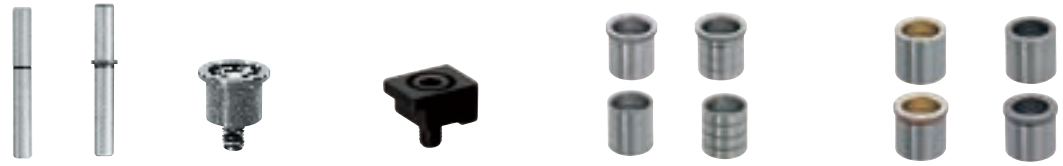
STRIPPER GUIDE PINS & BUSHINGS

STRIPPER GUIDE PINS AND BUSHINGS

Product name / Catalog No.	STRIPPER GUIDE PINS —HEADED TYPE— SGPH	SGOH	STRIPPER GUIDE PINS —STRAIGHT TYPE— SGPN	SGON	STRIPPER GUIDE PINS —DETACHABLE TYPE— SGPR	SGOR	SGPW
Page	749		750		751		752



HIGH RIGIDITY STRIPPER GUIDE PINS SGPWS	SGPWH	STOPPERS FOR BALL CAGES, FIXED TYPE SSTK	CLAMPS FOR STRIPPER GUIDE PINS FCLP	STRIPPER GUIDE BUSHINGS —STEEL— SGBA	SGBH	SGBL	SGBT	—COPPER ALLOY— SGSF	SGBF	—STEEL— SGBZ	SGHZ
753		754	754・776	755				756			

—COPPER ALLOY— SGCZ	SGFZ	—SINTERED ALLOY— SGBM	SGHM	STRIPPER GUIDE BUSHINGS —INTEGRATED BALL CAGE TYPE— SGBB	SGBBL	SGBBF	STRIPPER GUIDE BUSHINGS—FOR BALL CAGE— SGBBW	SGBBS	SGBBH	BALL CAGES MBSH	MBJH	SPRINGS BSWP
757				758			759			760		760

3 μm range STRIPPER GUIDE PINS TGPH	TGPN	—DETACHABLE— TGPR	3 μm range STRIPPER GUIDE BUSHINGS —STEEL— TGBL	TGBT	TGBZ	TGHZ	—COPPER ALLOY— TGSF	TGBF	TGCZ	TGFZ	—SINTERED ALLOY— TGBM	TGHM	Precision CARBIDE STRIPPER GUIDE PINS WVGPH	WVGPN	WVGPS
762		762	763				763		764		764		766		

Precision STRIPPER GUIDE PINS VGPH	VGPN	VGPS	—DETACHABLE— VGPR	Precision STRIPPER GUIDE BUSHINGS —STEEL— VGBL	VGBH	VGBZ	VGHZ	—COPPER ALLOY— VSGSF	VSGBF	VSGCZ	VSGFZ	—SINTERED ALLOY— VGBM	VGHM
767			768	769				769		770		770	

HIGH RIGIDITY ROLLER STRIPPER GUIDE PIN SETS RSGPW	—SINGLE ROLLER TYPE— RSGPS	ROLLER CAGES RBJ	ROLLER STOPPERS, FIXED TYPE RSTKH	SPRINGS RSWP
773	774	775	775	775

■How to mount stripper guide bushings

Item		Plain bushing				Ball bushings	
		Devcon adhesive type (SGBD)	Press-fit type —Straight— (SGBA)	Press-fit type —Headed— (SGBH)	Loctite adhesive type (SGBL・SGBT SGBZ・SGHZ etc.)	Press-fit type (SGBB)	Loctite adhesive type (SGBBL・SGBBF SGBBW・SGBBS etc.)
Before press fit	Pins and bushings Clearance	2 μ ～12 μ	10 μ ～20 μ	5 μ ～15 μ	2 μ ～12 μ	0 μ ～−10 μ	−10 μ ～−20 μ
Inside diameter shrinkage at press fitting		—	3 μ ～8 μ	1 μ ～3 μ	—	2 μ ～6 μ	—
Recommended plate press-fit interference		—	8 μ ～10 μ	3 μ ～5 μ	—	6 μ ～8 μ	—
After press fit	Pins and bushings Clearance	—	2 μ ～17 μ	2 μ ～14 μ	—	−2 μ ～−16 μ	—
Clearance between mounting hole and outer diameter of bushing (recommended value)		Relative to outer diameter of bushing +2 ～+3 on one side	—	—	Relative to outer diameter of bushing +0.01 ～+0.03 on one side	—	Relative to outer diameter of bushing +0.01 ～+0.03 on one side
Mounting method		Devcon adhesive	Press fit	Press fit	Loctite adhesive LOCTITE No.638	Press fit	Loctite adhesive LOCTITE No.638

See page 760 for Loctite adhesives.

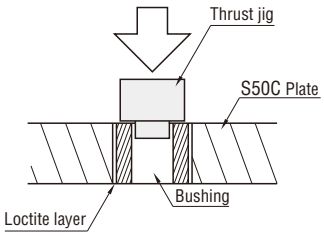
■Measurement of compression shear strength when guide bushing is fixed in place with Loctite 638

When bonded with Loctite adhesive, a shear force 8~10 times that of a press fit (interference fit) is obtained.

Bushing	Type	Fitting clearance (Both sides)	Compression shear force (kgf)	Compression shear strength (kgf/mm²)
SGBL25—20	Stripper guide bushing Loctite adhesive type	0.014 ～0.060	4,463kgf	228kgf/mm²
VGBL25—20	Fine grade stripper guide bushing Loctite adhesive type	0.003 ～0.006	3,382kgf	198kgf/mm²
SGBH25—20	Stripper guide bushing press—fit type	−0.004 ～0.008 (Interference fit)	420kgf	21kgf/mm²

(Curing time 72 hours at room temperature (25℃) S50C plate guide bushing SUJ2 Plate and bushing are degreased.)

Compression test machine
Thrust speed: 10mm/min



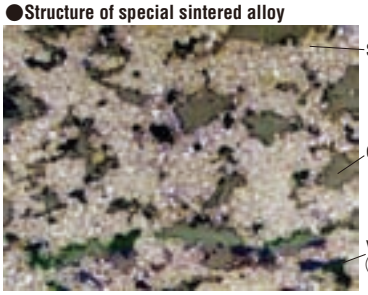
■Sintered alloy oil-free type bushing

This is an oil-free bushing made of a special alloy and covered with a fine solid lubricant that is composed mainly of graphite. The small pores of the alloy become impregnated with lubricating oil.

●Features

- Supports extremely small strokes of less than 1mm.
  The solid lubricants distributed on the surface are suitable for extremely small strokes, and this product is ideal as a stripper guide bushing.
- There are no restrictions on the sliding direction. It supports strokes, rocking, and rotation movement.
- Has excellent friction coefficient and wear resistance, making it suitable for high-speed strokes.
  New technologies result in a larger solid lubricant content than other sintered bushings. This allows the product to maintain stable performance over a long period of time.
- Although it can be used oil-free, its performance will be further enhanced with the use of initial break-in greasing or lubrication.

●Structure of special sintered alloy



●Notes

- Because the bushing is impregnated with lubricating oil, do not clean the inner face.
- Accurate measurement of the surface roughness is not possible due to the small pores in the material. However, the finishing method is the same as for other types of guide bushings.

●Range of use

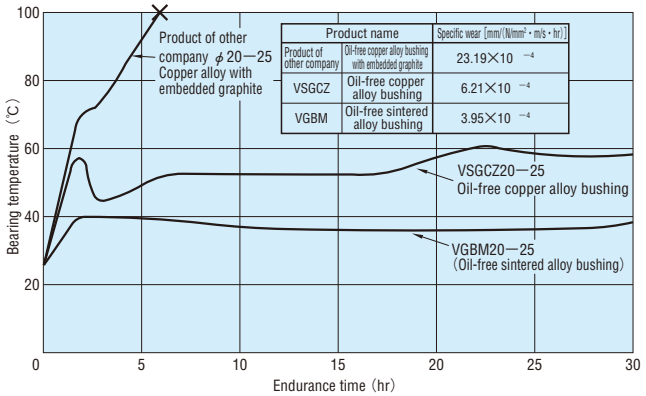
Lubrication condition : No lubrication
Service temperature range : −40 ～+120℃
Maximum allowable speed : 60m/min

●Mechanical properties

Thermal expansion coefficient : 12×10^{-6}/℃
Density : 5.8g/cm³

●Test data

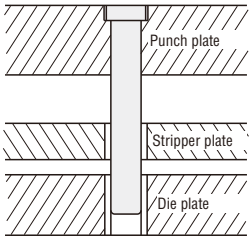
Test machine : Reciprocating motion test machine
Bushing : φ20× φ28×L25
Guide pin : VGPS20 (SKD11 58HRC ～)
Surface pressure : 1.2N/mm² {12kgf/cm²}
Speed : 30m/min, 300spm
Stroke : 50mm
Lubrication : Application of initial breaking-in grease



Changes in bearing temperature for various bearing materials

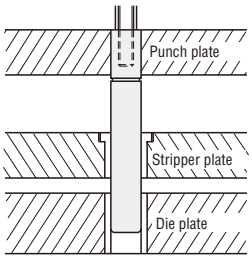
■Stripper guide pins

Headed type



Sliding part diameter tolerance	Catalog No.	M	Description	Page
−0.010 −0.015	SGPH	SUJ2		P.749
	SGOH	SUJ2	With oil grooves	
−0.010 −0.013	TGPH (3 μm range)	SUJ2		P.762
−0.010 −0.012	VGPH (Precision)	SKD11		P.767
	WVGPH (Precision)	Carbide		P.766

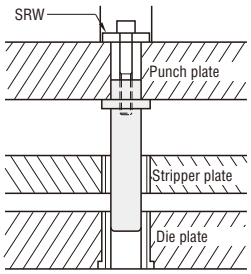
Straight type



Sliding part diameter tolerance	Catalog No.	M	Description	Page
−0.010 −0.015	SGPN	SUJ2		P.750
	SGON	SUJ2	With oil grooves	
−0.010 −0.013	TGPN (3 μm range)	SUJ2		P.762
−0.010 −0.012	VGPN (Precision)	SKD11		P.767
	VGPS (Precision)	SKD11	With press-in lead	
	WVGPN (Precision)	Carbide		P.766
	WVGPS (Precision)	Carbide	With press-in lead	

- With press-in lead: Press-in lead is provided on the thread side. By adjusting the mounting hole, these types can be fixed either by press fit or transition fit.

Detachable type

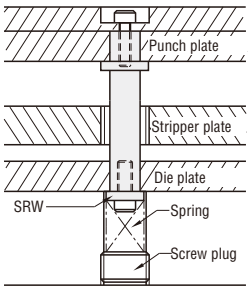


Sliding part diameter tolerance	Catalog No.	M	Description	Page
−0.010 −0.015	SGPR	SUJ2		P.751
	SGOR	SUJ2	With oil grooves	
−0.010 −0.013	TGPR (3 μm range)	SUJ2		P.762
−0.010 −0.012	VGPR (Precision)	SKD11		P.768

- The straight and detachable types are mounted by using bolts from the die set side. They can be removed without disassembling the die.
- Perpendicularity can be maintained by mounting in close contact with the punch plate face.

SRW ring: Use this ring as a pin stopper when the pin hole is a through hole without backing plate. SRW P.684

Detachable type, both ends tapped

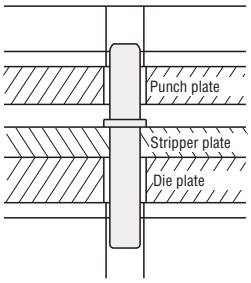


Sliding part diameter tolerance	Catalog No.	M	Page
−0.010 −0.015	SGPW	SUJ2	P.752

- These can be used for die sets in which the upper die is lifted up from below (such as for a progressive die intermittent cutting process and for tapping dies).

SRW ring: Use this ring as a stopper for the stripper guide pin on the die plate side. SRW P.684

Stripper plate (Fixed type)



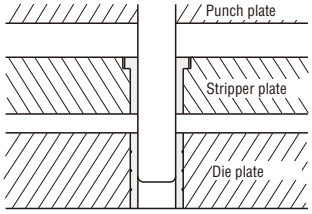
Guide type	Catalog No.	Page
Roller guide	RSGPW	P.773
Select either a ball guide or plain guide.	SGPWS SGPWH	P.753

- Because the guide pin is fixed to the stripper plate which is close to the blade (punch, die), the shaft rigidity is higher than with conventional fixing methods.
  This results in high-accuracy punching and high durability.

■Stripper guide bushings

See page 714 for Loctite adhesives.

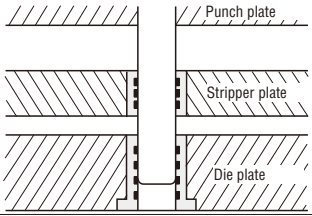
Oil type



Inner diameter tolerance	Catalog No.	M	Description	Mounting method	Page
$^{+0.005}_{0}$ $^{0}_{-0.005}$	SGBA	SUJ2	Straight	Press fit	P.755
	SGBH		Headed		
−0.003 −0.008	SGBD		Straight	Devcon adhesive	
	SGBL		Straight	Loctite adhesive	
	SGBT		Headed		
−0.010 −0.013	TGBL (3 μm range)		Straight		P.763
	TGBT (3 μm range)		Headed		
−0.003 −0.005	VGBL (Precision)		Straight		P.769
	VGBH (Precision)		Headed		

- Press-fit type: Although precision machining is required for the mounting holes, these stripper guide bushings allow machining and assembly to be carried out in parallel, improving workability.
- Devcon adhesive: Mounting hole clearance on one side: 2～3mm
- Loctite adhesive: Mounting hole clearance on one side: 0.01～0.03mm

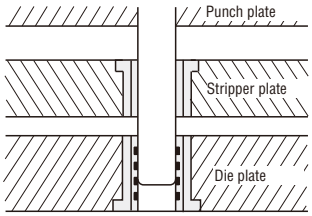
Oil-free type



Inner diameter tolerance	Catalog No.	M	Description	Mounting method	Page
−0.003 −0.008	SGBZ	FC250	Straight	Loctite adhesive	P.756
	SGHZ		Headed		
−0.003 −0.006	TGBZ (3 μm range)		Straight		P.763
	TGHZ (3 μm range)		Headed		
−0.003 −0.005	VGBZ (Precision)		Straight		P.769
	VGHZ (Precision)		Headed		

- Oil-free type: Because a special solid lubricant is embedded in the product, no lubrication is required.
  (However the use of initial break-in greasing will further improve durability.)

