Nikon CE

NIKKOR

AF Micro-Nikkor 60mm f/2.8D

Ck 使用说明书

En User's Manual

随附配件
62mm 搭扣式镜头前盖 镜头后盖

Supplied Accessories
62 mm snap-on front lens cap Rear lens cap

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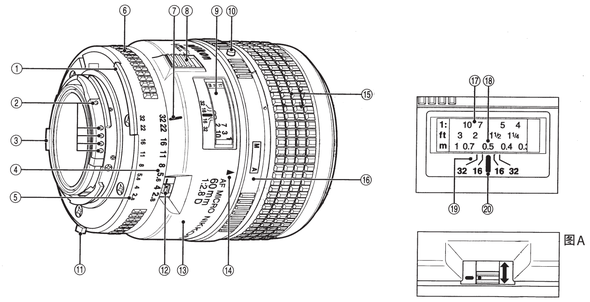
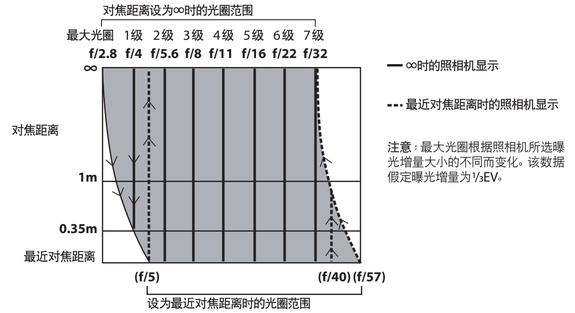


图A



注意：最大光圈根据照相机所选曝光增量大小的不同而变化。该数据假定曝光增量为⅓EV。

中文版（简体）

感谢您选购尼康产品。该款轻巧精密的AF微距尼克尔60mm f/2.8D微距镜头支持0.219m的最近对焦距离，且可为照相机机身提供距离信息以进行即时3D矩阵测光或3D多传感器均衡补充闪光的闪光控制。在使用本产品前，请仔细阅读这些指南和照相机说明书，以便您在现在和今后都能充分利用您的镜头。

使用产品前请仔细阅读本使用说明书，并请妥善保管。

安全须知

请在使用前仔细阅读“安全须知”，并以正确的方法使用。本“安全须知”中记载了重要的内容，可使您能够安全、正确地使用产品，并预防对您或他人造成人身伤害或财产损失。请在阅读之后妥善保管，以便本产品的所有使用者可以随时查阅。

有关指示

本节中标注的指示和含义如下。

⚠ 警告	表示若不遵守该项指示或操作不当，则有可能造成人员死亡或负重伤的内容。
⚠ 注意	表示若不遵守该项指示或操作不当，则有可能造成人员伤害、以及有可能造成物品损害的内容。

本节使用以下图示和符号对必须遵守的内容作分类和说明。

图示和符号的实例

△符号表示唤起注意（包括警告）的内容。
在图示中或图示附近标有具体的注意内容（左图之例为当心触电）。

⃠符号表示禁止（不允许进行的）的行为。
在图示中或图示附近标有具体的禁止内容（左图之例为禁止拆解）。

●符号表示强制执行（必需进行）的行为。
在图示中或图示附近标有具体的强制执行内容（左图之例为取出电池）。

⚠ 警告

- **禁止拆解** 切勿自行拆解、修理或改装。否则将会造成触电、发生故障并导致受伤。
- **禁止触碰** 当产品由于跌落而破损使得内部外露时，切勿用手触碰外露部分。
- **立即委托修理** 否则将会造成触电、或由于破损部分而导致受伤。取出照相机电池，并委托经销商或尼康授权的维修服务中心进行修理。
- **取出电池** **立即委托修理** 当发现产品变热、冒烟或发出焦味等异常时，请立刻取出照相机电池。若在此情况下继续使用，将会导致火灾或灼伤。取出电池时，请小心勿被烫伤。取出电池，并委托经销商或尼康授权的维修服务中心进行修理。
- **禁止接触水** 切勿浸入水中或接触到水，或被雨水淋湿。否则将会导致起火或触电。
- **禁止使用** 切勿在有可能起火、爆炸的场所使用。在有丙烷气、汽油、可燃性喷雾剂等易燃性气体、粉尘的场所使用产品，将会导致爆炸或火灾。
- **禁止观看** 切勿用镜头或照相机直接观看太阳或强光。否则将会导致失明或视觉损伤。

⚠ 注意

- **当心触电** 切勿用湿手触碰。否则将有可能导致触电。
- **禁止放置** 切勿在婴幼儿伸手可及之处保管产品。否则将有可能导致受伤。
- **小心使用** 进行逆光拍摄时，务必使太阳充分偏离视角。阳光会在照相机内部聚焦，并有可能导致火灾。太阳偏离视角的距离微小时，也有可能会导致火灾。
- **妥善保存** 不使用时请盖上镜头盖，或保存在没有阳光照射处。阳光会聚焦，并有可能导致火灾。
- **小心移动** 进行移动时，切勿将照相机或镜头安装在三脚架上。摔倒、碰撞时将有可能导致受伤。
- **禁止放置** 切勿放置于封闭的车辆中、直射阳光下或其它异常温之处。否则将对内部零件造成不良影响，并导致火灾。

■镜头部件

①测光耦合脊	⑪EE 伺服耦合杆
②CPU 接点	⑫最小光圈锁定杆
③光圈传递杆	⑬镜头镜筒
④光圈刻度	⑭A-M 模式标记
⑤光圈直读刻度	⑮对焦环
⑥光圈环	⑯A-M 模式环
⑦光圈/镜头安装标记	⑰复制比率指示
⑧对焦限制切换器	⑱对焦距离指示
⑨对焦距离指示窗口	⑲景深指示
⑩A-M 模式环释放按钮	⑳对焦距离标记

■注意事项

- 请保持CPU镜头接点清洁并小心不要损坏CPU接点。
- 不要将以下配件直接安装至本镜头：PK-1或PK-11自动延伸环、BR-4或BR-2自动环、K1或K2环（PK-11A和BR-2A可分别代替PK-11和BR-2使用）。若不遵守此注意事项，可能会导致损坏本镜头的CPU接点或其他部件。其他镜头配件可能与照相机不兼容；请务必在使用前先查阅照相机的说明书。
- 在某些照相机上，当光圈锁定于最小值时无法安装镜头。安装镜头前务必先解除光圈锁定。有关详细信息，请参阅“最小光圈锁定杆”。
- 本镜头无法与用于尼康F3AF照相机的DX-1取景器一起使用。

■对焦

本镜头支持A-M模式选择。若要选择A-M模式，请按住A-M模式环释放按钮并同时旋转A-M模式环。选择A可进行自动对焦，选择M则可进行手动对焦。近摄镜片镜头不支持自动对焦；使用近摄镜片镜头时请选择M。请注意，在镜头安装于尼康F-501时选择M将可能引起照相机故障。

■对焦限制切换器

将对焦限制切换器从FULL滑至LIMIT可获得更快的对焦。对焦距离较近时，选择LIMIT可将对焦限制在约0.3m至0.219m的距离内，而对焦距离较远时，选择LIMIT则可将对焦限制在约0.3m至∞之间的位置。

