TLM-EFDSINPC-190DA031A061A17-U-1010

TAMRON

- **SP AF24-135mm F/3.5-5.6 AD Aspherical [IF] Macro (Model 190D)**
- **AF28-200mm F/3.8-5.6 XR Di Aspherical [IF] Macro (Model A031)**
- **AF28-300mm F/3.5-6.3 XR Di LD Aspherical [IF] Macro (Model A061)**
- **AF70-300mm F/4-5.6 Di LD Macro 1:2 (Model A17)**

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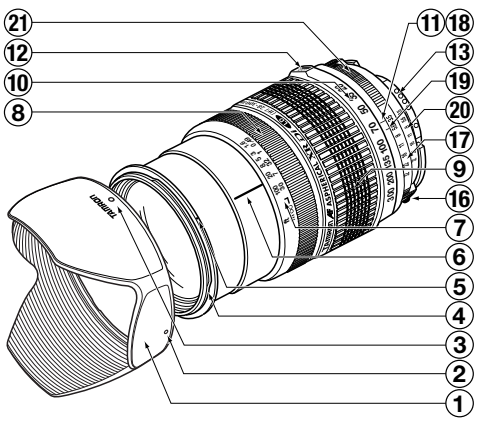
190D
A031
A061



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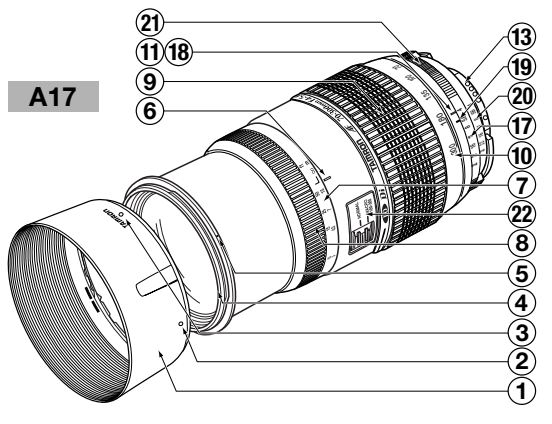

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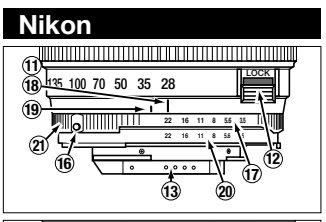
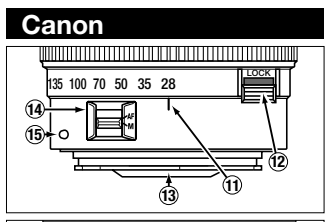
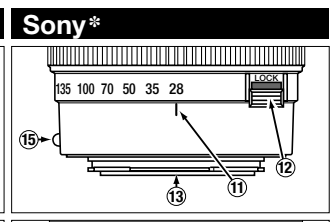
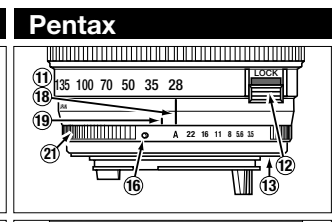
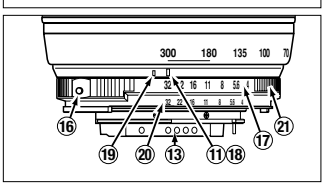
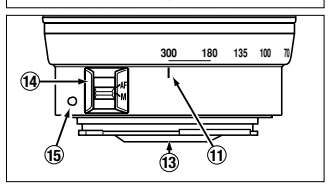
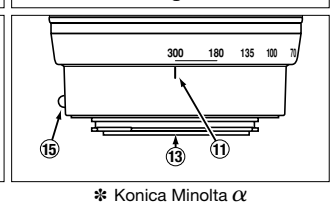
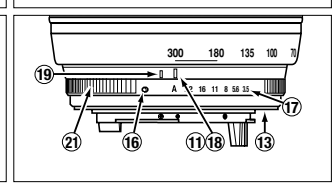
190D A031 A061				
A17				

* Konica Minolta α

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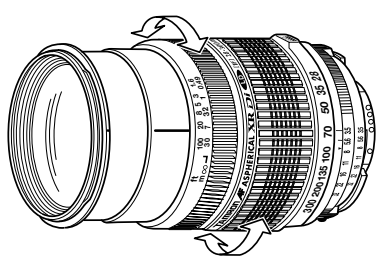
190D
A031
A061



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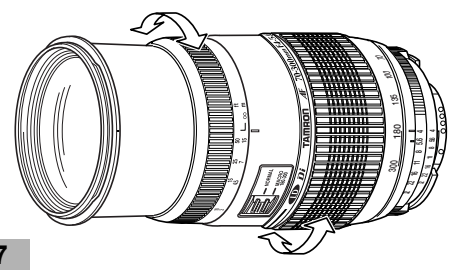

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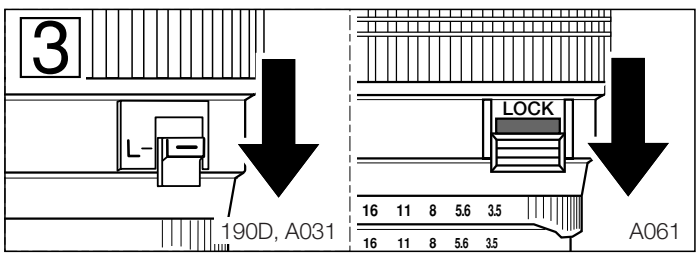

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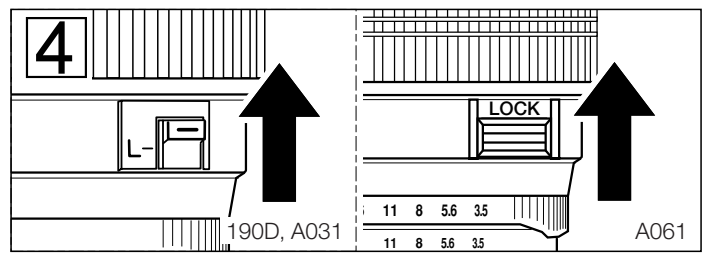

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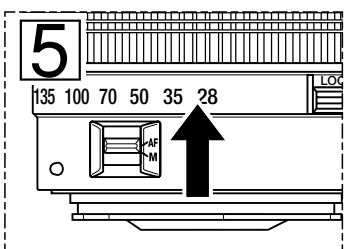

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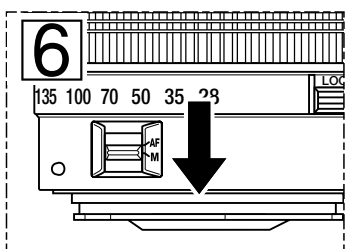

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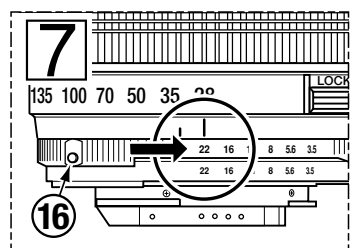

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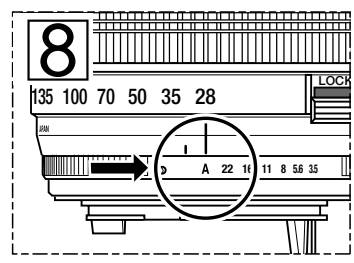

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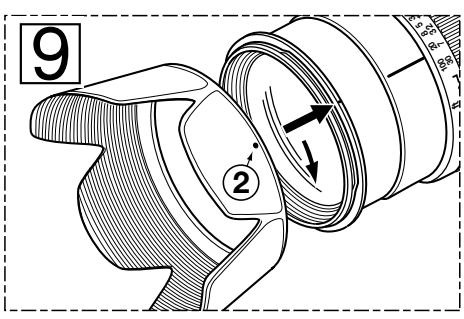

