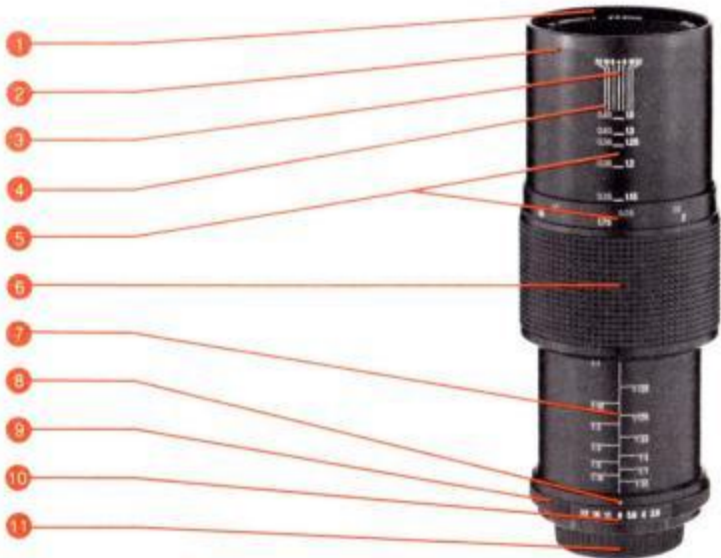


Vivitar®

Automatic Fixed Mount Macro Lens

90mm f2.8

Owner's Manual



Before you begin —

Carefully study this Owner's Manual. Keep it with the lens for a guide when questions arise.

Practice with your new Automatic Fixed Mount lens. *Dry runs* — taking pictures without film — will help you get the *feel* of it.

Shoot a roll of film. After you see those first great pictures, you'll know that you and your new lens are ready for an important occasion.

Getting Acquainted with your Lens

- | | |
|------------------------|--------------------------|
| 1 Accessory Thread | 7 Magnification Scale |
| 2 Lens Barrel | 8 Aperture Reference Dot |
| 3 Distance Index Line | 9 Aperture Ring |
| 4 Depth of Field Scale | 10 Aperture Scale |
| 5 Distance Scales | 11 Lens Mount |
| 6 Focusing Ring | |

Mounting your Lens

Your Vivitar Macro Lens is designed to mount on your camera with the ease and simplicity of your normal lens.

Before mounting, set the Focusing Ring ⑥ at infinity (∞).

Holding your Lens

You'll find it best to support the camera/lens combination by placing your left hand under the lens (see photo "A"). This leaves your right hand free to operate the camera controls and assures good balance and stability when shooting.

Focusing Operations

Your new Vivitar Macro lens will focus from infinity (∞), down to 35 cm (13¾ in.) from a subject to your camera's film plane. At the minimum focusing distance, the image produced will be life-size, or a 1:1 reproduction ratio.

To focus, turn the Focusing Ring ⑥ until the subject appears sharpest in your camera's viewfinder.

Exposure Control

Turning the Aperture Ring ⑨ changes the size of the opening of the lens diaphragm to control the amount of light that can pass through the lens when an exposure is made. The size of this opening is indicated by the f-stop position on the Aperture Scale ⑩ which aligns with the Aperture Reference Dot ⑧. The Aperture Ring has click-stops at each marked f-stop and at each intermediate half-stop except between f16 and f22.

Your new Vivitar lens has Automatic Diaphragm Control. With the lens mounted on your camera, the diaphragm remains open to its maximum aperture regardless of the Aperture Ring setting. When you release the shutter, the diaphragm automatically stops down to your pre-selected f-stop and instantly reopens after the exposure is completed.

NOTE: Universal Thread Mount lenses have an AUTO/MANUAL Switch (see photo "B") which must be set in the "A" (Auto) position for Automatic Diaphragm Control. In the "M" (Manual) position, the diaphragm opens and closes as the Aperture Ring is turned.

Canon Mount lenses have an AUTO/MANUAL Lever (see photo "C") which must be set at the clockwise end of its slot for Automatic Diaphragm Control. With the lever in the counterclockwise end of its slot, the lens diaphragm opens and closes as the Aperture Ring is turned.