■复制比率

复制比率是指物体的显示大小与其实际大小的比值。例如，若胶卷（图像传感器）上的图像为实际尺寸的1/5，复制比率即为1：5。若有需要，您可使用复制比率指示选择复制比率。例如，若要以1：5的复制比率进行拍摄，请选择手动对焦并旋转对焦环直至对焦距离标记与复制比率指示中的数字“5”对齐，然后向前或向后移动照相机直至拍摄对象清晰对焦。“近摄”表格中列出了不同对焦距离时的复制比率。

■对焦屏

以下照相机支持用于不同镜头或不同情况下的多种对焦屏。以下对焦屏适用于本镜头（当将B2/B3、E2/E3或K2/K3对焦屏用于非此处所列照相机时，请分别参考B、E或K列）：

照相机＼对焦屏	EC-B/EC-E	A/L	B	C	D	E	G1	G2	G3	G4
F6		◎	◎			◎				
F5+ DP-30	◎	◎	◎			◎		◎ (+1.0)		
F5+ DA-30	◎ (+0.5)	◎ (+0.5)	◎ (+0.5)			◎ (+0.5)		◎ (+0.5)		
F4+ DP-20/ F4+ DA-20			◎			◎		◎		
F3		◎	◎			◎	○	◎		

照相机＼对焦屏	H1	H2	H3	H4	J	K	P	M	R	T	U	F
F6					◎							
F5+ DP-30					◎							
F5+ DA-30					◎ (+0.5)							
F4+ DP-20/ F4+ DA-20					◎	◎	◎					
F3	○				◎	◎	◎		△	◎		

◎：推荐使用。
○：在取景器中可见渐晕（照片不会受到影响）。
△：分屏显示不会提高对焦准确度。
（）：括号中的数据是指用于中央重点测光的曝光补偿值。当调整F6的曝光补偿时，请在自定义设定b6（“对焦屏补偿”）中选择“其他对焦屏”；请注意，使用B或E以外的对焦屏时，即使曝光补偿值为0，也必须选择“其他对焦屏”。F5和F4的用户可分别使用自定义设定18和对焦屏曝光补偿拨盘调整曝光补偿；有关详细信息，请参阅照相机的说明书。

空白单元格：不适用于本镜头。请注意，在放大倍率为1：1或更高时，M型对焦屏仍可用于显微拍摄和近距拍摄。

■景深

对焦距离标记任意一边的景深指示都可显示近似景深（即拍摄对象前后物体清晰对焦的区域范围）。请注意，在较近对焦距离下该指示无法提供准确信息；若要确定景深，请参考景深表格。若照相机支持景深预览（光圈缩小）则景深还可在取景器中进行预览。

■最小光圈锁定杆（图A）

在程序自动或快门优先自动模式下进行拍摄时将光圈锁定为f/32。

1 **将光圈环旋转至最小光圈设定（f/32）。**

2 **朝光圈环滑动锁定杆，以便锁定杆上的白点与橙点对齐。**若要解除锁定，请按相反方向滑动锁定杆。

■近摄与还原功能

若要避免因照相机震动引起的模糊，请将照相机安装于三脚架并使用快门线或遥控线。近摄时景深通常极浅；为获取较长景深，请缩小镜头光圈，选择更长曝光时间，然后定位照相机，以便焦平面与您希望拍摄的拍摄对象部分平行。有关在镜头处于通常方向时测定曝光（在镜头反装时使用收缩光圈测光）的信息，请参阅下表，但是请注意，F-401s的曝光测光系统在使用伸缩镜腔或者PK-11A、PK-12或PK-13时无法发挥作用。

照相机	配件	测光
F90X、F90系列、F70系列、F50系列、F4系列、F-801、F-801s（CPU- AI）	PK-11A、12、13/ PN-11/TC-201/ TC-14A	全开光圈测光
	PK-2、3/PN-1/ 伸缩镜腔	收缩光圈测光[1]
F3系列、FE、FM、EL2、Nikkormat FT3、F2 Photomic A、F2 Photomic AS（AI）	PK-11A、12、13/ PN-11/TC-201/ TC-14A	全开光圈测光
	PK-2、3/PN-1/ 伸缩镜腔	收缩光圈测光[1]
F-501、FE2、FA、FM2、FG、FG-20、EM、F-301（AI）	PK-11A、12、13/ PN-11/TC-201/ TC-14A	全开光圈测光（或光强反馈式测光）
	PK-2、3/PN-1/ 伸缩镜腔	收缩光圈测光[1]
非AI	PK-11A、12、13/ PN-11/TC-201/ TC-14A/ 伸缩镜腔	收缩光圈测光[1]
	PK-2、3/PN-1	收缩光圈测光[1]
		全开光圈测光[2]

1 有关指示说明，请参阅照相机的说明书。
2 需要调整镜头。安装经调整的镜头后，请手动执行最大光圈传递。

■曝光补偿

伸出微距和其他近摄镜头以获取更高复制比率将减少到达胶卷（或图像传感器）的光线量，同时会更改有效f值（请参阅下文中的“曝光系数”）。镜后（TTL）测光和闪光控制可通过根据实际穿过镜头的光线量调整曝光、闪光级别和曝光指示自动补偿该变度损失，使用外部曝光测光所设定的曝光和闪光级别必须根据曝光系数手动进行调整。例如，若从外部曝光测光读取的快门速度为1/4秒，则复制比率为1：1时的亮度损失可通过将快门速度降低1档至1/4秒并将光圈增加⅔EV，或将快门速度降低2档至⅓秒并将光圈增加⅓EV来进行补偿。

■曝光系数

镜头f值表示对焦距离为无穷远时拍摄对象的亮度；复制比率越高，图像亮度则越低。实际亮度表示为“有效f值”，为补偿亮度损失而必须增加的曝光补偿量称为“曝光系数”。尽管本镜头的有效光圈会随焦距（复制比率）的不同而变化，但照相机取景器或控制面板中所示光圈会将该因素考虑在内进行自动调整，因而当将光圈设为外部曝光测光报道的值时若您参考这些显示，曝光系数可被忽略。F-401系列照相机的光圈拨盘同样将根据曝光系数进行自动调整；无需进行手动补偿。然而，F5和具备取景器光圈窗口的其他照相机的镜头光圈环或光圈显示不会进行该调整，因此在使用这些显示时您必须将曝光系数考虑在内。下表显示的是复制比率为1:10以上时的曝光系数和必须增加的光圈量。您还可通过调整快门速度来使光圈保持最小变化。

