

Vivitar®

Automatic Extension Tubes

Owner's Manual

CONGRATULATIONS... AND WELCOME

to the ever increasing number of photographers now enjoying the thrill of close-up photography with *Vivitar Automatic Extension Tubes*.

This Owner's Manual and the charts included provide a handy reference guide and we suggest you refer to it whenever questions arise. We thank you for selecting this product and wish you many years of picture-taking enjoyment.

MOUNTING

Vivitar Extension Tubes are mounted on the camera in the same way your camera lens is mounted. To ensure proper meter and diaphragm coupling to your camera it is *important* that you first mount the Extension Tube(s) on your camera the same way you would mount your lens. With the Extension Tube(s) securely in place, mount your lens on the Tube in the same way you would mount your lens to the camera. After shooting, the Extension Tube(s) can be removed from the camera in any order.

NOTE: for KONICA AUTOREFLEX owners —

After mounting your Extension Tube(s), make sure both your lens and the adjustable ring on the Extension Tube closest to the camera are set to 'EE' (Automatic). This will ensure proper EE meter and diaphragm coupling to your Konica cam-

era. For manual operation, set both your lens and the Extension Tube closest to the camera to 'M' (Manual).

DEPTH OF FIELD

Depth of field is the area of acceptable sharpness in front of and behind the subject in focus. As the distance from the lens to the film plane increases (as by adding Extension Tubes), depth of field becomes smaller and precise focusing becomes more important. Since some lenses shift the plane of focus as the f-stop changes, it is recommended you stop down your lens to the aperture you intend to shoot at to double check the focus using your camera's depth of field preview feature. (See your camera owner's manual for specific information on how to preview depth of field.)

FOCUSING

As the extension between the lens and the film plane increases, it becomes more difficult to focus using the focusing ring on the lens. To assure maximum sharpness when using your Extension Tubes, it is recommended you keep your lens focused at infinity (∞) and *move the camera and/or subject to focus*. To help you set up your equipment, approximate focusing distances for most practical lens/Extension Tube combinations are indicated by the charts included in this manual.

EXPOSURE

FOR CAMERAS WITH THROUGH THE LENS METERS —

On cameras equipped with TTL light meters, your Extension Tubes maintain full meter coupling between the camera and lens. Since the meter reads the amount of light coming through both the lens and the Extension Tube(s), no exposure calculations are necessary. You can determine exposures just as you would without the Extension Tubes.

Several Vivitar 12mm Extension Tube models are designed without a tension spring on the exposure meter coupling mechanism. Since the necessary tension is supplied by either your camera lens or another Extension Tube, the spring is not required.

FOR CAMERAS WITHOUT THROUGH-THE-LENS METERS —

If your camera does not have a through-the-lens light meter, determine the required changes in exposure as follows:

- 1)** Determine the correct exposure of your subject with a hand-held meter (or film manufacturer's exposure chart).
- 2)** Set your camera shutter speed and lens f-stop for the exposure indicated by your meter or chart.

3) Turn to the Close-up Data Chart in this manual that corresponds to the lens you are using. (Charts are provided for 50, 55, 105, and 135mm lenses.) Find the combination of Tubes you wish to use in the left-hand column on the chart.

4) Follow the row showing the proper combination across to the Exposure Data columns (last two columns). This exposure information indicates how to make exposure adjustments required with Extension Tubes in place by either altering the lens f-stop or the camera shutter speed, whichever you wish.

a) The *Exposure Increase Factor* column indicates the factor by which the original exposure obtained with your hand-held meter or chart must be increased. If you wish to make exposure adjustments by changing your shutter speed, multiply the indicated speed by the factor shown in this column.

EXAMPLE: You are shooting with a 50mm lens and Extension Tubes totaling 56mm (20mm Tube + 36mm Tube). Your hand-held light meter indicates an exposure of 1/250 second @ f16. Keep your lens set at f16, and multiply 1/250 by 4.5, the Exposure Increase Factor. $1/250 \times 4.5 = 4.5/250 = 2.25/125 = 1.125/62.5$; rounding the result to the nearest shutter speed gives you 1/60 sec. Set your camera shutter speed to 1/60.

b) The last column on the chart indicates how many f-stops you must open up

the lens if you wish to make the required exposure adjustments using lens f-stops alone.

EXAMPLE: Shooting with the same combination of lens and Extension Tubes as in the above example (50mm lens and 56mm extension), leave the camera shutter speed set at 1/250 as indicated by a light meter, and open your lens 2 f-stops (as shown in the last column on the chart) to f8.

5) If no chart is provided for the lens you wish to use, compute the change in exposure resulting from the extra extension using the following formula:

$$\text{Exposure Increase Factor} = \left(\frac{\text{lens focal length} + \text{length of extension}}{\text{lens focal length}} \right)^2$$

EXAMPLE: Using a 50mm lens and the 20mm Extension Tube, the formula reads:

$$\text{Exposure Factor} = \left(\frac{50 + 20}{50} \right)^2 = (1.4)^2 = 2$$

Thus, you must provide for an exposure factor of 2 or 2 times the exposure required without the Extension Tube in place. This can be done by *either* (1) halving the shutter speed (changing from 1/125 to 1/60 second, for example),

or 2) doubling the amount of light coming through the lens by opening the lens 1 full f-stop (from f5.6 to f4, for example).

