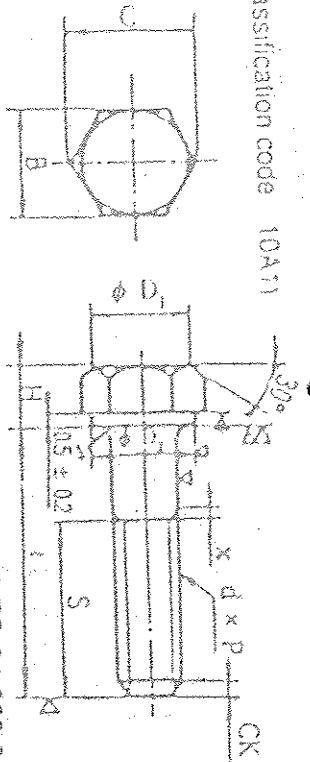


100-443887-100

(Parts classification code 10411)



General dimension tolerance shall conform to KES 04.0520

[illegible]

3. The division code 8 (KP 9 coming after ZnCl<sub>2</sub>) is used

As a rule, division code 6 (KP 9 coating) is used. However, if there is a technical ground for each case, this standard is not always abided by.




Table 1

Index

NOMINAL SIZE													
	06	08	10	12	14	16	18	20	22	24	27	30	36
S	6	8	10	12	14	16	18	20	22	24	27	30	36
P	1	1.25	1.5	1.75	2		2.5						60
S	16	18	25	28	32		35		38	42	46	51	
2 threads													
K APPROX.	1	1.2	1.5		2		2.5		3		3.5		4
K APPROX.	1.0 to 1.5												
T	0.5 to 0.8												
H	4	5.5	7	8	9	10	12	13	14	15	17	19	23
	10	13	17	19	22	24	27	30	32	36	40	46	55
BASIC SIZE													
	0	0	0			0				0			0
DEVIATION													
	-0.6	-0.7				-0.8				-1.0			-1.2
C	11.5	15.0	19.6	21.9	25.4	27.7	31.2	34.6	37.0	41.6	43.2	53.1	63.5
D	9.8	12.6	16.5	18	21	23	26	29	31	34	39	44	53
D	9.0	11.7	15.8	17.6	20.4	22.3	25.6	28.5	30.3	34.2	39.0	43.7	52.3
D	1.2	2		3			4			5		6	8
D	1.6						2.3					3.5	
M	E-3.7	E-4.5	E-5.8		E-6.8	E-7.3	E-7.8		E-9.8		E-10.3	E-12.3	E-12.8

Unit : mm

Division code 6 - 7 - 8 - B shall conform to Table 4.  
Division code D shall conform to Table 5.  
Division code E shall conform to Table 6.

Division code	6	7	8	B	D	E
Material	S35BC-H or equivalent or above					SCM435H
Surface treatment	KP-9 coating or BO	DZC-2	KP-9 coating after ZMC3	ZMC3	ZMC3B	KP-9 coating or BO
Heat treatment	S35BC-H : 1224/31300 (No decarburization or cementation) (This also applies to other materials)					1224/31300 (No decarburization or cementation)
Adhesive	---		LT-2C	---		
Yield point N/mm <sup>2</sup> (kg/mm <sup>2</sup> )	940 and above		95.9 and above			
Tensile strength N/mm <sup>2</sup> (kg/mm <sup>2</sup> )	1040 and above		106 and above			
Proof load stress N/mm <sup>2</sup> (kg/mm <sup>2</sup> )	830 and above		84.6 and above			
Hardness			HRC 32 to 38			
Impact strength 1 cm <sup>2</sup> (kg.cm)	68.0 and above		7 and above			
Head mark	 or 					
Application	For general use For hydraulic devices					For high-speed high-temperature engine parts

Remark : Quality of division code B (Bolt with adhesive) shall be conformed to 18 to 21, 23 and 24.

