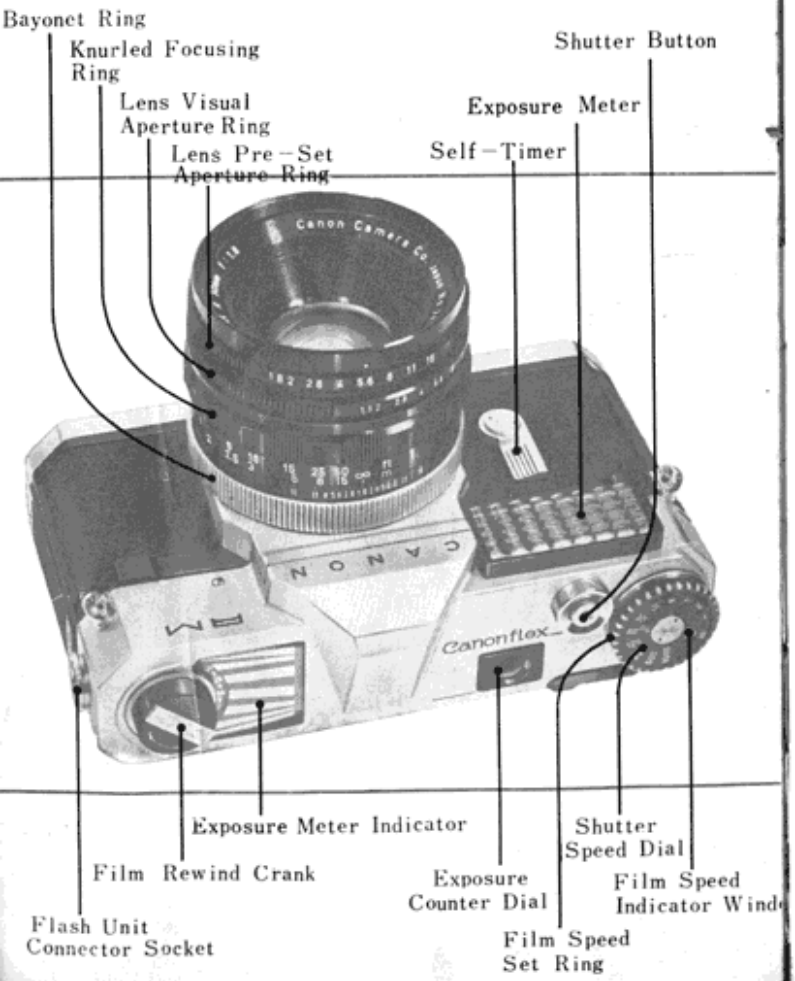
Foreword

Our sincerest gratitude for purchasing the Canonflex RM and our heartfelt congratulations on joining the thousands throughout the world who are proud owners of quality Canon cameras. Canon cameras are popular everywhere in the world. While leading the way to developments in the photographic circles in Japan, the Canon Camera Co. has continued untiring and consistent efforts to bring about a "Happier Life for Everyone" through various Canon products.

On the basis of production plans which always reflect the demand and trend, not just of the present, but also of the future, the Canon Camera Co. is striving to bring you better Canon cameras all time.

On the basis of many years of experience and of a most modern and rational production system combining Canon-exclusive theories and manufacturing technology, production is carried out according to an integrated system from raw materials to finished products. Consequently, we are confident that this Canonflex RM, just like all other Canon products, will completely satisfy you as to quality, performance, price and all other points.

We look forward to your making full and effective use of this Canon camera in your home, in your research laboratory, on trips and on hikes.



Main Specifications of Canonflex RM

Type	Single-lens reflex 35 mm camera
Finder	Pentaprism, single-lens reflex, eye-level type. The Waist-level Viewer 2 RM can be coupled.
Focusing Glass	Fresnel lens focusing glass using specially treated, high resolving power focusing glass. Split-image type rangefinder.
Mirror	Quick-return type.
Fully Automatic Pre-Set Aperture Mechanism	Super Canomatic system completely controls automatic pre-set aperture mechanism.
Shutter	Linearly calibrated from 1/1000~1 sec. and B. Single-pivot focal plane shutter.
Built-in Exposure Meter	Needle type coupled to the shutter speed dial. When using ASA 100 film, it has a sensitivity range from LV 6 to LV 17. Effective with film from ASA 10 ta ASA 800.
Flash Synchronization	Direct flash connector socket and automatic time-lag adjustment.
Interchangeable Lenses	Various types with pre-set diaphragms.
Self-Timer	Built-in type actuated by pressing shutter release button. Time can be adjusted.
Winding	Through winding of 120° film winding lever, the film is advanced one frame, the shutter is cocked and the mirror and the aperture are charged.
Film Rewind	Film rewind release button and folding type rewind crank.
Film Loading	One back cover to load either special magazine or regular cassette. Locking of back cover and release of magazine are carried out simultaneously. Opening of back cover automatically returns exposure counter dial to "S" (starting point).
Size	145×92×47 (mm)
Weight	680 (gr) without lens

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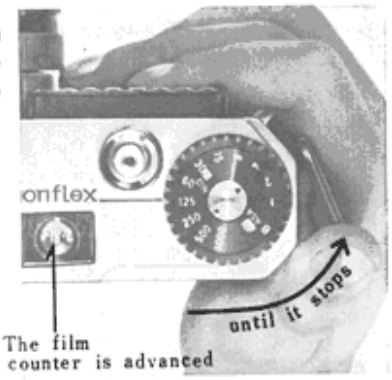
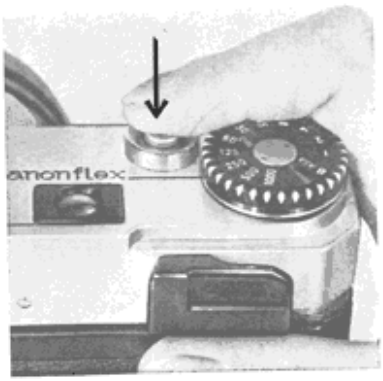
1. Winding of Film and Shutter

If you turn the film winding lever until it stops, the film is advanced one frame and the shutter is set.





- Through the film winding operation, the operating mechanism of the mirror and the automatic preset aperture mechanism of the lens are set at the same time.
- When you wind the film for the first time after loading film, the lever may slip, so wind once more.

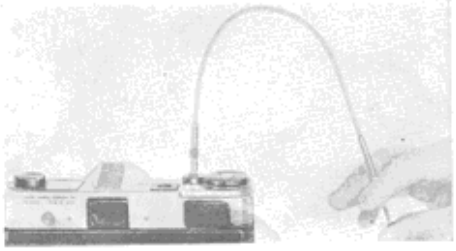
Exposure Counter Dial

As the film is advanced one frame, the exposure counter dial advances one number to show how many pictures have been taken. When the back cover is opened, the exposure counter dial automatically returns to "S", the starting mark.

When the shutter release button is pressed, the mirror snaps up, the lens is stopped down at the same time to the pre-set aperture and the shutter is released. The winding lever can be immediately wound after release of the shutter.

- If the film winding is not complete, the shutter will not be released even if the shutter button is pressed. In such cases, wind the lever once more.

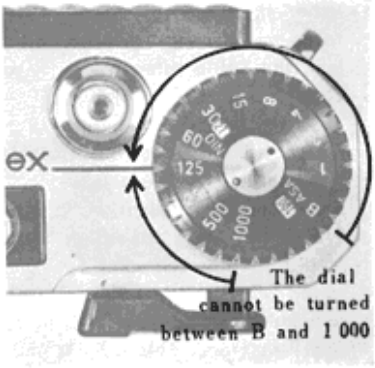
- A cable release can be attached to the shutter button.

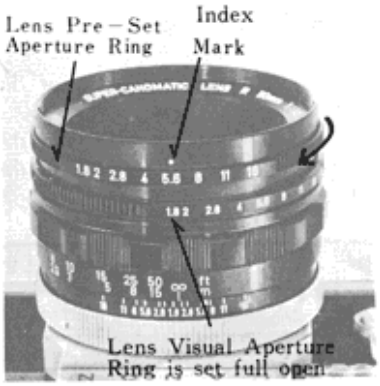


2. Shutter and Aperture Setting

The shutter and aperture opening decide the exposure, and if the coupled exposure meter is used, the correct exposure can be easily set.

If the dial stops at B, turn in the opposite direction. If the dial stops at 1000, turn in the opposite direction.





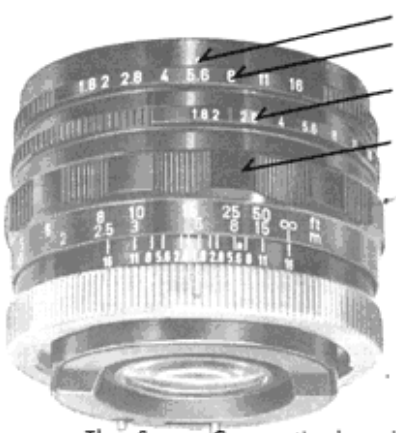
- The dial cannot be turned between B and 1000.
- The numbers on the shutter speed dial are the denominators for such fractions of a second as 1/1000 and 1/15.

- B is used for bulb exposure. The lens remains open as long as the shutter button is kept pressed. It is used for long exposure of over 1 second.
- When time exposure is required, set the dial to B, use a cable release with a lock and lock the cable release during exposure.
- The 1/60 scale on the dial is concurrently used for X flash synchronization. It is used for speedlight (electronic flash) photography. The actual exposure time is the time of speedlight flash duration. (such as 1/1000, 1/500, see your speedlight instruction).
- Avoid setting the dial for an intermediate speed other than calibrated. Turn the lens automatic pre-set aperture ring to the required aperture stop. This adjusts the light volume and brightness of the photographic object. Be sure to set the manual aperture setting at the full opening.
  - Leave the manual aperture setting at the full-opening position.
  - The ratio between the aperture and the exposure volume is as follows, F 2 as the standard:

Lens Aperture	1.2	1.4	1.8	2.0	2.8	(3.5)	4.0	5.6	8.0	11	16	22
Exposure ratio	1/3	1/2	1/1.25	1	2	(3)	4	8	16	32	64	128

- The aperture ring can be set at positions between numbers.

3. Super Canomatic Lens



The Super Canomatic lens is equipped with the automatic pre-set diaphragm. Ordinarily, the lens is wide open, but when the shutter is actuated, the lens is closed down automatically to the pre-selected aperture stop. When the shutter operation is completed, it automatically reopens to full aperture.

Automatic Pre-Set Diaphragm

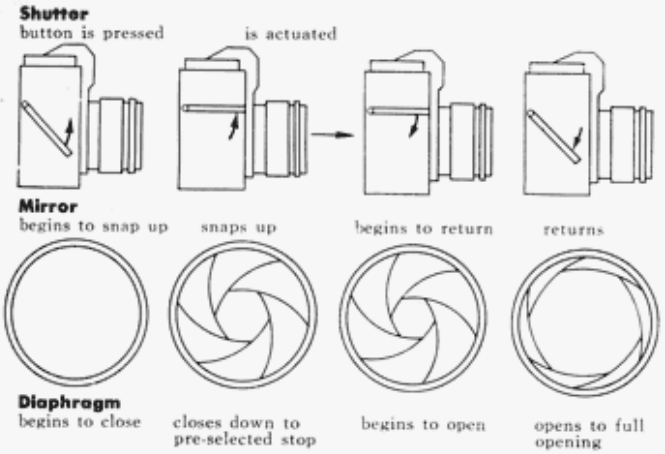
This is the mechanism for adjusting the size of the aperture which is automatically closed down. If this ring is turned and set to the mark, the lens is closed down to the pre-selected aperture stop for the instant that the shutter is released.

