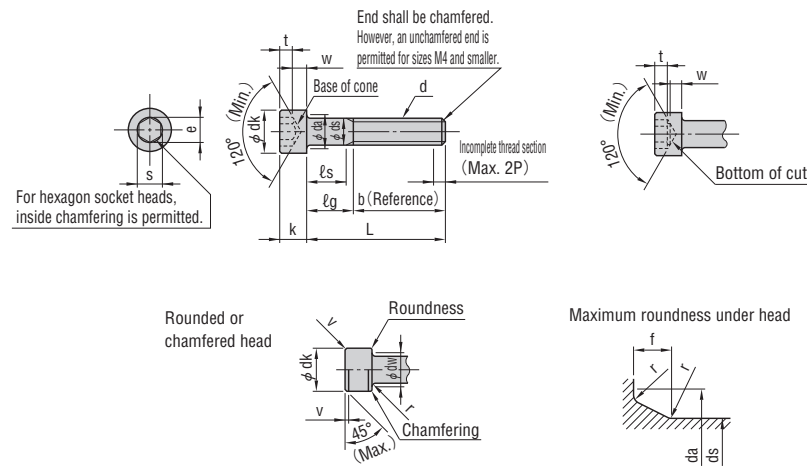


## 1. Names of parts



$$f \text{ (Max.)} = 1.7r \text{ (Max.)}$$

$$r \text{ (Max.)} = \frac{da \text{ (Max.)} - ds \text{ (Max.)}}{2}$$

$$r \text{ (Min.)} = \text{As shown in provided table}$$

Units: mm

Thread nominal (d) (°)	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24	(M27)	M30
<b>Thread pitch (P)</b>	0.5	0.7	0.8	1	1.25	1.5	1.75	2	2	2.5	2.5	2.5	3	3	3.5
<b>b Reference</b>	18	20	22	24	28	32	36	40	44	48	52	56	60	66	72
<b>dk</b>	Max. (standard dimension)*	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36	40
	Max.**	5.68	7.22	8.72	10.22	13.27	16.27	18.27	21.33	24.33	27.33	30.33	33.39	36.39	40.39
	Min.	5.32	6.78	8.28	9.78	12.73	15.73	17.73	20.67	23.67	26.67	29.67	32.61	35.61	39.61
<b>da</b>	Max.	3.6	4.7	5.7	6.8	9.2	11.2	13.7	15.7	17.7	20.2	22.4	26.4	30.4	33.4
	Min.	3	4	5	6	8	10	12	14	16	18	20	22	24	27
<b>ds</b>	Max. (standard dimension)	3	4	5	6	8	10	12	14	16	18	20	22	24	30
	Min.	2.86	3.82	4.82	5.82	7.78	9.78	11.73	13.73	15.73	17.73	19.67	21.67	23.67	26.67
<b>e</b>	Min.	2.87	3.44	4.58	5.72	6.86	9.15	11.43	13.72	16.00	19.44	19.44	21.73	21.73	25.15
<b>f</b>	Max.	0.51	0.60	0.60	0.68	1.02	1.02	1.45	1.45	1.45	1.87	2.04	2.04	2.04	2.89
	Min.	0.51	0.60	0.60	0.68	1.02	1.02	1.45	1.45	1.45	1.87	2.04	2.04	2.04	2.89
<b>k</b>	Max. (standard dimension)	3	4	5	6	8	10	12	14	16	18	20	22	24	30
	Min.	2.86	3.82	4.82	5.70	7.64	9.64	11.57	13.57	15.57	17.57	19.48	21.48	23.48	26.48
<b>r</b>	Max.	0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.8	0.8	0.8	1	1
	Min.	0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.8	0.8	0.8	1	1
<b>s</b>	Nominal (standard dimension)	2.5	3	4	5	6	8	10	12	14	14	17	17	19	22
	Min.	2.52	3.02	4.02	5.02	6.02	8.025	10.025	12.032	14.032	14.032	17.050	17.050	19.065	19.065
	Max. (1)	Section 1 2.580	3.080	4.095	5.140	6.140	8.175	10.175	12.212	14.212	14.212	17.230	17.230	19.275	19.275
Section 2 2.560	3.080	4.095	5.095	6.095	8.115	10.115	12.142	14.142	14.142						
<b>t</b>	Min.	1.3	2	2.5	3	4	5	6	7	8	9	10	11	12	13.5
<b>v</b>	Max.	0.3	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	3
<b>d<sub>w</sub></b>	Min.	5.07	6.53	8.03	9.38	12.33	15.33	17.23	20.17	23.17	25.87	28.87	31.81	34.81	43.61
<b>w</b>	Min.	1.15	1.4	1.9	2.3	3.3	4	4.8	5.8	6.8	7.7	8.6	9.5	10.4	13.1

Note (1): Section 1 for "s (Max.)" applies to bolts with strength class 8.8 and 10.9 and property class A2—50 and A2—70. Section 2 applies to bolts with strength class 12.9. However, based on agreement between the parties involved in the delivery, Section 1 may be applied to bolts with strength class 12.9.

s (Max.) for bolts of nominal size M20 or larger applies to bolts of all strength classes and property classes.