### Caution in Design

- (1) Boron steel (S35BC-H) has good hardenability but shows problems in creep characteristics and temper softening resistance. Also its relaxation characteristics are not good at 250°C or above. It should not, therefore, be used for tightening high-temperature parts (430°C or above).

However, use of KES-D 01020 (Boil (Stainless)) shall be examined, depending on the using temperature.

- (3) Division code 7 (Surface treatment : DYC-2) is to be used where a particular salt resistance is required.  
However, use of KES-D 01020 shall be examined for marine products.

When making a mating part (washer, spacer, etc.) anew and when manufacturing a bolt by setting its shank equal to the outside diameter of its threaded portion and using nominal size No. 14 or 16, that part's inside diameter must be set to a dimension not to interfere with the bolt's screw diameter (dimension d).

1. Parts No.

Diagram illustrating the structure of a composite code:

Variety code	Division code	Dimension code
1 2 3 4 5	6 7	8 9 10 11 12

Example: 01010-81250

Established:

# DOZ

Revised  
June 25, 1996

01010 01012 01014  
01011 01013 01015  
1 9 4 6

KES D 01012 and 01013 are to be used only when parts will not be tightened but a gap needs to be secured, and KES D 01014 and 01015 are to be used only when they are used for adjustment and sealed. They shall not be used to lighten general parts.

Variety code	Parts classification code	Length under head (mm)	Shape
01012	10A2	95 and below	
01013		100 and above	
01014	10A3	95 and below	
01015		100 and above	

General dimension tolerance shall conform to KES 04.052.0.

Table 2

Unit: mm

Normal size	06	08	10	12	14	16	20	24	30	36
d	6	8	10	12	14	16	20	24	30	36
p	1	1.25	1.5	1.75	2	2.5	3	4	5	6
s	16	18	25	28	32	35	42	51	60	
x (approx.)	4	12	15	2	2	2.5	3	3.5	4	
K (approx.)	0.5 to 0.8	0.5 to 0.8	0.5 to 0.8	0.5 to 0.8	0.5 to 0.8	0.5 to 0.8	0.5 to 0.8	0.5 to 0.8	0.5 to 0.8	0.5 to 0.8
f	4	5.5	7	8	9	10	13	15	19	23
h	10	13	17	19	22	24	30	36	46	55
Basic size	0	0	0	0	0	0	0	0	0	0
B Deviation	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7
c	11.5	15.0	19.6	21.9	25.4	27.7	34.6	41.6	51.1	63.5
d	9.8	12.6	16.5	18	21	23	29	36	44	53
d	9.0	11.7	15.8	17.6	20.4	22.3	28.5	34.2	41.7	52.3
d	1.2	2	3	4	4	4	5	6	8	
d	1.6	2	3	4	4	4	5	6	8	
m	-3.7	-4.5	-5.8	-6.8	-7.3	-7.8	-10.3	-12.3	-12.8	

Conforming to Table 4.

Division code	6	7	8
Material	S35BC-H or equivalent or above	KP-9 coating after ZMC3	
Surface treatment	KP-9 coating or BO	DZC-2	
Heat treatment	(No decarburization or cementation) (This also applies to other materials)		
Yield Point	N mm (kg mm <sup>2</sup> )	940 and above	959 and above
Tensile strength	N mm (kg mm <sup>2</sup> )	1040 and above	1060 and above
Proof load stress	N mm (kg mm <sup>2</sup> )	840 and above	848 and above
Hardness	HRC	32 to 38	
Impact strength	J/cm (ft/cm cm)	68.6 and above	17 and above
Head mark			

