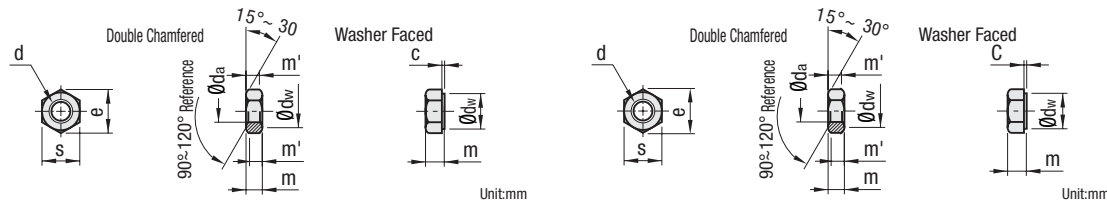


[Technical Data]
Hexagon Nuts/Cotter Pins
 Excerpts from JIS B 1181(1995) Excerpts from JIS B 1351(1987)

[Technical Data]
Spring Pins/Retaining Rings E-Type
 Excerpts from JIS B 2808(1995) Excerpts from JIS B 2805(1978)

1.Shape and Dimensions of Hexagon Nuts Style I (Parts Grade A)

2.Shape and Dimensions of Hexagon Nuts Style II (Parts Grade A)



Nominal of Thread d	M2	M3	M4	M5	M6	M8	M10	M12	(M14)	M16
Pitch P	0.4	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2
c	Max.	0.2	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.8
	Min.	0.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.2
da	Min. (Reference Dimension)	2	3	4	5	6	8	10	12	14
	Max.	2.3	3.45	4.6	5.75	6.75	8.75	10.8	13	15.1
ch	Max.	3.07	4.6	5.9	6.9	8.9	11.6	14.6	16.6	19.6
	Min.	4.32	6.01	7.66	8.79	11.05	14.38	17.77	20.03	23.35
e	Max. (Reference Dimension)	1.6	2.4	3.2	4.7	5.2	6.8	8.4	10.8	12.8
	Min.	1.35	2.15	2.9	4.4	4.9	6.44	8.04	10.37	12.1
m	Max. (Reference Dimension)	1.08	1.72	2.32	3.52	3.92	5.15	6.43	8.3	9.68
	Min.	4	5.5	7	8	10	13	16	18	21
s	Max. (Reference Dimension)	3.82	5.32	6.78	7.78	9.78	12.73	15.73	17.73	20.67
	Min.									

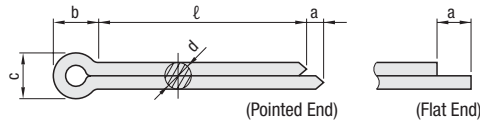
Nominal of Thread d	M5	M6	M8	M10	M12	(M14)	M16
Pitch P	0.8	1	1.25	1.5	1.75	2	2
c	Max.	0.5	0.5	0.6	0.6	0.6	0.8
	Min.	0.15	0.15	0.15	0.15	0.15	0.2
da	Min. (Reference Dimension)	5	6	8	10	12	14
	Max.	5.75	6.75	8.75	10.8	13	15.1
ch	Max.	6.9	8.9	11.6	14.6	16.6	19.6
	Min.	8.79	11.05	14.38	17.77	20.03	23.35
e	Max. (Reference Dimension)	5.1	5.7	7.5	9.3	12	14.1
	Min.	4.8	5.4	7.14	8.94	11.57	13.4
m	Max. (Reference Dimension)	3.84	4.32	5.71	7.15	9.26	10.7
	Min.	8	10	13	16	18	21
s	Max. (Reference Dimension)	7.78	9.78	12.73	15.73	17.73	20.67
	Min.						

Reference 1. Nominal of thread in brackets should not be used unless it is absolutely necessary.

2. The shape of nuts, unless otherwise designated, shall be "double chamfered", and the "washer faced" shall be as designated by the purchaser. Chamfering for the "washer faced" threads shall be based on the chamfered dimensions for "double chamfered".

