

Shoulder Bolts

Shaft Dia. Tolerance e9

Shoulder Bolts

Shaft Dia. Tolerance g6/h7/e9

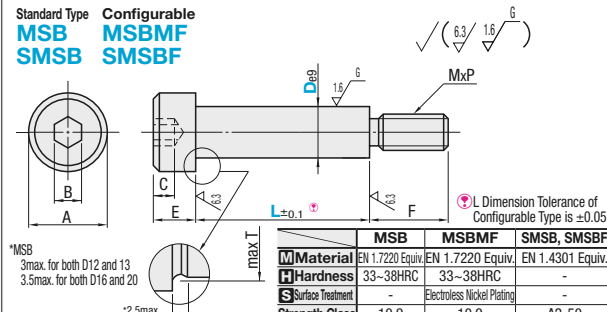
Shoulder Bolts
- Shaft Dia. Tolerance e9



RoHS

Standard Type
MSB
SMSB

Configurable
MSBMF
SMSBF



MSB
3max. for both D12 and 13
3.5max. for both D16 and 20

MSBMF
EN 1.7220 Equiv. EN 1.7220 Equiv. EN 1.4301 Equiv.

MSB, SMSB, SMSBF
EN 1.7220 Equiv. EN 1.7220 Equiv. EN 1.4301 Equiv.

Hardness
33~38HRC 33~38HRC -

Surface Treatment
Electroless Nickel Plating -

Strength Class
10.9 10.9 A2-50

Standard Type

Des	A	B	C	E	MxP	T
4	6.5	7	2.5	1.6	3	2.5x0.45
4.5	-0.020	8			3.5	3x0.5
5	-0.050					5.5
5.5		9	3	2.2	4	4x0.7
6				2		6
6.5	-0.025	10	4	2.5	5	5x0.8
8	-0.061	13	5	3	6	6x1.0
10		16				8.7
12	-0.032	17	6	4	8	8x1.25
13	-0.075	18	8	5	10	10x1.5
16	-0.040	24	10	7	14	12x1.75
20	-0.092	27	14	9	18	16x2.0

Standard Type																			
Part Number		L (SMSB is applicable only to sizes marked with *.)															F	Unit Price	
Type	D																	MSB	SMSB
MSB	4	*10	*15 *20 *25 *30 35 *40 45														5		
	4.5	*10	*15 *20 *25 *30 *35 *40 45 50																
	5	*10	*15 *20 *25 *30 35 *40 45 50														6		
	5.5	*10	*15 *20 *25 *30 *35 *40 45 50 55																
	6	*10	*15 *20 *25 *30 35 *40 45 50 55 60 65 70														7		
	6.5	*10	*15 *20 *25 *30 *35 *40 *45 *50 55 60 65 70 75 80																
	8	*10	*15 *20 *25 *30 *35 *40 *45 *50 *55 *60 *65 *70 *75 *80 85 90 95 100 110 120														9		
	10	*10	*15 *20 *25 *30 *35 *40 *45 *50 *55 *60 *65 *70 *75 *80 *85 *90 95 100 110 120																
	12	10	15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100														12		-
	13	10	15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 110 120 130																-
SMSB	16		15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 110 120 130 140 150														18		-
	20		40 50 60 70 80 90 100 110 120 130 140 150														24		-

Part Number		L 0.1mm Increment		F 0.5mm Increment		A		B		C		E		T		L+F Machining Conditions		Unit Price	
Type	Des																	MSBMF	SMSBF
MSBMF SMSBF	4		10~40			7	2.5	1.6	3	4.5	L+F≤46								
	4.5	-0.020	10~40							5	L+F≤46								
	5	-0.050	10~40			9	3	2.2	4	5.5	L+F≤47								
	5.5		10~40							6	L+F≤47								
	6		10~50			10	4	2.5	5	6.5	L+F≤59								
	6.5	-0.025	10~50							7	L+F≤59								
	8	-0.061	10~60			13	5	3	6	8.7	L+F≤70								
	10		10~60			16	6	4	8	10.8	L+F≤72								

Configurable Type may have different part dimensions from the Standard Type.

Alterations

Part Number

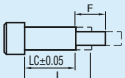
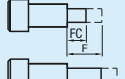
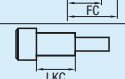
- L(LC) - F - (FC, LKC)

MSB10

SMSBF8

-- L30 -- F10 -- FC10 LKC

No Low Quantity Surcharge is necessary for alterations orders. For orders of 1 ~ 19 pc(s), the Unit Price is applied.