Exposure Measurements

Exposure measurements obtained from "through-the-lens" metering systems may change significantly as you move the camera to change your view of the subject. The proportions of light and dark areas in the total picture area may change as you change view.

To assure proper exposure, compose and focus your photograph *before* measuring exposure.

EE Coupled Lenses

The Aperture Ring on Konica Mount lenses locks with a positive click when placed in the "EE" position. To remove Konica Mount lenses from EE operation, press the EE lock button (see photo "D") and turn the Aperture Ring to the specific f-stop you want.

Konica Mount EE coupled lenses, when used in the manual mode, will stop down to f22. When in the automatic, or EE mode, the lens will stop down to f16 only.

Canon Mount lenses have a click-stop at the "O" marked EE position. The Aperture Ring may be set and removed from this position in the same manner as selecting a specifically marked f-stop.

Estimating Distance

Because your Vivitar Macro lens focuses to extremely close distances, the Focusing Ring ⑥ makes more than one revolution as it turns from the infinity setting (∞) to the minimum focus setting. For this reason, your Vivitar lens has two numbered Distance Scales ⑤ engraved on the Focusing Ring ⑥, and on the Lens Barrel ②. The *white numbers* indicate distance in *feet*, and the *green numbers* indicate distance in *meters*.

When focusing from infinity (∞) to 0.5 m (1.6 ft.), refer to the Distance Scales engraved on the Focusing Ring ⑥. The approximate distance to an *object-in-focus* is indicated on these scales at the Distance Index Line ③.

When focusing between 0.45 m and 0.35 m (1.5 ft. and 1.15 ft.), refer to the Distance Scales engraved on the Lens Barrel ②.

Depth of Field

Depth of field is the capability of a lens to produce acceptably sharp pictures of objects which are located in an area in front of and behind a subject in focus.

You can creatively control the size of this area, making it small to emphasize a single subject or making it large to accurately record every detail of a scene, by doing the following:

1 — Focus: Depth of field becomes smaller as you focus on nearby

objects and becomes larger as you focus on those that are farther away. For example, the depth of field with your lens focused at " ∞ " is much greater than the depth of field with your lens focused at 1.2 m (4 ft.).

2 — Aperture: Depth of field becomes larger as you reduce the size of the lens diaphragm opening. For example, the depth of field at f16 (see photo "E") is much larger than the depth of field at f2.8 (see photo "F").

Depth of Field in Macrophotography

In macrophotography, depth of field is directly related to magnification and aperture.

As magnification increases, depth of field decreases drastically. In most cases you are working with a zone of acceptable sharpness that measures in centimeters and millimeters (inches and fractions of inches).

You can compensate for this shallow depth of field (see photo "G") by a simple change of view (see photo "H").

Depth of Field Preview

Pressing your camera's Depth of Field Preview Button stops down the lens diaphragm to your pre-selected aperture allowing you to see the depth of field in the viewfinder prior to taking the picture.

NOTE: The AUTO/MANUAL Switch on Universal Thread Mount lenses

may be used for previewing depth of field by moving the switch to the "M" (Manual) position.

Macrophotography

The Vivitar 90mm f2.8 Macro lens focuses as close as 0.35 m (13¾ in.) between a subject and your camera's film plane to produce a life-sized 1:1 image magnification.

Magnification

The Magnification Scale ⑦ is read at the trailing edge of the Focusing Ring ⑥ to determine the image size for any given focus setting during macrophotography operation. (See photo "I")

Focusing Distance

The Focusing Distance Scales on the Lens Barrel ② are read at the leading edge of the Focusing Ring to determine the approximate subject to film plane distance for any given focus setting between 0.45 m and 0.35 m (1.5 ft. and 1.15 ft.). (See photo "J")

Aperture Control

For maximum resolution when photographing a subject at life-size, or 1:1 image magnification, the lens should be stopped down to f8, f11, or f16, where lighting conditions will allow.

