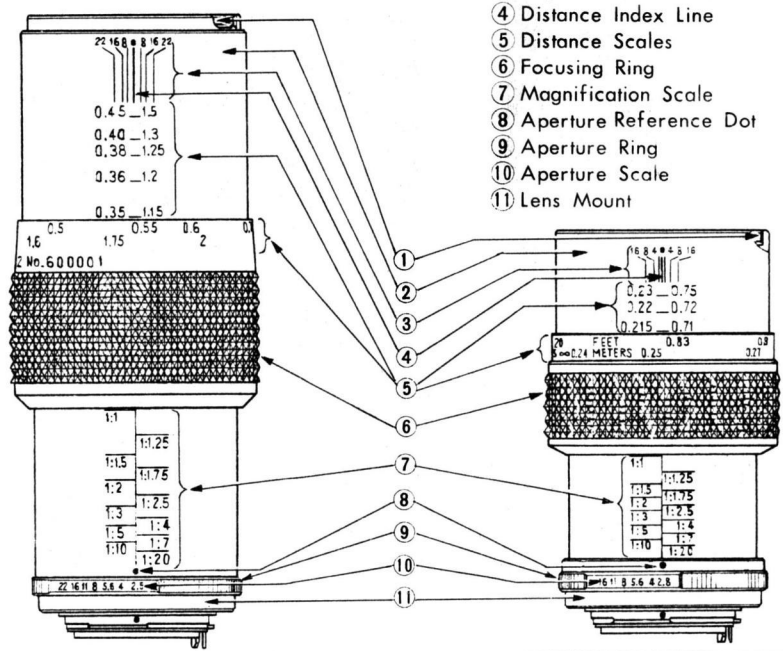
INSTRUCTIONS FOR **NEW**

V-HQ 90mm f/2.5 TRUE MACRO LENS
V-HQ 55mm f/2.8 TRUE MACRO LENS

SPECIFICATIONS

	V-HQ 90mm f/2.5	V-HQ 55mm f/2.8
Aperture Range :	f/2.5 - f/32	f/2.8 - f/22
Lens Construction :	6E - 5G	5E - 4G
Angle of View :	27°	43°
Minimum Focusing Distance :	35cm (13.8 in.)	21.5cm (8.5 in.)
Maximum Reproduction Ratio :	1 : 1	1 : 1
Length at Infinity :	85mm (3.3 in.)	63mm (2.5 in.)
Maximum Diameter :	74mm (2.9 in.)	70mm (2.8 in.)
Weight :	560g (19.8 oz.)	340g (12 oz.)
Lens Coating :	Multi-coated	Multi-coated
Accessory Size :	62mm	62mm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INTRODUCTION

Welcome to the wonderful world of Macro Photography. The MACRO Lens you have just purchased is a high quality, precision optical tool to enable you to take ultra sharp close-up photographs. As with any high quality appliance, care should be taken with handling and storage so that optimum results can be expected for many years to come. Please read this instruction sheet carefully before you begin to photograph and please make sure you store these instructions in a safe place, for future reference.

CARING FOR YOUR LENS

The two greatest enemies of your lens are dust and fingerprints. Please ensure that the dust caps (front and rear) as supplied with your lens are always attached after use, and a high quality optical filter (UV or Skylight 1A) should be seriously considered as additional protection to the front lens element. Should you need to remove dust or fingerprints from any glass surface, first clean the surface with a high quality lens brush, and then clean the surface gently with a small amount of lens fluid and a lens tissue. After use and after any required cleaning, store your lens in a cool dry place, suitably protected against dust, so that your lens is immediately ready for future use.

MOUNTING YOUR LENS AND HANDLING

Your MACRO Lens is designed to fit your camera in exactly the same manner as your standard camera lens, and attaching the lens to your camera is just as simple. If you have any doubts, please refer to your camera owner's handbook under the section describing lens attachment and removal. When holding the camera/lens combination, place it in the palm of your left hand and use your right hand to operate the camera controls. With a little practice you will be able to operate the lens focus and aperture control rings with the fingers of your left hand. It should be noted here that the method just described should only be used when you are using your MACRO Lens as a "Normal" Lens. When true "Macro" photography is being undertaken, a tripod or similar mechanical device and shutter cable release should be used to obtain maximum sharpness.