Manual Aperture Ring

If this ring is turned, the lens can be opened or closed without relation to the pre-selected aperture stop. Through use of this ring, you can see the actual sharpness of picture. When using the manual aperture mechanism, always have the automatic pre-set aperture ring at the full opening position, otherwise internal automatic mechanism will be strained.

Super Canomatic Mechanism

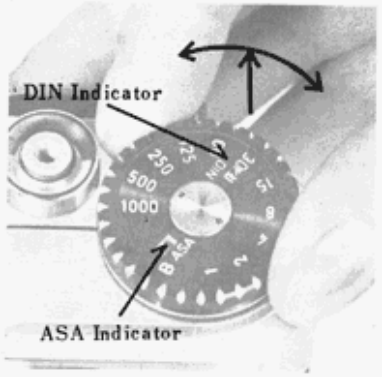
Through this mechanism, the opening and closing of the aperture cannot be seen with the human eye at high shutter speed. However, the movement can be seen with the eye at B or slow speeds. The larger the aperture number, (e.g. smaller lens opening,) the less light will reach the film, as you advance one stop on the aperture ring, the light volume is reduced to one-half. Consequently, when you stop down one stop on the aperture stop, double the exposure time. if you stop down two stops, you must increase the exposure time by four times. Positions between numbers on the aperture ring can be used. Depending on the lens, this halving of the light volume does not effectively apply between full open and the stop next to it (e.g. F 1.8 and F 2) Since the Canonflex RM has a built-in exposure meter, an appropriate combination shutter speed and lens aperture is automatically decided.



4. How to Use the Exposure Meter

Preparations

Set the film speed indicator to the speed of the film being used. To do this, lift up the outer sensitivity ring of the shutter dial and turn.



- Only the outer ring of the shutter dial can be lifted and turned. After 10 appears in the indicator, the dial cannot be turned any further to the right. If 800 appears, the dial cannot be turned any further to the left.

- The film speed is noted on the film box or in the instruction included the film.

- Sensitivities

ASA	10	16	32	50	100	200	300	800
DIN	11	13	16	18	21	24	27	30

Deciding the shutter speed (1)

Set the desired aperture stop. Aim your camera toward the object to be photographed.

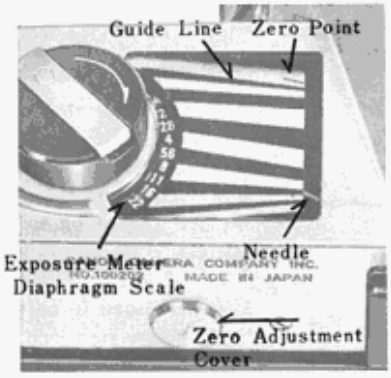
Turn the shutter speed dial and align the lens aperture reading with the needle.

Be sure to set the shutter dial to a click stop.

- When reading the light meter, take care not to cover the photo-cell with the hand.
- The reading of the aperture stop is carried out along the guide line

Deciding the Aperture (2)

Set the desired shutter speed as recommended in the film instruction. Point the camera at the object to be photographed. Read the aperture stop indicated by the exposure meter needle and set the automatic pre-set aperture ring accordingly. Be sure to read corresponding position of the zebra pattern edges.



- Positions between numbers on the shutter speed dial cannot be used, but positions between numbers on the aperture ring can be used. Consequently, in the strict sense of correct exposure, it is strongly recommended to set the shutter speed first and then adjust the lens aperture accordingly.

Zero Adjustment of Exposure

Adjust the exposure meter so that the needle always points to "O" when the photo-cell is covered.

Adjustment Method

1. First, turn the zero adjustment cover to the left and remove (easily possible if a rubber plate is used.)
2. An adjustment pin with a groove can be seen in the hole, so use a screwdriver or stick to turn the pin to the left or right so that the needle points to "O".
   During this operation, the photo-cell must be completely covered.

Adjustment Angle

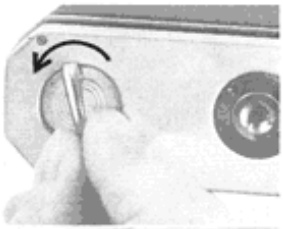
- When the background of the object being photographed is very bright as in the case of blue sky, there is the tendency that the main object being photographed will be under-exposed if the photo-cell is faced too far upward. When reading the exposure meter, it is necessary to avoid the camera from tilting upward.
- When shooting against the light, it is important to decide which to emphasize, the background or the main object, in order to determine the exposure.

- Almost entire picture that will appear on the finished film can be seen in the focusing glass, so there will be no parallax even if the lens is interchanged or the distance is altered.
- When focusing with the focusing glass but not using the split-image rangefinder, the part of the glass outside the circle is used.

- A waist-level viewer can be attached to the eye-level finder. The waist-level viewer is best suited for ultra telephoto lens, copying work and microphotography.

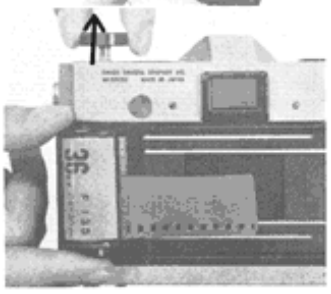
7. Loading the Film

Either daylight loading film (film in cartridge) or film loaded in special Canon magazine V can be used.



1. Turn up the back cover opening key and make a half-turn to the left.
The film magazine cannot be inserted unless the opening key is in the complete open position.

2. The back cover will float up slightly, open door completely the rest of the way by hand.



3. Lift up the rewind crank and pull out the rewind knob completely.

5. How to Hold the Canonflex RM

The camera can be in the positions shown in the photographs on the right, depending on whether you are taking vertical or horizontal pictures. While looking through the finder, focus and decide the composition of the picture and then press the shutter button.
At this time, the following points are particularly important :

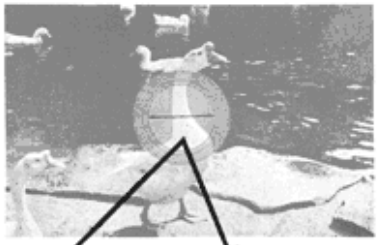
1. Grasp the camera as deeply as possible with both hands.
2. Steady the camera against either the cheek or forehead.

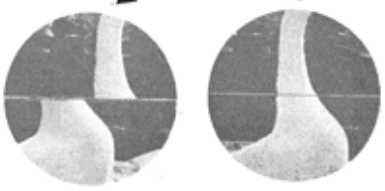
3. When taking a horizontal picture, have both elbows tight against the body. When taking a vertical picture, have at least one elbow tight against the body.

Pressing the shutter button roughly will result in shaking the camera and blurred pictures.
It is best to use a tripod and a cable release. This Is particularly true when shooting at speeds slower than 1/30 sec.

6. Focusing

Remove the lens cap and look through the finder. Turn the focusing ring.





When the picture in the circle in the finder is split in two by the center line, then the object is out of focus. The object is in focus when the image seen in the center aligns vertically.

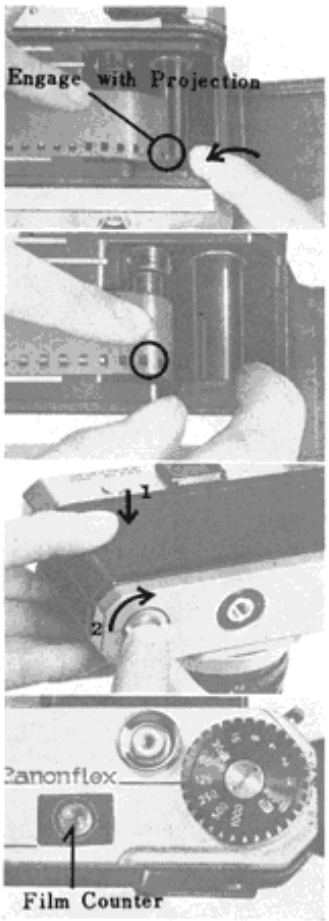
4. Pull out the end of the film and insert fully into the film take-up spool. While turning the flange of the spool slightly in arrow direction, hook the protuberance on the groove side with the perforation of the film.

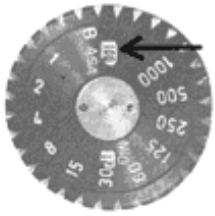
5. At this stage, have the both sides of film perforations accurately fit the teeth of the sprocket. Also, if there is slack in the film, turn the rewind crank slowly to the right to remove the slack.

6. Close the back cover While holding down the back cover, turn the back cover opening key to the right. The rewind crank should be folded.

7. Keeping the lens cap on, wind the film and release the shutter twice.

8. The exposure counter dial will be at the S (starting point) position, but after two blank shots, it will indicate 0. The camera will be ready for taking pictures when you wind the film for the next shot, i.e. film counter at No. 1 position.





Film Speed Indication

After you have loaded the film, show the film speed without fail in the film speed indicator window on the shutter speed dial. Refer to page 9 in connection with film speed.

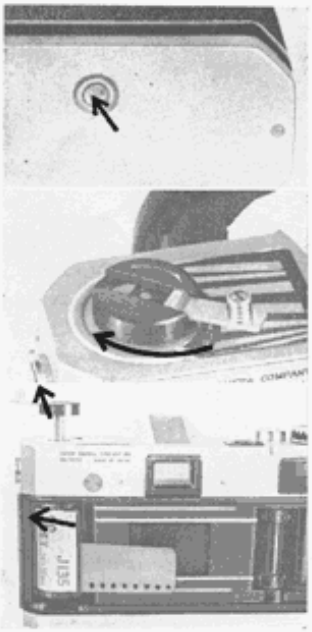
Checking Correct and Incorrect Loading

The rewind crank will turn each time the film is wound. The turning of the rewind crank will show you that the film is being correctly wound up by the film take-up spool. So when winding the film, always watch the rewind crank.

If the rewind crank does not turn, it means that either the end of the film has come loose from the take-up spool or the film perforations are not caught on the sprocket teeth. In such a case, refer to the section on rewinding the film in taking out the film and then reloading the camera.

8. Film Rewinding

When you come to the end of the film, it will be hard to wind the film any more, so rewind the film back into the cassette (or magazine) according to the following steps.



1. After pressing the film rewind release button in the buttom of the camera, raise the rewind crank and turn to the right to wind film back into the magazine.

2. If the turning of the film rewind release button stops, stop rewinding immediately.

3. Turn the back cover opening key to the left and open the back cover.

4. Pull out the rewind knob completely and take out the cassette (magazine).

* Once you have pressed the film rewind release button, you can remove your finger. The button will automatically return to its normal position when the film winding lever is wound.
* Do not forget to attach the lens cap when rewinding the film.
* If you forcefully wind the film even after you have reached the end of the roll of film, you may cut the film thereby making it impossible to rewind the film. In such a case, remove the film in a darkroom.

9. Self Timer

Wind the film, turn the self-timer lever in the arrow direction and press the shutter button. The shutter will click about 10 seconds later.

- Wind the self-timer lever more than 2/3 its complete turn.
- The time can be adjusted by the position of the self-timer lever.
- The winding of the film can be carried out after the self-timer lever has been set.

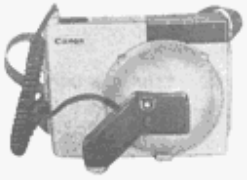
10. Flash Synchronization

If the Canon Flash Unit V-2 is mounted to the direct flash connector socket, flash photography can be carried out at the shutter speeds shown in the chart below. The speedlight (electronic flash) can be used with the Canonflex RM at 1/60 sec. setting.
The time lag of the flash is automatically adjusted at the time of setting the shutter speed dial. The lens hood is necessary for flash photography.

