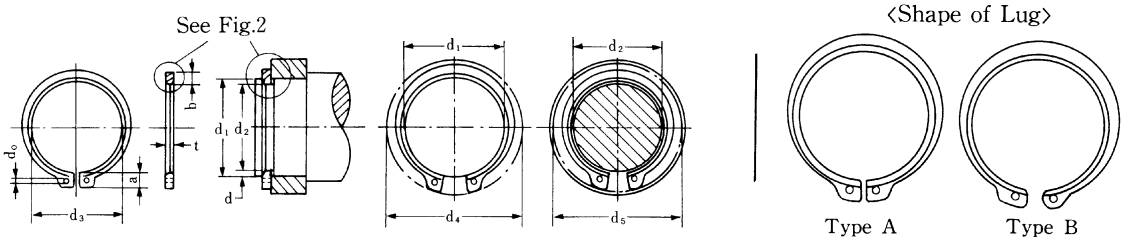
Beveled Retaining Rings (External)



Unit : mm

Size-No.	Ring dimension										Groove dimension						
	d_3		t		U		a	b	d_o	Shape of Lug	d_1	d_2			m		d
	Basic	Tol.	Basic	Tol.	Basic	Tol.						Basic	Tol.	T.I.R	Basic	Tol.	
NT−28	25.8	+0.25 −0.4	1.3	±0.06	1.04	±0.03	4.6	3.25	1.93	B	28	26.15	0 −0.1	0.13	1.1	+0.1 0	0.93
30	27.9						4.9	3.3			30	28.15					
32	29.6						4.65	3.55			32	29.85					1.08
35	32.3				0.99		4.6	3.9			35	32.55					1.23
40	36.75	+0.35 −0.5	1.6	±0.08	1.24		5.9	4.4	3.12		40	37.2	0 −0.15		1.3	+0.15 0	1.4
45	41.6				1.22		6	4.8			45	41.95					1.53
50	46.2				1.19		6.2	5.1			50	46.8					1.6
55	50.6	+0.35 −0.65	2		1.57	±0.04	6.7	5.4			55	51.3		0.15	1.7		1.85
60	55.8				1.52		6.75	5.7			60	56.2					1.9

●Material=Carbon spring steel. Hardness=HRC44～52. Finish=Phosphate coating, Zinc plate plus Chromate.

Fig.1

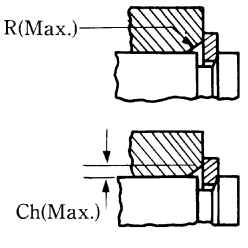
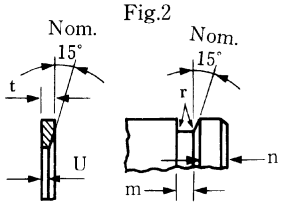


Fig.2



Size-No.	r(Max.)
50以下	0.12
52以上	0.25

Unit : mm

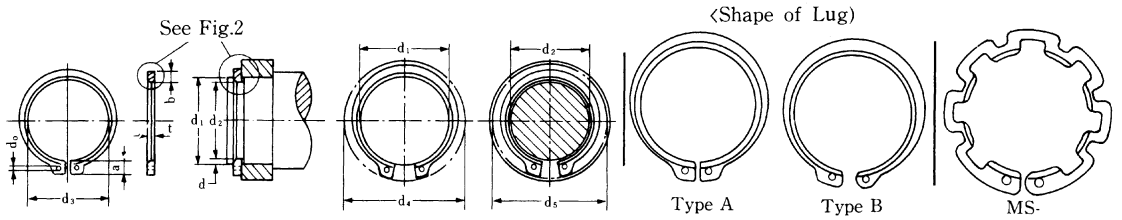
Size-No.	DATA							
	Clearance diameter		Allowable thrust load Sharp corner abutment		Maximum allowable corner radii and chamfers of retained parts (Fig. 1)		Rigid end-play take-up	n (Min.)
	When sprung into d_1	When sprung into d_3 (d_2)	Rings (standard material) Safety factor=4	Grooves (Cold rolled steel shafts) Safety factor=2				
	d_4	d_5	Pr(kN)	Pg(kN)	R(Max.)	Ch(Max.)		
NT−28	38.8	37.8	29.41	6.37	1.6	1	0.12	1.4
30	40.8	39.8	30.40	7.35				
32	42.8	41.7	32.36	8.23	1.8	1.1	0.14	1.6
35	45.9	44.6	35.30	9.80	2	1.2	0.16	1.8
40	54	52.6	50.01	12.74			0.19	2.1
45	59	57.4	56.87	16.67			0.2	2.3
50	64.4	62.8	63.74	20.59			0.21	2.4
55	70.6	68.7	88.25	24.51	2.5	1.5	0.25	2.8
60	75.6	73.7	97.08	31.38				2.9

●Note; The values for P_γ are applicable only when the ring is installed in a housing or on a shaft made of hardened steel where the thrust load capacity of the groove is equal to or greater than that of the ring. When the ring is seated in a groove cut in softer material, and P_g is less than P_γ, P_g becomes the limiting factor in the assembly.

