

GUIDE POSTS & BUSHINGS FOR DIE SETS

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	ROLLER GUIDE POST SETS FOR DIE SETS RGBL RGSL RGKL	ROLLER CAGES RBJ	MOVABLE STOPPERS RSTM	FIXED STOPPERS RSTK	SPRINGS RSWP	RINGS FOR PREVENTING CAGE LIFTING RWR
Product name Catalog No.	Page	783	785	785	785	786

	BALL GUIDE POST SETS FOR HIGH-RIGIDITY DIE SETS — DETACHABLE POST TYPE— RBSH QBSH RMSH QMSH RKSH QKSH		BALL GUIDE POST SETS FOR DIE SETS — DETACHABLE POST TYPE— RB QB RM QM RK QK
787	787		

	BALL GUIDE POST SETS FOR HIGH-RIGIDITY DIE SETS — PRESS-FIT POST TYPE— PB SH GB SH PM SH GM SH PK SH GK SH		BALL GUIDE POST SETS FOR DIE SETS — PRESS-FIT POST TYPE— PB GB PM GM PK GK
789	789		

	PLAIN GUIDE POST SETS FOR DIE SETS RD RF RZ RFZ PD PF PZ PFZ		GUIDE POSTS FOR DIE SETS MRP BRPM BRPK MSP BSPM BSPK
791	793		795

	GUIDE POSTS FOR DIE SETS — LONG TYPE, CONFIGURABLE FULL LENGTH— MRP BRPM BRPK MSP BSPM BSPK		BALL GUIDE BUSHINGS FOR DIE SETS — LONG TYPE, CONFIGURABLE FULL LENGTH— MBB LBB LBB		BALL GUIDE BUSHINGS FOR DIE SETS — DETACHABLE TYPE— RBB		BALL GUIDE BUSHINGS FOR LOWER DIE SETS LBBS
797	799	799	799	800	800	801	801

	SPRINGS SWPB		BALL CAGES FOR DIE SETS MBSH MBJH MBS MBJ		MOVABLE STOPPERS STM		FIXED STOPPERS STK		SPRINGS SWP SWPL
801	802	802	803	803	803	803	803	803	803



RINGS FOR PREVENTING CAGE LIFTING
RWB

PLAIN GUIDE BUSHINGS FOR DIE SETS
MDB LDB LFB LDBZ LFBZ

SHANKS FOR DIE SETS
MSK MSKS MSKTP

DIE ADHESIVES
LOC638

804

805

807

807

GUIDE POST SETS FOR DIE SETS

—GUIDE—

■ Comparison of roller guides, high-rigidity ball guides, ball guides, and plain guides (Excellent A → D Poor)

Type	Item	Seizure resistance	Rigidity	Cost ratio*	Max. allowable speed		Recommended lubricant	
					Oil type	Oil-free type	Oil	Grease
Roller guide		A	B	8.1	A	—	Bearing oil	—
High-rigidity ball guide		A	C	1.9	A	—		—
Ball guide		A	D	1.8	A	—		—
Plain guide Guide	Copper alloy + MoS ₂	B	A	1.7	B	C	ISO VG68	Lithium type No.2
	Copper alloy	B	A	1.5	C	—		
	SUJ2 + MoS ₂	B	A	1.4	C	C		
Plain guide	Plain guide	D	A	1.0	D	—		

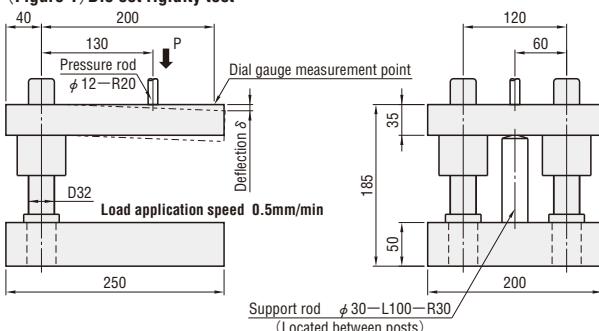
*Cost ratio with 1 as the price of a detachable plain guide RD32-160.

■ Effect of the guide type on die set rigidity

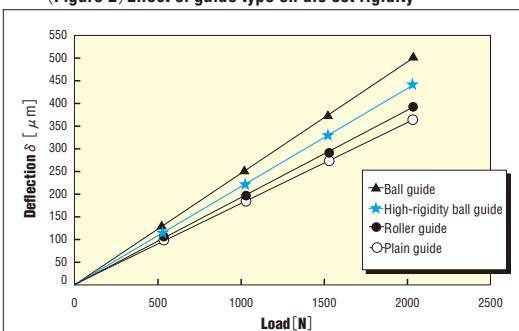
Figure 2 shows the rigidity provided by different guide types, examined using a back post type die set (Figure 1).

Deflection δ of the die set increases in the following order: Plain < Roller < High-rigidity ball < Ball.

(Figure 1) Die set rigidity test

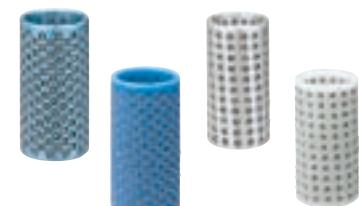


(Figure 2) Effect of guide type on die set rigidity



■ Comparison of ball cages

Item	Aluminum cage [MBS・MBSH]	Resin cage [MBJ・MBJH]
Main uses	Sturdy aluminum ball cages are often used for die applications in which the guide posts and bushings are removed and inserted during pressing, or in which the workpiece is bent.	Resin cages are often used for precision dies and dies used at high speed.
Ball holding force	Large because aluminum is used.	Weaker than aluminum.
Strength of ball cage	Unbreakable but deforms when dropped.	May break when dropped.
Weight	Heavier than resin.	Can be used for high SPM due to its light weight.
Wear particles	Aluminum wear particles are produced.	Wear particles are unlikely.



■ Features of various stopper systems

	No stopper	<ul style="list-style-type: none"> Not suitable for dies which require that posts and bushings be removed and inserted. Difficult to adjust the ball cage height when assembling. Because no stopper is present, can be used even for low shut-height dies.
	Movable stopper (RSTM・STM)	<ul style="list-style-type: none"> Ball cage height can be adjusted easily during assembly. Because the movable stopper lowers as the press lowers, can be used even for low shut-height dies.
	Fixed stopper (RSTK・STK)	<ul style="list-style-type: none"> The high stopper strength makes this type ideal for dies which require that posts and bushings be removed and inserted. Ball cage height can be adjusted easily during assembly. Because the stopper is fixed, this type is not suitable for low shut-height dies.

■ Guideline for selecting spring length (FL)

Detachable type

$$FL = L - (T + (R_{OU}) + RL/2)$$

Press-fit type

$$FL = L - (T_1 + (R_{OU}) + RL/2)$$

L: Post length

T: Flange thickness

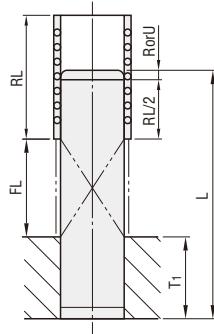
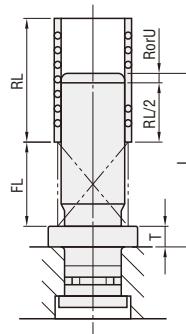
T₁: Die holder thickness

U: U of post

R: R of post

RL: Cage length

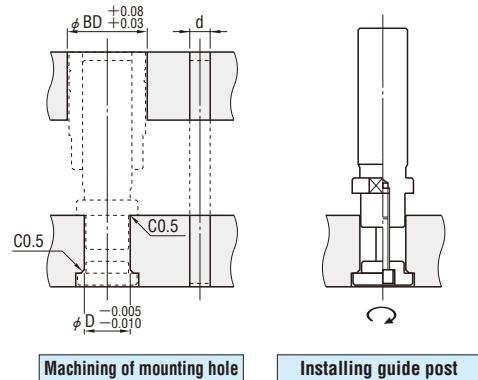
When a movable stopper or fixed stopper is used, FL should be 1.1 to 1.2 times the above calculation result.



■Installing a guide post set

■Machining the mounting holes for guide post and bushing

- Guide post and bushing mounting holes should be machined by boring or jig grinding after the machining of all other holes is completed and after any machining deformation removed (for example by regrinding the top and bottom surfaces).
- One method of creating a position reference for upper and lower dies is to create a dummy hole and insert a pin.

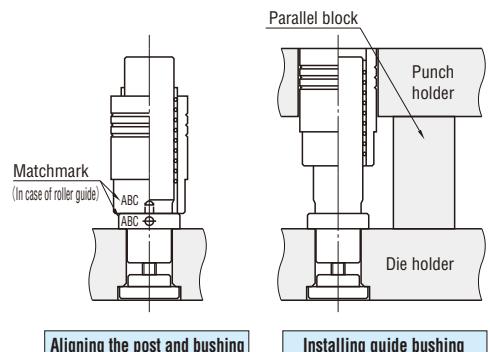


■Installing guide posts

- After cleaning the mounting hole, fix the guide post in place using a bolt.
- In the case of a roller guide post set, offsetting the reference plane of one guide post by 90° from the other posts helps prevent errors when the die set is assembled.
- Check the post perpendicularity. (0.01mm/100mm or less)
- When press-fitting the post, use a hydraulic press or similar means and insert the post slowly. Tapping the post with a hammer may cause post bending or deformation.

■Installing guide bushings

- Place the bushing onto the guide post.
(For a roller guide, align the matchmark and symbol.)
- Place a parallel block on the die holder and place the punch holder on it.
- Slide the guide bushing to check for any interference.
- Use solvent to clean any oil or dirt from the contact surface, then apply an anaerobic adhesive agent (Loctite 638 **P.808** is recommended) into the guide bushing's adhesive groove, and insert the bushing into the mounting hole. Set the guide bushing so that it will not come out from the punch holder and allow the adhesive to harden under those conditions. (3 to 6 hours at normal temperatures)



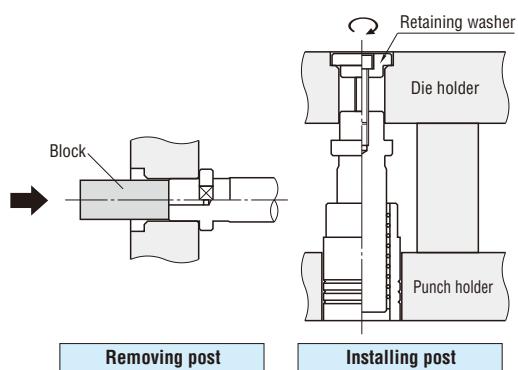
■Installing stoppers

- Movable stopper**...After the adhesive agent has completely hardened, insert the spring and cage, and tighten the hexagon shaft of movable stopper RSTM•STM using a spanner.
- Fixed stopper**...After the adhesive agent has completely hardened, insert the spring and cage, and attach the fixed stopper RSTK•STK.

■Removing and installing guide posts

Removing

- Remove the movable stopper, ball cage and spring from the guide post.
- Loosen the bolt and remove the retaining washer.
- In order to avoid damaging the internal surfaces of the mounting hole or tap holes, position a cushion block (such as a copper alloy block) and tap the block with a hammer to remove the guide post.



