

» Phoenix PZAG

沉孔钻头
Counterboring Cutter

Phoenix Counterboring Cutter



■ 特点 Features

追求切屑分断性能的
沉孔钻头

Counterboring cutter
with perfect chip control



为了连续进行沉孔加工,
切屑分断性尤为重要

Since counterboring process is continuous cutting,
chip breaking capability is utmost important.

- 强力断屑槽，实现卓越的切屑分断性。
- Excellent chip separation capability with the enhanced muscle breaker corresponding to each cutting edge.



■ 丰富的产品系列 Broad size lineup

符合紧固螺栓沉孔尺寸规格的尺寸系列(可对应螺栓尺寸 M8~M52)

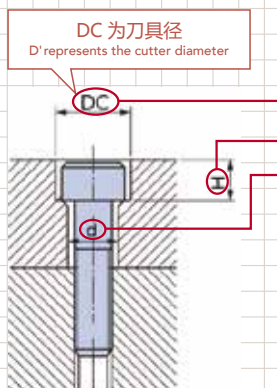
Size lineup corresponding to the cap bolt's counterbore hole size (Corresponds to bolt screw sizes M8 to M52)

■ 六角螺栓沉孔及螺栓孔的尺寸

Dimensions of counterbore and bolt hole with hexagon socket head bolt

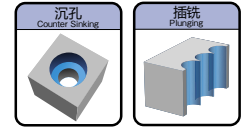


※不可作为面铣刀使用。
Cannot be used as a face milling cutter



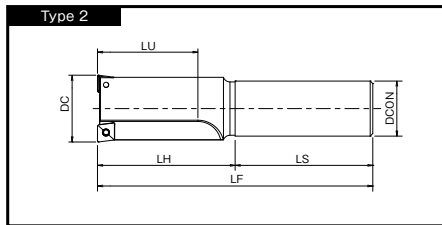
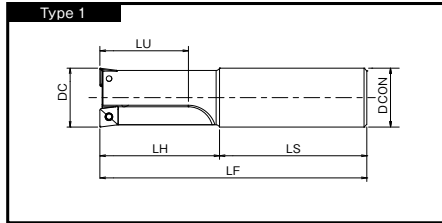
螺纹尺寸 Thread size	M8	M10	M12	M14	M16	M18	M20	M22	M24
DC	14	17.5	20	23	26	29	32	35	39
H	8.6	10.8	13	15.2	17.5	19.5	21.5	23.5	25.5
d	9	11	14	16	18	20	22	24	26

螺纹尺寸 Thread size	M27	M30	M33	M36	M39	M42	M45	M48	M52
DC	43	48	54	58	62	67	72	76	82
H	29	32	35	38	41	44	47	50	54
d	30	33	36	39	42	45	48	52	56



Specification

形状尺寸表 Specification



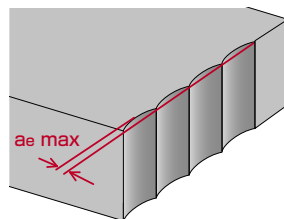
单位:mm Unit:mm

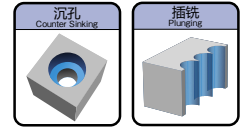
商品号 EDP No.	名称 Designation	外径 DC	刃数 ZEPF	柄径 DCON	柄长 LS	全长 LF	颈长 LH	有效加工深度 LU	最小底孔径 Min. Pre-Drilled Dia. 注1)	a _e 注2) (max)	适用刀片 Applicable Inserts	形状类型 Type
7832100	PZAG04R014SS20-2	14	2	20	70	100	30	21	6	4	①	1
7832101	PZAG06R0175SS20-2	17.5	2	20	70	105	35	26	5.5	6	②	1
7832102	PZAG06R020SS20-2	20	2	20	70	110	40	30	8	6		1
7832103	PZAG06R023SS25-2	23	2	25	75	125	50	34.5	11	6	③	1
7832104	PZAG09R026SS25-2	26	2	25	75	130	55	39	8	9		1
7832105	PZAG09R029SS32-2	29	2	32	80	140	60	43.5	11	9		1
7832106	PZAG09R032SS32-2	32	2	32	80	145	65	48	14	9		1
7832107	PZAG09R035SS32-2	35	2	32	80	150	70	52.5	17	9		2
7832108	PZAG09R039SS32-2	39	2	32	80	160	80	58.5	21	9		2
7832109	PZAG09R043SS32-2	43	2	32	80	170	90	64.5	25	9		2
7832110	PZAG09R048SS32-2	48	2	32	80	180	100	72	30	9		2

注1) 沉孔加工时, 表示底孔的最小值。
These minimum pre-drilled hole sizes are required before counterboring operations.