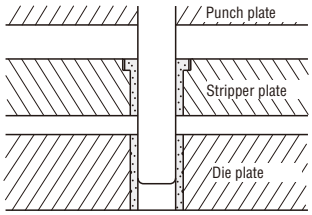
(Copper alloy on inner surface) Oil type Oil-free type



Type	Inner diameter tolerance	Catalog No.	M	Description	Mounting method	Page
Oil type	−0.003	SGSF	SUJ2 + Copper alloy	Straight	Loctite adhesive	P.756
	−0.008	SGBF		Headed		
	−0.003	TGSF (3 μm range)		Straight		P.763
	−0.006	TGBF (3 μm range)		Headed		
	−0.003	VSGSF (Precision)		Straight		P.765
	−0.005	VSGBF (Precision)		Headed		
Oil-free type	−0.003	SGCZ		Straight		P.757
	−0.008	SGFZ		Headed		
	−0.003	TGCZ (3 μm range)		Straight		P.763
	−0.006	TGFZ (3 μm range)		Headed		
	−0.003	VSGCZ (Precision)		Straight		P.770
	−0.005	VSGFZ (Precision)		Headed		

- The guide s inner surface is covered with copper alloy for improved seizure resistance.
  In addition to the oil type, an oil-free type with special solid lubricant embedded in the product is also available.

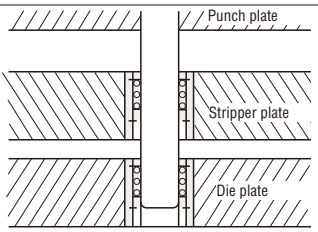
(Sintered alloy) Oil-free type



Type	Inner diameter tolerance	Catalog No.	M	Description	Mounting method	Page
Oil-free type	−0.003	SGBM	Special sintered alloy	Straight	Loctite adhesive	P.757
	−0.008	SGHM		Headed		
	−0.003	TGBM (3 μm range)		Straight		P.763
	−0.006	TGHM (3 μm range)		Headed		
	−0.003	VGBM (Precision)		Straight		P.770
	−0.005	VGHM (Precision)		Headed		

- Sintered alloy type: This is an oil-free bushing made of a special alloy on which a solid lubricant composed mainly of graphite is dispersed and sintered for oil-impregnation. The friction coefficient is lower than for cast iron or copper alloy bushings, and the wear resistance is superior. Because the amount of oil contained in the solid lubricant is high, the product is resistant to oil film depletion, allowing it to be used for high-speed operations.

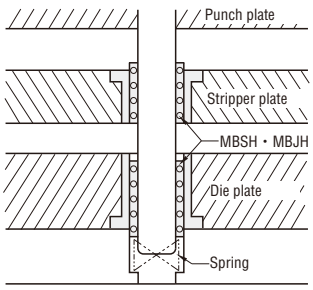
Ball type Integrated ball cage type



Catalog No.	M	Description	Mounting method	Page
SGBB	SUJ2	Straight	Press fit	P.758
SGBBL			Loctite adhesive	
SGBBF		Headed		

- Because ball bearings are used to support the sliding motion, the seizure resistance is outstanding.
- Both ends are fastened with snap rings so that the ball section does not come out of the bushing.
- Please note that the stroke is restricted.

Ball type For ball cage



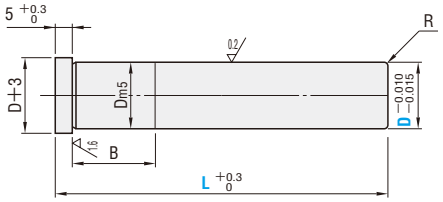
Catalog No.	M	Description	Mounting method	Page
SGBBW	SUJ2	Thick type	Loctite adhesive	P.759
SGBBS		Straight		
SGBBH		Headed		

- Because ball bearings are used to support the sliding motion, the seizure resistance is outstanding.
- For the ball cage, use MBSH (aluminum) or MBJH (resin). P.760.

STRIPPER GUIDE PINS
—HEADED—

RoHS

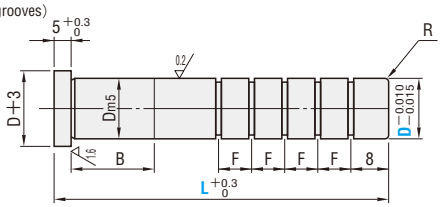
SGPH



M SUJ2
H 58HRC～

RoHS

SGOH (With oil grooves)



D \ L	Number of grooves						
	40～	50～	70～	80～	90～	160～	180～
8	2	3	4	5	6	—	—
10	2	3	4	5	6	—	—
13	2	3	4	5	6	7	8
16	2	3	4	5	6	7	8
20	2	3	4	5	6	7	8
25	2	3	4	5	6	7	8

※ L 40～119.5 →F= 8
L120～L(C) max. →F=10

M SUJ2 H 58HRC～

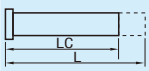
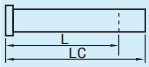
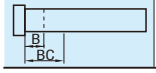
D_{m5}		R	B	Catalog No. Type	D	L	Base unit price 1～9 pieces SGPH	SGOH
8	+0.012 +0.006	1.0	10	SGPH SGOH	8	40 50 60 70 80		
10			13		10	40 50 60 70 80 90 100		
13	+0.015 +0.007	1.5	16		13	40 50 60 70 80 90 100 110 120		
16			20		16	50 60 70 80 90 100 110 120 130 140	Quotation	
20	+0.017 +0.008	2.0	25		20	60 70 80 90 100 110 120 130 140		
25			28		25	70 80 90 100 110 120 130 140		

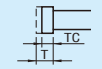
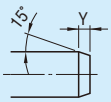
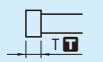
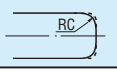
Order — Catalog No. — L
SGPH 16 — 100

Price — Quotation

Days to Ship — Quotation

Alterations — Catalog No. — L(LC) — (BC・TC・GC・TKC・RC)
SGPH 16 — LC95 — BC15
Quotation

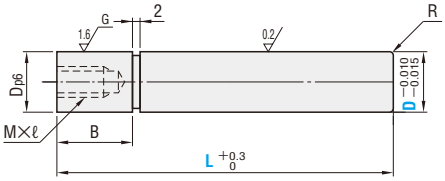
Alteration	Code	Spec.	1Code
	LC	Full length change 0.5mm increments ● SGPH: 20≦LC＜L ● SGOH: 40≦LC＜L B dimension remains as specified. To reduce the full length below the minimum specification length, combine with BC as necessary.	Quotation
	LC	Full length change (Long type LC) D / LC 0.5mm increments / 1Code SGPH SGOH 8: 80＜LC≦120 10: 100＜LC≦150 13: 120＜LC≦180 16: 140＜LC≦200 20: 140＜LC≦200 25: 140＜LC≦200 Quotation	
	BC	B dimension change 1mm increments 0≦BC≦D×2 Full length L remains as specified.	

Alteration	Code	Spec.	1Code
	TC	Head thickness change 0.1mm increments 2≦TC＜5 Full length L is shortened by (5—TC). If combined with LC, full length is equal to LC.	Quotation
	GC	Taper machining of the pin tip D / Y 8 10 13: 3 16 20 25: 5	
	TKC	Head thickness tolerance change T +0.3 0 ⇨ +0.02 0	
	RC	Tip R change D / Standard R / RC (Selection) 8・10: 1.0 / 1.5・2.0 13・16: 1.5 / 2.0・2.5 20・25: 2.0 / 2.5・3.0	

STRIPPER GUIDE PINS
—STRAIGHT—

RoHS

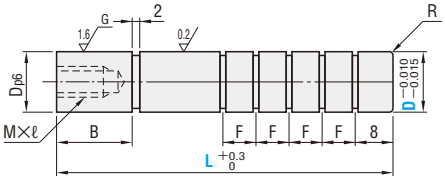
SGPN



M SUJ2
H 58HRC～

RoHS

SGON (With oil grooves)



D \ L	Number of grooves						
	40～	50～	70～	80～	90～	160～	180～
8	2	3	4	5	6	—	—
10	2	3	4	5	6	—	—
13	2	3	4	5	6	7	8
16	2	3	4	5	6	7	8
20	2	3	4	5	6	7	8
25	2	3	4	5	6	7	8

※ L 40～119.5 →F= 8
L120～L(C) max. →F=10

M SUJ2 H 58HRC～

Dp6		M×ℓ Pitch	R	B	Catalog No. Type	Catalog No. D	L	Base unit price 1～9 pieces SGPN	Base unit price 1～9 pieces SGON
8	+0.024 +0.015	M5×12 P0.8	1.0	10	SGPN SGON	8	40 50 60 70 80		
10				13		10	40 50 60 70 80 90 100		
13	+0.029 +0.018	M6×15 P1.0	1.5	16		13	40 50 60 70 80 90 100 110 120		
16				20		16	50 60 70 80 90 100 110 120	Quotation	
20	+0.035 +0.022	M8×20 P1.25	2.0	25		20	60 70 80 90 100 110 120 130 140		
25				28		25	70 80 90 100 110 120 130 140		

Order

Catalog No.	—	L
SGPN 20	—	80

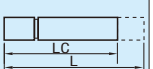
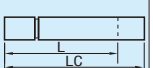
Price Quotation

Days to Ship Quotation

Alterations

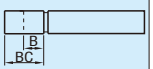
Catalog No.	—	L(LC)	—	(BC・DKC・GC・RC・TGC)
SGPN 20	—	LC75	—	BC20

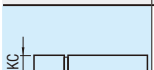
Quotation

Alteration	Code	Spec.	1Code
	LC	Full length change 0.5mm increments ●SGPN: 20≦LC＜L ●SGON: 40≦LC＜L B dimension remains as specified. To reduce the full length below the minimum specification length, combine with BC as necessary. If LC≦25, the tap pilot hole in the pin tip may go all the way through.	Quotation
	LC	Full length change (Long type LC)	

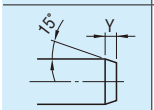
D	LC 0.5mm increments	1Code SGPN	1Code SGON
8	80＜LC≦120		
10	100＜LC≦150		
13	120＜LC≦180		
16	120＜LC≦200		
20	140＜LC≦200		
25	140＜LC≦200		

Quotation

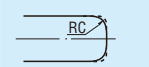
	BC	B dimension change 1mm increments 0≦BC≦D×2 When BC code is used, full length L and tap depth remain as specified. If BC=0, the 2mm groove on the outer periphery is eliminated.	

Alteration	Code	Spec.	1Code
	DKC	Press-fit tolerance change Dp6⇨Dm5 ⊗Cannot be used for SGON.	

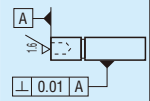
Dm5	
8	+0.012
10	+0.006
13	+0.015
16	+0.007
20	+0.017
25	+0.008

	GC	Taper machining of the pin tip	Quotation

D	Y
8 10	3
13 16 20 25	5

	RC	Tip R change	

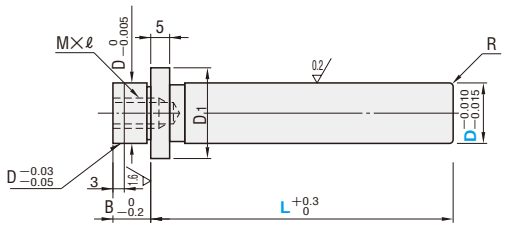
D	Standard R	RC (Selection)
8・10	1.0	1.5・2.0
13・16	1.5	2.0・2.5
20・25	2.0	2.5・3.0

	TGC	Machining of the tapped side end face Perpendicularity 0.01 Surface roughness 1.6a	

STRIPPER GUIDE PINS
—DETACHABLE TYPE—

RoHS

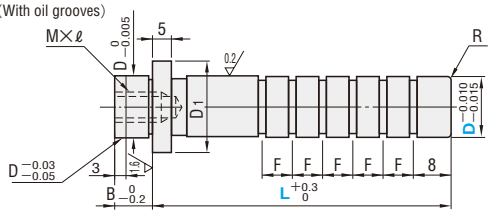
SGPR



M SUJ2
H 58HRC～

RoHS

SGOR (With oil grooves)



L(C) / D	Number of grooves 30～	40～	60～	70～	80～
8	2	3	4	5	—
10	2	3	4	5	6
13	2	3	4	5	6
16	2	3	4	5	6
20	2	3	4	5	6
25	2	3	4	5	6

※ L(C) 30～119.5 →F= 8
L120～L(C) max. →F=10

M SUJ2 H 58HRC～

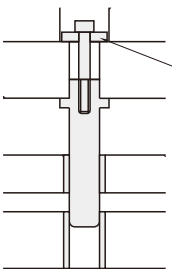
M×ℓ Pitch	D_1	R	B	Catalog No. Type	Catalog No. D	L	Base unit price 1～9 pieces SGPR	SGOR
M5×12 P0.8	13	1.0	8	SGPR SGOR	8	30 40 50 60 70		
	16				10	30 40 50 60 70 80		
M6×15 P1.0	20	1.5	10		13	40 50 60 70 80 90 100		
	23				16	40 50 60 70 80 90 100 110 120	Quotation	
M8×20 P1.25	27	2.0	13		20	50 60 70 80 90 100 110 120		
	32		16		25	60 70 80 90 100 110 120		

Order Catalog No. — L
SGPR 16 — 100

Days to Ship Quotation

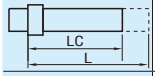
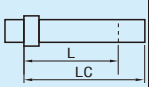
Price Quotation

Example

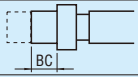
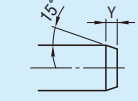
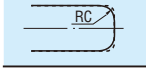


Washer for SGPR
SRW P.684

Alterations Catalog No. — L(LC) — (BC・GC・RC) Quotation
SGPR 16 — LC95

Alteration	Code	Spec.	1Code
	LC	Full length change 30≦LC＜L 0.5mm increments	Quotation
	LC	Full length change (Long type LC)	

D	LC 0.5mm increments	1Code SGPR	SGOR
8	70＜LC≦ 80	Quotation	
10	80＜LC≦100		
13	100＜LC≦120		
16	120＜LC≦140		
20	120＜LC≦140		
25	120＜LC≦140		

Alteration	Code	Spec.	1Code
	BC	B dimension change 1mm increments 5≦BC＜B (P) M tap depth is shortened by (B—BC).	Quotation
	GC	Taper machining of the pin tip	
	RC	Tip R change	