2. Adaptable parts: As per Table 3. The parts having variety codes in ( ) shall not be used for new design.

Table 3

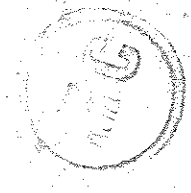
Nominal size		06	08	10	12	14	16	18	20	22	24	27	30	36
For 01010 01011	Protector 01099	02708	04212		04818		06022		07028					
	Nut 01570	00605	00808	01008	01210	01422	01625	01828	02032	02235	02438	02742	03046	03650
	Seat 01571	00609	00814	01016	01218	01422	01625	01828	02032	02235	02438	02742	03046	03650
	Nut 01580	00605	00806	01008	01210	01411	01613	01815	02016	02218	02419	02722	03024	03629
	Lock 01560	—	—	—	—	—	01630	—	02015	—	02435	—	03040	03650
For 01012 01013	Spacer 04254	00623	00823	01032	01232	01445	01645	—	—	—	—	—	—	—
	Nut 01590	00607	00809	01012	01215	01416	01619	01821	02022	02226	02427	02730	03033	03638
	Coiler pin 04050	1212	2015	2018	3022	3028	4030	4035	4040	5040	5045	5050	6055	6065
Nominal size of Wire		16												
For 01014 01015	Helicor 01190	06 X X	08 X X	10 X X	12 X X	14 X X	16 X X	18 X X	—	—	—	—	—	—
	Washer (01601)	—	—	—	—	—	—	—	—	—	—	—	—	—
	Washer (01602)	0619	0825	1030	1236	—	—	—	—	—	—	—	—	—
	Washer (01603)	00612	00816	01018	01220	01424	—	—	—	—	—	—	—	—
	Washer (01605)	—	00818	01023	01226	01430	01635	01835	02040	02245	02450	02750	03070	03680
	Washer (01640)	0610	0816	1016	1223	1426	1626	1826	2032	2232	2440	2740	3045	3650
	Washer (01641)	0608	0812	1016	1223	1423	1626	—	—	—	—	—	—	—
	Washer 01643	0623	0823	1012	1232	1445	1645	1845	2060	2260	2460	2780	3080	3680
	Washer (01650)	20608	20808	21012	21212	21412	21616	21816	22016	22216	22416	22718	24018	23618
	Washer (01653)	20608	20808	21012	21212	21412	21616	21816	22016	22216	22416	22718	24018	23618
For 01015	Washer 01670	0620	0830	1030	1240	1440	1640	1840	2050	2250	2450	—	—	—
	Washer 01671	0630	0840	1040	1250	1450	1650	1850	2070	2280	2480	—	—	—

3. Dimension codes of division code 6, 7, 8 and B: As per Table 4. The parts having ( ) shall not be used for new design.

Table 4

Nominal size		06	08	10	12	14	16	18	20	22	24	27	30	36
mm		Dimension code												
01010	0610	0810	1010	1210	1410	1610	1810	2010	2210	2410	2710	3010	3610	—
01012	0612	0812	1012	1212	1412	1612	1812	2012	2212	2412	2712	3012	3612	—
01014	0614	0814	1014	1214	1414	1614	1814	2014	2214	2414	2714	3014	3614	—
01016	0616	0816	1016	1216	1416	1616	1816	2016	2216	2416	2716	3016	3616	—
01018	0618	0818	1018	1218	1418	1618	1818	2018	2218	2418	2718	3018	3618	—
01020	0620	0820	1020	1220	1420	1620	1820	2020	2220	2420	2720	3020	3620	—
01022	0622	0822	1022	1222	1422	1622	1822	2022	2222	2422	2722	3022	3622	—
01025	0625	0825	1025	1225	1425	1625	1825	2025	2225	2425	2725	3025	3625	—

(Continued)



DOCUMENTATION

01010 01012 01014  
01016 01018 01020  
01022 01024 01026  
01028 01030 01032  
01034 01036 01038  
01040 01042 01044  
01046 01048 01050  
01052 01054 01056  
01058 01060 01062  
01064 01066 01068  
01070 01072 01074  
01076 01078 01080  
01082 01084 01086  
01088 01090 01092  
01094 01096 01098  
01100 01102 01104  
01106 01108 01110  
01112 01114 01116  
01118 01120 01122  
01124 01126 01128  
01130 01132 01134  
01136 01138 01140  
01142 01144 01146  
01148 01150 01152  
01154 01156 01158  
01160 01162 01164  
01166 01168 01170  
01172 01174 01176  
01178 01180 01182  
01184 01186 01188  
01190 01192 01194  
01196 01198 01200

