

REVERSE RING

RR - 27

RR - 40.5

1. Summary These reverse rings are accessories to mount lenses in reverse order magnifying objects.

2. Model RR-27
 RR-40.5

3. Specification

3-1. Physical (As per the attached drawing)

	RR-27	RR-40.5
Dimensions	See external view	See external view
Weight	6 g	25 g
Mount	C-Mount , CS-Mount (1-32UN-2A)	
Applicable Lens	Suited for the lenses having ϕ 27, P=0.5 of filter size.	Suited for the lenses having ϕ 40.5, P=0.5 of filter size.

3-2. Setup (See setup illustration)
 Setup shall be as follows.

Camera + (Extension Tube) + Reverse Ring + Lens (in reverse order) + Shading Ring

4. Related Formula (See setup illustration)

(1) $X = f^2 / \Delta X$

(2) Magnification : $M = \Delta X / f$

(3) Use the following formula to find out length of extension tube (EX-T) from any magnification.

$$EX - T = M \times f - FB - RR - A$$

(4) Object to Image Sensor Distance : $L = \{ (f^2 + \Delta X^2) / \Delta X \} + 2 \times f + H$

(5) Field of View Horizontal : $W = w / M$ (w : width of Image Sensor)

 Vertical : $H = h / M$ (h : height of Image Sensor)

(f : Focal Length , ΔX : Amount of Extension = Focal Point to Image Sensor Distance)

(H : Principal Interval , FB : Flange Back Length of Camera)

(RR : Thickness of Reverse Ring (2.5mm) , A : Focal Point to Lens Front End Distance)

Dimensions of Image Sensor

(1 Format : 12.7 \times 9.525 mm 2/3 Format : 8.8 \times 6.6 mm 1/2 Format : 6.4 \times 4.8 mm)

(1/3 Format : 4.8 \times 3.6 mm 1/4 Format : 3.6 \times 2.7 mm)

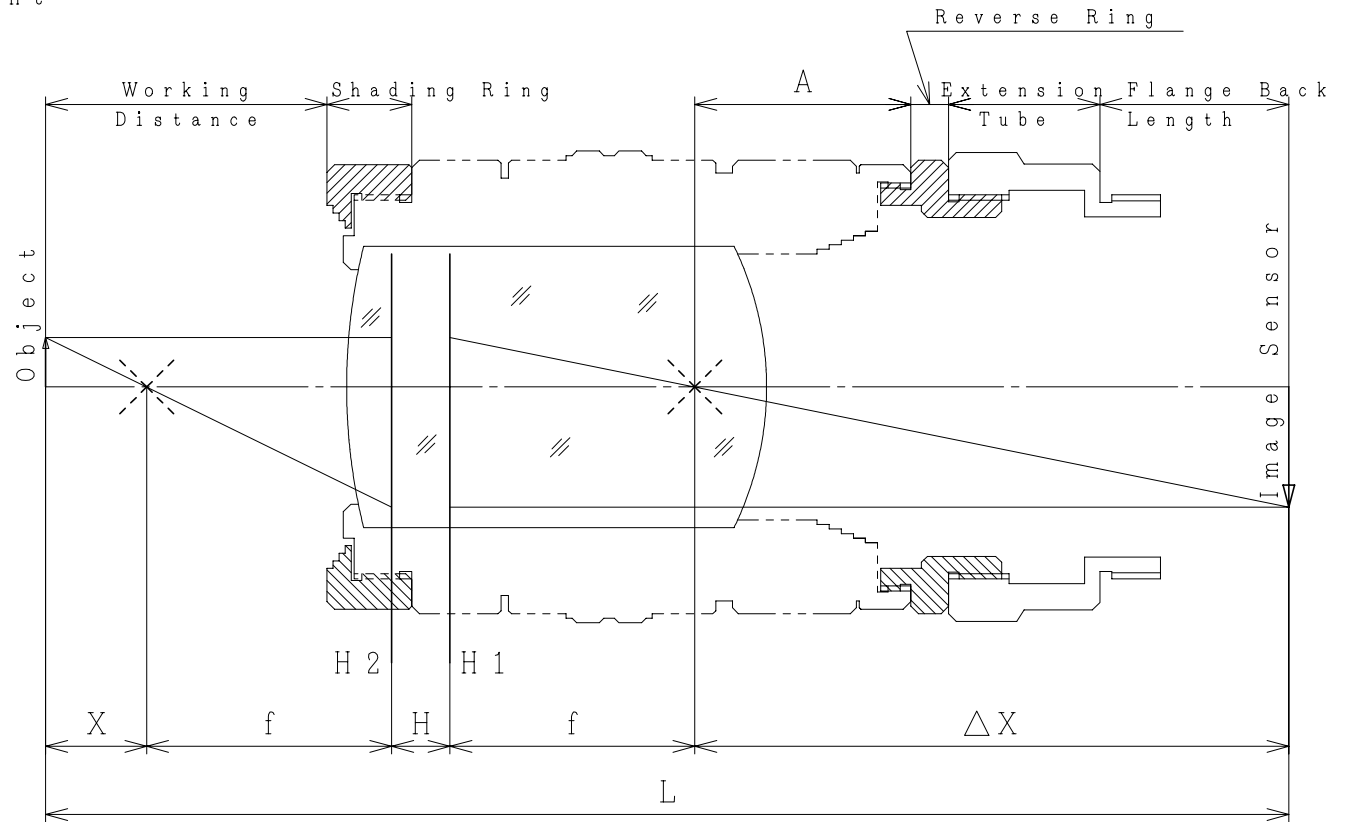
5. Constituent

Reverse Ring 1 piece
Shading Ring 1 piece

				Approved	Checked	Drawn	Drawing Title
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				NOV. 22,'02	80036-X001-00T1-B14		