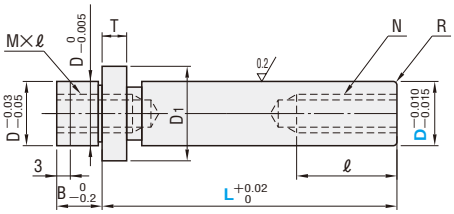
D	Y
8	3
10	
13	5
16	
20	
25	

D	Standard R	RC (Selection)
8・10	1.0	1.5・2.0
13・16	1.5	2.0・2.5
20・25	2.0	2.5・3.0

STRIPPER GUIDE PINS
—DETACHABLE AND BOTH ENDS TAPPED TYPE—

RoHS

SGPW



M SUJ2
H 58HRC～

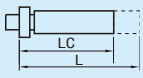
M×ℓ Pitch	N Pitch	ℓ	D_1	R	T	B	Catalog No. Type	Catalog No. D	L 5mm increments	Base unit price 1～9 pieces
M4×12 P0.7	M4 P0.7	8～13	12	1.0	3	8	SGPW	8	25～ 70	
			14			10		10		
M5×12 P0.8	M5 P0.8	10～15	17	1.5	5	10		13	30～ 75	Quotation
M6×15 P1.0	M6 P1.0		23					16	40～ 100	
M8×20 P1.25	M8 P1.25	16～21	27	2.0		13		20	60～ 120	
			32			16		25		

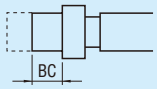
Order Catalog No. — L
SGPW 10 — 55

Price Quotation

Days to Ship Quotation

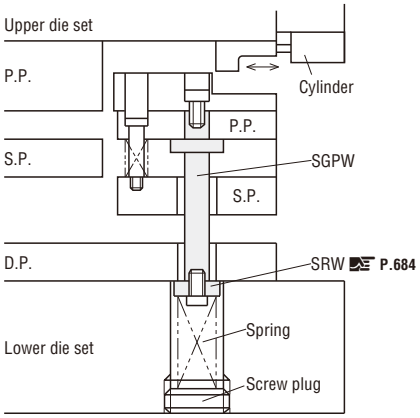
Alterations Catalog No. — L(LC) — (BC)
SGPW 10 — LC54 — BC6
Quotation

Alteration	Code	Spec.	1Code
	LC	Full length change D 8～13 25≦LC＜L D16～25 (Lmin.−5)≦LC＜L 0.5mm increments	Quotation

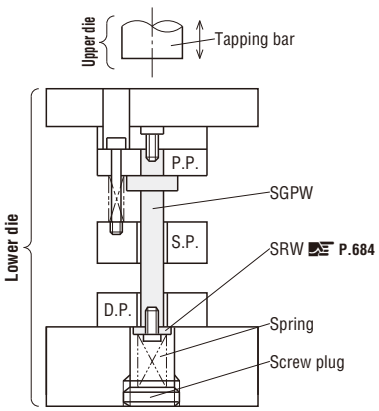
Alteration	Code	Spec.	1Code
	BC	B dimension change 1mm increments 5≦BC＜B (P) M tapping depth is shortened by (B−BC).	Quotation

Example

● Use these stripper guide pins for die sets in which the punch plate is lifted up from the lower-die side.



Intermittent cutting process for progressive die



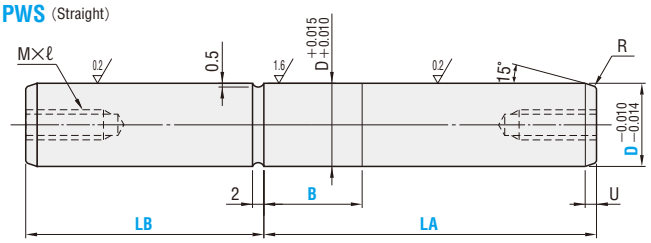
Movable lower die (tapping die)

HIGH RIGIDITY STRIPPER GUIDE PINS
—TYPE FIXED TO STRIPPER PLATE—

SGPWS・SGPWH can be combined with any of the bushings listed on P.755～P.760. Select a suitable combination according to the application.

RoHS

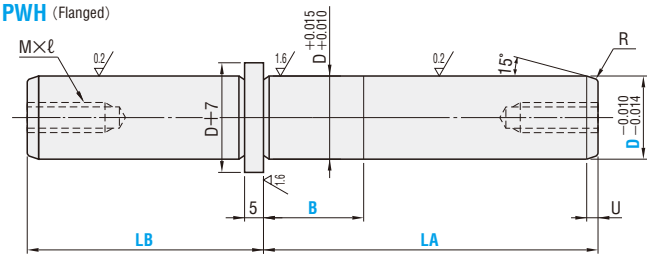
SGPWS (Straight)



M SUJ2
H 58HRC～

RoHS

SGPWH (Flanged)



M SUJ2
H 58HRC～

U	R	M×ℓ Pitch	Catalog No. Type	D	LA	LB 10mm increments	B 1mm increments	Base unit price 1～9 pieces SGPWS	SGPWH
2	1.5	M5×22 P0.8	SGPWH (Flanged)	13	60	30～50	10～30	Quotation	
					70	30～60			
					80	40～60			
3	2	M6×25 P1.0	SGPWS (Straight)	16	70	30～60			
					80	30～70			
					90	40～80			
		M8×25 P1.25		20	80	40～70			
					90	40～70			
			SGPWH (Flanged)		100	50～80			
4	3			25	90	50～70			
					100	50～80			
					110	60～90			

For the features of guide pins that are fixed to the stripper plate and the method of mounting, refer to P.771.

Order

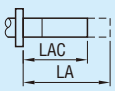
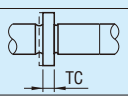
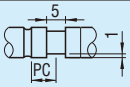
Catalog No.	LA	LB	B
SGPWS 25	100	60	B30

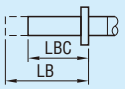
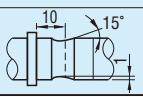
Days to Ship Quotation

Price Quotation

Alterations

Catalog No.	LA(LAC)	LB(LBC)	B	(TC・PC・NC)
SGPWH 20	LAC 78	50	B25	TC4

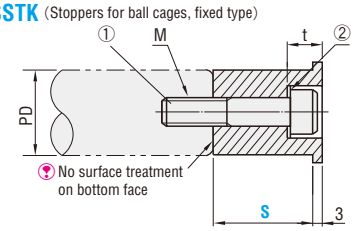
Alteration	Code	Spec.	1Code
	LAC	LA dimension change D / LA / 1mm increments 13: 60 50≦LAC＜60; 70 61≦LAC＜70; 80 71≦LAC＜80 16: 70 60≦LAC＜70; 80 71≦LAC＜80; 90 81≦LAC＜90 20: 80 70≦LAC＜80; 90 81≦LAC＜90; 100 91≦LAC＜100 25: 90 80≦LAC＜90; 100 91≦LAC＜100; 110 101≦LAC＜110 The tap depth is shortened by (LA-LAC).	Quotation
	TC	Head thickness change 3≦TC＜5 1mm increments Can be used for SGPWH.	
	PC	Addition of thread lock 1mm increments 5≦PC≦B−5 Can be used for SGPWS.	

Alteration	Code	Spec.	1Code
	LBC	LB dimension change D / LA / 1mm increments 13: 60 20≦LBC＜50; 70 20≦LBC＜60; 80 30≦LBC＜60 16: 70 20≦LBC＜60; 80 20≦LBC＜70; 90 30≦LBC＜80 20: 80 30≦LBC＜70; 90 30≦LBC＜70; 100 40≦LBC＜80 25: 90 40≦LBC＜70; 100 40≦LBC＜80; 110 50≦LBC＜90 The tap depth is shortened by (LB-LBC).	Quotation
	NC	Addition of thread lock Fixed to 10mm position (For M6) Can be used for SGPWH B≧16	

STOPPERS FOR BALL CAGES, FIXED TYPE / CLAMPS FOR STRIPPER GUIDE PINS

RoHS

SSTK (Stoppers for ball cages, fixed type)



M S45C
S Black oxide (Fe_3O_4)
A ①CB ②Spring washer

D	D_1	t	M	Catalog No. Type	Catalog No. No.	S 1mm increments	Base unit price 1~9 pieces
15	12	6.5	5	SSTK (Fixed-type stopper)	13	10~20	
17.3	15	8.5	6		16	10~20	Quotation
24	19	11	8		20	11~25	
29	24				25	11~30	

① Provided bolt CB					
PD (No.)	S				
	10~13	14~18	19~23	24~28	29~30
13					
16		Quotation			
20					
25					

Order: Catalog No. — S
SSTK 16 — 12

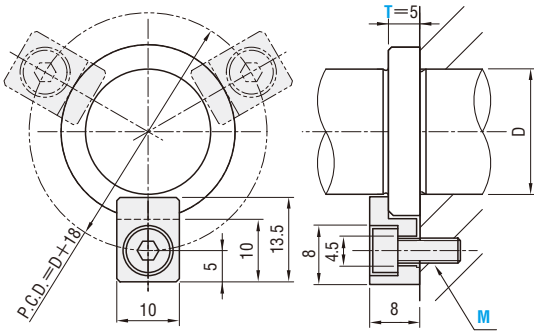
Days to Ship: Quotation

Price: Quotation

Use SSTK when attaching a stripper guide bushing for ball cage (P.759) to SGPWS or SGPWH.

RoHS

FCLP (Clamp for stripper guide pin)



M S45C
S Black oxide (Fe_3O_4)
A CB4—10

Catalog No. Type	T	M	Base unit price (1 piece) 1~9 pieces
FCLP	5	4	Quotation

FCLP can be used as a clamp for SGPWH・RSGPW・RSGPS. Use 3 pieces for D20 or less, or 4 pieces for D25 or more.

Order: Catalog No. — M
FCLP 5 — 4

Days to Ship: Quotation

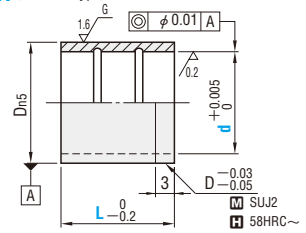
Price: Quotation

STRIPPER GUIDE BUSHINGS
—OIL・OIL-FREE TYPES—

■Oil type Use the stripper guide bushings at room temperature (40℃ or less). Mounting method P.746

RoHS

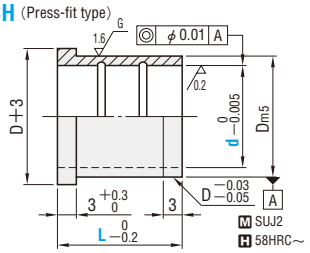
SGBA (Press-fit type)



Dn5		Catalog No. Type	d	L	Base unit price 1～9 pieces
12	+0.020 +0.012	SGBA	8	10 13 16 20	
14			10	10 13 16 20 25	Quotation
18			13	13 16 20 25	
22	+0.024 +0.015		16	16 20 25 30	
25			20	20 25 30	
32	+0.028 +0.017		25	25 30 35	

RoHS

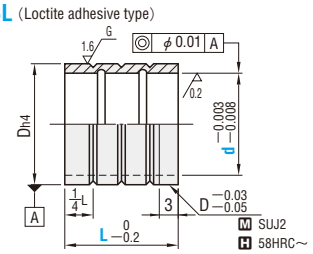
SGBH (Press-fit type)



Dm5		Catalog No. Type	d	L	Base unit price 1～9 pieces
12	+0.015 +0.007	SGBH	8	10 13 16 20	
14			10	10 13 16 20 22 25	Quotation
18			13	13 16 20 22 25 30 35	
22	+0.017 +0.008		16	13 16 20 22 25 30 35	
25			20	16 20 22 25 30 35	
32	+0.020 +0.009		25	20 22 25 30 35	

RoHS

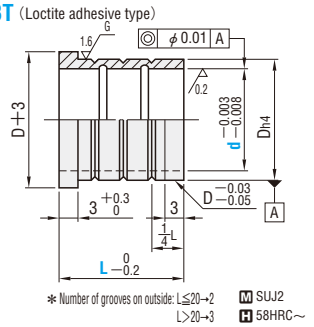
SGBL (Loctite adhesive type)



Dh4		Catalog No. Type	d	L	Base unit price 1～9 pieces
12	0 −0.005	SGBL	8	10 13 16 20	
14			10	10 13 16 20 22 25	Quotation
18			13	13 16 20 22 25 30 35	
22	0 −0.006		16	13 16 20 22 25 30 35	
25			20	16 20 22 25 30 35	
32	0 −0.007		25	20 22 25 30 35	

RoHS

SGBT (Loctite adhesive type)

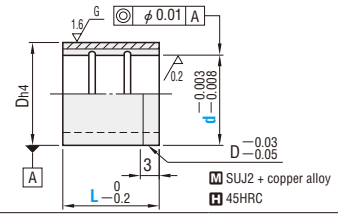


Dh4		Catalog No. Type	d	L	Base unit price 1～9 pieces
12	0 −0.005	SGBT	8	10 13 16 20	
14			10	10 13 16 20 22 25	Quotation
18			13	13 16 20 22 25 30 35	
22	0 −0.006		16	13 16 20 22 25 30 35	
25			20	16 20 22 25 30 35	
32	0 −0.007		25	20 22 25 30 35	

■Copper alloy, oil type

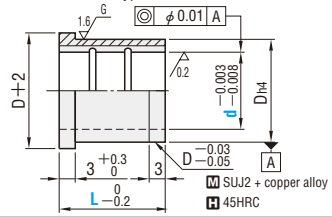
Use the stripper guide bushings at room temperature (40℃ or less). Mounting method P.746

SGSF (Loctite adhesive type)



Dh4		Catalog No. Type	d	L	Base unit price 1~9 pieces
16	0 −0.005	SGSF	10	10 13 16 20 22 25	Quotation
20	0 −0.006		13	13 16 20 22 25 30	
24			16	16 20 22 25 30 35	
28			20	16 20 22 25 30 35	
34	0 −0.007		25	20 22 25 30 35	

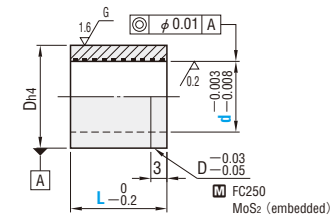
SGBF (Loctite adhesive type)



Dh4		Catalog No. Type	d	L	Base unit price 1~9 pieces
16	0 −0.005	SGBF	10	10 13 16 20 22 25	Quotation
20	0 −0.006		13	13 16 20 22 25 30	
24			16	16 20 22 25 30 35	
28			20	16 20 22 25 30 35	
34	0 −0.007		25	20 22 25 30 35	

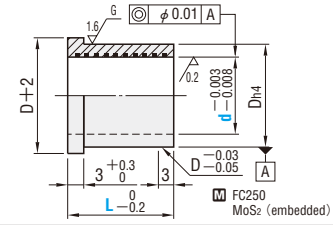
■Oil-free type

SGBZ (Loctite adhesive type)



Dh4		Catalog No. Type	d	L	Base unit price 1~9 pieces
13	0 −0.005	SGBZ	8	10 13 16 20	
16			10	10 13 16 20 22 25	Quotation
20	0 −0.006		13	13 16 20 22 25 30	
24			16	13 16 20 22 25 30 35	
28			20	16 20 22 25 30 35	
34	0 −0.007		25	20 22 25 30 35	

SGHZ (Loctite adhesive type)



Dh4		Catalog No. Type	d	L	Base unit price 1~9 pieces
13	0 −0.005	SGHZ	8	10 13 16 20	
16			10	10 13 16 20 22 25	Quotation
20	0 −0.006		13	13 16 20 22 25 30	
24			16	13 16 20 22 25 30 35	
28			20	16 20 22 25 30 35	
34	0 −0.007		25	20 22 25 30 35	

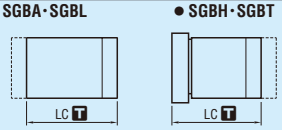
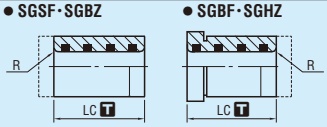
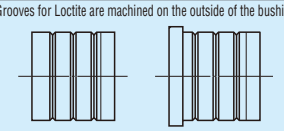
＊MoS_2 (Molybdenum disulfide) is a special solid lubricant which provides outstanding wear resistance.

