

HPM1 equivalent
SKD61
DC53

SPRUE BUSHINGS

—NORMAL BOLT TYPE • FLANGE THICKNESS 10mm—

Ⓢ Non JIS material definition is listed on P.1351 - 1352

Sprue Bushings
Locating Rings

Ⓢ Electroforming P.773

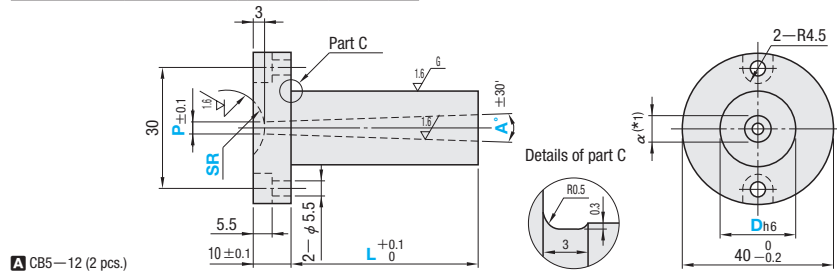
Ⓢ Details of string eliminator P.747

—Straight type—



RoHS

Part Number		M	G
Normal	String eliminator type		
SBBP	SBBPH	HPM1 equivalent	37~43HRC
SBBK	SBBKH	SKD61	48~52HRC
SBBS	SBBSH	DC53	58~62HRC



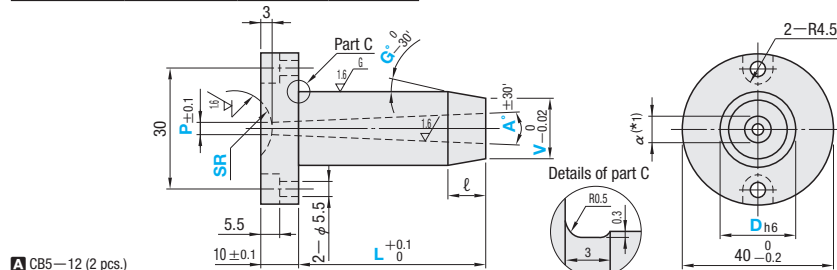
A CB5—12 (2 pcs.)

—Tapered type—



RoHS

Part Number		M	G
Normal	String eliminator type		
SBGP	SBGPH	HPM1 equivalent	37~43HRC
SBGK	SBGKH	SKD61	48~52HRC
SBGS	SBGSH	DC53	58~62HRC



A CB5—12 (2 pcs.)

Dh6	Part Number		D	L ^{(*)2} 0.1mm increments	SR	P	A° 0.5° increments	V 0.1mm increments	G° 1° increments
	Type	Type							
8	0 -0.009	—Straight type—		8	0 10.5 11	2 2.5 3 3.5	0.5~3 ^{(*)3}	Available for tapered type only	1~10
		Normal	String eliminator type						
		(HPM1 equivalent)	SBBP SBBPH						
10	0	Normal	String eliminator type	10	0	2 ^{(*)3,4} 2.5 ^{(*)3} 3 ^{(*)3} 3.5	0.5~4 ^{(*)3}	Available for tapered type only	1~10
		(SKD61)	SBBK SBBKH						
		(DC53)	SBBS SBBSH						
12	0	—Tapered type—		12	10.5 11	4.5 5	0.5~4 ^{(*)3}	Available for tapered type only	1~10
		Normal	String eliminator type						
		(HPM1 equivalent)	SBGP SBGPH						
13	-0.011	Normal	String eliminator type	13	12	5.5 6	0.5~4 ^{(*)3}	Available for tapered type only	1~10
		(SKD61)	SBBK SBBKH						
		(DC53)	SBBS SBBSH						
16	0	Normal	String eliminator type	16	13	6.5 7	0.5~4 ^{(*)3}	Available for tapered type only	1~10
		(HPM1 equivalent)	SBGP SBGPH						
		(SKD61)	SBBK SBBKH						
20	-0.013	Normal	String eliminator type	20	20 ^{(*)4}	8	0.5~4 ^{(*)3}	Available for tapered type only	1~10
		(DC53)	SBBS SBBSH						
		(DC53)	SBGS SBGSH						

(*)1 The value of α is set in accordance with L dimension.
 (*)2 L dimension is restricted by P, V and A.
 Similarly, G is restricted by L dimension.
 (*)3 L dimension limits
 P A 0.5 1 1.5~4.0 0.5 1 1.5~4.0 0.5 1 1.5 0.5 1~1.5
 L dimension limits 30 50 85 45 50 85 60 85 60 150
 (*)4 Not available for products with string eliminator.
 (*)5 Available only for SBBP and SBBK
 (*)6 D20 cannot be designated for SBBS • SBBSH • SBGS • SBGSH
 (*)7 L dimension is up to 100 for SBBS • SBBSH • SBGS • SBGSH
 Similar specifications : P3.5, SR11, L dimension selection type P.749

Ⓢ Working Limits Conversion Chart of Trigonometric Functions P.1337

• Straight type
 $D - \alpha \geq 2$ (Calculation of α value) $\alpha = P + 2(L + (U) + 7) \tan \frac{A}{2}$
 U : with ZC alteration

• Tapered type
 $V - \alpha \geq 2$
 $L - \ell \geq 3$ (Calculation of ℓ value) $\ell = \frac{D - V}{2 \tan(G - 0.25)}$
 ※ 0.25 is a value that takes G tolerance into account



Price

Quotation



Alterations

Part Number — L — SR — P — A — V — G — (AIW • AXW...etc.)
 SBGPH20 — 83.25 — SR16 — P2.5 — A2 — V18.0 — G8 — BXR3 — LKC