(Continuation)

Nominal size		06	08	10	12	14	16	18	20	22	24	27	30	36
mm		Dimension code												
01010- 01012- 01014- 01016- 01018- 01020- 01022- 01024- 01026- 01028- 01030- 01032- 01034- 01036- 01038- 01040- 01042- 01044- 01046- 01048- 01050- 01052- 01054- 01056- 01058- 01060- 01062- 01064- 01066- 01068- 01070- 01072- 01074- 01076- 01078- 01080- 01082- 01084- 01086- 01088- 01090- 01092- 01094- 01096- 01098- 01100- 01102- 01104- 01106- 01108- 01110- 01112- 01114- 01116- 01118- 01120- 01122- 01124- 01126- 01128- 01130- 01132- 01134- 01136- 01138- 01140- 01142- 01144- 01146- 01148- 01150- 01152- 01154- 01156- 01158- 01160- 01162- 01164- 01166- 01168- 01170- 01172- 01174- 01176- 01178- 01180- 01182- 01184- 01186- 01188- 01190- 01192- 01194- 01196- 01198- 01200-	30	0830	0830	1030	1230	1430	1630	(1830)						
	35	0835	0835	1035	1235	1435	1635	1835	2035					
	40	0840	0840	1040	1240	1440	1640	1840	2040	(2240)				
	45	0845	0845	1045	1245	1445	1645	1845	2045	(2245)				
	50	0850	0850	1050	1250	1450	1650	1850	2050	2250	2450			
	55	0855	0855	1055	1255	1455	1655	1855	2055	2255	2455	(2755)		
	60	0860	0860	1060	1260	1460	1660	1860	2060	2260	2460	(2760)	(3060)	
	65	(0865)	0865	1065	1265	1465	1665	1865	2065	2265	2465	(2765)	(3065)	
	70	(0870)	0870	1070	1270	1470	1670	1870	2070	2270	2470	(2770)	(3070)	(3670)
	75	(0875)	0875	1075	1275	1475	1675	(1875)	2075	(2275)	2475	2775	3075	(3675)
	80	(0880)	0880	1080	1280	1480	1680	(1880)	2080	2280	2480	2780	3080	(3680)
	85	(0885)	(0885)	1085	1285	1485	1685	(1885)	2085	(2285)	2485	2785	3085	(3685)
	90	(0890)	(0890)	1090	1290	1490	1690	(1890)	2090	2290	2490	2790	3090	(3690)
	95	(0895)	(0895)	1095	1295	1495	1695	(1895)	2095	(2295)	2495	(2795)	3095	3695
	100			1000	1200	1400	1600	(1800)	2000	2200	2400	2700	3000	3600
	105			1005	1205	1405	1605	(1805)	2005	(2205)	2405	(2705)	3005	3605
	110			1010	1210	1410	1610	(1810)	2010	2210	2410	2710	3010	3610
	115			1015	1215	1415	1615	(1815)	2015	(2215)	2415	(2715)	3015	3615
	120			1020	1220	1420	1620	(1820)	2020	(2220)	2420	2720	3020	3620
	125			1025	1225	1425	1625	(1825)	2025	(2225)	2425	(2725)	3025	3625
	130			1030	1230	1430	1630	(1830)	2030	2230	2430	2730	3030	3630
	135			1035	1235	1435	1635	(1835)	2035	2235	2435	2735	3035	3635
	140			1040	1240	1440	1640	(1840)	2040	2240	2440	2740	3040	3640
	145			1045	1245	1445	1645	(1845)	2045	2245	2445	2745	3045	3645
	150			1050	1250	1450	1650	(1850)	2050	2250	2450	2750	3050	3650
	155			1055	1255	1455	1655	(1855)	2055	(2255)	2455	(2755)	3055	3655
	160			1060	1260	1460	1660	(1860)	2060	(2260)	2460	(2760)	3060	3660
	165			1065	1265	1465	1665	(1865)	2065	(2265)	2465	(2765)	3065	3665
	170			1070	1270	1470	1670	(1870)	2070	(2270)	2470	(2770)	3070	3670
	175			1075	1275	1475	1675	(1875)	2075	(2275)	2475	(2775)	3075	3675
	180			1080	1280	1480	1680	(1880)	2080	(2280)	2480	(2780)	3080	3680
	185			1085	1285	1485	1685	(1885)	2085	(2285)	2485	(2785)	3085	3685
	190			1090	1290	1490	1690	(1890)	2090	(2290)	2490	(2790)	3090	3690