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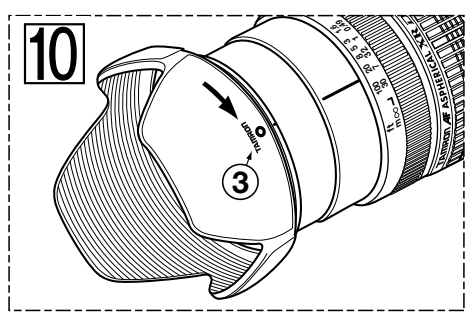

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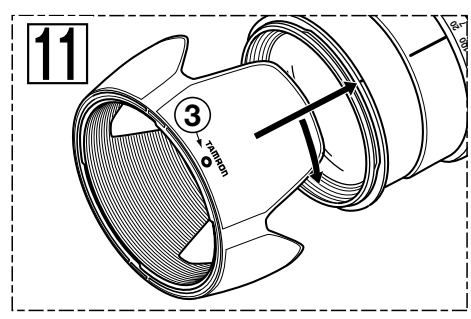

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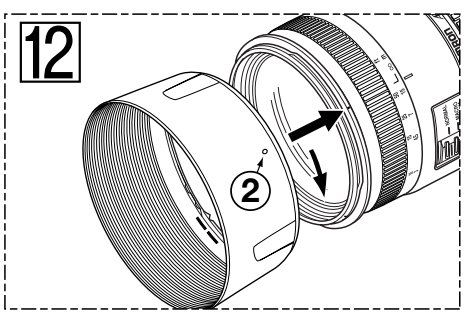

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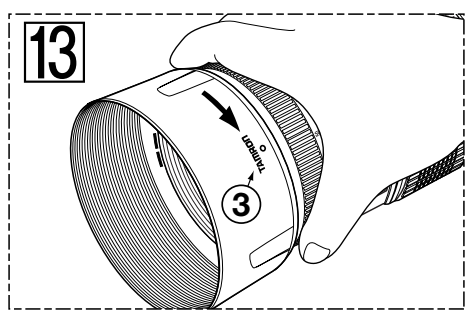

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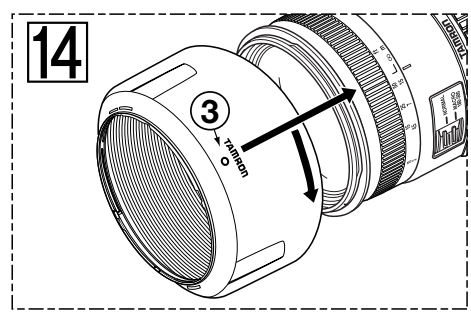

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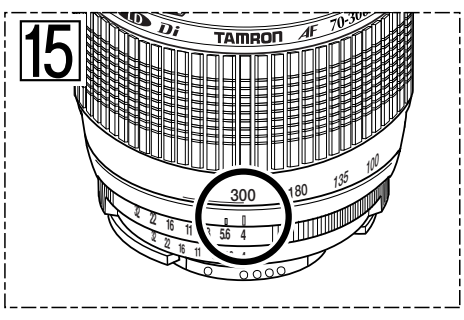

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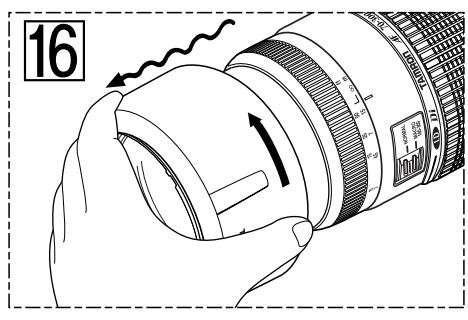

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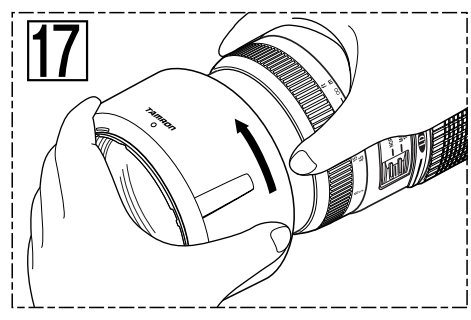

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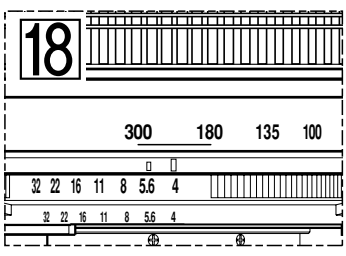

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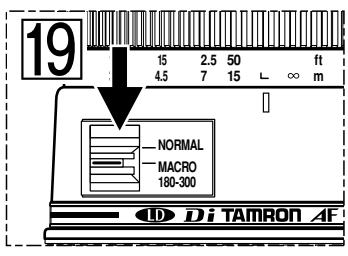

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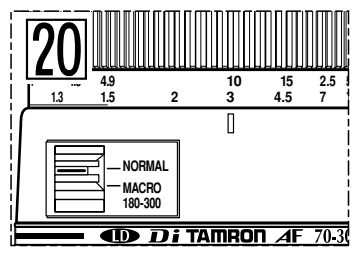

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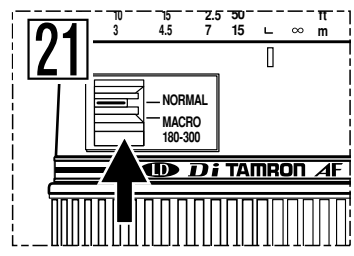

CE

* The CE Marking is a directive conformity mark of the European Community (EC).
* Das CE-Zeichen entspricht der EC Norm.
* La marquage CE est un marquage de conformité à la directive CEE (CE).
* La marca CE es marca de conformidad segun directiva de la Comunidad Europea (CE).
* Il marchio CE attesta la conformita alla directtiva della Comunità Europea (CEE).
* CE CE 标志表示符合欧州共同体(EC)指标

The EEC Conformity Report applies to the Council Directive 98/336/EEC, 92/31/EEC, 93/68/EEC and is used by Tamron Co., Ltd., manufacturer of this product.

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ENGLISH

Thank you for purchasing the Tamron lens as the latest addition to your photographic equipment. Before using your new lens, please read the contents of this Owner's Manual thoroughly to familiarize yourself with your lens and the proper techniques for creating the highest quality images possible.With proper handling and care, your Tamron lens will give you many years of photographing beautiful and exciting pictures.

• Explains precautions that help to prevent problems.

• Explains things you should know in addition to basic operations.

