

Bolt, Spanner & Hex Key Size Chart

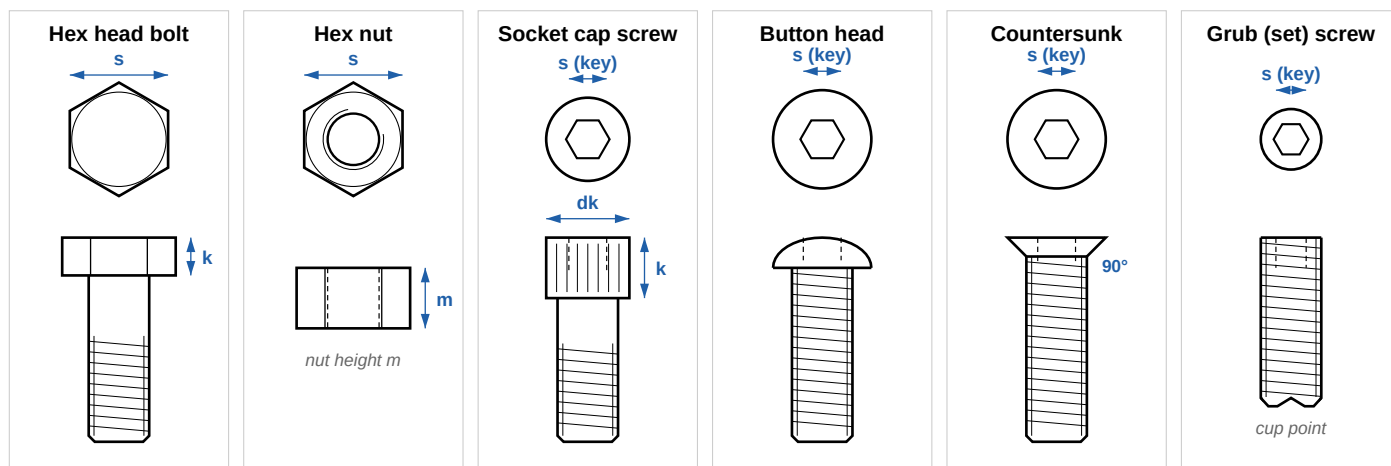
Mining and Industrial Suppliers (Pvt) Ltd

No 2 Hood Road, Southerton, Harare

Metric fasteners - spanner and hex key sizes (ISO, with the old DIN spanner sizes).

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Metric coarse bolts, nuts and socket screws (mm)

Thread	Pitch	Hex spanner ISO	Hex spanner DIN	Head height k	Nut height m	Cap screw key	Cap head dia	Button head key	Csk key	Grub screw key
M3	0.5	5.5	5.5	2	2.4	2.5	5.5	2	2	1.5
M4	0.7	7	7	2.8	3.2	3	7	2.5	2.5	2
M5	0.8	8	8	3.5	4.7	4	8.5	3	3	2.5
M6	1	10	10	4	5.2	5	10	4	4	3
M8	1.25	13	13	5.3	6.8	6	13	5	5	4
M10	1.5	16	17	6.4	8.4	8	16	6	6	5
M12	1.75	18	19	7.5	10.8	10	18	8	8	6
M14	2	21	22	8.8	12.8	12	21	-	10	6
M16	2	24	24	10	14.8	14	24	10	10	8
M18	2.5	27	27	11.5	15.8	14	27	-	-	-
M20	2.5	30	30	12.5	18	17	30	-	12	10
M22	2.5	34	32	14	19.4	17	33	-	14	-
M24	3	36	36	15	21.5	19	36	-	14	12
M27	3	41	41	17	23.8	19	40	-	-	-
M30	3.5	46	46	18.7	25.6	22	45	-	-	-
M33	3.5	50	50	21	28.7	24	50	-	-	-
M36	4	55	55	22.5	31	27	54	-	-	-
M42	4.5	65	65	26	34	32	63	-	-	-
M48	5	75	75	30	38	36	72	-	-	-

Hex bolts: ISO 4014 (part thread) / ISO 4017 (full thread), old DIN 931 / 933. Nuts: ISO 4032. Socket cap screws: ISO 4762 (DIN 912). Button heads: ISO 7380.