Quotation

Alterations	Code	AIW	AHW	AXW	ATW	AJW	ALW	APW	Spec.																					
Shape A (Trapezoid)	Spec.								[Designation method] AIW10—GC10 + Bolt hole position • Dowel hole position (When NC, KC code is used) • KC position (When KC code is used)																					
	1Code	Quotation							• W dimension and GC° selection <table border="1"> <tr><td>W</td><td>T</td><td>GC°</td></tr> <tr><td>3</td><td>2.5</td><td></td></tr> <tr><td>4</td><td>3</td><td>7°</td></tr> <tr><td>5</td><td>3.5</td><td></td></tr> <tr><td>6</td><td>4</td><td></td></tr> <tr><td>8</td><td>5.5</td><td>10°</td></tr> <tr><td>10</td><td>7</td><td></td></tr> </table>	W	T	GC°	3	2.5		4	3	7°	5	3.5		6	4		8	5.5	10°	10	7	
W	T	GC°																												
3	2.5																													
4	3	7°																												
5	3.5																													
6	4																													
8	5.5	10°																												
10	7																													

Alterations	Code	BIR	BHR	BXR	BTR	BJR	BLR	BPR	Spec.														
Shape B (Semicircle)	Spec.								[Designation method] BXR2 + Bolt hole position • Dowel hole position (When NC, KP code is used) • KC position (When KC code is used)														
	1Code	Quotation							• R dimension selection <table border="1"> <tr><td>R</td><td></td></tr> <tr><td>1</td><td>1.25</td></tr> <tr><td>1.5</td><td>1.75</td></tr> <tr><td>2</td><td>2.25</td></tr> <tr><td>2.5</td><td>3</td></tr> <tr><td>3</td><td>3.5</td></tr> <tr><td>4</td><td></td></tr> </table>	R		1	1.25	1.5	1.75	2	2.25	2.5	3	3	3.5	4	
R																							
1	1.25																						
1.5	1.75																						
2	2.25																						
2.5	3																						
3	3.5																						
4																							

Alterations	Code	CIQ	CHQ	CXQ	CTQ	CJQ	CLQ	CPQ	Spec.												
Shape C (Arc+Tangent)	Spec.								[Designation method] CTQ5 + Bolt hole position • Dowel hole position (When NC, KP code is used) • KC position (When KC code is used)												
	1Code	Quotation							• Q dimension selection <table border="1"> <tr><td>Q</td><td></td></tr> <tr><td>2</td><td>2.5</td></tr> <tr><td>3</td><td>3.5</td></tr> <tr><td>4</td><td>5</td></tr> <tr><td>5</td><td>6</td></tr> <tr><td>6</td><td>8</td></tr> </table>	Q		2	2.5	3	3.5	4	5	5	6	6	8
Q																					
2	2.5																				
3	3.5																				
4	5																				
5	6																				
6	8																				

Alterations	Code	Spec.	1Code
	BC	Increases No. of bolt holes. No. of bolt holes : 2 → 4 (Supplied bolts : 4) Ⓢ Combination with NC not available.	
	BN	Decreases No. of bolt holes. No. of bolt holes : 2 → 0 (Supplied bolts : 0) Ⓢ Available for equivalent of material HPM1	
	NC	Dowel hole boring Ⓢ Not available for string eliminator type	Quotation
	KP	Dowel hole boring (longitudinal) Ⓢ Not available for string eliminator type Ⓢ Combination with NC not available. Ⓢ Available for equivalent of HPM1 only	Quotation
	LKC	L dimension tolerance alteration $L +0.1 \dots L -0.02$ Ⓢ L dimension can be designated at 0.01mm increments when LKC is used. Ⓢ Combination with ZC not available.	
	GKC	Changes the G tolerance. $G -0.30 \dots G -0.15$ Ⓢ Available for tapered type when $\ell \leq 15$ and $(L - \ell) \geq 10$ Ⓢ Combination with ZC not available.	

Alterations	Code	Spec.	1Code
	KC	Single flange cutting KC=0.5mm increments $D/2 \leq KC < 20$ Ⓢ Combination with BC not available Ⓢ Not available for string eliminator type Ⓢ Combination with NC • KP not available Ⓢ Interference with the SR part may occur.	
	WKC	Two parallel flange cutting WKC=0.5mm increments $D/2 \leq WKC < 20$ Ⓢ Combination with BC not available Ⓢ Not available for string eliminator type Ⓢ Combination with NC • KP not available Ⓢ Interference with the SR part may occur.	
	ZC	Undercut machining S, T, U=0.1mm increments Ⓢ $S \geq \alpha + 2$ Ⓢ $\alpha + 2 \leq T \leq D(V - 2U \tan G)$ Ⓢ $1.5 \leq U \leq 5$ Ⓢ Specification L max. $\geq L + U$ Ⓢ [Designation method] Ⓢ Not available for D8 ZC—S3.5—T4.0—U2.0	Quotation
	RC	The step R is processed in the tip bore to prevent the connection between the sprue and the runner from breaking when releasing from the mold. Dimension selection of step R 1 2 Ⓢ Available for $\alpha \geq 5$ Ⓢ Straight type $D - \alpha - (2 \times RC) > 2$ Ⓢ Tapered type $V - \alpha - (2 \times RC) > 2$ Ⓢ Combination with shapes A, B and C not available. Ⓢ Combination with ZC not available.	