−CONTINUE−

OCHIAI
OF INDUSTRIAL FASTENERS

Beveled Retaining Rings (External)



Unit : mm

Size-No.	Ring Dimension										Groove Dimension						
	d_3		t		U		a	b	d_o	Shape of lug	d_1	d_2			m		d
	Basic	Tol.	Basic	Tol.	Basic	Tol.	Approx.	Approx.	Approx.			Basic	Tol.	T.I.R	Basic	Tol.	
MS-30013	25.5	+0.2 −0.5	1.27	±0.06	0.96	±0.03	4.9		1.95	B	30	26.6	$^{0}_{-0.6}$	0.13	1.05	+0.1 0	1.7
NT-32011	29.3			±0.05	1	$^{+0.04}_{-0.01}$	4.6	3.56			32	30.3	0 −0.25		1.1		0.85
35011	32.2	±0.25			0.99	±0.03	5.4	4.2	2		35	33					1.0
38011	35.2	$^{0}_{-0.5}$	1.75	±0.06	1.35	$^{0}_{-0.06}$	4.5	4.5	1.8		38	36			1.5	+0.15 0	
40011	37	±0.4			1.24	±0.03	5.7		2.5		40	38					
40012	37				1.15	$^{0}_{-0.06}$	5		1.9								
41011	37.8		2	±0.07	1.52	±0.03	6.1	5.2	2.3	A	41	39			1.7		
42011	38.8	$^{0}_{-0.7}$	1.6	±0.08	1.22		4.6	4.6	1.95	B	42	39.5			1.3		1.25
45011	41.5	±0.4	1.6	±0.07			6.3	4.8	2.5	A	45	42.5			1.5		
45013	40	$^{+0.35}_{-0.5}$	1.75		1.15	$^{0}_{-0.06}$	6	5.5		B					1.3		
50001	45.8	±0.4	2	±0.06	1.45		6.7	5		A	50	47			1.7		1.5
50011	45.8		1.75		1.2	$^{+0.04}_{-0.05}$									1.5		

●Material=Carbon spring steel. Hardness=HRC44～52. Finish=Phosphate coating, Zinc plate plus Chromate

Fig. 1

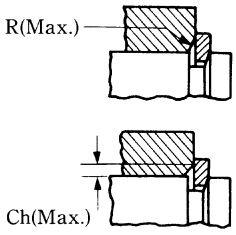
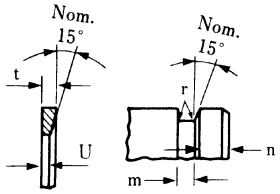


Fig. 2



Size-No.	r (Max.)
50 under	0.12
52 Above	0.25

Unit : mm

Size-No.	Data							
	Clearance diameter		Allowable thrust load Sharp corner abutment		Maximum allowable corner radii and chamfers of retained parts (Fig. 1)		Rigid end-play take-up	n (Min.)
	When sprung over Into d_4	When sprung into $d_5(d/2)$	Rings (standard material) Safety factor=4	Grooves (Cold rolled steel shafts) Safety factor=2				
	d_4	$d_5(d/2)$	Pr(kN)	Pr(kN)	R (Max.)	Ch (Max.)		
MS-30013	41	39.1	15.20	3.67			0.33	2.55
NT-32011	42.8	42	32.85	6.37	1.8	1.1	0.12	1.4
35011	47.5	48.5	35.79	8.33	2.0	1.2	0.11	1.3
38011	49.2	50.2	53.93	8.82			0.13	1.5
40011	53.3	54.3	56.38	9.31				
40012	51.9	52.9	56.38	9.31				
41011	56.1	57.1	66.19	9.80				
42011	53.4	54.7	54.42	12.74			0.17	1.9
45011	60.4	61.7	58.34	13.23				
45013	60.4	61.7	63.74	13.23				
50001	66.2	67.7	80.90	18.14			0.2	2.25
500611	66.2	67.7	71.09	18.14				

●Position of ring in groove

1. MINIMUM INSERTION OF RING IN GROOVE

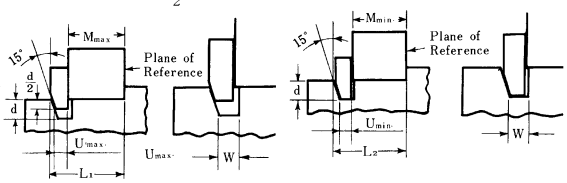
If the *maximum length* of the machine part *(Mmax.)*, the *maximum thickness* of the ring segment engaged in the groove *(Umax.)* and the *minimum distance* from the edge of the outer groove wall to the plane of reference coincide, the ring *must* engage at least half the depth of the groove.

$$L_1 \geqq M_{max.} + U_{max.} + \frac{d}{2} tan.15^\circ$$

2. MAXIMUM INSERTION OF RING IN GROOVE

If the *minimum length* of the machine part *(Mmin.)*, the *minimum thickness* of the ring segment engaged in the groove *(Umin.)* and the *maximum distance* from the outer groove wall to the plane of reference coincide, the ring should engage the *full* depth of the groove.

$$L_2 \leqq M_{min.} + U_{min.} + d\,tan.15^\circ$$



●Take-up

To function properly, ring take-up should be equal to or exceed the sum total of the tolerances.

$$Take\text{-}up = \frac{d}{2} tan.15^\circ \geqq \Delta L + \Delta M + \Delta U$$

$$\Delta L = L_{max.} - L_{min.}$$
$$\Delta M = M_{max.} - M_{min.}$$
$$\Delta U = U_{max.} - U_{min.}$$