复制比率	曝光系数	光圈增加幅度	照相机控制面板中所示光圈（有效光圈）			
			最大值（f/2.8）	f/8	f/16	最小值（f/32）
1 : 10	1.15	1/6 EV	3.2	11	16	32
1 : 7	1.23	1/3 EV	3.2	11	16	32
1 : 5	1.32	1/3 EV	3.2	11	16	32
1 : 4	1.41	1/2 EV	3.2	11	16	32
1 : 3	1.57	2/3 EV	3.5	11	22	45
1 : 2.5	1.71	2/3 EV	3.5	11	22	45
1 : 2	1.92	1 EV	4	11	22	45
1 : 1.8	2.04	1 EV	4	11	22	45
1 : 1.6	2.21	1+1/6 EV	4.2	11	22	45
1 : 1.4	2.42	1+1/3 EV	4.2	11	22	45
1 : 1.3	2.57	1+1/3 EV	4.5	11	22	45
1 : 1.2	2.73	1+1/2 EV	4.5	16	32	64
1 : 1.1	2.94	1+1/2 EV	4.8	16	32	64
1 : 1	3.20	1+2/3 EV	5	16	32	64

■镜头保养

- 用吹气球去除镜头表面的灰尘和浮屑。若要去除污点和指纹，可使用一块滴有少许乙醇或镜头清洁剂的干净软棉布或镜头清洁纸，以圆周运动方式从里向外进行清洁。注意不要留下污渍，也不要用手指触碰玻璃。
- 使用乙醚可能导致多涂层镜头上产生污渍。这些污渍可通过使用一块滴有少许乙醇的棉布再次清洁镜头来去除。
- 切勿使用涂料稀释剂或苯等有机溶剂清洁镜头。
- 镜头遮光罩或NC滤镜可用于保护镜头前部元件。
- 不使用镜头时，请盖上镜头前后盖。
- 保持镜头干燥。内部构造生锈将导致无法挽回的损坏。
- 若在较长时间内不使用镜头，请将其存放在阴凉干燥的地方以防止发霉和生锈。切不可存放在直射阳光下，也不可与石脑油或樟脑丸一起存放。
- 将镜头放置在过于炎热的地方将会使强化塑料部件受损或变形。
- 运输产品时，请在包装箱内装入足够多的缓冲材料，以减少（避免）由于冲击导致产品损坏。

■兼容的配件

- 62mm旋入式滤镜
- 62mm旋入式镜头遮光罩HN-22
- 软套CL-0815

■技术规格

卡口	F卡口
焦距	60mm
最大光圈	f/2.8
镜头结构	7组8片
视角	39° 40′
距离信息	输出到照相机
最小光圈锁定	初始提供
对焦距离指示	从0.219m至无穷远（∞），以米和英尺为单位
最近对焦距离	0.219m（至焦平面，所有变焦位置）
复制比率指示	1：10至1：1（实际尺寸）
光圈刻度	标准和光圈直读刻度上均为f/2.8至f/32
光圈	全自动
光圈范围	f/2.8-32
测光	• CPU/AI照相机：全开光圈测光 • 其他照相机：最小光圈
滤镜附件尺寸	62mm（P=0.75mm）
尺寸	约70mm（最大直径）×74.5mm（从照相机镜头卡口边缘开始的距离）；总体长度为82.8mm
重量	约440g

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■景深

（m）

对焦距离	景深								复制比率
	f/2.8	f/4	f/5.6	f/8	f/11	f/16	f/22	f/32	
0.219	0.219 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.1
0.22	0.220 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	1/1.1
0.225	0.225 - 0.225	0.225 - 0.225	0.225 - 0.225	0.225 - 0.225	0.225 - 0.225	0.225 - 0.225	0.224 - 0.225	0.224 - 0.225	1/1.3
0.23	0.230 - 0.230	0.230 - 0.230	0.230 - 0.230	0.229 - 0.230	0.229 - 0.230	0.229 - 0.230	0.229 - 0.230	0.229 - 0.230	1/1.4
0.235	0.235 - 0.235	0.235 - 0.235	0.234 - 0.235	0.234 - 0.235	0.234 - 0.235	0.234 - 0.235	0.234 - 0.235	0.234 - 0.235	1/1.5
0.24	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	1/1.7
0.25	0.249 - 0.250	0.249 - 0.250	0.249 - 0.250	0.249 - 0.250	0.249 - 0.250	0.249 - 0.250	0.248 - 0.251	0.248 - 0.251	1/1.9
0.27	0.269 - 0.270	0.269 - 0.270	0.269 - 0.270	0.269 - 0.270	0.269 - 0.271	0.268 - 0.271	0.267 - 0.272	0.267 - 0.273	1/2.3
0.30	0.299 - 0.300	0.299 - 0.300	0.299 - 0.301	0.298 - 0.301	0.298 - 0.302	0.297 - 0.302	0.296 - 0.304	0.294 - 0.305	1/2.8
0.35	0.349 - 0.351	0.349 - 0.351	0.348 - 0.352	0.347 - 0.352	0.346 - 0.354	0.344 - 0.355	0.342 - 0.358	0.339 - 0.361	1/3.7
0.40	0.398 - 0.401	0.397 - 0.402	0.396 - 0.403	0.395 - 0.404	0.393 - 0.406	0.391 - 0.409	0.387 - 0.413	0.382 - 0.419	1/4.6
0.50	0.496 - 0.503	0.495 - 0.504	0.493 - 0.506	0.491 - 0.509	0.487 - 0.513	0.487 - 0.519	0.475 - 0.528	0.466 - 0.541	1/6.3
0.70	0.692 - 0.708	0.688 - 0.711	0.684 - 0.716	0.677 - 0.724	0.669 - 0.734	0.657 - 0.750	0.641 - 0.773	0.620 - 0.809	1/9.7
1	0.981 - 1.020	0.973 - 1.029	0.963 - 1.041	0.948 - 1.059	0.929 - 1.085	0.903 - 1.126	0.868 - 1.189	0.825 - 1.293	1/14.7
2	1.914 - 2.096	1.880 - 2.138	1.835 - 2.202	1.774 - 2.298	1.696 - 2.421	1.597 - 2.709	1.477 - 3.189	1.336 - 3.281	1/31.4
∞	38.3 – ∞	27.1 – ∞	19.2 – ∞	19.5 – ∞	9.6 – ∞	9.8 – ∞	4.9 – ∞	3.5 – ∞	1/∞