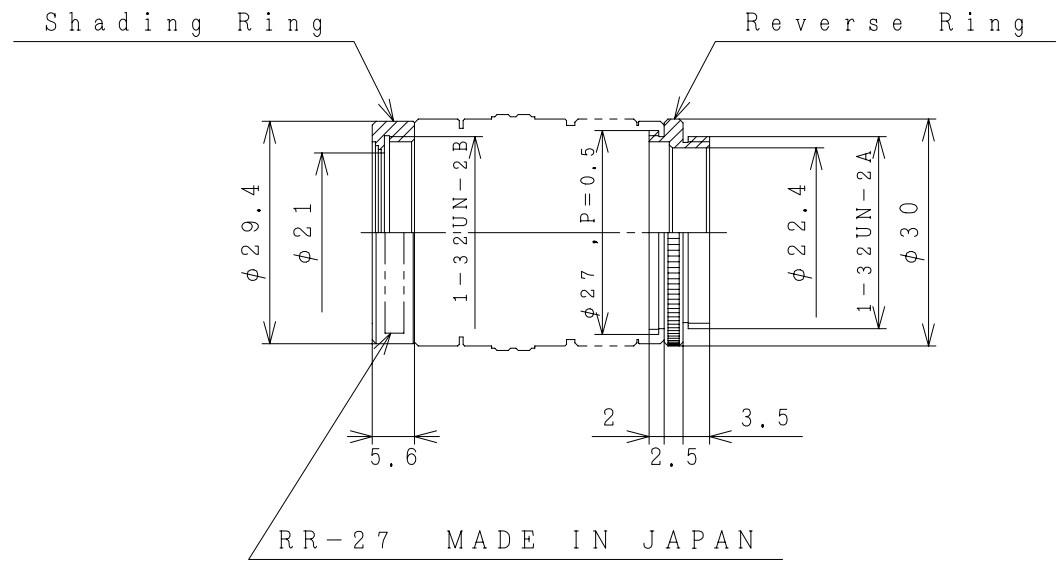
f = Focal Length
 H = Principal Interval
 $H1$ = Primary Principal Point
 $H2$ = Secondary Principal Point
 A = Focal Point to Lens
 Front End Distance

Optical and Mechanical Data		
	H mm	A mm
H 1 2 1 2 - M	5.372	15.782
C 1 6 1 4 - M	1.975	16.755
C 2 5 1 4 - M	-10.507	10.027
C 3 5 1 6 - M	-23.004	8.030
H 1 2 1 2 B	14.545	14.101
C 1 6 1 4 A	3.852	14.278
B 2 5 1 4 D	0.530	4.180
H 1 2 1 2 A	14.545	24.601
C 1 6 1 4	3.852	21.278
B 2 5 1 4 C - 2	-4.252	11.798
B 5 0 1 8 A - 3	-5.020	-24.794