Countersunk socket: ISO 10642 (DIN 7991). Grub screws: ISO 4026 - 4029 (DIN 913 - 916).

Where the ISO and DIN spanner sizes differ, check the head - many suppliers still sell DIN-size hex bolts.

Bolt, Spanner & Hex Key Size Chart

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Inch fasteners - Unified (UNC / UNF), Whitworth (BSW / BSF) and BA.

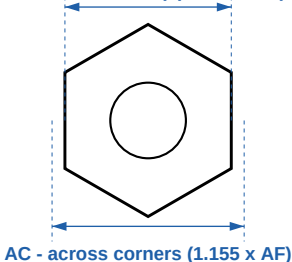
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Unified (UNC / UNF) bolts, nuts and socket screws

Size	TPI UNC / UNF	Hex bolt AF	Hex nut AF	Heavy nut AF	Cap screw key	Button head key	Flat head key	Set screw key
#4	40 / 48	-	-	-	3/32"	1/16"	1/16"	1/16"
#6	32 / 40	-	-	-	7/64"	5/64"	5/64"	1/16"
#8	32 / 36	-	-	-	9/64"	3/32"	3/32"	5/64"
#10	24 / 32	-	-	-	5/32"	1/8"	1/8"	3/32"
1/4"	20 / 28	7/16"	7/16"	1/2"	3/16"	5/32"	5/32"	1/8"
5/16"	18 / 24	1/2"	1/2"	9/16"	1/4"	3/16"	3/16"	5/32"
3/8"	16 / 24	9/16"	9/16"	11/16"	5/16"	7/32"	7/32"	3/16"
7/16"	14 / 20	5/8"	11/16"	3/4"	3/8"	-	1/4"	7/32"
1/2"	13 / 20	3/4"	3/4"	7/8"	3/8"	5/16"	5/16"	1/4"
9/16"	12 / 18	13/16"	7/8"	15/16"	7/16"	-	-	-
5/8"	11 / 18	15/16"	15/16"	1.1/16"	1/2"	3/8"	3/8"	5/16"
3/4"	10 / 16	1.1/8"	1.1/8"	1.1/4"	5/8"	-	1/2"	3/8"
7/8"	9 / 14	1.5/16"	1.5/16"	1.7/16"	3/4"	-	-	1/2"
1"	8 / 12	1.1/2"	1.1/2"	1.5/8"	3/4"	-	-	9/16"
1.1/8"	7 / 12	1.11/16"	1.11/16"	1.13/16"	7/8"	-	-	-
1.1/4"	7 / 12	1.7/8"	1.7/8"	2"	7/8"	-	-	-
1.1/2"	6 / 12	2.1/4"	2.1/4"	2.3/8"	1"	-	-	-

AF - across flats (spanner size)



Spanners are sized across the flats (AF). Measure a nut or bolt head across two opposite flats with a vernier - never across the corners.

Whitworth spanners are marked with the BOLT size, not the jaw size: a 1/4W spanner fits the head of an old 1/4" BSW bolt. BSF heads, and BSW heads made after the 1940s (BS 1083), are one size smaller - so the same 1/4W jaw fits a 5/16" BSF or a post-war 5/16" BSW bolt. Most Whitworth spanners are stamped with both.

Metric heads: ISO 4014 / 4017 changed four sizes from the old DIN 931 / 933: M10 17 -> 16 mm, M12 19 -> 18 mm, M14 22 -> 21 mm and M22 32 -> 34 mm. Keep both in the toolbox.