Order Part Number — L — SR — P — A — V — G
 SBBP20 — 85.0 — SR16 — P2.5 — A2
 SBGK20 — 35.5 — SR11 — P3 — A2 — V18.0 — G6

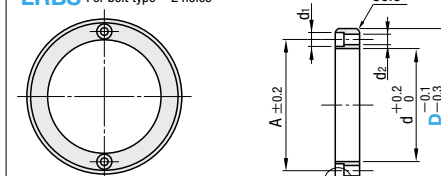
Days to Ship Quotation

LOCATING RINGS

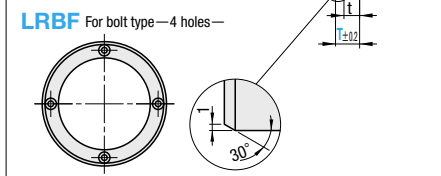
☎ Non JIS material definition is listed on P.1351 - 1352

☎ Combination examples of locating rings **P.735**

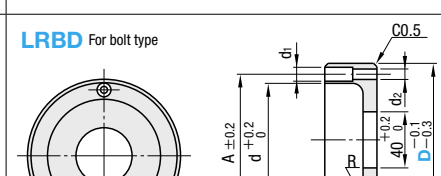
RoHS **LRBS** For bolt type—2 holes—



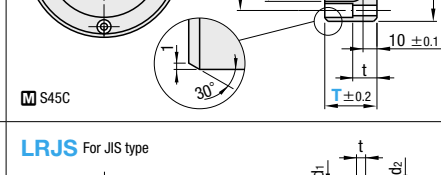
RoHS **LRBF** For bolt type—4 holes—



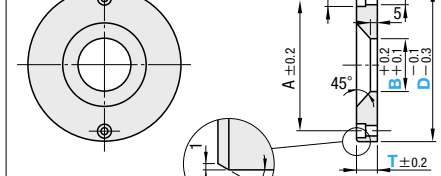
RoHS **LRBD** For bolt type



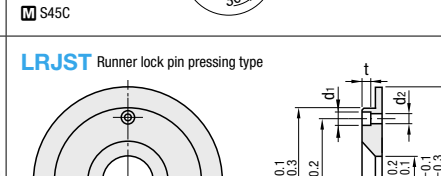
RoHS **LRJS** For JIS type



RoHS **LRJST** Runner lock pin pressing type



RoHS **LRK** Large diameter type



Applicable bolts	Bolt hole		t	d	A	Part Number		U/Price
	d ₂	d ₁				Type	D	
M5	5.5	9	5	40	50	LRBS —2 holes—	60	10
								15
								20
M6	6.5	11	3	70	85	LRBS —2 holes—	100	15
								20
								25
			8	80	95	LRBF —4 holes—	110	10
								15
								20
8	90	105	LRBF —4 holes—	120	15			
					20			
					25			
M8	9	14	6	110	130	LRBF —4 holes—	150	15
								20

☎ Which marked with * is available for LRBS only.

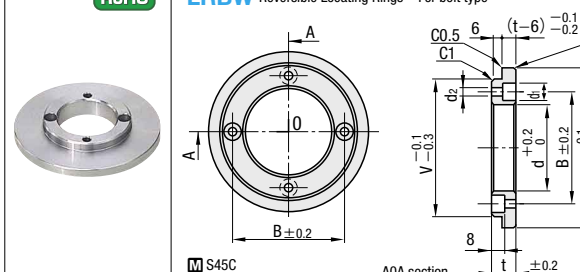
Applicable bolts	Bolt hole		t	R	d	A	Part Number		U/Price
	d ₂	d ₁					Type	D	
M6	6.5	11	9	5	70	85	LRBD	100	15
									20
									40
			10	80	95	LRBD	120	15	
								20	
								45	

Applicable bolts	Bolt hole		t	A	Part Number			U/Price									
	d ₂	d ₁			Type	D	T		B								
M6	6.5	11	6.5	85	LRJS	100	15	35	40	50							
							20	35	40	50							
							25	35	40	50							
							M8	9	14	8.6	100	LRJS	150	15	40	50	
														20	35	40	50

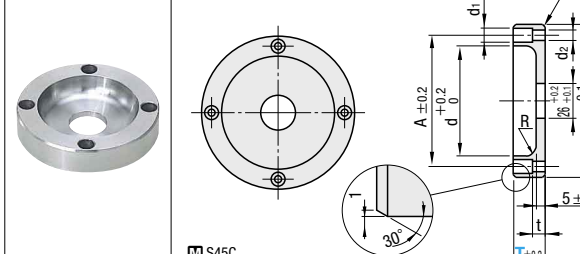
Applicable bolts	Bolt hole		t	A	Part Number		U/Price
	d ₂	d ₁			Type	D	
M6	6.5	11	6.5	85	LRJST	100	15
							20

Applicable bolts	Bolt hole		D ₁	d	A	Part Number		U/Price
	d ₂	d ₁				Type	D	
M6	6.5	11	130	85	115	LRK	100	10
								150

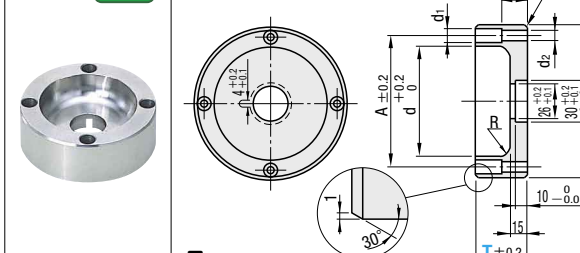
RoHS **LRBW** Reversible Locating Rings—For bolt type—



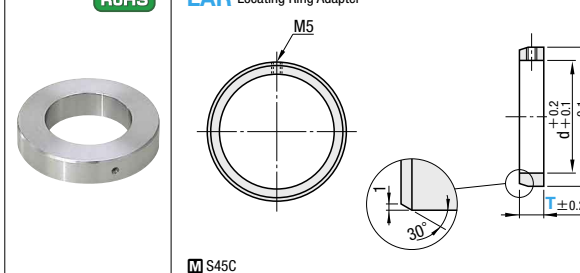
RoHS **LRSS** For shoulder type



RoHS **LRSD** For shoulder type



RoHS **LAR** Locating Ring Adapter



Applicable bolts	Bolt hole		d	B	V	D	t	Part Number		U/Price
	d ₂	d ₁						Type	No.	
M5	5.5	9	40	50	60	100	14	LRBW	100	10
										16
										100-16
M6	6.5	11	70	85	100	120	14	LRBW	120	14
										16
										120-16
										16
										130
										130-16