*With some of the hexagon bolts and hexagon nuts for M10 and M12 distributed at present, the opposite side S is based on JIS prior to the revision.

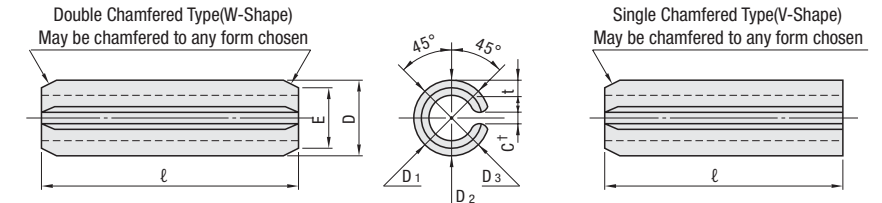
3.Shape and Dimensions of Cotter Pins



Nominal Diameter	0.6	0.8	1	1.2	1.6	2	2.5	3.2	4	5	6.3	8	10	13	16	20	
d	Reference Dimension	0.5	0.7	0.9	1	1.4	1.8	2.3	2.9	3.7	4.6	5.9	7.5	9.5	12.4	15.4	19.3
	Tolerance	0															
c	Reference Dimension	1	1.4	1.8	2	2.8	3.6	4.6	5.8	7.4	9.2	11.8	15	19	24.8	30.8	38.6
	Tolerance	0															
b	Approx.	2	2.4	3	3	3.2	4	5	6.4	8	10	12.6	16	20	26	32	40
	Over than or Less	2.5	3.5	4.5	5.5	7	9	11	14	20	27	39	56	80	120	170	220
a	Approx.	1.6	1.6	1.6	2.5	2.5	2.5	3.2	4	4	4	4	6.3	8.3	6.3	6.3	
	Over than or Less	2	3	4	5	6	8	9	12	17	23	29	44	69	110	160	
Bolts	Over than or Less	2	3	4	5	6	8	9	12	17	23	29	44	69	110	160	
	Pin	2	3	4	5	6	8	9	12	17	23	29	44	69	110	160	
Clevis	Over than or Less	2	3	4	5	6	8	9	12	17	23	29	44	69	110	160	
	Pin	2	3	4	5	6	8	9	12	17	23	29	44	69	110	160	
Dia. of Pin Hole	Reference	0.6	0.8	1	1.2	1.6	2	2.5	3.2	4	5	6.3	8	10	13	16	20
	Reference	0															
ℓ	4	±0.5															
	5	±0.5															
6	±0.5																
8	±0.5																
10	±0.5																
12	±0.5																
14	±0.5																
16	±0.8																
18	±0.8																
20	±0.8																
22	±0.8																
25	±0.8																
28	±0.8																
32	±0.8																
36	±0.8																
40	±1.2																
45	±1.2																
50	±1.2																
56	±1.2																
63	±1.2																
71	±1.2																
80	±1.2																
90	±1.2																
100	±1.2																
112	±1.2																
125	±1.2																
140	±1.2																
160	±1.2																
180	±1.2																
200	±1.2																
224	±1.2																
250	±1.2																
280	±1.2																

Reference 1. The nominal diameter is dependent on the diameter of the pin hole.
 2. d is a value for a spot somewhere between the end and the ℓ/2 spot.
 3. The end may be pointed or flat. If a pointed end or a flat one is needed, it should be specified.
 4. The length (ℓ) should be one enclosed by thick lines. The value in an enclosed area is a tolerance. If the required r-value is not given in the table, it should be specified by the ordering side.
 5. The head must not tilt excessively from the axial center.

Shape and Dimensions of Spring Pins

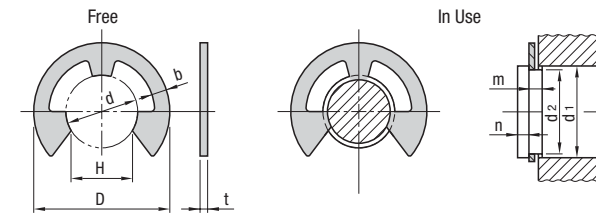


*The size of Gap C should be able to avoid the contact between the spring pin and the hole in which the pin is to be inserted.