Whitworth spanners (BS 190 / BS 1083) and BA spanners

Spanner marked	AF inch	AF mm	Fits old BSW (full head)	Fits BSF and post-war BSW
3/16W	0.445	11.3	3/16" BSW	1/4" BSF / BSW
1/4W	0.525	13.3	1/4" BSW	5/16" BSF / BSW
5/16W	0.600	15.2	5/16" BSW	3/8" BSF / BSW
3/8W	0.710	18	3/8" BSW	7/16" BSF / BSW
7/16W	0.820	20.8	7/16" BSW	1/2" BSF / BSW
1/2W	0.920	23.4	1/2" BSW	9/16" BSF / BSW
9/16W	1.010	25.7	9/16" BSW	5/8" BSF / BSW
5/8W	1.100	27.9	5/8" BSW	11/16" BSF / BSW
11/16W	1.200	30.5	11/16" BSW	3/4" BSF / BSW
3/4W	1.300	33	3/4" BSW	7/8" BSF / BSW
7/8W	1.480	37.6	7/8" BSW	1" BSF / BSW
1W	1.670	42.4	1" BSW	1.1/8" BSF / BSW

BA size	Thread dia mm	Spanner AF inch	AF mm
0BA	6	0.413	10.5
1BA	5.3	0.365	9.3
2BA	4.7	0.324	8.2
3BA	4.1	0.282	7.2
4BA	3.6	0.248	6.3
5BA	3.2	0.220	5.6
6BA	2.8	0.193	4.9
7BA	2.5	0.172	4.4
8BA	2.2	0.152	3.9

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Every common spanner size in order - metric, AF, Whitworth and BA - with the near misses.

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Metric

AF (inch)

Whitworth

BA

Up to 0.1 mm oversize will do in a pinch.

Spanner	mm	inch	Fits	Within 0.25 mm
8BA	3.86	0.152	8BA nut / bolt	
7BA	4.37	0.172	7BA nut / bolt	
6BA	4.9	0.193	6BA nut / bolt	
5.5 mm	5.5	0.217	M3 hex	5BA (+0.09)
5BA	5.59	0.220	5BA nut / bolt	5.5 mm (-0.09)
6 mm	6	0.236		
4BA	6.3	0.248	4BA nut / bolt	1/4" AF (+0.05)
1/4" AF	6.35	0.250		4BA (-0.05)
7 mm	7	0.276	M4 hex	3BA (+0.16)
3BA	7.16	0.282	3BA nut / bolt	7 mm (-0.16)
5/16" AF	7.94	0.312		8 mm (+0.06)
8 mm	8	0.315	M5 hex	5/16" AF (-0.06), 2BA (+0.23)
2BA	8.23	0.324	2BA nut / bolt	8 mm (-0.23)
11/32" AF	8.73	0.344		
9 mm	9	0.354		
1BA	9.27	0.365	1BA nut / bolt	
3/8" AF	9.52	0.375		
10 mm	10	0.394	M6 hex	
0BA	10.49	0.413	0BA nut / bolt	
11 mm	11	0.433		7/16" AF (+0.11)
7/16" AF	11.11	0.438	1/4" bolt / nut	11 mm (-0.11), 3/16W (+0.19)
3/16W	11.3	0.445	3/16" BSW (old), 1/4" BSF	7/16" AF (-0.19)
12 mm	12	0.472		
1/2" AF	12.7	0.500	1/4" heavy nut, 5/16" bolt / nut	
13 mm	13	0.512	M8 hex	
1/4W	13.33	0.525	1/4" BSW (old), 5/16" BSF	
14 mm	14	0.551		
9/16" AF	14.29	0.562	5/16" heavy nut, 3/8" bolt / nut	
15 mm	15	0.591		19/32" AF (+0.08), 5/16W (+0.24)
19/32" AF	15.08	0.594		15 mm (-0.08), 5/16W (+0.16)
5/16W	15.24	0.600	5/16" BSW (old), 3/8" BSF	15 mm (-0.24), 19/32" AF (-0.16)
5/8" AF	15.88	0.625	7/16" bolt / nut	16 mm (+0.12)
16 mm	16	0.630	M10 hex	5/8" AF (-0.12)
17 mm	17	0.669	M10 (DIN) hex	
11/16" AF	17.46	0.688	3/8" heavy nut, 7/16" nut	
18 mm	18	0.709	M12 hex	3/8W (+0.03)
3/8W	18.03	0.710	3/8" BSW (old), 7/16" BSF	18 mm (-0.03)
19 mm	19	0.748	M12 (DIN) hex	3/4" AF (+0.05)
3/4" AF	19.05	0.750	7/16" heavy nut, 1/2" bolt / nut	19 mm (-0.05)
20 mm	20	0.787		
13/16" AF	20.64	0.812	9/16" bolt / nut	7/16W (+0.19)
7/16W	20.83	0.820	7/16" BSW (old), 1/2" BSF	13/16" AF (-0.19), 21 mm (+0.17)
21 mm	21	0.827	M14 hex	7/16W (-0.17)
22 mm	22	0.866	M14 (DIN) hex	7/8" AF (+0.22)
7/8" AF	22.22	0.875	1/2" heavy nut, 9/16" nut	22 mm (-0.22)
23 mm	23	0.906		
1/2W	23.37	0.920	1/2" BSW (old), 9/16" BSF	

