Canon

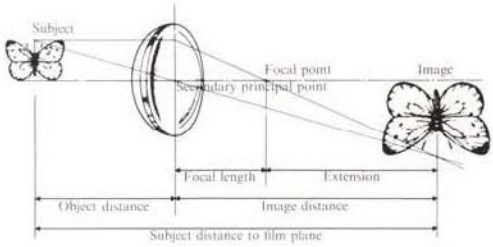
Macro system

English Edition
1980

Take a close look

Ours is a vast world, full of wonders, grandeur and excitement, no doubt about it. But after all – who has the time and money to go to all those far-away places with their intriguing, strange-sounding names?

That's one side of the world, and many of us will never get to see it in all its length and width because it is simply too large to behold in a single life span. What may be just as fascinating – if not more so – however, is the world around us with its myriad shapes and colors, details we actually have to learn to see. Because life has taught us to concentrate only on the most essential things, to "filter out" whatever else is not directly related to our strife for survival. Hard enough as the latter may be, our civilization has given us quite a sizable



margin to enjoy ourselves in relative prosperity. And this is what gives us room to explore far more than what we normally perceive. If we just stop to take a closer look at what appears to be run-of-the-mill, everyday details, we'll be rewarded with incredible beauty and harmony – all around us, just waiting there to be discovered. Unbelievable though it may seem – there is actually no such thing as "ugliness" as long as we just take the trouble to look at things closely, to get truly involved and down to detail. Whatever you look at in your immediate surroundings, if you only bother to do it thoroughly and closely enough, you will be surprised at how varied and multifaceted these seemingly "ordinary" details are.

Photography is the ideal medium to help us realize how beautiful our world really is. Canon SLR cameras are instrumental in getting you under way. They will help you record on film – in true, spectacular color and detail – all those breathtaking surprises which nature keeps in store for us. Close-up photography will open your eyes to a novel world. And this is no empty promise. An ordinary flower seen up close, the intricate detail of a shell, the subtle hues and shapes of any nondescript object – your Canon SLR will reveal an abundance of colors, shades, hues you had no idea actually existed. Close-up photography will show you a different world, one you simply did not know was there. It will make you realize that there is much more between heaven and earth than you had thought possible.

You wouldn't believe what any ordinary picture of our surroundings, any scenic view at all, actually conceals. Take a close look at just one detail from the myriad shapes and forms, and all of a sudden an entirely new, unknown world opens up in front of your eyes. There's infinite beauty in every single object right in front of you – a fact which the picture above amply proves. It's a detail of the general view opposite.

Ordinarily, our photographic lenses produce a reduced image of the world around us. However, with a sufficiently long extension between the lens proper and the film plane, subjects are imaged at life size or even larger on the film. It is this increased extension which is the whole secret of close-up photography.

The tools of close-up photography

As technical aids of all kinds proliferate, the corresponding terminology has been watered down to an extent where considerable misunderstandings become possible. Perhaps we should therefore start with a definition of close-up photography as such. Technically speaking, a close-up photograph is a film image ranging from at least one tenth the actual size of the subject to about ten times life size. The term "macrophotography" has lately become a favorite of camera buffs everywhere, and although there is no official convention, it is loosely used for magnifications from 1× to 10× and higher, although this is a rather arbitrary interpretation.

As far as equipment is concerned, close-up photography can be many different things. And a good close-up picture does not necessarily mean that you would have to go to great expense. A Canon close-up lens, for example, already is a great

The easy way into allround close-up photography is a Canon macro lens FD 50 mm f/3.5 which also makes a perfect standard lens of outstanding performance.

Our second macro lens, the FD 100 mm f/4, is especially well-suited for close-up work out in the field. Its longer focal length makes close-ups of elusive small animals particularly easy.

One of the least expensive ways into close-up photography is the use of extension tubes together with your standard lens. Different lengths of tubes cater for different requirements.

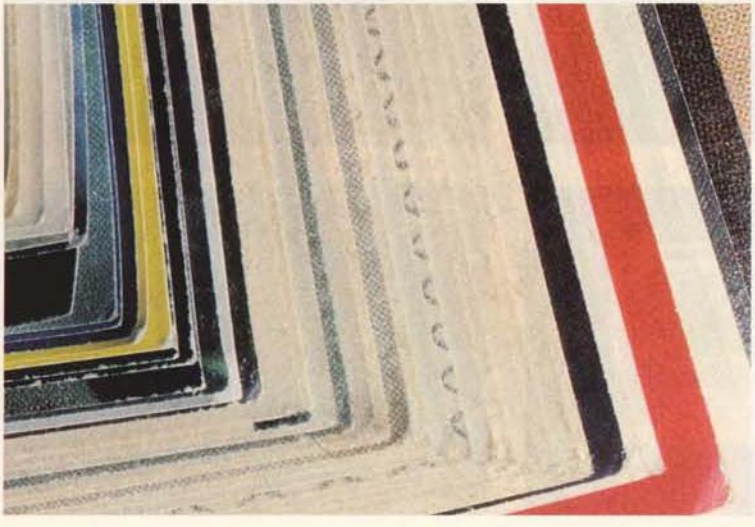
step in the right direction. It will dramatically shorten the focal length of your Canon FD lens for close-up pictures, without affecting full-aperture metering or even automatic aperture control. Or use an extension tube to increase the "draw" of your FD lens for a close look at things.

Of course, there are special Canon macro lenses as well. With their oversize focusing motion from infinity down to 0.5 × magnification, these lenses not only give you incredible freedom to photograph whatever you come across, from ordinary long shots right up to genuine close-ups at half life size. They are also specially corrected for top performance at close range, something you cannot possibly expect of an ordinary photographic lens.

The macro buff will find a bellows unit an invaluable aid because it gives continuous control over the variation of extension, allowing different magnifications to be attained with maximum ease. Moreover, it's a must for duplicating your own slides or going all the way into macrophotography with the aid of special macro bellows lenses for superb close-ups at magnifications of up to 20 × .

Owners of a Canon Auto Bellows will find a number of additional accessories, all designed for close-up work, which can make their macrophotographic hobby even more rewarding. A separate Macro Stand, for example, will hold the bellows plus camera for high-magnification work, a Double Cable Release preserves automatic diaphragm operation of an FD lens on the Auto Bellows, and a Macro Auto Ring will do the same even if the lens is reverse-mounted on other close-up accessories.

Special macro bellows lenses are fairly inexpensive but high-powered tools for critical close-up work at larger than life size. They are specially corrected for these magnifications which are possible only if the film-to-lens distance is many times the lens-to-subject distance.



Users of a Canon Auto Bellows will find the Macro Stand a valuable accessory which holds the camera plus bellows in a vertical or horizontal position and greatly facilitates macro work.

Step by step

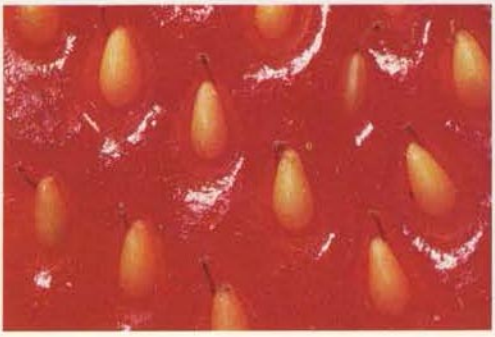
On the following pages, we should like to initiate you into the world of close-up photography. Step by step, we shall explore the possibilities offered by your Canon single-lens reflex camera for great close-up pictures.

Just as the motives for shooting close-ups will vary from one photographer to another, there are many different avenues leading into the fascinating realm of small things viewed up close. To a certain point, close-up photography can be surprisingly simple and inexpensive, too. After all, your Canon SLR is an extremely versatile tool. Looking and focusing right through the taking lens, you will hardly notice any difference between ordinary and close-up photography. The ground-glass image gives you a perfect idea of what your picture will look like and makes focusing extremely easy. This is a particularly

important point since depth of field becomes ever shallower as magnification increases. In fact, without through-the-lens viewing it would be practically impossible to place the focus exactly where you want to have it. And, of course, framing is just as reliable as in ordinary photography – another feat which only your single-lens reflex will perform.

The interchangeability of lenses in your Canon SLR lets you go well beyond the initial stages where close-up lenses hold great promise even for the least experienced photographer: Interchangeable lenses let you vary the extension between optical system and film plane almost at will. And as you increase the lens-to-film distance, your picture will show ever smaller detail blown up to fill the frame.

On the equipment side, the transition is extremely smooth. The mere addition of a suitable extension tube between the lens and camera body can take you all the way to life-size photography, if you wish. However, there are many different approaches, and a considerable amount of overlap between the different tools and techniques lets you tailor your equipment to suit your own personal requirements. Thus the same magnifications can be attained with different accessories – on different budgets. This makes close-ups a truly popular field of SLR photography, one you are certain to enjoy.