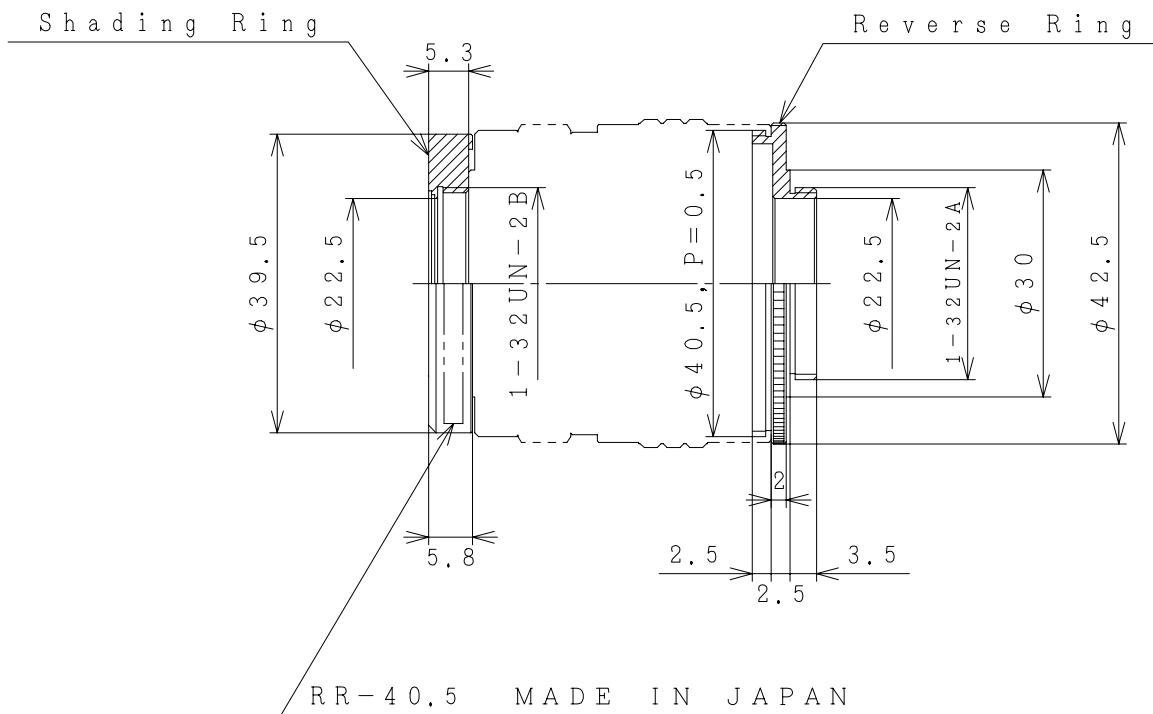
UNIT : mm

$\triangle 3$				尺度	個数	
$\triangle 2$				N. T. S.		
$\triangle 1$				名称		
	訂正	記事	年月日	RR-27 RR-40.5 Reverse Setup Illustration		
承認	設計	製図	検図	完図	Nov. 25.'02 年月日	
				図面番号		
				80036-X001-00T1-B24		
PENTAX Precision Co., Ltd.						



UNIT : mm

				尺度	個数	
				N. T. S.		
				名称		
訂正記事				年月日	担当	RR-27 Reverse Ring Setup View
承認	設計	製図	検図	完図		
				Nov. 25.'02	年月日	図面番号
						80036-X001-00T1-B34
PENTAX Precision Co., Ltd.						



UNIT : mm

$\triangle 3$				尺度	個数	
$\triangle 2$				N. T. S.		
$\triangle 1$				名称		
	訂	正	記	年	月	日
	事			担	当	
承認	設計	製図	検図	完図	RR-40.5 Reverse Ring Setup View	
				Nov. 25.'02	図面番号	
				年 月 日	80036-X001-00T1-B44	
PENTAX Precision Co., Ltd.						

Supplementary Table 1.								
Macro-Focus Table (Shading Ring + H1214-M + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	14.7	2.9					2.2	1.7
5	14.2	3.3					2.0	1.5
10	13.8	3.7					1.7	1.3
15	13.5	4.1					1.6	1.2
20	13.2	4.5					1.4	1.1
25	13.0	4.9					1.3	1.0
30	12.8	5.3					1.2	0.9
35	12.6	5.7					1.1	0.8
40	12.5	6.1					1.0	0.8
45	12.3	6.5					1.0	0.7
50	12.2	6.9					0.9	0.7
55	12.1	7.3					0.9	0.7
60	12.0	7.7					0.8	0.6
65	12.0	8.1					0.8	0.6
70	11.9	8.5					0.8	0.6
75	11.8	8.9					0.7	0.5

Supplementary Table 2.								
Macro-Focus Table (Shading Ring + H1214-M + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	15.4	2.5	2.6	1.9	1.9	1.5	1.5	1.1
5	14.7	2.9	2.2	1.7	1.7	1.3	1.3	0.9
10	14.2	3.3	2.0	1.5	1.5	1.1	1.1	0.8
15	13.8	3.7	1.7	1.3	1.3	1.0	1.0	0.7
20	13.5	4.1	1.6	1.2	1.2	0.9	0.9	0.7
25	13.2	4.5	1.4	1.1	1.1	0.8	0.8	0.6
30	13.0	4.9	1.3	1.0	1.0	0.7	0.7	0.6
35	12.8	5.3	1.2	0.9	0.9	0.7	0.7	0.5
40	12.6	5.7	1.1	0.8	0.8	0.6	0.6	0.5
45	12.5	6.1	1.1	0.8	0.8	0.6	0.6	0.4
50	12.3	6.5	1.0	0.7	0.7	0.6	0.6	0.4
55	12.2	6.9	0.9	0.7	0.7	0.5	0.5	0.4
60	12.1	7.3	0.9	0.7	0.7	0.5	0.5	0.4
65	12.0	7.7	0.8	0.6	0.6	0.5	0.5	0.4
70	12.0	8.1	0.8	0.6	0.6	0.4	0.4	0.3
75	11.9	8.5	0.8	0.6	0.6	0.4	0.4	0.3

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							SPEC. SHEET
No.	Revisions	Date	By	Date Drawn NOV. 22,'02		Drawing Number 80036 Supplementary Table	

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Supplementary Table 3.

Macro-Focus Table (Shading Ring + C1614-M + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	18.9	2.3			3.8	2.9	2.8	2.1
5	18.1	2.6			3.4	2.5	2.5	1.8
10	17.4	2.9			3.0	2.3	2.2	1.6
15	16.9	3.2			2.7	2.0	2.0	1.5
20	16.4	3.5			2.5	1.9	1.8	1.4
25	16.1	3.9			2.3	1.7	1.7	1.2
30	15.8	4.2			2.1	1.6	1.5	1.1
35	15.5	4.5			2.0	1.5	1.4	1.1
40	15.3	4.8			1.8	1.4	1.3	1.0
45	15.1	5.1			1.7	1.3	1.3	0.9
50	14.9	5.4			1.6	1.2	1.2	0.9
55	14.7	5.7			1.5	1.2	1.1	0.8
60	14.6	6.0			1.5	1.1	1.1	0.8
65	14.4	6.4			1.4	1.0	1.0	0.8
70	14.3	6.7			1.3	1.0	1.0	0.7
75	14.2	7.0			1.3	0.9	0.9	0.7

Supplementary Table 4.