Applicable bolts	Bolt hole		t	R	d	A	Part Number		U/Price									
	d ₂	d ₁					Type	D		T								
M5	5.5	9	4.5	5	40	50	LRSS	60	10									
									15									
									20									
									25									
									M6	6.5	11	3.5	10	70	85	LRSS	100	10
																		15
20																		
25																		
30																		
35																		
M6	6.5	11	8	5	80	95	LRSS	110	15									
									20									
									25									
									M8	9	14	6	5	90	105	LRSS	120	15
																		20
																		25
15																		
20																		
25																		

Applicable bolts	Bolt hole		t	R	d	A	Part Number		U/Price									
	d ₂	d ₁					Type	D		T								
M6	6.5	11	20	10	70	85	LRSD	100	35									
									40									
									45									
									M6	6.5	11	20	10	90	105	LRSD	120	35
																		40
																		45

d	Part Number		U/Price
	Type	D	
60	LAR	100	10
			15
			20
100	LAR	120	10
			15
			20

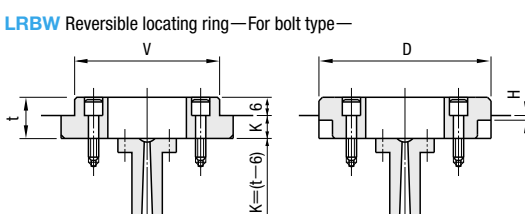
☎ Order **Part Number** — **T** — **B**
LRBS 120 — 15
LRBW100
LRJS 100 — 15 — 35

☎ Days to Ship **Quotation**

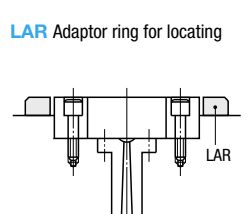
☎ Price **Quotation**

ex Example

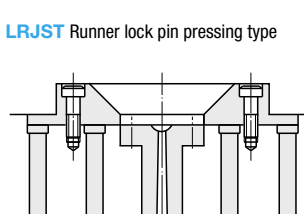
LRBW Reversible locating ring—For bolt type—



LAR Adaptor ring for locating



LRJST Runner lock pin pressing type



- It can be installed from both sides.
- Outer diameter of locating ring can be selected to suit a molding machine.
 When No.=100・120・130; K=8, H=2
 When No.=100-16・120-16・130-16; K=10, H=4
- Making the locating ring diameter wider by one size without locating ring replacement is possible by installing LAR on the outer side of locating ring.
- A wide range of runner lock pins can be pressed by the head of locating ring.

ADJUSTABLE PINS FOR RUNNER FLOW

Ⓜ Non JIS material definition is listed on P.1351 - 1352

RoHS

Type (Select the runner groove shape from the drawings below)

RFAN (L dimension selection type)
RFAL (L dimension designation type)

Stopper

Ⓜ The surface roughness of hexagon socket. (\sqrt{Ra})

※ ℓ = L dimension selection type
F = L dimension designation type

Pin **M** SKD61
H 48~52HRC

Stopper **M** SKD61 equivalent
A M5 Left-hand screw
special screw plug

Shape 1 Top shape

N (No groove) **I** **Y**

Shape 2 Side shape

Shape A (Trapezoid)

● **A dimension selection**

Applicable D dimension	A	t	GC°
10 · 13 · 16	3	2.5	7
13 · 16	4	3	10
16	5	3.5	
	6	4	

Available to select the trapezoidal taper angle (GC°). For details, refer to the Alterations column at lower right.
Ⓜ Without GC, taper angle is 10°.
Ⓧ Not available for D8
Ⓧ When Shape 1 is Y, A5 and A6 are impossible to process for the hexagonal wrench fitness get worse.

Shape B (Semicircle)

● **B dimension selection**

Applicable D dimension	B
8 · 10 · 13 · 16	1
	1.25
	1.75
10 · 13 · 16	2
	2.25
13 · 16	3
	3.5
16	4

Ⓧ When Shape 1 is Y, B3~B4 are impossible to process for the hexagonal wrench fitness get worse.

Shape C (Arc + Tangent)

● **C dimension selection**

Applicable D dimension	C
8 · 10 · 13 · 16	2
10 · 13 · 16	2.5
13 · 16	3
	3.5
16	4

Ⓧ When Shape 1 is Y, C3.5 and C4 are impossible to process for the hexagonal wrench fitness get worse.

L dimension selection · L dimension designation type

Stopper				H	E	S	Part Number		Shape1	Shape2			L	ℓ or F		P
W	Ls	L1	L2				Type	D		A	B	C		RFAN ℓ	RFAL F (1mm increments)	
13	22	15.5	11	12.5	3	4	RFAN (L dimension selection)	8	N	—	1 1.5	1.25	2	RFAN L dimension selection type 20 25 30 35 40 50	12	3
15	24	16.5	12	14.5		5				RFAL L dimension designation type 0.1mm increments 15.0~50.0	10	I	3	1 1.5	1.25 1.75	
18	27.5	18.5	14	17.5	4	6	RFAN (L dimension selection)	13	I	3	1 1.5	1.25 1.75	2 2.5	RFAN L dimension selection type 20 25 30 35 40 50 60	14	5
														RFAL L dimension designation type 0.1mm increments 20.0~60.0		
21	30	19.5	15	20.5	5	10	RFAL (L dimension designation)	16	*Y	3	1 1.5	1.25 1.75	2 2.5	RFAN L dimension selection type 30 35 40 50 60	18	6
										4	2 2.5	2.25 3	3	RFAL L dimension designation type 0.1mm increments 20.0~60.0		
										*5	*3.5	*3	*3.5			
										*6	*4	*4	*4			

Ⓧ When Shape 1 is Y, A5 6 · B3 4 · C3.5 are impossible to process.
Ⓧ When Shape 1 is N, no need to designate Shape 2.