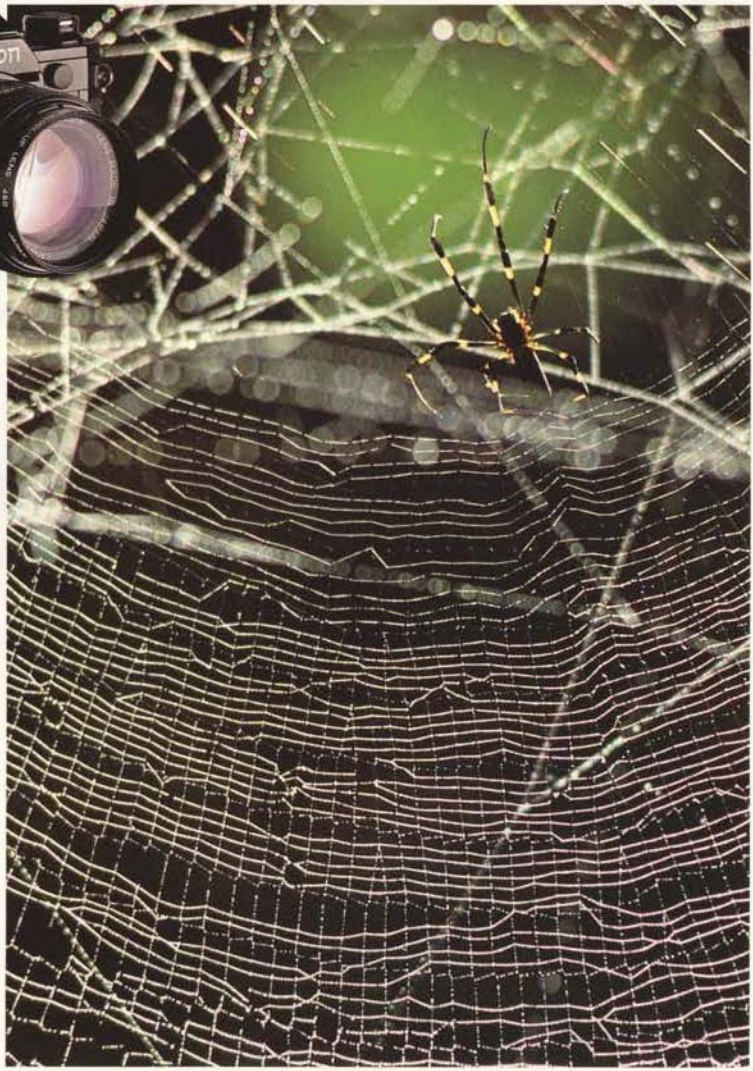


0.2× Canon close-up lenses will easily take you to 0.2× magnification.
0.4× With an FD extension tube between the camera body and your standard lens, magnifications like 0.4× are easy to attain.
0.5× An FD macro lens 50mm f/3.5 takes you from infinity right up to 0.5× magnification.
0.6× Our telephoto macro lens with its extension tube FD50-U conveniently covers magnifications like 0.6×.
0.8× Like the telephoto macro, our standard FD 50mm f/3.5 macro lens comes with an extension tube for magnifications from 0.5× to 1×.
1× With its extension tube FD50-U, the telephoto macro lens 100mm f/4 allows AE photography up to 1× magnification.
1.5× Further increasing the extension, for example of the FD 100mm f/4, with the aid of an Auto Bellows easily takes you to 1.5× magnification.
3× Image quality at magnifications such as 3× with an FD 50mm f/3.5 macro lens will be improved if the latter is reverse-mounted.
5× A special macro bellows lens like the Canon 35mm f/2.8 on the Auto Bellows easily gives you 5× magnification.
10× With a macro bellows lens like the Canon 20mm f/3.5 on a Canon bellows, 10× magnification is no problem.
15× Adding to the extension of the Auto Bellows by the use of additional extension tubes, even 15× magnification can be attained with the 20mm Canon Macro Bellows Lens.

0.2x
Standard lens FD 50mm f/1.4
Close-up lenses

Easily screwed in place on your standard lens, Canon close-up lenses are the simplest way into the realm of small things. While they shorten the focal length of your standard lens, they have no effect on its speed. Nor will they affect automatic diaphragm operation, full-aperture metering or automatic aperture control.

Two types of Canon close-up lenses are available for different magnifications, the models 450 and 240, each of them with different diameters to suit those of the most popular FD lenses. Close-up lenses of 52mm diameter are highly-corrected two-element achromatic systems to improve lens performance at the short shooting distances involved. The use of Canon close-up lenses is recommended in conjunction with FD lenses with focal lengths ranging from 35mm to 135mm.



The picture opposite is only an example underlining the great potential of these supplementary lenses. A considerable range of magnifications is possible, depending on the focal length of the master lens and the type of Canon close-up lens used.

0.4x
Standard lens FD 50mm f/1.4
FD extension tubes

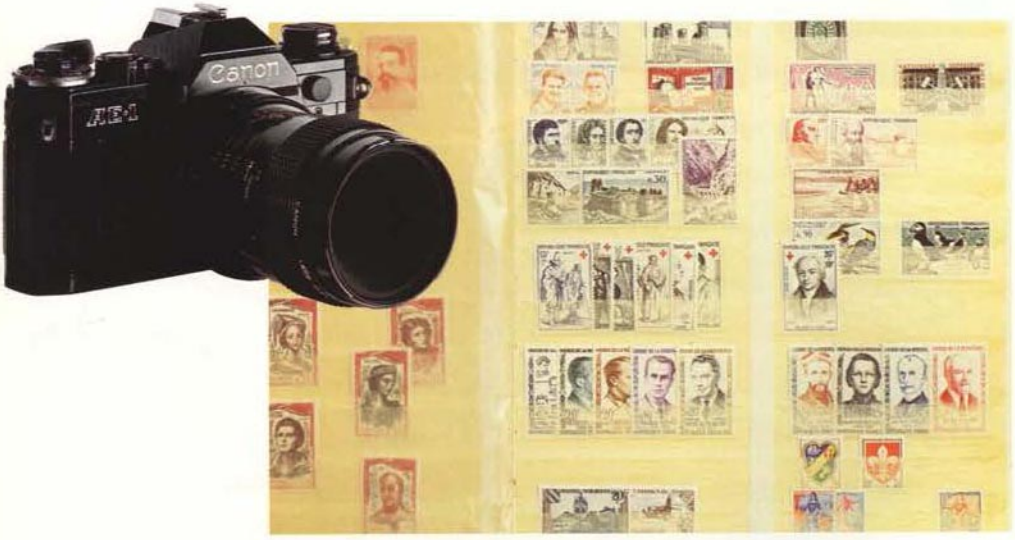
Inserting one of the Canon extension tubes FD15-U, FD25-U or FD50-U between your FD lens and the camera body is just as easy as changing lenses – but the increased extension is your key to close-up photography. Even the shortest of these tubes, the FD15-U, will give you 0.5 × magnification with your standard 50mm lens. However, the tubes may be used with any other FD lens of fixed focal length between 35mm and 200mm, except for the FD 85mm f/1.2 L.

With an FD-U extension tube in place, photography is just as simple as with an FD lens alone: The light can still be metered at full aperture, the automatic diaphragm remains fully coupled, and even automatic aperture control is possible if your Canon SLR is equipped for this AE mode.

The magnification that can be obtained with a specific extension tube is a function of lens focal length: The shorter the focal length of the FD lens used, the greater the effect of increased extension. As a basic rule, you may remember that 1 × magnification (life size) is obtained by increasing the extension of a lens by an amount equivalent to its focal length. In other words, an extension tube FD50-U will give you 1 × magnification with your standard 50mm lens.

0.5x
FD macro lens 50mm f/3.5

If you are looking for top optical quality not only at ordinary shooting distances but in close-up work as well, the 50mm FD macro lens is the answer. And image quality is only one aspect. Another is the incredible ease with which this lens makes literally any subject from infinity right up to 23.2 cm from the film plane a natural booty: Its extra-long helical focusing mount gives you direct and continuous control up to half life size. Without any accessories, with a minimum of weight and volume, you thus have an unusually versatile standard lens at a truly attractive price – a lens that is just as useful for normal shooting as it is for duplicating your own slides, copying two-dimensional originals and shooting all kinds of close-ups without the least hassle. You simple can't beat the FD 50mm macro lens for performance and versatility.



The correction of aberrations in the FD 50mm macro lens makes special allowance for very short lens-to-subject distances that are outside the shooting distance of an ordinary camera lens. Thus, you won't find any distortion in critical copy work; a perfectly flattened field gives crisp sharpness right out to the corners; overall resolution is outstanding and contrast rendition excellent. What makes this lens all the more valuable is the fact that its high performance is not restricted to short distances alone. Extremely high correction for ordinary shooting distances up to infinity make it an ideal standard lens as well.

0.6x
FD macro lens 100mm f/4

Originally, you may wonder why the FD system contains two macro lenses of different focal length. However, there is good reason: While the standard macro lens of 50mm focal length is indispensable for copying, slide duplication and normal close-ups, the FD 100mm f/4 offers the advantage of longer working distance and is thus ideally suited for macro shots out in the field. Elusive small animals, for example, are much easier to capture on film if you don't have to move up too close. Also, the longer working distance will be found of advantage when flash or artificial light sources are used because there is more room to illuminate the subject properly.

Otherwise, this telephoto macro lens is just as perfectly corrected as its standard counterpart. This means that it is more than merely a macro lens: It also doubles as a short telephoto lens of outstanding performance.

The helical focusing mount of the FD 100mm f/4 is unusually long: From infinity right up to 0.5× magnification, direct focusing is possible without any accessories, with a mere twist of your hand. Which means, you have the ideal short telephoto lens that gives you perfect control over framing: Just move up as close as you wish for perfect "cropping". The FD 100mm f/4 knows no limits. With its extension tube FD50-U, it will even cover the range from 0,5× to life size.

0.8x
FD macro lens 50mm f/3.5
Extension tube FD25-U

When you buy an FD 50mm f/3.5 macro lens, you also buy an extension tube FD25-U, because that comes with the lens. And while the lens alone is just perfect for allround work up to 0.5 × magnification, the extension tube takes you right up to life size. Needless to say, even with the extension tube in place on the lens, the shooting procedure itself will still be the same: The unit fully couples with the automatic diaphragm, full-aperture metering is possible as usual, and so is automatic aperture control. In other words, you have all the amenities of advanced AE photography right up to life size.

Properly speaking, life-size photography with a 35mm camera already gives you considerably higher magnifications than simply 1 × because your 35mm pictures will either be enlarged on paper or magnified many times over by your slide projector.