NOTES ON THE CHARTS

The Close-Up Data charts are designed as a guide only. Exact data will vary slightly, depending on the lens/camera combination being used. For best results, keep your lens focused at infinity.

The Exposure Increase Factor column shows the factor by which the camera shutter speed must be multiplied (slowed) if you wish to leave the lens f-stop set as indicated by your meter or exposure chart.

The Aperture Increase Factor column shows the number of f-stops to open your lens if you wish to leave the camera shutter speed set as indicated by your meter or exposure chart.

Depth of field in closeup photography is independent of the focal length of the lens used and depends only on the ratio of image magnification or reduction and the diaphragm opening.

CLOSE-UP DATA FOR 50mm LENSES				EXPOSURE DATA	
Total Tube Extension	Subject-to-Lens Distance mm	Subject-to-Film Distance mm	Ratio of Image Size to Subject Size	Exposure Increase Factor	Aperture Increase Factor
0	—	—	—	1.0	0
12 mm	258	320	0.24	1.5	$\frac{1}{2}$
20 mm	175	245	0.40	1.9	1
32 mm	128	210	0.64	2.7	$1\frac{1}{2}$
36 mm	119	205	0.72	3.0	$1\frac{1}{2}$
48 mm	102	200	0.96	3.8	2
56 mm	96	201	1.12	4.5	2
66 mm	87	205	1.36	5.6	$2\frac{1}{2}$

CLOSE-UP DATA FOR 85mm LENSES				EXPOSURE DATA	
Total Tube Extension	Subject-to-Lens Distance mm	Subject-to-Film Distance mm	Ratio of Image Size to Subject Size	Exposure Increase Factor	Aperture Increase Factor
0	—	—	—	1.0	0
12 mm	687	784	14	1.3	$\frac{1}{2}$
20 mm	446	551	24	1.5	$\frac{1}{2}$
32 mm	311	428	38	1.9	1
36 mm	286	407	42	2.0	1
48 mm	236	369	56	2.4	1
56 mm	214	355	66	2.8	$1\frac{1}{2}$
68 mm	191	344	80	3.2	$1\frac{1}{2}$

CLOSE-UP DATA FOR 105mm LENSES				EXPOSURE DATA	
Total Tube Extension	Subject-to-Lens Distance mm	Subject-to-Film Distance mm	Ratio of Image Size to Subject Size	Exposure Increase Factor	Aperture Increase Factor
0	—	—	—	1.0	0
12 mm	1024	1141	0.11	1.2	$\frac{1}{2}$
20 mm	656	781	0.19	1.4	$\frac{1}{2}$
32 mm	449	586	0.30	1.7	f
36 mm	411	552	0.34	1.8	f
48 mm	335	488	0.46	2.1	f
56 mm	302	463	0.53	2.3	f
68 mm	267	440	0.65	2.7	$1\frac{1}{2}$

CLOSE-UP DATA FOR 135mm LENSES				EXPOSURE DATA	
Total Tube Extension	Subject-to-Lens Distance mm	Subject-to-Film Distance mm	Ratio of Image Size to Subject Size	Exposure Increase Factor	Aperture Increase Factor
0	—	—	—	1.0	0
12 mm	1654	1801	0.09	1.1	0
20 mm	1046	1201	0.15	1.3	$\frac{1}{2}$
32 mm	704	871	0.24	1.5	$\frac{1}{2}$
36 mm	641	812	0.27	1.6	$\frac{1}{2}$
48 mm	515	698	0.35	1.8	1
56 mm	460	651	0.41	2.0	1
68 mm	403	606	0.50	2.2	1

TOTAL DEPTH OF FIELD FOR MACROPHOTOGRAPHY (in mm)								
Ratio of Image Size to Subject Size	f-Stop							
	4.5	5.6	8	11	16	22	32	64
0.1:1	18.15	22.59	32.27	44.37	64.53	88.73	129.07	258.13
0.2:1	5.40	6.72	9.60	13.20	18.20	26.40	38.40	76.80
0.3:1	2.87	3.51	5.01	6.89	10.01	13.77	20.03	40.01
0.4:1	1.84	2.29	3.27	4.49	6.53	8.98	13.07	26.13
0.5:1	1.35	1.68	2.40	3.30	4.80	6.60	9.60	19.20
0.6:1	1.07	1.33	1.80	2.51	3.79	5.21	7.59	15.17
0.7:1	0.88	1.10	1.57	2.16	3.14	4.33	6.29	12.58
0.8:1	0.76	0.95	1.35	1.86	2.70	3.71	5.40	10.80
0.9:1	0.67	0.83	1.19	1.63	2.38	3.27	4.75	9.56
1:1	0.60	0.75	1.06	1.47	2.13	2.93	4.26	8.53
2:1	0.34	0.42	0.60	0.83	1.20	1.65	2.40	4.80
3:1	0.27	0.33	0.47	0.65	0.95	1.30	1.90	3.79

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