Order **Part Number** — **Shape1** — **Shape2** — **L** — **F** — **P**

RFAN13 — I — C2.5 — 30 — P5
RFAL13 — I — C2.5 — 31.2 — F20 — P6

Days to Ship **Quotation**

Price **Quotation**

Alterations **Part Number** — **Shape1** — **Shape2** — **L(LC)** — **F** — **P** — (LKC · GC · EQ · SL · EC)

RFAN13 — I — C2.5 — LC28.01 — P5 — LKC
RFAL13 — I — A4 — 31.2 — F20 — P6 — GC7

Alterations	Code	Spec.	1Code
	LC	Full length alteration 0.1mm increments 20 < LC < Lmax. Ⓜ Available for L dimension selection type. When combined with LKC, LC=0.01mm increments possible. Ⓜ ℓ becomes shorter by (L-LC). ℓ ≥ N+1	Quotation
	LKC	Changes L dimension tolerance $L_{+0.2}^{+0.1} \rightarrow L_{-0.02}^0$ Ⓜ When L dimension designation, L dimension designation in 0.01mm increments possible.	
	GC	Shape2 A shape taper angle (GC°) change GC° selection 10° 7° Designation method 10° → GC10 7° → GC7 Ⓧ Not available for D8	
	SL	Processing on the sprue lock Designation method SL—G1 G=1° increments 0 ≤ G ≤ 5	Quotation
	EC	Changes the groove depth E dimension of hexagonal wrench.	

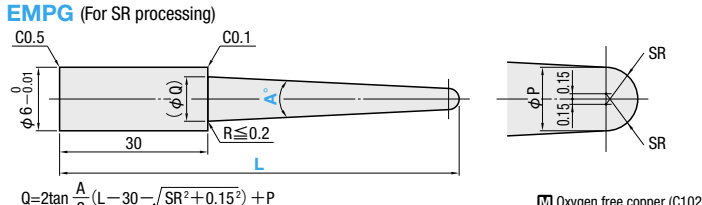
ELECTRODES FOR PIN-POINT GATE

ELECTRODES FOR OBLIQUE GATE

Ⓜ Non JIS material definition is listed on P.1351 - 1352

—ELECTRODES FOR PIN-POINT GATE— **RoHS**

EMPG (For SR processing)



Ⓜ Oxygen free copper (C1020)

*P	SR	Part Number Type	No.	L	A°	U/Price 1~9
						L50~90 L110
0.50	0.40	EMPG	0.8	50 70	1 2 3	Quotation
0.70	0.50		1			
0.90	0.60		1.2	50 70 90	1 2 3	
1.20	0.75		1.5	50 70 90	1 2 3	
1.70	1.00		2		110 1 2 3	
2.20	1.25		2.5	50 70 90	1 2 3	
2.70	1.50		3		110 1 2	
3.20	1.75		3.5	50 70	1 2 3	
3.70	2.00		4		110 1	

Order Part Number — L — A
EMPG3 — 70 — A2

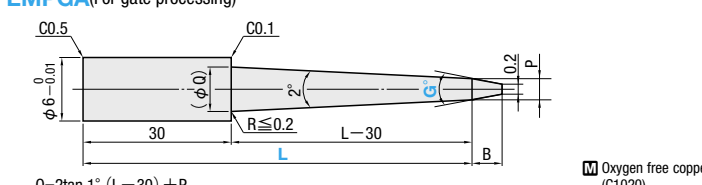
Days to Ship **Quotation**

Price **Quotation**

*This electrode is designed for a 0.15mm discharge gap on each side.
Ⓜ Because a center point of SR shifts 0.15mm from the center in one side, P dimension is 0.3mm less than nominal diameter (No.)=(2×SR)

—ELECTRODES FOR PIN-POINT GATE— **RoHS**

EMPGA(For gate processing)



Ⓜ Oxygen free copper (C1020)

*P	Part Number Type	No.	L	G°	U/Price 1~9
					L50~90 L110
0.50	EMPGA	0.8	50 70	20	Quotation
0.70		1			
0.90		1.2	50 70 90	30	
1.20		1.5		40	
1.70		2	50 70 90 110	50	
2.20		2.5		60	
2.70		3			
3.20		3.5	50 70 90		
3.70		4			

B dimension choices

No.	G20	G30	G40	G50	G60
0.8	0.85	0.56	0.41	0.32	0.26
1	1.42	0.93	0.69	0.54	0.43
1.2	1.99	1.31	0.96	0.75	0.61
1.5	2.84	1.87	1.37	1.07	0.87
2	4.25	2.80	2.06	1.61	1.30
2.5	5.67	3.73	2.75	2.14	1.73
3	7.09	4.67	3.43	2.68	2.17
3.5	8.51	5.60	4.12	3.22	2.60
4	9.92	6.53	4.81	3.75	3.03

Order Part Number — L — G
EMPGA3 — 70 — G40

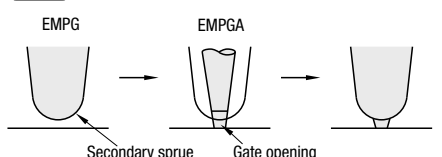
Days to Ship **Quotation**

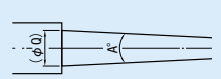
Price **Quotation**

Alterations Part Number — L — G — (A)
EMPGA3 — 70 — G40 — A1

Ⓜ The electrode's tip may be bent if it is dropped or its tip directly touches other objects. If so, make sure to perform dressing before using it for rotating discharge process.