The extension tube FD25-U, which comes with the FD 50mm f/3.5, lets you photograph very small detail with great ease. In general, anything beyond 0.5 × magnification calls for a rigid camera support. Depth of field at these magnifications is extremely shallow, and the natural motion involved in hand-held photography could easily throw your picture out of focus. A good tripod therefore becomes an important accessory as you go deeper into truly close-up photography. At home, one of our copy stands makes a perfect support for shooting small detail.

1x
FD macro lens 100mm f/4
Extension tube FD50-U

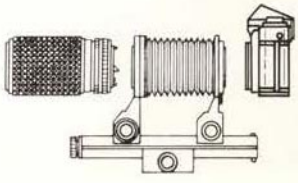
Like its standard counterpart, the telephoto macro lens FD 100mm f/4 comes complete with its own extension tube. This must, of course, be longer to provide the longer extension needed at 100 mm focal length to cover the range from 0.5 × magnification to 1 ×. Otherwise, however, the extension tube FD50-U is just as convenient an accessory as the one for the standard macro lens. It provides automatic diaphragm coupling and allows full-aperture metering as well as automatic aperture control. Here also, however, a good tripod becomes more or less of a necessity as soon as you go beyond 0.5 × magnification. In other words, we begin to enter a different world as we leave the range covered by the extra-long helical focusing mounts of these macro lenses.

A little while ago we told you that it takes additional extension equivalent to the focal length of the master lens to reach 1 × magnification. And still, if you take a close look at the extension tubes supplied with our macro lenses, you may wonder why their length corresponds to only half the focal length of the lens with which they are supplied. Well, the explanation is very simple: Each of our two macro lenses has an extra-long helical focusing mount. You might say that the other half of the extension tube normally required already is an integral part of the macro lens. Adding this built-in extension to the extension tube supplied with the lens gives you the full length needed for life-size photography. So the basic rule still holds.

1.5x
Canon Auto Bellows
FD macro lens 100mm f/4

The heart of the Canon Macro System is the Auto Bellows, an advanced, rock-solid bellows unit that gives you continuous control over extension from 39 mm to 175mm. It is this continuous variation of extension which makes a bellows unit one of the most versatile accessories for close-up photography.

The Canon Auto Bellows is not only very ruggedly built for maximum stability – indispensable for precise close-up work. It also offers a remarkable degree of operator comfort and great flexibility. Both its front and rear panels are adjustable by rack-and-pinion on a massive guide rail and can be clamped. After bellows extension has been selected to suit the magnification desired, the entire unit can be shifted axially on a separate rack-and-pinion for precise focusing. These three degrees of freedom offer practically unlimited possibilities for camera setup and the use of additional close-up accessories.



The front panel of the Auto Bellows can be slid off the guide rail and reversed, making a Macrophoto Coupler superfluous. A double cable release, which comes with the bellows, preserves the automatic diaphragm function of Canon FD and FL lenses, even when they are reverse-mounted.

Switching from horizontal to vertical shots is extremely easy: The rear panel allows the camera to be rotated through 90° so that the entire setup may remain conveniently mounted on the tripod.

The front panel has the same Canon bayonet as your camera and will readily accept any Canon FD or FL lens. This means that you can easily use your standard lens or a wide-angle lens for close-up work, unless you are very critical or wish to do copy work for which ordinary camera lenses are less suited than a specially corrected macro lens. As long as your subjects are of the pictorial type, however, an ordinary lens will generally do. In view of the extremely shallow depth of field which goes with high-magnification work, you will generally use a small working aperture anyway, thus improving the performance of an ordinary lens at these critically short distances.

However, if you are out for top quality, a macro lens will be your best choice. Which of our two macro lenses fits your requirements best will depend entirely on the type of work you are interested in. While a telephoto macro lens gives you greater working distance, the standard macro lens allows higher magnification due to its shorter focal length.

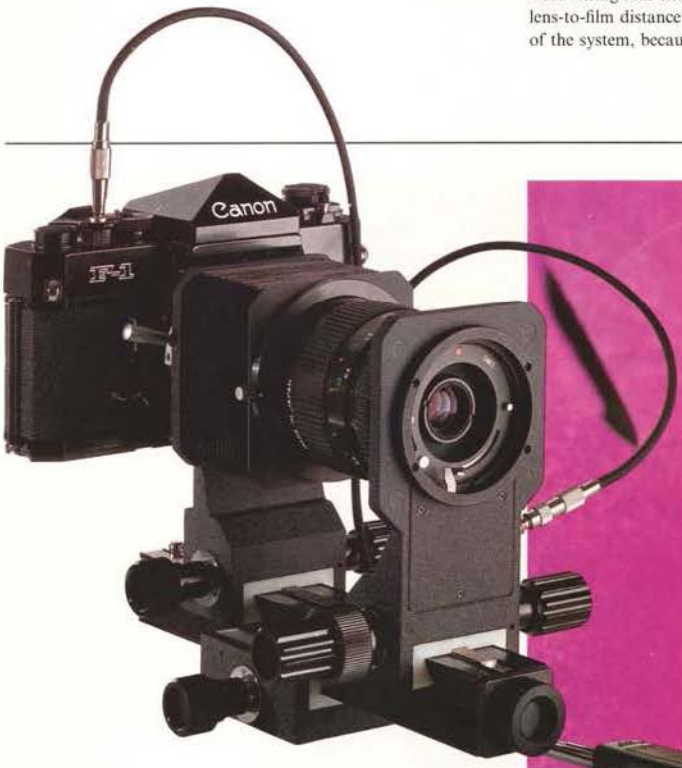
For the true believer, a Canon Auto Bellows is the key to macrophotography. Its three degrees of freedom guarantee optimum flexibility. You may leave the rear panel at the rear end of the guide rail, for example if you wish to use your camera with a motor drive. When the forward edge of the rear panel thus stands at zero on the bellows scale, the forward edge of the front panel directly indicates the extension set. On the other hand, if you move the rear panel forward, as may be advisable for shorter bellows extensions, reading of the extension at the forward end of the front panel remains very easy if you just set the rear panel to a round value and add the latter to the reading.

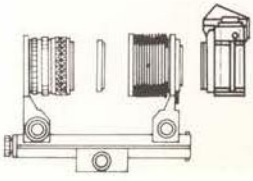
A feature of considerable importance is the focusing slide underneath the guide rail, which allows the entire setup on the guide rail to be shifted axially for precise focusing. In this way, the magnification set with the aid of bellows extension will not noticeably change during fine focusing. This is a considerable advantage over bellows units in which one of the two panels has to be shifted for focusing.

3x
FD macro lens 50mm f/3.5
Reverse-mounted
on Auto Bellows

Why should anyone want to mount a lens in reverse? Well, the fact is that ordinary and even macro lenses are computed and corrected for longer lens-to-subject than lens-to-film distances. But what happens if we really go into close-up photography? All of a sudden, shooting distances are whittled down to "nothing". On the other hand, the distance between the lens and the film plane becomes ever longer because we have to increase the extension precisely to obtain the desired magnification – and focus on a subject just centimeters away from the front lens.

If we turn our lenses round and mount them so that their rear lens faces the subject, things begin to look normal again: The extremely short subject-to-lens distance is what the forward-facing rear lens is used to. And the comparatively long lens-to-film distance makes much more sense to the front lens of the system, because that's what it is used to anyway.





The result is obvious: As soon as the lens-to-film distance becomes longer than the lens-to-subject distance, reverse-mounting will improve image quality because it restores more or less normal conditions for the optical system. And this also applies to macro lenses.

But there's an additional bonus to reverse-mounting: It will not only give you higher image quality; it will also increase magnification. Take your FD 50mm f/1.4 standard lens, for example. Mounted normally on an Auto Bellows, this lens will give you from 0.7 × to 3.4 × magnification. Reverse-mounted, the same lens will give you magnifications from 1.16 × to 3.74 × – a difference that is particularly noticeable at the lower end of available extensions.

With a Canon Auto Bellows, reverse-mounting of lenses is particularly easy. This is due to the reversibility of the bellows' front panel. Reverse-mounted on the guide rail, it offers normal mounting conditions for the lens, its bayonet facing the camera. As a result, the lens can be attached in the normal manner. An adapter ring, finally, allows the bellows itself to be attached to the backward-facing filter thread of the lens. And since the front panel of the Auto Bellows has a screw socket for one end of the Canon Double Cable Release, even the automatic diaphragm of the lens remains fully coupled. Reverse-mounting your lenses on the Canon Auto Bellows thus is mere routine.

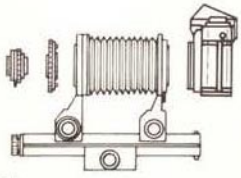
There may be occasions when the extension of the Auto Bellows alone will not be enough to obtain the desired magnification and when reverse-mounting on the reversible front panel of the bellows therefore will be impossible. Even if additional extension tubes are fitted to the front of the bellows, however, reverse-mounting of the lens is possible. In this case, a Canon Macrophoto Coupler can be attached to the corresponding extension tube on one side and will hold the lens by its front filter thread on the other.
With the rear of your FD lens facing the subject, of course, none of the lens functions can couple with the camera body any more. However, if you attach a Canon Macro Auto Ring to the forward-looking lens bayonet, a double cable release will restore operation of the automatic diaphragm, providing unusual operating comfort in a fairly extreme shooting situation.

