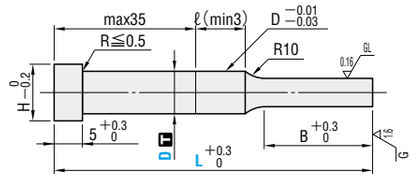
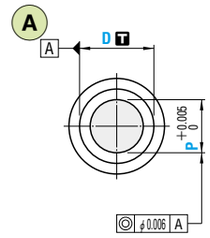
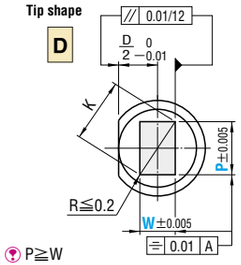
SHOULDER PUNCHES
—LAPPING—

Type	Shank diameter D T tolerance	M / H	Catalog No. Type	Tip shape	B Tip length
RoHS  For shank diameter tolerance D T, select either m5 or $^{+0.005}_{0}$.	D_{m5}	Equivalent to SKD11 60～63HRC	L—SP	A D R E G	S
		Equivalent to SKH51 61～64HRC	L—SH		L
		Powdered high-speed steel 64～67HRC	L—PH		X
	$D^{+0.005}_{0}$	Equivalent to SKD11 60～63HRC	AL—SP		Tip length (B) X>L>S
		Equivalent to SKH51 61～64HRC	AL—SH		
		Powdered high-speed steel 64～67HRC	AL—PH		

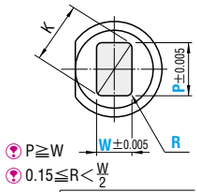
The tip shape can be selected from Tip shape A～G in the figure below.



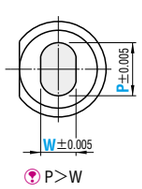
Tip shape A


Tip shape D


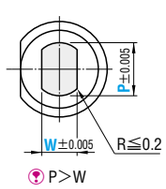
P≧W
K=$\sqrt{P^2+W^2}$

Tip shape R


P≧W
0.15≦R<$\frac{W}{2}$

Tip shape E


P>W

Tip shape G


P>W

Catalog No. Type	Tip shape	B Tip length	D	L	0.001 mm increments Ⓐ min. P max.	0.001 mm increments D R E G P·Kmax.	0.001 mm increments D R E G P·Wmin.	0.01 mm R	B	H
(D_{m5}) L—SP L—SH L—PH ($D^{+0.005}_{0}$) AL—SP AL—SH AL—PH	A D R E G	S	3	40 50 60 70 80 90 100	1.000～ 2.990	(☞ P.87)		0.15≦R<$\frac{W}{2}$ (Ⓡ only)	8	5
			4	40 50 60 70 80 90 100	1.000～ 3.990	3.970	1.000			7
			5	40 50 60 70 80 90 100	2.000～ 4.990	4.970	1.200			8
			6	40 50 60 70 80 90 100	2.000～ 5.990	5.970	1.500			9
			8	(40) 50 60 70 80 90 100	3.000～ 7.990	7.970	2.000		13	11
			10	(40) 50 60 70 80 90 100	3.000～ 9.990	9.970	2.500			13
			13	(40) 50 60 70 80 90 100	6.000～ 12.990	12.970	3.000			16
			16	(40) 50 60 70 80 90 100	10.000～ 15.990	15.970	4.000		19	19
			20	(40) 50 60 70 80 90 100	13.000～ 19.990	19.970	5.000			23
			25	(40) 50 60 70 80 90 100	18.000～ 24.990	24.970	6.000			28
		L	3	50 60 70 80 90 100	1.000～ 2.990	(☞ P.87)			13	5
			4	50 60 70 80 90 100	1.000～ 3.990	3.970	2.000			7
			5	50 60 70 80 90 100	2.000～ 4.990	4.970	2.000			8
			6	50 60 70 80 90 100	2.000～ 5.990	5.970	2.000			9
			8	50 60 70 80 90 100	3.000～ 7.990	7.970	2.500		19	11
			10	50 60 70 80 90 100	3.000～ 9.990	9.970	2.500			13
			13	50 60 70 80 90 100	6.000～ 12.990	12.970	3.000			16
			16	60 70 80 90 100	10.000～ 15.990	15.970	4.000		25	19
			20	60 70 80 90 100	13.000～ 19.990	19.970	5.000			23
			25	60 70 80 90 100	18.000～ 24.990	24.970	6.000			28
		X	3	50 60 70 80 90 100	1.200～ 2.990	—			19	5
			4	50 60 70 80 90 100	1.200～ 3.990	3.970	2.000			7
			5	60 70 80 90 100	2.000～ 4.990	4.970	3.500		25	8
			6	60 70 80 90 100	2.000～ 5.990	5.970	3.500			9
			8	60 70 80 90 100	3.000～ 7.990	7.970	5.000		30	11
			10	60 70 80 90 100	3.000～ 9.990	9.970	5.000			13
			13	60 70 80 90 100	6.000～ 12.990	12.970	5.000			16
			16	70 80 90 100	10.000～ 15.990	—			40	19
			20	70 80 90 100	13.000～ 19.990					23
			25	70 80 90 100	18.000～ 24.990					28

Ⓐ: P>D−0.03⋯ℓ=0 If P>D−0.03 for a round punch, $D^{-0.01}_{-0.03}$ (press-in lead) is not included.
D R E G: P·K>D−0.05⋯ℓ=0 If P·K>D−0.05 for a shaped punch, $D^{-0.01}_{-0.03}$ (press-in lead) is not included.
L(40)⋯B=8 If full length is (40), tip length is 8 mm in all cases.