Spanner	mm	inch	Fits	Within 0.25 mm
15/16" AF	23.81	0.938	9/16" heavy nut, 5/8" bolt / nut	24 mm (+0.19)
24 mm	24	0.945	M16 hex	15/16" AF (-0.19)
25 mm	25	0.984		
1" AF	25.4	1.000		
9/16W	25.65	1.010	9/16" BSW (old), 5/8" BSF	
26 mm	26	1.024		
1.1/16" AF	26.99	1.062	5/8" heavy nut	27 mm (+0.01)
27 mm	27	1.063	M18 hex	1.1/16" AF (-0.01)
5/8W	27.94	1.100	5/8" BSW (old), 11/16" BSF	28 mm (+0.06)
28 mm	28	1.102		5/8W (-0.06)
1.1/8" AF	28.57	1.125	3/4" bolt / nut	
29 mm	29	1.142		
30 mm	30	1.181	M20 hex	
11/16W	30.48	1.200	11/16" BSW (old), 3/4" BSF	
31 mm	31	1.220		
1.1/4" AF	31.75	1.250	3/4" heavy nut	32 mm (+0.25)
32 mm	32	1.260	M22 (DIN) hex	1.1/4" AF (-0.25)
33 mm	33	1.299		3/4W (+0.02)
3/4W	33.02	1.300	3/4" BSW (old), 7/8" BSF	33 mm (-0.02)
1.5/16" AF	33.34	1.312	7/8" bolt / nut	
34 mm	34	1.339	M22 hex	
1.3/8" AF	34.92	1.375		35 mm (+0.08)
35 mm	35	1.378		1.3/8" AF (-0.08)
36 mm	36	1.417	M24 hex	
1.7/16" AF	36.51	1.438	7/8" heavy nut	
7/8W	37.59	1.480	7/8" BSW (old), 1" BSF	
38 mm	38	1.496		1.1/2" AF (+0.10)
1.1/2" AF	38.1	1.500	1" bolt / nut	38 mm (-0.10)
40 mm	40	1.575		
41 mm	41	1.614	M27 hex	
1.5/8" AF	41.27	1.625	1" heavy nut	
42 mm	42	1.654		
1W	42.42	1.670	1" BSW (old), 1.1/8" BSF	
1.11/16" AF	42.86	1.688	1.1/8" bolt / nut	
44 mm	44	1.732		
45 mm	45	1.772		
46 mm	46	1.811	M30 hex	1.13/16" AF (+0.04)
1.13/16" AF	46.04	1.812	1.1/8" heavy nut	46 mm (-0.04)
1.7/8" AF	47.62	1.875	1.1/4" bolt / nut	
48 mm	48	1.890		
50 mm	50	1.969	M33 hex	
2" AF	50.8	2.000	1.1/4" heavy nut	
52 mm	52	2.047		
54 mm	54	2.126		
55 mm	55	2.165	M36 hex	
2.1/4" AF	57.15	2.250	1.1/2" bolt / nut	
60 mm	60	2.362		