■近摄

（cm）

配件	近摄			近摄（镜头反装）[1]		
	复制比率	拍摄对象范围	对焦距离	复制比率	拍摄对象范围	对焦距离
No.5T近摄镜片镜头	1/11 – 1.1	26.6 × 39.9 – 2.16 × 3.25	79.1 – 21.5	–	–	–
No.6T近摄镜片镜头	1/5.7 – 1.2	13.6 × 20.5 – 1.98 × 2.98	46.7 – 21.0	–	–	–
No.5T和No.6T近摄镜片镜头[2]	1/3.8 – 1.3	9.1 × 13.6 – 1.84 × 2.76	35.9 – 20.9	–	–	–
PK系列环[3]	1/7.5 – 2.1	18.0 × 27.0 – 1.2 × 1.7	58.5 – 24.6	–	–	–
PN环	1/1.1 – 2.1	2.7 × 4.1 – 1.1 × 1.7	24.8 – 24.9	–	–	–
PB-4或PB-5伸缩镜腔	1/1.4 – 3.1	3.3 × 5.0 – 0.78 × 1.2	25.3 – 33.1	1.7 – 4.0	1.5 × 2.2 – 0.60 × 0.90	26.2 – 38.3
PB-6伸缩镜腔	1/1.3 – 3.5	300 × 4.50 – 0.69 × 1.04	24.95 – 35.18	1.4 – 2.9	1.70 × 2.55 – 0.83 × 1.24	25.37 – 32.61
PS-4或PS-5幻灯片翻拍接腔[4]	1/1.4 – 1.8	3.3 × 5.0 – 1.4 × 2.0	25.3 – 26.6	1.7 – 3.8	1.5 × 22 – 0.62 × 0.94	26.2 – 37.3
PS-6幻灯片翻拍接腔	1/1.3 – 1.8	300 × 4.50 – 1.37 × 2.05	24.96 – 26.60	1.4 – 1.8	1.70 × 2.55 – 1.37 × 2.05	25.37 – 26.60
PB-6M微距翻拍架	1/1.3 – 1.8	30.0 × 4.50 – 0.33 × 0.49	24.95 – 26.90	1.4 – 1.8	1.7 × 2.55 – 1.31 × 1.97	25.37 – 26.90
PB-6E延伸镜腔	1/1.3 – 7.3	3.00 × 4.50 – 0.33 × 0.49	24.95 – 57.27	1.4 – 6.7	1.70 × 2.55 – 0.36 × 0.54	25.37 – 53.99
PF-2、PF-3或PF-4翻拍装置[5]	1/12.0 – 1.0	28.9 × 43.3 – 2.4 × 3.6	85.3 – 21.6	–	–	–

1 反装镜头时，PB-6、PB-6E、PB-6M和PS-6需使用另购的BR-5适配环，其他镜腔则需使用另购的BR-2A适配环。
2 不推荐使用；创建的近摄照片不够清晰。
3 第一个数据适用于单独使用PK-11A时，其他数据则适用于一起使用从PK-11A到PK-13、PK-11到PK-13或PK-1到PK-3的PK环时。请注意，PK-11和PK-1无法直接安装于镜头。
4 反装镜头时需使用BR-3或BR-6微距适配环。
5 PF-2、PF-3和PF-4翻拍装置的数据适用于不使用近摄镜片的情况下使用镜头时被置于底座上的拍摄对象。将粗调对焦控制设为最小值并将微调对焦降低约45mm即可获取1：1的复制比率。

照相机及相关产品中有毒有害物质或元素的名称、含量及环保使用期限说明

环保使用期限	部件名称	有毒有害物质或元素					
		铅（Pb）	汞（Hg）	镉（Cd）	六价铬（Cr（VI））	多溴联苯（PBB）	多溴二苯醚（PBDE）
10	1 照相机外壳和镜筒（金属制） 照相机外壳和镜筒（塑料制）	× ○	○ ○	○ ○	○ ○	○ ○	○ ○
	2 机械元件	×	○	○	○	○	○
	3 光学镜头、棱镜、滤镜玻璃	○	○	○	○	○	○
	4 电子表面装配元件（包括电子元件）	×	○	○	○	○	○
	5 机械元件，包括螺钉、包括螺母和垫圈等	○	○	○	○	○	○

注：
有毒有害物质或元素标识说明
○ 表示该有毒有害物质或元素在该部件所有均质材料中的含量均在SJ/T11363-2006标准规定的限量要求以下。
× 表示该有毒有害物质或元素至少在该部件的某一均质材料中的含量超出SJ/T11363-2006标准规定的限量要求。但是，以现有的技术条件要使照相机相关产品完全不含有上述有毒有害物质极为困难，并且上述产品都包含在《关于电气电子设备中特定有害物质使用限制指令2002/95/EC》的豁免范围之内。

环保使用期限

此标志的数字是基于中华人民共和国电子信息产品污染控制管理办法及相关标准，表示该产品的环保使用期限的年数。
请遵守产品的安全及使用注意事项，并在产品使用后根据各地的法律、规定以适当的方法回收再利用或废弃处理本产品。

进口商：尼康映像仪器销售（中国）有限公司（上海市西藏中路268号来福士广场50楼01-04室，200001）
尼康客户支持中心服务热线：4008-201-665（周一至周日9：00－18：00）
http://www.nikon.com.cn/

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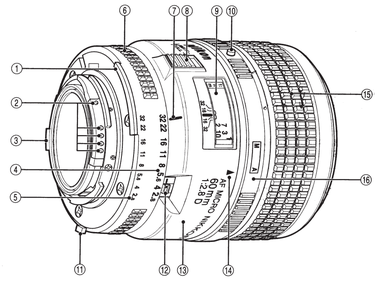
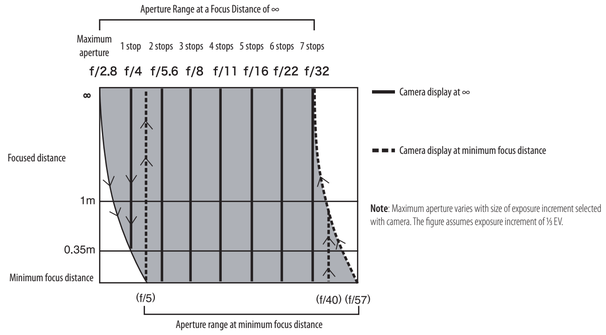


Figure A



Note: Maximum aperture varies with size of exposure increment selected with camera. The figure assumes exposure increment of ½ EV.

English

Thank you for purchasing a Nikon product. The light, compact AF Micro-Nikkor 60mm f/2.8D micro lens has a minimum focus distance of 0.219 m (0.72 ft.) and can supply distance information to the camera body for instantaneous 3D matrix metering or 3D multi-sensor balanced fill-flash flash control. Before using this product, please carefully read both these instructions and the camera manual so you can get the most out of your lens now and for years to come.

■ For Your Safety

⚠ **CAUTIONS**

- ***Do not disassemble***. Touching the internal parts of the camera or lens could result in injury. In the event of malfunction, the product should be repaired only by a qualified technician. Should the product break open as the result of a fall or other accident, remove the camera battery and/or disconnect the AC adapter and then take the product to a Nikon-authorized service center for inspection.
- ***Turn the camera off immediately in the event of malfunction***. Should you notice smoke or an unusual smell coming from the equipment, immediately unplug the AC adapter and remove the camera battery, taking care to avoid burns. Continued operation could result in fire or injury. After removing or disconnecting the power source, take the equipment to a Nikon-authorized service center for inspection.
- ***Do not use in the presence of flammable gas***. Operating electronic equipment in the presence of flammable gas could result in explosion or fire.
- ***Do not look at the sun through the lens or the camera viewfinder***. Viewing the sun or other bright light source through the lens or viewfinder could cause permanent visual impairment.
- ***Keep out of reach of children***. Particular care should be taken to prevent infants from putting the batteries or other small parts into their mouths.
- ***Observe the following precautions when handling the lens and camera***:
  - Keep the lens and camera dry. Failure to observe this precaution could result in fire or electric shock.
  - Do not handle the lens or camera with wet hands. Failure to observe this precaution could in electric shock.
  - Keep the sun well out of the frame when shooting backlit subjects. Sunlight focused into the camera when the sun is in or close to the frame could cause a fire.
  - If the lens will not be used for an extended period, attach the front and rear lens caps and store the lens out of direct sunlight. If left in direct sunlight, the lens could focus the sun's rays onto flammable objects, causing fire.