Spring Pins	Nominal Diameter	D ⁽¹⁾	Nominal Diameter														
			1	1.2	1.4	1.5	1.6	2	2.5	3	4	5	6	8	10	13	
t	Max.	Min.	1.2	1.4	1.6	1.7	1.8	2.25	2.75	3.25	4.4	5.4	6.4	8.6	10.6	13.7	
			1.1	1.3	1.5	1.6	1.7	2.15	2.65	3.15	4.2	5.2	6.2	8.3	10.3	13.4	
E	For General Use	Light Load	0.2	0.25	0.28	0.3	0.4	0.5	0.6	0.8	1	1.2	1.6	2	2.5		
			0.1	0.12	0.15	0.15	0.2	0.25	0.3	0.4	0.5	0.6	0.8	1	1.2	1.6	
Double Shearing Load kN(kgf)	For General Use	Light Load	0.9	1.1	1.3	1.4	1.5	1.9	2.4	2.9	3.9	4.8	5.8	7.8	9.8	12.7	
			0.69	1.02	1.35	1.55	1.68	2.76	4.31	6.20	10.80	17.25	24.83	44.13	68.94	112.78	
Applicable Holes	Dimensional Tolerance	Diameter	+0.08			+0.09			+0.12			+0.15			+0.2		
			0			0			0			0			0		

Note(1) : Maximum value for D is the maximum value on the pin's circumference, and the minimum value for D is the average of D₁, D₂ and D₃.
 Reference t is in accordance with JSMA (Japan Spring Manufacturers Association Standard) No.6.

Shape and Dimensions of Retaining Ring-E Type



Reference: Typical shape is shown.

Nominal	d ⁽¹⁾		D		t		b		Classification of d ₁		Applicable Shaft (Reference)		m		n	
	Reference Dimension	Tolerance	Reference Dimension	Tolerance	Reference Dimension	Tolerance	Approx.	More than	or Less	Reference Dimension	Tolerance	Reference Dimension	Tolerance	Min.		
0.8	0.8	-0.08	2	±0.1	0.7	0	0.2	±0.02	0.3	1	1.4	0.8	+0.05	0.3	0.4	
1.2	1.2		3		1	-0.25	0.3	±0.025	0.4	1.4	2	1.2		0.4	+0.05	0.6
1.5	1.5		4		1.3		0.4		0.6	2	2.5	1.5		0.5	0.8	
2	2	-0.09	5		1.7		0.4	±0.03	0.7	2.5	3.2	2				
2.5	2.5		6		2.1		0.4		0.8	3.2	4	2.5				
3	3		7		2.6		0.6		0.9	4	5	3				
4	4		9		3.5		0.6		1.1	5	7	4				
5	5	-0.12	11	±0.2	4.3	-0.3	0.6	±0.04	1.2	6	8	5	+0.075	0.7	+0.1	1.2
6	6		12		5.2		0.8		1.4	7	9	6				
7	7		14		6.1		0.8		1.6	8	11	7				
8	8		16		6.9		0.8		1.8	9	12	8	+0.09	0.9	1.5	1.8
9	9	-0.15	18		7.8	-0.35	0.8		2.0	10	14	9				
10	10		20		8.7		1.0	±0.05	2.2	11	15	10				
12	12		23		10.4		1.0		2.4	13	18	12	+0.11	1.15	2.5	3
15	15	-0.18	29	±0.3	13		1.6 ⁽²⁾	±0.06	2.8	16	24	15	0	(?)	+0.14	0
19	19		37		16.5		1.6 ⁽²⁾		4.0	20	31	19	+0.13	1.75	3.5	4
24	24	-0.21	44		20.8		2.0	±0.07	5.0	25	38	24	0	2.2		

Note⁽¹⁾ : d should be measured with a limit plug gauge.
 Note⁽²⁾ : thickness(t)=1.6mm, may be kept at 1.5mm for the time being. m should be 1.65mm.
 Reference : The recommended dimensions of the applicable shaft are given here for reference.