FOCUSING THE LENS AND IMAGE MAGNIFICATION

Your MACRO Lens is able to focus from infinity (∞) to a magnification of 1:1 (life-size), which means that the image on your film will be the same size as the subject you are photographing. To focus your lens, turn the Focusing Ring ⑥ until the subject appears the sharpest in your camera viewfinder. Alternatively, if you know what magnification you want your photograph to yield, set the Magnification Scale ⑦ on the Lens Barrel ② to the lower edge of the Focusing Ring ⑥ by turning the Ring, and move the camera/lens combination towards the subject until the sharpest focus is seen in the camera viewfinder. The Magnification Scale ⑦ provided on your MACRO Lens is easy to use: Life-size is indicated by 1:1, Half life-size by 1:2, one quarter life-size by 1:4 and so on.

DISTANCE SCALES AND DISTANCE INDEX LINE

Your MACRO Lens has two separate Distance Scales ⑤ engraved on the Focusing Ring ⑥ and the Lens Barrel ②, in feet (red markings) and meters (white markings). The numbers indicate the distance the subject is away from the camera film plane.

90mm: from infinity (∞) to 1.6 feet (0.5 meters), read the Distance Scale ⑤ on the Focusing Ring ⑥ by means of the Distance Index Line ④. Between 1.5 feet (0.45 meters) and 1.15 feet (0.35 meters), read the Distance Scale ⑤ on the Lens Barrel ② by turning the Focusing Ring ⑥ until the upper edge of the Ring aligns with the white indicator line for the distance on the Lens Barrel ②.

55mm: from infinity (∞) to 0.79 feet (0.24 meters), read the Distance Scales ⑤ on the Focusing Ring ⑥ by means of the Distance Index Line ④. Between 0.75 feet (0.23 meters) and 0.71 feet (0.215 meters), read the Distance Scale ⑤ on the Lens Barrel ② by turning the Focusing Ring ⑥ until the upper edge of the Ring aligns with the white indicator line for the distance on the Lens Barrel ②.

APERTURE RING AND AUTOMATIC DIAPHRAGM CONTROL

Your MACRO Lens incorporates an automatic diaphragm control to vary the amount of light that will reach the film and this control is designed to work automatically with your camera.
The amount of light is controlled by the size of the opening of the lens diaphragm. The size of this opening is indicated by the Aperture Scale ⑩, engraved on the Aperture Ring ⑨, which aligns with the Aperture Reference Dot ⑧. When you release the shutter of your camera, your MACRO Lens will automatically stop down to the aperture you have pre-selected and reopen automatically after the photograph has been taken. Cameras which have an EE Method of operation with their normal lens will find this provision on your MACRO Lens.

DEPTH OF FIELD AND DEPTH OF FIELD SCALE

Depth of field is the area of acceptable sharpness in front of and behind the point of actual focus. The amount of acceptable sharpness is determined by the aperture you have selected and the distance the subject is away from the film plane. The farther away from your subject or the higher the f-stop number (the smaller the actual lens diaphragm opening) you have chosen, the greater will be the depth of field. Likewise, the closer you come to your subject or the smaller the f-stop number (the larger the actual lens diaphragm opening) you choose, the smaller will be the depth of field. For example, the depth of field with your lens focused at infinity (∞) is much greater than focused at 5 feet (1.2 meters) and the depth of field at f/16 is much greater than at f/4.
The Depth of Field Scale ③ is located at either side of the Distance Index Line ④ on the Lens Barrel ②. To see this Scale in operation, focus your lens without the aid of your camera viewfinder on 5 feet (1.5 meters): -

90mm: *You will see from the Scale at either side that at, say, f/22, everything between about 4.5 feet (1.3 meters) and 5.5 feet (1.6 meters) will be in focus.*

55mm: *You will see from the Scale at either side that at, say, f/16, everything between about 4 feet (1.2 meters) and 6 feet (1.8 meters) will be in focus.*

To see the depth of field in operation, use the depth of field preview button on your camera, should one be provided. MACRO Lenses with an Olympus (OM) mount have the depth of field preview button incorporated.