Order — Catalog No. — L
SGBH 10 — 16

Price — Quotation

Days to Ship — Quotation

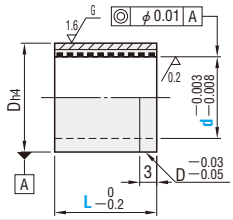
Alterations — Catalog No. — L(LC) — (DLC)
SGBA 16 — LC22.0
Quotation

Alteration	L dimension change			Addition of grooves for Loctite
Code	LC			DLC
Spec.	● SGBA・SGBL / ● SGBH・SGBT	● SGSF・SGBZ / ● SGBF・SGHZ		Grooves for Loctite are machined on the outside of the bushing.
				
	SGBD: The urethane ring is not provided when alteration LC alteration is selected.	Depending on the position of the solid lubricant, R may become larger.		Straight・headed
	d / LC 0.1mm increments / T: 8 8.0≦LC<L; 10 8.0≦LC<L; 13 10.0≦LC<L; 16 13.0≦LC<L; 20 16.0≦LC<L; 25 20.0≦LC<L; T = 0 −0.2	d / LC 0.1mm increments / T: 8 8.0≦LC<L; 10 8.0≦LC<L; 13 10.0≦LC<L; 16 13.0≦LC<L; 20 16.0≦LC<L; 25 20.0≦LC<L; T = 0 −0.2		＊Number of grooves on outside 8.0≦L(LC)≦15.9→1 16.0≦L(LC)≦24.9→2 25.0≦L(LC)≦35.0→3 ⊗ Cannot be used for SGBD・SGBA・SGBH・SGBL・SGBT.
1Code	Quotation	Quotation		Quotation

STRIPPER GUIDE BUSHINGS
—OIL-FREE TYPE—

■Copper alloy, oil-free type
Use the stripper guide bushings at room temperature (40℃ or less). Mounting method P.746

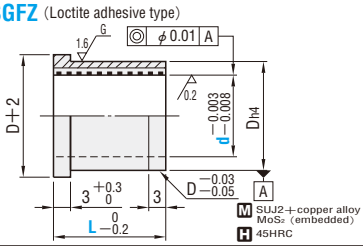
SGCZ (Loctite adhesive type)



Dh4		Catalog No. Type	d	L	Base unit price 1~9 pieces
16	0 −0.005	SGCZ	10	10 13 16 20 22 25	Quotation
20			13	13 16 20 22 25 30	
24	0 −0.006		16	16 20 22 25 30 35	
28			20	16 20 22 25 30 35	
34	0 −0.007		25	20 22 25 30 35	

∗MoS_2 is a special solid lubricant which provides outstanding wear resistance.

SGFZ (Loctite adhesive type)



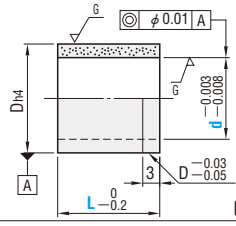
Dh4		Catalog No. Type	d	L	Base unit price 1~9 pieces
16	0 −0.005	SGFZ	10	10 13 16 20 22 25	Quotation
20			13	13 16 20 22 25 30	
24	0 −0.006		16	16 20 22 25 30 35	
28			20	16 20 22 25 30 35	
34	0 −0.007		25	20 22 25 30 35	

∗MoS_2 is a special solid lubricant which provides outstanding wear resistance.

■Sintered alloy (dispersed solid lubricant), oil-free type
Guide P.746

RoHS

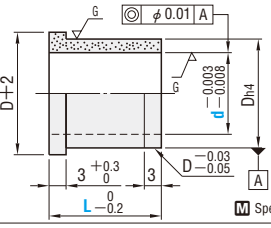
SGBM (Loctite adhesive type)



Dh4		Catalog No. Type	d	L	Base unit price 1~9 pieces
16	0 −0.005	SGBM	10	10 13 16 20 22 25	Quotation
20			13	13 16 20 22 25 30	
24	0 −0.006		16	16 20 22 25 30 35	
28			20	20 22 25 30 35	
34	0 −0.007		25	20 22 25 30 35	

RoHS

SGHM (Loctite adhesive type)



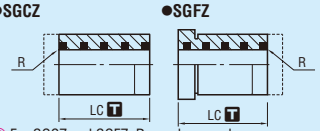
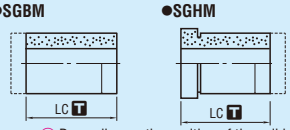
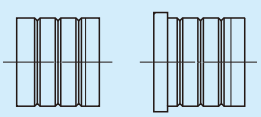
Dh4		Catalog No. Type	d	L	Base unit price 1~9 pieces
16	0 −0.005	SGHM	10	10 13 16 20 22 25	Quotation
20			13	13 16 20 22 25 30	
24	0 −0.006		16	16 20 22 25 30 35	
28			20	20 22 25 30 35	
34	0 −0.007		25	20 22 25 30 35	

Order Catalog No. — L
SGFZ 10 — 16

Price Quotation

Days to Ship Quotation

Alterations Catalog No. — L(LC) — (DLC) Quotation
SGFZ 16 — LC18.0

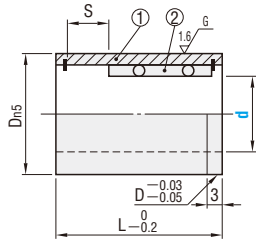
Alteration	L dimension change	Addition of grooves for Loctite
Code	LC	DLC
Spec.	●SGCZ ●SGFZ  For SGCZ and SGFZ, R may become larger depending on the position of the solid lubricant. d / LC 0.1mm increments / T 10 8.0≦LC<L 13 10.0≦LC<L 16 13.0≦LC<L 20 16.0≦LC<L 25 20.0≦LC<L T: 0 −0.2 ●SGBM ●SGHM  Depending on the position of the solid lubricant, R may become larger. d / LC 0.1mm increments / T 10 8.0≦LC<L 13 10.0≦LC<L 16 13.0≦LC<L 20 16.0≦LC<L 25 20.0≦LC<L T: 0 −0.2	Grooves for Loctite are machined on the outside of the bushing.  Straight・headed type ∗Number of grooves on outside 8.0≦L(LC)≦15.9→1 16.0≦L(LC)≦24.9→2 25.0≦L(LC)≦35.0→3
1Code	Quotation	Quotation

STRIPPER GUIDE BUSHINGS
—INTEGRATED BALL CAGE TYPE—

■Integrated ball cage type

RoHS

SGBB (Press-fit type)



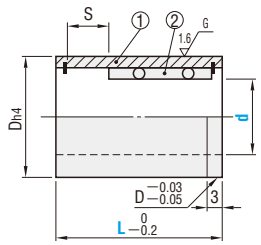
Both ends are fastened with snap rings so that the ball section does not come out of the bushing.

M ① SUJ2 ② A5056
H 58HRC～

Dn5		L	N Number of rows	n Number of balls	S	Maximum stroke	Catalog No. Type	Catalog No. d	Base unit price 1～9 pieces
16	+0.020 +0.012	24	5	55	7.8	15.6	SGBB (Press-fit type)	8	Quotation
20		30			8.4	16.8		10	
25	+0.024 +0.015	35	6	66	9.25	18.5		13	
28		37		78	10.15	20.3		16	
32	+0.028 +0.017	45		96	12.75	25.5		20	
38		50	7	112	14.0	28.0		25	

RoHS

SGBBL (Loctite adhesive type)



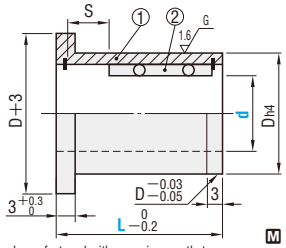
Both ends are fastened with snap rings, so that the ball section does not come out of the bushing.

M ① SUJ2 ② A5056
H 58HRC～

Dh4		N Number of rows	n Number of balls	S	Maximum stroke	Catalog No. Type	Catalog No. d	L (Selection)	Base unit price 1～9 pieces
16	0 −0.005	5	35	5	10	SGBBL (Loctite adhesive type)	8	20	Quotation
		7	49					25	
20	0 −0.006	6	48				10	25	
		8	64					30	
25		6	60				13	25	
		8	80					30	
28		7	77	7.5	15		16	30	
		9	99					35	
32	0 −0.007	4	44				20	30	
		6	66					35	
38		8	112				25	40	

RoHS

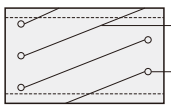
SGBBF (Loctite adhesive type)



Both ends are fastened with snap rings so that the ball section does not come out of the bushing.

M ① SUJ2 ② A5056
H 58HRC～

Dh4		N Number of rows	n Number of balls	S	Maximum stroke	Catalog No. Type	Catalog No. d	L (Selection)	Base unit price 1～9 pieces
16	0 −0.005	5	35	5	10	SGBBF (Loctite adhesive type)	8	20	Quotation
		7	49					25	
20	0 −0.006	6	48				10	25	
		8	64					30	
25		6	60				13	25	
		8	80					30	
28		7	77	7.5	15		16	30	
		9	99					35	
32	0 −0.007	4	44				20	30	
		6	66					35	
38		8	112				25	40	



N Number of rows (1.....N)
n Number of balls (1.....n)

SGBB 8 ····· Ball diameter 1.588mm (1/16 inch)
SGBB 10 ····· Ball diameter 2.381mm (3/32 inch)
SGBB13～25····· Ball diameter 3.175mm (1/8 inch)
SGBBL/F 8 ····· Ball diameter 1.5mm
SGBBL/F10～16 ··· Ball diameter 2.0mm
SGBBL/F20・25 ··· Ball diameter 3.0mm

Order

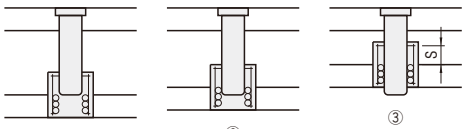
Catalog No.	—	L
SGBB 20		
SGBBL 20	—	35

Days to Ship Quotation

Alterations

Catalog No.	—	L (LC)	
SGBB 16.0	—	LC30.0	Quotation
SGBBF 13	—	LC22.5	

Example

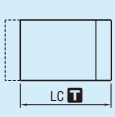
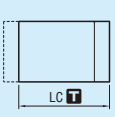
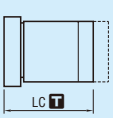


① ② ③ Max. stroke=S×2

① Insert the pin into the bushing that is set in the stripper plate.
② ③Because the pin and bushing are fastened by an interference fit of 2 ～ 20 μm, push the pin down to the bottom dead center.

Price Quotation

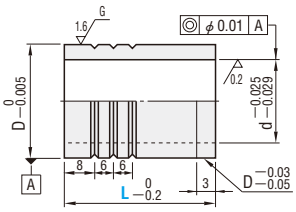
To use alternation LC for SGBB, specify dimension d to the first decimal place.

Alteration	L dimension change											
Code	LC											
Spec.	•SGBB			d	LC 0.1mm increments	T	•SGBBL	•SGBBF		d	LC 0.1mm increments	T
				8	20.0≦LC＜L	0 −0.2				8	17.5≦LC＜L	0 −0.2
				10	25.0≦LC＜L					10	22.5≦LC＜L	
				13	30.0≦LC＜L					13	22.5≦LC＜L	
				16	30.0≦LC＜L					16	25.0≦LC＜L	
				20	35.0≦LC＜L					20	25.0≦LC＜L	
				25	40.0≦LC＜L					25	35.0≦LC＜L	
	S dimension is shortened by (L−LC). (S≧2.5)						S dimension is shortened by (L−LC). (S≧2.5)					
1Code	Quotation						Quotation					

STRIPPER GUIDE BUSHINGS
—FOR BALL CAGES—

RoHS

SGBBW (Thick wall, Loctite adhesive type)

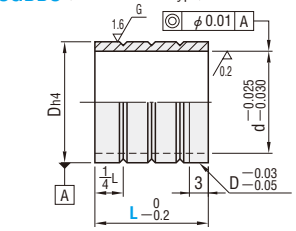


M SUJ2
H 58HRC～

d	D		Catalog No. Type	PD	L	Base unit price 1～9 pieces
17	24	0 −0.005	SGBBW	13	30 35	Quotation
20	28			16	35 40	
26	34			20	40 45 50	
31	40			25	45 50 60	

RoHS

SGBBS (Loctite adhesive type)

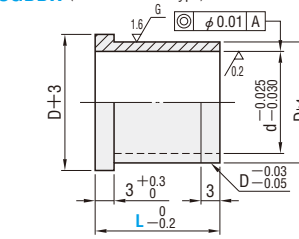


M SUJ2
H 58HRC～

d	Dh4		Catalog No. Type	PD	L	Base unit price 1～9 pieces
14	18	0 −0.005	SGBBS	10	20 25 30	Quotation
17	22			13	20 25 30	
20	26	0 −0.006		16	25 30 35	
26	31			20	25 30 35 40	
31	37	0 −0.007		25	35 40	

RoHS

SGBBH (Loctite adhesive type)



M SUJ2
H 58HRC～

d	Dh4		Catalog No. Type	PD	L	Base unit price 1～9 pieces
14	18	0 −0.005	SGBBH	10	20 25 30	Quotation
17	22			13	20 25 30	
20	26	0 −0.006		16	25 30 35	
26	31			20	25 30 35 40	
31	37	0 −0.007		25	35 40	

Order

Catalog No.	—	L
SGBBW 16	—	35

Price Quotation

Days to Ship Quotation

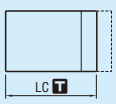
Alterations

Catalog No. — L(LC) — (DLC) Quotation

SGBBH 16 — LC25.5

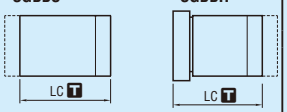
Alteration	L dimension change		Addition of grooves for Loctite
Code	LC		DLC
Spec.	●SGBBW	●SGBBS ●SGBBH	Grooves for Loctite are machined on the outside of the bushing.
1Code	Quotation	Quotation	Quotation

●SGBBW

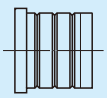


PD	LC 0.1mm increments	T
13	25.0≦LC＜L	0 −0.2
16	30.0≦LC＜L	
20	35.0≦LC＜L	
25	40.0≦LC＜L	

●SGBBS ●SGBBH



PD	LC 0.1mm increments	T
10	15.0≦LC＜L	0 −0.2
13	15.0≦LC＜L	
16	20.0≦LC＜L	
20	20.0≦LC＜L	
25	30.0≦LC＜L	



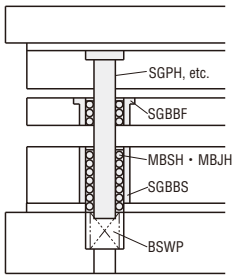
＊Number of grooves on outside
8.0≦L(LC)≦15.9→1
16.0≦L(LC)≦24.9→2
25.0≦L(LC)≦35.0→3

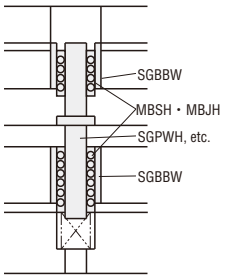
⊗ Cannot be used for SGBBW and SGBBS.