Exposure Adjustment

Focusing on nearby objects extends the effective focal length of a lens, thereby changing the f-stop value of each aperture ring position. This change is not constant, but rather becomes greater as the lens is focused closer.

On lenses which do not focus extremely close, this change is not sufficient to make a significant difference in exposure. However, when using your Vivitar 90mm Macro lens, which focuses down to life-size (1:1), this change becomes as great as two full f-stops.

Through-the-lens metering systems *automatically* adjust for this change and exposure adjustments are *not* required.

Exposure settings based on light measurements with hand-held meters require compensations for these changes in f-stop values.

Magnification	Exposure Compensation (f-stop)
1:5	1/2
1:2.5	1
1:1.5	1 1/2
1:1	2

To apply the exposure compensation factor, open the lens diaphragm the number of f-stops indicated by the exposure compensation chart given above.

For example, if your hand-held meter indicates proper exposure at $f11$, and your lens is at 1:1 magnification, the exposure compensation factor is 2. Turn the Aperture Ring $\text{\textcircled{9}}$ to the *exposure-adjusted* f-stop, $f5.6$. If the meter reading is $f11$, and the lens is at 1:1.5 magnification, the exposure compensation factor is $1\frac{1}{2}$. Turn the Aperture Ring to the *exposure-adjusted* f-stop, which is the click-stop between $f8$ and $f5.6$.

Helpful Hints for Macrophotography

- 1** — *Bracket* — shoot several pictures of the same subject at different exposures; exposure in macrophotography is critical. Under and overexpose by a half to a full stop as well as shooting at "correct" exposure. This *insurance* is well worth a few pennies in film.
- 2** — Use a *tripod* or other *firm support* — slight movements and vibrations can ruin a great photo. If, for some reason, a support can't be used, shoot the photo at the fastest possible shutter speed lighting conditions will allow.
- 3** — Use a *cable release* — the slight movement of your finger pressing the shutter release can cause movement of your camera (even when your camera is mounted on a tripod). After you compose the photo, make all camera adjustments, and advance the film, wait a moment — then shoot. If your camera has a *self-timer*, use it for movement-free camera operation when a cable release is not available.

4 — The lens barrel, with the recessed front element, functions as a lens hood. However, when using filters on the front of the lens, it is recommended that you use a conventional lens hood to minimize flare.


Copying

Your Vivitar Macro lens is ideally suited for photographing documents, photographs, or postage stamps. Mount your camera on a copystand or macrophoto stand to ensure optimum results. If possible, place a piece of non-reflective glass over the subject to keep it flat.

Unless you desire special shading, use two identical light sources on each side of the camera to eliminate distracting shadows. Place the lights at a 45° angle above the subject and adjust their position to minimize glaring highlights in the picture.

Taking Care of your Lens

1 — It's a good idea to keep a filter (such as a Vivitar UV filter) on your lens at all times. This not only improves some photographs, but also protects the front lens element from scratches.

2 — When attaching threaded accessories (filters, etc.) to your lens, carefully align the accessory with the Accessory Thread  to prevent damage.

- 3** — Keep your lens dust free by making sure both front and rear lens caps are in place when it's not in use.
- 4** — Clean your lens with an air brush, anti-static brush, or wipe it lightly with a camel-hair brush or lens tissue. In EXTREME cases use a clean, soft, cotton cloth moistened with denatured alcohol. *Never rub the lens surface with your finger, clothing, or any other abrasive material.* Cleaning your lens this way will scratch the lens coating and can cause damage to the element surface.
- 5** — Always store your lens in a cool, dry place.

Specifications

Optical Construction: 6 elements in 4 groups

Aperture Range: f2.8 to f22

Maximum Reproduction Ratio: 1:1

Minimum Focusing Distance from Film Plane: 35 cm (13¾")

Length at infinity (∞): 89 mm (3½")

Weight: 480 g (17 oz.)