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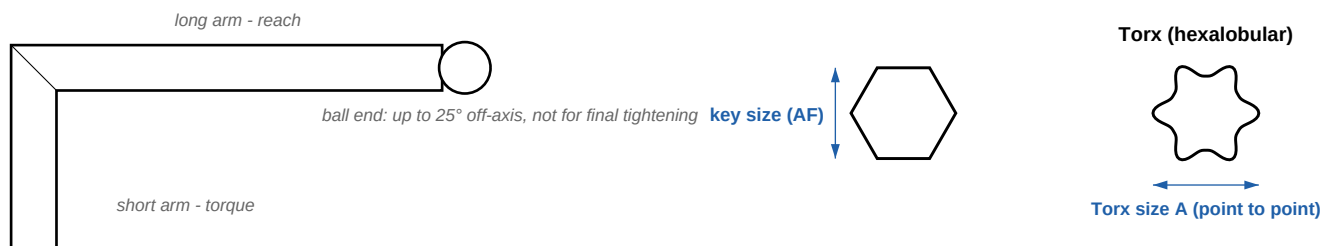
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Hex (Allen) keys and Torx - which key fits which screw.

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Yellow = metric key, blue = inch key. Keys within 0.2 mm of each other feel like they fit - using the wrong one rounds the socket.

Hex keys in size order

Hex key	mm	Fits	Within 0.2 mm - do not swap
1/16"	1.59	button #4; flat #4; set #4, #6	
5/64"	1.98	button #6; flat #6; set #8	2 mm (+0.02)
2 mm	2	button M3; csk M3; grub M4	5/64" (-0.02)
3/32"	2.38	cap #4; button #8; flat #8; set #10	2.5 mm (+0.12)
2.5 mm	2.5	cap M3; button M4; csk M4; grub M5	3/32" (-0.12)
7/64"	2.78	cap #6	
3 mm	3	cap M4; button M5; csk M5; grub M6	1/8" (+0.17)
1/8"	3.17	button #10; flat #10; set 1/4"	3 mm (-0.17)
9/64"	3.57	cap #8	
5/32"	3.97	cap #10; button 1/4"; flat 1/4"; set 5/16"	4 mm (+0.03)
4 mm	4	cap M5; button M6; csk M6; grub M8	5/32" (-0.03)
3/16"	4.76	cap 1/4"; button 5/16"; flat 5/16"; set 3/8"	
5 mm	5	cap M6; button M8; csk M8; grub M10	
7/32"	5.56	button 3/8"; flat 3/8"; set 7/16"	
6 mm	6	cap M8; button M10; csk M10; grub M12, M14	
1/4"	6.35	cap 5/16"; flat 7/16"; set 1/2"	
5/16"	7.94	cap 3/8"; button 1/2"; flat 1/2"; set 5/8"	8 mm (+0.06)
8 mm	8	cap M10; button M12; csk M12; grub M16	5/16" (-0.06)
3/8"	9.52	cap 7/16", 1/2"; button 5/8"; flat 5/8"; set 3/4"	
10 mm	10	cap M12; csk M14, M16; button M16; grub M20	
7/16"	11.11	cap 9/16"	
12 mm	12	cap M14; csk M20; grub M24	
1/2"	12.7	cap 5/8"; flat 3/4"; set 7/8"	
14 mm	14	cap M16, M18; csk M22, M24	
9/16"	14.29	set 1"	
5/8"	15.88	cap 3/4"	
17 mm	17	cap M20, M22	
19 mm	19	cap M24, M27	3/4" (+0.05)
3/4"	19.05	cap 7/8", 1"	19 mm (-0.05)
22 mm	22	cap M30	
7/8"	22.22	cap 1.1/8", 1.1/4"	
24 mm	24	cap M33	
1"	25.4	cap 1.1/2"	
27 mm	27	cap M36	
32 mm	32	cap M42	
36 mm	36	cap M48	

Torx	Tip A mm	Typical screw
T6	1.70	M2
T8	2.30	M2.5
T10	2.74	M3
T15	3.27	M3.5
T20	3.86	M4
T25	4.43	M5
T27	4.99	M5 (some)
T30	5.52	M6
T40	6.65	M8
T45	7.82	M8 - M10
T50	8.83	M10
T55	11.22	M12 - M14
T60	13.25	M16
T70	15.51	M20