EXPOSURE ADJUSTMENT

TTL (Through-the-lens) metering systems automatically adjust the changes in f-stop value, but exposure settings based on light measurements with hand-held meters require compensation for the changes. To apply the exposure compensation factor, open the lens diaphragm the number of f-stops indicated by the following compensation chart: -

MAGNIFICATION	*EXPOSURE COMPENSATION (f-stop)*
1 : 5	*½*
1 : 2.5	*1*
1 : 1.5	*1½*
1 : 1	*2*

OPTIONAL ACCESSORIES

90mm: MATCHED 2X CLOSE-UP LENS to increase the Lens' magnification range from 1 : 1 (life-size) to 2 : 1 (Twice life-size).
AUTO RING FLASH for even and practically shadowless illumination.
UNIVERSAL MICRO FOCUS ADJUSTER for critical focusing and framing.

55mm: REVERSE ADAPTOR & TUBE SET for magnifications greator than life-size, up to 2.75X, and also for slide copying.
AUTO RING FLASH for even and practically shadowless illumination.
UNIVERSAL MICRO FOCUS ADJUSTER for critical focusing and framing.

90mm f/2.5 Depth of Field Tables

〈Meter Scale〉

meters \ f	2.5	4	5.6	8	11	16	22	32
0.35	0.349～ 0.351	0.349～ 0.351	0.349～ 0.351	0.348～ 0.352	0.348～ 0.352	0.347～ 0.353	0.345～ 0.355	0.343～ 0.357
0.36	0.359～ 0.361	0.359～ 0.361	0.359～ 0.361	0.358～ 0.362	0.358～ 0.362	0.356～ 0.364	0.355～ 0.365	0.353～ 0.367
0.38	0.379～ 0.381	0.379～ 0.381	0.379～ 0.381	0.378～ 0.382	0.377～ 0.383	0.376～ 0.384	0.374～ 0.386	0.372～ 0.389
0.4	0.399～ 0.401	0.399～ 0.401	0.398～ 0.402	0.398～ 0.402	0.397～ 0.403	0.395～ 0.405	0.394～ 0.407	0.391～ 0.410
0.45	0.449～ 0.451	0.448～ 0.452	0.448～ 0.452	0.447～ 0.453	0.446～ 0.454	0.444～ 0.457	0.441～ 0.459	0.438～ 0.463
0.5	0.499～ 0.501	0.498～ 0.502	0.497～ 0.503	0.496～ 0.504	0.494～ 0.506	0.492～ 0.508	0.489～ 0.512	0.484～ 0.517
0.55	0.548～ 0.552	0.547～ 0.553	0.546～ 0.554	0.545～ 0.555	0.543～ 0.557	0.540～ 0.561	0.536～ 0.565	0.530～ 0.572
0.6	0.598～ 0.602	0.597～ 0.603	0.596～ 0.605	0.594～ 0.607	0.591～ 0.609	0.587～ 0.613	0.583～ 0.618	0.576～ 0.627
0.7	0.697～ 0.703	0.695～ 0.705	0.694～ 0.706	0.691～ 0.709	0.688～ 0.713	0.682～ 0.719	0.676～ 0.726	0.665～ 0.739
0.8	0.796～ 0.804	0.794～ 0.806	0.791～ 0.809	0.788～ 0.813	0.783～ 0.818	0.776～ 0.826	0.767～ 0.836	0.753～ 0.854
1	0.994～ 1.006	0.990～ 1.010	0.986～ 1.015	0.980～ 1.021	0.973～ 1.029	0.961～ 1.043	0.947～ 1.060	0.925～ 1.090
1.2	1.191～ 1.210	1.185～ 1.215	1.179～ 1.222	1.170～ 1.231	1.160～ 1.243	1.142～ 1.264	1.122～ 1.290	1.090～ 1.337
1.5	1.485～ 1.516	1.476～ 1.525	1.466～ 1.535	1.453～ 1.551	1.436～ 1.571	1.408～ 1.606	1.377～ 1.649	1.328～ 1.728
2	1.97 ～ 2.03	1.96 ～ 2.05	1.94 ～ 2.07	1.91 ～ 2.10	1.88 ～ 2.13	1.84 ～ 2.20	1.78 ～ 2.29	1.70 ～ 2.44
3	2.94 ～ 3.07	2.90 ～ 3.11	2.86 ～ 3.15	2.81 ～ 3.23	2.74 ～ 3.32	2.63 ～ 3.49	2.52 ～ 3.72	2.35 ～ 4.17
5	4.82 ～ 5.19	4.72 ～ 5.32	4.62 ～ 5.46	4.47 ～ 5.68	4.30 ～ 5.98	4.04 ～ 6.57	3.77 ～ 7.46	3.40 ～ 9.62
10	9.30 ～10.82	8.92 ～11.38	8.55 ～12.05	8.05 ～13.21	7.51 ～15.03	6.74 ～19.50	6.01 ～30.39	5.10 ～ ∞
∞	129.6 ～ ∞	81.0 ～ ∞	57.9 ～ ∞	40.5 ～∞	29.5 ～ ∞	20.3 ～ ∞	14.7 ～ ∞	10.13 ～ ∞