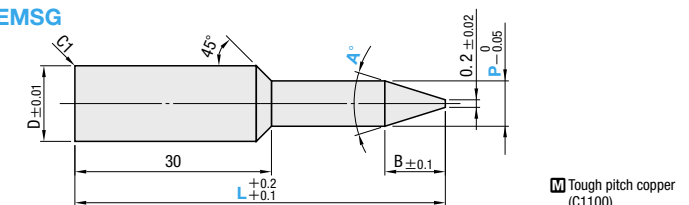
EX Example



Alterations	Code	Spec.	¥/1Code
	A	Select the taper angle A°, only available for EMPGA. 1° 3° Designation method 1°→A1, 3°→A3 Ⓜ A3 is not available when L110 for No2.5・3 and L90 for No3.5・4 are chosen.	0

—ELECTRODES FOR OBLIQUE GATE— **RoHS**

EMSG



Ⓜ Tough pitch copper (C1100)

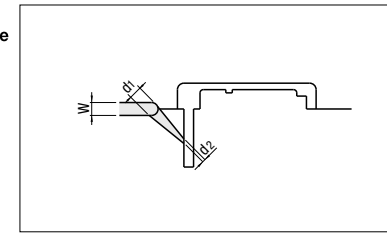
P	B				D	Part Number Type	P	L	A°	U/Price 1~9
	10°	15°	20°	30°						
1.5	—	—	3.7	—	6	EMSG	1.5	60	20	Quotation
2	10.3	6.8	5.1	3.4			2	60 70	10 15 20 30	
2.5	13.1	8.7	6.5	4.3			2.5	60 70	10 15 20 30	
3	16.0	10.6	7.9	5.2			3	60 70 90	10 15 20 30	
4	21.7	14.4	10.8	7.1			4	60 70 90	10 15 20 30	
5	—	—	13.6	9.0			5	60 70 90	20 30	
6	—	—	16.4	10.8			6	60 70 90	20 30	
8	—	—	—	14.6			8	70	30	

Order Part Number — L — A
EMSG2 — 60 — 30

Days to Ship **Quotation**

Price **Quotation**

EX Example



Ⓜ Note that when ordering EMSG, there is no need to enter the letter A of the alphabet.

- Oblique gates require angular hole processing that are often difficult by drilling. Electro discharging is suitable for preparing an angular hole in places where the drill tip would not be well aligned or broken.
- The di dimension is dependent on the runner diameter (W). Select the appropriate P dimension in accordance with di.

Ⓜ The electrode's tip may be bent if it is dropped or its tip directly touches other objects. If so, make sure to perform dressing before using it for rotating discharge process.

Components of Runner Electrodes


UNDERSIZED TAPPING ELECTRODES

ELECTRODES FOR ENGRAVING

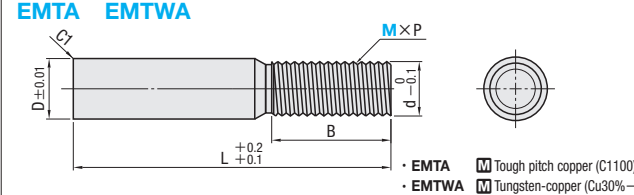
—Round type—

ⓘ Non JIS material definition is listed on P.1351 - 1352

—UNDERSIZED TAPPING ELECTRODES— **RoHS**

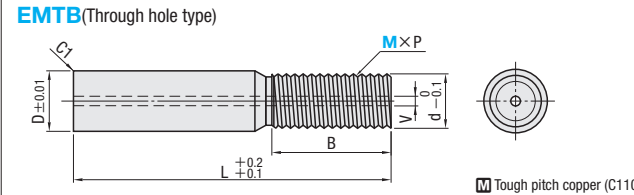


EMTA EMTWA



• EMTA Tough pitch copper (C1100)
• EMTWA Tungsten-copper (Cu30%—W)

EMTB(Through hole type)




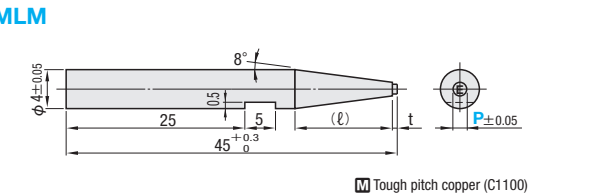
Tough pitch copper (C1100)

[EMTWA] Even a work made of carbide can be processed since it contains tungsten.
(An electric discharging machine capable of using a copper tungsten electrode is required.)

[EMTB] Has a through hole for water circulation that enables higher processing speed and helps reduce secondary electric discharge.

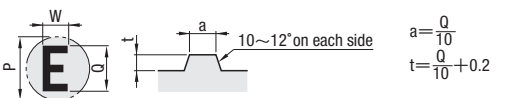
—ROUND TYPE— **RoHS**

EMLM

Tough pitch copper (C1100)

■ Character size



$a = \frac{Q}{10}$
 $t = \frac{Q}{10} + 0.2$

D	d	P	L	B	V (EMTB only)	Part Number		U/Price 1~4		
						Type	M	EMTA	EMTB	EMTWA
5	2.2	0.5	50	15	0.5	EMTA	3			
	3.0	0.7			4					
	3.9	0.8			5					
8	4.7	1.0	60	20	1.2	EMTB (Through hole type)	6			
	6.4	1.25			8					
12	8.2	1.5	70	30	2.5	EMTWA (M3~12)	10			
	10.0	1.75			12					
16	13.6	2.0	80	40	3					
20	17.1	2.5			3					

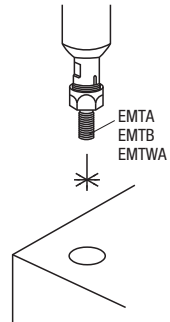
Quotation

Order **Part Number**
EMTA4

Price **Quotation**

Days to Ship **Quotation**

Example ■ Undersized Tapping Electrodes
This electrode is used when forming a female thread in hardened steel by electrical discharge machining.



ⓘ Tip diameter (d) is smaller than the screw size (M).
Insert an undersized tapping electrode in the low screw hole (low hole diameter reference value P.1347), and perform electrical discharge machining while rocking X and Y directions.