Example

■Features

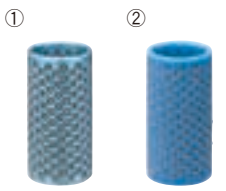
SGBBW	The thick wall results in higher rigidity.
SGBBS SGBBH	Can be combined with any type of stripper guide pin. (The same applies to SGBBW.)



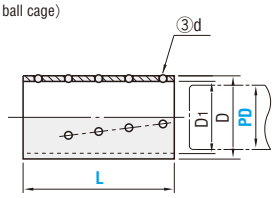


BALL CAGES / SPRINGS FOR BALL CAGES

RoHS



① **MBSH** (High rigidity aluminum ball cage)
② **MBJH** (High rigidity resin ball cage)



M ①A5056 (Aluminum)
②POM (Polyacetal resin)
③SUJ2 Sphericity 0.25 μm
H ③62～67HRC

D	D1	Ball diameter d	Catalog No. Type	PD	L	Base unit price for 1～9 pieces MBSH	MBJH
13.7	10.3	2	MBSH (Aluminum) MBJH (Resin)	10	25 30 35		
16.7	13.3	2		13	25 30 35		
19.7	16.3	2		16	30 35 40	Quotation	
25.5	20.5	3		20	30 35 40 45		
30.5	25.5	3		25	35 40 45 50		

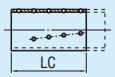
Other L sizes are available for PD20・25. P.802

Order: Catalog No. — L
MBJH 20 — 45

Alterations: Catalog No. — L(LC)
MBJH 20 — LC 42
Quotation

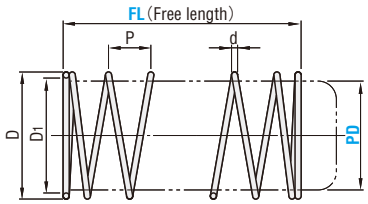
Days to Ship: Quotation

Price: Quotation

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

RoHS

BSWP (Spring for ball cage)



M SWP—B

D	D1	d	P	Catalog No. Type	PD	FL 5mm increments	Base unit price 1～9 pieces
11.7	10.5	0.6	5	BSWP (For ball cage)	10	30～80	Quotation
14.9	13.5	0.7	6		13	30～80	
18.3	16.5	0.8	12		16	30～90	
22.5	20.5	1.0	14		20	35～90	
27.9	25.5	1.2	14		25	40～90	

Order: Catalog No. — FL
BSWP 20 — 80

Days to Ship: Quotation

Price: Quotation

Spring solid height (mm) / Spring constant (g/mm)														
Type	PD	FL (Free length) 30	35	40	45	50	55	60	65	70	75	80	85	90
BSWP	10	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	9.6	10.2	10.8	—	—
		16	14	12	11	9	9	8	7	7	6	6		
	13	4.9	5.4	6.1	6.6	7.2	7.8	8.4	8.9	9.6	10.1	10.7	—	—
		17	15	13	11	10	9	8	8	7	7	6		
	16	3.2	3.4	3.7	4.0	4.2	4.5	4.8	5.0	5.3	5.6	5.8	6.1	6.4
		32	26	23	22	20	19	16	15	14	13	12	12	11
	20	—	4.7	5.0	5.3	5.6	5.8	6.0	6.5	7.0	7.4	7.7	8.1	8.5
			40	35	31	28	26	23	22	20	19	18	16	15
	25	—	—	6.0	6.3	6.6	7.0	7.4	7.9	8.4	8.7	9.0	9.3	9.6
				38	34	30	28	25	24	22	20	19	18	17

Upper: Solid height
Lower: Spring constant

3 μm RANGE STRIPPER GUIDE PINS & BUSHINGS
—GUIDE—

■Features

- The TG series of stripper guides achieve accuracy that is close to precision grades at prices that are close to the SG series.
  The pin and bushing are finished to tolerances in the 3 μm range, and the clearance (on one side) is 2 ～ 5 μm. Compared with the SG series, the roundness, concentricity, and surface roughness are all improved. These stripper guide pins and bushings are suitable for precision dies used in medium volume production.

- **Outer diameter finishing with absolute tolerance**
  For precision dies, W-EDM or jig grinding is ordinarily used to machine the mounting holes for the pins and bushings. To support this practice, the pin holder is finished with an absolute tolerance of $^{+0.003}_{0}$, and the bushing outer diameter is finished with an absolute tolerance of $^{0}_{-0.005}$.

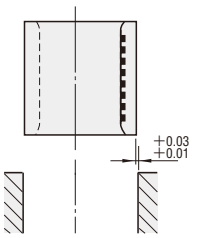
■Comparison of stripper guide pin and bushing accuracy

Series	Dimensional accuracy of sliding part			Clearance (Single side: μm)	Pin holder ( ) Detachable type	Bushing diameter	Roundness	Concentricity		Surface roughness [Ra]		Application
	Tolerance range	Pin tolerance	Bushing tolerance				Pins and bushings	Pins (2)	Bushings	Pins	Bushings	
Precision grade **VG** series **WG** series	2 μm	−0.010 −0.012	−0.003 −0.005	2.5 ～ 4.5	+0.002 0	+0.002 0	1.5 μm	3 μm	5 μm	0.1	0.1	High speed, high accuracy mass production
		−0.007 (1) −0.009		1 ～ 3 (1)	(0 −0.002)							
TG series	3 μm	−0.010 −0.013	−0.003 −0.006	2 ～ 5	+0.003 0 (0 −0.003)	0 −0.005	1.5 μm	3 μm	10 μm	0.15	0.2	High accuracy medium-scale production
SG series	5 μm	−0.010 −0.015	−0.003 −0.008	1 ～ 6	m5 0 (−0.005)	h4	2 μm	5 μm	10 μm	0.2	0.2	Standard grade medium-scale production

(1) When diameter tolerance change DKC is used for stripper guide pins　(2) Concentricity of press fit point and sliding part

■Stripper guide pins (3 μm range)

Catalog No.	M	Shape	Features
TGPH	SUJ2	Headed	● The end face on the holder side of the guide pin and the guide part are finished to perpendicularity of 0.01/100mm.
TGPN		Straight	
TGPR		Detachable type	



■Stripper guide bushings (3 μm range)

Catalog No.	M	Oil	Shape	Seizure resistance (Poor 1←→5 Excellent)
TGBL	SUJ2	Oil type	Straight	3
TGBT			Headed	
TGBZ	FC250+MoS_2	Oil-free type	Straight	4
TGHZ			Headed	
TGSF	SUJ2+Copper alloy	Oil type	Straight	4
TGBF			Headed	
TGCZ	SUJ2+Copper alloy+MoS_2	Oil-free type	Straight	5
TGFZ			Headed	
TGBM	Special sintered alloy	Oil-free type	Straight	5
TGHM			Headed	

- Recommended clearance between bushing and mounting hole (Single side $^{+0.03}_{+0.01}$)
- When the mounting hole is machined using jig grinding or similar means and the bushing is bonded with zero clearance, use alteration DLC (addition of grooves for Loctite).
- Use Loctite No. 638 when mounting the bushing.
- To improve the bonding strength, degrease the bushing outer periphery and mounting hole. (Do not degrease the bushing inner surface.)

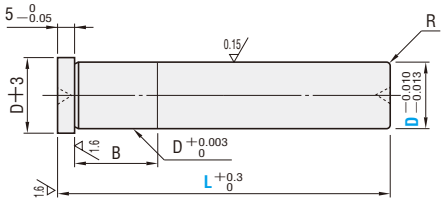
- Oil type: Circular oil grooves are machined on the inner surface.
- Oil-free type: Molybdenum disulfide (MoS_2), a solid lubricant with a particularly low friction coefficient, is embedded in the sliding part, impregnating the product with lubricant for improved wear resistance and seizure resistance.
  Because no solid lubricant is embedded in the bushing outer periphery, the bushings can be degreased to facilitate Loctite bonding.
  Although this product can be used with no oil, applying initial break-in grease or oil will further improve the durability.
- Copper alloy type: Because the inner face is sintered with copper alloy, the resistance to seizure is excellent.
- Sintered alloy type: This is an oil-free bushing made of a special alloy on which a solid lubricant composed mainly of graphite is dispersed and sintered for oil-impregnation.
  The friction coefficient is lower than for cast iron or copper alloy bushings, and the wear resistance is superior.
  Because the solid lubricant is dispersed and sintered over the entire bushing, the product is resistant to oil film depletion, allowing it to be used for high-speed operations.

Notes: Use oil-free types (except for sintered alloy types) with a stroke of 1mm or more.Because the inner surface of the bushing is impregnated with lubricant, do not clean it.

3 μm RANGE STRIPPER GUIDE PINS
—HEADED TYPE・STRAIGHT TYPE・DETACHABLE TYPE—

RoHS

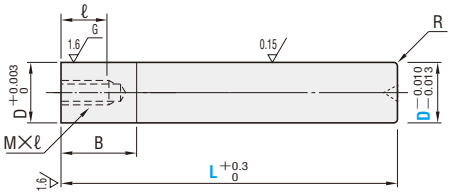
TGPH
(Headed type)



M SUJ2
H 58HRC ～

RoHS

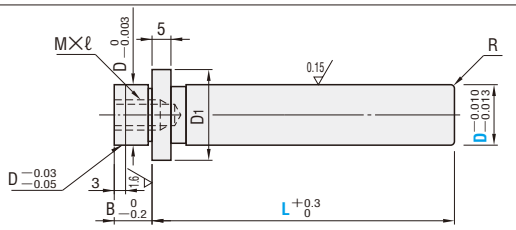
TGPN
(Straight type)



M SUJ2
H 58HRC ～

RoHS

TGPR
(Detachable)



M SUJ2
H 58HRC ～

TGPN M×ℓ Pitch	R	B	Catalog No. Type	Catalog No. D	L	Base unit price for 1 ～ 9 pieces TGPH	Base unit price for 1 ～ 9 pieces TGPN
M5×12 P0.8	1.0	13	TGPH / TGPN	10	40 50 60 70 80 100	Quotation	
M6×15 P1.0	1.5	16		13	50 60 70 80 90 100 120		
		20		16	50 60 70 80 90 100 110 120 140		
M8×20 P1.25	2.0	25		20	70 80 90 100 110 120 140		
		28		25	70 80 90 100 110 120 140		

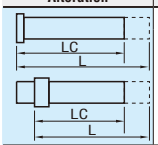
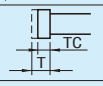
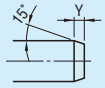
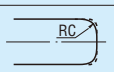
M×ℓ Pitch	D1	R	B	Catalog No. Type	Catalog No. D	L	Base unit price 1 ～ 9 pieces
M5×12 P0.8	16	1.0	8	TGPR	10	40 50 60	Quotation
M6×15 P1.0	20	1.5	10		13	40 50 60 70	
	23				16	40 50 60 70 80 90 100	
M8×20 P1.25	27	2.0	13		20	50 60 70 80 90 100	

Order Catalog No. — L
TGPH 16 — 100

Days to Ship Quotation

Price Quotation

Alterations Catalog No. — L(LC) — (TC・GC・RC)
TGPH 16 — LC95.0 — TC4.0 — GC — RC2.5
Quotation

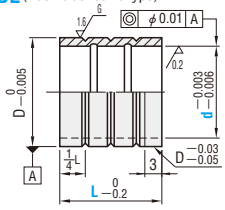
Alteration	Code	Spec.	1Code
	LC	L dimension change 0.5mm increments D: 10 — LC: TGPH・TGPN 30≦LC＜L, TGPR 30≦LC＜L D: 13・16 — LC: TGPH・TGPN 40≦LC＜L, TGPR 40≦LC＜L D: 20 — LC: TGPH・TGPN 60≦LC＜L, TGPR 50≦LC＜L D: 25 — LC: TGPH・TGPN 60≦LC＜L, TGPR —	Quotation
	TC	Head thickness change 2≦TC＜5 0.1mm increments Full length L is shortened by (5—TC). If combined with LC, full length is equal to LC. (5—TC≦Lmax.—LC) Can be used for TGPH only.	
	GC	Taper machining of the pin tip D: 10 13 16 20 25 — Y: 3 / 5	
	RC	Tip R change D: 10 — Standard R 1.0 — RC (Selection) 1.5・2.0 D: 13・16 — Standard R 1.5 — RC (Selection) 2.0・2.5 D: 20・25 — Standard R 2.0 — RC (Selection) 2.5・3.0	

3 μm RANGE STRIPPER GUIDE BUSHINGS

■Oil type

RoHS

TGBL (Loctite adhesive type)

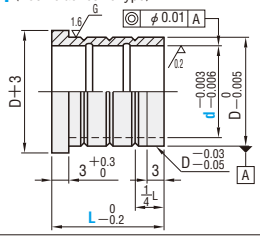


M SUJ2
H 58HRC～

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
14	TGBL	10	10 13 16 20 22 25	Quotation
18		13	13 16 20 22 25 30	
22		16	16 20 22 25 30 35	
25		20	20 22 25 30 35	

RoHS

TGBT (Loctite adhesive type)