Installing

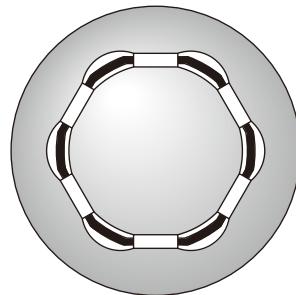
- Attach the spring, cage and movable stopper to the guide post, then insert the guide post into the guide bushing.
- Place a parallel block onto the punch holder and position the die holder on top of it so that the die holder does not contact the roller guide or ball guide.
- Slide each guide post up and down to check for any interference with the mounting hole. If necessary, adjust the punch holder position.
- After cleaning the mounting hole, fix the guide post in place using a bolt.

ROLLER GUIDE POST SETS FOR DIE SETS

—GUIDE—

■Features of roller guide

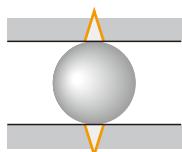
A roller guide has rollers positioned on 6 faces, producing a contact area that is several times larger than that of a ball guide, also provides rigidity that is nearly equivalent to a plain guide. This results in rigidity and accuracy that are not possible with ball guides. Roller guides not only improve the overall rigidity and straightness of the die set, they can also maintain smooth vertical strokes and stable accuracy over long periods of time. They also feature improved durability in response to high-speed intermittent operation and vibration.



Changing from point contact to linear contact [Achievement of high rigidity]

A roller's contact surface area is approximately 10 times larger than that of a ball, and this results in a higher level of rigidity between the guide post and guide bushing when a roller guide is used.

The ball guide improves the rigidity by increasing the preload to 10 to 25 μm . However, the large preload causes a large thrust shock to the ball, resulting in vibration.



Because the contact is linear, the preload of the rollers is much smaller, at 4 to 12 μm . This contributes to smooth movement and reduced thrust shock.



■Component names

①Guide bushing

Hardness: 60 ~ 62HRC

Raceway surface: Ra0.2 μm

①

④Matchmark/symbol

When using the bushing, align the matchmarks on the bottom of the guide bushing and the side of the guide post flange, and be sure that the post and bushing symbols are matched.
(Concentricity when properly aligned: 3 μm or less)

④

②Roller cage

Single-piece structure made of polyacetal

③Guide post

Hardness: 60 ~ 62HRC

Raceway surface: Ra0.1 μm

②

⑤Reference surface

Offsetting the reference surface of one guide post by 90° from the other posts helps prevent errors when the die set is assembled.

⑤

■Applications

- Precision punch dies for ultra thin metal and resin materials
Switches, relay components, lead frames, printed circuits, films, etc.
- Punch dies for relatively thick materials
Motor components, connectors, fine blanking, etc.
- Guides for specialized machines and precision machines
For press units, positioning control, jigs, etc.

■Accuracy standards for roller guides and die sets

Inspection item	Measurement method	Tolerance				
		Reference surface	Upper/lower surfaces	Other surfaces		
Surface roughness of holder		32/	08/	63/		
Parallelism of upper/lower surfaces for punch holders and die holders		Nominal size (length of longer side)	100 or less	200 or less	300 or less	600 or less
		Accuracy	0.004	0.008	0.01	0.015
Perpendicularity of die holder bottom surface and guide post		0.01/100 or less				
Parallelism after assembly		Nominal size (length of longer side)	100 or less	200 or less	300 or less	600 or less
		Accuracy	0.008	0.012	0.02	0.025

[Notes]

- Select an appropriate guide post length so that the guide bushing will not separate from the guide post at top dead center during press processing.
- The minimum stroke of the roller guide must be equal to or larger than the roller diameter $\phi d \times \pi$.
A stroke shorter than this will cause stress to be applied at certain rollers only; resulting in rapid deterioration of roller guide performance.
- Be sure to periodically lubricate the roller guide.
- If scraps or other debris collect in the roller guide, protect the guide using a cover.
- Do not modify the roller guide. (Doing so may make it impossible to achieve the designated accuracy and performance.)

ROLLER GUIDE POST SETS FOR DIE SETS

RGBL
(No stopper)



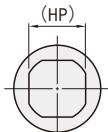
RGSL
(For movable stopper)



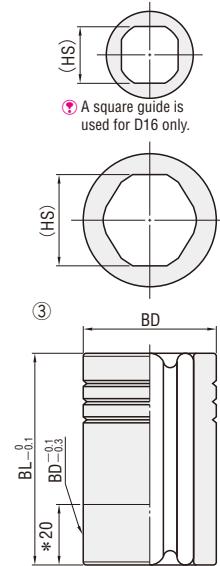
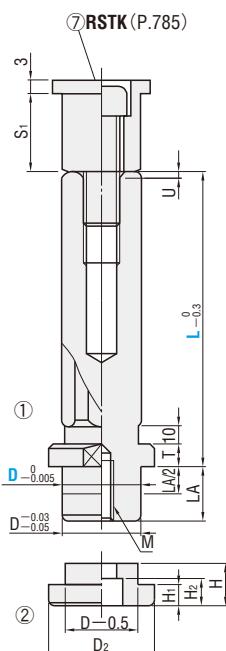
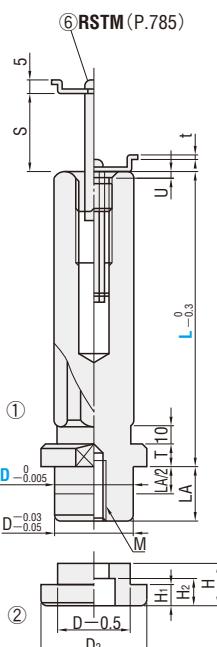
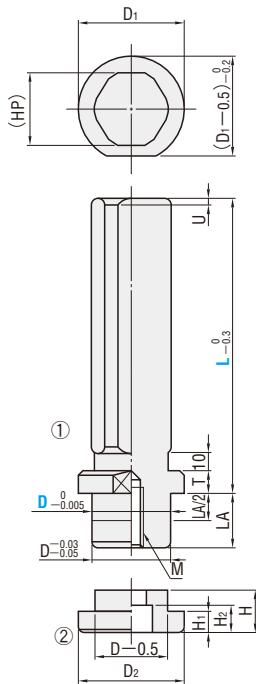
RGKL
(For fixed stopper)



RoHS



Ⓐ A square guide is used for D16 only.



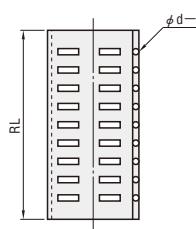
* The dimension is 0 for D13 and D16.

Name	M	H
① Guide post	SKS3	60 ~ 62HRC
② Retaining washer	S45C	—
③ Guide bushing	SKS3	60 ~ 62HRC
④ Roller cage	SUJ2 Polyacetal	
⑤ Spring	SWP-B	
⑥ Movable stopper	S45C SPC-1	—
⑦ Fixed stopper	S45C	

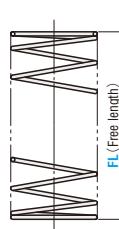
Roller cage④, spring⑤, movable stopper⑥ and fixed stopper⑦ can be purchased individually.

参照 P.785

④RBJ (P.785)



⑤RSWP (P.786)



参照 Assemble the set in accordance with "Accuracy standards for roller guides and die sets" on page 782.

D	Post											Bushing								
	D ₁	D ₂	LA	H	H ₁	H ₂	(HP)	T	M	Provided bolt	U	t	S	S ₁	BD	BL	(HS)	Number of grooves		
13	19	17	12	7	3	5.5	11.2	5	5×8	CB 5×10	2.5	—	—	—	23	0	15.2			
16	24	22	16	10	4	6.5	14.6	6	6×10	CB 6×10	4.3	1.2	11	14	30	-0.006	40	18.6		
20	29	28	16			14	7	8.5	18.8									3		
25	35	35	18					8	8×20	CB 8×15	3.0		20	23	37		60	22.8		
28	37	36	20						23.8				25	28	45	0	70	27.8		
32	42	40	23					10	10×20	CB10×20	3.5	1.6	27	30	47	-0.007	75	31.6		
40	54	50	35						26.6				28	31	55		78	36.2	4	
50	64	60	35						31.2	10×25			33	36	68	0	92	45.1	5	
60	74	72	42			18	9	12	37.1	12×30	CB12×25	4.0		35	38	80	-0.008	96	54.9	
									48.9	12×30	CB14×30	5.0	2.0	51	54	95		120	67.1	6

Catalog No.		5mm increments		Base unit price 1 ~ 9 sets	
Type	D	L	FL	RGBL	RGSL·RGKL
RGBL (No stopper)	13	70 ~ 100 105 ~ 120	30 ~ 100		
	16	75 ~ 100 105 ~ 120 125 ~ 135	30 ~ 110		
	20	75 ~ 100 105 ~ 120 125 ~ 140	40 ~ 120		
	25	95 ~ 120 125 ~ 140 145 ~ 160	60 ~ 140		
	28	95 ~ 120 125 ~ 140 145 ~ 160	50 ~ 140		
	32	115 ~ 140 145 ~ 160 165 ~ 180	70 ~ 155		

Quotation

Catalog No.		10mm increments		Base unit price 1 ~ 9 sets	
Type	D	L	FL	RGBL	RGSL·RGKL
RGBL (No stopper)	40	120 ~ 140 150 ~ 170 180 ~ 200	70 ~ 200		
	50	210 ~ 220 150 ~ 170 180 ~ 200	90 ~ 230		
	60	210 ~ 230 240 ~ 250 150 ~ 170 180 ~ 200	70 ~ 210		
RGSL (For movable stopper)					
RGKL (For fixed stopper)					

Quotation



Catalog No. — L — FL
RGBL 25 — 120 — FL80



Days to Ship Quotation



Quotation



Catalog No. — L(LC) — FL — (LAC)
RGBL 20 — LC78 — FL40

Alteration	Code	Spec.	1Code	Alteration	Code	Spec.	1Code
	LC	Post length L change D 1mm increments 13 70<LC<120 16 75<LC<135 20 75<LC<140 25 95<LC<160 28 95<LC<160 32 115<LC<180 40 120<LC<220 50 150<LC<250 60 150<LC<250	Quotation		LAC	LA dimension change LA/2+1≤LAC<LA 1mm increments Tap depth is shortened.	Quotation

Configurable guide post length type (long)

Catalog No.		5mm increments	10mm increments	Base unit price
Type	D	LC	FL	1~9 pieces
RGBL	20	145 ~ 200	110 ~ 200	
	25	165 ~ 200	120 ~ 190	
	28	165 ~ 200	120 ~ 190	Quotation
	32	185 ~ 240	140 ~ 230	