※ 不可横拉。
Specialized for plunging.

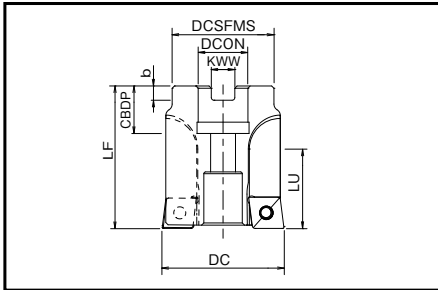
注2): 插铣加工时的最大切深量(a_e)
Maximum depth of cut in plunge milling





Specification

■形状尺寸表 Specification



单位:mm Unit:mm

商品号 EDP No.	名称 Designation	外径 DC	刃数 ZEFP	全长 LF	有效加工深度 LU	刀盘径 DCSFMS	孔径 DCON	孔径深度 CDDP	端面键槽		最小底孔径 Min. Pre-Drilled Dia. 注1)	ae 注2) (max)	适用刀片 Applicable Inserts
									宽度 KWW	深度 b			
7832111	PZAG13R054M22-4	54	4	63	35	45	22	21	10.4	6.3	29	12.5	④
7832112	PZAG13R058M22-4	58	4	63	38	45	22	21	10.4	6.3	33	12.5	
7832113	PZAG13R062M22-4	62	4	63	41	45	22	21	10.4	6.3	37	12.5	
7832114	PZAG13R067M22-4	67	4	63	44	45	22	21	10.4	6.3	42	12.5	
7832115	PZAG13R072M22-4	72	4	63	47	45	22	21	10.4	6.3	47	12.5	
7832116	PZAG17R076M22-4	76	4	63	50	45	22	21	10.4	6.3	44	16	⑤
7832117	PZAG17R082M22-4	82	4	63	54	45	22	21	10.4	6.3	50	16	

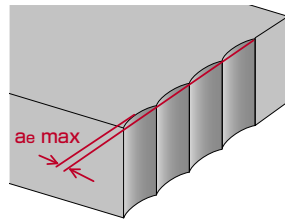
注1) 沉孔加工时, 表示底孔的最小值。

These minimum pre-drilled hole sizes are required before counterboring operations.

※ 不可横拉。

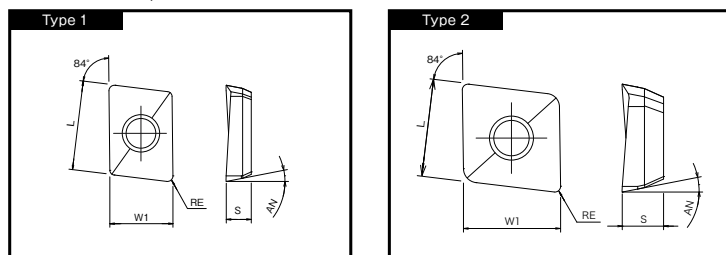
Specialized for plunging.

注2) : 插铣加工时的最大切深(ae)
Maximum depth of cut in plunge milling



Inserts

形状尺寸表 Specification




适用刀片 Applicable Inserts

单位:mm Unit:mm

商品号 Designation	切削刃数 No. of Cutting Edges	刀片尺寸 Insert Size				形状 Type	适用刀体 Applicable Body	涂层种类 Carbide Coated Materials	
		L×W1	厚度 S	后角 AN	RE			XP8030	XC8035
① ZPNT040104ER	2	6.35×4.45	1.76	11°	0.4	1	φ14	7814101	7815101
② ZPNT060204EN	2	6.95×6.95	2.93	11°	0.4	2	φ17.5~23	7814103	7815103
③ ZPNT090404EN	2	9.94×9.94	4.65	11°	0.4	2	φ26~48	7814106	7815106
④ ZPNT130504EN	2	13.92×13.92	5.46	11°	0.4	2	φ54~72	7814109	7815109
⑤ ZPNT170608EN	2	17.85×17.85	6.31	11°	0.8	2	φ76, 82	7814111	7815111