Alterations	Code	Spec.
	LC	Changes L dimension (machining) O.A.L. (LC) tolerance is ±0.05. Lmin≤LC≤Lmax Specified in 0.1mm ⚠ This alteration does not change the F dimension. To change the F dimension, combine FC alteration with it. ⚠ Applicable to MSB only.
	FC	Changes the thread part length. M≤FC≤Mx3 0.5mm Increment ⚠ 3≤FC≤7.5 only when D=4 ⚠ Applicable only when MSB and altered LC is combined.
	LKC	Changes L Dimension Tolerance L dimension tolerance is from ±0.05 to 0.1. ⚠ Applicable to MSBMF and SMSBF only.

Shoulder Bolts: Dimension Selectable
- Shaft Dia. Tolerance g6/h7



RoHS

Type

D Tolerance

Material

Hardness

Strength Class

GMSB

g6

EN 1.7220 Equiv.

33~38HRC

10.9

SGMSB

h7

EN 1.4301 Equiv.

-

A2-50

MSBH

h7

EN 1.7220 Equiv.

33~38HRC

10.9

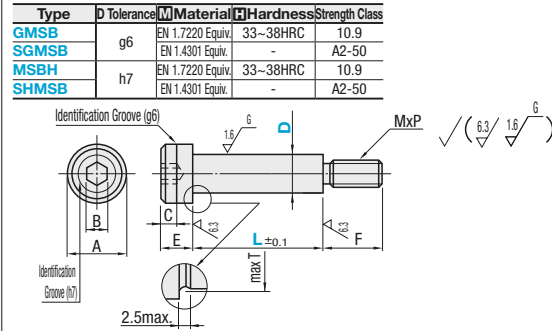
SHMSB

h7

EN 1.4301 Equiv.

-

A2-50



Identification Groove (g6)
Identification Groove (h7)

MSB
3max. for both D12 and 13
3.5max. for both D16 and 20

MSBH
EN 1.7220 Equiv. EN 1.7220 Equiv. EN 1.4301 Equiv.

MSBH, SHMSB
EN 1.7220 Equiv. EN 1.7220 Equiv. EN 1.4301 Equiv.

Hardness
33~38HRC 33~38HRC -

Surface Treatment
Electroless Nickel Plating -

Strength Class
10.9 10.9 A2-50

D Tolerance

D

g6

h7

A

B

C

E

F

MxP

T

4

-0.004

0

6.5

2.5

1.6

3

5

2.5x0.45

4.5

5

-0.012

-0.012

8

 3 | 2 | 4 | 7 | 3x0.5 | 5.5 |

6

-0.005

0

 9 | 3 | 2 | 4 | 7 | 4x0.7 | 6.5 |

8

-0.014

-0.015 13 | 5 | 3 | 6 | 9 | 6x1.0 | 8.7 |

10

16 | 6 | 4 | 8 | 12 | 8x1.25 | 10.8 |

Part Number		L (MSB is applicable only to sizes marked with *.)										F		Unit Price	
Type	D													GMSB	SGMSB
GMSB SGMSB	4	15	20	(25)	(30)										
	*10														
	5	15	20	(25)	(30)										
	*10														
	6	15	20	25	30	35	40								
	*10														
	8	15	20	25	30	35	40	45	50						
	*10														
	10	15	20	25	30	35	40	45	50	55	60				
	*10														
MSBH SHMSB	4	15	20												
	*10														
	5	15	20												
	*10														
	6	15	20	25											
	*10														
	8	15	20	25	30										
	*10														
	10	15	20	25	30	35									
	*10														

Ordering Example

Part Number

- L

GMSB10

SGMSB8

- 50

- 30

Shoulder Bolts: Configurable Type
- Shaft Dia. Tolerance g6/h7



RoHS

Type

D Tolerance

Material

Hardness

Strength Class

GMSB

g6

EN 1.7220 Equiv.

33~38HRC

10.9

GDSMSB

h7

EN 1.4301 Equiv.

-

A2-50

HDSMSB

h7

EN 1.7220 Equiv.