Scope of Synchronization

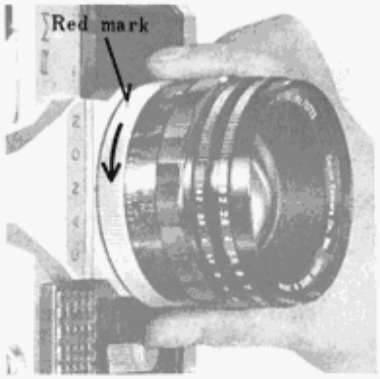
Type of Flash Bulb	1000	500	250	125	X 60	30	15	8	4	2	1	B
FP Type	○	○	○	○	×	×	○	○	○	○	○	○
M Type	×	×	△	△	×	×	○	○	○	○	○	○
F Type	×	×	×	×	×	○	○	○	○	○	○	○

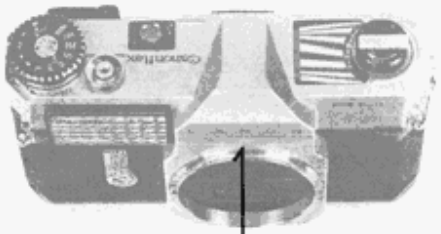
×Mark means it does not synchronize. The 1/60 sec. position is used for "X" contact. As the light quantity of the extra small flash bulbs is very small, choose a speed slower than 1/15 sec. △ Mark means that those two shutter speeds synchronize only with larger bulbs.

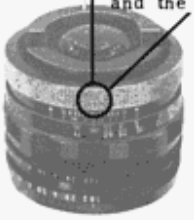


11. Changing of Lens

In order to remove the lens from the camera, turn the bayonet ring of the lens counter clockwise and then pull out the lens. When you mount the lens, match the red mark on the lens to the red mark on the mounting part of the camera and insert the lens. Turn the bayonet ring clockwise to secure the lens to the camera.

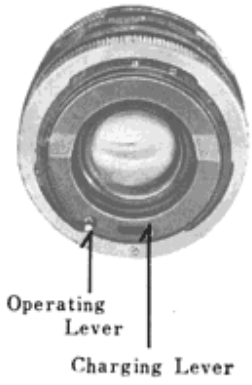






In the back end of the lens, there are the charging lever and operating lever of the automatic pre-set diaphragm.
When attaching the lens charge this charging lever before attaching the lens as shown.

If an uncharged lens is attached to a camera which has already been wound, the automatic pre-set aperture system will not work for the first shot. Of course, the automatic pre-set will operate from the second shot.

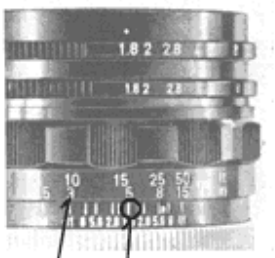


- When removing the lens, take care not to touch the mirror with the finger. Also, if the lens is to be removed for a long time, cover both the camera and lens mounts with caps or covers.

Small bubbles in the lens will reduce the brightness by 1/500–1/1000, but it will have no adverse effects on taking pictures and on the sharpness of the finished picture.

Distance Scale

The distance scale indicates the distance between the focused object and the film surface. It is not absolutely necessary for ordinary photography, but it is needed for checking the depth of field, for infra-red photography, and for flash. On the distance scale, the exact positions are the center of the number for single digit numbers, the point midway between two numbers for two digit numbers and the middle number for three digit numbers.



- When you want to take pictures by actually measuring the distance, measure from the film position mark on the camera to the desired point and then turn the distance scale to the appropriate number for the distance.

Infra-Red Photography

On the depth-of-field scale of Canon lenses is the letter "R". This is for infra red film. When using this film, focus in the normal way. Read off the distance of the object you are focusing on as shown opposite the red distance scale. Turn the lens barrel until the distance reading is opposite the "R" mark. Your lens is now focused for infra-red photography.

In other words, if the distance is 15 ft. after focused have the 15 move to the R position.


Canon

14. Photo Aids for Canonflex RM

Canon Filters

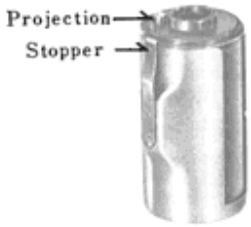
Canon filters are made of solid, specially selected optical glass, polished optically flat and coated hard on both surfaces Canon filters are made with the same precision care as the Canon cameras and lenses. Screw-in filters for Canonflex are available in nine varieties, in sizes of 40, 48, and 58 mm to fit any Canonflex lenses.

	For Black and White
UV	Ultra Violet
Y1	Light Yellow
Y3	Yellow
O1	Orange
R 1	Red
G1	Green
	For Color
CCA	Color Conversion A
CCB	Color Conversion B
Sky	Skylight
—	—
ND4	Neutral Density (×4)
ND8	Neutral Density (×8)

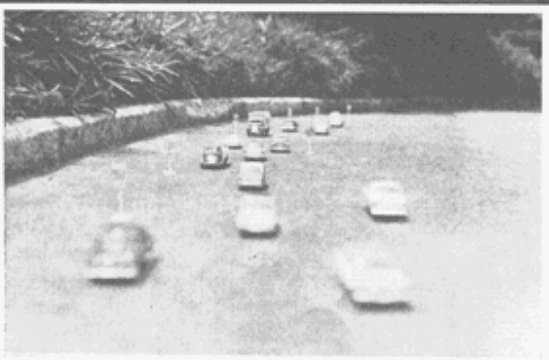
Film Magazine

(Available separately as an accessory.)

Holds up to 36 exposures (five feet) of film. Nickel in black finish; scratch-proof film slots. Supplied in plastic case.



50 mm Lens

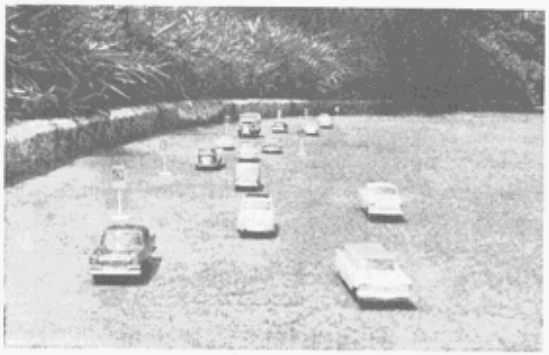


F5.6

Depth of field 3.7m-7.8m

Focused at 5m

50 mm Lens



F11

Depth of field 2.9m-17m

Focused at 5m

13. Canon Interchangeable Lenses for Canonflex RM

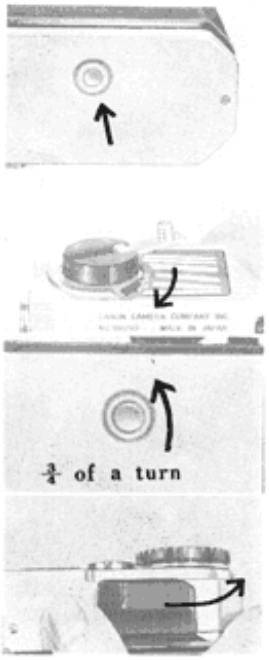
Canon lenses are held in the highest esteem by professionals and discerning amateurs the world over for their unmatched performance in black and white or color, unique optical design, precision engineering and Canon-exclusive Spectra-Coating. Canon pioneered development of high-speed lenses . . . opening up a new lane in photographic versatility to many serious photographers. Every Canon lens is thoroughly tested to insure the highest resolution, contrast, brilliance, and color fidelity. Interchangeable lenses for Canonflex extend the range to as long as 1000 mm F 11 . . . 14 lenses in all (please refer to the specification chart).

The Super Canomatic Lenses have fully automatic springback diaphragm. As the shutter is released, the diaphragm closes down to the pre-selected aperture stop, and returns to full-opening view instantly . . . thus, you view with full brightness at all times.

12. Double Exposure

Accident double exposure is not possible with the Canonflex RM because of the double exposure preventive device. However, double exposure can be made by the following steps:

1. After the first exposure, press the film rewind release button.
2. While watching the dot on the film rewind release button, turn the rewind crank.
3. Stop rewinding when the dot shows 3/4 of one turn.
4. Lightly hold the rewind crank and wind the film winding lever. When you feel resistance in the rewind crank, release it.
5. Then carry out regular film winding.
6. If you repeat the above procedures, you can make as many exposure as you please on one frame.



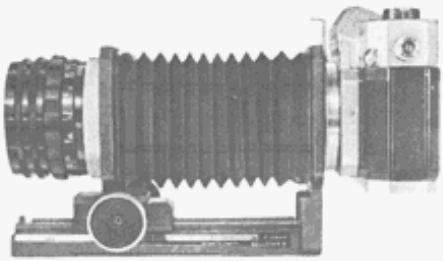
In extremely cold areas, avoid exposing camera except when actually taking pictures. It is desirable to complete photography as speedy as possible to protect the camera.

Depth of Field Scale

The depth-of-field scale shows the range within sharp picture which focus can be made before and behind the point of focus. Range will vary with the F-stop chosen. The larger the lens aperture, the lesser will be the depth-of-field. For example: with an F-stop of 5.6, and with the object you have focused on at 5 m (15 ft.), your camera will give you a sharp picture from approximately 3.7 m (12.3 ft.) to 7.8 m 26 ft.) away from the camera. At F 11 you will get a sharp picture from 2.9 m (9.7 ft.) to 17 m (6.3 ft.) (Please see illustration).

The versatile Super Canomatic Lens has a feature which enables you to see the actual sharpness through the viewfinder eyepiece by manually rotating the manual aperture ring, which is an exclusive feature of Canonflex.

Bellows R



It has wide usage . . . in close-ups, focusing of long-telephoto and extra-long-telephoto lenses, copy work, microphotography, etc. The Bellows R can be adjusted freely either vertically or horizontally by a lever that rotates 90 degrees.

The focusing device is specially designed to assure precision performance in the forward and backward movement.

- When the rangefinder type camera lenses of focal length longer than 85 mm are used, close-ups from infinity to 1:1 life-size are possible.

Camera Holder R3

To steady camera position, this holder is used conveniently for easy and versatile copy work. The holder has a tripod bush on two sides. The camera can be used in normal and inverted positions. Copy work can be done with camera on holder attached to a tripod facing downward.

Lens Mount Converter

There are two types available, A and B. Converter A is used to mount the screw-in type lenses (for rangefinder type cameras) to the Canonflex which is of bayonet mount. Unlike focusing adapter, only the mounting part changes (converter is added), thus, it can be used for close-ups and copy work. Conversely, the Converter B is used when mounting the lenses designed originally for Canonflex on to the rangefinder type cameras. If you use A and B together, they will act as extension tubes. If extension tube is added, macrophotography is possible.

15. Other Photo Aids for Canonflex RM

Copy Stand 3R

Designed for easy copy work with the Canonflex. The set consists of baseboard, stanchion, arm, camera holder, and close-up lens. Using the baseboard and with a camera-to-subject distance of 60 cm., a picture with a field-of-view of about the full page size of LIFE magazine can be taken.

Without the baseboard a field-of-view of 580mm×385mm (about the size of newspaper) or larger can be photographed. Use cable release to steady the camera Waist-level viewer can be conveniently used if you view the subject horizontally.

Macrophotography

For macrophotography, Canon provides macrophoto unit to be used with the Canonflex. It is coupled to the Bellows R and used in combination with Super Canomatic Lens R 50 mm F 1.8, macrophoto coupler, extension tube, lens mount converter A, Bellows R. Tubes are available in 6 different length; 25 mm, 50mm, 75mm, 100mm, 150mm, and 200 mm. Subjects can be blown up from 1.5 to 6.5 times of their original sizes. Macrophoto strut is recommended for extension tubes longer than 75 mm.

Microphotography

Microphotography by Canonflex is done in combination with the Copy Stand 3 R. Waist-Level Viewer can be used conveniently. Bellows R is used to facilitate the operation. It also makes possible the microphotography in which you will get greater magnification that can be taken only with the microscope. With lens mount converter A and microphoto hood mounted on Canonflex camera body, the unit couples to the ocular tube of any standard microscope with an outside diameter of from 24.7 to 25.2 mm.