4. Dimension code of division code D Conforming to Table 5.

Table 5

Normal size	06	08	10	12
t mm	Dimension code			
10	0610	0810	1010	1210
12	0612	0812	1012	1212
16	0616	0816	1016	1216
20	0620	0820	1020	1220
25	0625	0825	1025	1225
30	0630	0830	1030	1230
35	0635	0835	1035	1235
40	0640	0840	1040	1240
45	0645	0845	1045	1245
50	0650	0850	1050	1250

01010-  
D ☐ ☐ ☐ ☐ ☐

5. Dimension code of division code E Conforming to Table 6.

Table 6

Nominal size	08	10	12
t mm	Dimension code		
10	0810		
12	0812		
16	0816	1016	
20	0820	1020	1220
25	0825	1025	1225
30	0830	1030	1230
35	0835	1035	1235
40	0840	1040	1240
45	0845	1045	1245
50	0850	1050	1250
55	0855	1055	1255
60	0860	1060	1260
65	0865	1065	1265
70	0870	1070	1270
75	0875	1075	1275
80	0880	1080	1280
85		1085	1285
90		1090	1290
95		1095	1295
100		1000	1200
105		1005	1205
110		1010	1210
115		1015	1215
120		1020	1220
125		1025	1225
130		1030	1230
135		1035	1235
140		1040	1240
145		1045	1245
150		1050	1250

01010-  
E□□□□

01011-  
E□□□□

01011-  
E ☐ ☐ ☐ ☐ ☐

(Continuation)

Nominal size	08	10	12
	Dimension code		
t mm			
155			1255
160			1260
165			1265
170			1270
175			1275
180			1280
185			1285
190			1290

01011-

E□□□□

01011-  
E ☐ ☐ ☐ ☐ ☐

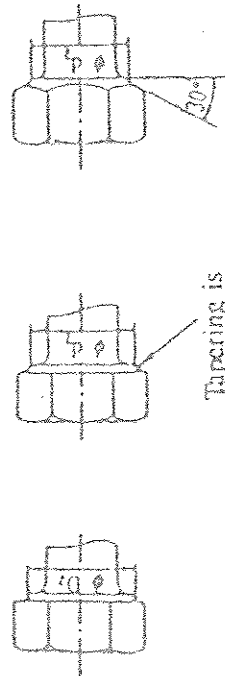
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3. The quality and other standards shall comply with JIS B 1180 (Hexagon head bolts).
7. The screw thread shall comply with Grade 2 stipulated in KES 04.120.72 (Limits of size and tolerances of metric screw threads). However, the maximum allowable size of a thread applied with ZMC3, ZMC1B or DZC-2 may be the maximum allowable size of a Grade 1 external thread for outside diameter, pitch diameter and root diameter.
8. Where  $t \leq s + x$ , the thread shall be machined up to the base of the head. In that case, the distance from under the head to the end of the effective thread shall, in principle, be 3 ridges including  $x$ . Those figures shown above the thick line in the size code column represent it.
9. Where a bolt is manufactured with the diameter of the non-threaded portion almost equal to the pitch diameter, the radius under the head may be as follows.