〈Feet Scale〉

feet \ f	2.5	4	5.6	8	11	16	22	32
1.15	1.148～ 1.152	1.147～ 1.153	1.146～ 1.154	1.145～ 1.156	1.143～ 1.158	1.139～ 1.161	1.135～ 1.165	1.129～ 1.173
1.2	1.138～ 1.202	1.197～ 1.203	1.196～ 1.204	1.194～ 1.206	1.192～ 1.209	1.188～ 1.212	1.183～ 1.217	1.176～ 1.225
1.25	1.248～ 1.252	1.247～ 1.253	1.245～ 1.255	1.243～ 1.257	1.241～ 1.260	1.236～ 1.264	1.232～ 1.269	1.223～ 1.278
1.3	1.298～ 1.302	1.296～ 1.304	1.295～ 1.305	1.292～ 1.308	1.290～ 1.311	1.285～ 1.315	1.280～ 1.321	1.271～ 1.331
1.5	1.497～ 1.503	1.495～ 1.505	1.492～ 1.508	1.489～ 1.511	1.485～ 1.515	1.479～ 1.522	1.471～ 1.531	1.458～ 1.545
1.6	1.596～ 1.604	1.594～ 1.606	1.591～ 1.609	1.587～ 1.613	1.583～ 1.618	1.575～ 1.626	1.566～ 1.636	1.551～ 1.653
1.75	1.745～ 1.755	1.742～ 1.758	1.739～ 1.761	1.734～ 1.766	1.728～ 1.772	1.719～ 1.783	1.707～ 1.795	1.689～ 1.817
2	1.993～ 2.007	1.989～ 2.011	1.985～ 2.015	1.978～ 2.022	1.970～ 2.031	1.957～ 2.045	1.942～ 2.062	1.917～ 2.092
2.5	2.489～ 2.511	2.482～ 2.518	2.475～ 2.526	2.464～ 2.537	2.451～ 2.551	2.429～ 2.576	2.404～ 2.605	2.363～ 2.657
3	2.983～ 3.017	2.973～ 3.028	2.962～ 3.039	2.946～ 3.056	2.926～ 3.078	2.894～ 3.115	2.857～ 3.160	2.796～ 3.240
4	3.968～ 4.033	3.949～ 4.052	3.929～ 4.074	3.900～ 4.106	3.863～ 4.148	3.804～ 4.219	3.736～ 4.308	3.628～ 4.465
5	4.949～ 5.053	4.918～ 5.085	4.886～ 5.120	4.839～ 5.173	4.782～ 5.241	4.689～ 5.359	4.583～ 5.508	4.416～ 5.776
7	6.90 ～ 7.11	6.84 ～ 7.17	6.77 ～ 7.25	6.68 ～ 7.36	6.57 ～ 7.50	6.39 ～ 7.75	6.18 ～ 8.08	5.87 ～ 8.70
10	9.78 ～10.23	9.66 ～10.37	9.53 ～10.52	9.34 ～10.77	9.11 ～11.08	8.76 ～11.66	8.38 ～12.44	7.81 ～14.01
15	14.51 ～15.53	14.23 ～15.86	13.94 ～16.24	13.54 ～16.83	13.06 ～17.64	12.34 ～19.18	11.57 ～21.43	10.49 ～26.68
30	28.06 ～32.23	27.01 ～33.74	25.98 ～35.51	24.57 ～38.55	23.02 ～43.18	20.82 ～54.02	18.69 ～77.41	15.98 ～28.10
∞	425.2 ～ ∞	265.8 ～ ∞	189.8 ～ ∞	132.9 ～ ∞	96.6 ～ ∞	66.4 ～ ∞	48.3 ～ ∞	33.22 ～ ∞