33~38HRC

10.9

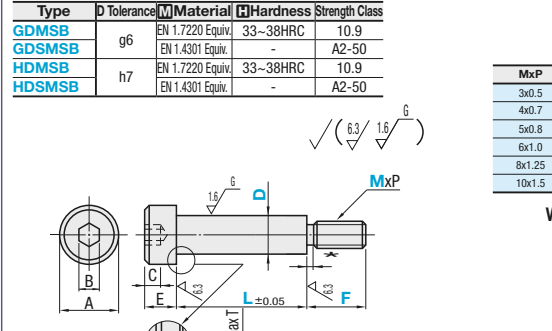
HDSMSB

h7

EN 1.4301 Equiv.

-

A2-50



Identification Groove (g6)
Identification Groove (h7)

MSB
3max. for both D12 and 13
3.5max. for both D16 and 20

MSBH
EN 1.7220 Equiv. EN 1.7220 Equiv. EN 1.4301 Equiv.

MSBH, SHMSB
EN 1.7220 Equiv. EN 1.7220 Equiv. EN 1.4301 Equiv.

Hardness
33~38HRC 33~38HRC -

Surface Treatment
Electroless Nickel Plating -

Strength Class
10.9 10.9 A2-50

D Tolerance

D

g6

h7

A

B

C

E

T

L+F Machining Conditions

4

-0.004

0

 7 | 2.5 | 1.6 | 3 | 4.5 | L+F≤46 |

5

-0.012

-0.012 9 | 3 | 2.2 | 3.5 | 5.5 | L+F≤47 |

6

-0.005

0 10 | 4 | 2.5 | 5 | 6.5 | L+F≤59 |

8

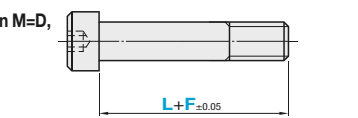
-0.014

-0.015 13 | 5 | 3 | 6 | 8.7 | L+F≤70 |

10

16 | 6 | 4 | 8 | 10.8 | L+F≤72 |

When M=D,



L+F≤0.05

* M=D has no groove and F is the effective thread.
In Standard L, therefore, incomplete threaded portion of approximately 1 to 2 pitch long occurs.

Part Number		L 0.1mm Increment		F 0.5mm Increment		M		Unit Price			
Type	D							GDSMSB	GDSMSB	HDSMSB	HDSMSB
GDSMSB GDSMSB HDSMSB HDSMSB	4	10~40		3~9		3	4				
	4.5	10~40		3~9		3	4				
	5	10~40		4~12		3	4	5			
	5.5	10~40		4~12		3	4	5			
	6	10~50		5~15		4	5	6			
	6.5	10~50		5~15		4	5	6			
	8	10~60		6~18		5	6	8			
	10	10~60		8~24		6	8	10			

Ordering Example

Part Number

- L - F - M

HDSMSB6.5

- 30

- F12

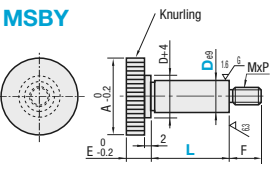
- M5

Large Head Shoulder Bolts
- Shaft Dia. Tolerance e9



RoHS

MSBY



Knurling

Material: EN 1.1191 Equiv.
Hardness: From 40 HRC
Surface Treatment: Knurled Head Black Oxide

Part Number

Des

L Selection

MxP

A

E

F

Unit Price

MSBY

6

-0.020

15 20

4x0.7

24

7

7

8

-0.025

 25 | 30 | 35 | 40 | 6x1.0 | 30 | 8 | 9 | |

10

-0.061

 25 | 30 | 35 | 40 | 8x1.25 | 36 | 10 | 12 | |

* It can be tightened by hand since A dimension is larger than that of MSB.

Ordering Example

Part Number

- L

MSBY6

- 20

Low Head Shoulder Screws

Shaft Dia. Tolerance e9/g6/h7

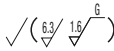
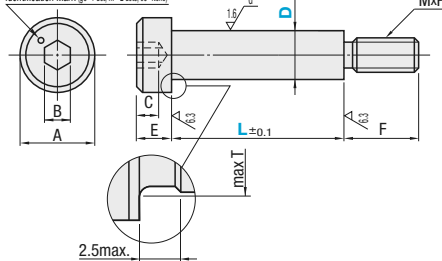
Low Head Shoulder Screws