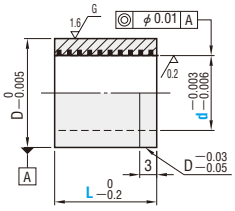
M SUJ2
H 58HRC～

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
14	TGBT	10	10 13 16 20 22 25	Quotation
18		13	13 16 20 22 25 30	
22		16	16 20 22 25 30 35	
25		20	20 22 25 30 35	

■Oil-free type

RoHS

TGBZ (Loctite adhesive type)

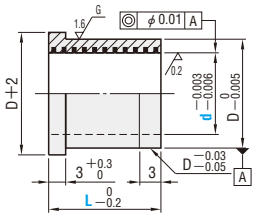


M FC250
MoS_2
(embedded)

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
16	TGBZ	10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	
34		25	20 22 25 30 35	

RoHS

TGHZ (Loctite adhesive type)

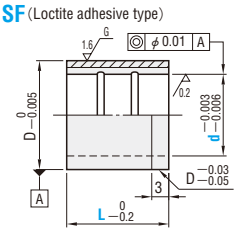


M FC250
MoS_2
(embedded)

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
16	TGHZ	10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	
34		25	20 22 25 30 35	

■Copper alloy, oil type

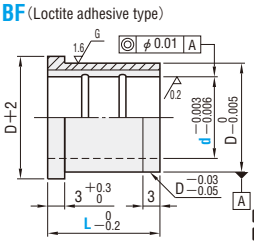
TGSF (Loctite adhesive type)



M SUJ2+copper alloy
H 45HRC

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
16	TGSF	10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	

TGBF (Loctite adhesive type)

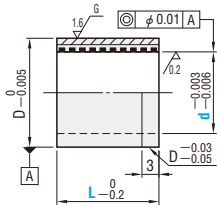


M SUJ2+copper alloy
H 45HRC

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
16	TGBF	10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	

■Copper alloy, oil-free type

TGCZ (Loctite adhesive type)

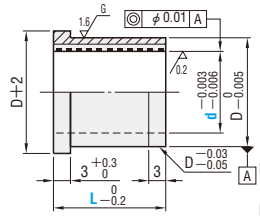


M SUJ2+Copper alloy
MoS_2 (embedded)
H 45HRC

D	Catalog No. Type	d	L	Base unit price 1~9 pieces
16	TGCZ	10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	
34		25	20 22 25 30 35	

∗ MoS_2 is a special solid lubricant which provides outstanding wear resistance.

TGFZ (Loctite adhesive type)



M SUJ2+Copper alloy
MoS_2 (embedded)
H 45HRC

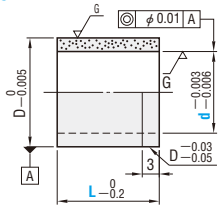
D	Catalog No. Type	d	L	Base unit price 1~9 pieces
16	TGFZ	10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	
34		25	20 22 25 30 35	

∗ MoS_2 is a special solid lubricant which provides outstanding wear resistance.

■Sintered alloy (dispersed solid lubricant), oil-free type Guide P.746

RoHS

TGBM (Loctite adhesive type)

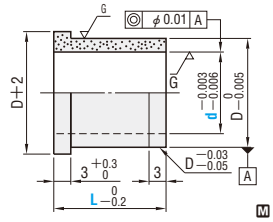


M Special sintered alloy

D	Catalog No. Type	d	L	Base unit price 1~9 pieces
16	TGBM	10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	

RoHS

TGHM (Loctite adhesive type)



M Special sintered alloy

D	Catalog No. Type	d	L	Base unit price 1~9 pieces
16	TGHM	10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	

Order

Catalog No.	—	L
TGBZ 16	—	20

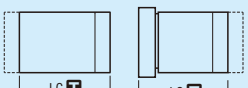
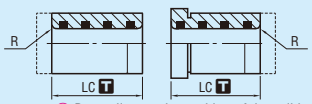
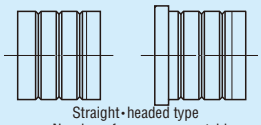
Days to Ship Quotation

Alterations

Catalog No.	—	L (LC)	—	(DLC)
TGFZ 20	—	LC28	—	DLC

Quotation

Price Quotation

Alteration	L dimension change		Addition of grooves for Loctite
Code	LC		DLC
Spec.	●TGBL·TGSF TGBM ●TGBT·TGBF TGHM	●TGBZ·TGCZ ●TGHZ·TGFZ	Grooves for Loctite are machined on the outside of the bushing.
			
		Depending on the position of the solid lubricant, R may become larger.	Straight·headed type
			∗Number of grooves on outside 8.0≦L (LC) ≦15.9→1 16.0≦L (LC) ≦24.9→2 25.0≦L (LC) ≦35.0→3
			Use this alteration when the mounting hole is machined using jig grinding or similar means and the bushing is bonded with zero clearance. Cannot be used for TGBL and TGBT.
1Code	Quotation	Quotation	Quotation

d	LC 0.1mm increments	T
10	8.0≦LC<L	0 −0.2
13	10.0≦LC<L	
16	13.0≦LC<L	
20	16.0≦LC<L	

d	LC 0.1mm increments	T
10	8.0≦LC<L	0 −0.2
13	10.0≦LC<L	
16	13.0≦LC<L	
20	16.0≦LC<L	
25	20.0≦LC<L	

PRECISION STRIPPER GUIDE PINS & BUSHINGS
—GUIDE—

PRECISION Stripper guide pins and bushings with a tolerance range of 2 μm!

PRECISION These stripper guide pins and bushings are standard parts that are ideal for precision and super-precision progressive dies.
Both the outer diameter of pin and the inner/outer diameters of the bushing are finished to a tolerance range of 2 μm. The clearance between pin and bushing (one side) is kept to 2.5 ~ 4.5 μm.

■Precision stripper guide pins

Shape	Catalog No.	M	Page
Headed	VGPH	SKD11	P.767
	WVGPH	Carbide (V30)	P.766
Straight	VGPN	SKD11	P.767
	VGPS (With press-in lead)	SKD11	
	WVGPN	Carbide (V30)	P.766
	WVGPS (With press-in lead)	Carbide (V30)	
Detachable type	VGPR	SKD11	P.768

- Carbide (V30): The use of copper alloy bushings is recommended for carbide guide pins.
- With press-in lead (**VGPS・WVGPS**): Press-in lead is provided on the thread side. By adjusting the mounting hole, these types can be fixed either by press fit or transition fit.

■Precision stripper guide bushings

Shape	Catalog No.	M	Description	Page
Headed	VGBH	SUJ2	Oil type	P.769
	VGHZ	FC250	Oil-free type	
	VSGBF	SUJ2+Copper alloy	Oil type	
	VSGFZ	SUJ2+Copper alloy	Oil-free type	P.770
	VGHM	Special sintered alloy	Oil-free type	
Straight	VGBL	SUJ2	Oil type	P.769
	VGBZ	FC250	Oil-free type	
	VSGSF	SUJ2+Copper alloy	Oil type	
	VSGCZ	SUJ2+Copper alloy	Oil-free type	P.770
	VGBM	Special sintered alloy	Oil-free type	

■Accuracy guarantee

PRECISION In order to ensure reliable use of our stripper guide pins and bushings by the customers, these products are measured both at the time of manufacture and also again after being left in a thermostatic chamber for a certain period of time after manufacture. These measurements are listed in the Quality Guarantee Certificate which is attached to the product.

Measurement item		Guaranteed accuracy: Guide pin		Guaranteed accuracy: Guide bushing	
Dimensions	Outer diameter Inner diameter	Press fit	+0.002 0	Outer diameter	+0.002 0
		Slide part	−0.010 −0.012	Inner diameter	−0.003 −0.005
	Concentricity	Press fit and slide part 0.003 or less		Outer diameter and inner diameter 0.005 or less	
Shape	Roundness	Press fit Slide part	0.0015 or less	Inner/outer diameters	0.0015 or less
	Surface roughness	Press fit	0.2a or less	Outer diameter	0.2a or less
		Slide part	0.1a or less	Inner diameter	0.1a or less

Guide pin: Press fit / Sliding part
Guide bushing: Inner diameter / Outer diameter

- Oil type : A spiral oil groove of 6mm pitch is created on the sliding part of the inner surface.
- Oil-free type : A special solid lubricant (main component: MoS_2) is embedded in the form of rings at a pitch of 2mm on the sliding part of the inner surface.Use these products without oil.
  (However the use of initial break-in greasing will further improve durability.)
- Copper alloy : The guide´s inner surface is covered with copper alloy for improved seizure resistance.
- Sintered alloy : This is an oil-free bushing made of a special alloy on which a solid lubricant composed mainly of graphite is dispersed and sintered for oil-impregnation. The friction coefficient is lower than for cast iron or copper alloy bushings, and the wear resistance is superior.Because the solid lubricant is dispersed and sintered over the entire bushing, the product is resistant to oil film depletion, allowing it to be used for high-speed operations.

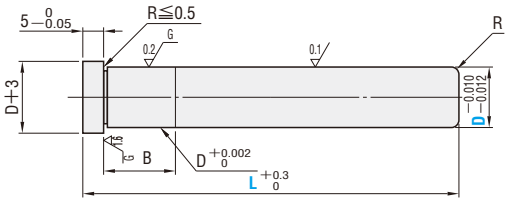
Notes
(1) Use oil-free types (except for sintered alloy types) with a stroke of 1mm or more. Because the inner surface of the bushing is impregnated with lubricant, do not clean it.
(2) When the mounting hole is machined using jig grinding or similar means and the bushing is bonded with zero clearance, use busing alteration DRC (addition of grooves for Loctite, see P.770).

PRECISION CARBIDE STRIPPER GUIDE PINS
—HEADED TYPE・STRAIGHT TYPE—

The use of copper alloy bushings (pages 769 and 770) is recommended for carbide stripper guide pins.

RoHS

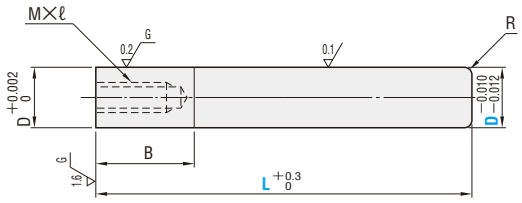
WVGPH
(Headed type)



M V30 (HIP)
H 88 ～ 89HRA

RoHS

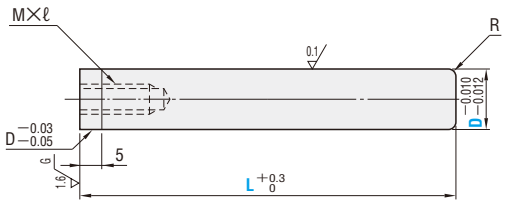
WVGPN
(Straight type)



M V30 (HIP)
H 88 ～ 89HRA

RoHS

WVGPS
(Straight
With press-in lead)



M V30 (HIP)
H 88 ～ 89HRA

M×ℓ Pitch	R	B	Catalog No. Type	D	L	Base unit price for 1 ～ 9 pieces WVGPH	WVGPN・WVGPS
M5×12 P0.8	1.0	13	WVGPH WVGPN WVGPS	10	50 60 70 100	Quotation	
M6×15 P1.0	1.5	16		13	60 70 80 90 120		
		20		16	70 80 90 100 140		
M8×20 P1.25	2.0	25		20	70 80 90 100 140		

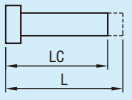
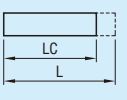
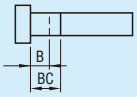
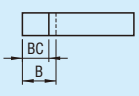
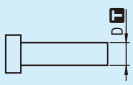
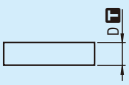
Order — Catalog No. — L
WVGPH 13 — 60

Price — Quotation

Days to Ship — Quotation

Alterations — Catalog No. — L(LC) — (BC・DKC)
WVGPH 13 — LC55 — BC10
Quotation

Use oil-free bushings for pins which were modified by alteration DKC. With oil type bushings, scuffing is more likely to occur because it is difficult to form oil films on them.

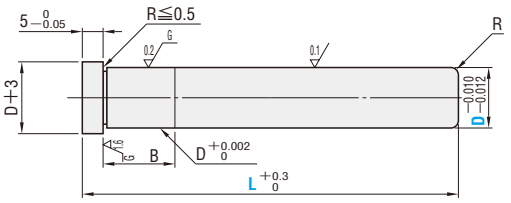
Alteration Headed	Alteration Straight	Code	Spec.	1Code
		LC	L dimension change 30≦LC＜L 0.5mm increments To reduce the full length below the specification minimum length, combine with BC as necessary.	Quotation
		BC	B dimension change ・WVGPH：0≦BC≦D×2 ・WVGPN：6≦BC≦D×2 0.5mm increments ⊗ Cannot be used for WVGPS.	
		DKC	Outer diameter tolerance change D −0.010 −0.012 ⇨ D −0.007 −0.009 The clearance between pin and bushing is 1 ～ 3 μm on each side. Note that only **oil-free type bushings can be used.**	

PRECISION STRIPPER GUIDE PINS

—HEADED TYPE・STRAIGHT TYPE—

RoHS

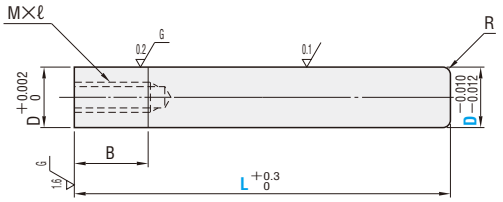
VGPH
(Headed)



M SKD11
H 58HRC～

RoHS

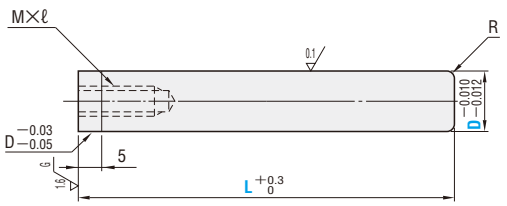
VGPN
(Straight type)



M SKD11
H 58HRC～

RoHS

VGPS
(Straight type
With press-in lead)



M SKD11
H 58HRC～

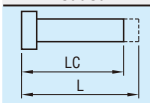
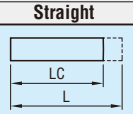
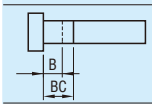
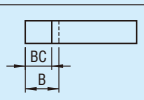
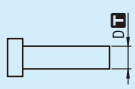
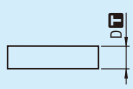
M×ℓ Pitch	R	B	Catalog No. Type	Catalog No. D	L	Base unit price 1～9 pieces VGPH	Base unit price 1～9 pieces VGPN・VGPS
M5×12 P0.8	1.0	10	VGPH VGPN VGPS	8	40 50 60 70 80	Quotation	
		13		10	40 50 60 70 80 90 100		
M6×15 P1.0	1.5	16		13	50 60 70 80 90 100 110 120		
		20		16	50 60 70 80 90 100 110 120 130 140		
M8×20 P1.25	2.0	25		20	60 70 80 90 100 110 120 130 140		
		28		25	70 80 90 100 110 120 130 140 150		

Order Catalog No. — L
VGPH 10 — 60

Price Quotation

Days to Ship Quotation

Alterations Catalog No. — L(LC) — (BC・DKC)
VGPH 10 — LC55 — BC10

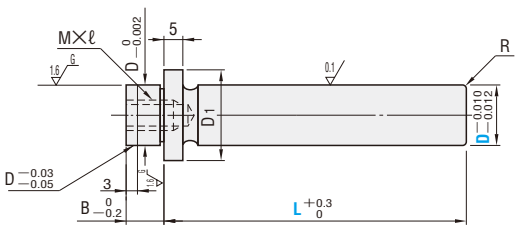
Alteration Headed	Alteration Straight	Code	Spec.	1Code
		LC	L dimension change 30≦LC＜L 0.5mm increments To reduce the full length below the specification minimum length, combine with BC as necessary.	Quotation
		BC	B dimension change 0.5mm increments ・VGPH：0≦BC≦D×2 ・VGPN：6≦BC≦D×2 Cannot be used for VGPS.	
		DKC	Outer diameter tolerance change D −0.010 −0.012 ⇨ D −0.007 −0.009 The clearance between pin and bushing is 1～3 μmm on each side.Note that only **oil-free type bushings can be used.**	

Use oil-free bushings for pins which were modified by alteration DKC. With oil type bushings, scuffing is more likely to occur because it is difficult to form oil films on them.