Catalog No. — LC — FL
RGBL 25 — LC200 — FL160

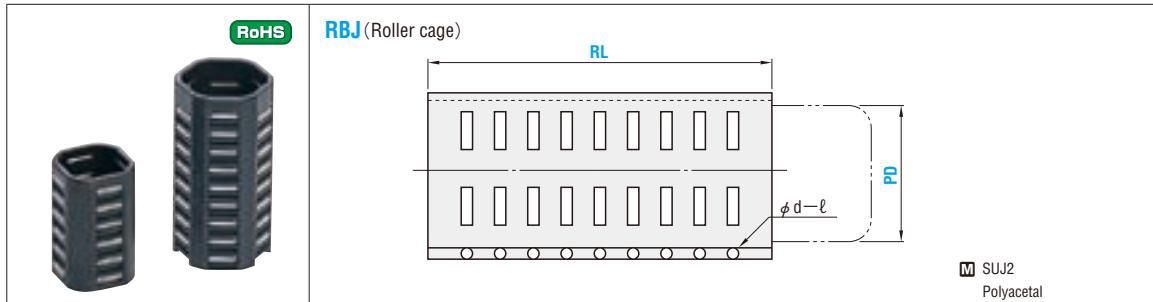


Days to Ship Quotation



Quotation

ROLLER CAGES AND STOPPERS FOR ROLLER GUIDE POSTS



d	ℓ	Number of rollers	Catalog No.		RL	Base unit price 1 ~ 9 pieces
			Type	PD		
2.0	4.8	45	RBJ	13	30	
	6.8	24		16	30	
		48		20	52	
		57		25	62	
	7.8	57		28	66	
		69		32	68	
2.5	9.8	75		40	78	
	11.8	78		50	82	
3.0	13.8	84		60	116	

Quotation



Catalog No. — RL
RBJ 20 — 52



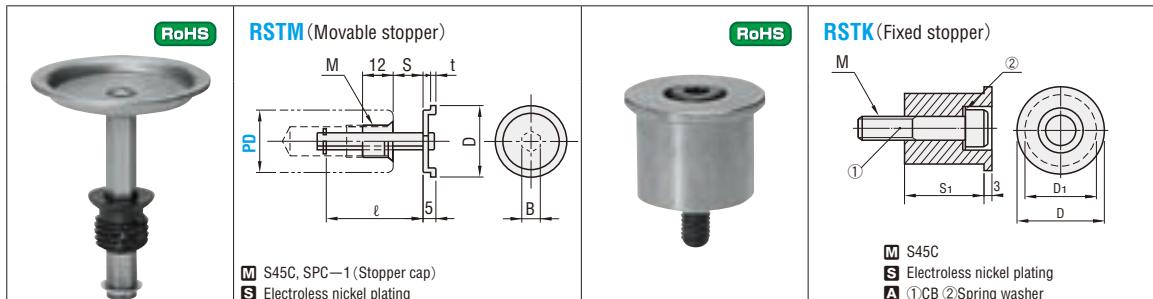
Price

Quotation



Days to Ship

Quotation



Post diameter	D	M×P	RSTM				RSTK			Catalog No.		RL	Base unit price 1 ~ 9 pieces
			S	ℓ	t	B	D ₁	S ₁	Provided bolt	Type	PD		
16	17.5	8×1.25	0 ~ 9	21	1.2	4	14.4	14	M 8×20	RSTM (Movable stopper)	16	30	
20	21	10×1.5	0 ~ 20	32			5	18	23		20	52	
25	26		0 ~ 25	37			23	28			25	62	
28	29	12×1.5	0 ~ 27	39			25.5	30	M12×35		28	66	
32	34		0 ~ 28	40			30	31			32	68	
40	43		0 ~ 33	45			38	36	M16×40		40	78	
50	52.5	16×1.5	0 ~ 35	47			47.5	38		RSTK (Fixed stopper)	50	82	
60	64.5		0 ~ 51	63			57.5	54	M16×50		60	116	

Quotation



Catalog No. — RL
RSTM 20 — 52



Price

Quotation



Days to Ship

Quotation

SPRINGS FOR ROLLER GUIDE POSTS / RINGS FOR PREVENTING CAGE LIFTING

For the spring length selection standards, refer to P.779.

RoHS				RSWP (Spring)		FL (Free length)		M SWP-B	
D	D ₁	d	P	Type	PD	5mm increments	10mm increments	Base unit price 1 ~ 9 pieces	
14.1	12.5	0.8	8	RSWP	13	30 ~ 80 85 ~ 100	—		
17.9	16.3		12		16	30 ~ 80 85 ~ 110	—		
22.1	20.3		14		20	35 ~ 80 85 ~ 120	—		
27.2	25.4		15		—	130 ~ 200			
30.0	28.0		1.0		25	40 ~ 80 85 ~ 140	—		
34.9	32.5		1.2		28	50 ~ 80 85 ~ 140	—		
43.9	40.7		1.6		32	70 ~ 120 125 ~ 155	—		
53.8	50.6		1.6		40	—	160 ~ 210		
65.7	60.5		2.6		50	—	70 ~ 140		
			30		60	—	150 ~ 210		

Quotation



Catalog No. — FL
RSWP 20 — 90



Price

Quotation



Days to Ship

Quotation

RoHS		RWR (For roller guides)			
Inner diameter d	Outer diameter d ₁	Catalog No.		Base unit price 1 ~ 9 pieces	
		Type	PD	20	
20.1	35 ± 1.5 ± 0.3	RWR (For roller guide)	20		
25.2	40 ± 2.0 ± 0.5		25		
27.6	45 ± 2.0 ± 0.5		28		
32.3	50 ± 3.0 ± 1.0		32		
40.2	60 ± 3.0 ± 1.0		40		
50.3	75 ± 4.0 ± 1.0		50		
60.5	85 ± 4.0 ± 1.5		60		

M Polyacetal resin (POM), black



Catalog No.

RWR 25

■ Features P.804



Days to Ship

Quotation



Price

Quotation

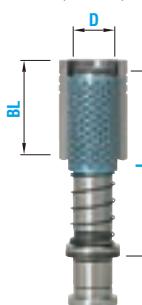
BALL GUIDE POST SETS FOR DIE SETS

—DETACHABLE POST TYPE—

High-rigidity ball guide post sets

No stopper Movable stopper Fixed stopper

RBSH
(QBSH)



RMSH
(QMSH)



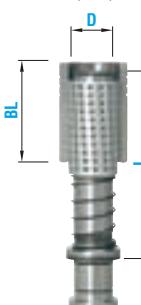
RKSH
(QKSH)



Ball guide post sets

No stopper

RB
(QB)



RM
(QM)

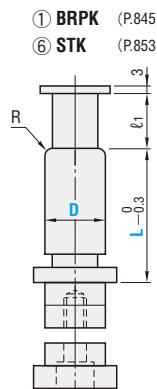
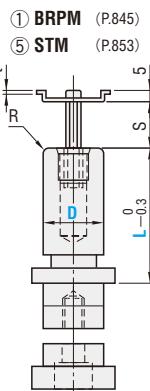
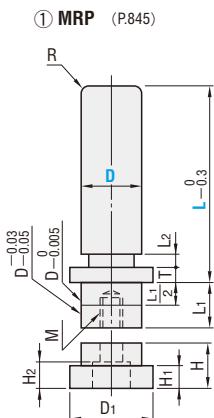


RK
(QK)

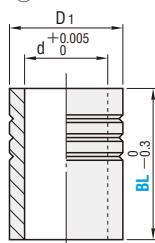


RoHS

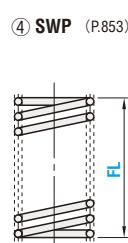
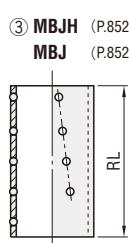
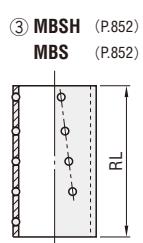
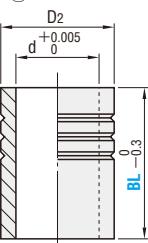
Catalog No.	Components					
	①	②	③	④	⑤	⑥
RBSH	MRP				—	—
RMSH	BRPM	MBSH		STM	—	
RKSH	BRPK	MBB LBB	SWP	—	STK	
QBSH	MRP			—	—	
QMSH	BRPM	MBJH		STM	—	
QKSH	BRPK			—	STK	
RB	MRP			—	—	
RM	BRPM	MBS		STM	—	
RK	BRPK	MBB LBB	SWP	—	STK	
QB	MRP			—	—	
QM	BRPM	MBJ		STM	—	
QK	BRPK			—	STK	



② MBB (P.849)



② LBB (P.849)



MRP·BRPM·BRPK

D	D ₁	L ₁	L ₂	H	H ₁	H ₂	T	t	M	R	Provided bolt
20	+0.020	28	15	10	14	7	8.5	1.6	8	2.0	CB8-25
22	+0.015	30	16		8				18	3.0	
25		35	18								
28	+0.025	36	20	12	16	8	10.5	2.0	10	3.5	CB10-30
32	+0.020	40	23						22		
38	+0.030	49	27		18	10	12.5		12	4.0	
45	+0.025	55	32	15				2.0	27		CB12-35
50	+0.035	62	35		20	12	14.5		14	4.5	
60	+0.030	72	42						31		

MBB·LBB

d	D ₁ -D ₂	D ₁ T	D ₂ T	RL	S	ℓ ₁
26	37	+0.5 +0.3	0 -0.007 0 -0.008 0 -0.010	50	0 ~ 19	15
60	40			60	0 ~ 23	20
28	40			75	0 ~ 30	25
31	45			90	0 ~ 37	30
36	50			110	0 ~ 47	35
40	55					
48	64					
55	74					
60	83					
70	95					

Installing the bushing (Adhesives P.808)

MBB	Devcon adhesive	—
LBB	Locite adhesive	Loctite No.638 (LOC638)

About high-rigidity ball guide post sets

These products utilize a high-rigidity ball cage (MBSH, MBJH) containing approximately 1.6 times more balls, achieving rigidity that is nearly equivalent to that of a plain guide at low cost.

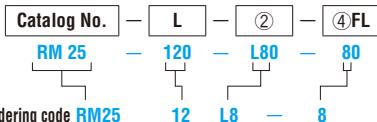


※When ordering by set, only the standard dimensions are available.
If dimensions other than standards are required, order alterations
(P.795 ~ 806) to individual parts.

Catalog No.		L					②MBB・LBB		RL	FL 10mm increments
Type	D	80	90	100	110	120	Type	BL		
RBSh	20	80	90	100	110	120	M (MBB)	50	50	40 ~ 140
RMSH	22	80	90	100	110	120		50	50	40 ~ 140
RKSh	25	80	90	100	110	120		60	60	40 ~ 150
QBSh	28	100	110	120	130	140		60	60	40 ~ 150
QMSH	32	120	130	140	150	160		80	75	50 ~ 150
QKSh	38	140	150	160	170	180		60	60	70 ~ 190
RB	45	140	150	160	170	180		80	75	80 ~ 190
RM	50	160	170	180	200			100	90	80 ~ 190
RK	60	160	170	180	200			100	90	80 ~ 190
QB								100	90	80 ~ 190
QM								120	110	
QK								100	90	
								120	110	



Order



Days to Ship

Quotation



Price

Quotation

Type	M H S
MRP BRPM BRPK	M SUJ2 M S45C (Cap) H 58HRC ~ (Induction hardening)
STM	M S45C S Black oxide (Fe ₃ O ₄)
STK	M S45C S Black oxide (Fe ₃ O ₄) Accessories CB

Type	M H
MBB LBB	M SUJ2 H 58HRC ~
MBSH MBS	M A5056 (Aluminum)

Type	M
MBJH MBJ	M Polyacetal resin (POM)
SWP	M SWP-B



※When ordering by set, only the standard dimensions are available.
If dimensions other than standards are required, order alterations
(P.795 ~ 806) to individual parts.