RoHS

Type	D Tolerance	Material	Hardness	Strength Class
LMSB	e9	EN 1.7220 Equiv.	28~37HRC	9.8 Equiv.
LSMSB	-	EN 1.4301 Equiv.	-	A2-50
LMSBG	g6	EN 1.7220 Equiv.	28~37HRC	9.8 Equiv.
LSMSG	-	EN 1.4301 Equiv.	-	A2-50
LMSBH	h7	EN 1.7220 Equiv.	28~37HRC	9.8 Equiv.
LSMSBH	-	EN 1.4301 Equiv.	-	A2-50

Identification Mark (g6=1 dot, h7=2 dots, e9=none)



D Tolerance				A	B	C	E	F	MxP	T
D	e9	g6	h7							
4				6.5			2	5	2.5x0.45	4.5
4.5				7	2.5	1.6	2	6	3x0.5	5.0
5	-0.020	-0.004	0	8			2	6		5.5
5.5	-0.050	-0.012	-0.012	9	3	2.2	2.5	6	4x0.7	6.0
6				9			2	2.5	7	6.5
6.5				10	4	2.5	3	9	5x0.8	7.0
8	-0.025	-0.005	0	13	5	3	4	9	6x1.0	8.7
8	-0.061	-0.014	-0.015	16	6	4	5	12	8x1.25	10.8

Part Number		L		LMSB		LSMSB		LMSBG		LSMSG		LMSBH		LSMSBH	
Type	D	(Both g6 and h7 Tolerance are Applicable only to Sizes Marked with *)		Unit Price	Volume Discount Rate	Unit Price	Volume Discount Rate	Unit Price	Volume Discount Rate	Unit Price	Volume Discount Rate	Unit Price	Volume Discount Rate	Unit Price	Volume Discount Rate
LMSB	4	*10 *15 *20													
LSMSB	4.5	*10 *15 *20 25 30 35 40													
LMSBG	5	*10 *15 *20 *25													
LSMSG	5.5	*10 *15 *20 *25 30 35 40													
LMSBH	6	*10 *15 *20 *25													
LSMSBH	6.5	*10 *15 *20 *25 30 35 40													
	8	*10 *15 *20 *25 30 35 40													
	10	*10 *15 *20 *25 30 35 40													

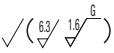
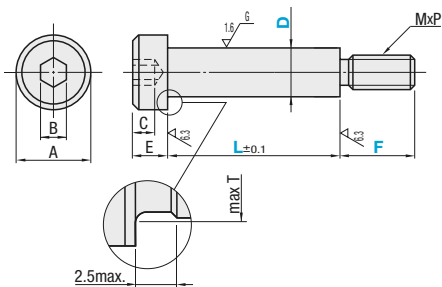
Ordering Example
Part Number - L
LSMSB6.5 - 30

Low Head Shoulder Screws



RoHS

Type	D Tolerance	Material	Hardness	Strength Class
FMSB	e9	EN 1.7220 Equiv.	28~37HRC	9.8 Equiv.
FSMSB	-	EN 1.4301 Equiv.	-	A2-50
FMSBG	g6	EN 1.7220 Equiv.	28~37HRC	9.8 Equiv.
FSMSG	-	EN 1.4301 Equiv.	-	A2-50
FMSBH	h7	EN 1.7220 Equiv.	28~37HRC	9.8 Equiv.
FSMSBH	-	EN 1.4301 Equiv.	-	A2-50



D Tolerance				A	B	C	E	MxP	T
D	e9	g6	h7						
4				6.5			2	2.5x0.45	4.5
4.5				7	2.5	1.6	2	3x0.5	5.0
5	-0.020	-0.004	0	8			2		5.5
5.5	-0.050	-0.012	-0.012	9	3	2.2	2.5	4x0.7	6.0
6				9			2	2.5	6.5
6.5				10	4	2.5	3	5x0.8	7.0
8	-0.025	-0.005	0	13	5	3	4	6x1.0	8.7
8	-0.061	-0.014	-0.015	16	6	4	5	8x1.25	10.8

Part Number		L 0.1mm Increment		F 1mm Increment		L+F Machining Conditions		Unit Price					
Type	D							FMSB	FSMSB	FMSBG	FSMSG	FMSBH	FSMSBH
FMSB	4	10~40				L+F≤45							
FSMSB	4.5	10~40				L+F≤46							
FMSBG	5	10~40				L+F≤46							
FSMSG	5.5	10~40				L+F≤47							
FMSBH	6	10~40				L+F≤47							
FSMSBH	6.5	10~50				L+F≤59							
	8	10~60				L+F≤70							
	10	10~60				L+F≤72							