NOMENCLATURE (Refer to Fig. 1, if not specified)

① Lens hood
② Hood attaching alignment mark
③ Hood attaching indicator
④ Filter ring
⑤ Hood attaching bayonet ring
⑥ Distance index
⑦ Distance scale
⑧ Focusing ring
⑨ Zooming ring
⑩ Focal length scale
⑪ Zoom index mark
⑫ Zoom lock switch (190D, A031, A061: Figs. 3 & 4)
⑬ Lens mount/Lens mount contacts (Nikon)
⑭ AF-MF switch (Canon Fig. 5 & 6)
⑮ Lens attachment mark
⑯ AE (minimum aperture) lock
⑰ Aperture scale
⑱ Aperture Index
⑲ F-number index mark for long focal lengths (Nikon, Pentax)
⑳ F-number scale for finder display (Nikon)
㉑ Aperture ring
㉒ Macro selector switch

SPECIFICATIONS

	190D	A031	A061	A17
Focal Length	24-135 mm	28-200 mm	28-300 mm	70-300 mm
Maximum Aperture	F/3.5-5.6	F/3.8-5.6	F/3.5-6.3	F/4-5.6
Angle of View	84°4′ - 18°12′	75°23′ - 12°21′	75°23′ - 8°15′	34°21′ - 8°15′
Lens Construction	10/14	14/15	13/15	9/13
Minimum Focusing Distance	0.4 m (throughout the range)	0.49 m (throughout the range)	0.49 m (throughout the range)	1.5 m (0.95m at Macro)
Maximum Magnification Ratio	1:3.3 (at 135mm)	1:4 (at 200mm)	1:2.9 (at 300mm)	1:3.9 (1:2 at Macro)
Filter Size ∅	72 mm	62 mm	62 mm	62 mm
Length	80.6 mm	75.2 mm	83.7 mm	116.5 mm
Diameter ∅	78.5 mm	71 mm	73 mm	76.6 mm
Weight	530 g	354 g	420 g	435 g
lens Hood	D6FH	AD06	AD06	DA17

• Lengths and weights listed in lens specifications are for lenses with Nikon mounts.
• Features and cosmetic designs of lenses listed in this owner's manual may be revised without notice.

ATTACHING AND REMOVING THE LENS (190D, A031, A061, A17)

■ How to mount the lens

Removing the rear cap of the lens. Align the Lens attachment mark ⑮ on the lens barrel with its counterpart on the camera mount and insert the lens.
Rotate the lens clockwise until it click-locks. For Nikon and Pentax models, align the lens attachment mark on the camera and the zoom index ⑪ on the lens to attach the lens. For Nikon models, align the lens attachment mark with the dot on the camera and rotate the lens counter-clockwise until it click-locks.

■ How to detach the lens

Pressing the lens release button on the camera down, turn the lens counter-clockwise (in case of Nikon lens, clockwise), and lift the lens off the camera's lens mount.

• For further details, please read the instruction manual of your camera.

FOCUSING (Autofocus) (Ref. Figs. 1 & 2) (190D, A031, A061, A17)

Switch the focusing mode switch of the camera to Auto focusing mode (AF) in case of Nikon, Sony or Pentax. In case of a Canon camera, switch the AF/MF switch ⑭ on the lens to AF. (Fig. 5). Press the shutter button lightly while viewing through the camera's viewfinder, the lens focuses automatically. An in-focus mark will light when lens focuses on the main subject sharply. Press the shutter button further to photograph.

• When set on AF mode, interfering with focusing ring ⑧ may cause serious damage to the lens mechanism.

• For further details, please read the instruction manual of your camera.

FOCUSING (Manual Focus) (Ref. Figs. 1, 2 & 6) (190D, A031, A061, A17)

Switch the focusing mode switch of the camera to manual focusing mode (MF) in case of Nikon, Sony or Pentax. In case of a Canon camera, switch the AF/MF switch ⑭ on the lens to MF. (Fig. 6) Focus manually rotating the focusing ring while viewing through the camera's viewfinder. The main subject in the viewfinder will be sharp when the lens is focused correctly.

• Even in the MF mode, turning focusing ring ⑧ while pressing the shutter button halfway the focus aid function lamp lights up when the picture is in focus.
• At infinity, make sure the image in the viewfinder appears sharp. The infinity position on 190D, A031, A061, A17 is made with certain allowances to insure proper focus under a variety of conditions.
• For further details, please read the instruction manual of your camera.

ZOOMING (Ref. Fig. 1 & 2) (190D, A031, A061, A17)

Rotate zooming ring ⑨ of the lens while viewing through the camera's viewfinder and compose your image at the chosen focal length.

ZOOM LOCK SWITCH (Ref. Figs. 3 & 4) (190D, A031, A061)

Models A031, A061 and 190D are equipped with a zoom lock switch mechanisms which prevent lens barrels from extendting toward long focal length by their own weight while hanged from shoulders. Activated the switches at 28mm setting (24-mm position for Model 190D) to stop the lens barrels from rotating and extending.

■ How to activate the zoom lock switch mechanism

1) Locking: Set the lens to the 28-mm position (24-mm position for Model 190D). Move the switch ⑫ toward the camera, until the index lines align with each other. The lens barrel is now locked in position and does not rotate or extend by its own weight.
2) Releasing: Push the switch away from your camera. The lens barrel is now free to rotated and extend for zooming.

• The zoom lock switch ⑫ can not be activated unless the lens is set to the 28-mm position (24-mm position for Model 190D). Do not force the lock switch or try to rotate the lens barrel while locked.
• The lens can be used at 28-mm setting (24-mm position for Model 190D) for picture taking even when locked by the switch.
• The zoom lock mechanism is made to prevent the lens barrel from extending while carried around on shoulder. When not locked the zoom lens may change its focal length during a long exposure if while used in a low or high angle position.

LENS APERTURE AND AE MODE (Ref. Figs. 1, 7 & 8) (190D, A031, A061, A17)

■ Setting lens f-numbers with Canon & Sony cameras

Set the f-number with aperture setting device of the camera body in accordance with the selected photographing mode.

• For further details, please red the instruction manual of your camera.

■ Setting lens f-numbers with Nikon & Pentax cameras

Photographing in a programmed-AE or a shotter-speed-priority-AE mode. Rotate the lens aperture ring ㉑ to the minimum aperture setting position, in case of a Nikon camera, and set on the "A" position in case of a Pentax camera. The aperture ring will be locked in position automatically. When shooting in an aperture-priority-AE or manual-exposure mode, release the lens aperture ring lock botton.

• The lens aperture varies with zooming movement. Cameras read the difference lens openings and automatically adjust the exposure properly.
• For futher details, please read the instruction manual of your camera.
• If your camera is a Nikon F401 or F50, you can set the aperture to any desired f-number, leaving the aperture ring at the minimum opeening positon.

LENS HOOD (Ref. Figs. 1, 9 to 11) (190D, A031,A061)

A bayonet-type lens hood is provided as standard equipment. We recommend shooting with the hood attached whenever possible as the lens hood eliminates stray light which is harmful to the picture. However, please be aware of the precautions written below when your camera is equipped with a built-in flash.

■ Attaching the Lens Hood (Ref. Figs. 9 & 10)

Align Hood attaching alignment mark ② on the hood with the corresponding index mark ⑤ or the top of the index line of the distance scale) on the lens. Press the hood lightly onto the hood attaching bayonet ring (Fig. 9) and then rotate it clockwise to secure (Fig. 9). The lens hood will be securely held as the mark "TAMRON ○" comes to the top (Fig. 10). When attaching the lens hood, hold the focusing and zoom control rings so that they are not rotated unintentionally.

• Pay particular attention to align the hood attaching indexes when using zoom lenses including wide-angle (e.i. 35 mm or wider) settings.
Improper attachment of a hood for wide-angle zoom lens may cause large shadowed areas in your pictures.

■ Stowing lens hood on the lens (Ref. Fig. 11)

1) Reverse the lens hood. Point the lens toward to opening, then align the hood attachment mark on the lens with the (TAMRON ○) alignment on the hood ③.
2) Turn the hood clockwise until it alignment mark (•) is at the top to set it. (Fig. 11)

LENS HOOD (Ref. Figs. 1, 12 to 17) (A17)

• When attaching and detaching the lens hood for the A17, be sure to set your camera or lens to MF mode. The hood attaching bayonet ring ⑤ turns as the focusing ring ⑧ turns. Trying to attach the lens hood when the camera or lens is set in the AF mode forces the focusing ring ⑧ to turn and will damage the camera or lens.