Catalog No.		L									② MBB・LBB		RL	FL 10mm increments
Type	D	100	110	120	130	140	150	160	170	180	Type	BL		
PBSH	20	100	110	120	130	140	150	160	170	180	M (MBB)	50	50	40 ~ 140
PMSH	22	120	130	140	150	160	170	180			L (LBB)	50	50	40 ~ 140
PKSH	25	120	130	140	150	160	170	180				60	60	40 ~ 150
GBSH												60	60	40 ~ 150
GMSH	28	140	150	160	170	180	190	200				80	75	
GKSH												60	60	50 ~ 150
PB	32	160	170	180	190	200	220	240	260			80	75	50 ~ 150
PM	38	180	190	200	220	240	260					80	75	70 ~ 190
PK	45	180	190	200	220	240	260					100	90	80 ~ 190
GB												100	90	80 ~ 190
GM	50	200	220	240	260							120	110	80 ~ 190
GK	60	200	220	240	260							100	90	80 ~ 190
												120	110	80 ~ 190



Catalog No. — L — ② — ④FL
GBSH 25 — 150 — L60 — 120

Ordering code GBSH 25 15 L6 — 12



Days to Ship

Quotation



Price

Quotation

Type	M H S
MSP BSPM BSPK	M SUJ2 M S45C (Cap) H 58HRC ~ (Induction hardening)
STM	M S45C S Black oxide (Fe ₃ O ₄)
STK	M S45C S Black oxide (Fe ₃ O ₄) Accessories CB

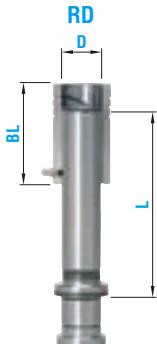
Type	M H
MBB LBB	M SUJ2 H 58HRC ~
MBSH MBS	M A5056 (Aluminum)

Type	M
MBJH MBJ	M Polyacetal resin (POM)
SWP	M SWP-B

PLAIN GUIDE POST SETS FOR DIE SETS

—DETACHABLE POST TYPE—

Plain guide



Oil-free (MoS₂)



Copper alloy laminated



Copper alloy laminated
Oil-free (MoS₂)



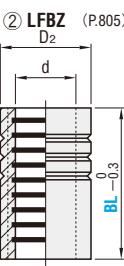
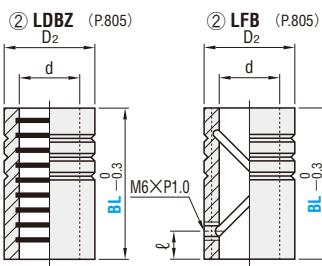
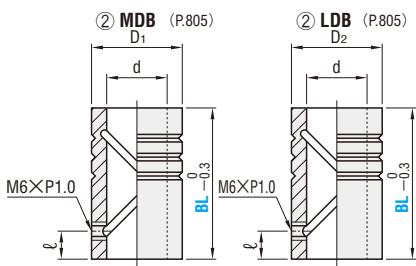
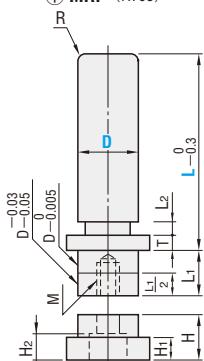
RoHS

Catalog No.	Components	
	①	②
RD	MRP	MDB
		LDB
		LDBZ
		LFB
		LFBZ

■Installing the bushing (Adhesives P.808)

MDB	Devcon adhesive	—
LDB		
LDBZ		
LFB	Loctite adhesive	Loctite No.638 (LOC638)
LFBZ		

① MRP (P.795)



MRP

D	D ₁	L ₁	L ₂	H	H ₁	H ₂	T	M	R	Provided bolt	
										5	8
20	+0.020	28	15							2.0	
22	+0.015	30	16	10	14	7	8.5	8	18	3.0	CB 8-25
25		35	18								
28	+0.025	36	20					10	22	3.5	CB10-30
32	+0.020	40	23	12	16	8	10.5	10	22		
38	+0.030	49	27					12	27	4.0	CB12-35
45	+0.025	55	32					14	31	4.5	CB14-40
50	+0.035	62	35	15	20	12	14.5	15			
60	+0.030	72	42								

MDB LDB·LDBZ·LFB·LFBZ

ℓ	d	MDB		LDB·LDBZ·LFB·LFBZ		Type	M H A
		D ₁	D ₂	D ₁	D ₂		
10	+0.027	20	31	31		MRP	M SUJ2 H 58HRC ~ (Induction hardening) M S45C (Cap) A Cap screw CB
		22	34	34			
		25	37	37	-0.007		
		28	42	42			
15	+0.032	32	46	46		MDB LDB	M SUJ2 H 58HRC ~ A Grease nipple GPA6A
		38	54	54			
		45	62	62	-0.008		
		50	70	70			
20	+0.045	55	80	80	-0.010	LDBZ LFB	M SUJ2·Copper alloy H 45HRC ~ A Grease nipple GPA6A
		60					
25	+0.040					LFBZ	M SUJ2·Copper alloy MoS ₂ (embedded) H 45HRC ~



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If dimensions other than standards are required, order alterations
(P.795 ~ 806) to individual parts.

Catalog No.		L							RD Type (②)	BL	
Type	D	80	90	100	110	120	130	140	150	160	
RD	20										50
	22	80	90	100	110	120					M 50 60
RZ	25	80	90	100	110	120	130				60 80
	28			100	110	120	130	140	150	160	L 60 80
RF	32					120	130	140	150	160	80 100
	38							140	150	160	100 120
RFZ	45							140	150	160	100 120
	50								160	170	180 200
RD	60								160	170	180 200

Specify for RD type only



Order

Catalog No. — L — ②·BL

RD20 — 120 — M50

Ordering code RD 20 12 M5
RZ 20 12 5



Days to Ship

Quotation



Price

Quotation

PLAIN GUIDE POST SETS FOR DIE SETS

—PRESS-FIT POST TYPE—

Plain guide



Oil-free (MoS₂)



Copper alloy laminated



Copper alloy laminated
Oil-free (MoS₂)

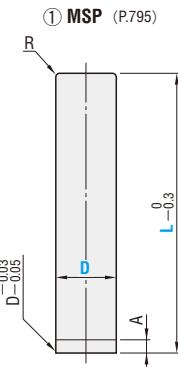


RoHS

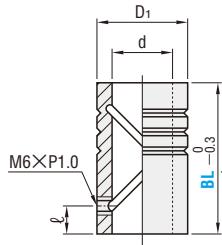
Catalog No.	Components	
	①	②
PD	MSP	MDB
PZ		LDB
PF		LDBZ
LFB		LFB
LFBZ		LFBZ

■Installing the bushing (Adhesives P.808)

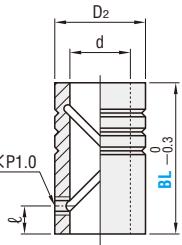
MDB	Devcon adhesive	—
LDB		
LDBZ		
LFB	Loctite adhesive	Loctite No.638 (LOC638)
LFBZ		



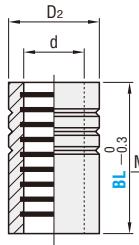
② MDB (P.805)



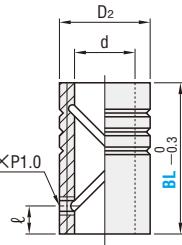
② LDB (P.805)



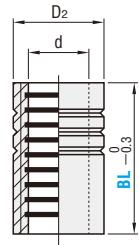
② LDBZ (P.805)



② LFB (P.805)



② LFBZ (P.805)



MSP			
D	A	R	
20	+0.020	4	2.0
22	+0.015		3.0
25		5	3.5
28	+0.025		3.5
32	+0.020	6	4.0
38	+0.030		4.0
45	+0.025	7	4.5
50	+0.035		4.5
60	+0.030		

ℓ	d		MDB		LDB-LDBZ-LFB-LFBZ	
	D ₁	D ₂	D ₁	D ₂	D ₁	D ₂
10	20	+0.027	31		31	
	22	+0.022	34		34	
	25		37		37	-0.007
15	28	+0.032	42	+0.5	42	
	32	+0.027	46	+0.3	46	
	38	+0.037	54		54	0
	45	+0.040	62		62	-0.008
	50	+0.045	70		70	
	60	+0.040	80		80	-0.010

Type	M H A
MSP	SUJ2 58HRC ~ (Induction hardening)
MDB LDB	SUJ2 58HRC ~ Grease nipple GPA6A
LDBZ	SUJ2 MoS ₂ (embedded) 58HRC ~
LFB	SUJ2-Copper alloy 45HRC ~ Grease nipple GPA6A
LFBZ	SUJ2-Copper alloy MoS ₂ (embedded) 45HRC ~



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If dimensions other than standards are required, order alterations
(P.795 ~ 806) to individual parts.

Catalog No.		L										PD Type	BL
Type	D											(②)	
PD	20	100	110	120	130	140	150	160	170	180		M (MDB)	50
	22		120	130	140	150	160	170	180				50 60
	25		120	130	140	150	160	170	180				60 80
	28			140	150	160	170	180	190	200			60 80
	32				160	170	180	190	200	220	240	L (LDB)	80 100
PD	38					180	190	200	220	240	260		80 100
	45					180	190	200	220	240	260		100 120
	50						200	220	240	260			100 120
PD	60						200	220	240	260			100 120

Specify for PD
type only



Catalog No. — L — ②·BL
PD 28 — 160 — M 80
Ordering code PD 28 16 M8
PZ 28 16 8



Days to Ship **Quotation**



Price **Quotation**

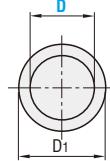
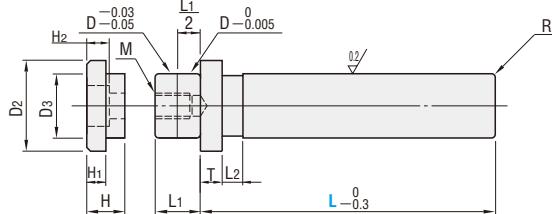
GUIDE POSTS FOR DIE SETS

RoHS

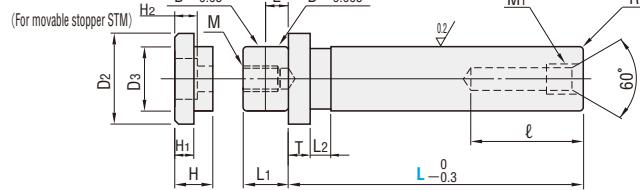
—Detachable post type—



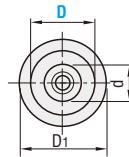
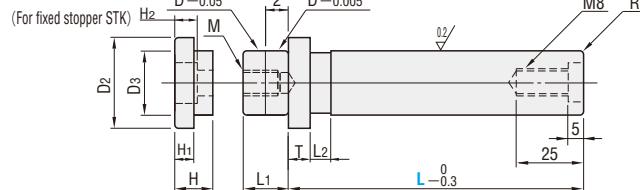
MRP



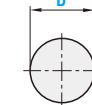
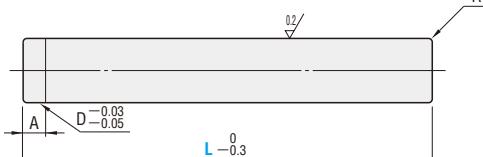
BRPM