Unit: mm

Nominal size	06	08	10	12	14	16	18	20	22	24
$r$	0.4 to 0.8	0.5 to 0.9	0.6 to 1.2	1.0 to 1.5	1.2 to 1.5	1.2 to 1.8	1.2 to 1.8	1.2 to 2.0		1.5 to 2.5

10. The bolt shank curve shall be a maximum of  $\frac{0.3}{100}$  its length ( $r$ ).
11. The tempering temperature shall be 430°C or above.
12. The surface treatment shall be conformed to KES 58.313 (Rust preventive oil of oil film type), KES 58.342 (Zinc plating), KES 58.358.2 (Zinc dust chromic acid chemical conversion film) and KES 58.357 (Black oxide film (Magnetite film)).
13. The outline of the head bearing surface may be any of the following



14. The head mark shall be embossed. Its size shall be as follows. It may be stamped, however, where embossment is impossible.

Unit: mm

Nominal size	06-08	10-16	18 to 27	30 to 30
Height of H - T - E	3	5	7	10

15. The root protective shall comply with KES 45.229.1 (Protector design (Bolts and fittings)).

16. The bolt check shall comply with the following

- Appearance, shape and size check:  
The appearance, shape and size check shall comply with JIS B 1180.
- Thread precision check:  
The thread precision check shall comply with JIS B 1180.
- Shank curve check:  
The shank curve check shall comply with JIS B 1176 (Recess hexagon head bolts).
- Yield point check:  
There must be no permanent distortion, when the tension test for products stipulated in JIS B 1051 (Mechanical properties of bolts and machine screws) is applied. (A dimensional error within 0.013 mm after the load is applied is not to be regarded as permanent distortion.) The endurance test load shown in the table below must be used in the test.

Nominal size	06	08	10	12	14	16	18	20
Yield load (N)	16769	30499	48347	70216	96203	130428	160829	203976
Yield load (kg)	(1710)	(3110)	(4930)	(7160)	(9810)	(13300)	(16400)	(20800)

Nominal size	22	24	27	30	33	36	39
Yield load (N)	252857	294200	382450	483468	596244	720789	857101
Yield load (kg)	(25800)	(30000)	(39000)	(49300)	(60800)	(73300)	(87400)

- (5) Tensile strength check

A sample bolt which went through the yield point check must not break when subjected to the wedge tension test method stipulated in JIS B 1051 (Mechanical properties of bolts and machine screws) using a smaller tension load than shown in the table below. Also it must not break in patterns other than the thread when the above tension load is increased.

The angle of the wedge to be driven into the bolt bearing surface shall be as follows.

Nominal size	Angle	$\pm 0^\circ - 30^\circ$
06 to 20	$\pm 2^\circ - 3^\circ$	$\pm 2^\circ - 3^\circ$
22 to 39	10	6
	6	4

Nominal size	06	08	10	12	14	16	18	20
Tension (N)	218012	37688	59722	86780	118660	161810	198094	252031
Tension (kg)	(22100)	(3840)	(6080)	(8850)	(12100)	(16500)	(20200)	(25700)

Nominal size	22	24	27	30	33	36	39
Tension (N)	312832	362846	472681	597225	736479	890444	1059118
Tension (kg)	(31900)	(37000)	(48200)	(60800)	(75100)	(90800)	(108400)

DOCUMENTATION

# DOCUMENTATION

## 4. Dimension code of division code D Confirming to Table 5.

Table 5				
Nominal size	06	08	10	12
Dimension code				
t mm	0610	0810	1010	1210
10	0610	0810	1010	1210
12	0612	0812	1012	1212
16	0616	0816	1016	1216
20	0620	0820	1020	1220
25	0625	0825	1025	1225
30	0630	0830	1030	1230
35	0635	0835	1035	1235
40	0640	0840	1040	1240
45	0645	0845	1045	1245
50	0650	0850	1050	1250