16. Maintenance and Cleaning of the Camera

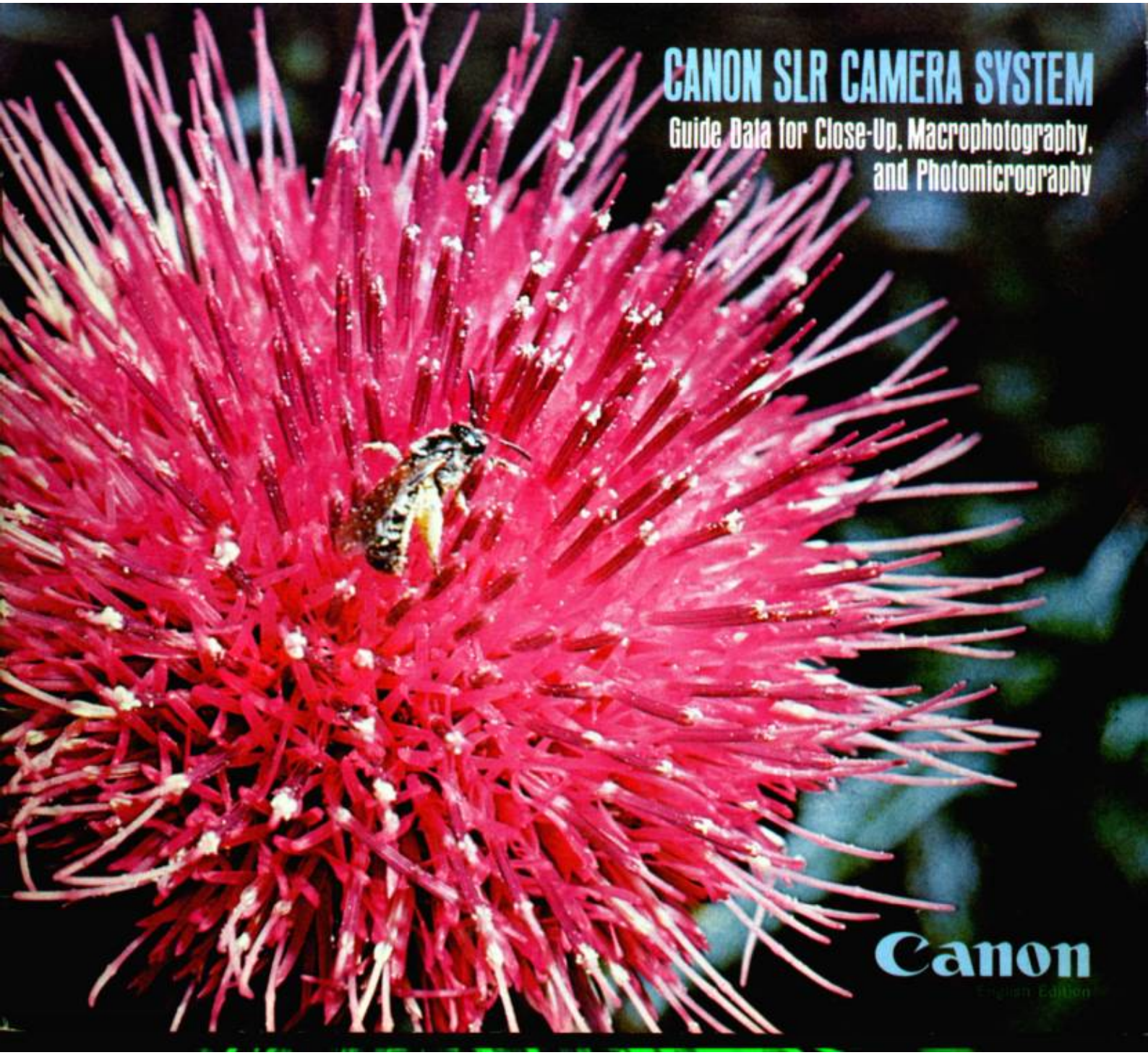
1. Maintenance

Moisture and dust are harmful for the camera. If the camera is stored for a long time, there is the possibility of stains and rusting. It is best to use the camera from time to time so that it will "breathe" the outside air. When the camera is to be put away for a long time, insert silica gel or other dessicating agent. When storing, remove the camera from the eveready case.

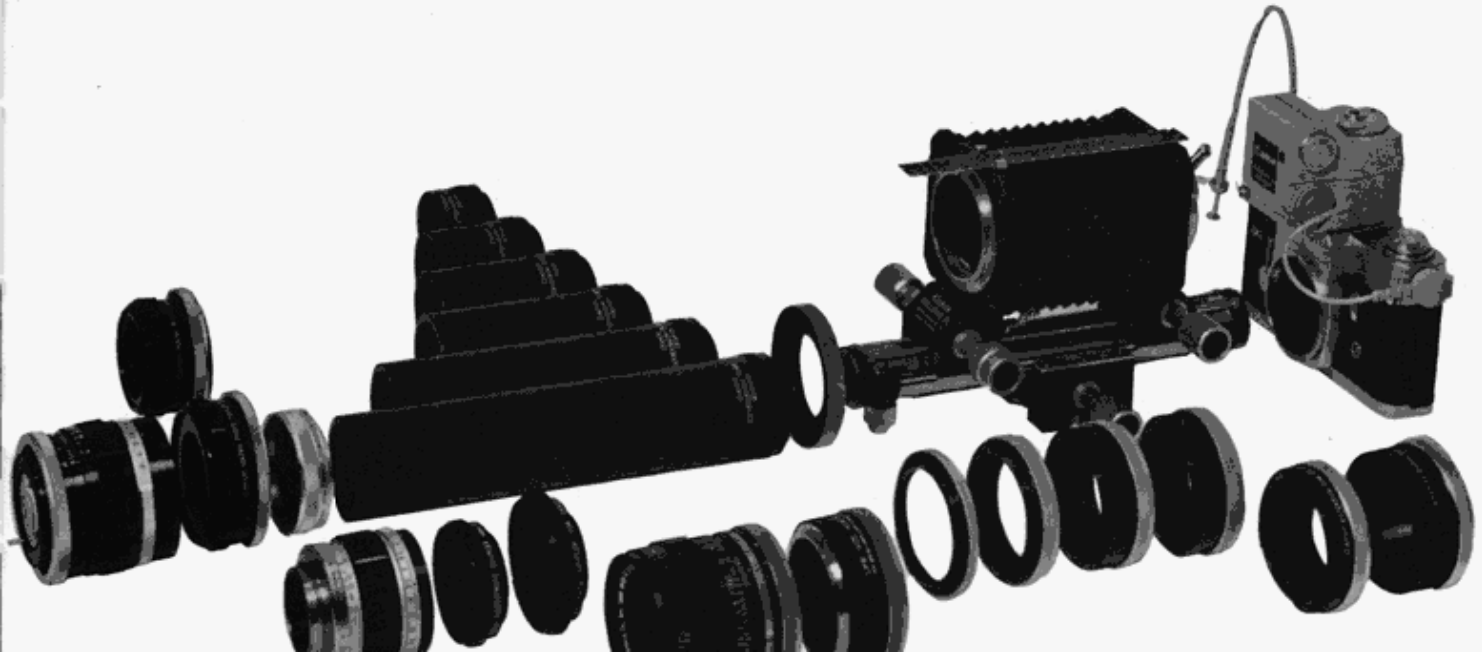
2. Cleaning

Dust adheres to cameras used outdoors, while moisture and salt after use on a rainy day or at the seaside will create stains and rust and may become the cause of "burns" on or rusting of the lens. Use a soft brush to brush away dust and a soft, dry cloth to carefully wipe the lens. Avoid touching the lens with the fingers. Use a blower with a rubber ball to blow away the dust or use a soft brush to brush away dust.

When wiping the lens cannot be avoided, wind a completely clean and soft cloth around a stick, moisten the end slightly with alcohol (best to add a little ether) and wipe lightly from the center outwards, describing circles all the time. Be careful not to wipe with too much force or with cloth with dust attached because such action will result in damaging the lens surface. Take special care not to touch the mirror. If you drop your camera in the sea water, wash immediately with fresh water and wipe completely clean. Send out immediately for repair. If you wait too long, the whole camera will become rusted and it will be impossible to clean and repair your camera.

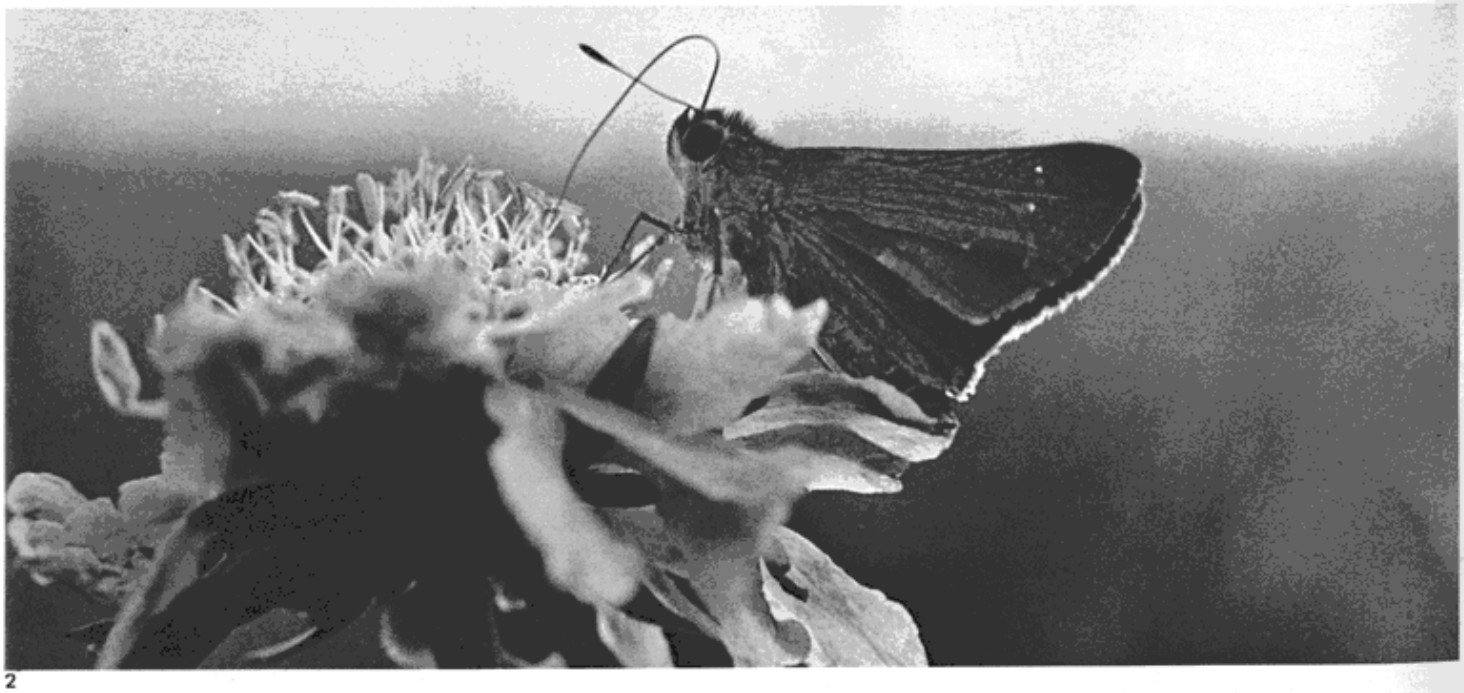

CANON SLR CAMERA SYSTEM
Guide Data for Close-Up, Macrophotography, and Photomicrography
Canon