Macro-Focus Table (Shading Ring + C1614-M + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	20.0	2.0	3.2	2.4	2.4	1.8	1.8	1.4
5	18.9	2.3	2.8	2.1	2.1	1.6	1.6	1.2
10	18.1	2.6	2.5	1.8	1.8	1.4	1.4	1.0
15	17.4	2.9	2.2	1.6	1.6	1.2	1.2	0.9
20	16.9	3.2	2.0	1.5	1.5	1.1	1.1	0.8
25	16.4	3.5	1.8	1.4	1.4	1.0	1.0	0.8
30	16.1	3.9	1.7	1.2	1.2	0.9	0.9	0.7
35	15.8	4.2	1.5	1.2	1.2	0.9	0.9	0.6
40	15.5	4.5	1.4	1.1	1.1	0.8	0.8	0.6
45	15.3	4.8	1.3	1.0	1.0	0.8	0.8	0.6
50	15.1	5.1	1.3	0.9	0.9	0.7	0.7	0.5
55	14.9	5.4	1.2	0.9	0.9	0.7	0.7	0.5
60	14.7	5.7	1.1	0.8	0.8	0.6	0.6	0.5
65	14.6	6.0	1.1	0.8	0.8	0.6	0.6	0.4
70	14.4	6.4	1.0	0.8	0.8	0.6	0.6	0.4
75	14.3	6.7	1.0	0.7	0.7	0.5	0.5	0.4

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Supplementary Table 5.								
Macro-Focus Table (Shading Ring + C2514-M + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	31.5	1.2			7.3	5.5	5.3	4.0
5	28.5	1.4			6.3	4.7	4.6	3.4
10	26.3	1.6			5.5	4.1	4.0	3.0
15	24.6	1.8			4.9	3.7	3.6	2.7
20	23.2	2.0			4.4	3.3	3.2	2.4
25	22.1	2.2			4.0	3.0	2.9	2.2
30	21.1	2.4			3.7	2.7	2.7	2.0
35	20.3	2.6			3.4	2.5	2.5	1.8
40	19.6	2.8			3.1	2.4	2.3	1.7
45	19.0	3.0			2.9	2.2	2.1	1.6
50	18.5	3.2			2.7	2.1	2.0	1.5
55	18.0	3.4			2.6	1.9	1.9	1.4
60	17.6	3.6			2.4	1.8	1.8	1.3
65	17.3	3.8			2.3	1.7	1.7	1.3
70	16.9	4.0			2.2	1.6	1.6	1.2
75	16.6	4.2			2.1	1.6	1.5	1.1

Supplementary Table 6.								
Macro-Focus Table (Shading Ring + C2514-M + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	35.7	1.0	6.4	4.8	4.8	3.6	3.6	2.7
5	31.5	1.2	5.3	4.0	4.0	3.0	3.0	2.2
10	28.5	1.4	4.6	3.4	3.4	2.6	2.6	1.9
15	26.3	1.6	4.0	3.0	3.0	2.2	2.2	1.7
20	24.6	1.8	3.6	2.7	2.7	2.0	2.0	1.5
25	23.2	2.0	3.2	2.4	2.4	1.8	1.8	1.3
30	22.1	2.2	2.9	2.2	2.2	1.6	1.6	1.2
35	21.1	2.4	2.7	2.0	2.0	1.5	1.5	1.1
40	20.3	2.6	2.5	1.8	1.8	1.4	1.4	1.0
45	19.6	2.8	2.3	1.7	1.7	1.3	1.3	1.0
50	19.0	3.0	2.1	1.6	1.6	1.2	1.2	0.9
55	18.5	3.2	2.0	1.5	1.5	1.1	1.1	0.8
60	18.0	3.4	1.9	1.4	1.4	1.1	1.1	0.8
65	17.6	3.6	1.8	1.3	1.3	1.0	1.0	0.7
70	17.3	3.8	1.7	1.3	1.3	0.9	0.9	0.7
75	16.9	4.0	1.6	1.2	1.2	0.9	0.9	0.7

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PENTAX Precision Co.,Ltd.				NOV. 22,'02		80036 Supplementary Table	

Supplementary Table 7.								
Macro-Focus Table (Shading Ring + C3516-M + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	52.6	0.8			10.6	8.0	7.7	5.8
5	46.4	1.0			9.0	6.8	6.6	4.9
10	41.8	1.1			7.9	5.9	5.7	4.3
15	38.3	1.3			6.9	5.2	5.0	3.8
20	35.5	1.4			6.2	4.7	4.5	3.4
25	33.3	1.6			5.6	4.2	4.1	3.1
30	31.4	1.7			5.1	3.9	3.7	2.8
35	29.8	1.9			4.7	3.6	3.4	2.6
40	28.5	2.0			4.4	3.3	3.2	2.4
45	27.3	2.2			4.1	3.1	3.0	2.2
50	26.3	2.3			3.8	2.9	2.8	2.1
55	25.4	2.4			3.6	2.7	2.6	2.0
60	24.6	2.6			3.4	2.5	2.5	1.9
65	23.9	2.7			3.2	2.4	2.3	1.8
70	23.3	2.9			3.0	2.3	2.2	1.7
75	22.7	3.0			2.9	2.2	2.1	1.6