Accessories

零件 Accessories

	商品号 EDP No.	名称 Designation	适用刀片 Applicable Inserts	适用刀具 Applicable Cutters	推荐安装扭矩 Recommended Tightening Torque
 固定螺丝 Clamping Screw	7808096	FS18536P (Torx 6IP)	① ZPNT04...	PZAG SS φ14	0.7 Nm
	7808138	FS22550P (Torx 7IP)	② ZPNT06...	PZAG SS φ17.5~23	1.0 Nm
	7808135	FS30570P (Torx 9IP)	③ ZPNT09...	PZAG SS φ26~48	2.2 Nm
	7808114	FS45510P (Torx 20IP)	④ ZPNT13...	PZAG BORE φ54~82	5.0 Nm
			⑤ ZPNT17...		

	商品号 EDP No.	名称 Designation	适用刀片 Applicable Inserts	适用刀具 Applicable Cutters
 扳手 Wrench	7808223	6IP-D (Torx 6IP)	① ZPNT04...	PZAG SS φ14
	7808224	7IP-D (Torx 7IP)	② ZPNT06...	PZAG SS φ17.5~23
	7808226	9IP-D (Torx 9IP)	③ ZPNT09...	PZAG SS φ26~48
	7808229	20IP-D (Torx 20IP)	④ ZPNT13...	PZAG BORE φ54~82
			⑤ ZPNT17...	

扳手请另购。 The wrenches are sold separately from the cutters.

Cutting
Conditions

加工材料推荐

Recommended Materials by Insert Type

◎第一推荐材料 Best
○第二推荐材料 Good

刀片材质 Insert Grades	切削油剂 Coolant	P	M	K	N	S	H
XP8030	有 Wet	◎	◎	○	○	○	○
XC8035	无 Dry	○		◎			
	有 Wet		○				

■ 切削条件基准表 Cutting Conditions 沉孔加工·插铣加工通用 For both counterboring and plunge milling

加工材料 Work Material	抗张强度·硬度 Tensile Strength·Hardness	切削速度 Vc (m/min) Cutting Speed	进给量 f(mm/rev) Feed Rate				
			φ14~φ17.5	φ20~φ23	φ26~φ48	φ54~φ72	φ76~φ82
P 软钢·低碳素钢 Mild Steel, Carbon Steel (SS400, S10C) 碳素钢、合金钢 Carbon Steel, Alloy Steel (S50C, SCM440) 模具钢 Die Steel (SKD11, SKD61)	~180HB	160(100~200)	0.14(0.08~0.2)	0.18(0.1~0.25)	0.2(0.12~0.3)	0.4(0.2~0.6)	0.4(0.2~0.6)
	~280HB	150(100~200)	0.14(0.08~0.2)	0.18(0.1~0.25)	0.2(0.12~0.3)	0.4(0.2~0.6)	0.4(0.2~0.6)
	~280HB	120(80~180)	0.12(0.08~0.15)	0.14(0.1~0.2)	0.18(0.12~0.25)	0.4(0.2~0.5)	0.4(0.2~0.5)
M 不锈钢 Stainless Steel (SUS304, SUS420)	~250HB	130(80~180)	0.1(0.08~0.15)	0.12(0.1~0.2)	0.16(0.12~0.25)	0.35(0.2~0.5)	0.35(0.2~0.5)
K 铸铁 Cast Iron (FC250) 球墨铸铁 Ductile Cast Iron (FCD400)	~350N/mm ²	200(150~280)	0.16(0.08~0.25)	0.2(0.1~0.3)	0.3(0.15~0.4)	0.6(0.3~0.8)	0.6(0.3~0.8)
	~800N/mm ²	160(100~220)	0.14(0.08~0.2)	0.18(0.1~0.25)	0.2(0.15~0.3)	0.4(0.3~0.6)	0.4(0.3~0.6)
N 铝合金 Aluminum Alloy	~13%Si	200(100~800)	0.16(0.08~0.25)	0.2(0.1~0.3)	0.3(0.15~0.4)	0.6(0.3~0.8)	0.6(0.3~0.8)
S 超耐热合金(湿式) Superalloy (Wet) (Inconel 718) 钛合金(湿式) Titanium Alloy (Wet) (Ti-6Al-4V)	-	50(30~60)	0.08(0.05~0.14)	0.08(0.06~0.14)	0.12(0.08~0.2)	0.25(0.16~0.4)	0.25(0.16~0.4)
	-	60(30~100)	0.08(0.05~0.14)	0.1(0.06~0.16)	0.14(0.08~0.2)	0.3(0.16~0.5)	0.3(0.16~0.5)
H 预硬钢 Pre-hardened Steel (NAK80) 调质钢 Hardened Steel (SKD11)	40~43HRC	100(60~120)	0.08(0.05~0.14)	0.1(0.06~0.16)	0.14(0.08~0.2)	0.3(0.16~0.5)	0.3(0.16~0.5)
	50~55HRC	60(40~80)	0.08(0.05~0.14)	0.08(0.05~0.14)	0.12(0.08~0.2)	0.25(0.16~0.4)	0.25(0.16~0.4)