■ Attaching the Lens Hood (Ref. Figs. 12 & 13)

1) For Nikon, Sony and Pentax cameras, set the camera to the MF mode. For Canon cameras, set the AF-MF switch ⑭ on the lens to the MF position.
2) Align Hood attaching alignment mark ② on the hood with the corresponding index mark ⑤ or the top of the index line of the distance scale) on the lens. Press the hood lightly onto the hood attaching bayonet ring (Fig. 12) and then rotate it clockwise to secure (Fig. 12). The lens hood will be securely held as the mark "TAMRON ○" comes to the top (Fig. 13). When attaching the lens hood, hold the focusing and zoom control rings so that they are not rotated unintentionally.

■ Detaching the lens hood

1) For Nikon, Sony and Pentax cameras, set the camera to the MF mode. For Canon cameras, set the AF-MF switch ⑭ on the lens to the MF position.
2) Secure the focusing ring ⑧ from moving while turning the lens hood ① counter-clock wise until the hood is released from the lens.

■ Storing the lens hood (Ref. Fig. 14)

The lens hood can be reverse-mounted for easy storage.
1) For Nikon, Sony and Pentax cameras, set the camera to the MF mode. For Canon cameras, set the AF-MF switch ⑭ to the MF position.
2) Reverse the lens hood. Point the lens toward to opening, then align the hood ⑤ on the lens with the (TAMRON ○) alignment on the hood ③.
3) Turn the hood clockwise until it alignment mark (•) is at the top to set it. (Fig. ⑭)

■ Detaching the stored lens hood (Ref. Figs. 15 to 17)

1) For Nikon, Sony and Pentax cameras, set the camera to the MF mode. For Canon cameras, set the AF-MF switch ⑭ to the MF position.
2) Set the zoom index mark ⑪ at 300mm on the zooming ring ⑨.
3) Hold the extended portion of the focusing ring ⑧ to secure from moving while turning the hood ① counter-clock wise until the hood is released.

MACRO SWITCHOVER MECHANISM (Ref. Figs. 1, 18 to 21) (A17)

The Model A17 allows macro photography by operating the macro selector switch.

■ SWITCHING TO MACRO PHOTOGRAPHY

First, turn the zoom ring to align the zoom between 180 and 300 mm. Next, slide the macro selector switch ㉒ from the Normal to the Macro position. The lens is now switched to the macro photography mode.

• The macro selector switch ㉒ cannot be operated unless the zooming ring ⑨ is between 180 mm, and 300 mm. Always make sure to align the zoom ring between 180 mm and 300 mm before operating the macro selector switch.
• When in the macro photography mode, the zoom ring can only be rotated over the range of 180 mm to 300 mm.
• When in the macro photography mode, the focus ring rotates continously from infinith to the minimum focus distance of 0.95 m.
• The maximum magnification ratio in the macro photography mode is 1:2 (f=300 mm, 0.95 m).

■ CANCELLATION OF MACRO PHOTOGRAPHY

First check that the focusing ring ⑧ is aligned to 1.5 m or farther (1.5 - ∞). Next, slide the macro selector switch ㉒ from the Macro position to the Normal position. The macro photography mode is now canceled.

• The macro selector switch ㉒ cannot be operated unless the focusing ring ⑧ is set to a distance between 1.5 m abd infinity (∞). Always make sure to set the focus ring between 1.5 m and infinity (∞) before operating the macro selecor switch.
• The focus ring can only be turned between infinity (∞) and 1.5 m when the macro selector switch is set to the Normal position (when macro photography canceied). It cannot be turned to a distance closer than 1.5 m.

PRECAUTIONS IN SHOOTING

• The optical design for Di takes into consideration the various features of digital single reflex cameras. However, due to the configuration of the digital single reflex cameras, even when the autofocus accuracy is within specifi-cations, the focal point may be a little forward or behind the optimum point when shooting with auto focus under some conditions.
• The Tamron lenses described here employ an internal focusing (IF) system. Because of the characteristics of this optical design, the angles of view at distances other than infinity are wider than that of the lenses applying an ordinary focusing system.
• When the built-in flash on the camera is used, adverse photographic phenomena such as corner illumination fall-off or vignetting at the bottom part of the image may be observed, especially in wide angle ranges. This is due to the inherent limitation of the coverage of the built-in flash, and/or the relative position of the flash to the edge of the lens barrel which causes shadows on the image. It is strongly recommended to use a suitable separate flash unit provided by the camera manufacturer for all flash photography.
For further details, please read the "built-in flash" article on the instruction manual of your camera.
• When using a special filter suen as a PL filter on the 190D use low profile filters. The thick rim of a normal filter may cause vignetting.
• When set on AF mode, interfering with focusing ring may cause serious damage to the lens mechanism.
• Certain camera models may indicate the maximum and minimum aperture values of the lens inapproximate numbers. This is inherent to the design of the camera and not an indication of an error.
• Please be aware that there is no infrared index line on any models listed on this owner's manual, and therefore, practically, no black-and- white infrared film can be used with these lenses.

TO ENSURE LONG-TERM SATISFACTION

• Avoid touching the glass element surface. Use a photographic lens cloth or blower to remove dust from the lens element surface. When not using the lens, always place a lens cap on it for protection.
• Use a lens cleaning tissue or lint cloth with a drop of cleaning solution to remove fingerprints or dirt on the glass lens surface with a rotary motion from the center to the edge.
• Use a silicon cloth to clean your lens barrel only.
• Mildew is an enemy of your lens. Clean the lens after shooting near water or in any humid place. Store your lens in a clean, cool and dry place.When storing the lens in an lens case, store it with commercially available drying agent such as silicagel, and change the agent occasionally. If you find mildew on your lens, consult an authorized repair shop or nearby photo-graphic store.
• Do not touch the lens-camera interface contacts since dust, dirt and/or stains may cause a contact failure between the lens and camera.
• When using your equipment [camera(s) and lens(es)] in an environment where the temperature changes from one extreme to the other, make sure to put your equipment temporarily in a case or a plastic bag for a length of time in order for the equipment to go through a gradual temperature shift.
This will reduce potential equipment trouble.

TLM-EFDSINPC-190DA031A061A17-U-1010

TAMRON

● SP AF24-135mm F/3.5-5.6 AD Aspherical [IF] Macro (Model 190D)
● AF28-200mm F/3.8-5.6 XR Di Aspherical [IF] Macro (Model A031)
● AF28-300mm F/3.5-6.3 XR Di LD Aspherical [IF] Macro (Model A061)
● AF70-300mm F/4-5.6 Di LD Macro 1:2 (Model A17)

SP AF24-135mm F/3.5-5.6 AD Aspherical [IF] Macro (Model 190D)