Mirror	Viewfinder	Light Measurement	Exposure Range	Size, Weight
Stationary Pellicle Mirror, half transparent type	Eye level type Built-in prism screen rangefinder	Built-in CdS through-the-lens exposure meter	EV0.5(with ASA 100 film, f/1.2 at 1 sec.) -EV18(f/16 at 1/1000 sec.) ASA25 - 2000	144 x 91 x 43mm (5-3/4"x3-5/6"x1-3/4") 755 grams (1 lb. 10-1/2 oz.) body only
Shockless quick-return system, Mirror can be rocked up.	Same as above	Same as above	EV2.5(with ASA 100 film, f/1.2 at 1/4 sec.) -EV18(f/16 at 1/1000 sec.) ASA25 - 2000	144 x 93 x 43mm (5-3/4"x3-5/6"x1-3/4") 740 grams (1 lb. 10 oz.) body only
Same as above	Eye level type Built-in split image rangefinder	Built-in CdS exposure meter	EV1(with ASA 100 film, f/1.4 at 1 sec.) -EV18(f/16 at 1/1000 sec.) ASA10 - 800	141 x 90 x 43mm (5-1/2"x3-1/2"x1-3/4") 670 grams (1 lb. 7-1/2 oz.) body only
Same as above	Same as above	CdS clip-on coupled exposure meter	Same as above	141 x 90 x 43mm (5-1/2"x3-1/2"x1-3/4") 650 grams (1 lb. 4 oz.) body only

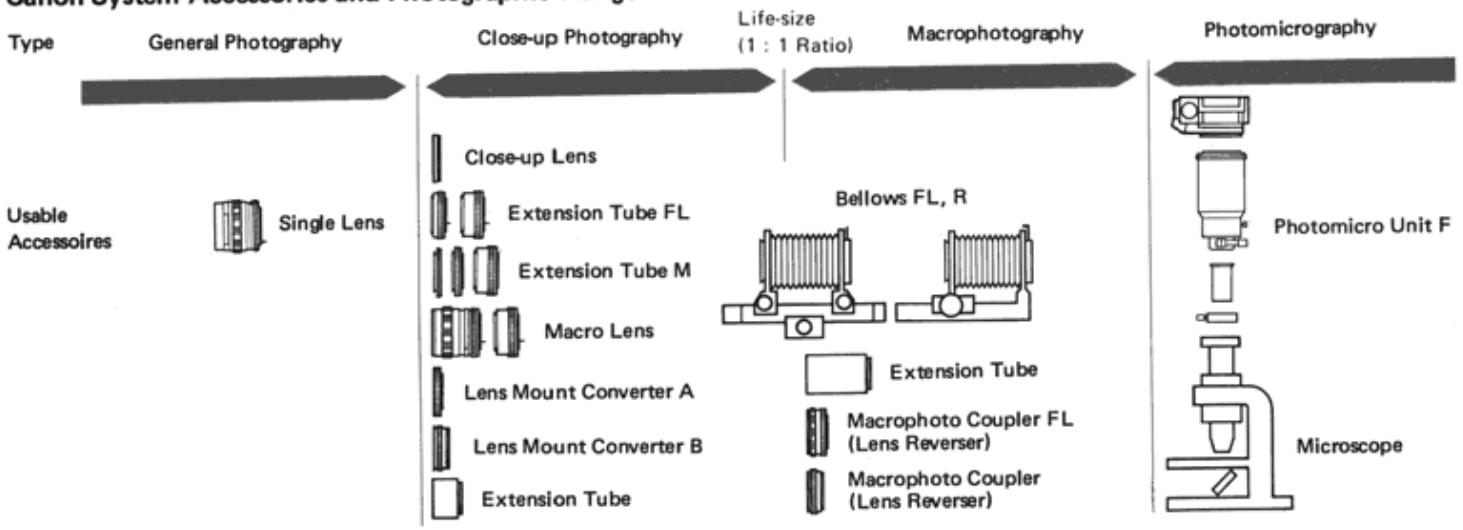


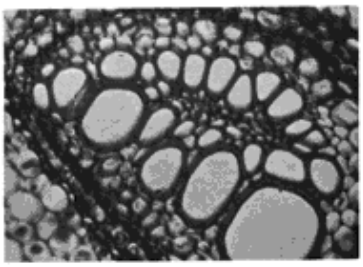
Canon SLR Cameras and Their Performances

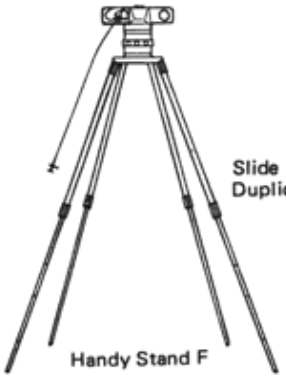
Specifications / Model	Standard Lenses	Interchangeable Lenses	Shutter Speeds	Aperture	Flash Synchronization
Canon Pellix QL	Canon FL50mm F1.8 FL50mm F1.4 FL55mm F1.2	FL19mm F3.5R- FLP38mm F2.8- R1000mm F11, 22 Lenses	Focal plane shutter with speeds from 1/1000 to 1, B and X	Fully automatic pre-set aperture built-in	FP and X contacts FP, M, FM flash bulbs and electronic flash facility
Canon FT QL	Canon FL50mm F1.8 FL50mm F1.4 FL55mm F1.2	FL19mm F3.5R- R1000mm F11, 21 Lenses	Same as above	Same as above	Same as above
Canon FX	Canon FL50mm F1.8 FL50mm F1.4 FL55mm F1.2	FL19mm F3.5R- R1000mm F11, 21 Lenses	Same as above	Same as above	Same as above
Canon FP	Canon FL50mm F1.8 FL50mm F1.4 FL55mm F1.2	FL19mm F3.5R- R1000mm F11, 21 Lenses	Same as above	Same as above	Same as above

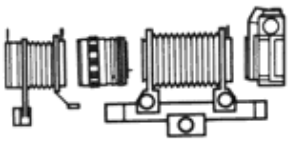


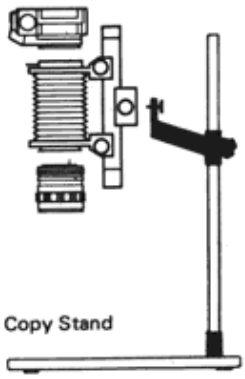
Canon System Accessories and Photographic Range