PRECISION STRIPPER GUIDE PINS
—DETACHABLE TYPE—

RoHS

VGPR



M SKD11
H 58HRC～

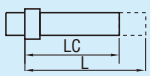
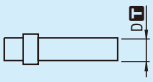
M×ℓ Pitch	D_1	R	B	Catalog No. Type	Catalog No. D	L	Base unit price 1～9 pieces
M5×12 P0.8	16	1.0	8	VGPR	10	30 40 50 60 70 80	
M6×15 P1.0	20	1.5	10	VGPR	13	40 50 60 70 80 90 100	
M6×15 P1.0	23	1.5	10	VGPR	16	40 50 60 70 80 90 100 110 120	Quotation
M8×20 P1.25	27	2.0	13	VGPR	20	50 60 70 80 90 100 110 120	

Order — Catalog No. — L
VGPR 16 — 100

Price — Quotation

Days to Ship — Quotation

Alterations — Catalog No. — L(LC) — (DKC)
VGPR 10 — LC55

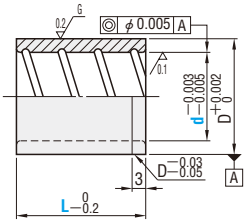
Alteration	Code	Spec.	1Code
	LC	L dimension change 30≦LC＜L 0.5mm increments	Quotation
	DKC	Outer diameter tolerance change D -0.010 -0.012 ⇨ D -0.007 -0.009 The clearance between pin and bushing is 1～3 μm on each side.Note that only **oil-free type bushings can be used.**	

Use oil-free bushings for pins which were modified by alteration DKC. With oil type bushings, scuffing is more likely to occur because it is difficult to form oil films on them.

PRECISION STRIPPER GUIDE BUSHINGS
—OIL TYPE・OIL-FREE TYPE—

■Oil type

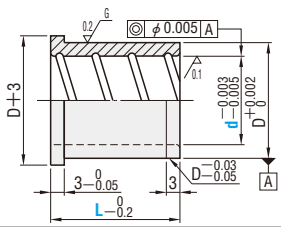
VGBL (Loctite adhesive type)



M SUJ2
H 58HRC～

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
12	VGBL	8	10 13 16 20	
14		10	10 13 16 20 22 25	Quotation
18		13	13 16 20 22 25 30	
22		16	16 20 22 25 30 35	
25		20	20 22 25 30 35	
32		25	20 22 25 30 35	

VGBH (Loctite adhesive type)

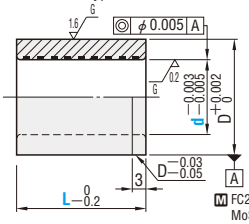


M SUJ2
H 58HRC～

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
12	VGBH	8	10 13 16 20	
14		10	10 13 16 20 22 25	Quotation
18		13	13 16 20 22 25 30	
22		16	16 20 22 25 30 35	
25		20	20 22 25 30 35	
32		25	20 22 25 30 35	

■Oil-free type

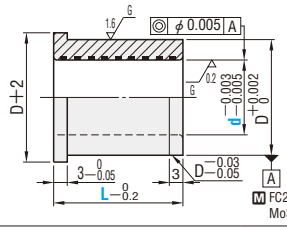
VGBZ (Loctite adhesive type)



M FC250
MoS_2 (embedded)

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
13	VGBZ	8	10 13 16 20	
16		10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	
34		25	20 22 25 30 35	

VGHZ (Loctite adhesive type)

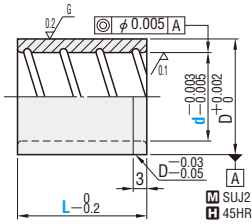


M FC250
MoS_2 (embedded)

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
13	VGHZ	8	10 13 16 20	
16		10	10 13 16 20 22 25	Quotation
20		13	13 16 20 22 25 30	
24		16	16 20 22 25 30 35	
28		20	20 22 25 30 35	
34		25	20 22 25 30 35	

■Copper alloy, oil type

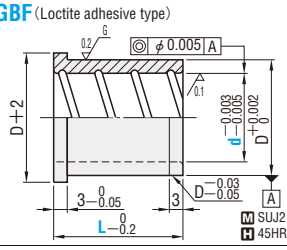
VSGSF (Loctite adhesive type)



M SUJ2+copper alloy
H 45HRC

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
16	VSGSF	10	10 13 16 20	
20		13	13 16 20 25	Quotation
24		16	16 20 25 30	
28		20	20 25 30	

VSGBF (Loctite adhesive type)

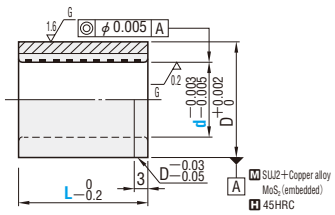


M SUJ2+copper alloy
H 45HRC

D	Catalog No. Type	d	L	Base unit price 1～9 pieces
16	VSGBF	10	10 13 16 20	
20		13	13 16 20 25	Quotation
24		16	16 20 25 30	
28		20	20 25 30	

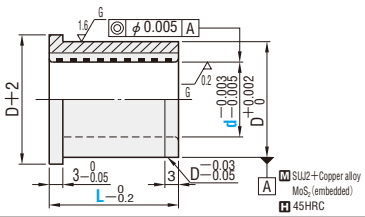
■Copper alloy, oil-free type

VSGCZ (Loctite adhesive type)



D	Catalog No. Type	d	L	Base unit price 1~9 pieces
16	VSGCZ	10	10 13 16 20	Quotation
20		13	13 16 20 25	
24		16	16 20 25 30	
28		20	20 25 30	
34		25	25 30	

VSGFZ (Loctite adhesive type)

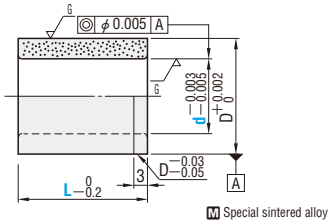


D	Catalog No. Type	d	L	Base unit price 1~9 pieces
16	VSGFZ	10	10 13 16 20	Quotation
20		13	13 16 20 25	
24		16	16 20 25 30	
28		20	20 25 30	
34		25	25 30	

■Sintered alloy (dispersed solid lubricant), oil-free type Guide P.746

RoHS

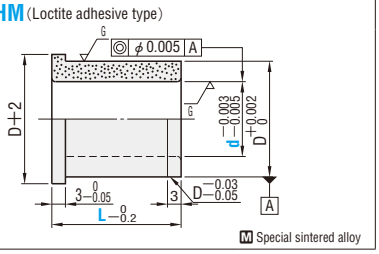
VGBM (Loctite adhesive type)



D	Catalog No. Type	d	L	Base unit price 1~9 pieces
16	VGBM	10	10 13 16 20	Quotation
20		13	13 16 20 25	
24		16	16 20 25 30	
28		20	20 25 30	

RoHS

VGHM (Loctite adhesive type)



D	Catalog No. Type	d	L	Base unit price 1~9 pieces
16	VGHM	10	10 13 16 20	Quotation
20		13	13 16 20 25	
24		16	16 20 25 30	
28		20	20 25 30	

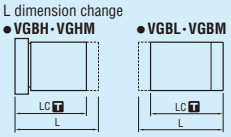
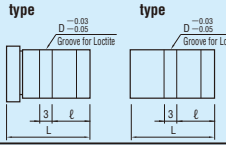
Order — Catalog No. — L — VGBH 10 — 16

Price — Quotation

Days to Ship — Quotation

- Sliding part (inner surface) structure of oil type
  To prevent scuffing, a spiral oil groove is created in the sliding part and which penetrates the surface.
  Pitch=6mm, Width=1.5mm, Depth=0.5mm
- Fixing method Loctite adhesive
  Loctite No.638 P.714
- Pin and bushing clearance (one side) 2.5~4.5 μm
- Use oil-free types (except for sintered alloy types) with a stroke of 1mm or more.

Alterations — Catalog No. — L (LC) — (DRC) — VGBH 10 — LC12.5 — Quotation

Alteration	L dimension change	Addition of grooves for Loctite
Code	LC	DRC
Spec.	L dimension change ● VGBH・VGHM ● VGBL・VGBM  ⊗ Cannot be used for VGHZ・VGBZ・VSG□F・VSG□Z.	d / LC 0.1mm increments (VGBL・VGBH / VGBM・VGHM) / T 8: 8.0~19.9 / — 10: 8.0~24.9 / 8.0~19.9 13: 10.0~29.9 / 10.0~24.9 16: 13.0~34.9 / 13.0~29.9 20: 16.0~34.9 / 16.0~29.9 25: 20.0~34.9 / — T: 0 −0.2	● Headed type ● Straight type  Addition of grooves for Loctite ● Headed: ℓ=L/2−2 ● Straight: ℓ=L/2 ⊗ L=10 cannot be selected for VGBH・VGBL・VGHZ・VGBZ. ⊗ Cannot be combined with LC.
1Code	Quotation	Quotation

■Features of high rigidity stripper guide pins

1. High rigidity and accuracy

Because the guide pin is fixed to the stripper plate which is close to the blade (punch, die), the shaft rigidity is several times higher than with conventional fixing methods. This results in high-accuracy punching and high durability.In addition, the improved reliability of the guide helps prolong the life of the die.

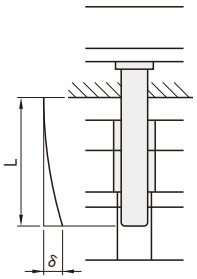
2. High durability

The guide posts are thoroughly hardened in order to improve durability.

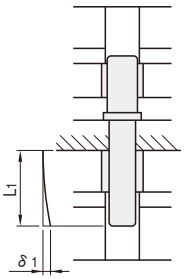
3. Three guide types are available.

Guide type	Features
Roller guide	The roller has a contact area that is several times larger than that of a ball bearing, and has rigidity that is nearly equivalent to a plain guide. This results in rigidity and accuracy that are not possible with ball guides.
Ball guide	The use of a high rigidity ball cage (MBSH / MBJH) achieves rigidity that is nearly equivalent to a plain guide at lower cost. These guides can be used for high speed operations.
Plain guide	A wide variety of plain bushings are available, including SUJ2, copper alloy types, and oil-free types.

〔Figure 1〕Type fixed to punch plate



〔Figure 2〕Type fixed to stripper plate



From the calculation formula used for beams: Deflection $\delta = WL^3 / 3EI$
Because deflection is in proportion to the cube of the pin length, the guide pin type that is fixed to the stripper plate has higher rigidity due to the shorter length.

Mounting method

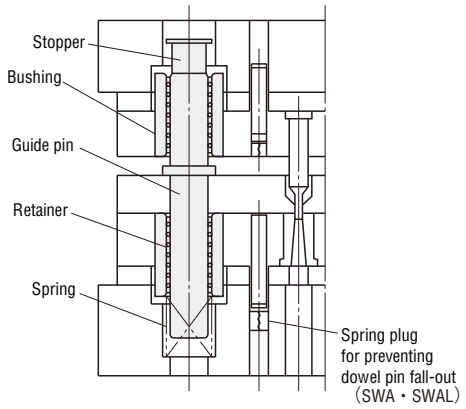
■Creating mounting holes for guide pins and bushings

- Create mounting holes for posts and bushings by boring, jig grinding, or a similar method.
- One method of creating a position reference for plates (punch, die, stripper) is to create a dummy hole and insert a reference pin into the hole.
- With these products, dowel pins are not necessary because the guide pins and bushing can serve as the reference for machining the plates (punch, die, stripper). If a dowel pin is required to make assembly easier, enlarge a hole on one side only by approximately 0.1mm. (If dowel pins and precision holes are used on both sides, then if the positional accuracy of the dowel pins is insufficient, the guide bushing will be subject to a thrust load which has an adverse effect.)

■Mounting guide pins

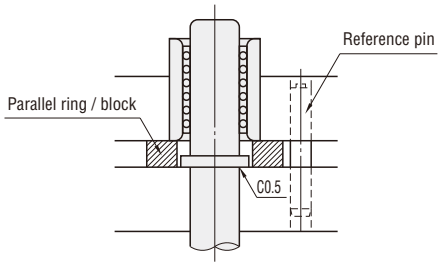
- Mount guide pins either by transition fit or press fit .
- Check the guide pin perpendicularity. (0.01mm/100mm or less)

〔Figure 3〕Example of mounting



■Installing guide bushings

- Align the matchmark or symbol on the bushing with the guide pin and insert the bushing. (In the case of a roller guide)
- Place a parallel ring・block on the stripper plate and mount the die plate (punch plate) onto it. Then slide the guide bushing to check for interference.
- Use solvent to clean any oil or dirt from the contact surface, then apply an anaerobic adhesive agent (Loctite 638 is recommended) into the guide bushing´s adhesive groove, and insert the bushing into the mounting hole.Set the guide bushing so that it does not protrude from the plate and allow the adhesive to harden under those conditions. (3 to 6 hours at normal temperatures)



■Guideline for positioning roller cages and ball cages

(The methods explained here should be considered an approximate guideline. The results will vary due to roller or ball pitch errors and other factors.)