Supplementary Table 8.								
Macro-Focus Table (Shading Ring + C3516-M + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	61.6	0.7	9.4	7.1	7.1	5.3	5.3	4.0
5	52.7	0.8	7.8	5.8	5.8	4.4	4.4	3.3
10	46.4	1.0	6.6	4.9	4.9	3.7	3.7	2.8
15	41.8	1.1	5.7	4.3	4.3	3.2	3.2	2.4
20	38.3	1.3	5.0	3.8	3.8	2.8	2.8	2.1
25	35.5	1.4	4.5	3.4	3.4	2.5	2.5	1.9
30	33.3	1.6	4.1	3.1	3.1	2.3	2.3	1.7
35	31.4	1.7	3.7	2.8	2.8	2.1	2.1	1.6
40	29.8	1.9	3.4	2.6	2.6	1.9	1.9	1.5
45	28.5	2.0	3.2	2.4	2.4	1.8	1.8	1.3
50	27.3	2.2	3.0	2.2	2.2	1.7	1.7	1.3
55	26.3	2.3	2.8	2.1	2.1	1.6	1.6	1.2
60	25.4	2.4	2.6	2.0	2.0	1.5	1.5	1.1
65	24.6	2.6	2.5	1.9	1.9	1.4	1.4	1.0
70	23.9	2.7	2.3	1.8	1.8	1.3	1.3	1.0
75	23.3	2.9	2.2	1.7	1.7	1.2	1.2	0.9

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PENTAX Precision Co.,Ltd.				NOV. 22,'02		80036 Supplementary Table	

Supplementary Table 9.								
Macro-Focus Table (Shading Ring + H1212B + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	16.3	2.8					2.3	1.7
5	15.7	3.2					2.0	1.5
10	15.3	3.6					1.8	1.3
15	15.0	4.0					1.6	1.2
20	14.7	4.4					1.4	1.1
25	14.4	4.9					1.3	1.0
30	14.2	5.3					1.2	0.9
35	14.1	5.7					1.1	0.8
40	13.9	6.1					1.1	0.8
45	13.8	6.5					1.0	0.7
50	13.7	6.9					0.9	0.7
55	13.6	7.3					0.9	0.7
60	13.5	7.7					0.8	0.6
65	13.4	8.1					0.8	0.6
70	13.4	8.5					0.7	0.6
75	13.3	9.0					0.7	0.5

Supplementary Table 10.								
Macro-Focus Table (Shading Ring + H1212B + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	17.0	2.4	2.7	2.0	2.0	1.5	1.5	1.1
5	16.3	2.8	2.3	1.7	1.7	1.3	1.3	1.0
10	15.7	3.2	2.0	1.5	1.5	1.1	1.1	0.8
15	15.3	3.6	1.8	1.3	1.3	1.0	1.0	0.7
20	15.0	4.0	1.6	1.2	1.2	0.9	0.9	0.7
25	14.7	4.4	1.4	1.1	1.1	0.8	0.8	0.6
30	14.4	4.8	1.3	1.0	1.0	0.7	0.7	0.6
35	14.2	5.3	1.2	0.9	0.9	0.7	0.7	0.5
40	14.1	5.7	1.1	0.8	0.8	0.6	0.6	0.5
45	13.9	6.1	1.1	0.8	0.8	0.6	0.6	0.4
50	13.8	6.5	1.0	0.7	0.7	0.6	0.6	0.4
55	13.7	6.9	0.9	0.7	0.7	0.5	0.5	0.4
60	13.6	7.3	0.9	0.7	0.7	0.5	0.5	0.4
65	13.5	7.7	0.8	0.6	0.6	0.5	0.5	0.3
70	13.4	8.1	0.8	0.6	0.6	0.4	0.4	0.3
75	13.4	8.5	0.7	0.6	0.6	0.4	0.4	0.3

				Approved	Checked	Drawn	Drawing Title
							SPEC. SHEET
No.	Revisions	Date	By				
PENTAX Precision Co.,Ltd.				Date Drawn NOV. 22,'02	Drawnig Number 80036 Supplementary Table		

Supplementary Table 11.

Macro-Focus Table (Shading Ring + C1614A + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	19.6	2.1			4.2	3.1	3.0	2.3
5	18.6	2.4			3.6	2.7	2.6	2.0
10	17.8	2.7			3.2	2.4	2.3	1.8
15	17.2	3.0			2.9	2.2	2.1	1.6
20	16.8	3.4			2.6	2.0	1.9	1.4
25	16.4	3.7			2.4	1.8	1.7	1.3
30	16.0	4.0			2.2	1.7	1.6	1.2
35	15.7	4.3			2.1	1.5	1.5	1.1
40	15.5	4.6			1.9	1.4	1.4	1.0
45	15.2	4.9			1.8	1.3	1.3	1.0
50	15.0	5.2			1.7	1.3	1.2	0.9
55	14.9	5.5			1.6	1.2	1.2	0.9
60	14.7	5.8			1.5	1.1	1.1	0.8
65	14.6	6.1			1.4	1.1	1.0	0.8
70	14.4	6.4			1.4	1.0	1.0	0.7
75	14.3	6.7			1.3	1.0	0.9	0.7

Supplementary Table 12.