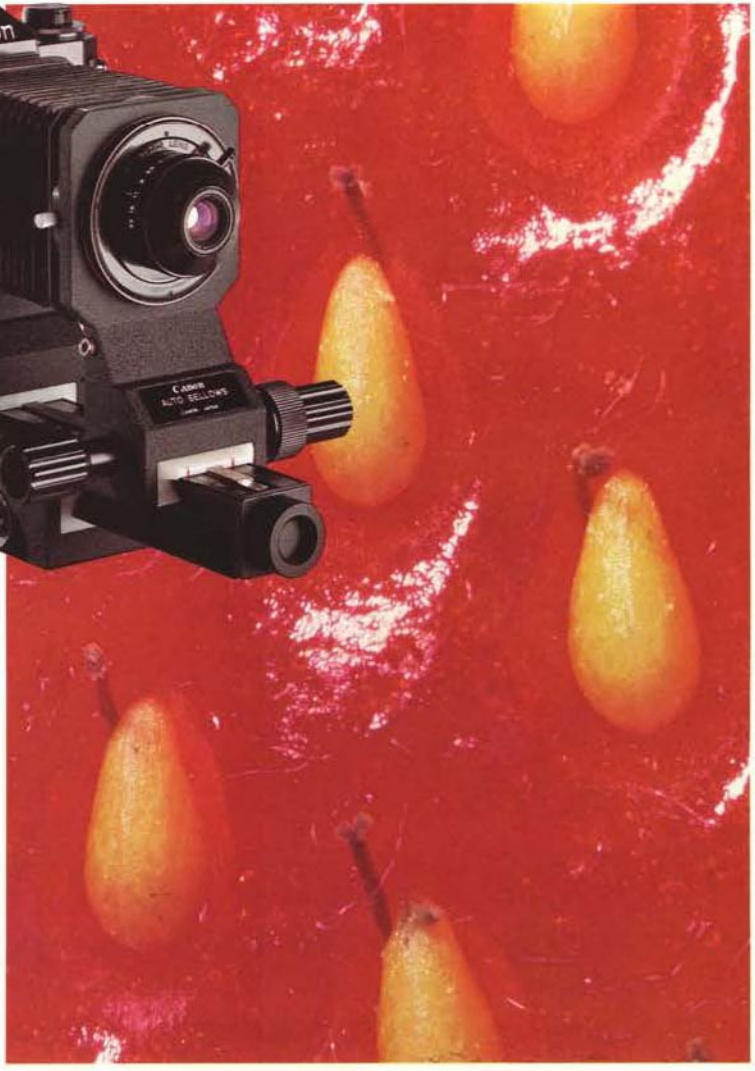
5x
Canon Macro Bellows Lens 35mm f/2.8 Auto Bellows

It's easy to understand that optical performance cannot be limitless and we have to draw the line somwhere. This is the case when we get into higher magnifications than 1 × where even the performance of a specially corrected macro lens soon reaches its limits. To close the gap between macrophotography and photomicrography, we have developed special macro bellows lenses for use with one of our bellows units. One of these is the Canon 35mm f/2.8, an attractively priced and extremely compact special-purpose lens that looks very much like a microscope objective. And the similarity is not coincidental.

On the Auto Bellows, this lens will give you from 1.96 × to 5.84 × magnification, the minimum lens-to-subject distance being only about 44mm. The lens has a handy lever for aperture control.

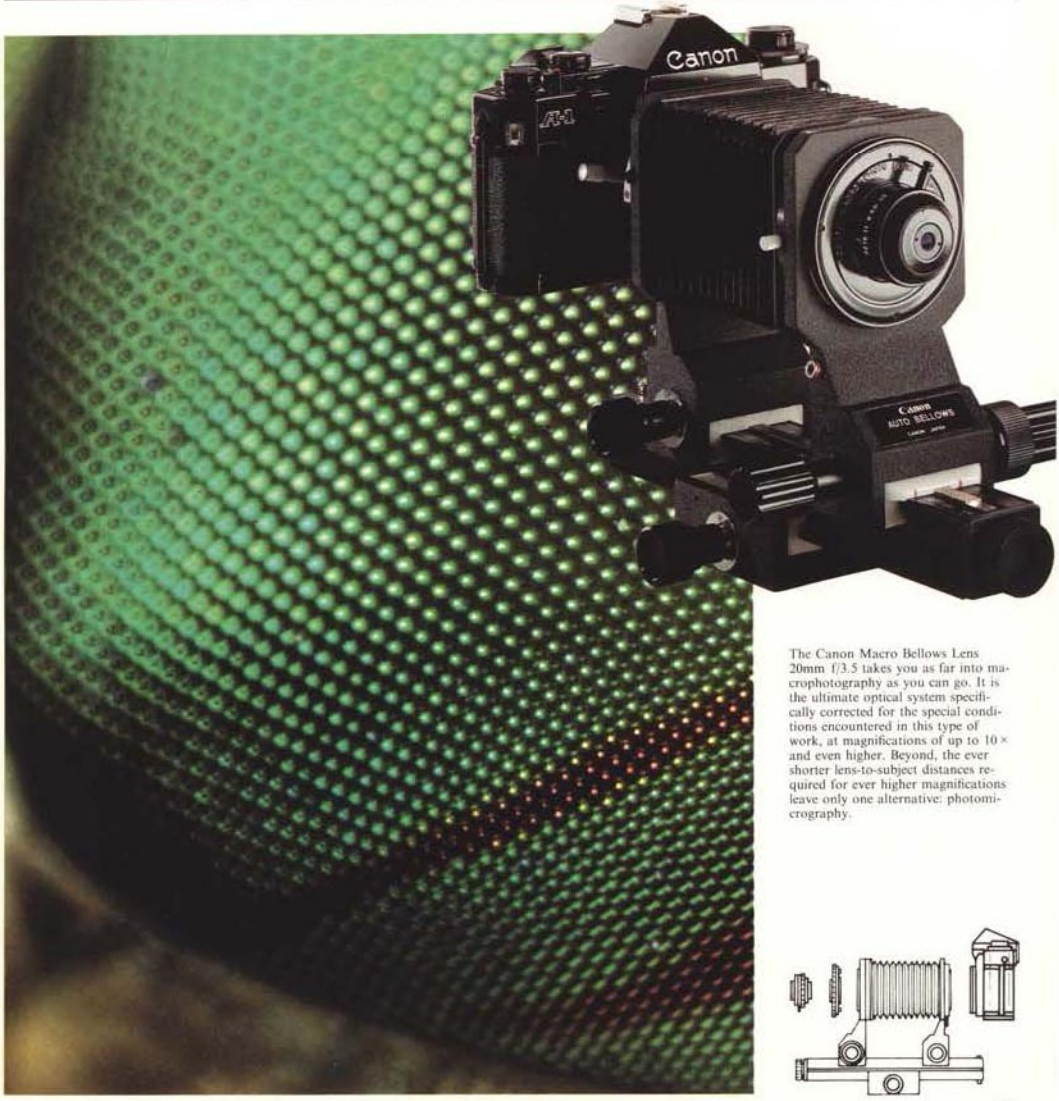
The Canon Macro Bellows Lens 35mm f/2.8 can be stopped down to f/22 and comes with an adapter that fits into the Canon bayonet of the Auto Bellows or suitable accessories. Its front mount is tapered so as to facilitate lighting of subjects at the extremely short shooting distances involved.





10x
Canon Macro Bellows Lens 20mm f/3.5 Auto Bellows

The second macro bellows lens has an even shorter focal length and will therefore give higher magnifications. Its optical correction does, of course, make allowance for these magnifications which, with a Canon Auto Bellows, range from 3.93 × to 10.72 × . The lens is only 20mm long and weighs a mere 35 g. This is due in large measure to the fact that only a manually controlled iris diaphragm is required in this particular case and that a focusing mount can be omitted because this type of lens is designed for exclusive use with a bellows unit which thus contributes the necessary focusing motion.

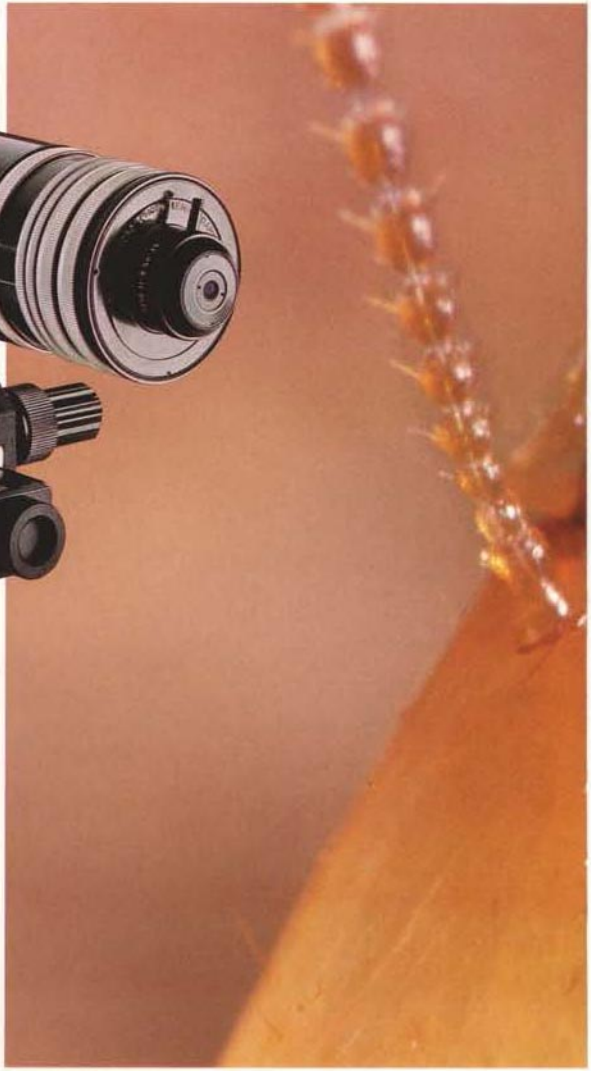


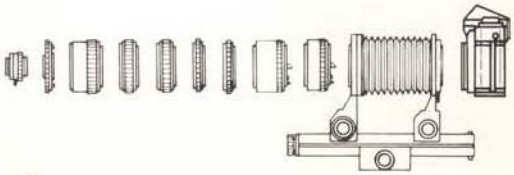
The Canon Macro Bellows Lens 20mm f/3.5 takes you as far into macrophotography as you can go. It is the ultimate optical system specifically corrected for the special conditions encountered in this type of work, at magnifications of up to 10 × and even higher. Beyond, the ever shorter lens-to-subject distances required for ever higher magnifications leave only one alternative: photomicrography.