■ Parts of the Lens

① Meter coupling ridge
② CPU contacts
③ Aperture indexing post
④ Aperture scale
⑤ Aperture–direct-readout scale
⑥ Aperture ring
⑦ Aperture/mounting index
⑧ Focus limit switch
⑨ Focus distance indicator window
⑩ A-M mode ring release button
⑪ EE servo coupling post
⑫ Minimum aperture lock lever
⑬ Lens barrel
⑭ A-M mode index
⑮ Focus ring
⑯ A-M mode ring
⑰ Reproduction ratio indicator
⑱ Focus distance indicator
⑲ Depth-of-field indicators
⑳ Focus distance mark

■ Notices

- Keep the CPU lens contacts clean and be careful not damage the CPU contacts.
- Do not attach the following accessories directly to the lens: PK-1 or PK-11 auto extension rings, BR-4 or BR-2 auto rings, or K1 or K2 rings (the PK-11A and BR-2A can be used in place of the PK-11 and BR-2, respectively). Failure to observe this precaution will result in damage to the CPU contacts or other parts of the lens. Other lens accessories may not be compatible with the camera; be sure to consult the camera manual before use.
- On some cameras, the lens can not be mounted with aperture locked at the minimum value. Be sure to release the aperture lock before attaching the lens. See "The Minimum Aperture Lock Lever" for details.
- The lens can not be used with the DX-1 viewfinder for Nikon F3AF cameras.

■ Focus

This lens supports A-M mode selection. To choose the A-M mode, rotate the A-M mode ring while pressing the A-M mode ring release button. Select **A** for autofocus and **M** for manual focus. Autofocus is not supported with close-up attachment lenses; select **M** when using a close-up attachment lens. Note that selecting **M** when the lens is mounted on a Nikon N2020 (sold in the U. S. A. and Canada only) or F-501 may cause the camera to malfunction.

■ The Focus Limit Switch

For faster focusing, slide the focus limit switch from **FULL** to **LIMIT**. At short focus distances, selecting **LIMIT** will restrict focus to distances in the vicinity of 0.3 m to 0.219 m (1 ft. to 0.72 ft.), while selecting **LIMIT** at longer focus distances will restrict focus to positions between approximately 0.3 m (1 ft.) and ∞.

■ Reproduction Ratio

The reproduction ratio is the ratio of the apparent size of an object to its true size. If, for example, the image on the film (image sensor) is one-fifth of actual size, the reproduction ratio is 1: 5. If desired, the reproduction ratio can be selected using the reproduction ratio indicator. To shoot at a reproduction ratio of 1: 5, for example, select manual focus and rotate the focus ring until the focus distance mark aligns with the number "5" in the reproduction ratio indicator, then move the camera forward or back until the subject is in focus. The "Close-up Photography" table shows the reproduction ratios for different focus distances.

■ Focusing Screens

The cameras below support a variety of focusing screens for use with different lenses or in different situations. The following screens are suited for use with this lens (when using B2/B3, E2/E3, or K2/K3 screens with cameras not listed here, refer respectively to columns B, E, or K):

Camera \ Screen	EC-B/ EC-E	A/L	B	C	D	E	G1	G2	G3	G4	H1
F6		◉	◉			◉					
F5+DP-30	◉	◉	◉			◉		◉ (+1.0)			
F5+DA-30	◉ (+0.5)	◉ (+0.5)	◉ (+0.5)			◉ (+0.5)		◉ (+0.5)			
F4+DP-20/ F4+DA-20			◉			◉		◉			
F3		◉	◉			◉	○	◉			○

Camera \ Screen	H2	H3	H4	J	K	P	M	R	T	U	F
F6				◉							
F5+DP-30				◉							
F5+DA-30				◉ (+0.5)							
F4+DP-20/ F4+DA-20				◉	◉	◉					
F3				◉	◉	◉		△	◉		

◉: Recommended.
○: Vignetting visible in viewfinder (photographs are not affected).
△: Split-screen display does not improve focus accuracy.
( ): Figures in parentheses give the exposure compensation for center-weighted metering. Select "Other screen" for Custom Setting b6 ("Screen comp.") when adjusting exposure compensation for the F6; note that with screens other than B or E, "Other screen" must be selected even when the value for exposure compensation is 0. Users of the F5 and F4 can adjust exposure compensation using Custom Setting 18 or the focusing screen exposure compensation dial, respectively; see the camera manual for details.
Empty cell: Not suited to use with this lens. Note that type M screens can however be used for photomicrography and macro photography at magnifications of 1 : 1 or higher.

■ Depth of Field

The depth-of-field indicators on either side of the focus distance mark show the approximate depth of field (or in other words, the extent of the area in which objects behind or in front of the subject appear to be in focus). Note that the indicators do not provide accurate information at short focus distances; to determine depth of field, refer to the depth of field table. If the camera offers depth-of-field preview (stop down), depth of field can also be previewed in the viewfinder.

■ The Minimum Aperture Lock Lever (Figure A)

Lock aperture at f/32 when shooting in programmed auto or shutter-priority auto mode.

1. Rotate the aperture ring to the minimum aperture setting (f/32).
2. Slide the lock lever toward the aperture ring so that the white dot on the lock lever aligns with the orange dot.

To release the lock, slide the lever in the opposite direction.

■ Close ups and Reproduction Work

To prevent blur caused by camera shake, mount the camera on a tripod and use a cable release or remote cord. Close ups are generally associated with extremely shallow field depths; for greater depths of field, stop down the lens, choose longer exposure times, and position the camera so that the focal plane is parallel to the portion of the subject you wish to photograph. See the following table for information on metering exposure with the lens oriented normally (use stop-down metering when the lens reversed), but note that the exposure metering system for the F-401s/N4004s[1] does not function with bellows or with the PK-11A, PK-12, or PK-13.

Camera	Accessory	Metering
F90X, N90s[2], F90-Series/N90[2], F70-Series/N70[2], F50-Series/N50[2], F4 series, F-801/N8008[2], F-801s/N8008s[2] (CPU- AI)	PK-11A,12,13/PN-11/ TC-201 /TC-14A	Full-aperture
	PK-2, 3/PN-1/Bellows	Stop-down[3]
F3 series, FE, FM, EL2, Nikkormat FT3, F2 Photomic A, F2 Photomic AS (AI)	PK-11A, 12, 13/PN-11/TC-201/TC-14A	Full-aperture
	PK-2, 3/PN-1/Bellows	Stop-down[3]
F-501/N2020[2], FE2, FA, FM2, FG, FG-20, EM, F-301/N2000[2] (AI)	PK-11A,12,13/PN-11/ TC-201/TC-14A	Full-aperture (or light intensity feedback)
	PK-2, 3/PN-1/Bellows	Stop-down[3]
Non-AI	PK-11A,12, 13/PN-11/TC-201/TC-14A/ Bellows	Stop-down[3]
	PK-2, 3/PN-1	Stop-down[3]
		Full-aperture[2]

1. See camera manual for instructions.
2. Lens modification required. After attaching modified lens, perform maximum aperture indexing manually.
3. Sold in U. S. A. only.
4. Sold in U.S. A. and Canada only.