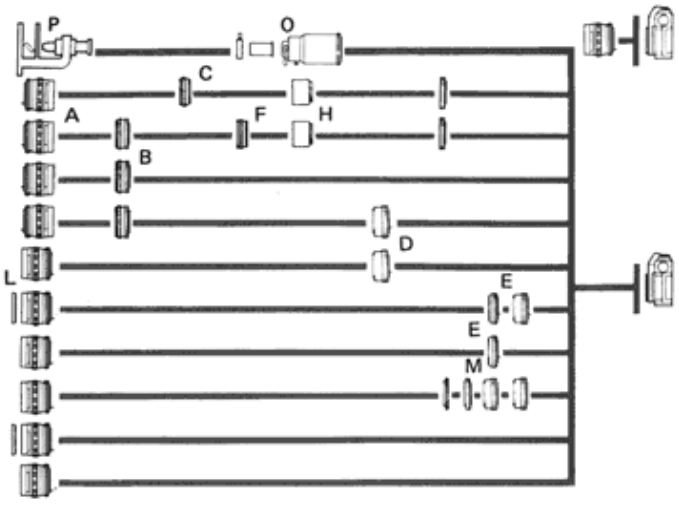


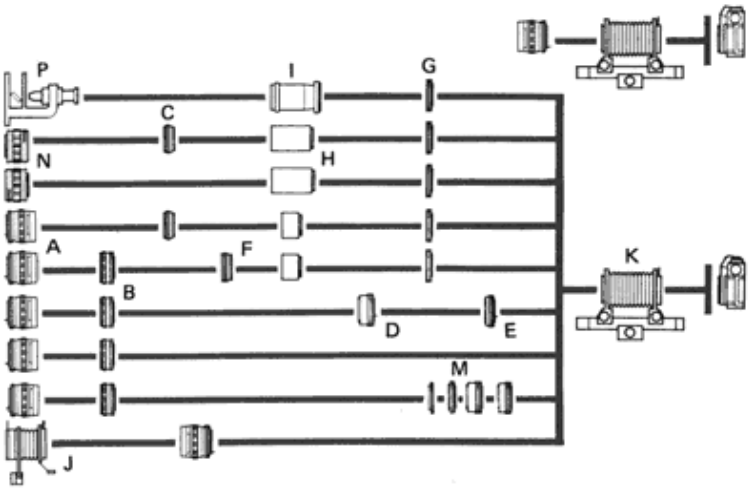






Combinations and Uses of Close-up Accessories





A: FL Lens

B: Macrophoto Coupler FL

C: Macrophoto Coupler

D: Life-size Adapter

E: Extension Tube FL

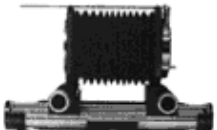
F: Mount Converter B

G: Mount Converter A

H: Extension Tube

I: Microphoto Hood

J: Slide Duplicator



K: Bellows FL

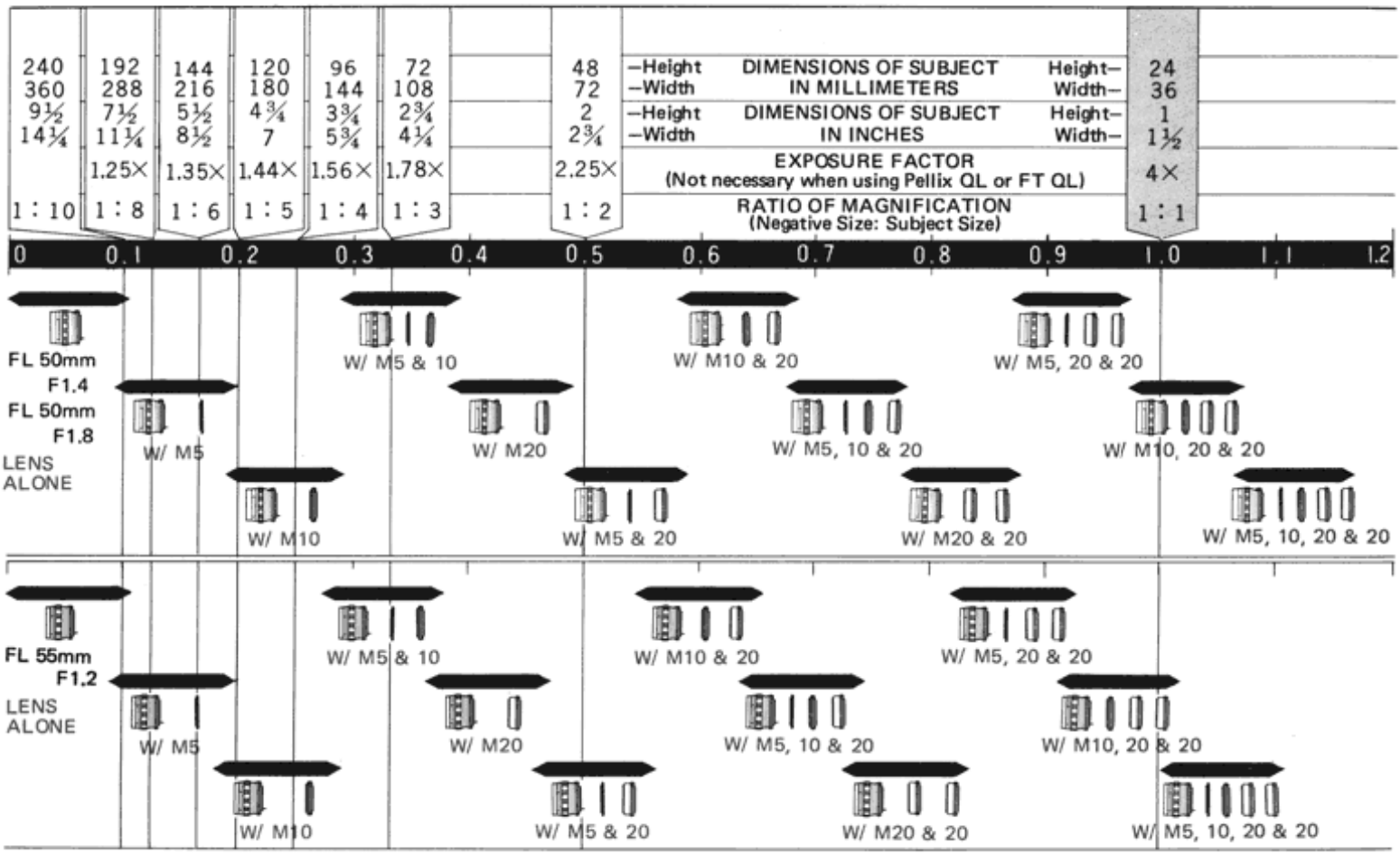
L: Close-up Lens

TOUR

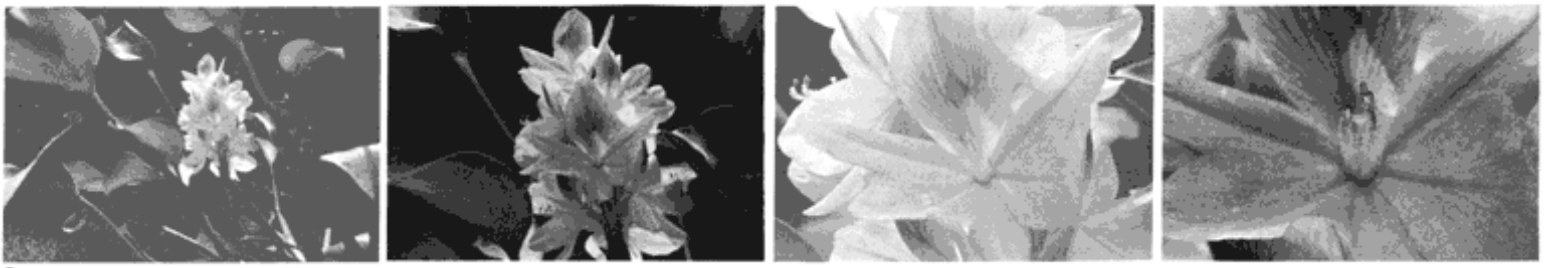
Canonflex RM

with BUILT-IN EXPOSUER METER

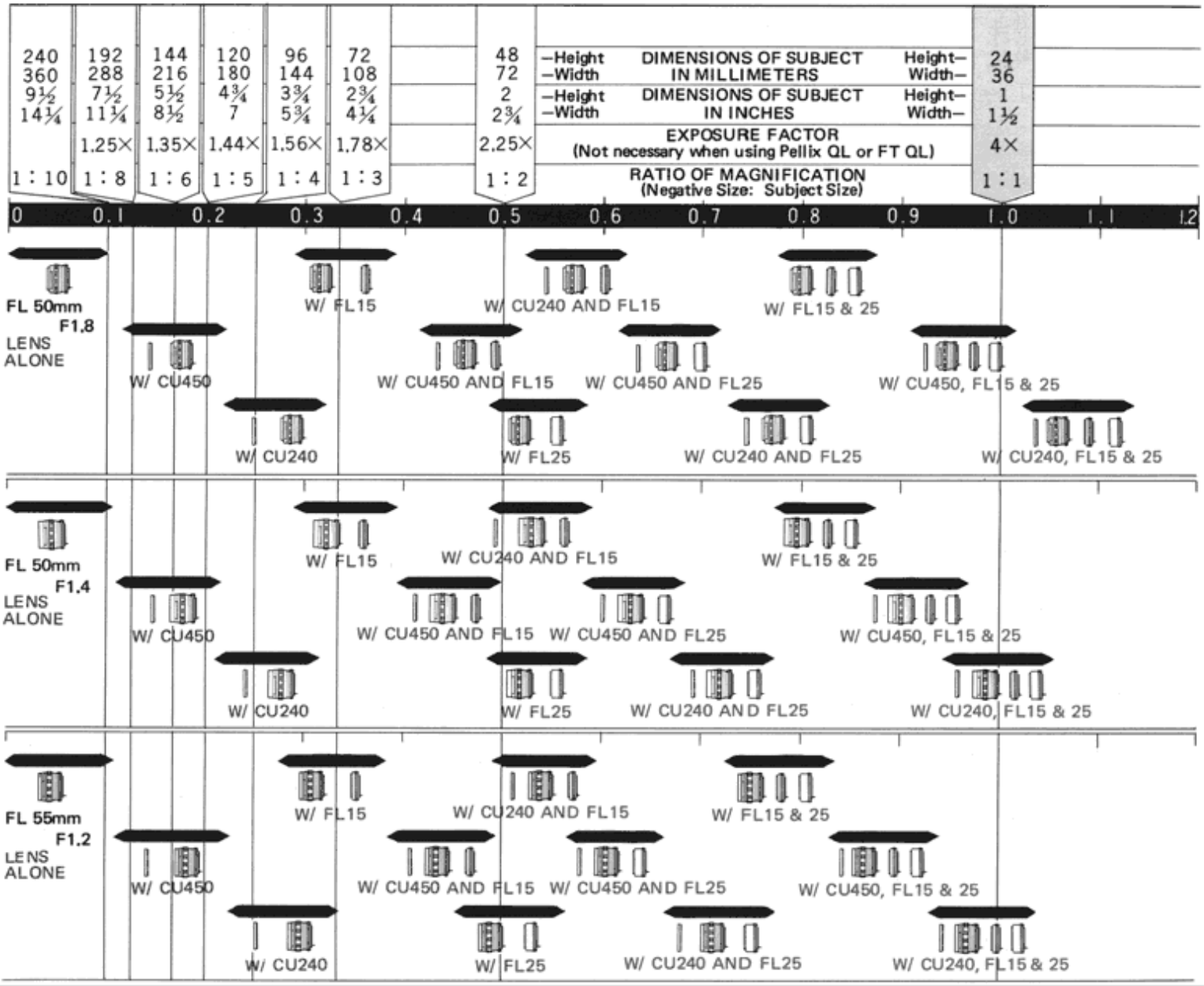
Photographic Range with Standard Lens and M Tubes



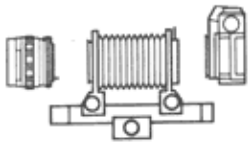
M5, 10, 20 : Extension Tubes M5, 10, 20



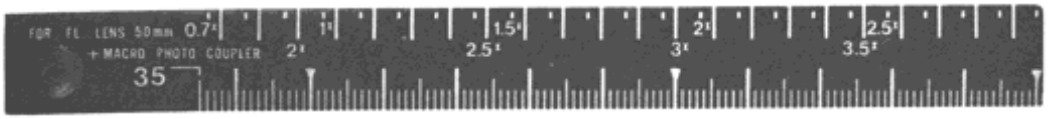
Photographic Range with Standard Lens FL Tubes and Close-up Lenses (450, 240)



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



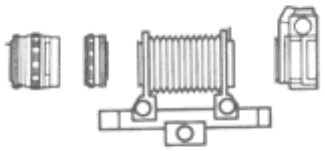
Lens	Bellows FL Scale (mm) (in)	34.5 1-3/8	40 1-9/16	50 1-15/16	60 2-3/8	70 2-3/4	80 3-1/8	90 3-9/16	100 3-15/16	110 4-5/16	120 4-3/4	130 5-1/8	142.5 5-5/8
FL 35mm F 3.5	Magnification	0.97	1.12	1.41	1.69	1.97	2.25	2.53	2.81	3.09	3.37	3.65	4.01
	Subject Distance (mm)	158	159	162	168	175	183	191	200	209	218	227	239
	(in)	6-1/4	6-1/4	6-3/8	6-5/8	6-7/8	7-3/16	7-1/2	7-7/8	8-1/4	8-9/16	8-15/16	9-7/16
	Field Size (mm)	24.7 ×37.1	21.3 ×32.0	17.1 ×25.6	14.2 ×21.3	12.2 ×18.3	10.7 ×16.0	9.5 ×14.2	8.5 ×12.8	7.8 ×11.6	7.1 ×10.7	6.6 ×9.9	6.0 ×9.0
	(in)	15/16 ×1-7/16	13/16 ×1-1/4	11/16 ×1	9/16 ×13/16	1/2 ×3/4	7/16 ×5/8	3/8 ×9/16	5/16 ×1/2	5/16 ×7/16	1/4 ×7/16	1/4 ×3/8	1/4 ×3/8
FL 35mm F 2.5	Magnification	0.97	1.13	1.41	1.69	1.97	2.25	2.54	2.82	3.10	3.38	3.66	4.01
	Subject Distance (mm)	60	160	164	170	177	185	193	201	210	219	229	240
	(in)	2-3/8	6-5/16	6-7/16	6-11/16	6-15/16	7-5/16	7-5/8	7-15/16	13/16	8-5/8	9-1/16	9-7/16
	Field Size (mm)	24.7 ×37.0	21.3 ×32.0	17.0 ×25.6	14.2 ×21.3	12.2 ×18.3	10.7 ×16.0	9.5 ×14.2	8.5 ×12.8	7.8 ×11.6	7.1 ×10.7	6.6 ×9.8	6.0 ×9.0
	(in)	15/16 ×1-7/16	13/16 ×1-1/4	11/16 ×1.00	9/16 ×13/16	1/2 ×3/4	7/16 ×5/8	3/8 ×9/16	5/16 ×1/2	5/16 ×7/16	1/4 ×7/16	1/4 ×3/8	1/4 ×3/8
FL 50mm F 3.5	Magnification	0.67	0.78	0.97	1.16	1.36	1.55	1.74	1.94	2.13	2.33	2.52	2.76
	Subject Distance (mm)	216	211	208	209	213	218	224	231	239	247	255	266
	(in)	8-1/2	8-5/16	8-3/16	8-1/4	8-3/8	8-9/16	8-13/16	9-1/8	9-7/16	9-3/4	10-1/16	10-1/2
	Field Size (mm)	35.9 ×53.8	31.0 ×46.6	24.8 ×37.2	20.6 ×31.0	17.7 ×26.5	15.5 ×23.2	13.8 ×20.6	12.4 ×18.6	11.3 ×16.9	10.3 ×15.5	9.53 ×14.3	8.7 ×13.0
	(in)	1-7/16 ×2-1/8	1-1/4× 1-13/16	15/16 ×1-7/16	13/16 ×1-1/4	11/16 ×1-1/16	5/8 ×15/16	9/16 ×13/16	1/2 ×3/4	7/16 ×11/16	3/8 ×5/8	3/8 ×9/16	5/16 ×1/2
FL 50mm F 1.8	Magnification	0.67	0.77	0.97	1.16	1.36	1.55	1.74	1.94	2.13	2.32	2.52	2.76
	Subject Distance (mm)	206	201	197	198	202	207	214	221	228	236	244	255
	(in)	8-1/8	7-15/16	7-3/4	7-13/16	7-15/16	8-1/8	8-7/16	8-11/16	8-15/16	9-5/16	9-5/8	10-1/16
	Field Size (mm)	35.9 ×53.9	31.0 ×46.5	24.8 ×37.2	20.7 ×31.0	17.7 ×26.6	15.5 ×23.2	13.8 ×20.7	12.4 ×18.6	11.3 ×16.9	10.3 ×15.5	9.53 ×14.3	8.69 ×13.0
	(in)	1-7/16 ×2-1/8	1-1/4× 1-13/16	3/4 ×1-7/16	13/16 ×1-1/4	11/16 ×1-1/16	5/8 ×5/16	9/16 ×13/16	1/2 ×3/4	7/16 ×11/16	3/8 ×5/8	3/8 ×9/16	5/16 ×1/2
FL 50mm F 1.4	Magnification	0.67	0.78	0.97	1.16	1.36	1.55	1.74	1.94	2.13	2.33	2.52	2.76
	Subject Distance (mm)	198	193	189	190	194	199	206	213	220	228	236	247
	(in)	7-13/16	7-5/8	7-7/16	7-1/2	7-5/8	7-13/16	8-1/8	8-3/8	8-11/16	8-15/16	8-5/16	8-3/4
	Field Size (mm)	35.9 ×53.8	31.0 ×46.4	24.8 ×37.2	20.6 ×31.0	17.7 ×26.5	1.55 ×23.2	13.8 ×20.6	12.4 ×18.6	11.3 ×16.9	10.3 ×15.5	9.53 ×14.3	8.69 ×13.0
	(in)	1-7/16 ×2-1/8	1-1/4× 1-13/16	3/4 ×1-7/16	13/16 ×1-1/4	11/16 ×1-1/16	5/8 ×15/16	9/16 ×13/16	1/2 ×3/4	7/16 ×11/16	3/8 ×5/8	3/8 ×9/16	5/16 ×1/2
FL 55mm F 1.2	Magnification	0.63	0.73	0.91	1.09	1.27	1.46	1.64	1.82	2.00	2.18	2.36	2.59
	Subject Distance (mm)	213	206	201	201	204	209	214	221	228	236	244	254
	(in)	8-3/8	8-1/8	7-15/16	7-15/16	8-1/16	8-1/4	8-7/16	8-11/16	8-15/16	9-5/16	9-5/8	10
	Field Size (mm)	38.2 ×57.4	33.0 ×49.5	26.4 ×39.6	22.0 ×33.0	18.8 ×28.3	16.5 ×24.7	14.7 ×22.0	13.2 ×19.8	12.0 ×18.0	11.0 ×16.5	10.1 ×15.2	9.3 ×13.9
	(in)	1-1/2 ×2-1/4	1-5/16× 1-15/16	1-1/16 ×1-9/16	7/8 ×1-5/16	3/4 ×1-1/8	5/8 ×15/16	9/16 ×7/8	1/2 ×3/4	1/2 ×11/16	7/16 ×5/8	3/8 ×5/8	3/8 ×9/16
FL 58mm F 1.2	Magnification	0.59	0.69	0.86	1.03	1.21	1.38	1.55	1.72	1.90	2.07	2.24	2.46
	Subject Distance (mm)	231	223	216	215	217	201	226	232	239	247	255	265
	(in)	9-1/8	8-3/4	8-1/2	8-7/16	8-9/16	7-15/16	8-7/8	9-1/8	9-7/16	9-3/4	10-1/16	10-7/16
	Field Size (mm)	40.4 ×60.5	34.8 ×52.2	27.8 ×41.8	23.2 ×34.8	19.9 ×29.8	17.4 ×26.1	15.5 ×23.2	13.9 ×20.9	12.7 ×19.0	11.6 ×17.4	10.7 ×16.1	9.77 ×14.7
	(in)	1-9/16 ×2-3/8	1-3/8 ×2-1/16	1-1/8 ×1-5/8	15/16 ×1-3/8	13/16 ×1-3/16	11/16 ×1-1/16	5/8 ×8/7	9/16 ×13/16	1/2 ×3/4	7/16 ×11/16	7/16 ×5/8	7/8 ×9/16