15x
Canon Macro Bellows Lens 20mm f/3.5 Auto Bellows plus extension tubes

We had already hinted that even 10 × magnification is not the absolute limit that can be reached with our 20mm macro bellows lens f/3.5. Adding a few extension tubes to the extension of the Auto Bellows, you can move up even closer and advance to the very limit of macrophotography.

The limit is a very real one: To obtain higher magnifications, you have to reduce the separation between front lens and subject more and more – until there is hardly any room left between the two. And this, of course, poses a tremendous problem for lighting. While the tapered front mount of our macro bellows lens helps you throw some light on your subject up to very short distances, there will be a point when your subject will simply be "in the shade" of the camera setup. And that's the end of macrophotography.





At high magnifications, depth of field comes down to practically nothing. The use of very small apertures therefore is an absolute must. Even so, however, great care will have to be taken to have all important detail as nearly in one plane as possible. The small apertures involved naturally call for very intense lighting, much of which is lost anyway on the unusually long way from the lens through the extension tubes and the bellows to the camera. The only viable alternative in this case therefore is electronic flash – and your subject will have to be absolutely stationary so that you can adjust the focus.

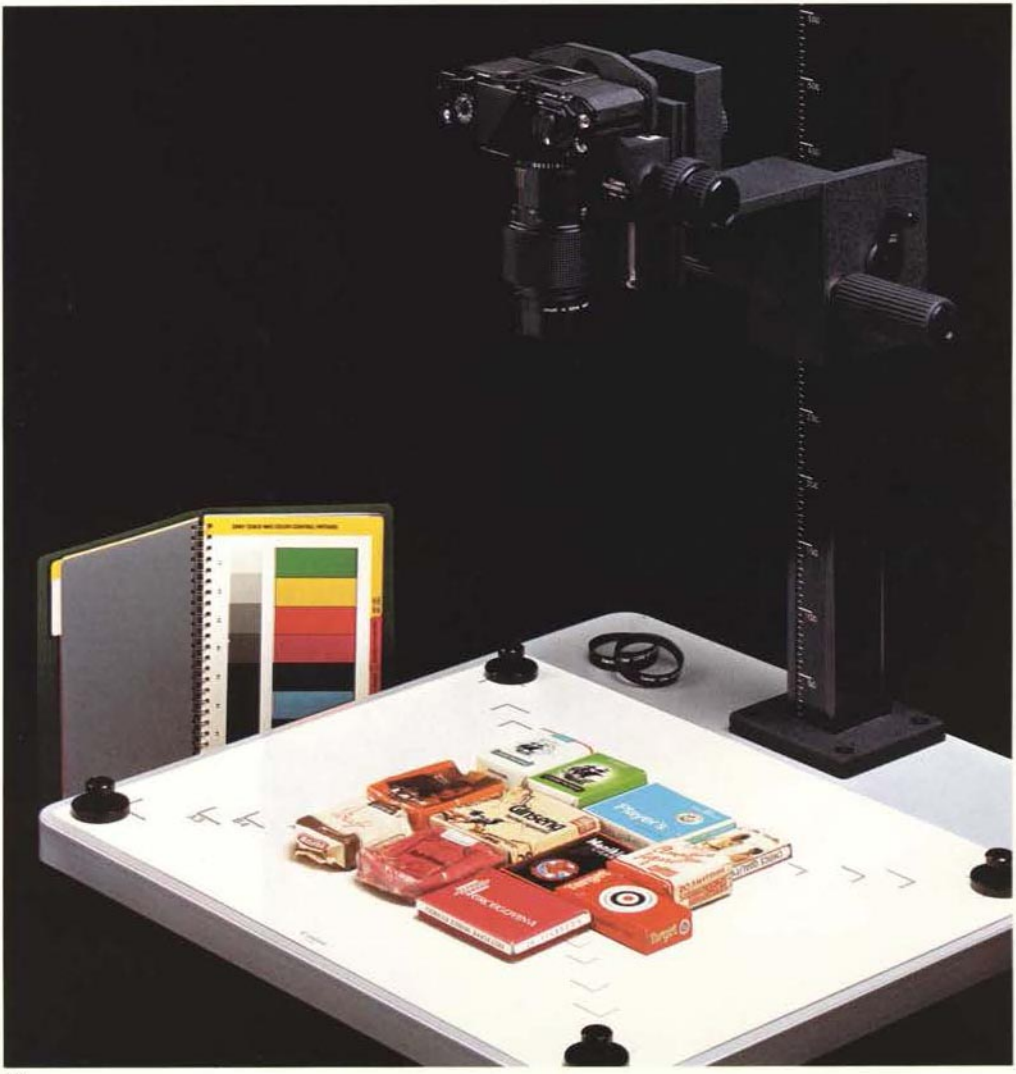
The stability of the camera setup takes on added importance at these magnifications because the slightest vibration would inevitably ruin the sharpness of your picture. After all, magnifying your subject 10, 15 or more times on the film means that any vibration will be amplified just as many times. The sturdiest tripod you can find will therefore be just good enough. And the utmost care should be taken to lock all settings on the Auto Bellows firmly with the clamp screws provided for the purpose. Tripping the shutter with your finger on the shutter release is, of course, out of the question. A long cable release is your only safeguard against camera shake. In a Canon F-1 you may even wish to lock up the mirror before actual exposure as an added precaution.

The Canon Auto Bellows will take a large number of additional close-up accessories. Apart from FD-U extension tubes, there are screw-type tubes that can be attached with the aid of suitable adapter rings. Alternatively, M-type extension tubes are available in lengths of 5mm, 10mm and 20mm, which have the normal bayonet mount but do not provide for automatic diaphragm coupling and other FD features.

Copying your own documents

Copy work is an extremely varied field, and there are a lot of things which do not fall under the definition of "copying" in the strict sense but are simply close-ups taken with the aid of copy equipment.

It is only natural that the Canon Reflex System should include the necessary tools to convert your Canon SLR into your own "copy camera". First and foremost, this is our Copy Stand 5, an unusually rugged and stable camera support consisting of an extra-large, thick baseboard 595mm square that will hold even the largest standard-format documents. A counterweight in the rectangular, 900mm column ensures extremely smooth vertical motion of the entire camera outfit. The baseboard is designed so that originals can be held in place with



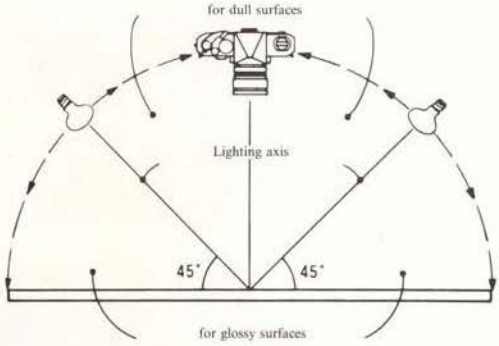
the aid of permanent magnets. The Canon Focusing Rail further improves the stability of the setup because it allows axial fine adjustment by 85mm for precise focusing. In addition, the camera can be easily turned through 90° on the copy stand's camera arm.

A popular version is our Copy Stand 4 which likewise makes a very stable camera support but is smaller than the Model 5. Its round column is 617mm high and its baseboard measures 450mm × 420mm. A useful baseboard area of 280mm × 420mm takes originals up to A3 size. The budget price of this copy stand makes it ideally suited for amateur use. The Canon Focusing Rail may likewise be used with this stand.

If you prefer an especially compact camera support that will fold into a neat package for easy carrying, our Handy Stand F will be your best choice. This is primarily intended for copying documents, its four legs being provided with indices for the different legal sizes so that the camera can be quickly set up at the necessary distance from the original. The stand consists of four legs, a camera mounting ring with an adapter and an extension tube M 5.

An optional Camera Holder F 3, finally, may further improve the stability of your camera on a Copy Stand 4 or a tripod. It has two tripod screw holes for horizontal and vertical mounting and will accept any Canon SLR.

No matter whether you like to photograph match boxes, watches, coins, stamps or any other small object – a copy stand is an invaluable aid in close-up photography at home. Its importance goes far beyond copying documents, maps or drawings.



Even illumination of your subject is very important in copying two-dimensional subjects. As a minimum configuration, two lamps should be set up to the left and right of the copy stand so that the direction of the light makes an angle of 45° with the optical axis. An optimum setup would consist of four lamps positioned just outside the four corners of the baseboard.

The Canon Copy Stand 5 is a professional model which combines extreme stability with great versatility and ultra-smooth operation. The possibility of using permanent magnets to fix originals on the baseboard is only one attractive feature of this "home copy studio".

The Canon Handy Stand F is of the "traveling type": Its four legs, camera mounting ring, adapter and extension tube M 5 will fold into a neat package for easy carrying. The unit can be quickly preset to the proper lens-to-subject distances for the most widely used legal document sizes.

Duplicate your own slides

Once you own a Canon Auto Bellows, it is only a small step to set you up in the "business" of slide duplication. And this is neither an "unnecessary complication" nor superfluous in the sense that there would hardly ever be a need to duplicate your slides.

First of all, duplication opens up an entirely new field to you: creative photography based on the manipulation of your slides, their improvement and processing into something entirely different. At home you can discover a new joy of experimentation with sandwiching, double exposure, masking and a variety of photomontage techniques. Simply mounting two suitable slides as a "sandwich" in one frame and duplicating it will give you an entirely new result – one you had heretofore

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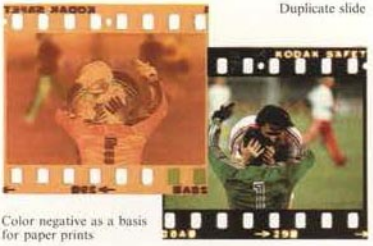
Slide duplication may serve many different purposes. Obtaining copies of your valuable slides to give away or send to exhibitions is only one of them. You may also wish to produce color negatives from which any desired number of paper prints can be obtained. Or you may try the most promising approach of all and start to manipulate the original product by various techniques that are fairly easy to handle.