- Swing amount = $M - d - 0.1$ (Target)
- Clearance for electro discharge = on one side 0.1~0.5

What is copper tungsten?

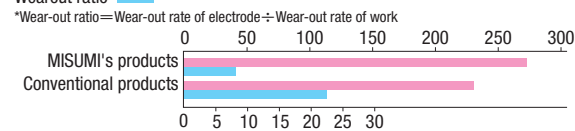
- Characteristics
- The composition and alloy structure are optimally adjusted to extend life of an electrode and to raise efficiency of electrical discharge machining at the same time.
 - It is possible to increase the machining speed, and reduce the wear of the electrode itself. Tungsten is very hard, permitting accurate electrical discharge machining.

■ Characteristic values

Material characteristics	Copper tungsten
Gravity	14.0
Hardness (HRB)	93.5
Conductivity (IACS%)	50
Tensile strength (kgf/mm ²)	60
Transverse rupture strength (kgf/mm ²)	125

■ Comparison of machining data

Work: Carbide V3
Machining condition: 14~16μm settings
Machining speed (g/min.)
Wearout ratio



ℓ	Q			W			Part Number		Characters for engraving (Round Gothic type)	U/Price 1~9
	Numerals alphabetical characters	<	+	Numerals alphabetical characters	<	+	Type	P		
11.4	0.4	0.36	0.23	0.23	0.185	0.23	EMLM	*0.8A	1234567890 ABCDEFGHI JKLMNOPQR STUVWXYZ Note1 / > < + - Note2	Quotation
11.4	0.6	0.53	0.35	0.3	0.27	0.35		0.8		
10.7	0.7	0.62	0.41	0.4	0.31	0.41		1.0		
10	1.0	0.88	0.58	0.6	0.44	0.58		1.2		
8.9	1.2	1.06	0.7	0.7	0.53	0.70		1.5		
7.1	1.6	1.42	0.93	1.1	0.71	0.93		2.0		
5.3	2.0	1.77	1.16	1.4	0.89	1.16		2.5		
3.6	2.5	2.22	1.46	1.7	1.11	1.46		3.0		
—	3.5	3.11	2.04	2.4	1.57	2.04		4.0		

ⓘ Concentricity between the engraving character and the shank is about 0.1.
ⓘ Note 1 : Use ¥ for designating / (slash) ; Note2 : Use # for — (minus).

*When 0.8A (P=0.8), only character size becomes small.

Order **Part Number** — **Characters for engraving**
EMLM0.8A — A
EMLM2.0 — ¥ (The actual engraved character is /.)


Price **Quotation**

Days to Ship **Quotation**

PIN GATE EXTENSION BUSHINGS

Non JIS material definition is listed on P.1351 - 1352

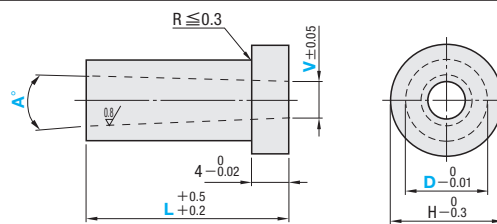
RoHS



Head type

Part Number	M	H
PGEH	SKH51	58~60HRC
PGEN	NAK80	37~43HRC

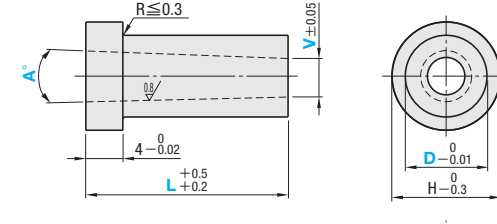
⊕ Eccentricity between D and V is 0.05 or less.



Head type · Reverse tapered type

Part Number	M	H
PGEHR	SKH51	58~60HRC
PGENR	NAK80	37~43HRC

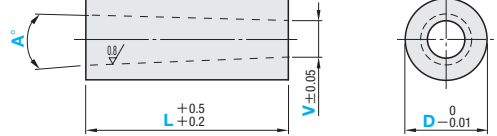
⊕ Eccentricity between D and V is 0.05 or less.



Headless type

Part Number	M	H
PGEHS	SKH51	58~60HRC
PGENS	NAK80	37~43HRC

⊕ Eccentricity between D and V is 0.05 or less.



H	Part Number	D	L	V	A°	U/Price
Type		0.1mm increments			Angled	1~4 pcs.
9	Head type PGEH (SKH51) PGEN (NAK80)	6	10.0~30.0 30.1~40.0	1.5 2.0 2.5	1 2	Quotation
11	Head type · Reverse tapered type PGEHR (SKH51) PGENR (NAK80)	8	10.0~30.0 30.1~40.0	2.0 2.5 3.0 3.5		
15	Headless type PGEHS (SKH51) PGENS (NAK80)	10	10.0~30.0 30.1~40.0	3.0 3.5 4.0 4.5 5.0	1 2 3	
18		13	10.0~30.0 30.1~40.0	4.5 5.0 5.5 6.0 6.5 7.0		

⊕ To use this bushing together with a pin-point gate bushing, select the appropriate dimension referring to "How to Select V Dimension" on the next page.