55mm f/2.8 Depth of Field Tables

〈Meter Scale〉

meters \ f	2.8	4	5.6	8	11	16	22
0.215	0.214～ 0.216	0.214～ 0.216	0.214～ 0.216	0.213～ 0.217	0.213～ 0.217	0.212～ 0.218	0.210～ 0.220
0.22	0.219～ 0.221	0.219～ 0.221	0.219～ 0.221	0.218～ 0.222	0.218～ 0.223	0.216～ 0.224	0.215～ 0.225
0.23	0.229～ 0.231	0.229～ 0.231	0.229～ 0.231	0.228～ 0.232	0.227～ 0.233	0.226～ 0.234	0.225～ 0.236
0.25	0.249～ 0.251	0.249～ 0.251	0.248～ 0.252	0.248～ 0.253	0.247～ 0.254	0.245～ 0.255	0.243～ 0.257
0.27	0.269～ 0.271	0.268～ 0.272	0.268～ 0.272	0.267～ 0.273	0.266～ 0.274	0.264～ 0.276	0.262～ 0.279
0.3	0.299～ 0.301	0.298～ 0.302	0.297～ 0.303	0.296～ 0.304	0.295～ 0.306	0.292～ 0.308	0.290～ 0.311
0.35	0.348～ 0.352	0.347～ 0.353	0.346～ 0.354	0.344～ 0.356	0.342～ 0.358	0.339～ 0.362	0.335～ 0.367
0.4	0.397～ 0.403	0.396～ 0.404	0.395～ 0.406	0.392～ 0.408	0.390～ 0.411	0.385～ 0.416	0.380～ 0.423
0.5	0.495～ 0.505	0.494～ 0.507	0.491～ 0.509	0.487～ 0.513	0.483～ 0.519	0.475～ 0.528	0.467～ 0.539
0.7	0.691～ 0.710	0.687～ 0.714	0.681～ 0.720	0.674～ 0.729	0.664～ 0.740	0.649～ 0.760	0.632～ 0.786
1	0.98 ～ 1.02	0.97 ～ 1.03	0.96 ～ 1.04	0.94 ～ 1.06	0.93 ～ 1.09	0.90 ～ 1.14	0.86 ～ 1.20
1.5	1.45 ～ 1.55	1.43 ～ 1.57	1.41 ～ 1.60	1.37 ～ 1.65	1.33 ～ 1.72	1.27 ～ 1.84	1.20 ～ 2.02
2	1.92 ～ 2.09	1.88 ～ 2.13	1.84 ～ 2.19	1.78 ～ 2.29	1.71 ～ 2.42	1.60 ～ 2.67	1.49 ～ 3.05
3	2.81 ～ 3.22	2.74 ～ 3.32	2.65 ～ 3.47	2.52 ～ 3.71	2.38 ～ 4.08	2.18 ～ 4.88	1.97 ～ 6.40
5	4.49 ～ 5.64	4.31 ～ 5.97	4.08 ～ 6.47	3.78 ～ 7.40	3.47 ～ 9.04	3.05 ～14.34	2.66 ～49.0
∞	43.21 ～ ∞	30.25 ～ ∞	21.61 ～ ∞	15.13 ～ ∞	11.00 ～ ∞	7.56 ～ ∞	5.50 ～ ∞