Maximum Diameter: 70 mm (2¾")

Accessory Size: Ø62mm

Lens Coating: MC (multicoated)

Lens Cap Size: 65mm

Accessories Included: Front and Rear Lens Caps

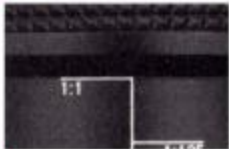
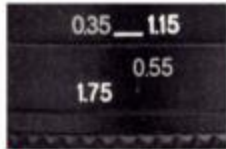
Specifications subject to change without notice.

Length and weight may vary slightly depending on lens mount.

Depth of Field Tables

$R \setminus f$	2.8	4	5.6	8	11	16	22
1.18	11% - 11% ⁺	11% - 11% ⁺	11% - 11% ⁺	11% - 11% ⁺	11% - 12% ⁺	11% - 12% ⁺	11% - 12% ⁺
1.2	12% - 12% ⁺	12% - 12% ⁺	12% - 12% ⁺	12% - 12% ⁺	12% - 12% ⁺	12% - 12% ⁺	12% - 12% ⁺
1.25	12% - 13% ⁺	12% - 13% ⁺	12% - 13% ⁺	12% - 13% ⁺	12% - 13% ⁺	12% - 13% ⁺	12% - 13% ⁺
1.3	13% - 13% ⁺	13% - 13% ⁺	13% - 13% ⁺	13% - 13% ⁺	13% - 13% ⁺	13% - 14% ⁺	13% - 14% ⁺
1.5	15% - 16% ⁺	15% - 16% ⁺	15% - 16% ⁺	15% - 16% ⁺	15% - 16% ⁺	15% - 16% ⁺	15% - 16% ⁺
1.6	17% - 17% ⁺	17% - 17% ⁺	17% - 17% ⁺	18% - 17% ⁺	18% - 17% ⁺	18% - 17% ⁺	18% - 18% ⁺
1.75	18% - 19% ⁺	18% - 19% ⁺	18% - 19% ⁺	18% - 19% ⁺	18% - 19% ⁺	18% - 19% ⁺	18% - 19% ⁺
2	21% - 21% ⁺	21% - 21% ⁺	21% - 21% ⁺	21% - 21% ⁺	21% - 21% ⁺	21% - 21% ⁺	21% - 21% ⁺
2.5	25% - 26% ⁺	25% - 26% ⁺	25% - 26% ⁺	25% - 26% ⁺	25% - 27% ⁺	24% - 27% ⁺	24% - 26% ⁺
3	31% - 31% ⁺	31% - 31% ⁺	31% - 31% ⁺	31% - 31% ⁺	31% - 31% ⁺	29% - 32% ⁺	29% - 32% ⁺
4	31% ⁺ - 41% ⁺	31% ⁺ - 41% ⁺	31% ⁺ - 41% ⁺	31% ⁺ - 42% ⁺	31% ⁺ - 42% ⁺	28% ⁺ - 40% ⁺	27% ⁺ - 40% ⁺
5	41% ⁺ - 51% ⁺	41% ⁺ - 52% ⁺	41% ⁺ - 52% ⁺	41% ⁺ - 53% ⁺	41% ⁺ - 54% ⁺	41% ⁺ - 52% ⁺	41% ⁺ - 51% ⁺
7	61% ⁺ - 72% ⁺	61% ⁺ - 72% ⁺	61% ⁺ - 74% ⁺	62% ⁺ - 76% ⁺	62% ⁺ - 78% ⁺	62% ⁺ - 82% ⁺	61% ⁺ - 83% ⁺
10	83% ⁺ - 104% ⁺	83% ⁺ - 108% ⁺	84% ⁺ - 109% ⁺	85% ⁺ - 111% ⁺	81% ⁺ - 117% ⁺	84% ⁺ - 126% ⁺	79% ⁺ - 129% ⁺
15	142% ⁺ - 1510% ⁺	56% ⁺ - 163% ⁺	127% ⁺ - 169% ⁺	121% ⁺ - 178% ⁺	125% ⁺ - 1810% ⁺	118% ⁺ - 214% ⁺	108% ⁺ - 253% ⁺
20	272% ⁺ - 339% ⁺	261% ⁺ - 353% ⁺	241% ⁺ - 371% ⁺	231% ⁺ - 429% ⁺	213% ⁺ - 5010% ⁺	181% ⁺ - 743% ⁺	168% ⁺ - 1663% ⁺
∞	262% ⁺ - ∞	2014% ⁺ - ∞	14210% ⁺ - ∞	1098% ⁺ - ∞	723% ⁺ - ∞	504% ⁺ - ∞	367% ⁺ - ∞