Order







Part Number	L	V	A
PGEH 8	30.0	V2.5	A2
PGEHR8	30.0	V2.5	A2
PGEHS8	30.0	V2.5	A2

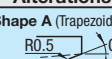
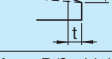

Days to Ship **Quotation**

Price **Quotation**

Alterations

Part Number	L	V(VC)	A	(AIW · AHW...etc.)
PGEH10	28.34	VC2.5	A3	AIW5 - GC7 - LKC

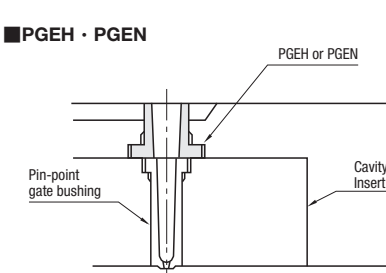
Alterations	Code	Spec.	1Code
	KC	Adds a single key flat on the head. ⊕ Available for head type ⊗ L < 16 not available	Quotation
	WKC	Adds two parallel key flats on the head. ⊕ Available for head type ⊗ L < 16 not available	
	LKC	Changes the L dimension tolerance $L \pm 0.5 \rightarrow L \pm 0.05$ ⊗ L < 16 not available When LKC is used, L dimension alteration in 0.01mm increments possible	
	VC	Changes V dimension. VC=0.1mm increments	
	HC	Head diameter change $D \geq HC < H$ 0.1mm increments	
	TC	Head diameter change $2.0 \leq TC < 4$ 0.1mm increments ⊕ L dimension remains unchanged even when TC is used. ⊕ $4 - TC \leq L_{max} - L$	

Alterations	Code	Spec.	1Code
	AIW	⊕ Available only for PGEH · PGEN ⊕ AIW10 - GC7 ⊕ Key flat position when KC · WKC is combined. ⊕ $W \leq (\beta - 0.4) \cdot L \geq 20$	Quotation
	BIR	⊕ Available only for PGEH · PGEN ⊕ BIR4 ⊕ Key flat position when KC · WKC is combined. ⊕ $R \leq (\beta - 0.4) \cdot L \geq 20$	
	CIQ	⊕ Available only for PGEH · PGEN ⊕ CIQ6 ⊕ Key flat position when KC · WKC is combined. ⊕ $Q \leq (\beta - 0.4) \cdot L \geq 20$	
	CHQ		

⊕ Previously the trapezoidal taper angle was fixed at 10°, but now it is possible to select a taper angle of either 10° or 7°. When you wish to use a taper angle of 7°, specify (Code)(W dimension)—GC7. If you do not specify the taper angle, an angle of 10° will be automatically selected.

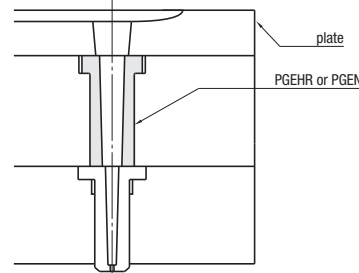
Example

PGEH · PGEN

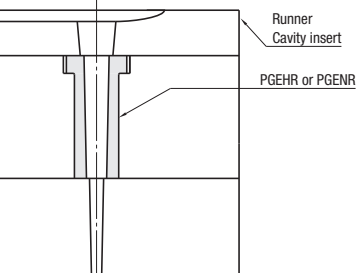


PGEHR · PGENR

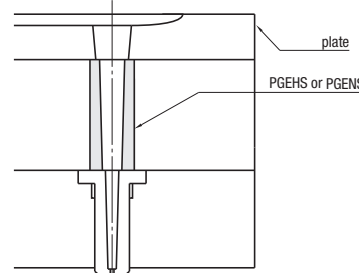
· Extension method for pin-point gate bushings

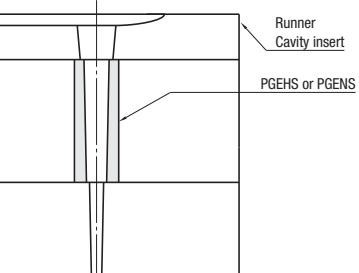


· Extension method for cavity inserts

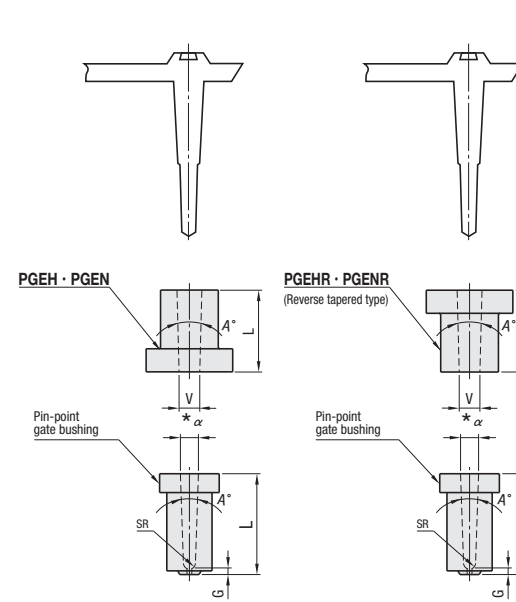


PGEHS · PGENS





How to Select V Dimension



$V \geq \alpha + X$

⊕ To use this pin gate extension bushing together with a select the appropriate α dimension from the following formula and designate V dimension.

Calculation for the inlet diameter * α of Pin Gate Extension Bushings

$\alpha = 2SR + 2(L - G - SR) \tan \frac{A^\circ}{2}$ (SR the inside diameter) $\alpha = 2(L - G) \tan \frac{A^\circ}{2} + G \tan \frac{K^\circ}{2} + P$ (Tapered the inside diameter)

⊕ The dimension acquired using the above calculation is the theoretical (reference) value.

Applicable x dimensions

M	Type	α	Eccentricity between D and V	Pin Gate Extension Bushing	X
SKH51	PGHS PGHST PGHTBL PGHB□A PGHV□A PGHVT□A	PGH□A PGHD□A PGHT□A PGHF□A PGHB□A PGHV□A	±0.1	0.05 or less	0.3
Carbide	PGWB□A PGW□A				
Electro forming	PGES PGEST PGE□A PGE□A PGEV□A	PGE□A PGEK□A PGET□A PGE□A PGE□A	±0.05	0.05 or less	0.3
Electro forming (high hardness)	PGKS PGKST PGKB□A PGK□A	PGK□A PGK□A PGK□A PGK□A			

⊕ Please examine at the time of designing the mold that the relationship between V and α will not be undercut when runner is pulled out.

Calculation for the inlet diameter * β of Pin Gate Extension Bushings