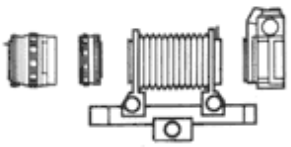
Lens	Bellows FL Scale (mm) (in)	34.5 1-3/8	40 1-9/16	50 1-15/16	60 2-3/8	70 2-3/4	80 3-1/8	90 3-9/16	100 3-15/16	110 4-5/16	120 4-3/4	130 5-1/8	142.5 5-5/8
FL 85mm F 1.8	Magnification	0.41	0.48	0.60	0.71	0.83	0.95	1.07	1.19	1.31	1.43	1.55	1.70
	Subject Distance (mm)	398	375	350	336	330	327	327	329	333	338	343	351
	(in)	1' 3-11/16	1' 2-3/4	1'1-3/4	1'1-1/4	1'5/16	1'7/8	1'7/8	1'7/8	1'1-1/8	1'1-5/16	1'1-1/2	1'1-13/16
	Field Size (mm)	58.4 ×87.7	50.4 ×75.6	40.3 ×60.5	33.6 ×50.4	28.8 ×43.2	25.2 ×37.8	22.4 ×33.6	20.2 ×30.2	18.3 ×27.5	16.8 ×25.2	15.5 ×23.3	14.1 ×21.2
	(in)	2-5/16 ×3-7/16	1-15/16 × 2-15/16	1-9/16 ×2-3/8	1-5/16× 1-15/16	1-1/8× 1-11/16	15/16 ×1-1/2	7/8× 1-5/16	13/16× 1-3/16	3/4× 1-1/16	11/16 ×15/16	5/8 ×15/16	9/16 ×13/16
FL 100mm F 3.5	Magnification	0.35	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.43
	Subject Distance (mm)	524	490	450	427	413	405	401	400	401	404	407	413
	(in)	1'8-5/8	1'7-5/16	1' 5-11/16	1'4-13/16	1'4-1/4	1'3-15/16	1'3-13/16	1'3-3/4	1'3-13/16	1'3-7/8	1'4-1/16	1'4-1/4
	Field Size (mm)	69.4 ×104.0	59.9 ×89.8	47.9 ×71.9	39.9 ×59.9	34.2 ×51.3	29.9 ×44.9	26.7 ×39.9	24 ×35.9	21.8 ×32.7	20 ×30	18.4 ×27.6	16.8 ×25.2
	(in)	2-3/4 ×4-1/8	2-3/8 ×3-9/16	1-7/8× 2-13/16	1-9/16× 2-3/8	1-3/8 ×2-1/16	1-3/16 ×1-3/4	1-1/16 ×1-9/16	15/16 ×1-7/6	7/8 ×1-5/16	13/16 ×1-3/16	3/4 ×1-1/16	11/16 ×15/16
FL 135mm F 3.5	Magnification	0.26	0.3	0.37	0.45	0.52	0.60	0.67	0.74	0.82	0.81	0.97	1.06
	Subject Distance (mm)	847	781	700	650	617	595	580	570	564	560	559	559
	(in)	2'9-3/8	2'6-3/4	2'3-9/16	2'1-9/16	2'5/16	1'1-7/16	1'10-13/16	1'10-7/16	1'10-3/16	1'10-1/16	1'10	1'10
	Field Size (mm)	93.4 ×140	80.6 ×121	64.6 ×96.7	53.7 ×80.6	46.0 ×69.1	40.3 ×60.4	35.8 ×53.7	32.2 ×48.3	29.3 ×43.9	26.9 ×40.3	24.8 ×37.2	22.6 ×33.9
	(in)	3-11/16 ×5-1/2	3-3/16 ×4-3/4	2-9/16× 3-13/16	2-1/8 ×3-3/16	1-13/16 ×2-3/4	1-9/16 ×2-3/8	1-7/16 ×2-1/8	1-1/4 ×1-7/8	1-1/8 ×1-3/4	1-1/16 ×1-9/16	15/16 ×1-7/16	7/8 ×1-5/16
FL 135mm F 2.5	Magnification	0.26	0.30	0.38	0.46	0.53	0.61	0.68	0.76	0.84	0.91	0.99	1.08
	Subject Distance (mm)	801	738	661	614	583	562	548	538	533	529	528	529
	(in)	2'7-9/16	2'5-1/16	2'2-1/16	2'3/16	1'10-15/16	1'10-1/8	1'9-9/16	1'9-3/16	1'8-15/16	1'8-13/16	1'8-13/16	1'8-13/16
	Field Size (mm)	91.5 ×137	78.9 ×118	63.1 ×94.7	52.6 ×78.9	45.1 ×67.7	39.5 ×59.2	35.1 ×52.6	31.6 ×47.4	28.7 ×43.1	26.3 ×39.5	24.3 ×36.4	22.2 ×33.2
	(in)	3-5/8 ×5-3/8	3-1/16 ×4-5/8	2-1/2 ×3-3/4	2-1/16 ×3-1/8	1-3/4× 2-11/16	1-9/16 ×2-5/16	1-3/8 ×2-1/16	1-1/4 ×1-7/8	1-1/8× 1-11/16	1-1/16 ×1-9/16	15/16 ×1-7/16	7/8 ×1-5/16
FL 200mm F 4.5	Magnification	0.18	0.20	0.26	0.31	0.36	0.41	0.46	0.51	0.56	0.61	0.67	0.73
	Subject Distance (mm)	1535	1389	1208	1090	1009	951	908	876	851	832	818	804
	(in)	5'7/16	4' 6-11/16	3'1-9/16	3' 6-15/16	3'3-3/8	3'1-7/16	2'11-3/4	2'10-1/2	2'9-1/2	2'8-3/4	2'8-3/16	2'7-5/8
	Field Size (mm)	136 ×204	117 ×176	93.8 ×141	78.2 ×117	67.0 ×101	58.6 ×87.9	52.1 ×78.2	46.9 ×70.4	42.6 ×64.0	39.1 ×58.6	36.1 ×54.1	32.9 ×49.4
	(in)	5-3/8 ×8-1/16	4-5/8× 6-15/16	3-11/16 ×5-9/16	3-1/16 ×4-5/8	2-5/8× 3-15/16	2-5/16 ×3-7/16	2-1/16 ×3-1/16	1-7/8 ×2-3/4	1-11/16 ×2-1/2	1-9/16 ×2-5/16	1-7/16 ×2-1/8	1-5/16× 1-15/16
FL 200mm F 3.5	Magnification	0.18	0.20	0.25	0.30	0.36	0.41	0.46	0.51	0.56	0.61	0.66	0.72
	Subject Distance (mm)	1555	1406	1222	1103	1021	962	918	885	859	840	825	811
	(in)	5'1-1/4	4'7-3/8	3'1/8	3'7-7/16	3'4-3/16	3'1-7/8	3'1/8	2'10-13/16	2'9-13/16	2'9-1/16	2'8-1/2	2'7-15/16
	Field Size (mm)	137 ×205	118 ×177	94.5 ×142	78.8 ×118	67.5 ×101	59.1 ×88.6	52.5 ×78.8	47.3 ×70.9	43.0 ×64.4	39.4 ×59.1	36.4 ×54.5	33.2 ×49.8
	(in)	5-3/8 ×8-1/16	4-5/8× 6-15/16	3-3/4 ×5-9/16	3-1/8 ×4-5/8	2-11/16 ×3-15/16	2-5/16 ×3-1/2	2-1/16 ×3-/18	1-7/8× 2-13/16	1-11/16 ×2-9/16	1-9/16 ×2-5/16	1-7/16 ×2-1/8	1-5/10× 1-15/16