Original slide



Duplicate slide

Color negative as a basis for paper prints

The Duplicator 35 can be attached to the front end of the Canon Auto Bellows' guide rail within seconds. It normally takes mounted 35mm slides which can be shifted vertically by 8 mm and horizontally by 12 mm for cropping.
The Canon Rollfilm Stage facilitates the duplication of slides from film strips.
A Canon macro lens FD 50mm f/3.5 should be used for this type of work. If this lens is reverse-mounted, it will even be possible to duplicate 110-type slides on 35mm film. Even in this case, there will be room for cropping.
An opal-glass diffusion disk at the forward-looking end of the Duplicator 35 ensures even illumination of the slide inserted for duplication. The slide stage also has sufficient room for the insertion of gelatine filters to improve or correct color rendition.
Electronic flash is very suitable for slide duplication, since it guarantees high reproducibility of settings. A tungsten-halogen lamp, however, will also make an excellent light source for slide duplication. Whichever source is used, precise records should be kept on the source-to-slide distance to obtain reproducible aperture settings.

thought impossible to attain with the means at your disposal. The same technique is helpful in saving many an unexciting shot by sandwiching it with your own overlay sheets – slides you can easily "make to order" by photographing suitable colored light patches with your camera lens completely defocused – and duplicating it. The possibilities are unlimited.

Increasing the contrast of your slides can sometimes work wonders – and duplication is an easy way to do just that. In other cases, you may wish to improve some of your slides by cropping, and here you will use special slide duplicating film to obtain as perfect a copy of the original as possible. After some experimentation with the incredible potential which slide duplication offers, you will come to consider many of your original slides as mere "basic products", as ingredients in an exciting mix of creative possibilities. Slide duplication will not only help you improve your overall results but – more importantly – raise your level of awareness of the creative possibilities inherent in modern photography. We should, in fact, warn you: Manipulating your photographic results at home by slide duplication can become an obsession! Once you've been bitten by the bug, you may find it extremely hard to resist the temptation of trying your hand at some further experimentation – and all that for the price of a small accessory to your Canon Auto Bellows, the Duplicator 35.

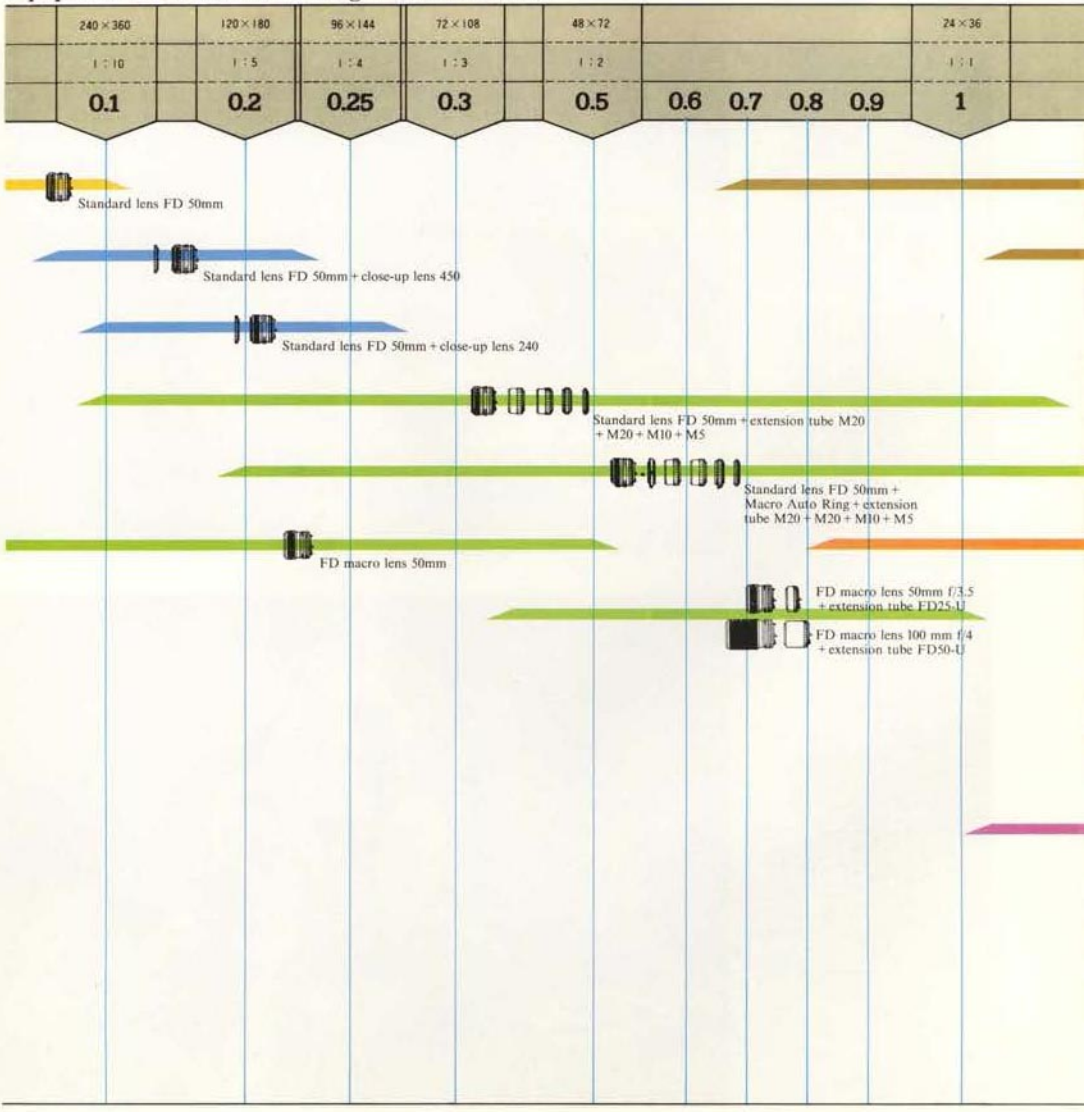
The Canon Reflex System even provides the necessary equipment for duplicating single frames from 8 or 16mm movie film on 35mm film. Equipmentwise, you need a Canon Auto Bellows or Bellows M plus one of our special macro bellows lenses and the corresponding duplicator. In the case of 8mm film, this is the macro bellows lens 20mm f/3.5 and the Duplicator 8, in the case of 16mm film the macro bellows lens 35mm f/2.8 and the Duplicator 16. The duplicators are fully equipped for Koehler illumination to prevent reflections, reduce the temperature in the plane of the movie film and ensure even illumination.

The Canon Macro Stage is an extremely convenient specimen holder which can be mounted at the front end of the Auto Bellows' guide rail just like the Duplicator 35. For incident-light photography of small objects, the stage may be used so that the camera unit is in a vertical position. Two stage clips serve to hold the subject securely in place. For transmitted-light photography, the stage may be used with the camera in a horizontal position, to allow for transillumination of the subject. In this position, the Macro Stage may also be employed for duplicating slides up to 4.5cm × 6cm in size.

Your guide to close-up photography

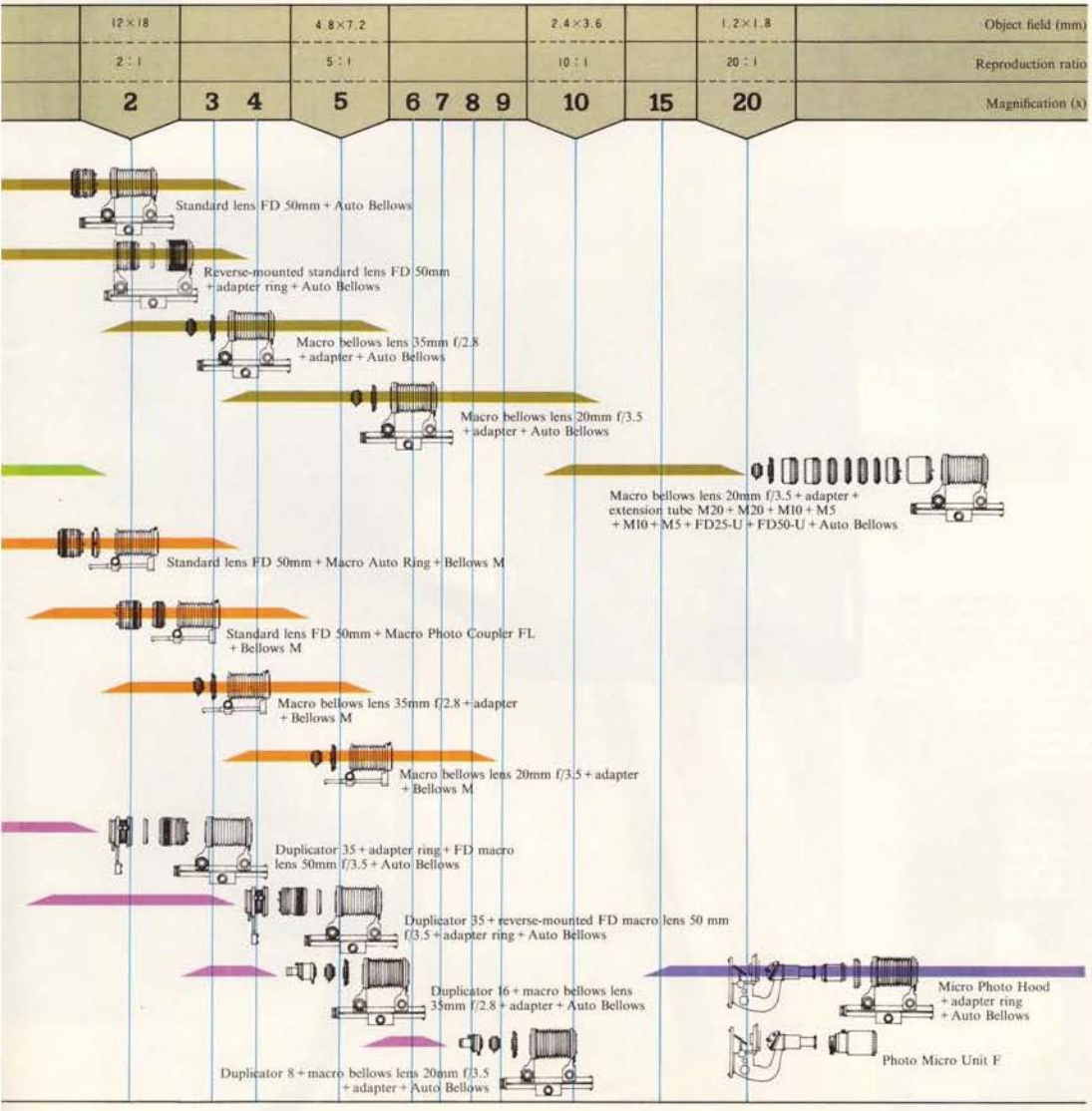
The diagram below shows at a single glance what equipment you need to attain certain magnifications. And it also indicates that there are considerable zones of overlap for the different accessories. In other words, one and the same magnification can be attained in different ways. And it will be up to you to decide which of the accessories is the most appealing to you and offers the best answer to your quality requirements and –