Ordering Example
Part Number - L - F
FMSB4.5 - 30.5 - 4

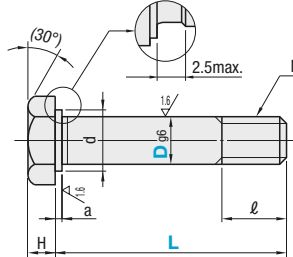
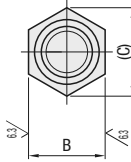
Reamer Bolts

Reamer Bolts

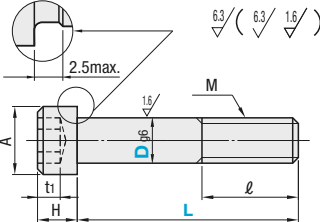
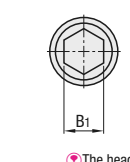


RoHS

RMB
SRMB
(Stainless Steel)



RMBR
SRMBR
(Stainless Steel)



The head is not knurled.

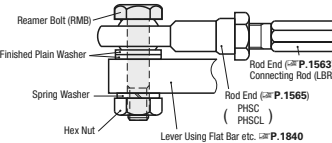
Type	Material	Surface Treatment
RMB, RMBR	EN 1.1191 Equiv.	Black Oxide
SRMB, SRMBR	EN 1.4301 Equiv.	-

Part Number		L		M		B		B ₁		(C)		A		H		t ₁ max		d		a		Unit Price			
Type	Dg6																					RMB	SRMB	RMBR	SRMBR
RMB(D5~16)	5	-0.004	23 26 29	M5	6	3	11.5	8.5	3.5	2.4	9.0	0.5													
SRMB(D5~10)	6	-0.012	23 26 29 32 35	M6	8	10	4	10	4.0	3															
	8	-0.005	32 35 36 38	M8	10	13	5	15.0	13	5.0	3.75	10.4													
RMBR(D5~8)	10	-0.014	36 38 39 42	M10	12	17		19.6	6.5	12.9															
SRMBR(D5~8)	12	-0.006	39 42 45 48 52 55	M12	16	19	-	21.9	8.0	-	15.4	1.0													
	16	-0.017	52 55 58	M16	20	22		25.4	10.0	-	19.4														

Ordering Example
Part Number - L
RMB10 - 39

ex Example

L dimension of reamer bolt is specified with the assumption of use as below.

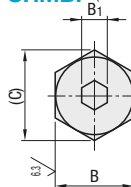


Hex Socket Head Reamer Bolts - Configurable Length

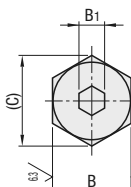


RoHS

RMBF
SRMBF
(D5~10)



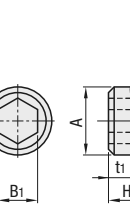
RMBFB
SRMBFB
(D5~10)



The outer hex head (B) and the hex socket (B₁) are not accurately aligned.

Type	Material	Surface Treatment
RMBF RMBFB RMBFR	EN 1.1191 Equiv.	Black Oxide
SRMBF SRMBFB SRMBFR	EN 1.4301 Equiv.	-

RMBFR
SRMBFR
(D5~8)



The head is not knurled.

Part Number		1mm Increment		M		B		B ₁		(C)		A		H		t ₁ max		d		a		Unit Price			
Type	Dg6	L	F																			RMBF, RMBFB	SRMBF, SRMBFB	RMBFR	SRMBFR
RMBF	5	-0.004	20~29	M5	10	3	11.5	8.5	3.5	2.7	2.4	9.0	0.5												
SRMBF	6	-0.012	20~35	M6	13	5	15.0	13	5	3.8	3.75	10.4													
RMBFB	8	-0.005	20~38	M8	17	6	19.6	6.5	4.5																
SRMBFB	10	-0.014	20~42	M10	21	8	21.9	8	5	-															
RMBFR	12	-0.006	20~55	M12	25	10	25.4	10	6																
SRMBFR	16	-0.017	20~58	M16	22	10	25.4	10	6																

Ordering Example
Part Number - L - F
RMBF5 - 28 - F10