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

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



Lens \ Bellows FL Scale (mm) (in)		34.5 1-3/8	40 1-9/16	50 1-15/16	60 2-3/8	70 2-3/4	80 3-1/8	90 3-9/16	100 3-15/16	110 4-5/16	120 4-3/4	130 5-1/8	142.5 5-5/8
FL 35mm F 3.5	Magnification	2.78	2.93	3.21	3.50	3.78	4.06	4.34	4.62	4.90	5.18	5.46	5.83
	Subject Distance (mm)	199	204	213	222	231	240	250	259	269	278	288	300
	(in)	7-13/16	8-1/16	8-3/8	8-3/4	9-1/8	9-7/16	9-13/16	10-3/16	10-9/16	10-15/16	11-5/16	11-13/16
	Field Size (mm)	8.6 ×13.0	8.2 ×12.3	7.5 ×11.2	6.9 ×10.3	6.4 ×9.5	5.9 ×8.9	5.5 ×8.3	5.2 ×7.8	4.9 ×7.3	4.6 ×6.9	4.4 ×6.6	4.1 ×6.2
	(in)	5/16 ×1/2	5/16 ×1/2	5/16 ×7/16	1/4 ×7/16	1/4 ×3/8	1/4 ×3/8	3/16 ×5/16	3/16 ×5/16	3/16 ×5/16	3/16 ×1/4	3/16 ×1/4	3/16 ×1/4
FL 35mm F 2.5	Magnification	2.95	3.10	3.39	3.67	3.95	4.23	4.51	4.79	5.08	5.39	5.64	5.99
	Subject Distance (mm)	206	210	220	229	238	247	257	266	276	286	295	307
	(in)	8-1/8	8-1/4	8-11/16	9-1/16	9-3/8	9-3/4	10-1/8	10-1/2	10-7/8	11-1/4	11-5/8	1'1/16
	Field Size (mm)	8.1 ×12.2	7.7 ×11.6	7.1 ×10.6	6.6 ×9.8	6.1 ×9.1	5.7 ×8.5	5.3 ×8.0	5.0 ×7.5	4.7 ×7.1	4.5 ×6.7	4.3 ×6.4	4.0 ×6.0
	(in)	5/16 ×1/2	5/16 ×7/16	1/4 ×7/16	1/4 ×3/8	1/4 ×3/8	1/4 ×5/16	3/16 ×5/16	3/16 ×5/16	3/16 ×1/4	3/16 ×1/4	3/16 ×1/4	3/16 ×1/4
FL 50mm F 3.5	Magnification	1.74	1.85	2.04	2.24	2.43	2.63	2.82	3.01	3.21	3.40	3.59	3.84
	Subject Distance (mm)	224	228	235	243	251	260	268	277	286	295	304	316
	(in)	8-13/16	8-15/16	9-1/4	9-9/16	9-7/8	10-1/4	10-9/16	10-7/8	11-1/4	11-5/8	11-15/16	1'7/16
	Field Size (mm)	13.8 ×20.7	11.7 ×19.5	11.7 ×17.6	10.7 ×16.1	9.9 ×14.8	9.1 ×13.7	8.5 ×12.8	8.0 ×12.0	7.5 ×11.2	7.1 ×10.6	6.7 ×10.0	6.3 ×9.4
	(in)	9/16 ×13/16	7/16 ×3/4	7/16 ×11/16	7/16 ×5/8	3/8 ×9/16	3/8 ×9/16	5/16 ×1/2	5/16 ×1/2	5/16 ×7/16	1/4 ×7/16	1/4 ×3/8	1/4 ×3/8
FL 50mm F 1.8	Magnification	1.77	1.87	2.07	2.26	2.45	2.65	2.84	3.03	3.23	3.42	3.62	3.86
	Subject Distance (mm)	214	218	226	233	242	250	259	268	277	286	295	306
	(in)	8-7/16	8-9/16	8-7/8	9-3/16	9-1/2	9-13/16	10-3/16	10-9/16	10-7/8	11-1/4	11-5/8	12-1/16
	Field Size (mm)	13.6 ×20.4	12.8 ×19.2	11.6 ×17.4	10.6 ×15.9	9.8 ×14.7	9.1 ×13.6	8.4 ×12.7	7.9 ×11.9	7.4 ×11.2	7.0 ×10.5	6.6 ×10.0	6.2 ×9.3
	(in)	9/16 ×13/16	1/2 ×3/4	7/16 ×11/16	7/16 ×5/8	3/8 ×9/16	3/8 ×9/16	5/16 ×1/2	5/16 ×7/16	5/16 ×7/16	1/4 ×7/16	1/4 ×3/8	1/4 ×3/8
FL 50mm F 1.4	Magnification	2.01	2.11	2.31	2.50	2.69	2.89	3.03	3.28	3.47	3.66	3.86	4.10
	Subject Distance (mm)	251	219	227	236	244	253	262	271	280	289	298	310
	(in)	8-7/16	8-5/8	8-15/16	9-5/16	9-5/8	9-15/16	10-5/16	10-11/16	11-1/16	11-3/8	11-3/4	12-3/16
	Field Size (mm)	12.0 ×17.9	11.4 ×17.0	10.4 ×15.6	9.6 ×14.4	8.9 ×13.4	8.3 ×12.5	7.8 ×11.7	7.3 ×11.0	6.9 ×10.4	6.6 ×9.8	6.2 ×9.3	5.9 ×8.8
	(in)	1/2 ×11/16	7/16 ×11/16	7/16 ×5/8	3/8 ×9/16	3/8 ×1/2	5/16 ×1/2	5/16 ×7/16	5/16 ×7/16	1/4 ×7/16	1/4 ×3/8	1/4 ×3/8	1/4 ×3/8
FL 55mm F 1.2	Magnification	1.82	1.92	2.11	2.29	2.47	2.65	2.83	3.01	3.20	3.38	3.56	3.79
	Subject Distance (mm)	221	225	233	241	249	257	266	275	284	293	302	314
	(in)	8-11/16	8-7/8	9-3/16	9-1/2	9-13/16	10-1/8	10-1/2	10-13/16	11-3/16	11-9/16	11-7/8	12-3/8
	Field Size (mm)	13.1 ×19.7	12.5 ×18.7	11.4 ×17.1	10.5 ×15.7	9.7 ×14.6	9.1 ×13.6	8.5 ×12.7	8.0 ×11.9	7.5 ×11.3	7.1 ×10.7	6.7 ×10.1	6.3 ×9.5
	(in)	1/2 ×3/4	1/2 ×3/4	7/16 ×11/16	7/16 ×5/8	3/8 ×9/16	3/8 ×9/16	5/16 ×1/2	5/16 ×7/16	5/16 ×7/16	1/4 ×7/16	1/4 ×3/8	1/4 ×3/8
FL 58mm F 1.2	Magnification	1.59	1.69	1.86	2.03	2.20	2.38	2.55	2.72	2.89	3.07	3.24	3.45
	Subject Distance (mm)	227	231	238	245	253	261	269	278	287	295	304	316
	(in)	8-15/16	9-1/8	9-3/8	9-5/8	9-15/16	10-1/4	10-9/16	10-15/16	11-5/16	11-5/8	11-15/16	1'7/16
	Field Size (mm)	15.1 ×22.6	14.2 ×21.3	12.9 ×19.4	11.8 ×17.7	10.9 ×16.3	10.1 ×15.2	9.4 ×14.1	8.8 ×13.2	8.3 ×12.4	7.8 ×11.7	7.4 ×11.1	7.0 ×10.4
	(in)	5/8 ×7/8	9/16 ×13/16	1/2 ×3/4	7/16 ×11/16	7/16 ×5/8	3/8 ×5/8	3/8 ×9/16	3/8 ×1/2	5/16 ×1/2	5/16 ×7/16	5/16 ×7/16	1/4 ×7/16



Lens	Adapter Used		Bellows FL+ Macrophoto Coupler both extended	Macrophoto Coupler FL + reversed FL lens: Macrophoto Coupler, min. length	Macrophoto Coupler FL + reversed FL lens: Macrophoto Coupler, max. length
FL 35mm F 3.5	Magnification		6.18	1.81	2.17
	Subject Distance	(mm)	313	171	181
		(in)	12-5/16	6-3/4	7-1/8
	Field Size	(mm)	3.9 ×5.8	13.3 ×19.9	11.0 ×16.6
		(in)	1/8 ×1/4	1/2 ×13/16	7/16 ×5/8
FL 35mm F 2.5	Magnification		6.36	1.98	2.34
	Subject Distance	(mm)	320	177	187
		(in)	12-5/8	6-15/16	7-3/8
	Field Size	(mm)	3.8 ×5.7	12.1 ×18.2	10.2 ×15.4
		(in)	1/8 ×1/4	1/2 ×11/16	3/8 ×5/8
FL 50mm F 3.5	Magnification		4.09	1.07	1.33
	Subject Distance	(mm)	328	208.0	212.0
		(in)	12-15/16	8-3/16	8-11/16
	Field Size	(mm)	5.9 ×8.3	22.3 ×33.5	18.1 ×27.1
		(in)	1/4 ×5/16	7/8 ×3/8	11/16 ×1-1/16
FL 50mm F 1.8	Magnification		4.11	1.10	1.35
	Subject Distance	(mm)	319	198	202
		(in)	12-9/16	7-13/16	7-15/16
	Field Size	(mm)	5.8 ×8.8	21.9 ×32.8	17.8 ×26.7
		(in)	1/4 ×3/8	7/8 ×1-5/16	11/16 ×1-1/16
FL 50mm F 1.4	Magnification		4.35	1.34	1.59
	Subject Distance	(mm)	322	194	200
		(in)	12-11/16	7-5/8	7-7/8
	Field Size	(mm)	5.5 ×8.3	17.9 ×26.9	15.1 ×22.7
		(in)	3/16 ×5/16	11/16 ×1-1/16	5/8 ×7/8
FL 55mm F 1.2	Magnification		4.02	1.20	1.43
	Subject Distance	(mm)	326	202	208
		(in)	12-13/16	7-7/8	8-3/16
	Field Size	(mm)	6.0 ×8.9	20.1 ×30.1	16.8 ×25.1
		(in)	1/4 ×3/8	13/16 ×1-3/16	11/16 ×15/16
FL 58mm F 1.2	Magnification		3.68	1.00	1.22
	Subject Distance	(mm)	328	215	217
		(in)	12-15/16	8-7/8	8-9/16
	Field Size	(mm)	6.5 ×9.8	24.1 ×36.1	19.7 ×29.6
		(in)	1/4 ×3/8	13/16 ×7/16	3/4 ×1-3/16

Lens	Adapter Used		Bellows FL+ Macrophoto Coupler both extended	Macrophoto Coupler FL + reversed FL lens: Macrophoto Coupler, min. length	Macrophoto Coupler FL + reversed FL lens: Macrophoto Coupler, max. length
FL 85mm F 1.8	Magnification		1.86	0.16	
	Subject Distance	(mm)	360	685	
		(in)	14-3/16	2'3	
	Field Size	(mm)	12.9 ×19.4	146.4 ×219.7	
		(in)	1/2 ×3/4	5-3/4 ×8-5/8	
FL 100mm F 3.5	Magnification		1.25		
	Subject Distance	(mm)	405		
		(in)	1'3-15/16		
	Field Size	(mm)	19.3 ×29		
		(in)	3/4 ×1-1/8		
FL 135mm F 3.5	Magnification		0.42		
	Subject Distance	(mm)	665		
		(in)	26-3/16		
	Field Size	(mm)	56.9 ×85.4		
		(in)	2-1/4 ×3-3/8		
FL 135mm F 2.5	Magnification		0.73		
	Subject Distance	(mm)	541		
		(in)	1'9-5/16		
	Field Size	(mm)	32.7 ×49.1		
		(in)	1-5/16 ×1-15/16		
FL 200mm F 4.5	Magnification		0.08		
	Subject Distance	(mm)	2753		
		(in)	9'3/8		
	Field Size	(mm)	288 ×432		
		(in)	11-5/16 ×1'5		
FL 200mm F 3.5	Magnification		0.08		
	Subject Distance	(mm)	2976		
		(in)	9'9-3/16		
	Field Size	(mm)	313 ×496		
		(in)	1'5/16 ×1'6-7/16