Focal Length	Focus Distance	F/3.5	F/4.0	F/5.6	F/8.0	F/11	F/16	F/22	
24 mm	0.4 m	0.38-0.42	0.38-0.42	0.37-0.43	0.36-0.45	0.35-0.47	0.34-0.51	0.32-0.58	
	0.7 m	0.64-0.78	0.63-0.79	0.61-0.84	0.58-0.92	0.54-1.04	0.49-1.37	0.45-2.28	
	1 m	0.87-1.19	0.85-1.22	0.81-1.34	0.75-1.58	0.68-2.05	0.60-4.26	0.53-∞	
	3 m	1.98-6.49	1.89-7.82	1.65-23.00	1.38-∞	1.17-∞	0.93-∞	0.75-∞	
	5 m	2.65-61.70	2.49-∞	2.08-∞	1.68-∞	1.36-∞	1.04-∞	0.82-∞	
	10 m	3.56-∞	3.27-∞	2.59-∞	1.99-∞	1.55-∞	1.14-∞	0.88-∞	
	∞	5.3 -∞	4.73-∞	3.41-∞	2.42-∞	1.79-∞	1.26-∞	0.95-∞	
		F/3.7	F/4	F/5.6	F/8	F/11	F/16	F/22	
28 mm	0.4 m	0.39-0.42	0.39-0.42	0.38-0.42	0.37-0.44	0.36-0.45	0.35-0.48	0.33-0.53	
	0.7 m	0.65-0.76	0.64-0.77	0.62-0.80	0.60-0.86	0.57-0.94	0.52-1.13	0.48-1.51	
	1 m	0.89-1.15	0.88-1.17	0.84-1.25	0.79-1.41	0.73-1.67	0.65-2.48	0.58-6.34	
	3 m	2.09-5.45	2.04-5.85	1.81-9.56	1.56-304	1.33-∞	1.07-∞	0.88-∞	
	5 m	2.86-21.6	2.77-29.8	2.36-∞	1.93-∞	1.59-∞	1.23-∞	0.98-∞	
	10 m	3.97-∞	3.79-∞	3.05-∞	2.37-∞	1.86-∞	1.38-∞	1.06-∞	
	∞	6.39-∞	5.92-∞	4.27-∞	3.03-∞	2.23-∞	1.57-∞	1.17-∞	
			F/4	F/5.6	F/8	F/11	F/16	F/22	F/32
35 mm	0.4 m		0.39-0.41	0.39-0.42	0.38-0.42	0.37-0.43	0.36-0.45	0.35-0.47	0.34-0.51
	0.7 m		0.66-0.74	0.65-0.76	0.63-0.79	0.61-0.84	0.57-0.92	0.54-1.05	0.49-1.40
	1 m		0.92-1.10	0.89-1.15	0.85-1.23	0.81-1.34	0.74-1.60	0.68-2.10	0.60-4.61
	3 m		2.30-4.35	2.11-5.33	1.87-8.06	1.65-23.1	1.38-∞	1.15-∞	0.92-∞
	5 m		3.29-10.7	2.90-19.7	2.47-∞	2.08-∞	1.66-∞	1.34-∞	1.03-∞
	10 m		4.86-∞	4.04-∞	3.23-∞	2.59-∞	1.96-∞	1.53-∞	1.13-∞
	∞		9.12-∞	6.58-∞	4.65-∞	3.42-∞	2.39-∞	1.76-∞	1.24-∞
			F/4.6	F/5.6	F/8	F/11	F/16	F/22	F/32
50 mm	0.4 m		0.39-0.41	0.39-0.41	0.39-0.41	0.39-0.42	0.38-0.42	0.37-0.43	0.36-0.45
	0.7 m		0.68-0.72	0.67-0.73	0.66-0.74	0.65-0.76	0.63-0.79	0.61-0.84	0.57-0.92
	1 m		0.95-1.06	0.94-1.07	0.92-1.10	0.89-1.14	0.85-1.22	0.81-1.34	0.74-1.60
	3 m		2.56-3.64	2.48-3.81	2.31-4.32	2.13-5.19	1.88-7.84	1.66-20.8	1.39-∞
	5 m		3.86-7.13	3.68-7.86	3.31-10.4	2.94-17.8	2.49-∞	2.10-∞	1.68-∞
	10 m		6.25-25.4	5.78-38.3	4.91-∞	4.13-∞	3.27-∞	2.63-∞	1.99-∞
	∞		15.9-∞	13.1-∞	9.31-∞	6.83-∞	4.74-∞	3.48-∞	2.43-∞
			F/5.0	F/5.6	F/8	F/11	F/16	F/22	F/32
70 mm	0.4 m		0.40-0.40	0.40-0.40	0.39-0.41	0.39-0.41	0.39-0.41	0.39-0.42	0.38-0.43
	0.7 m		0.69-0.71	0.69-0.72	0.68-0.72	0.67-0.73	0.66-0.75	0.65-0.77	0.62-0.80
	1 m		0.97-1.03	0.97-1.03	0.96-1.05	0.94-1.07	0.91-1.11	0.89-1.15	0.84-1.24
	3 m		2.73-3.33	2.71-3.37	2.60-3.56	2.47-3.83	2.29-4.38	2.11-5.31	1.86-8.25
	5 m		4.29-6.00	4.22-6.14	3.96-6.81	3.67-7.89	3.28-10.7	2.91-19.1	2.45-∞
	10 m		7.49-15.1	7.27-16.0	6.52-21.7	5.77-38.8	4.85-∞	4.07-∞	3.22-∞
	∞		27.9-∞	25.1-∞	17.8-∞	13.1-∞	9.12-∞	6.69-∞	4.65-∞
			F/5.4	F/5.6	F/8	F/11	F/16	F/22	F/32
100 mm	0.4 m		0.40-0.40	0.40-0.40	0.40-0.40	0.40-0.41	0.39-0.41	0.39-0.41	0.39-0.41
	0.7 m		0.69-0.71	0.69-0.71	0.69-0.71	0.68-0.72	0.68-0.72	0.67-0.73	0.66-0.75
	1 m		0.98-1.02	0.98-1.02	0.98-1.03	0.97-1.04	0.95-1.05	0.94-1.07	0.91-1.11
	3 m		2.85-3.17	2.84-3.17	2.78-3.26	2.71-3.36	2.60-3.56	2.47-3.83	2.29-4.39
	5 m		4.59-5.49	4.58-5.51	4.42-5.76	4.24-6.11	3.96-6.80	3.68-7.86	3.28-10.70
	10 m		8.49-12.2	8.44-12.3	7.91-13.6	7.34-15.7	6.55-21.4	5.80-37.3	4.87-∞
	∞		50.1-∞	48.5-∞	35.0-∞	26.0-∞	18.2-∞	13.4-∞	9.29-∞
				F/5.6	F/8	F/11	F/16	F/22	F/32
135 mm	0.4 m			0.40-0.40	0.40-0.40	0.40-0.40	0.40-0.41	0.39-0.41	0.39-0.41
	0.7 m			0.70-0.71	0.69-0.71	0.69-0.71	0.69-0.72	0.68-0.72	0.67-0.73
	1 m			0.99-1.01	0.98-1.02	0.98-1.02	0.97-1.03	0.96-1.05	0.94-1.07
	3 m			2.90-3.10	2.86-3.15	2.82-3.21	2.74-3.32	2.65-3.45	2.52-3.71
	5 m			4.74-5.29	4.63-5.43	4.51-5.61	4.32-5.94	4.11-6.40	3.80-7.33
	10 m			9.01-11.2	8.64-11.9	8.22-12.8	7.60-14.6	6.98-17.7	6.14-27.3
	∞			77.0-∞	56.5-∞	42.4-∞	30.0-∞	22.2-∞	15.5-∞

AF28-200mm F/3.8-5.6 XR Di Aspherical [IF] Macro (Model A031)