Macro-Focus Table (Shading Ring + C1614A + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	20.9	1.8	3.5	2.7	2.7	2.0	2.0	1.5
5	19.6	2.1	3.0	2.3	2.3	1.7	1.7	1.3
10	18.6	2.4	2.6	2.0	2.0	1.5	1.5	1.1
15	17.9	2.7	2.3	1.8	1.8	1.3	1.3	1.0
20	17.3	3.0	2.1	1.6	1.6	1.2	1.2	0.9
25	16.8	3.4	1.9	1.4	1.4	1.1	1.1	0.8
30	16.4	3.7	1.7	1.3	1.3	1.0	1.0	0.7
35	16.0	4.0	1.6	1.2	1.2	0.9	0.9	0.7
40	15.7	4.3	1.5	1.1	1.1	0.8	0.8	0.6
45	15.5	4.6	1.4	1.0	1.0	0.8	0.8	0.6
50	15.2	4.9	1.3	1.0	1.0	0.7	0.7	0.6
55	15.0	5.2	1.2	0.9	0.9	0.7	0.7	0.5
60	14.9	5.5	1.2	0.9	0.9	0.7	0.7	0.5
65	14.7	5.8	1.1	0.8	0.8	0.6	0.6	0.5
70	14.6	6.1	1.0	0.8	0.8	0.6	0.6	0.4
75	14.4	6.4	1.0	0.7	0.7	0.6	0.6	0.4

				Approved	Checked	Drawn	Drawing Title
							SPEC. SHEET
No.	Revisions	Date	By	Date Drawn NOV. 22,'02		Drawning Number 80036 Supplementary Table	

PENTAX Precision Co.,Ltd.

Date Drawn
NOV. 22,'02

Drawning Number
80036 Supplementary Table

Supplementary Table 13.

Macro-Focus Table (Shading Ring + B2514D + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	37.9	1.0	13.1	9.9	9.1	6.8	6.6	5.0
5	33.4	1.2	10.9	8.2	7.6	5.7	5.5	4.1
10	30.3	1.4	9.3	7.0	6.4	4.8	4.7	3.5
15	27.9	1.6	8.1	6.1	5.6	4.2	4.1	3.1
20	26.1	1.8	7.2	5.4	5.0	3.7	3.6	2.7
25	24.7	2.0	6.5	4.9	4.5	3.4	3.3	2.4
30	23.5	2.2	5.9	4.4	4.1	3.1	3.0	2.2
35	22.5	2.4	5.4	4.0	3.7	2.8	2.7	2.0
40	21.7	2.6	5.0	3.7	3.4	2.6	2.5	1.9
45	21.0	2.8	4.6	3.4	3.2	2.4	2.3	1.7
50	20.4	3.0	4.3	3.2	3.0	2.2	2.2	1.6
55	19.9	3.2	4.0	3.0	2.8	2.1	2.0	1.5
60	19.4	3.4	3.8	2.8	2.6	2.0	1.9	1.4
65	19.0	3.6	3.6	2.7	2.5	1.9	1.8	1.3
70	18.6	3.8	3.4	2.5	2.3	1.8	1.7	1.3
75	18.3	4.0	3.2	2.4	2.2	1.7	1.6	1.2

Supplementary Table 14.

Macro-Focus Table (Shading Ring + B2514D + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	44.7	0.8	8.4	6.3	6.3	4.7	4.7	3.5
5	37.9	1.0	6.6	5.0	5.0	3.7	3.7	2.8
10	33.4	1.2	5.5	4.1	4.1	3.1	3.1	2.3
15	30.3	1.4	4.7	3.5	3.5	2.6	2.6	2.0
20	28.0	1.6	4.1	3.1	3.1	2.3	2.3	1.7
25	26.1	1.8	3.6	2.7	2.7	2.0	2.0	1.5
30	24.7	2.0	3.3	2.4	2.4	1.8	1.8	1.4
35	23.5	2.2	3.0	2.2	2.2	1.7	1.7	1.2
40	22.5	2.4	2.7	2.0	2.0	1.5	1.5	1.1
45	21.7	2.6	2.5	1.9	1.9	1.4	1.4	1.1
50	21.0	2.8	2.3	1.7	1.7	1.3	1.3	1.0
55	20.4	3.0	2.2	1.6	1.6	1.2	1.2	0.9
60	19.9	3.2	2.0	1.5	1.5	1.1	1.1	0.9
65	19.4	3.4	1.9	1.4	1.4	1.1	1.1	0.8
70	19.0	3.6	1.8	1.3	1.3	1.0	1.0	0.8
75	18.6	3.8	1.7	1.3	1.3	1.0	1.0	0.7

				Approved	Checked	Drawn	Drawing Title
							SPEC. SHEET
No.	Revisions	Date	By	Date Drawn	Drawning Number		
				NOV. 22, '02	80036 Supplementary Table		

PENTAX Precision Co.,Ltd.