$m \setminus l$	2,8	4	5,8	8	11	16	22
0,25	0,349 - 0,351	0,348 - 0,352	0,347 - 0,353	0,348 - 0,354	0,345 - 0,358	0,342 - 0,358	0,339 - 0,381
0,30	0,358 - 0,361	0,358 - 0,362	0,357 - 0,363	0,358 - 0,364	0,354 - 0,368	0,352 - 0,368	0,349 - 0,372
0,35	0,378 - 0,382	0,378 - 0,382	0,377 - 0,383	0,375 - 0,385	0,374 - 0,387	0,371 - 0,390	0,367 - 0,393
0,4	0,398 - 0,402	0,397 - 0,403	0,396 - 0,404	0,395 - 0,405	0,393 - 0,407	0,390 - 0,411	0,385 - 0,415
0,45	0,418 - 0,452	0,447 - 0,453	0,445 - 0,455	0,443 - 0,457	0,441 - 0,458	0,437 - 0,464	0,433 - 0,489
0,5	0,497 - 0,503	0,496 - 0,504	0,494 - 0,506	0,492 - 0,508	0,489 - 0,511	0,484 - 0,517	0,479 - 0,523
0,55	0,547 - 0,553	0,545 - 0,555	0,543 - 0,557	0,540 - 0,560	0,537 - 0,564	0,531 - 0,570	0,524 - 0,579
0,6	0,596 - 0,604	0,594 - 0,608	0,592 - 0,608	0,588 - 0,612	0,584 - 0,617	0,577 - 0,624	0,569 - 0,634
0,7	0,694 - 0,706	0,692 - 0,708	0,689 - 0,711	0,684 - 0,716	0,679 - 0,723	0,668 - 0,733	0,658 - 0,747
0,8	0,793 - 0,807	0,790 - 0,811	0,788 - 0,815	0,780 - 0,821	0,772 - 0,830	0,760 - 0,844	0,748 - 0,862
1	0,889 - 1,012	0,884 - 1,017	0,878 - 1,023	0,868 - 1,034	0,857 - 1,047	0,838 - 1,070	0,818 - 1,098
1,2	0,180 - 1,215	1,175 - 1,220	1,165 - 1,230	1,155 - 1,240	1,135 - 1,265	1,110 - 1,300	1,080 - 1,345
1,5	1,425 - 1,525	1,480 - 1,535	1,450 - 1,550	1,430 - 1,575	1,405 - 1,605	1,365 - 1,660	1,320 - 1,730
2	1,955 - 2,045	1,925 - 2,085	1,910 - 2,095	1,875 - 2,135	1,835 - 2,195	1,765 - 2,300	1,695 - 2,435
3	2,660 - 3,105	2,660 - 3,150	2,605 - 3,220	2,730 - 3,325	2,640 - 3,465	2,505 - 3,725	2,360 - 4,100
5	4,73 - 5,30	4,82 - 5,44	4,49 - 5,64	4,30 - 5,97	4,09 - 6,44	3,77 - 7,42	3,45 - 9,06
10	8,96 - 11,29	8,60 - 11,65	8,14 - 12,96	7,54 - 14,84	6,91 - 18,12	6,05 - 26,72	5,27 - 38,43
∞	87,08 - ∞	81,36 - ∞	43,83 - ∞	30,68 - ∞	22,31 - ∞	15,24 - ∞	11,18 - ∞

**A****B****C****D****E****F****G****H****I****J**

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