## 5. Dimension code of division code E Confirming to Table 6.

Table 6				
Nominal size	08	10	12	
Dimension code				
t mm	0810	1010	1210	
10	0810	1010	1210	
12	0812	1012	1212	
16	0816	1016	1216	
20	0820	1020	1220	
25	0825	1025	1225	
30	0830	1030	1230	
35	0835	1035	1235	
40	0840	1040	1240	
45	0845	1045	1245	
50	0850	1050	1250	
55	0855	1055	1255	
60	0860	1060	1260	
65	0865	1065	1265	
70	0870	1070	1270	
75	0875	1075	1275	
80	0880	1080	1280	
85		1085	1285	
90		1090	1290	
95		1095	1295	
100		1000	1200	
105		1005	1205	
110		1010	1210	
115		1015	1215	
120		1020	1220	
125		1025	1225	
130		1030	1230	
135		1035	1235	
140		1040	1240	
145		1045	1245	
150		1050	1250	

(Continuation)

Nominal size	08	10	12
Dimension code			
t mm			
155			1255
160			1260
165			1265
170			1270
175			1275
180			1280
185			1285
190			1290

01010 01012 01014  
01011 01013 01015  
(1 2 3 4 5)

(Continued)

Established:  
April 5, 1969

**KOMATSU**

Revised  
June 25, 1996

01010 01012 01014  
01011 01013 01015  
1 9 9 6 1

23. The bolts of division code B are not used for spare parts. Therefore, application of adhesive shall be indicated in assembly drawings and shop manuals when using them.

24. When entering the bolts of division code B in a parts book, they are entered with parts numbers replaced as follows:

Arrangement Parts No.	Replaced Parts No.
01010-B X X X X	01010-8 X X X X

25. Before revision on February 27, 1995, the following nominal sizes and dimension codes were specified for division codes 6, 7, and 8. They shall not be used for new design.

Nominal size		Dimension code	
mm			
01010-	65	3365	
01012-	70	3370	
01014-	75	3375	3975
	80	3380	3980
	85	3385	3985
	90	3390	3990
	95	3395	3995
01011-	100	3300	3900
01013-	105	3305	3905
01015-	110	3310	3910
	115	3315	3915
	120	3320	3920
	125	3325	3925

Nominal size		Dimension code	
mm			
130		3330	3930
135		3335	3935
140		3340	3940
145		3345	3945
150		3350	3950
155		3355	3955
160		3360	3960
165		3365	3965
170		3370	3970
175		3375	3975
180		3380	3980
185		3385	3985
190		3390	3990
195			3995

Reference standards: This standard has been enacted by extracting the relevant stipulation from JIS B 1180 excluding those variety codes m and d, in 01012 and 01013, and d, in 01014 and 01015.

References 1. Before revised on March 15, 1976, SAE10B21 was specified as the material for division codes 3 to 5. SAE10B21 is, however, omitted from the latest revision since it is included in S43C or equivalent or above. (For the bolts, the special emphasis is put on the strength of material check but not on the material check.)

2. With respect to the following bolts of the division code D, those drawings currently in use have been standardized as KES. (X)-243)

Parts No.	Parts No. of Drawings	Parts No.	Parts No. of Drawings
01010-D0625	154-970-3760	01010-D1035	20Y-43-12160
01010-D0825	195-54-41260	01010-D1045	20Y-43-21750
01010-D1020	21X-54-13280	01010-D1230	195-54-43210
01010-D1025	21X-54-13280 20Y-54-13410		

26. Before revision on February 27, 1995, there were the following parts. They shall not be used for new design. Instead, the division codes in the following table shall be used for new design.