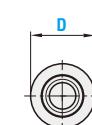
BRPK



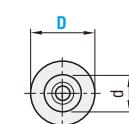
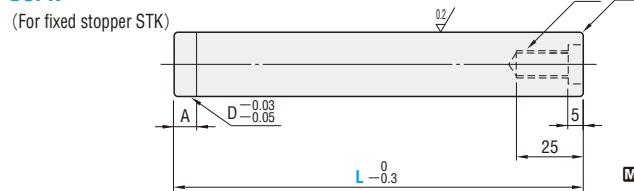
MSP



BSPM



BSPK



M SUJ2 H 58HRC~Induction hardening
(Depth 1.5~2.0mm)

—Press-fit post type—



D	D ₁	T	L ₁	L ₂	ℓ	M ₁ ×P	d	A	M	R	D ₂	D ₃	H	H ₁	H ₂	Provided bolt	
20	+0.020 +0.015	29	5	15	38	M10×1.5			2.0	28	19.5						
22		31		8	42			4	M8×18	3.0	30	21.5	14	7	8.5	CB 8-25	
25		36			50					3.0	35	24.5					
28	+0.025 +0.020	39	10	20	50	M12×1.5		5	M10×22	3.5	36	27.5	16	8	10.5	CB10-30	
32		44		23	60					40	31.5						
38	+0.030 +0.025	53	12	27	60			6	M12×27	4.0	49	37.5					
45		59			70	M16×1.5	20			55	44.5		18	10	12.5	CB12-35	
50	+0.035	69	15	35	70			7	M14×31	5.0	62	49.5	20	12	14.5	CB14-40	
60	+0.030	79		42	70					72	59.5						

Catalog No.		D	L								Base unit price 1~9 pieces		
Type			80	90	100	110	120	130	140	150	160	MRP	BRPM·BRPK
MRP	20		80	90	100	110	120						
	22		80	90	100	110	120						
	25		80	90	100	110	120	130					
	28			100	110	120	130		140	150	160		
BRPM	32					120	130	140		150	160		
	38							140	150	160			
	45							140	150	160		170	180
BRPK	50								160	170			
	60								160	170	180		200

Quotation

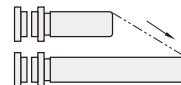
Catalog No.		D	L								Base unit price 1~9 pieces			
Type			100	110	120	130	140	150	160	170	180	MSP	BSPM·BSPK	
MSP	20		100	110	120	130	140	150	160	170	180			
	22			120	130	140	150		160	170	180			
	25				120	130	140	150		160	170			
	28					140	150	160	170		180	190	200	
BSPM	32						160	170	180	190	200	200	220	240
	38							180	190	200		220	240	260
	45							180	190	200		220	240	260
BSPK	50								200	220		240	260	
	60								200	220		240	260	

Quotation



Catalog No. — L
BSPM 32 — 180

Long type guide posts with configurable full length are listed on P.797.



Days to Ship **Quotation**



Price **Quotation**



Alterations Catalog No. — L(LC)
MRP 20 — LC77
Quotation

Alteration	Code	Spec.				1Code		
		D	MRP	BRPM·BRPK	MSP	BSPM·BSPK	D	MRP·MSP BSPM·BSPK
MRP·BRPM·BRPK								
		LC						
			60 ~ 119	70 ~ 119	70 ~ 179	80 ~ 179		
			20	60 ~ 119	70 ~ 119	70 ~ 179	80 ~ 179	
			22	60 ~ 119	70 ~ 119	70 ~ 179	80 ~ 179	
			25	60 ~ 129	80 ~ 129	70 ~ 179	80 ~ 179	
			28	60 ~ 159	80 ~ 159	70 ~ 199	80 ~ 199	
			32	60 ~ 159	100 ~ 159	70 ~ 239	80 ~ 239	
			38	60 ~ 179	100 ~ 179	70 ~ 259	80 ~ 259	
			45	60 ~ 179	120 ~ 179	70 ~ 259	90 ~ 259	
			50	60 ~ 199	120 ~ 199	70 ~ 259	90 ~ 259	
			60	60 ~ 199	120 ~ 199	70 ~ 259	90 ~ 259	
MSP·BSPM·BSPK								
		LC						
			60 ~ 199	120 ~ 199	70 ~ 259	90 ~ 259		
			60	60 ~ 199	120 ~ 199	70 ~ 259	90 ~ 259	

Quotation

GUIDE POSTS FOR DIE SETS

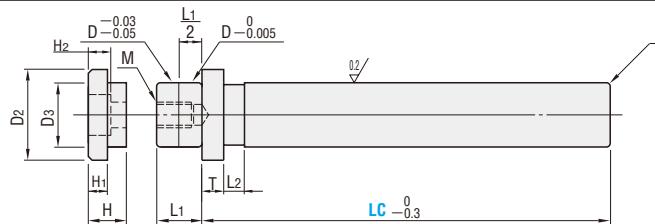
—LONG TYPE, CONFIGURABLE FULL LENGTH—

RoHS

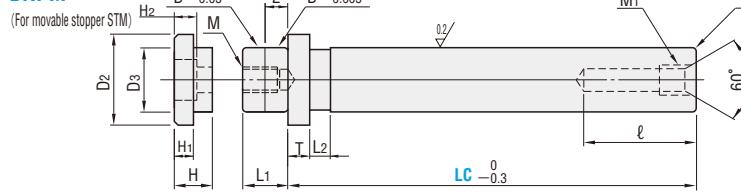
—Detachable post type—



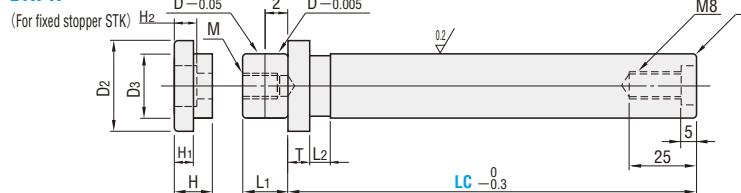
MRP



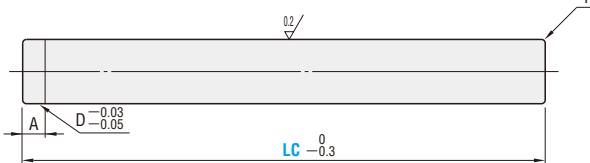
BRPM



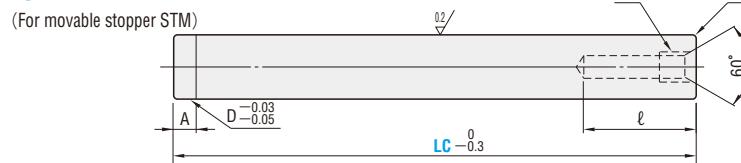
BRPK



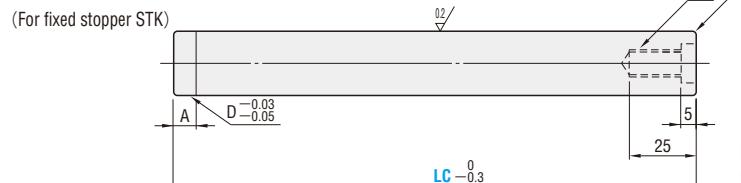
MSP



BSPM



BSPK



M SUJ2

H 58HRC ~ Induction hardening
(Depth 1.5 ~ 2.0mm)

—Press-fit post type—



D	D ₁	T	L ₁	L ₂	ℓ	M ₁ ×P	d	A	M	R	D ₂	D ₃	H	H ₁	H ₂	[A] Provided bolt
20	+0.020	29	5	15	10	38	14	4	M10×18	2.0	28	19.5	14	7	8.5	CB 8-25
22	+0.015	31		16		42				3.0	30	21.5				
25		36		18		50				35	24.5					
28	+0.025	39		20	12	50	20	5	M12×1.5	3.5	36	27.5	16	8	10.5	CB10-30
32	+0.020	44		23		60				40	31.5					
38	+0.030	53		27		60				49	37.5	18	10	12.5	CB12-35	
45	+0.025	59		32		70				55	44.5					
50	+0.035	69		35	15	70	20	6	M12×27	4.0	62	49.5	20	12	14.5	CB14-40
60	+0.030	79		42		70				72	59.5					

■ Detachable post type

Catalog No.		1mm increments LC	Base unit price 1 ~ 9 pieces	
Type	D		MRP	BRPM BRPK
MRP	20	121 ~ 160		
		161 ~ 200		
		* 201 ~ 250		
	22	121 ~ 160		
		161 ~ 200		
		* 201 ~ 250		
	25	131 ~ 160		
		161 ~ 200		
		201 ~ 240		
		* 241 ~ 300		
BRPM	28	161 ~ 200		
		201 ~ 240		
		* 241 ~ 300		
BRPK	32	161 ~ 200		
		201 ~ 240		
		* 241 ~ 350		
BSPM	38	181 ~ 200		
		201 ~ 240		
		241 ~ 260		
		* 261 ~ 400		
	45	181 ~ 260		
		* 261 ~ 400		
	50	201 ~ 260		
		* 261 ~ 400		
	60	201 ~ 260		
		* 261 ~ 400		

Quotation

■ Press-fit post type

Catalog No.		1mm increments LC	Base unit price 1 ~ 9 pieces	
Type	D		MSP	BSPM BSPK
MSP	20	181 ~ 200		
		201 ~ 240		
		241 ~ 300		
	22	181 ~ 200		
		201 ~ 240		
		241 ~ 300		
	25	181 ~ 200		
		201 ~ 240		
		241 ~ 300		
		* 301 ~ 350		
	28	201 ~ 240		
		241 ~ 300		
		301 ~ 350		
		* 351 ~ 400		
	32	241 ~ 300		
		301 ~ 350		
		* 351 ~ 400		
		261 ~ 300		
	38	301 ~ 350		
		351 ~ 400		
		* 401 ~ 450		
		261 ~ 300		
	45	301 ~ 400		
		* 401 ~ 450		
	50	261 ~ 400		
		* 401 ~ 500		
	60	261 ~ 400		
		* 401 ~ 500		

Quotation



Catalog No. — LC
BSPM 22 — LC205



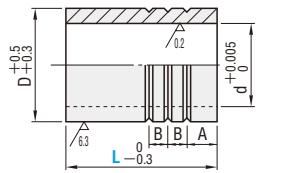
Days to Ship Quotation



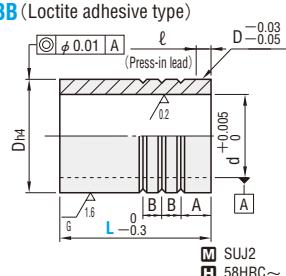
P Price Quotation

BALL GUIDE BUSHINGS FOR DIE SETS

 RoHS	MBB (Devcon adhesive type)
 RoHS	LBB (Locite adhesive type)



M SUJ2
H 58HRC~



M SUJ2
H 58HRC~

Type	Catalog No.	PD	L		Base unit price 1~9 pieces	
			MBB	LBB	MBB	LBB
	20	50				
	22	50 60				
	25	60 80				
	28	60 80				
	32	80 100				
	38	80 100				
	45	100 120				
	50	100 120				
	60	100 120				

Quotation

Post diameter	Catalog No.	MBB-LBB				
		d	D_h4	l	A	B
20	+0.020	26	37			
22	+0.015	28	40			
25		31	45	-0.007		
28	+0.025	36	50			
32	+0.020	40	55			
38	+0.030	48	64	0		
45	+0.025	55	74	-0.008		
50	+0.035	60	83	0		
60	+0.030	70	95	-0.010		

⚠ Do not use a cooling-fit for the bushings. In the same way as with sub-zero treatment, cooling causes residual austenite to transform into martensite and expand. This expands both the bushing inner and outer diameters, rendering the bushing unusable.