1. 这张切削条件基准表的数值是根据实际切削速度的标准数据。请根据加工环境适当的调整。
2. 请确保整洁干净后紧紧地安装刀片。
3. 请牢牢固定加工材料，确保在没有变形，弯曲，振动的情况下加工。

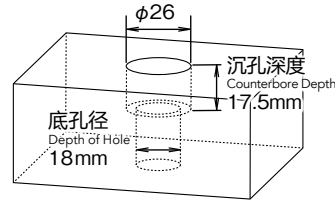
1. The above cutting conditions are to be used as general guidelines. Adjustments may be necessary depending on actual cutting condition.
2. Inserts should be attached to the holder tightly in a very neat condition.
3. Fasten the work material to reduce the possibility of work deformation, deflection of machined surface, or vibration.

Cutting Data

■加工数据 Cutting Data

■S50C的沉孔加工 Counterboring in S50C

使用工具 Tool	PZAG09R026SS25-2 (φ26×2刃)
使用刀片(材质) Insert (grade)	ZPNT090404EN (XC8035)
加工材料 Work Material	S50C
切削速度 Cutting Speed	150m/min (1,837min ⁻¹)
进给速度 Feed	550mm/min (0.3mm/rev)
沉孔深度 Counterbore Depth	17.5mm
切削油剂 Coolant	干式 Dry
使用机械 Machine	立式加工中心(BT50) Vertical Machining Center





在M16紧固螺栓用的沉孔加工中, 实现了良好的切屑分断性, 稳定的连续加工。

In the counterboring of a M16 cap bolt, excellent chip breaking was performed, enabling consecutive processing.

■SS400大型零部件的沉孔加工 Counterboring of large parts in SS400

使用工具 Tool	PZAG17R076M22-4 (φ76×4刃)	其他公司高速钢铣刀 (φ30×4刃) Competitor's HSS Endmill
使用刀片(材质) Insert (grade)	ZPNT170608EN (XP8030)	
加工材料 Work Material	SS400	
切削速度 Cutting Speed	112m/min (470min ⁻¹)	30m/min (318min ⁻¹)
进给速度 Feed	140mm/min (0.3mm/rev) 0.5mmステップ Step	127mm/min (0.1mm/t)
沉孔深度 Counterbore Depth	51mm	ap=51mm ae=3mm×4パス Pass
切削油剂 Coolant	水溶性切削油剂 Water-Soluble	
使用机械 Machine	龙门加工中心(BT50) Double Column Machining Center	

	加工时间(分/孔) Cutting Time (min./hole)					
	0.5	1	1.5	2	2.5	3
PZAG						
其他公司产品 Competitor						

使用高速钢铣刀进行SS400的大型零部件的螺栓孔沉孔加工。以往1孔的加工时间需要3分钟, 但是使用PZAG加工只需1分半钟, 缩短了一半时间。
A HSS end mill was used in the counterboring of a bolt for a large part in SS400. The PZAG was able to reduce machining time by half from 3 minutes per hole to 1.5 minutes.