Division code	3	4	5	A	C
Application nominal size	06 to 24 of Table 1				
Material	S43C or equivalent or above				
Surface treatment	KP-9 coating or BO	DZC-2	KP-9 coating after ZMC3	ZMC3	EO10 coating after ZMC3C
Heat treatment	S43C, 1324001-400 (No decarburization or cementation) (This also applies to other materials)				
Adhesive	—				
Yield point N/mm <sup>2</sup> (kg/mm <sup>2</sup> )	883 and above   90 and above   LT-2C				
Tensile strength N/mm <sup>2</sup> (kg/mm <sup>2</sup> )	1010 and above   105 and above				
Proof load stress N/mm <sup>2</sup> (kg/mm <sup>2</sup> )	814 and above   85 and above				
Hardness	HRC 32 to 38				
Impact strength J/cm (kg-cm)	58.8 and above   6 and above				
Heat mark					
Dimension code	Conforming to Table 4				
Division code used for new design	6	7	8	B	7

Nominal size of division code C and Dimension code

Nominal size	06	08	10	12	16	24
mm						
12	0612					
16	0616	0816	1016			
20		0820	1020	1220		
25		0825	1025	1225	1625	
30			1030	1230		
35				1235	1635	
40				1240		
45				1245		
50				1250		2450
80				1280		



- References
3. Revised item(1983R): Precautions for making drawings of mating parts for thick bolts of nominal sizes 14 and 16 were added.  
Revised by: Takehiko Horito, Technical Administration Dept., Technical Center, Awazu Plant
  4. Revised item(1986): Precautions for design was so changed that boron steel will not be used for tightening high-temperature parts (at 430°C or above), since it has problems in high-temperature characteristics.  
Revised by: Suguru Murakami, Material Technical Center, Engine Technical Center, Oyama Plant
  5. Revised item(1989): Bolts with pressing medium was added.(89-136)
  6. Revised item(1990): Parts having surfaces treated with ZMC3G for higher corrosion resistance were added as division C(90-001)  
Revised by: Tsutomu Hoshi, Technical Administration Dept., Technical Center, Komatsu MEC Corp.
  7. Revised item(1991): Bolts of ZMC3B were added as division code D(90-243)  
Revised by: Yoshio Nishizaka, Medium/Small-sized Equipment Development Dept., Technical Center, Osaka Plant  
Kohei Okada, Administration Dept., Technical Center, Osaka Plant
  8. Revised item(1992): The company mark on the bolt head was deleted according to "Scope and concept of use of new logo" issued by the General Office of 1990's Committee.(94-290)  
Revised by: Yasuhiko Kubota, Technical Center, Komatsu MEC Corp.  
Tsutomu Hoshi, Technical Administration Dept., Technical Center, Komatsu MEC Corp.
  9. Revised item(1995):  
The following items were changed after review of item commonization activities.(94-170)
    - (1) It was decided not to use the following parts for new design to reduce the number of items.
      - (a) Variety codes 01012 and 01013 are to be used only when parts will not be tightened but a gap needs to be secured.
      - (b) Variety codes 01014 and 01015 are to be used only when they are used for adjustment and sealed.
      - (c) Division codes 3, 4, 5, A, and C
      - (d) Nominal sizes 33 and 39 of division codes 6, 7, and 8
    - (2) Bolts made of SCM435H and having the head mark of E for tightening hot-temperature parts of engines were added as division code E.
    - (3) The mechanical properties were conformed to JIS.
 Revised by: Yoichi Nishiyama, Planning & Administration Group, Component Technical Center
  10. Revised items (1996)
    - (1) Applied nominations of division code B were enlarged to 20, 24, 30, and 36.(95-073)
    - (2) Applied nominations of division code 6 were changed to 14 through 36 as a rule.(95-181)
  11. Revised by: HARRY STUART, Design Dept., KUK  
Makoto Nakamura, Technical Division
  12. Keyword: Bolt

DOCUMENTATION