Supplementary Table 15.								
Macro-Focus Table (Shading Ring + H1212A + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	15.6	3.7					1.7	1.3
5	15.2	4.1					1.6	1.2
10	14.9	4.5					1.4	1.1
15	14.7	4.9					1.3	1.0
20	14.5	5.3					1.2	0.9
25	14.4	5.7					1.1	0.8
30	14.2	6.1					1.0	0.8
35	14.1	6.5					1.0	0.7
40	14.0	6.9					0.9	0.7
45	13.9	7.4					0.9	0.7
50	13.8	7.8					0.8	0.6
55	13.7	8.2					0.8	0.6
60	13.6	8.6					0.7	0.6
65	13.6	9.0					0.7	0.5
70	13.5	9.4					0.7	0.5
75	13.5	9.8					0.7	0.5

Supplementary Table 16.								
Macro-Focus Table (Shading Ring + H1212A + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	16.0	3.2	2.0	1.5	1.5	1.1	1.1	0.8
5	15.6	3.7	1.7	1.3	1.3	1.0	1.0	0.7
10	15.2	4.1	1.6	1.2	1.2	0.9	0.9	0.7
15	14.9	4.5	1.4	1.1	1.1	0.8	0.8	0.6
20	14.7	4.9	1.3	1.0	1.0	0.7	0.7	0.6
25	14.5	5.3	1.2	0.9	0.9	0.7	0.7	0.5
30	14.4	5.7	1.1	0.8	0.8	0.6	0.6	0.5
35	14.2	6.1	1.0	0.8	0.8	0.6	0.6	0.4
40	14.1	6.5	1.0	0.7	0.7	0.6	0.6	0.4
45	14.0	6.9	0.9	0.7	0.7	0.5	0.5	0.4
50	13.9	7.4	0.9	0.7	0.7	0.5	0.5	0.4
55	13.8	7.8	0.8	0.6	0.6	0.5	0.5	0.3
60	13.7	8.2	0.8	0.6	0.6	0.4	0.4	0.3
65	13.6	8.6	0.7	0.6	0.6	0.4	0.4	0.3
70	13.6	9.0	0.7	0.5	0.5	0.4	0.4	0.3
75	13.5	9.4	0.7	0.5	0.5	0.4	0.4	0.3

				Approved	Checked	Drawn	Drawing Title
							SPEC. SHEET
No.	Revisions	Date	By				
PENTAX Precision Co.,Ltd.				Date Drawn NOV. 22,'02	Drawning Number 80036 Supplementary Table		

Supplementary Table 17.

Macro-Focus Table (Shading Ring + C1614 + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	18.6	2.5			3.5	2.6	2.5	1.9
5	17.9	2.9			3.1	2.3	2.2	1.7
10	17.3	3.2			2.8	2.1	2.0	1.5
15	16.9	3.5			2.5	1.9	1.8	1.4
20	16.5	3.8			2.3	1.7	1.7	1.3
25	16.2	4.1			2.1	1.6	1.6	1.2
30	15.9	4.4			2.0	1.5	1.5	1.1
35	15.7	4.7			1.9	1.4	1.4	1.0
40	15.5	5.0			1.8	1.3	1.3	1.0
45	15.3	5.3			1.7	1.2	1.2	0.9
50	15.1	5.6			1.6	1.2	1.1	0.9
55	15.0	5.9			1.5	1.1	1.1	0.8
60	14.8	6.3			1.4	1.1	1.0	0.8
65	14.7	6.6			1.3	1.0	1.0	0.7
70	14.6	6.9			1.3	1.0	0.9	0.7
75	14.5	7.2			1.2	0.9	0.9	0.7

Supplementary Table 18.

Macro-Focus Table (Shading Ring + C1614 + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	19.5	2.2	2.9	2.1	2.1	1.6	1.6	1.2
5	18.6	2.5	2.5	1.9	1.9	1.4	1.4	1.1
10	17.9	2.9	2.2	1.7	1.7	1.3	1.3	0.9
15	17.3	3.2	2.0	1.5	1.5	1.1	1.1	0.9
20	16.9	3.5	1.8	1.4	1.4	1.0	1.0	0.8
25	16.5	3.8	1.7	1.3	1.3	1.0	1.0	0.7
30	16.2	4.1	1.6	1.2	1.2	0.9	0.9	0.7
35	15.9	4.4	1.5	1.1	1.1	0.8	0.8	0.6
40	15.7	4.7	1.4	1.0	1.0	0.8	0.8	0.6
45	15.5	5.0	1.3	1.0	1.0	0.7	0.7	0.5
50	15.3	5.3	1.2	0.9	0.9	0.7	0.7	0.5
55	15.1	5.6	1.1	0.9	0.9	0.6	0.6	0.5
60	15.0	5.9	1.1	0.8	0.8	0.6	0.6	0.5
65	14.8	6.3	1.0	0.8	0.8	0.6	0.6	0.4
70	14.7	6.6	1.0	0.7	0.7	0.5	0.5	0.4
75	14.6	6.9	0.9	0.7	0.7	0.5	0.5	0.4

				Approved	Checked	Drawn	Drawing Title
							SPEC. SHEET
No.	Revisions	Date	By				
PENTAX Precision Co.,Ltd.				Date Drawn NOV. 22,'02	Drawnig Number 80036 Supplementary Table		

Supplementary Table 19.