■ Exposure Compensation

Extending macro and other close-up lenses for higher reproduction ratios decreases the amount of light reaching the film (or image sensor), changing the effective f-number (see "Exposure Factor", below). While through-the-lens (TTL) metering and flash control automatically compensate for this drop in brightness by adjusting exposure, flash level, and the exposure indicator according to the amount of light actually passing through the lens, exposure and flash levels set using external exposure meters must be adjusted manually with reference to the exposure factor. For example, if the shutter speed read from an external exposure meter is ⅛ s, the drop in illumination at a reproduction ratio of 1 : 1 can be compensated for by slowing shutter speed by one stop to ¼ s and increasing aperture by ⅔ EV, or by slowing shutter speed by two stops to ½ s and increasing aperture by ⅓ EV.

■ Exposure Factor

The lens f-number indicates the brightness of the subject at a focus distance of infinity; higher reproduction ratios result in reduced image brightness. The actual brightness is referred to as the "effective f-number", and the amount that exposure compensation has to be raised to account for the loss in brightness as the "exposure factor".

Although the effective aperture of this lens changes with focal length (reproduction ratio), the aperture shown in the camera viewfinder or control panel is automatically adjusted to take this into account, with the result that the exposure factor can be ignored if you reference these displays when setting aperture to the value reported by an external exposure meter. The aperture dials for cameras in the F-401 series also automatically adjust for the exposure factor; manual compensation is not required. This adjustment is not however performed by the lens aperture ring or the aperture displays for the F5 and other cameras with a viewfinder aperture window, and consequently you must take the exposure factor into account when using these displays. The following table shows the exposure factors and the amount by which aperture must be increased at reproduction ratios above 1 : 10. Changes to aperture can be kept to a minimum by also adjusting shutter speed.

Reproduction ratio	Exposure factor	Increase aperture by	Aperture shown in camera control panel (effective aperture)			
			Max. (f/2.8)	f/8	f/16	Min. (f/32)
1 : 10	1.15	1/6 EV	3.2	11	16	32
1 : 7	1.23	1/3 EV	3.2	11	16	32
1 : 5	1.32	1/3 EV	3.2	11	16	32
1 : 4	1.41	1/2 EV	3.2	11	16	32
1 : 3	1.57	2/3 EV	3.5	11	22	45
1 : 2.5	1.71	2/3 EV	3.5	11	22	45
1 : 2	1.92	1 EV	4	11	22	45
1 : 1.8	2.04	1 EV	4	11	22	45
1 : 1.6	2.21	1+1/6 EV	4.2	11	22	45
1 : 1.4	2.42	1+1/3 EV	4.2	11	22	45
1 : 1.3	2.57	1+1/3 EV	4.5	11	22	45
1 : 1.2	2.73	1+1/2 EV	4.5	16	32	64
1 : 1.1	2.94	1+1/2 EV	4.8	16	32	64
1 : 1	3.20	1+2/3 EV	5	16	32	64

■ Lens Care

- Use a blower to remove dust and lint from the lens surfaces. To remove smudges and fingerprints, apply a small amount of ethanol or lens cleaner to a soft, clean cotton cloth or lens-cleaning tissue and clean from the center outwards using a circular motion, taking care not to leave smears or touch the glass with your fingers.
- The use of ether may cause smudges to develop on multi-coated lenses. Such smudges can be removed by cleaning the lens again using a cotton cloth dampened with a small amount of ethanol.
- Never use organic solvents such as paint thinner or benzene to clean the lens.
- A lens hood or NC filter can be used to protect the front lens element.
- Attach the front and rear caps when the lens is not in use.
- Keep the lens dry. Rusting of the internal mechanism can cause irreparable damage.
- If the lens will not be used for an extended period, store it in a cool, dry location to prevent mold and rust. Do not store in direct sunlight or with naphtha or camphor moth balls.
- Leaving the lens in extremely hot locations could damage or warp parts made from reinforced plastic.

■ Compatible Accessories

- 62 mm screw-on filters
- 62 mm screw-on Lens Hood HN-22
- Soft Case CL-0815

■ Specifications

Mount	F mount
Focal length	60 mm
Maximum aperture	f/2.8
Lens construction	8 elements in 7 groups
Angle of view	39° 40′
Distance information	Output to camera
Minimum aperture lock	Provided
Focus distance indicator	Graduated in meters and feet from 0.219 m (8 ¾ in.) to infinity (∞)
Minimum focus distance	0.219 m (0.72 ft) from focal plane at all zoom positions
Reproduction ratio indicator	1 : 10 to 1 : 1 (life size)
Aperture scale	f/2.8–f/32 on both standard and aperture-direct-readout scales
Diaphragm	Fully automatic
Aperture range	f/2.8 – 32
Metering	• **CPU/AI cameras**: Full aperture • **Other cameras**: Minimum aperture
Filter-attachment size	62 mm (P = 0.75 mm)
Dimensions	Approx. 70 mm maximum diameter × 74.5 mm (distance from camera lens mount flange); overall length 82.8 mm
Weight	Approx. 440 g (15.5 oz)

Nikon reserves the right to change the specifications of the hardware described in this manual at any time and without prior notice.

■ Depth of Field (Metric)

(m)

Focus distance	Depth of field								Reproduction ratio
	f/2.8	f/4	f/5.6	f/8	f/11	f/16	f/22	f/32	
0.219	0.219 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	0.218 - 0.219	**0.1**
0.22	0.220 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	0.219 - 0.220	**1/1.1**
0.225	0.225 - 0.225	0.225 - 0.225	0.225 - 0.225	0.225 - 0.225	0.225 - 0.225	0.225 - 0.225	0.224 - 0.225	0.224 - 0.225	**1/1.3**
0.23	0.230 - 0.230	0.230 - 0.230	0.230 - 0.230	0.229 - 0.230	0.229 - 0.230	0.229 - 0.230	0.229 - 0.230	0.229 - 0.230	**1/1.4**
0.235	0.235 - 0.235	0.235 - 0.235	0.234 - 0.235	0.234 - 0.235	0.234 - 0.235	0.234 - 0.235	0.234 - 0.235	0.234 - 0.235	**1/1.5**
0.24	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	0.239 - 0.240	**1/1.7**
0.25	0.249 - 0.250	0.249 - 0.250	0.249 - 0.250	0.249 - 0.250	0.249 - 0.250	0.249 - 0.250	0.248 - 0.251	0.248 - 0.251	**1/1.9**
0.27	0.269 - 0.270	0.269 - 0.270	0.269 - 0.270	0.269 - 0.270	0.269 - 0.271	0.268 - 0.271	0.267 - 0.272	0.267 - 0.273	**1/2.3**
0.30	0.299 - 0.300	0.299 - 0.300	0.299 - 0.301	0.298 - 0.301	0.298 - 0.302	0.297 - 0.302	0.296 - 0.304	0.294 - 0.305	**1/2.8**
0.35	0.349 - 0.351	0.349 - 0.351	0.348 - 0.352	0.347 - 0.352	0.346 - 0.354	0.344 - 0.355	0.342 - 0.358	0.339 - 0.361	**1/3.7**
0.40	0.398 - 0.401	0.397 - 0.402	0.396 - 0.403	0.395 - 0.404	0.393 - 0.406	0.391 - 0.409	0.387 - 0.413	0.382 - 0.419	**1/4.6**
0.50	0.496 - 0.503	0.495 - 0.504	0.493 - 0.506	0.491 - 0.509	0.487 - 0.513	0.487 - 0.519	0.475 - 0.528	0.466 - 0.541	**1/6.3**
0.70	0.692 - 0.708	0.688 - 0.711	0.684 - 0.716	0.677 - 0.724	0.669 - 0.734	0.657 - 0.750	0.641 - 0.773	0.620 - 0.809	**1/9.7**
1	0.981 - 1.020	0.973 - 1.029	0.963 - 1.041	0.948 - 1.059	0.929 - 1.085	0.903 - 1.126	0.868 - 1.189	0.825 - 1.293	**1/14.7**
2	1.914 - 2.096	1.880 - 2.138	1.835 - 2.202	1.774 - 2.298	1.696 - 2.421	1.597 - 2.709	1.477 - 3.189	1.336 - 3.281	**1/31.4**
∞	38.3 – ∞	27.1 – ∞	19.2 – ∞	19.5 – ∞	9.6 – ∞	9.8 – ∞	4.9 – ∞	3.5 – ∞	**1/∞**