Note (2): Nominal sizes shown in ( ) should not be used whenever possible.

Remarks 1. Add a straight knurl or diamond knurl (refer to JIS B 0951 (KNURLING)) to the sides of the head. In this case, dk (Max.) is the value marked by \*\* in this table.

If a bolt without knurling is required, it shall be specified by the ordering party. However the dk (Max.) is the value marked by \* in this table.

2. The recommended length (ℓ) for the nominal thread size shall be enclosed in a bold line.

For cases in which L is shorter than the position of the dotted line, full thread shall be used and the length of the incomplete thread part under the head shall be approximately 3P.

3. ℓg (Max.) and ℓs (Min.) for cases of a nominal length (ℓ) longer than the position of the dotted line shall be determined by the following formula.

$$\ell_g \text{ (Max.)} = \text{Nominal length } (\ell) - b$$

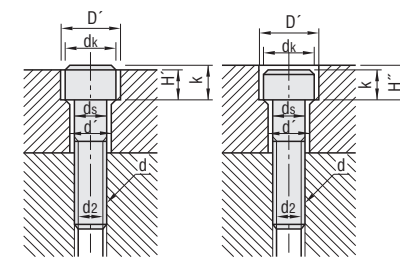
$$\ell_s \text{ (Min.)} = \ell_g \text{ (Max.)} - 5P$$

## 2. L, ℓs, and ℓg of hexagon socket head cap screws

Units: mm

Thread nominal (d)	M3		M4		M5		M6		M8		M10		M12		(M14)		M16		(M18)		M20		(M22)		M24		(M27)		M30			
	L		ℓs Min. and ℓg Max.																													
Nominal length	min.	max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.	ℓs min.	ℓs max.		
5	4.76	5.24																														
6	5.76	6.24																														
8	7.71	8.29																														
10	9.71	10.29																														
12	11.65	12.35																														
16	15.65	16.35																														
20	19.58	20.42																														
25	24.58	25.42	4.5	7																												
30	29.58	30.42	9.5	12	6.5	10	4	8																								
35	34.5	35.5			11.5	15	9	13	6	11																						
40	39.5	40.5			16.5	20	14	18	11	16	5.75	12																				
45	44.5	45.5					19	23	16	21	10.75	17	5.5	13																		
50	49.5	50.5					24	28	21	26	15.75	22	10.5	18																		
55	54.4	55.6							26	31	20.75	27	15.5	23	10.25	19																
60	59.4	60.6							31	36	25.75	32	20.5	28	15.25	24	10	20														
65	64.4	65.6									30.75	37	25.5	33	20.25	29	15	25	11	21	4.5	17										
70	69.4	70.6									35.75	42	30.5	38	25.25	34	20	30	16	26	9.5	22										
80	79.4	80.6									45.75	52	40.5	48	35.25	44	30	40	26	36	19.5	32	15.5	28	11.5	24						
90	89.3	90.7											50.5	58	45.25	54	40	50	36	46	29.5	42	25.5	38	21.5	34	15	30	9	24		
100	99.3	100.7											60.5	68	55.25	64	50	60	46	56	39.5	52	35.5	48	31.5	44	25	40	19	34		
110	109.3	110.7													66.25	74	60	70	56	66	49.5	62	45.5	58	41.5	54	35	50	29	44	20.5	38
120	119.3	120.7													75.25	84	70	80	66	76	59.5	72	55.5	68	51.5	64	45	60	39	54	30.5	48
130	129.2	130.8															80	90	76	86	69.5	82	65.5	78	61.5	74	55	70	49	64	40.5	58
140	139.2	140.8														90	100	86	96	79.5	92	75.5	88	71.5	84	65	80	59	74	50.5	68	
150	149.2	150.8																96	106	89.5	102	85.5	98	81.5	94	75	90	69	84	60.5	78	
160	159.2	160.8																106	116	99.5	112	95.5	108	91.5	104	85	100	79	94	70.5	88	
180	179.2	180.8																		119.5	132	115.5	128	111.5	124	105	120	99	114	90.5	108	
200	199.05	200.95																			135.5	148	131.5	144	125	140	119	134	110.5	128		
220	219.05	220.95																										139	154	130.5	148	
240	239.05	240.95																										159	174	150.5	168	
260	258.95	261.05																											179	194	170.5	188
280	278.95	281.05																											199	214	190.5	208
300	298.95	301.05																											219	234	210.5	228

Reference: Dimensions of counterbore and bolt holes for hexagon socket head cap screws



Thread nominal (d)	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	M27	M30
ds	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
d'	3.4	4.5	5.5	6.6	9	11	14	16	18	20	22	24</			