Macro-Focus Table (Shading Ring + B2514C-2 + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	31.8	1.3	10.0	7.5	6.9	5.2	5.0	3.8
5	29.2	1.5	8.6	6.5	6.0	4.5	4.3	3.3
10	27.2	1.7	7.6	5.7	5.3	3.9	3.8	2.9
15	25.6	1.9	6.8	5.1	4.7	3.5	3.4	2.6
20	24.3	2.1	6.1	4.6	4.2	3.2	3.1	2.3
25	23.2	2.3	5.6	4.2	3.9	2.9	2.8	2.1
30	22.3	2.5	5.1	3.9	3.6	2.7	2.6	1.9
35	21.6	2.7	4.7	3.6	3.3	2.5	2.4	1.8
40	20.9	2.9	4.4	3.3	3.1	2.3	2.2	1.7
45	20.4	3.1	4.1	3.1	2.9	2.1	2.1	1.6
50	19.9	3.3	3.9	2.9	2.7	2.0	2.0	1.5
55	19.4	3.5	3.7	2.7	2.5	1.9	1.8	1.4
60	19.0	3.7	3.5	2.6	2.4	1.8	1.7	1.3
65	18.7	3.9	3.3	2.5	2.3	1.7	1.7	1.2
70	18.4	4.1	3.1	2.3	2.2	1.6	1.6	1.2
75	18.1	4.3	3.0	2.2	2.1	1.5	1.5	1.1

Supplementary Table 20.

Macro-Focus Table (Shading Ring + B2514C-2 + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0	35.5	1.1	6.0	4.5	4.5	3.4	3.4	2.5
5	31.9	1.3	5.0	3.8	3.8	2.8	2.8	2.1
10	29.2	1.5	4.3	3.3	3.3	2.4	2.4	1.8
15	27.2	1.7	3.8	2.9	2.9	2.2	2.2	1.6
20	25.6	1.9	3.4	2.6	2.6	1.9	1.9	1.4
25	24.3	2.1	3.1	2.3	2.3	1.7	1.7	1.3
30	23.2	2.3	2.8	2.1	2.1	1.6	1.6	1.2
35	22.3	2.5	2.6	1.9	1.9	1.5	1.5	1.1
40	21.6	2.7	2.4	1.8	1.8	1.3	1.3	1.0
45	20.9	2.9	2.2	1.7	1.7	1.3	1.3	0.9
50	20.4	3.1	2.1	1.6	1.6	1.2	1.2	0.9
55	19.9	3.3	2.0	1.5	1.5	1.1	1.1	0.8
60	19.4	3.5	1.8	1.4	1.4	1.0	1.0	0.8
65	19.0	3.7	1.7	1.3	1.3	1.0	1.0	0.7
70	18.7	3.9	1.7	1.2	1.2	0.9	0.9	0.7
75	18.4	4.1	1.6	1.2	1.2	0.9	0.9	0.7

				Approved	Checked	Drawn	Drawing Title	
							SPEC. SHEET	
No.	Revisions	Date	By	Date Drawn	Drawning Number			
PENTAX Precision Co.,Ltd.				NOV. 22,'02	80036 Supplementary Table			

Supplementary Table 21.

Macro-Focus Table (Shading Ring + B5018A-3 + Reverse Ring + Extension Tube + C-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1 Format		2/3 Format		1/2 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0								
5								
10								
15								
20								
25								
30								
35								
40								
45								
50								
55	61.8	1.0	12.6	9.5	8.7	6.6	6.4	4.8
60	57.3	1.1	11.5	8.6	8.0	6.0	5.8	4.3
65	53.6	1.2	10.5	7.9	7.3	5.5	5.3	4.0
70	50.4	1.3	9.7	7.3	6.7	5.1	4.9	3.7
75	47.7	1.4	9.0	6.8	6.3	4.7	4.5	3.4

Supplementary Table 22.

Macro-Focus Table (Shading Ring + B5018A-3 + Reverse Ring + Extension Tube + CS-Mount Camera)								
Extension Tube Length [mm]	Working Distance [mm]	Magnification	Field of View [mm]					
			1/2 Format		1/3 Format		1/4 Format	
			Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical
0								
5								
10								
15								
20								
25								
30								
35								
40								
45								
50								
55								
60	61.9	1.0	6.4	4.8	4.8	3.6	3.6	2.7
65	57.4	1.1	5.8	4.3	4.3	3.3	3.3	2.4
70	53.6	1.2	5.3	4.0	4.0	3.0	3.0	2.2
75	50.4	1.3	4.9	3.7	3.7	2.8	2.8	2.1

				Approved	Checked	Drawn	Drawing Title
							SPEC. SHEET
No.	Revisions	Date	By	Date Drawn NOV. 22,'02		Drawnig Number 80036 Supplementary Table	

PENTAX Precision Co.,Ltd.