Focal Length	Focus Distance	F/3.8	F/4.0	F/5.6	F/8.0	F/11	F/16	F/22	F/32
28 mm	0.49 m	0.47-0.52	0.47-0.52	0.46-0.53	0.44-0.55	0.43-0.58	0.41-0.63	0.39-0.71	0.35-0.92
	1 m	0.89-1.14	0.88-1.16	0.85-1.23	0.80-1.37	0.74-1.61	0.67-2.27	0.60-4.70	0.51-∞
	2 m	1.58-2.74	1.56-2.83	1.43-3.41	1.28-4.96	1.13-11.7	0.95-∞	0.81-∞	0.65-∞
	3 m	2.13-5.16	2.08-5.50	1.86-8.33	1.60-38.4	1.37-∞	1.11-∞	0.91-∞	0.71-∞
	5 m	2.95-17.5	2.85-22.2	2.44-∞	2.01-∞	1.66-∞	1.29-∞	1.02-∞	0.77-∞
	10 m	4.14-∞	3.95-∞	3.19-∞	2.49-∞	1.96-∞	1.46-∞	1.12-∞	0.82-∞
	30 m	5.67-∞	5.32-∞	4.02-∞	2.95-∞	2.23-∞	1.60-∞	1.20-∞	0.86-∞
	∞	6.95-∞	6.42-∞	4.62-∞	3.26-∞	2.40-∞	1.68-∞	1.24-∞	0.88-∞
			F/4.0	F/5.6	F/8.0	F/11	F/16	F/22	F/32
35 mm	0.49 m		0.47-0.51	0.47-0.52	0.46-0.53	0.45-0.55	0.43-0.58	0.41-0.62	0.39-0.71
	1 m		0.92-1.10	0.89-1.15	0.85-1.23	0.80-1.35	0.74-1.61	0.68-2.13	0.60-4.76
	2 m		1.67-2.51	1.57-2.79	1.44-3.37	1.30-4.59	1.13-11.8	0.98-∞	0.81-∞
	3 m		2.30-4.36	2.10-5.33	1.87-8.08	1.64-23.3	1.37-∞	1.15-∞	0.91-∞
	5 m		3.29-10.7	2.90-19.7	2.46-∞	2.08-∞	1.66-∞	1.34-∞	1.02-∞
	10 m		4.86-∞	4.04-∞	3.23-∞	2.59-∞	1.96-∞	1.52-∞	1.12-∞
	30 m		7.13-∞	5.48-∞	4.08-∞	3.10-∞	2.23-∞	1.68-∞	1.20-∞
	∞		9.30-∞	6.67-∞	4.70-∞	3.44-∞	2.40-∞	1.77-∞	1.24-∞
			F/4.5	F/5.6	F/8.0	F/11	F/16	F/22	F/32
50 mm	0.49 m		0.48-0.50	0.48-0.50	0.47-0.51	0.47-0.52	0.46-0.53	0.45-0.55	0.43-0.58
	1 m		0.95-1.06	0.94-1.07	0.92-1.10	0.89-1.15	0.85-1.23	0.80-1.35	0.74-1.61
	2 m		1.80-2.25	1.76-2.32	1.67-2.50	1.58-2.76	1.44-3.35	1.31-4.53	1.14-11.2
	3 m		2.56-3.63	2.48-3.82	2.31-4.33	2.12-5.21	1.88-7.90	1.65-21.3	1.38-∞
	5 m		3.87-7.09	3.68-7.87	3.31-10.5	2.94-17.9	2.48-∞	2.10-∞	1.67-∞
	10 m		6.28-24.9	5.78-38.4	4.90-∞	4.12-∞	3.27-∞	2.62-∞	1.98-∞
	30 m		10.74-∞	9.34-∞	7.23-∞	5.64-∞	4.14-∞	3.15-∞	2.26-∞
	∞		16.66-∞	13.50-∞	9.48-∞	6.92-∞	4.78-∞	3.50-∞	2.44-∞
			F/5.0	F/5.6	F/8.0	F/11	F/16	F/22	F/32
70 mm	0.49 m		0.48-0.50	0.48-0.50	0.48-0.50	0.48-0.50	0.47-0.51	0.46-0.52	0.45-0.54
	1 m		0.97-1.03	0.97-1.04	0.95-1.05	0.94-1.07	0.91-1.11	0.88-1.16	0.84-1.25
	2 m		1.88-2.14	1.87-2.16	1.81-2.23	1.75-2.33	1.66-2.53	1.56-2.81	1.42-3.45
	3 m		2.73-3.33	2.70-3.37	2.59-3.57	2.47-3.84	2.29-4.40	2.10-5.35	1.85-8.39
	5 m		4.29-5.99	4.22-6.15	3.95-6.83	3.66-7.92	3.27-10.8	2.90-19.4	2.44-∞
	10 m		7.50-15.0	7.27-16.1	6.51-21.8	5.76-39.2	4.84-∞	4.06-∞	3.21-∞
	30 m		15.0-∞	14.1-∞	11.5-∞	9.31-∞	7.10-∞	5.54-∞	4.06-∞
	∞		29.7-∞	26.4-∞	18.5-∞	13.5-∞	9.27-∞	6.77-∞	4.68-∞
			F/5.3	F/5.6	F/8.0	F/11	F/16	F/22	F/32
100 mm	0.49 m		0.49-0.49	0.49-0.49	0.48-0.50	0.48-0.50	0.48-0.50	0.48-0.51	0.47-0.51
	1 m		0.98-1.02	0.98-1.02	0.98-1.03	0.97-1.04	0.95-1.06	0.93-1.08	0.91-1.12
	2 m		1.93-2.07	1.93-2.08	1.90-2.11	1.86-2.16	1.81-2.24	1.75-2.34	1.65-2.54
	3 m		2.85-3.17	2.84-3.18	2.78-3.26	2.70-3.37	2.59-3.57	2.46-3.85	2.28-4.42
	5 m		4.59-5.49	4.57-5.52	4.41-5.77	4.23-6.13	3.95-6.83	3.66-7.91	3.27-10.8
	10 m		8.49-12.2	8.43-12.3	7.90-13.6	7.32-15.8	6.53-21.5	5.78-37.9	4.86-∞
	30 m		19.6-64.4	19.3-68.2	16.7-150	14.3-∞	11.6-∞	9.41-∞	7.18-∞
	∞		56.3-∞	53.7-∞	37.6-∞	27.4-∞	18.8-∞	13.7-∞	9.45-∞
				F/5.6	F/8.0	F/11	F/16	F/22	F/32
135 mm	0.49 m			0.49-0.49	0.49-0.49	0.49-0.50	0.48-0.50	0.48-0.50	0.48-0.51
	1 m			0.99-1.01	0.98-1.02	0.98-1.02	0.97-1.03	0.96-1.05	0.94-1.07
	2 m			1.96-2.05	1.94-2.07	1.92-2.09	1.88-2.13	1.84-2.19	1.78-2.29
	3 m			2.90-3.10	2.87-3.15	2.82-3.20	2.75-3.31	2.66-3.44	2.53-3.68
	5 m			4.74-5.29	4.65-5.41	4.53-5.58	4.34-5.90	4.14-6.32	3.84-7.19
	10 m			9.04-11.2	8.70-11.8	8.30-12.6	7.70-14.3	7.09-17.0	6.26-25.0
	30 m			22.8-43.8	20.8-53.9	18.7-76.8	15.9-265	13.5-∞	10.8-∞
	∞			95.9-∞	68.2-∞	49.6-∞	34.1-∞	24.8-∞	17.1-∞
				F/5.6	F/8.0	F/11	F/16	F/22	F/32
200 mm	0.49 m			0.49-0.49	0.49-0.49	0.49-0.49	0.49-0.50	0.48-0.50	0.48-0.50
	1 m			1.00-1.01	1.00-1.02	0.99-1.02	0.99-1.03	0.98-1.04	0.97-1.05
	2 m			1.97-2.03	1.96-2.04	1.95-2.05	1.93-2.08	1.90-2.11	1.86-2.16
	3 m			2.94-3.06	2.92-3.08	2.90-3.11	2.85-3.17	2.80-3.23	2.72-3.35
	5 m			4.85-5.16	4.80-5.22	4.73-5.30	4.62-5.46	4.49-5.65	4.29-6.00
	10 m			9.46-10.6	9.27-10.9	9.02-11.2	8.64-11.9	8.22-12.8	7.60-14.6
	30 m			25.8-35.9	24.5-38.7	22.9-43.4	20.7-54.4	18.6-78.3	15.8-292
	∞			192-∞	140-∞	102-∞	69.8-∞	50.8-∞	34.9-∞