〈Feet Scale〉

feet \ f	2.8	4	5.6	8	11	16	22
0.71	0.708～ 0.712	0.707～ 0.713	0.706～ 0.714	0.704～ 0.716	0.702～ 0.718	0.699～ 0.722	0.695～ 0.726
0.72	0.718～ 0.722	0.717～ 0.723	0.716～ 0.724	0.714～ 0.726	0.712～ 0.728	0.709～ 0.732	0.704～ 0.737
0.75	0.748～ 0.752	0.747～ 0.753	0.745～ 0.755	0.744～ 0.757	0.741～ 0.759	0.737～ 0.763	0.733～ 0.769
0.83	0.827～ 0.833	0.826～ 0.834	0.824～ 0.836	0.822～ 0.839	0.819～ 0.842	0.813～ 0.847	0.807～ 0.854
0.9	0.896～ 0.904	0.895～ 0.905	0.893～ 0.907	0.890～ 0.911	0.886～ 0.915	0.880～ 0.921	0.872～ 0.930
1	0.995～ 1.005	0.993～ 1.007	0.991～ 1.010	0.987～ 1.014	0.982～ 1.019	0.974～ 1.028	0.964～ 1.039
1.25	1.242～ 1.258	1.239～ 1.262	1.234～ 1.266	1.227～ 1.274	1.219～ 1.283	1.206～ 1.298	1.190～ 1.317
1.5	1.488～ 1.512	1.483～ 1.518	1.476～ 1.525	1.466～ 1.536	1.453～ 1.550	1.433～ 1.574	1.410～ 1.604
2	1.977～ 2.024	1.967～ 2.034	1.954～ 2.048	1.936～ 2.069	1.913～ 2.097	1.876～ 2.144	1.833～ 2.204
3	2.95 ～ 3.06	2.92 ～ 3.08	2.89 ～ 3.12	2.85 ～ 3.17	2.80 ～ 3.24	2.71 ～ 3.36	2.62 ～ 3.52
4	3.90 ～ 4.11	3.86 ～ 4.15	3.81 ～ 4.22	3.73 ～ 4.32	3.63 ～ 4.45	3.49 ～ 4.70	3.33 ～ 5.03
5	4.84 ～ 5.17	4.78 ～ 5.25	4.69 ～ 5.35	4.57 ～ 5.52	4.43 ～ 5.74	4.22 ～ 6.16	3.98 ～ 6.76
7	6.69 ～ 7.35	6.56 ～ 7.50	6.40 ～ 7.73	6.18 ～ 8.09	5.92 ～ 8.59	5.53 ～ 9.59	5.13 ～11.14
10	9.36 ～10.73	9.12 ～11.08	8.81 ～11.58	8.38 ～12.42	7.90 ～13.67	7.22 ～16.43	6.54 ～21.72
20	17.57 ～23.22	16.70 ～24.95	15.67 ～27.69	14.34 ～33.18	12.97 ～44.14	11.20 ～98.69	9.63 ～ ∞
∞	142 ～ ∞	99.25 ～ ∞	70.89 ～ ∞	49.62 ～ ∞	36.09 ～ ∞	24.81 ～ ∞	18.04 ～ ∞

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