Equipment combinations and magnifications covered



last but not least – your budget. Because absolutely top quality is not necessarily required in every single case – and thus your initial outlay may be considerably less if you aim for a proper balance between what is really needed and what can be done with the different technical means available within the comprehensive Canon Reflex System.

Whichever way you go, whichever avenue you choose – you may rest assured that we have the answer to your photographic problems. Be it small or large, sophisticated or fairly simple – there is the right Canon accessory for your macrophotographic needs.



The Canon Macrolite ML-1

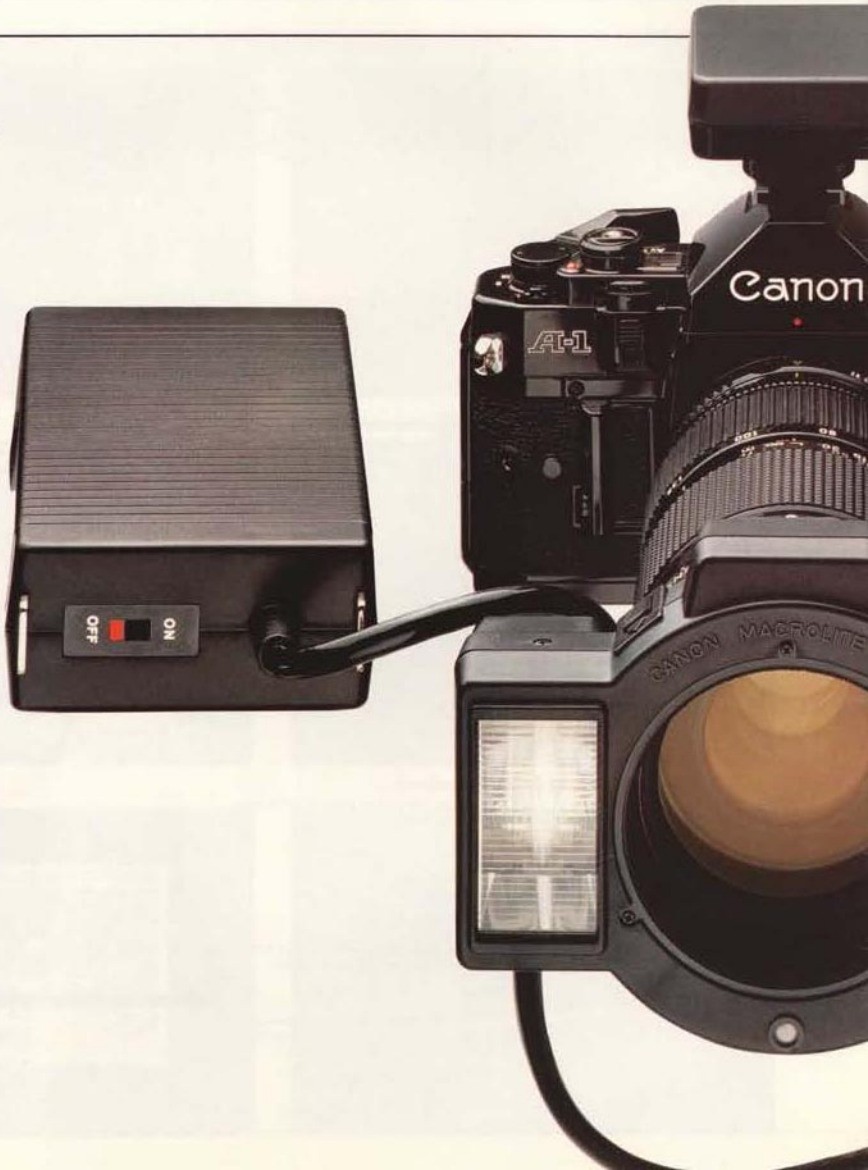
Shooting moving subjects at close range may make the use of electronic flash an absolute necessity, since only flash can combine small working apertures for maximum depth of field and truly short exposure time for perfectly sharp contours. On the other hand, the use of flash for close-up subjects may be quite tricky because the axes of flash and lens have to intersect at the precise shooting distance, which would require special mounting and possibly adjustment for shooting distance.

Our Macrolite ML-1 is the perfect answer to all these problems. Basically, it is a reflector ring that is attached to the front lens bayonet of one of several Canon FD lenses. A separate control unit slips into the hot shoe of a Canon SLR camera and will switch any A-type camera to its sync speed of 1/60 s as soon as the flash is ready for firing. Power is supplied

The control unit of the ML-1 can be locked in the camera's hot shoe. It has a ready lamp and a confidence lamp at the back. The confidence lamp lights up after a flash if the light intensity was sufficient for proper exposure. It thus allows test firing.

The battery pack takes eight type AA penlite cells in two Battery Magazines D and can be hung from the shoulder or clipped to a belt. One set of fresh batteries is good for about 250 flashes with both heads. The recycling time with fresh alkaline-manganese batteries is approx. 4 s. Flash duration is so short that sharp contours are guaranteed: 1/500–1/50 000 s.

The reflector ring with its two flash heads and the sensor can be quickly mounted on the front bajonet of FD lenses with a filter diameter of 58 mm. Adapters are provided for lenses with a filter diameter of 55 and 52 mm. The two flash heads guarantee shadowless illumination which can, however, be modeled for greater pictorial impact: Diffusion screens may be slipped onto one reflector to reduce its intensity to that of a fill-in flash, or onto both reflectors to attain softer overall illumination. In this case, the auto ranges will be shorter than at full power. The reflector ring also has a switch with which either the left or the right-hand reflector can be turned off completely. Finally, the ring can be rotated from its locked position to control the direction of illumination.

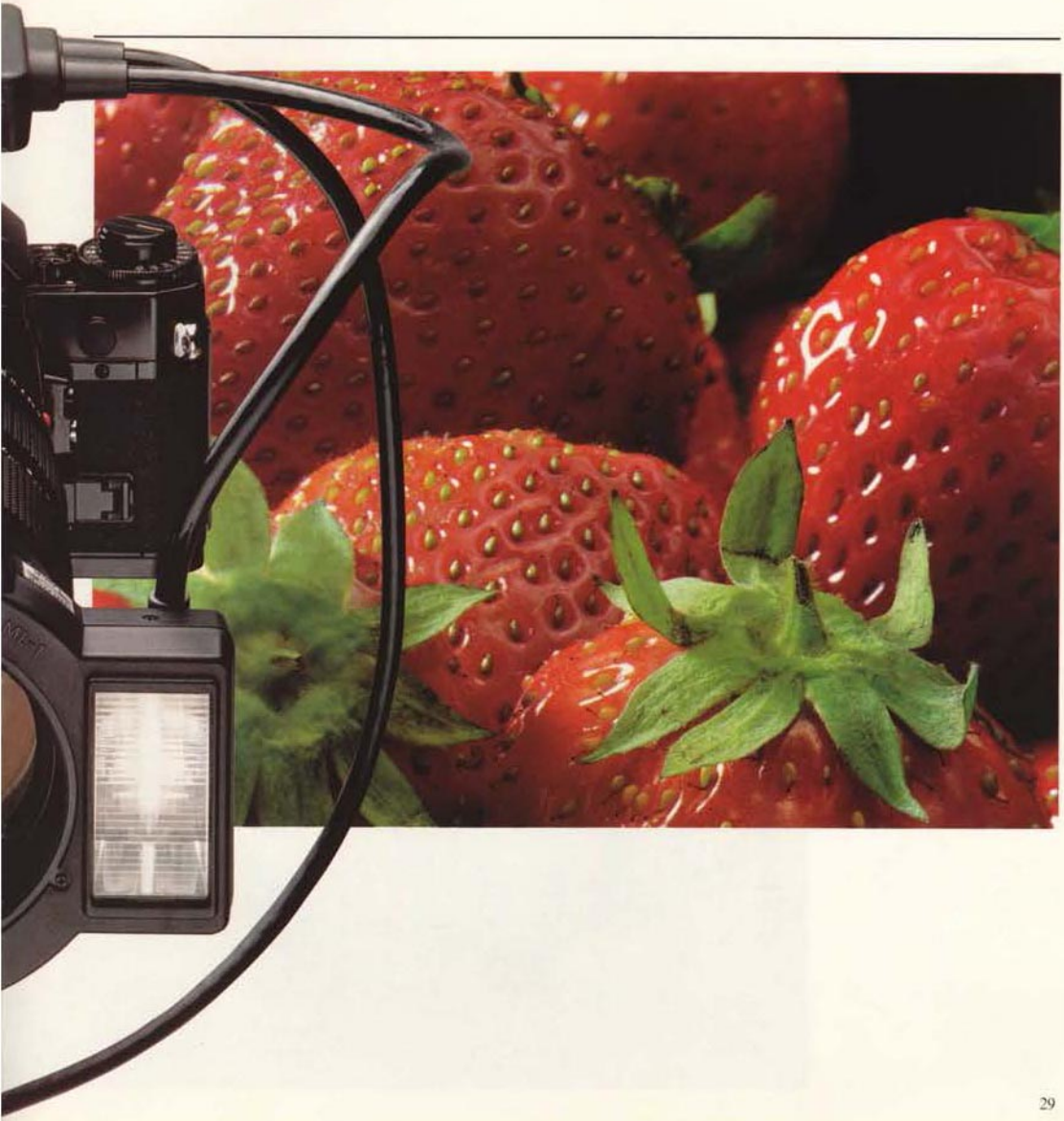


by eight penlite cells in a separate battery pack that can be carried on a shoulder strap or clipped to a belt. It is connected to the control unit by cable.