Order
Catalog No. — L — P — W — R (Ⓡ only)
L—SHAS 10 — 70 — P9.500
AL—PHDL 13 — 80 — P10.500 — W7.340

Days to Ship: Quotation

Alterations
Catalog No. — L(LC·LCT·LMT) — P(PC) — W(WC) — R — (BC·HC·TC, etc.)
AL—SPAS 10 — LC72 — PC2.800 — BC8

Alteration	Code	Ⓐ	D R E G	1Code
Alterations to tip	PC WC	Tip dimension change PC≧$\frac{Pmin.}{2}$ 0.001 mm increments P(PC): 0.500～0.799 Bmax. 10; 0.800～0.999 13; 1.000～1.999 20; 2.000～3.999 35; 4.000～4.999 45; 5.000～5.999 50; 6.000～ 60	Tip dimension change PC/WC≧$\frac{P·Wmin.}{2}$≧0.800 ⊗ Cannot be used for tip X. 0.001 mm increments P(PC)·W(WC): 0.800～1.499 8; 1.500～1.999 13; 2.000～3.499 19; 3.500～4.999 25; 5.000～ 30	
	BC	Tip length change 2≦BC≦Bmax. 0.1 mm increments Full length L must be at least 25 mm longer than tip length BC.	Tip length change 2≦BC≦Bmax. 0.1 mm increments Full length L must be at least 30 mm longer than tip length BC.	
	PRC	Rounding of tip side edge 0.3≦PRC≦1 0.1 mm increments PRC≦(P−0.2)/2 ⊗ Cannot be combined with PCC·GC.	——	
	PCC	Chamfering to tip side edge 0.3≦PCC≦1 0.1 mm increments PCC≦(P−0.2)/2 ⊗ Cannot be combined with PRC·GC.	——	Quotation
	GC	20°≦GC<90° 1° increments Tip length B≧f+2 f=P/2×tan(90°−GC°) Tip edges are rounded. ⊗ Cannot be used for P<1.0. ⊗ Cannot be combined with LKC·LKZ·LCT·LMT·PRC·PCC.	——	
Alterations to full length	LC	Full length change 25+B(BC)≦LC<L 0.1 mm increments If difference between full length and tip length is 25 mm or less, tip length is adjusted to (Full length−25 mm).	Full length change 30+B(BC)≦LC<L 0.1 mm increments If difference between full length and tip length is 30 mm or less, tip length is adjusted to (Full length−30 mm).	
		(If combined with LKC·LKZ, 0.01 mm increments can be selected.)		
	LCT	Changes to head thickness tolerance and full length are processed using a single code. The allowable range of change, increment, ordering process, and notes are the same as for LC. TKC Head thickness tolerance change $T^{+0.3}_{0}$ ⇨ $^{+0.02}_{0}$ + LC Full length change + Full length tolerance change $L^{+0.3}_{0}$ ⇨ $^{+0.1}_{0}$		
	LMT	Changes to head thickness tolerance and full length are processed using a single code. The allowable range of change, increment, ordering process, and notes are the same as for LC. TKM Head thickness tolerance change $T^{+0.3}_{0}$ ⇨ $^{0}_{-0.02}$ + LC Full length change + Full length tolerance change $L^{+0.3}_{0}$ ⇨ $^{+0.1}_{0}$		

Alteration	Code	Ⓐ	D R E G	1Code
Alterations to full length	LKC	Full length tolerance change $L^{+0.3}_{0}$ ⇨ $^{+0.05}_{0}$		
	LKZ	Full length tolerance change $L^{+0.3}_{0}$ ⇨ $^{+0.01}_{0}$		
Alterations to head	KC	Addition of single key flat to head	Key flat position change 1° increments	
	WKC	Addition of double key flats in parallel	Double key flats in parallel Can be combined with KC.	
	KFC	Double key flats at 0° and a selected angle 1° increments ⊗ Cannot be combined with KC·WKC.	Double key flats at 0° and a selected angle 1° increments ⊗ Cannot be combined with KC·WKC.	
	NKC	——	No key flat	
	HC	Head diameter change D≦HC<H 0.1 mm increments		
	TC	Head thickness change 2≦TC<5 0.1 mm increments (If combined with TKC·TKM·LCT·LMT, 0.01 mm increments can be selected.) Full length L is shortened by (5−TC). If combined with LC·LCT·LMT, full length remains as specified.		Quotation
	TKC	Head thickness tolerance change $T^{+0.3}_{0}$ ⇨ $^{+0.02}_{0}$		
	TKM	Head thickness tolerance change $T^{+0.3}_{0}$ ⇨ $^{0}_{-0.02}$		
	TCC	Chamfering of head This improves the strength of the punch head. ☞ P.1611 0.1 mm increments 0.5≦TCC≦(H−D)/2 If H≦5, then TCC is 0.5.		
	RC	Head thickness is machined to a tolerance of −0.04～0 relative to the retainer surface. ⊗ Cannot be used for $D^{+0.005}_{0}$ types.		
Alterations to shank	SKC	Single key flat on shank ·D3～6 P≦D−1.2 W≦D−1.2 (Machining width 0.5) ·D8～ P≦D−2.2 W≦D−2.2 (Machining width 1) ⊗ Cannot be combined with KC·WKC·KFC.	Ⓐ D R E G	
	NDC	No press-in lead ℓ≧3 ⇨ ℓ=0		

Price: Quotation