■ Depth of Field (Imperial)

(ft)

Focus distance	Depth of field								Reproduction ratio
	f/2.8	f/4	f/5.6	f/8	f/11	f/16	f/22	f/32	
8 ¾ in.	8 11/16 in. – 8 11/16 in.	8 11/16 in. – 8 11/16 in.	8 11/16 in. – 8 11/16 in.	8 11/16 in. – 8 11/16 in.	8 11/16 in. – 8 11/16 in.	8 11/16 in. – 8 11/16 in.	8 11/16 in. – 8 11/16 in.	8 11/16 in. – 8 11/16 in.	**1/1.2**
9 in.	9 in. – 8 15/16 in.	9 in. – 8 15/16 in.	9 in. – 8 15/16 in.	9 in. – 8 15/16 in.	9 in. – 8 15/16 in.	9 in. – 8 15/16 in.	9 in. – 8 15/16 in.	9 in. – 8 15/16 in.	**1/1.4**
9 ¼ in.	9 5/16 in. – 9 3/16 in.	9 5/16 in. – 9 3/16 in.	9 5/16 in. – 9 3/16 in.	9 5/16 in. – 9 3/16 in.	9 5/16 in. – 9 3/16 in.	9 5/16 in. – 9 3/16 in.	9 5/16 in. – 9 3/16 in.	9 5/16 in. – 9 3/16 in.	**1/1.5**
9 ½ in.	9 5/8 in. – 9 7/16 in.	9 5/8 in. – 9 7/16 in.	9 5/8 in. – 9 7/16 in.	9 5/8 in. – 9 7/16 in.	9 5/8 in. – 9 7/16 in.	9 5/8 in. – 9 7/16 in.	9 5/8 in. – 9 7/16 in.	9 5/8 in. – 9 7/16 in.	**1/1.7**
10 in.	10 in. – 9 15/16 in.	10 in. – 9 15/16 in.	10 in. – 9 15/16 in.	10 in. – 9 15/16 in.	10 in. – 9 15/16 in.	10 in. – 9 15/16 in.	10 in. – 9 15/16 in.	10 1/16 in. – 9 15/16 in.	**1/2.0**
1 ft	1 ft – 11 15/16 in.	1 ft – 11 15/16 in.	1 ft – 11 15/16 in.	1 ft – 11 15/16 in.	1 ft 1/16 in. – 11 13/16 in.	1 ft 1/16 in. – 11 13/16 in.	1 ft 3/16 in. – 11 13/16 in.	1 ft 3/16 in. – 11 13/16 in.	**1/2.9**
1 ¼ ft	1 ft 3 in. – 1 ft 2 15/16 in.	1 ft 3 1/16 in. – 1 ft 2 15/16 in.	1 ft 3 1/16 in. – 1 ft 2 15/16 in.	1 ft 3 1/16 in. – 1 ft 2 15/16 in.	1 ft 3 1/16 in. – 1 ft 2 15/16 in.	1 ft 3 1/16 in. – 1 ft 2 15/16 in.	1 ft 3 7/16 in. – 1 ft 2 7/16 in.	1 ft 3 15/16 in. – 1 ft 2 7/16 in.	**1/4.3**
1 ½ ft	1 ft 6 1/16 in. – 1 ft 2 15/16 in.	1 ft 6 1/16 in. – 1 ft 5 13/16 in.	1 ft 6 1/16 in. – 1 ft 5 13/16 in.	1 ft 6 5/16 in. – 1 ft 5 13/16 in.	1 ft 6 5/16 in. – 1 ft 5 5/16 in.	1 ft 6 5/16 in. – 1 ft 5 5/16 in.	1 ft 6 5/16 in. – 1 ft 5 5/16 in.	1 ft 7 3/16 in. – 1 ft 4 13/16 in.	**1/5.6**
2 ft	2 ft 3/16 in. – 1 ft 11 15/16 in.	2 ft 5/16 in. – 1 ft 11 15/16 in.	2 ft 7/16 in. – 1 ft 11 15/16 in.	2 ft 9/16 in. – 1 ft 11 15/16 in.	2 ft 15/16 in. – 1 ft 11 3/16 in.	2 ft 1 3/16 in. – 1 ft 11 3/16 in.	2 ft 1 15/16 in. – 1 ft 10 15/16 in.	2 ft 2 1/16 in. – 1 ft 9 15/16 in.	**1/8.2**
3 ft	3 ft 15/16 in. – 2 ft 11 15/16 in.	3 ft 1/16 in. – 2 ft 11 15/16 in.	3 ft 1 1/16 in. – 2 ft 10 15/16 in.	3 ft 1 13/16 in. – 2 ft 10 5/16 in.	3 ft 2 1/16 in. – 2 ft 9 15/16 in.	3 ft 3 3/16 in. – 2 ft 8 13/16 in.	3 ft 5 1/16 in. – 2 ft 7 1/16 in.	3 ft 9 in. – 2 ft 6 5/16 in.	**1/13.3**
7 ft	7 ft 4 3/16 in. – 6 ft 7 15/16 in.	7 ft 6 1/16 in. – 6 ft 6 15/16 in.	7 ft 8 15/16 in. – 6 ft 4 15/16 in.	8 ft 1 15/16 in. – 6 ft 1 11/16 in.	8 ft 8 7/16 in. – 5 ft 10 15/16 in.	9 ft 8 15/16 in. – 5 ft 5 15/16 in.	11 ft 7 11/16 in. – 5 ft 1 1/16 in.	16 ft 4 in. – 4 ft 6 15/16 in.	**1/33.6**
∞	125 ft – ∞	88 ft – ∞	63 ft – ∞	44 ft – ∞	31 ft – ∞	22 ft – ∞	16 ft – ∞	11 ft – ∞	**1/∞**

