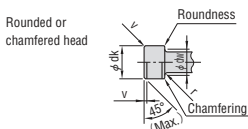
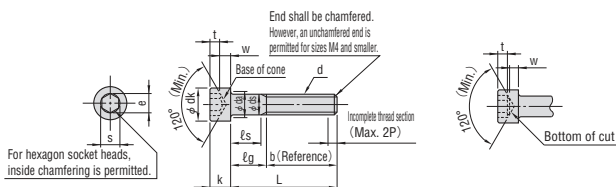
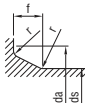


1. Names of parts



Maximum roundness under head



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

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

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

Units: mm

Thread nominal (d) (1)	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24	(M27)	M30	
Thread pitch (P)	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 Reference	18	20	22	24	28	32	36	40	44	48	52	56	60	66	72	
dk	Max. (standard dimension) *	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36	40	45
	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	45.39
da	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	44.61
	Max.	3.6	4.7	5.7	6.8	9.2	11.2	13.7	15.7	17.7	20.2	22.4	24.4	26.4	30.4	33.4
ds	Max. (standard dimension)	3	4	5	6	8	10	12	14	16	18	20	22	24	27	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	29.67
e	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	
f	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	2.89
	Min.	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
k	Max. (standard dimension)	3	4	5	6	8	10	12	14	16	18	20	22	24	27	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	29.48
r	Nominal (standard dimension)	0.1	0.2	0.2	0.25	0.4	0.4	0.6	0.6	0.6	0.6	0.8	0.8	0.8	1	1
	Min.	2.5	3	4	5	6	8	10	12	14	14	17	17	19	19	22
	Max.	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	22.065
	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	22.275
(1) Section 2	2.560	3.080	4.095	5.095	6.095	8.115	10.115	12.142	14.142	14.142	17.230	17.230	19.275	19.275	22.275	
t	Min.	1.3	2	2.5	3	4	5	6	7	8	9	10	11	12	13.5	15.5
	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	2.7	3
dw	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	38.61	43.61
	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	12.1	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.

$$lg \text{ (Max.)} = \text{Nominal length (L)} - b$$

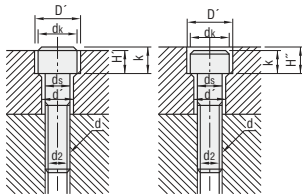
$$ls \text{ (Min.)} = lg \text{ (Max.)} - 5P$$

2. L, ϵ_s , and ϵ_g of hexagon socket head cap screws

Units: mm

Thread nominal (d)	L		M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20	(M22)	M24	(M27)	M30
			ϵ_s Min. and ϵ_g Max.														
	min.	max.	ϵ_s min.	ϵ_s max.	ϵ_s min.	ϵ_s max.	ϵ_s min.	ϵ_s max.	ϵ_s min.	ϵ_s max.	ϵ_s min.	ϵ_s max.	ϵ_s min.	ϵ_s max.	ϵ_s min.	ϵ_s max.	ϵ_s min.
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															
40	39.5	40.5															
45	44.5	45.5															
50	49.5	50.5															
55	54.4	55.6															
60	59.4	60.6															
65	64.4	65.6															
70	69.4	70.6															
80	79.4	80.6															
90	89.3	90.7															
100	99.3	100.7															
110	109.3	110.7															
120	119.3	120.7															
130	129.2	130.8															
140	139.2	140.8															
150	149.2	150.8															
160	159.2	160.8															
180	179.2	180.8															
200	199.05	200.95															
220	219.05	220.95															
240	239.05	240.95															
260	258.95	261.05															
280	278.95	281.05															
300	298.95	301.05															

Reference: Dimensions of counterbore and bolt holes for 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
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	26	30	33
dk	5.5	7	8.5	10	13	16	18	21	24	27	30	33	36	40	45
D'	6.5	8	9.5	11	14	17.5	20	23	26	29	32	35	39	43	48
k	3	4	5	6	8	10	12	14	16	18	20	22	24	27	30
H'	2.7	3.6	4.6	5.5	7.4	9.2	11	12.8	14.5	16.5	18.5	20.5	22.5	25	28
H	3.3	4.4	5.4	6.5	8.6	10.8	13	15.2	17.5	19.5	21.5	23.5	25.5	29	32
d _e	2.6	3.4	4.3	5.1	6.9	8.6	10.4	12.2	14.2	15.7	17.7	19.7	21.2	24.2	26.7