Order

Catalog No. — L
MBB 50 — 120



Alterations

Catalog No. — L(LC)
LBB 22 — LC45

Quotation



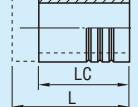
Days to Ship

Quotation



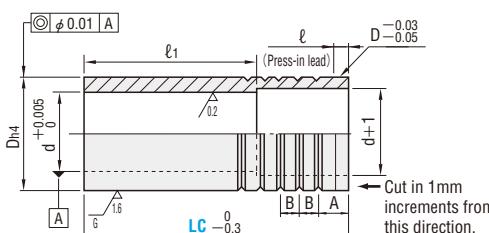
Price

Quotation

Alteration	Code	Spec.	1Code
	LC	Full length change $L/2 \leq LC < L$ 1mm increments	Quotation

■ Long type ball guide bushings for die sets

 RoHS	LBB (Locite adhesive type)



M SUJ2
H 58HRC~

⚠ Do not use a cooling-fit for the bushings. In the same way as with sub-zero treatment, cooling causes residual austenite to transform into martensite and expand. This expands both the bushing inner and outer diameters, rendering the bushing unusable.

d	D_h4	l	A	B	Effective sliding length ϵ_1	Catalog No.	LC	Base unit price 1~9 pieces	
								Type	PD
26	37				60	20	51 ~ 120		
28	40	0	4	12	7X7 pieces	22	61 ~ 120		
31	45	0	-0.007			25	81 ~ 120		
36	50				80	28	81 ~ 150		
40	55				100	32	101 ~ 150		
48	64	0			100	38	101 ~ 180		
55	74	-0.008			120	45	121 ~ 180		
60	83	0			120	50	121 ~ 200		
70	95	-0.010			120	60	121 ~ 200		

Quotation



Catalog No. — LC
LBB 22 — LC100



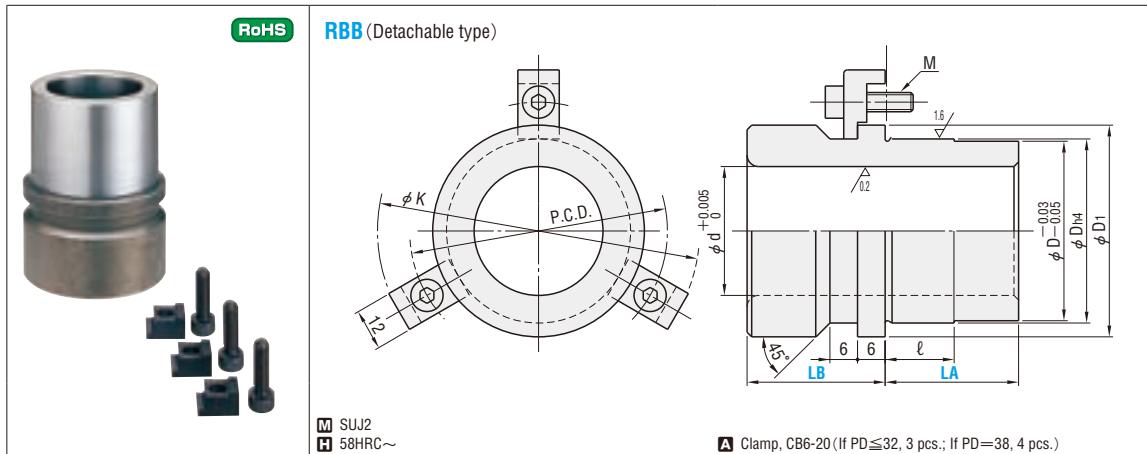
Days to Ship



Price

BALL GUIDE BUSHINGS FOR DIE SETS

—DETACHABLE TYPE—



PD Post diameter	d	D_{h4}		D ₁	ℓ	P.C.D.	K	M	Catalog No.		LA	LB	Base unit price 1~9 pieces
									Type	PD			
20		26	37	43		55	71			30	20		
22	+0.020 +0.015	28	40	46	15	58	74			35	25		
25		31	45	51		63	79			30	20		
28	+0.025 +0.020	36	50	56		68	84			35	25		
32	+0.020	40	55	61		73	89			40	40		
38	+0.030 +0.025	48	64	70	20	82	98			35	25		
										40	40		
										40	40		
										50	50		
										40	40		
										50	50		

Quotation



Order

Catalog No. — LA — LB
RBB 25 — 40 — 40



Days to Ship

Quotation



Price

Quotation



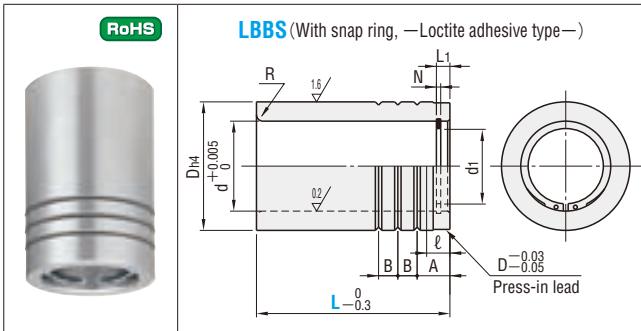
Alterations

Catalog No. — LA(LAC) — LB(LBC) — (SNC)
RBB 20 — LAC32 — 25

Alteration	Code	Spec.	1Code
	LAC	LA dimension change $\ell+2 \leq LAC < LA$ 1mm increments	
	LBC	LB dimension change $6 \leq LBC < LB$ 1mm increments	Quotation

Alteration	Code	Spec.	1Code																												
	SNC	Installation of a snap ring onto the lower die bushing. <table border="1"> <tr> <th>PD</th><th>L1</th><th>N</th><th>d1</th></tr> <tr> <td>20</td><td>4</td><td>1.35</td><td>21.4</td></tr> <tr> <td>22</td><td>4.5</td><td>1.45</td><td>23</td></tr> <tr> <td>25</td><td>5</td><td>1.65</td><td>26</td></tr> <tr> <td>28</td><td>5.5</td><td>1.65</td><td>30</td></tr> <tr> <td>32</td><td>6</td><td>1.65</td><td>33.2</td></tr> <tr> <td>38</td><td>6.5</td><td>1.9</td><td>40</td></tr> </table> For applications, see P.849.	PD	L1	N	d1	20	4	1.35	21.4	22	4.5	1.45	23	25	5	1.65	26	28	5.5	1.65	30	32	6	1.65	33.2	38	6.5	1.9	40	Quotation
PD	L1	N	d1																												
20	4	1.35	21.4																												
22	4.5	1.45	23																												
25	5	1.65	26																												
28	5.5	1.65	30																												
32	6	1.65	33.2																												
38	6.5	1.9	40																												

BALL GUIDE BUSHINGS FOR LOWER DIE SETS



Catalog No. — L
LBBS 50 — 120



Quotation



Quotation

M SUJ2 H 58HRC~

A Snap ring (Spring steel 44~52HRC)

PD Post diameter	d	D_{h4}	ℓ	A	B	L_1	N	R	d_1	Catalog No. Type	L	Base unit price 1~9 pieces
										PD		
20	+0.020	26	37							20	50	
22	+0.015	28	40							22	50	60
25		31	45	-0.007						25	60	80
28	+0.025	36	50							28	60	80
32	+0.020	40	55							32	80	100
38	+0.030	48	64	0			4.5	1.65		38	80	100
45	+0.025	55	74		-0.008			1.9		45	100	120
50	+0.035	60	83	0					3.5	50	100	120
60	+0.030	70	95	-0.010						60	100	120

Quotation

Features of ball guide bushings for lower die sets

- Stable guide ... The distance between punch and die blades and the guide (post and bushing) can be shortened. ($A < B$)
- Easy regrinding of punch & die ... Due to the short distance between the punch/die blade and guide post end, it is possible to perform regrinding without detaching the guide post.

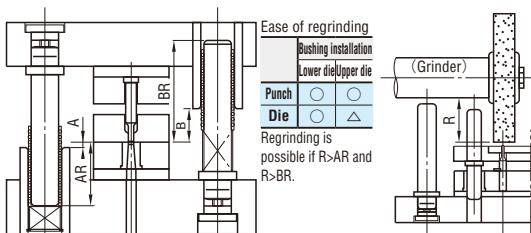


Figure 2: Regrinding of punch



Catalog No. — L(LC)
LBBS 22 — LC45

Alteration	Code	Spec.	1Code
	LC	Full length change $L/2 \leq LC < L$ 1mm increments	Quotation

Do not use a cooling-fit for the bushings. In the same way as with sub-zero treatment, cooling causes residual austenite to transform into martensite and expand. This expands both the bushing inner and outer diameters, rendering the bushing unusable.

D	D ₁	d	P	Catalog No. Type	FL 5mm increments	Base unit price 1~9 pieces
				PD	20	25 ~ 40
25	23.2	0.9	12	SWPB	20	25 ~ 40
27	25.0	1.0	13		22	25 ~ 50
30	27.8	1.1	13		25	25 ~ 60
35	32.6	1.2	15		28	25 ~ 60
39	36.0	1.5	18		32	35 ~ 70
47	43.4	1.8	18		38	35 ~ 70
54	50.0	2.0			45	45 ~ 80
59	54.4	2.3	20		50	45 ~ 80
69	63.8	2.6			60	45 ~ 80

Quotation



Catalog No. — FL
SWPB 25 — 50



Quotation



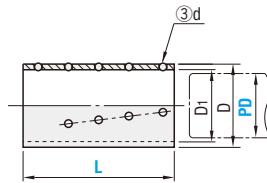
Quotation

Spring solid height

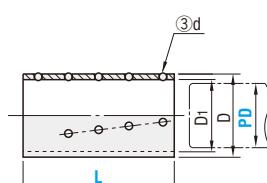
PD	FL (Free length)										
	25	30	35	40	45	50	55	60	65	70	75
20	3.7	4.0	4.4	4.8	—	—	—	—	—	—	—
22	4.1	4.5	4.9	5.3	5.7	6.2	—	—	—	—	—
25	4.3	4.7	5.2	5.6	5.9	6.4	6.8	7.3	—	—	—
28	4.4	4.8	5.2	5.6	6.0	6.4	6.8	7.2	—	—	—
32	—	—	6.4	7.0	7.5	8.0	8.5	9.5	9.4	10.0	—
38	—	—	7.0	7.6	8.0	8.6	9.0	9.5	10.0	10.6	—
45	—	—	—	—	8.6	9.0	9.6	10.0	10.6	11.0	11.6
50	—	—	—	—	9.9	10.4	11.0	11.5	12.2	12.6	13.3
60	—	—	—	—	11.2	11.7	12.5	13.0	13.8	14.3	15.1

BALL CAGES FOR DIE SETS

 RoHS	MBSH (①High-rigidity aluminum ball cage) MBJH (②High-rigidity resin ball cage)
 RoHS	MBS (①Aluminum ball cage) MBJ (②Resin ball cage)



① Compared with conventional ball cages (MBS, MBJ), these products contain 1.6 times more balls.
M ①A5056 (Aluminum)
 ②POM (Polyacetal resin)
 ③SUJ2 Sphericity 0.25 μm
H ③62~67HRC



For holder guide posts **P**.827
M ①A5056 (Aluminum)
 ②POM (Polyacetal resin)
 ③SUJ2 Sphericity 0.25 μm
H ③62~67HRC

PD Post diameter	Outer diameter ϕD	Inner diameter ϕD_1	Ball diameter ϕd	Number of balls			Type	Catalog No.	L	Base unit price 1~9 pieces			
				MBSH MBJH	MBS MBJ	Ratio				PD	MBSH	MBJH	MBS
20	25.5	20.5		165	96	1.72			20	50			
22	+0.020 +0.015	27.5	22.5	180	112	1.61			22	50			
25		30.5	25.5	228	140	1.63			25	60			
28	+0.025 +0.020	35.5	28.5	266	160	1.66			28	60			
32		39.5	32.5	350	208	1.68			32	75			
38	+0.030 +0.025	47.5	38.5	204	126	1.62			38	75			
45		54.5	45.5	252	154	1.64			45	90			
50	+0.035 +0.030	59.5	50.5	294	176	1.67			50	110			
60		69.5	60.5	350	208	1.68			60	90			
				238	144	1.65							
				280	176	1.67							
				320	198	1.70							
				400	234	1.71							
				360	220	1.72							
				450	260	1.73							
				400	242	1.74							
				500	286	1.75							



Order

Catalog No.