The Macrolite ML-1 is primarily intended for use with an FD lens 80–200mm f/4 with which it allows sensor-controlled automatic flash photography. The guide number of the unit is 16 for ASA 100, and you may choose from one of three auto f-stops which are f/5.6, f/11 and f/22 for ASA 100. The corresponding auto ranges are 0.6–2.8m, 0.4–1.4m and 0.4–0.7m, respectively.

Since the FD 80–200mm focuses down to 1m, the range from 2.8m to 1 m is available without any further accessories. An additional range from about 0.49 to 0.65m can be covered with the aid of a special close-up lens.

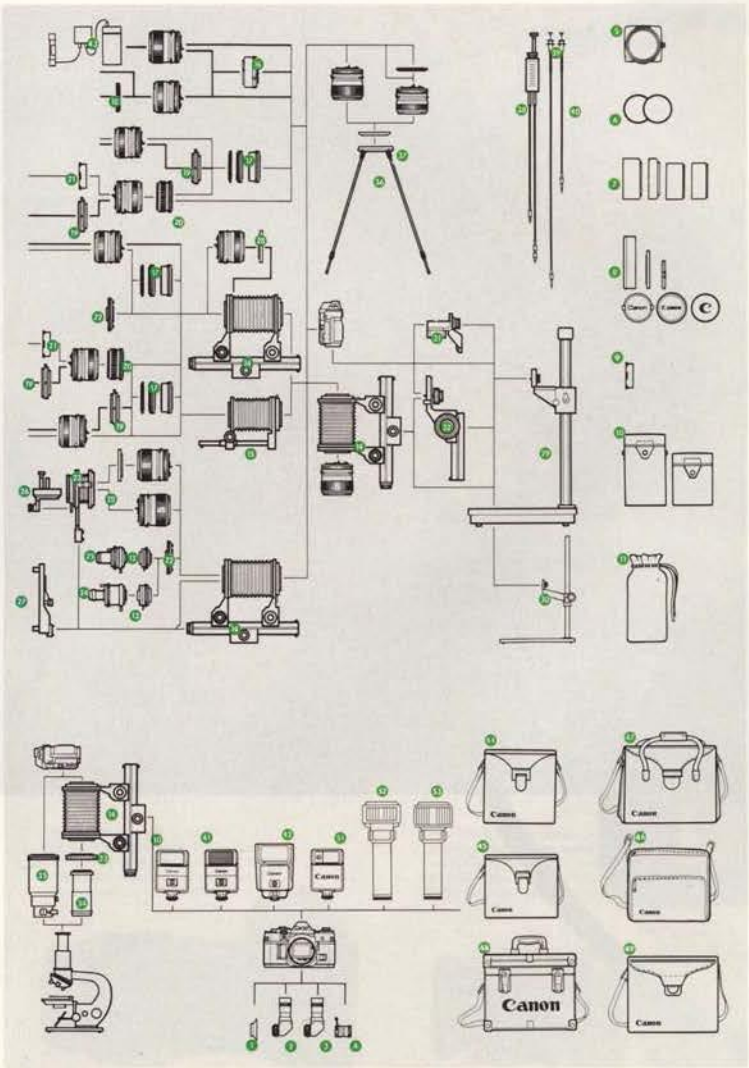
The long working distance provided by a telephoto zoom lens makes this special equipment combination particularly well-suited for industrial and medical applications as well as for general close-up work, for example in the field. However, the Macrolite ML-1 may also be used in conjunction with one of our two macro lenses, the FD 50mm f/3.5 or the FD 100 mm f/4. In this case, a correction factor has to be applied to the working aperture, which is indicated at the back of the flash head. The two flash reflectors can be fired either simultaneously or separately and may also be rotated for controlled illumination. Diffusion screens can be slipped onto the two reflectors for softer lighting or just one reflector which will then act only as fill-in.



The complete Canon Macro System

The chart below gives an overall view not only of all the accessories available within the extensive Canon Macro System, but also shows in full detail how the different components can be combined. All these accessories are fully compatible with any of the SLR cameras in the Canon Reflex System. As in the case of our professional FD lenses, even the lowest-priced of our cameras is thus on an equal footing with such professional models as the Canon F-1 or A-1. It is this com-

1 Eyecup
2 Angle finder A2
3 Angle finder B
4 Focusing magnifier
5 Gelatine filter holder
6 Filters
7 Lens hoods
8 Lens caps
9 Rear lens caps
10 Hard cases
11 Soft case
12 Macro bellows lens 20 mm f/3.5
13 Macro bellows lens 35 mm f/2.8
14 Auto Bellows
15 Bellows M
16 Extension tubes FD 15, 25, 50
17 Extension tube set M
18 Close-up lenses 240 and 450
19 Macro Auto Ring
20 Macrophoto coupler FL
21 Macro hood
22 Macro bellows lens adapter
23 Duplicator 35
24 Duplicator 16
25 Duplicator 8
26 Roll-film stage
27 Macro stage
28 Adapter ring
29 Copy Stand 5
30 Copy Stand 4
31 Camera holder F3
32 Focusing stage
33 Lens-mount converter A
34 Microphoto hood
35 Microphotographic unit F
36 Handy Stand F
37 Adapter ring for Handy Stand F
38 Double cable release
39 Canon cable release 50
40 Canon cable release 30
41 Canon Speedlite 155A
42 Canon Speedlite 199A
43 Macrolite macro flash unit
44 Gadget bag L-2
45 Gadget bag L-1
46 Gadget bag GS-1
47 Gadget bag GL-1
48 Gadget bag GM-1
49 Gadget bag GL-2
50 Canon Speedlite 177A
51 Canon Speedlite 133A
52 Canon Speedlite 533G
53 Canon Speedlite 577G



plete interchangeability which makes the Canon Reflex System so outstanding.

As you try your hand at close-up photography, you will notice that shooting things close up today no longer means awkward calculations simply to find the proper exposure allowing for the increased extension due to the use of bellows, extensions tubes or similar accessories. Thanks to through-the-lens metering in all Canon SLR cameras, you can take exposure readings just as quickly and easily as in normal photography. The metering systems of all these cameras will register only the amount of light actually reaching the photo cell. As a result, close-up photography today is easier and faster than ever before – and your results will show the difference. Only if flash is used for illumination will it become necessary to apply a correction factor to allow for the additional extension.

① A Data Back F will convert your Canon F-1 into a high-powered close-up camera not only suited for recording the date, but also code figures or letters in the lower right-hand corner of your pictures.

② Any Canon A-type camera with the exception of the AV-1 takes a Data Back A, which is slightly smaller than the Data Back F for the F-1, but otherwise identical in operation and capability.

③ The stability of the camera setup on a tripod or copy stand can be further improved with the aid of a Camera Holder F3 which will take any 35mm Canon SLR.

④ The Magnifier R screws into the round eyepiece mount of a Canon F-1 and magnifies the center of the viewfinder image for precise focusing. It can easily be swung back for normal, full-field viewing.

⑤ The Magnifier S slips onto the rectangular eyepiece mounts of Canon A-type cameras and is otherwise identical with the Magnifier R.

⑥ An Angle Finder B can be very helpful in close-up photography because it allows looking through the viewfinder at right angles to the optical axis. The angle finder gives an upright and unreversed image of the full viewfinder frame, has a focusing eyelens and can be rotated on the camera.

⑦ A Lens Mount Converter A will adapt screw-type Canon extension tubes to the bayonet mount of Canon SLR cameras.

⑧ A Macro Hood is required for reverse-mounted Canon FD lenses to release the bayonet lock so that the aperture ring will act directly on the iris diaphragm. At the same time, a Macro Hood will protect the contacts and levers at the rear of the lens from mechanical damage. It also acts as a short lens hood.

⑨ Canon cable releases are available in lengths of 30cm and 50cm. They are indispensable in close-up work to ensure vibration-free shutter tripping.

In this catalog, we have given you an idea of what we have to offer in the field of close-up photography. Of course, this is only one aspect of the comprehensive Canon Reflex System. We have therefore prepared separate catalogs reviewing not only this system as a whole but also our extensive line of FD high-performance lenses, our lineup of compact cameras highlighting the new autofocus AF35M and, finally, the world-famous series of Canon movie cameras. Please help yourself to any of these catalogs at your dealer's.

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English Edition ZC900.01.360.1080

Designed by Van Sambeek & Walters, Amsterdam (Shigeru Watano GVN), product photography David van Dijk, printed in Switzerland by Colour Printing Weber Ltd. Bienne