【Die side】 Protruding length from die plate: S1

S1＝(LA−B−2R)／2+h1

S dimension of stopper

S＝RL−S1 (roller)

S＝L−S1 (ball)

【Punch side】 S dimension of stopper

S＝RL+h1−R−{(h+LB)／2} (roller)

S＝L+h1−R−{(h+LB)／2} (ball)

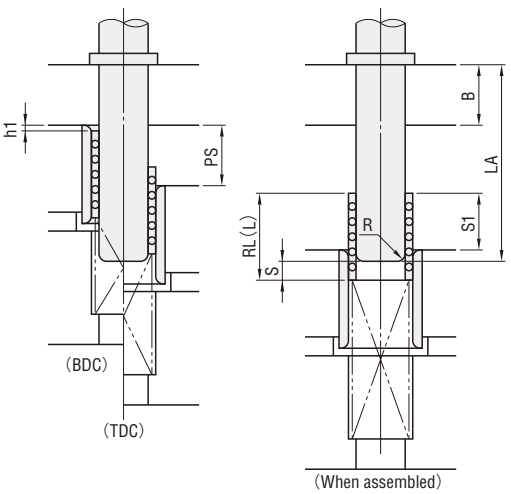
Guideline for selecting spring length FL

FL＝(LB+S−RL−5)×1.1 ～ 1.2 With fixed stopper

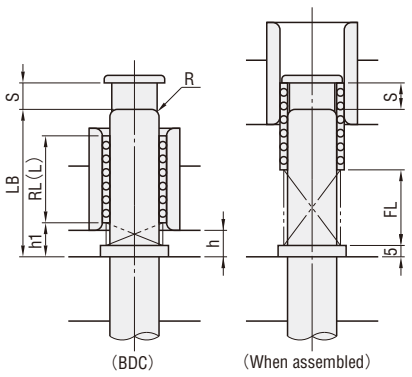
FL＝(LB+S−RL−5) Without fixed stoppers

- Guide pin length: LA, LB
- End face R of guide pin: R
- Cage length: RL (roller)
  L (ball)
- Press stroke: PS

- Stripper plate thickness: B
- Gap between stripper plate and punch plate (bottom dead center): h
- Distances between stripper plate and roller cage or ball cage (bottom dead center): h1
  (Select h1 with consideration for the spring solid height.)



If the cage is positioned at S1 from the die plate when assembled, its bottom dead center position will be h1.



If the cage is positioned at S when assembled, its bottom dead center position will be h1.

【Notes】

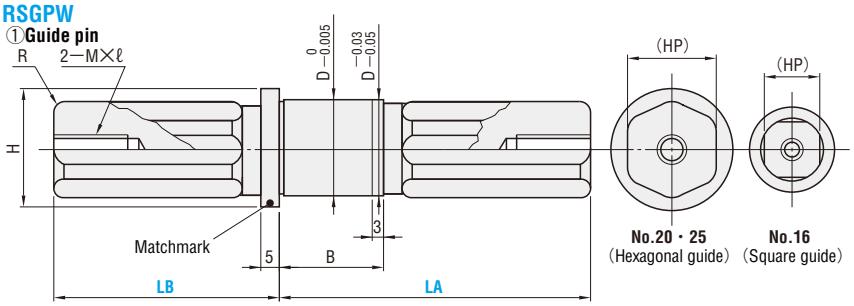
- Select an appropriate guide pin length so that the guide bushing will not separate from the guide pin at top dead center during press processing.
- The stripper plate thickness must be equal to or larger than the guide pin nominal diameter (PD).
- Be sure to periodically apply lubricating oil.
- Assemble the die set in accordance with the accuracy standard shown on P.782

HIGH RIGIDITY ROLLER STRIPPER GUIDE PIN SETS
—TYPE FIXED TO STRIPPER PLATE—

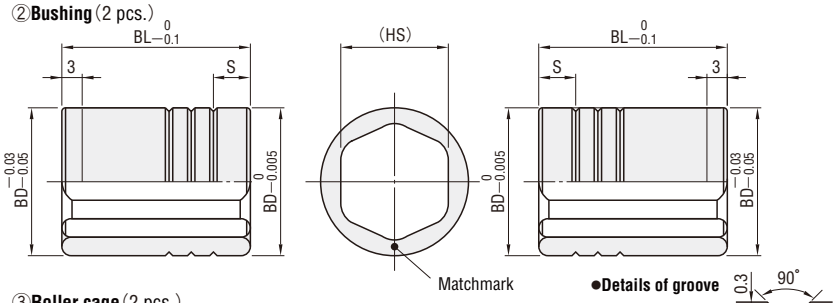
RoHS

RSGPW

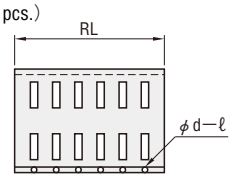
①Guide pin



②Bushing (2 pcs.)



③Roller cage (2 pcs.)



①Guide pin
M SKS3
H 60～62HRC

②Bushings (2 pcs.)
M SKS3
H 60～62HRC

③Roller cages (2 pcs.)
M SUJ2
Polyacetal

①Guide pin						②Bushing					③Roller cage			Catalog No.		LA	LB 10mm increments	Base unit price 1～9 pieces
D	B	R	M×ℓ	H	(HP)	BD	BL	(HS)	S	Number of grooves	RL	d	ℓ	Type	No.			
16.5	16	1.5	M6×15	23	14.6	28	40	18.6	7	3	30	2.0	6.8	RSGPW	16	70	40～60	Quotation
																80	40～70	
																90	50～80	
20.5	20	2	M8×20	27	18.8	34	50	22.8			46				20	80	50～70	
																90	50～80	
																100	60～90	
25.5	25	3		32	23.9	40	60	27.9	8		56		7.8		25	90	60～80	
																100	60～90	
																110	70～90	

Order

Catalog No.	—	LA	—	LB
RSGPW 25	—	100	—	70

Price Quotation

Days to Ship Quotation

【Notes】

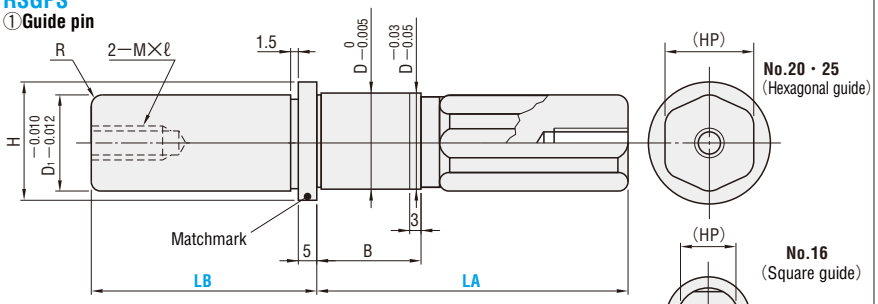
- The roller guide pin D dimension is 0.5mm larger than the nominal diameter (No.)
- When using the set, align the matchmarks and symbols on the guide pin flange and bushing end face. (Concentricity when properly aligned: 3 μm or less)
- Set the bushing so that its matchmark (on end face) is aligned with the guide pin flange.
- Select an appropriate guide pin length so that the guide bushing will not separate from the guide pin at top dead center during press processing.
- Do not modify the roller guide. (Doing so may make it impossible to achieve the designated accuracy and performance.)
- For the features of guide pins that are fixed to the stripper plate and the method of mounting, refer to P.770.

HIGH RIGIDITY ROLLER STRIPPER GUIDE PIN SETS
—TYPE FIXED TO STRIPPER PLATE·SINGLE ROLLER TYPE—

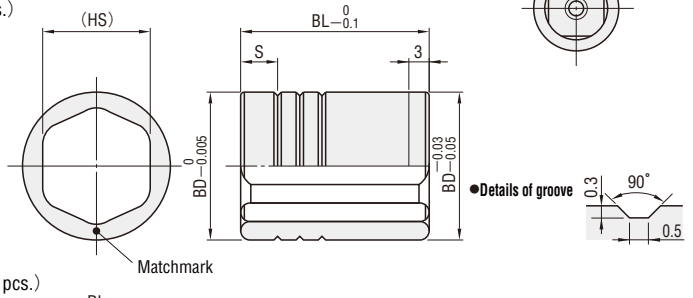
RoHS

RSGPS

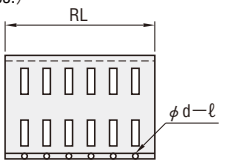
①Guide pin



②Bushing (1 pcs.)



③Roller cage (1 pcs.)



①Guide pin
M SKS3
H 60～62HRC

②Bushings (2 pcs.)
M SKS3
H 60～62HRC

③Roller cages (2 pcs.)
M SUJ2
Polyacetal

①Guide pin							②Bushing					③Roller cage			Catalog No.		LA	LB 10mm increments	Base unit price 1～9 pieces
D	D_1	B	R	M×ℓ	H	(HP)	BD	BL	(HS)	S	Number of grooves	RL	d	ℓ	Type	No.			
16.5	16	16	1.5	M6×15	23	14.5	28	40	18.5	7	3	30	2.0	6.8	RSGPS	16	70	40～60	
																	80	40～70	
																	90	50～80	
20.5	20	20	2	M8×20	27	19	34	50	23			46				20	80	50～70	
																	90	50～80	
																	100	60～90	
25.5	25	25	3		32	24	40	60	28	8		56		7.8		25	90	60～80	
																	100	60～90	
																	110	70～90	

Quotation

Order

Catalog No.	—	LA	—	LB
RSGPS 25	—	100	—	70

Price Quotation

Days to Ship Quotation

■Features

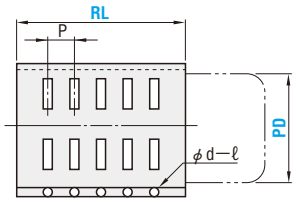
The use of a round shape for the guide on the punch plate side, where the amount of movement is small, reduces the cost by approximately 30% in comparison with RSGPW.

【Notes】

- The roller guide pin D dimension is 0.5mm larger than the nominal diameter (No.)
- When using the set, align the matchmarks and symbols on the guide pin flange and bushing end face. (Concentricity when properly aligned: 3 μm or less)
- Set the bushing so that its matchmark (on end face) is aligned with the guide pin flange.
- Select an appropriate guide pin length so that the guide bushing will not separate from the guide pin at top dead center during press processing.
- Do not modify the roller guide. (Doing so may make it impossible to achieve the designated accuracy and performance.)
- On the LB side, use a high rigidity ball cage (MBJH: P.810), bushing for ball cage (SGBBW: P.809) or precision oil-free bushing (P.819, P.820).
- For the features of guide pins that are fixed to the stripper plate and the method of mounting, refer to P.771.

RoHS

RBJ (Roller cage)



M SUJ2
Polyacetal

d	ℓ	P	Number of rollers	Catalog No. Type	Catalog No. PD	RL	Base unit price 1～9 pieces
2.0	6.8	4.7	24	RBJ (Roller cage)	16	30	
2.0	6.8	4.8	51		20	46	Quotation
2.0	7.8	4.7	63		25	56	

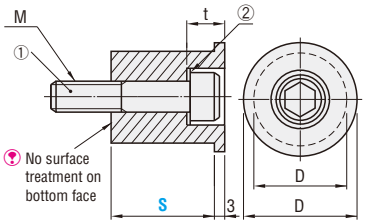
Order: Catalog No. — RL
RBJ 20 — 46

Days to Ship: Quotation

Price: Quotation

RoHS

RSTKH (Roller stopper, fixed type)



M S45C
S Electroless nickel plating
A ①CB ②Spring washer

D	D_1	t	Catalog No. Type	Catalog No. PD	S 1mm increments	Base unit price 1～9 pieces
17	13.5	8.5	RSTKH (Fixed stopper)	16	11～20	
21	18	11		20	11～25	Quotation
26	23	11		25	11～30	

Order: Catalog No. — S
RSTKH 16 — 12

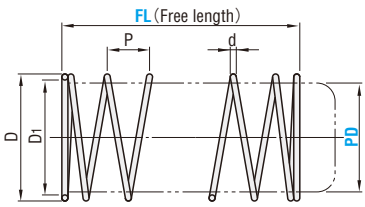
Days to Ship: Quotation

Price: Quotation

PD (No.)	①Provided bolt CB S 11～13	14～18	19～23	24～28	29～30
16	M6×15	M6×20	M6×25	—	—
20	M8×15	M8×20	M8×25	M8×30	—
25	M8×15	M8×20	M8×25	M8×30	M8×35

RoHS

RSWP (Roller spring)



M SWP—B

D	D_1	d	P	Catalog No. Type	Catalog No. PD	FL 5mm increments	Base unit price 1～9 pieces
17.9	16.3	0.8	12	RSWP (Roller spring)	16	30～80	
22.1	20.3	0.9	14		20	35～80	Quotation
27.2	25.4	0.9	15		25	40～80	

Order: Catalog No. — FL
RSWP 20 — 80

Days to Ship: Quotation

Price: Quotation

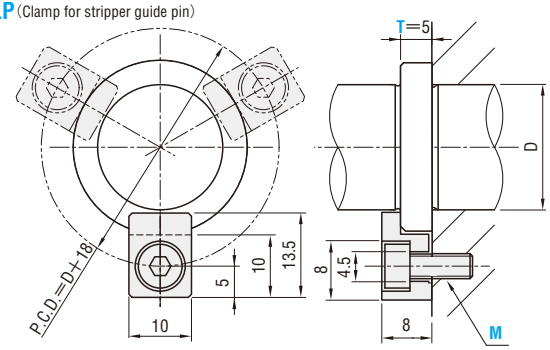
Type	PD	Spring solid height (mm) / Spring constant (g / mm) FL (Free length) 30	35	40	45	50	55	60	65	70	75	80
RSWP	16	3.7	4.1	4.4	4.6	5.0	5.3	5.7	5.9	6.2	6.6	6.9
		32	26	23	22	20	19	16	15	14	13	12
	20	—	4.1	4.4	4.7	5.0	5.3	5.7	5.9	6.3	6.7	6.9
			28	24	22	19	18	16	15	14	13	12
	25	—	—	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6
				13	12	10	9	9	8	8	7	7

Upper: Solid height
Lower: Spring constant

CLAMPS FOR STRIPPER GUIDE PINS

RoHS

FCLP (Clamp for stripper guide pin)



M S45C
S Black oxide (Fe_3O_4)
A CB4—10

Catalog No.		M	Base unit price (1 piece)
Type	T		1～9 pieces
FCLP	5	4	Quotation

FCLP can be used as a clamp for SGPWH・RSGPW・RSGPS.
Use 3 pieces for D20 or less, or 4 pieces for D25 or more.

Order

Catalog No.	—	M
FCLP 5	—	4

Days to Ship: Quotation

Price: Quotation