MBJ 50

L

— 110



Price

Quotation



Days to Ship

Quotation



Alterations

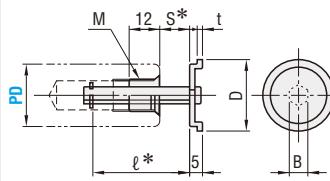
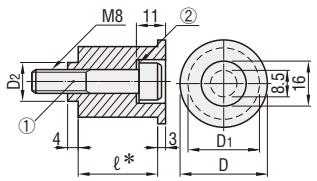
Catalog No. — L (LC)
MBJH 22 — LC45

Quotation

Alteration	Code	Spec.	1Code
	LC	Full length change $20 \leq LC < L$ 1mm increments ⑤ Ball holes may remain on the cut surface.	Quotation

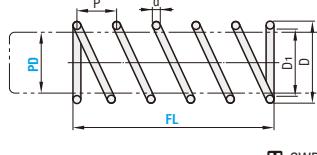
⑤ MBSH and MBJH are also listed in P.810. (For stripper guides: PD10~25)

STOPPERS AND SPRINGS FOR BALL GUIDES

 RoHS STM (Movable stopper)	 <p>* Determined according to the ball cage length. M S45C, SPC-1 (Stopper cap) S Black oxide (Fe₃O₄)</p>	 RoHS STK (Fixed-type stopper)	 <p>* Determined according to the ball cage length. M S45C S Black oxide (Fe₃O₄) A ① CB ② Spring washer</p>
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PD Post diameter	D	M×P	B	t	D ₁	D ₂	② A Spring washer	Catalog No.		L Ball cage length	Base unit price 1~9 pieces
								Type	PD		
20	24	10×1.5	5		19			20	50		
22	26				21			22	50	60	
25	29				24			25	60	75	
28	33	12×1.5	6		27			28	60	75	
32	37				31			32	75	90	
38	44				37			38	75	90	
45	51				44			45	90	110	
50	56	16×1.5	8	2.0	49			50	90	110	
60	66				59			60	90	110	

L Ball cage length	STM		STK		Order	Catalog No.	— L	Days to Ship	Quotation
	S	ℓ	ℓ	①CB					
50	0~19	31	15	8~30					
60	0~23	35	20	8~35					
75	0~30	42	25	8~40					
90	0~37	49	30	8~45					
110	0~47	59	35	8~50					

 RoHS SWP SWPL (Long type)	 <p>M SWP-B</p>
--	--

PD Post diameter	D	D ₁ + ₀ ¹	d	P
20	22.5	20.5	1.0	14
22	24.5	22.5	1.0	14
25	27.9	25.5	1.2	14
28	31.3	28.5	1.4	16
32	35.7	32.5	1.6	16
38	42.5	38.5	2.0	18
45	50.1	45.5	2.3	20
50	55.7	50.5	2.6	20
60	66.9	60.5	3.2	20

● Solid height = $\frac{FL \times d}{P} + 2d$

 Order	Catalog No. — FL SWP 32 — 100
 Days to Ship	Quotation

Catalog No.	Type	PD	FL		Base unit price 1~9 pieces
			10mm increments		
	SWP	20	40 ~ 90		
		22	100 ~ 140		
		25	40 ~ 90		
		28	100 ~ 150		
		32	50 ~ 90		
		38	100 ~ 150		
		45	70 ~ 140		
		50	150 ~ 190		
		60	80 ~ 140		
			150 ~ 190		

Catalog No.	Type	PD	FL		Base unit price 1~9 pieces
			10mm increments		
	SWPL	20	150 ~ 190		
		22	200 ~ 240		
		25	150 ~ 190		
		28	210 ~ 260		
		32	160 ~ 200		
		38	210 ~ 260		
		45	200 ~ 240		
		50	250 ~ 300		
		60	200 ~ 240		
			250 ~ 300		

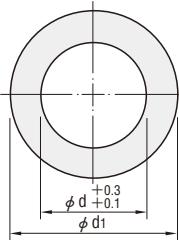
 Price	Quotation
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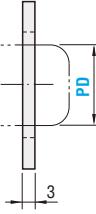
RINGS FOR PREVENTING CAGE LIFTING

RoHS



RWB (For ball guide)





■ Polyacetal resin (POM), white

Inner diameter d	Outer diameter d1	Catalog No.		Base unit price 1~9 pieces
		Type	PD	
20	35	20	20	Quotation
22	35	22	22	
25	40	25	25	
28	45	28	28	
32	50	32	32	
38	60	38	38	
45	70	45	45	
50	75	50	50	
60	85	60	60	

RWB
(For ball guide)

Catalog No.
RWB 25

■ Order

■ Days to Ship

■ Price

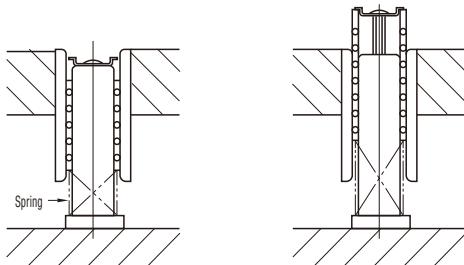
■ Quotation

■ Quotation

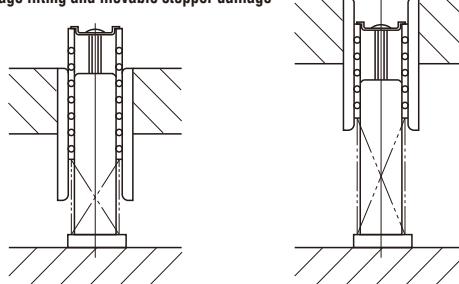
■ Quotation

■Features Prevents lifting of the cage caused by the upward force of the spring, extending the lifetimes of guide post and bushing.

Figure 1: Cage lifting and movable stopper damage

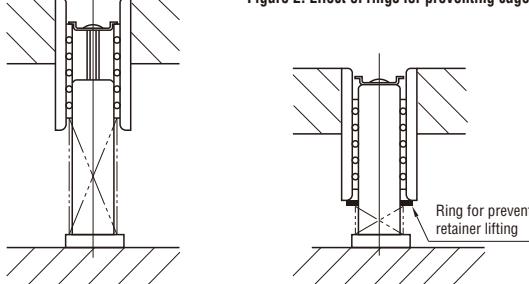


The spring's upward force becomes larger near the bottom dead center, causing the cage to slip.



Cage lifting occurs.

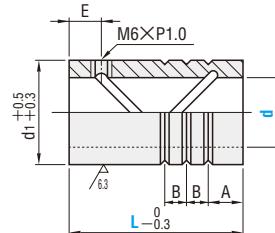
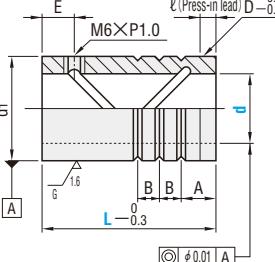
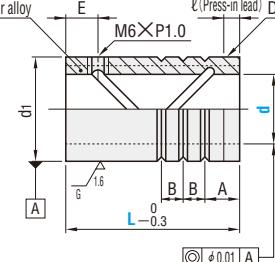
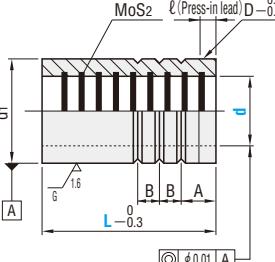
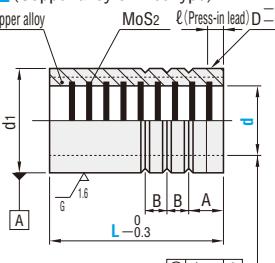
Figure 2: Effect of rings for preventing cage lifting



If cage lifting progresses, a load is applied to the movable stopper at top dead center. As a result, the movable stopper may undergo fatigue fracture or it may not be possible to remove the upper die during maintenance.

The ring for preventing cage lifting separates the spring from the cage at bottom dead center, preventing slippage caused by the upward force of the spring.