■ Close-up Photography (Metric)

(cm)

Accessory	Close-up photography			Close-up photography (lens reversed)[1]		
	Reproduction ratio	Subject field	Focus distance	Reproduction ratio	Subject field	Focus distance
No. 5T close-up attachment lens	1/11 – 1.1	26.6 × 39.9 – 2.16 × 3.25	79.1 – 21.5	–	–	–
No. 6T close-up attachment lens	1/5.7 – 1.2	13.6 × 20.5 – 1.98 × 2.98	46.7 – 21.0	–	–	–
No. 5T with No. 6T close-up attachment lens[2]	1/3.8 – 1.3	9.1 × 13.6 – 1.84 × 2.76	35.9 – 20.9	–	–	–
PK-series Rings[3]	1/7.5 – 2.1	18.0 × 27.0 – 1.2 × 1.7	58.5 – 24.6	–	–	–
PN-Ring	1/1.1 – 2.1	2.7 × 4.1 – 1.1 × 1.7	24.8 – 24.9	–	–	–
PB-4 or PB-5 bellows attachment	1/1.4 – 3.1	3.3 × 5.0 – 0.78 × 1.2	25.3 – 33.1	1.7 – 4.0	1.5 × 2.2 – 0.60 × 0.90	26.2 – 38.3
PB-6 bellows attachment	1/1.3 – 3.5	300 × 4.50 – 0.69 × 1.04	24.95 – 35.18	1.4 – 2.9	1.70 × 2.55 – 0.83 × 1.24	25.37 – 32.61
PS-4 or PS-5 slide copying adapter[4]	1/1.4 – 1.8	3.3 × 5.0 – 1.4 × 2.0	25.3 – 26.6	1.7 – 3.8	1.5 × 22 – 0.62 × 0.94	26.2 – 37.3
PS-6 slide copying adapter	1/1.3 – 1.8	300 × 4.50 – 1.37 × 2.05	24.96 – 26.60	1.4 – 1.8	1.70 × 2.55 – 1.37 × 2.05	25.37 – 26.60
PB-6M macro copying stand	1/1.3 – 1.8	30.0 × 4.50 – 0.33 × 0.49	24.95 – 26.90	1.4 – 1.8	1.7 × 2.55 – 1.31 × 1.97	25.37 – 26.90
PB-6E extension bellows	1/1.3 – 7.3	3.00 × 4.50 – 0.33 × 0.49	24.95 – 57.27	1.4 – 6.7	1.70 × 2.55 – 0.36 × 0.54	25.37 – 53.99
PF-2, PF-3, or PF-4 repro copy outfit[5]	1/12.0 – 1.0	28.9 × 43.3 – 2.4 × 3.6	85.3 – 21.6	–	–	–

1.When lens is reversed, PB-6, PB-6E, PB-6M, and PS-6 require optional BR-5 adapter ring, other attachments optional BR-2A adapter ring.
2.Not recommended; results in close up photographs with poor definition.
3.First figure is for PK-11A when used alone, remaining figures for rings PK-11A through PK-13, PK-11 through PK-13, or PK-1 through PK-3 used together. Note the PK-11 and PK-1 can not be attached directly to the lens.
4.BR-3 or BR-6 macro ring adapter require when lens is reversed.
5.The figures for the PF-2, PF-3, and PF-4 repro copy outfits are for a subject positioned on the base plate when the lens is used without close-up attachments. A reproduction ratio of 1 : 1 can be obtained by setting the coarse focus control to minimum and lowering fine focus by about 45 mm.

■ Close-up Photography (Imperial)

(in.)

Accessory	Close-up photography			Close-up photography (lens reversed)[1]		
	Reproduction ratio	Subject field	Focus distance	Reproduction ratio	Subject field	Focus distance
No. 5T close-up attachment lens	1/11 – 1.1	10.5 × 15.7 – 0.85 × 1.28	31.1 – 8.5	–	–	–
No. 6T close-up attachment lens	1/5.7 – 1.2	5.4 × 8.1 – 0.78 × 1.17	18.4 – 8.3	–	–	–
No. 5T with No. 6T close-up attachment lens[2]	1/3.8 – 1.3	3.6 × 5.4 – 0.73 × 1.09	14.1 – 8.2	–	–	–
PK-series Rings[3]	1/7.5 – 2.1	7.1 × 10.6 – 0.46 × 0.68	23.0 – 9.7	–	–	–
PN-Ring	1/1.1 – 2.1	1.1 × 1.6 – 0.44 × 0.67	9.7 – 9.8	–	–	–
PB-4 or PB-5 bellows attachment	1/1.4 – 3.1	1.3 × 2.0 – 0.31 × 0.46	10.0 – 13.0	1.7 – 4.0	0.57 × 0.86 – 0.24 × 0.35	10.3 – 15.1
PB-6 bellows attachment	1/1.3 – 3.5	1.18 × 1.77 – 0.27 × 0.41	9.82 – 13.85	1.4 – 2.9	0.67 × 1.01 – 0.32 × 0.49	9.99 – 12.66
PS-4 or PS-5 slide copying adapter[4]	1/1.4 – 1.8	1.3 × 2.0 – 0.54 × 0.81	10.0 – 10.5	1.7 – 3.8	0.57 × 0.86 – 0.25 × 0.37	10.3 – 14.7
PS-6 slide copying adapter	1/1.3 – 1.8	1.18 × 1.77 – 0.54 × 0.81	9.82 – 10.47	1.4 – 1.8	0.67 × 1.01 – 0.54 × 0.81	9.99 – 10.47
PB-6M macro copying stand	1/1.3 – 1.8	1.18 × 1.77 – 0.52 × 0.78	9.82 – 10.59	1.4 – 1.8	0.67 × 1.01 – 0.52 × 0.78	9.99 – 10.59
PB-6E extension bellows	1/1.3 – 7.3	1.18 × 1.77 – 0.13× 0.19	9.82 – 22.55	1.4 – 6.7	0.67 × 1.01 – 0.14 × 0.21	9.99 – 21.26
PF-2, PF-3, or PF-4 repro copy outfit[5]	1/12.0 – 1.0	1.14 × 1.70 – 0.94 × 1.42	33.6 – 8.6	–	–	–

1.When lens is reversed, PB-6, PB-6E, PB-6M, and PS-6 require optional BR-5 adapter ring, other attachments optional BR-2A adapter ring.
2.Not recommended; results in close up photographs with poor definition.
3.First figure is for PK-11A when used alone, remaining figures for rings PK-11A through PK-13, PK-11 through PK-13, or PK-1 through PK-3 used together. Note the PK-11 and PK-1 can not be attached directly to the lens.
4.BR-3 or BR-6 macro ring adapter require when lens is reversed.
5.The figures for the PF-2, PF-3, and PF-4 repro copy outfits are for a subject positioned on the base plate when the lens is used without close-up attachments. A reproduction ratio of 1 : 1 can be obtained by setting the coarse focus control to minimum and lowering fine focus by about 45 mm.