AF28-300mm F/3.5-6.3 XR Di LD Aspherical [IF] Macro (Model A061)

Focal Length	Focus Distance	F/3.8	F/4.0	F/5.6	F/8.0	F/11	F/16	F/22	
28 mm	0.49 m	0.47-0.51	0.47-0.52	0.46-0.53	0.45-0.55	0.43-0.57	0.41-0.62	0.39-0.70	
	1 m	0.90-1.13	0.89-1.15	0.85-1.23	0.80-1.37	0.74-1.59	0.67-2.23	0.60-4.50	
	2 m	1.60-2.69	1.56-2.83	1.43-3.40	1.28-4.93	1.14-11.6	0.96-∞	0.81-∞	
	3 m	2.17-4.97	2.08-5.49	1.86-8.31	1.61-38.5	1.38-∞	1.12-∞	0.92-∞	
	7 m	3.62-172	3.39-∞	2.82-∞	2.26-∞	1.82-∞	1.38-∞	1.08-∞	
	30 m	5.90-∞	5.30-∞	4.01-∞	2.95-∞	2.23-∞	1.60-∞	1.2-∞	
	∞	7.20-∞	6.32-∞	4.56-∞	3.23-∞	2.38-∞	1.67-∞	1.25-∞	
		F/3.8	F/4	F/5.6	F/8	F/11	F/16	F/22	
35 mm	0.49 m	0.48-0.51	0.47-0.51	0.47-0.52	0.46-0.53	0.45-0.54	0.43-0.57	0.42-0.61	
	1 m	0.92-1.09	0.92-1.10	0.89-1.15	0.85-1.22	0.81-1.34	0.74-1.59	0.68-2.09	
	2 m	1.69-2.47	1.67-2.50	1.57-2.78	1.44-3.36	1.31-4.55	1.14-11.5	0.99-∞	
	3 m	2.33-4.25	2.30-4.35	2.11-5.32	1.88-8.04	1.65-22.9	1.38-∞	1.16-∞	
	7 m	4.13-24.3	4.04-28.0	3.46-∞	2.86-∞	2.35-∞	1.82-∞	1.44-∞	
	30 m	7.41-∞	7.13-∞	5.48-∞	4.08-∞	3.11-∞	2.23-∞	1.68-∞	
	∞	9.60-∞	9.12-∞	6.58-∞	4.65-∞	3.42-∞	2.39-∞	1.77-∞	
			F/4.4	F/5.6	F/8	F/11	F/16	F/22	F/32
50 mm	0.49 m		0.48-0.50	0.48-0.50	0.47-0.51	0.47-0.52	0.46-0.53	0.45-0.54	0.43-0.57
	1 m		0.95-1.05	0.94-1.07	0.92-1.10	0.89-1.14	0.85-1.22	0.81-1.34	0.75-1.59
	2 m		1.81-2.24	1.76-2.32	1.68-2.49	1.58-2.75	1.45-3.33	1.31-4.47	1.14-10.8
	3 m		2.58-3.60	2.48-3.81	2.31-4.32	2.13-5.18	1.89-7.83	1.66-20.6	1.39-∞
	7 m		5.02-11.7	4.65-14.4	4.07-26.5	3.52-∞	2.88-∞	2.37-∞	1.84-∞
	30 m		11.0-∞	9.34-∞	7.23-∞	5.65-∞	4.15-∞	3.16-∞	2.27-∞
	∞		16.7-∞	13.1-∞	9.30-∞	6.82-∞	4.74-∞	3.48-∞	2.43-∞
			F/4.9	F/5.6	F/8	F/11	F/16	F/22	F/32
70 mm	0.49 m		0.48-0.50	0.48-0.50	0.48-0.50	0.48-0.50	0.47-0.51	0.47-0.52	0.46-0.53
	1 m		0.97-1.03	0.97-1.03	0.96-1.05	0.94-1.07	0.92-1.10	0.89-1.15	0.85-1.24
	2 m		1.88-2.13	1.87-2.15	1.82-2.23	1.76-2.33	1.67-2.51	1.57-2.79	1.43-3.41
	3 m		2.74-3.32	2.71-3.37	2.60-3.56	2.47-3.82	2.29-4.38	2.11-5.30	1.86-8.22
	7 m		5.70-9.10	5.55-9.49	5.10-11.2	4.64-14.5	4.02-28.5	3.48-∞	2.84-∞
	30 m		15.0-∞	14.1-∞	11.5-∞	9.32-∞	7.11-∞	5.55-∞	4.07-∞
	∞		28.3-∞	25.0-∞	17.8-∞	13.1-∞	9.11-∞	6.68-∞	4.64-∞
			F/5.5	F/5.6	F/8	F/11	F/16	F/22	F/32
100 mm	0.49 m		0.49-0.49	0.49-0.49	0.49-0.50	0.48-0.50	0.48-0.50	0.48-0.50	0.47-0.51
	1 m		0.98-1.02	0.98-1.02	0.98-1.03	0.97-1.04	0.95-1.05	0.94-1.07	0.91-1.11
	2 m		1.93-2.07	1.93-2.07	1.90-2.11	1.87-2.15	1.82-2.23	1.76-2.33	1.66-2.52
	3 m		2.85-3.17	2.85-3.17	2.78-3.25	2.71-3.36	2.60-3.56	2.47-3.82	2.29-4.37
	7 m		6.21-8.02	6.20-8.04	5.91-8.59	5.59-9.39	5.12-11.1	4.65-14.3	4.04-27.4
	30 m		19.4-66.7	19.3-68.1	16.7-150	14.3-∞	11.6-∞	9.43-∞	7.20-∞
	∞		49.2-∞	48.5-∞	35.0-∞	25.9-∞	18.2-∞	13.35-∞	9.28-∞
				F/5.9	F/8	F/11	F/16	F/22	F/32
135 mm	0.49 m			0.49-0.49	0.49-0.49	0.49-0.49	0.48-0.50	0.48-0.50	0.48-0.50
	1 m			0.99-1.01	0.99-1.02	0.98-1.02	0.97-1.03	0.96-1.04	0.95-1.06
	2 m			1.96-2.04	1.94-2.06	1.92-2.08	1.89-2.13	1.85-2.18	1.79-2.27
	3 m			2.91-3.10	2.87-3.14	2.83-3.19	2.76-3.29	2.68-3.42	2.55-3.65
	7 m			6.51-7.58	6.35-7.80	6.13-8.15	5.81-8.81	5.46-9.77	4.97-11.9
	30 m			22.6-44.5	20.9-53.5	18.7-75.9	16.0-250	13.6-∞	10.9-∞
	∞			78.0-∞	60.2-∞	45.3-∞	32.0-∞	23.7-∞	16.6-∞
				F/6.2	F/8	F/11	F/16	F/22	F/32
200 mm	0.49 m			0.49-0.49	0.49-0.49	0.49-0.49	0.49-0.49	0.49-0.50	0.48-0.50
	1 m			0.99-1.01	0.99-1.01	0.99-1.01	0.98-1.02	0.98-1.02	0.97-1.03
	2 m			1.98-2.02	1.97-2.03	1.96-2.04	1.94-2.06	1.92-2.09	1.89-2.13
	3 m			2.95-3.05	2.94-3.07	2.91-3.09	2.88-3.14	2.83-3.19	2.76-3.29
	7 m			6.74-7.28	6.68-7.36	6.56-7.50	6.38-7.76	6.17-8.08	5.86-8.70
	30 m			25.9-35.7	25.0-37.6	23.5-41.6	21.4-50.4	19.3-67.6	16.6-157
	∞			138-∞	115-∞	89.5-∞	65.2-∞	49.2-∞	34.9-∞
				F/6.3	F/8	F/11	F/16	F/22	F/32
300 mm	0.49 m			0.49-0.49	0.49-0.49	0.49-0.49	0.49-0.49	0.49-0.49	0.49-0.50
	1 m			1.00-1.00	1.00-1.01	0.99-1.01	0.99-1.01	0.99-1.01	0.98-1.02
	2 m			1.99-2.01	1.98-2.02	1.98-2.02	1.97-2.04	1.95-2.05	1.93-2.07
	3 m			2.97-3.03	2.96-3.04	2.95-3.05	2.93-3.08	2.90-3.11	2.86-3.16
	7 m			6.86-7.15	6.82-7.19	6.76-7.26	6.66-7.38	6.53-7.54	6.34-7.81
	30 m			27.7-32.7	27.3-33.4	26.4-34.8	25.0-37.5	23.5-41.5	21.4-50.2
	∞			218-∞	193-∞	157-∞	119-∞	92.8-∞	67.7-∞