PLAIN GUIDE BUSHINGS FOR DIE SETS

 RoHS	MDB (Devcon adhesive type)	 <p>Technical drawing of the MDB bushing showing dimensions: d₁, d, L = 0.3, G = 1.6, E, M6×P1.0, and lead-in length l = 0.03. Material: SUJ2, Grease nipple GPA6A, 58HRC~.</p>	<table border="1"> <thead> <tr> <th colspan="2">Catalog No.</th> <th rowspan="2">L</th> <th rowspan="2">Base unit price 1~9 pieces</th> </tr> <tr> <th>Type</th> <th>d</th> </tr> </thead> <tbody> <tr><td rowspan="8">MDB</td><td>20</td><td>50</td><td></td></tr> <tr><td>22</td><td>50 60</td><td></td></tr> <tr><td>25</td><td>60 80</td><td></td></tr> <tr><td>28</td><td>60 80</td><td></td></tr> <tr><td>32</td><td>80 100</td><td></td></tr> <tr><td>38</td><td>80 100</td><td></td></tr> <tr><td>45</td><td>100 120</td><td></td></tr> <tr><td>50</td><td>100 120</td><td></td></tr> <tr><td>60</td><td>100 120</td><td></td></tr> </tbody> </table>	Catalog No.		L	Base unit price 1~9 pieces	Type	d	MDB	20	50		22	50 60		25	60 80		28	60 80		32	80 100		38	80 100		45	100 120		50	100 120		60	100 120	
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 RoHS	LDB (Loctite adhesive type)	 <p>Technical drawing of the LDB bushing showing dimensions: d₁, d, L = 0.3, G = 1.6, E, M6×P1.0, and lead-in length l = 0.03. Material: SUJ2, Grease nipple GPA6A, 58HRC~.</p>	<table border="1"> <thead> <tr> <th colspan="2">Catalog No.</th> <th rowspan="2">L</th> <th rowspan="2">Base unit price 1~9 pieces</th> </tr> <tr> <th>Type</th> <th>d</th> </tr> </thead> <tbody> <tr><td rowspan="8">LDB</td><td>20</td><td>50</td><td></td></tr> <tr><td>22</td><td>50 60</td><td></td></tr> <tr><td>25</td><td>60 80</td><td></td></tr> <tr><td>28</td><td>60 80</td><td></td></tr> <tr><td>32</td><td>80 100</td><td></td></tr> <tr><td>38</td><td>80 100</td><td></td></tr> <tr><td>45</td><td>100 120</td><td></td></tr> <tr><td>50</td><td>100 120</td><td></td></tr> <tr><td>60</td><td>100 120</td><td></td></tr> </tbody> </table>	Catalog No.		L	Base unit price 1~9 pieces	Type	d	LDB	20	50		22	50 60		25	60 80		28	60 80		32	80 100		38	80 100		45	100 120		50	100 120		60	100 120	
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 RoHS	LFB (Copper alloy type)	 <p>Technical drawing of the LFB bushing showing dimensions: d₁, d, L = 0.3, G = 1.6, E, M6×P1.0, and lead-in length l = 0.03. Material: SUJ2+Copper alloy, Grease nipple GPA6A, 58HRC~.</p>	<table border="1"> <thead> <tr> <th colspan="2">Catalog No.</th> <th rowspan="2">L</th> <th rowspan="2">Base unit price 1~9 pieces</th> </tr> <tr> <th>Type</th> <th>d</th> </tr> </thead> <tbody> <tr><td rowspan="5">LFB</td><td>20</td><td>50</td><td></td></tr> <tr><td>22</td><td>50 60</td><td></td></tr> <tr><td>25</td><td>60 80</td><td></td></tr> <tr><td>28</td><td>60 80</td><td></td></tr> <tr><td>32</td><td>80 100</td><td></td></tr> </tbody> </table>	Catalog No.		L	Base unit price 1~9 pieces	Type	d	LFB	20	50		22	50 60		25	60 80		28	60 80		32	80 100													
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 RoHS	LDBZ (Oil-free type)	 <p>Technical drawing of the LDBZ bushing showing dimensions: d₁, d, L = 0.3, G = 1.6, E, MoS₂, and lead-in length l = 0.03. Material: SUJ2, MoS₂(embedded), 58HRC~.</p>	<table border="1"> <thead> <tr> <th colspan="2">Catalog No.</th> <th rowspan="2">L</th> <th rowspan="2">Base unit price 1~9 pieces</th> </tr> <tr> <th>Type</th> <th>d</th> </tr> </thead> <tbody> <tr><td rowspan="6">LDBZ</td><td>20</td><td>50</td><td></td></tr> <tr><td>22</td><td>50 60</td><td></td></tr> <tr><td>25</td><td>60 80</td><td></td></tr> <tr><td>28</td><td>60 80</td><td></td></tr> <tr><td>32</td><td>80 100</td><td></td></tr> <tr><td>38</td><td>80 100</td><td></td></tr> </tbody> </table>	Catalog No.		L	Base unit price 1~9 pieces	Type	d	LDBZ	20	50		22	50 60		25	60 80		28	60 80		32	80 100		38	80 100										
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 RoHS	LFBZ (Copper alloy oil-free type)	 <p>Technical drawing of the LFBZ bushing showing dimensions: d₁, d, L = 0.3, G = 1.6, E, MoS₂, and lead-in length l = 0.03. Material: SUJ2+Copper alloy, MoS₂(embedded), 45HRC~(SUJ2 part).</p>	<table border="1"> <thead> <tr> <th colspan="2">Catalog No.</th> <th rowspan="2">L</th> <th rowspan="2">Base unit price 1~9 pieces</th> </tr> <tr> <th>Type</th> <th>d</th> </tr> </thead> <tbody> <tr><td rowspan="5">LFBZ</td><td>20</td><td>50</td><td></td></tr> <tr><td>22</td><td>50 60</td><td></td></tr> <tr><td>25</td><td>60 80</td><td></td></tr> <tr><td>28</td><td>60 80</td><td></td></tr> <tr><td>32</td><td>80 100</td><td></td></tr> </tbody> </table>	Catalog No.		L	Base unit price 1~9 pieces	Type	d	LFBZ	20	50		22	50 60		25	60 80		28	60 80		32	80 100													
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● Do not use a cooling-fit for the bushings. In the same way as with sub-zero treatment, cooling causes residual austenite to transform into martensite and expand. This expands both the bushing inner and outer diameters, rendering the bushing unusable.

Quotation

Quotation

Quotation

Quotation

Quotation

d	d1	d1 tolerance		l	A	B	E
		MDB	LDB·LFB·LDBZ·LFBZ				
20	+0.027 +0.022	31		4	10	6	10
22	+0.027 +0.022	34		5	12	7	L 80→E10 L100→E15
25	+0.027	37					
28	+0.032 +0.027	42	+0.5 +0.3				
32	+0.032 +0.027	46					
38	+0.037 +0.032	54					
45	+0.040 +0.035	62					
50	+0.045 +0.040	70					
60	+0.040	80					15
							-0.010

Bushing bonding method (Adhesives P.808)	
Catalog No.	Adhesive
MDB	—
LDB	
LDBZ	
LFB	Loctite No.638 (LOC638)
LFBZ	



Catalog No. — L
LFBZ 28 — 80



Days to Ship **Quotation**



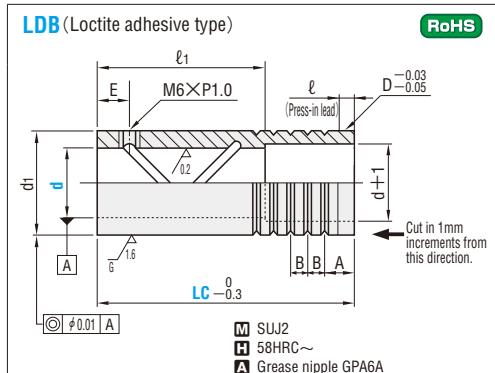
Quotation



Catalog No. — L(LC)
LDB 22 — LC45
Quotation

Alteration	Code	Spec.	1Code
Full length change Can be used for MDB and LDB only. L/2 ≤ LC < L 1mm increments If cut, the oil groove may be cut.	LC	d20~32	Quotation
		d38~	

■ Long type guide bushings with configurable full length



d	d1	l	A	B	E	Effective sliding length ℓ_1	Catalog No.	LC	Base unit price
							Type	d	1mm increments 1~9 pieces
20	31					60	20	51~120	
22	+0.027 +0.022	34	4	12	7×7 pieces	80	22	61~120	
25	+0.027	37				100	25	81~120	
28	+0.032	42	5		10×5 pieces	120	28	81~150	
32	+0.027	46					32	101~150	
38	+0.037 +0.032	54			10×6 pieces		38	101~180	
45	+0.040 +0.035	62			10×8 pieces		45	121~180	
50	+0.045	70					50	121~200	
60	+0.040	80	0	-0.010			60	121~200	

※ If there is only one groove remaining as the result of cutting, groove(s) are added so that a minimum of two grooves are present.



Catalog No. — LC
LDB 22 — LC100

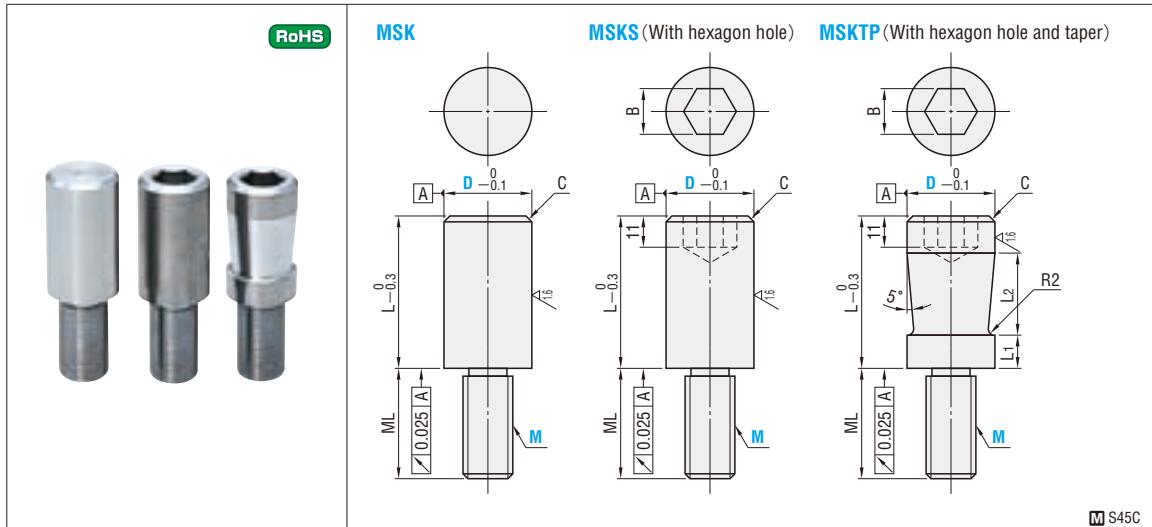


Days to Ship **Quotation**



The unit price is the bushing unit price after alteration.
Quotation

SHANKS FOR DIE SETS



B	C	L	ML	M	MSKTP		Catalog No.		Base unit price 1~19 pieces			
					L ₁	L ₂	Type	D—M	MSK	MSKS	MSKTP	
12	2	50	40	M18×P1.5	10	28	MSK MSKS MSKTP	25—18				
				M22×P1.5				25				
	3	60		M30×P2	12	30		32			Quotation	
					13	32		38				
		65			15			50				



Order

Catalog No.

MSK 50



Days to Ship

Quotation



Price

Quotation



Alterations

Catalog No. — (MLC)
MSKTP 38 — MLC40

Quotation

Alteration	Code	Spec.	1Code
	MLC	ML dimension change M≤MLC<ML 1mm increments	Quotation

DIE ADHESIVE



- Order Catalog No. — Amount
LOC 638 — 50
- Days to Ship Quotation
- Price Quotation

Fluid color	Main ingredient	Viscosity (cP)	Service temperature range (°C)	Catalog No.	Volume (mL)	Base unit price 1~4 pieces
Green	Anaerobic resin	2500	-55~125	LOC638	250 50	Quotation

■ Applications (LOC638)

- Can be used for bonding knock bushings (KNLB, KNLBB), die set bushings (LBB, LDB) and stripper guide bushings (SGBL, SGBZ, SGHZ, SGBF, SGFZ).

Strength	Recommended clearance at one side (mm)	Hardening time ^{Note(2)} (hours at room temp.)		Hardening method
		Active surface	Inert surface	
Shear strength 25~35 (N/mm ²)	0.01~0.03 ^{Note(1)}	1~3	3~6	Room temperature

(1) Generally, when a die part is press-fit, it is bonded with a clearance of 0.01~0.03mm on one side.

(2) This is the time required until a serviceable strength (50% hardening) is reached.

Active surfaces are steel, copper alloys, aluminum alloys, and similar surfaces. Inert surfaces are stainless steel, zinc, heat-curing resins, plated surfaces, and similar surfaces.

(3) Service temperature range : -55~125°C

⚠ Degreasing is recommended before application of Loctite adhesives.