AF70-300mm F/4-5.6 Di LD Macro 1:2 (Model A17)

Focal Length	Focus Distance	F/4	F/5.6	F/8	F/11	F/16	F/22	F/32
70 mm	1.5 m	1.46-1.55	1.44-1.56	1.42-1.59	1.39-1.63	1.35-1.70	1.30-1.78	1.23-1.96
	2 m	1.92-2.09	1.89-2.12	1.85-2.18	1.80-2.26	1.72-2.40	1.63-2.60	1.51-3.02
	3 m	2.81-3.22	2.74-3.31	2.65-3.47	2.54-3.68	2.37-4.11	2.20-4.79	1.97-6.61
	4.5 m	4.06-5.05	3.92-5.28	3.72-5.71	3.50-6.35	3.18-7.84	2.87-10.9	2.47-32.5
	7 m	5.96-8.49	5.66-9.19	5.24-10.6	4.79-13.2	4.19-22.3	3.65-132	3.01-∞
	15 m	10.8-24.5	9.85-31.7	8.59-61.1	7.42-∞	6.04-∞	4.95-∞	3.82-∞
	∞	37.9-∞	27.9-∞	19.6-∞	14.3-∞	9.85-∞	7.20-∞	4.98-∞
100 mm	1.5 m	1.48-1.52	1.47-1.53	1.46-1.55	1.44-1.57	1.42-1.60	1.39-1.64	1.34-1.71
	2 m	1.96-2.05	1.94-2.06	1.92-2.09	1.89-2.13	1.84-2.19	1.79-2.27	1.71-2.42
	3 m	2.90-3.11	2.86-3.15	2.81-3.23	2.74-3.32	2.64-3.49	2.52-3.71	2.35-4.17
	4.5 m	4.26-4.77	4.18-4.87	4.06-5.05	3.91-5.30	3.70-5.77	3.46-6.45	3.14-8.05
	7 m	6.41-7.71	6.23-7.98	5.96-8.50	5.64-9.24	5.19-10.8	4.73-13.6	4.13-24.1
	15 m	12.5-18.8	11.8-20.6	10.8-24.6	9.79-32.3	8.46-68.4	7.28-∞	5.91-∞
	∞	72.2-∞	53.8-∞	37.7-∞	27.4-∞	18.9-∞	13.8-∞	9.49-∞
135 mm	1.5 m	1.49-1.51	1.48-1.52	1.48-1.53	1.47-1.54	1.45-1.55	1.43-1.57	1.41-1.61
	2 m	1.97-2.03	1.97-2.03	1.95-2.05	1.94-2.07	1.91-2.10	1.88-2.14	1.83-2.21
	3 m	2.94-3.06	2.92-3.08	2.89-3.12	2.85-3.17	2.79-3.25	2.71-3.35	2.60-3.55
	4.5 m	4.36-4.65	4.32-4.70	4.25-4.79	4.16-4.91	4.02-5.12	3.86-5.39	3.63-5.93
	7 m	6.65-7.39	6.56-7.51	6.39-7.75	6.18-8.07	5.87-8.68	5.54-9.53	5.06-11.4
	15 m	13.4-17.0	13.1-17.6	12.4-19.1	11.6-21.2	10.5-26.2	9.47-36.3	8.12-103
	∞	126-∞	98.2-∞	68.8-∞	50.0-∞	34.4-∞	25.0-∞	17.2-∞
200 mm	0.95 m	0.95-0.95	0.95-0.95	0.95-0.96	0.94-0.96	0.94-0.96	0.94-0.96	0.93-0.97
	1 m	1.00-1.00	1.00-1.00	1.00-1.01	0.99-1.01	0.99-1.01	0.99-1.01	0.98-1.02
	1.1 m	1.10-1.10	1.10-1.10	1.09-1.11	1.09-1.11	1.09-1.11	1.08-1.12	1.08-1.13
	1.2 m	1.20-1.20	1.20-1.21	1.19-1.21	1.19-1.21	1.19-1.22	1.18-1.22	1.17-1.23
	1.3 m	1.30-1.31	1.29-1.31	1.29-1.31	1.29-1.31	1.28-1.32	1.28-1.32	1.27-1.34
	1.5 m	1.49-1.51	1.49-1.51	1.49-1.51	1.48-1.52	1.48-1.52	1.47-1.53	1.45-1.55
	2 m	1.99-2.01	1.99-2.02	1.98-2.02	1.97-2.03	1.96-2.05	1.94-2.06	1.92-2.09
	3 m	2.97-3.03	2.96-3.04	2.95-3.05	2.93-3.08	2.90-3.11	2.86-3.15	2.80-3.23
	4.5 m	4.43-4.58	4.41-4.59	4.38-4.63	4.34-4.68	4.26-4.76	4.18-4.87	4.05-5.06
	7 m	6.82-7.19	6.79-7.22	6.70-7.33	6.60-7.46	6.43-7.68	6.24-7.97	5.95-8.51
	15 m	14.2-15.9	14.0-16.1	13.7-16.6	13.2-17.3	12.5-18.7	11.8-20.5	10.8-24.7
	∞	254-∞	214-∞	150-∞	109-∞	74.8-∞	54.4-∞	37.4-∞
300 mm	0.95 m		0.95-0.95	0.95-0.95	0.95-0.95	0.95-0.95	0.94-0.96	0.94-0.96
	1 m		1.00-1.00	1.00-1.00	1.00-1.00	1.00-1.01	0.99-1.01	0.99-1.01
	1.1 m		1.10-1.10	1.10-1.10	1.10-1.10	1.09-1.11	1.09-1.11	1.09-1.11
	1.2 m		1.20-1.20	1.20-1.20	1.20-1.21	1.19-1.21	1.19-1.21	1.19-1.21
	1.3 m		1.30-1.30	1.30-1.30	1.29-1.31	1.29-1.31	1.29-1.31	1.28-1.32
	1.5 m		1.50-1.50	1.49-1.51	1.49-1.51	1.49-1.51	1.49-1.52	1.48-1.52
	2 m		1.99-2.01	1.99-2.01	1.99-2.02	1.98-2.02	1.97-2.03	1.96-2.04
	3 m		2.98-3.02	2.98-3.03	2.97-3.04	2.95-3.05	2.93-3.07	2.90-3.10
	4.5 m		4.46-4.54	4.44-4.56	4.42-4.58	4.39-4.62	4.34-4.67	4.28-4.75
	7 m		6.90-7.11	6.86-7.15	6.80-7.21	6.72-7.31	6.62-7.43	6.46-7.64
	15 m		14.5-15.5	14.3-15.7	14.1-16.0	13.7-16.5	13.3-17.2	12.7-18.4
	∞		441-∞	317-∞	231-∞	159-∞	115-∞	79.4-∞

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