

**Internal Machining Tools**

**Innovative Solutions for Manufacturing**

**德国赫比尔兹  
孔加工及非标刀具**

钻孔 沉头孔 扩孔 铰孔

BORE COUNTERSINK COUNTERBORE REAM





Our tools for drilling, countersinking and re-boring as well as finish machining have been continually withstanding the toughest tests on a daily basis for more than 80 years.

The German machine tool and automotive industries in particular have appreciated our capability, reliability and quality for years.

We have become famous for counterbore, end facing and countersinking systems. We were the first to market a complete modular tool system: with short taper flange, small, light, short design length as well as universally applicable. Further to this we have our reverse countersink system.

Next to the classical machining with shell drill and bayonet catch, countersinks, of up to 3 times the bore diameter, can be safely and automatically machined using reverse boring bars and Autofacers.

To remain No. 1 in countersinking we have continually improved the geometry of our countersink tools and enlarged the spectrum of our tools and cutting materials - by means of coated HSS-inserts, with carbide, Cermet, PCD and CBN.

Our tool spectrum for bore machining, evolved through years of experience and close contact with our customers world-wide, is constantly being developed further. Thanks to our tailor-made concepts we can offer no-compromise, interesting, special solutions for bore machining.

Thus the H. Bilz tool lines are always a step beyond the present market needs. Talk to us if you require detailed information.

#### 公司简介

我们H.BILZ是一家来自于德国古老的城市-斯图加特,具有80年专业刀具设计及生产的工厂。我们的产品每年销往全球四十多个国家及地区,其中包括BENZ、BMW、VOLKSWAGEN、MAN、AIRBUS、Rolls-Royce、BOSCH、MTU、LIEBHERR、JOHN DEERE等全球知名企业,年销售达到3亿。

#### 沉头孔和反划刀

在业界,我们以扩孔、端面及沉头孔刀具而闻名。我们是第一家推出全套模块化刀具系统的公司:短锥法兰斜口,小型,轻量,设计长度短小且应用领域广泛。

不仅如此,我们的反划沉头孔刀具在业界也颇有声誉。在传统机械加工基础上,进行套式反划扩孔-卡口连接、反划沉头孔-尤其是针对通孔直径的2.2倍,可以通过反划刀杆和自动反划刀进行安全、自动机械加工。

为了保持在沉头孔业的龙头地位,我们不断改善沉头孔刀具的几何结构,扩大刀具种类和材质-整体硬质合金、金属陶瓷和PCD。

#### 精加工

在高精度刀具的帮助下,钻孔的同时也能达到铰刀的精度:几乎每次都可以节省加工工艺流程。主要得益于我们刀具特殊的切削几何结构,系统简单而且设置精准。

除此之外,我们可以为客户快速提供整体项目解决方案,而且价格具有竞争力。



## 反划刀系列 Back counterboring

- BILZ RBS-Micro RBSM 微型反划刀具
- BILZ Reverse boring bar RBS-Micro RBSM
- BILZ RBS+ 反划沉头孔刀具
- BILZ Reverse boring bar RBS+
- BILZ RFS 反划倒角刀具
- BILZ Reverse chamfering bar RFS
- BILZ TU 手动装夹式反划刀具
- BILZ Reverse counterbore system TU
- BILZ Autofacer AFA 自动反划刀具
- 非标刀具
- Special tools
- 应用案例
- Application examples



**RBS-Micro RBSM 微型反划刀具**

- 整体硬质合金微型反划刀加工范围 M3-M6
- 大范围的弹性模量设计, 保证最大加工范围 1.9 x D
- Solid carbide RBS for countersinks from M3 to M6
- A large e-modulus guarantees reverse machining even at width of cut up to 1,9 x D

4-6



**反划沉头孔刀具 Reverse boring bar RBS+**

- 稳定可靠的刀片装夹系统
- 刀片规格齐全
- Stable and reliable tool with indexable inserts
- Large selection of indexable inserts

4-6



**反划倒角刀具 Reverse chamfering bar RFS**

- 稳定可靠的刀片装夹系统
- 刀片规格齐全
- Stable and reliable chamfering tool with indexable inserts
- Large selection of indexable inserts

4-6



**手动装夹反划刀具 Reverse counterbore system TU**

- 手动装夹反划刀具, 加工范围 2.5 x d
- 简单灵活的装夹方式, 适用于小批量生产
- Manual counterboring up to 2,5 x d
- Simple and flexible for production of small quantities

7-12



**Autofacer AFA 自动反划刀具**

- 自动反划刀具适用于大批量生产
- 高可靠性与安全性
- Automatic operation for mass-production
- High reliability and safety

13-15

应用 / 特征 Application / Feature	RBSM	RBS/ RFS	TU	AFA
手 动 / Manual	-	-	++	+
自 动 / Automatic	++	++	-	++
批量生产 / Batch production	++	++	-	++
单件生产/小批量生产 / Single part/Small batch production	+	+	++	-
1.8倍径尺寸以下 / Ratio of diameters up to 1,8 x d	++	+	++	++
大于1.8倍径尺寸 / Ratio of diameters > 1,8 x d	++	+	++	++
保证同轴度的推拉式加工 / Forward and backward machining	-	-	-	++

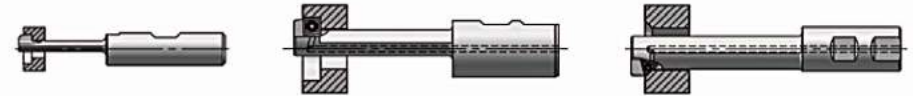
+ + 强烈推荐 / well suitable     
 + 一般推荐 / suitable to only a limited extent     
 - 不推荐 / less suitable

RBSM max. 1,9 x d <sub>1</sub>	RBSM TiAlN	RBS+ max. 1,8 x d <sub>1</sub>	RBS+ für d > 20	RFS
GG(G)	ALU	NE	ST(ELL)	

**微型反划刀具 RBS-Micro RBSM Reverse boring bar RBS-Micro RBSM**

**反划沉头孔 Reverse boring bar RBS+**

**反划倒角刀 Reverse chamfering bar RFS**

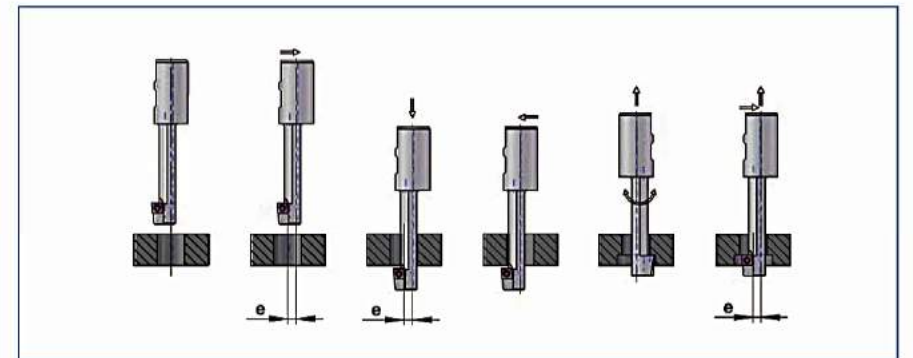


**特点:**

- 针对于加工难度较高的沉头孔、孔倒角
- 针对于螺钉帽孔M3-M48
- 针对于1.9倍径的沉头孔
- RBS+和RFS反划刀具十分安全可靠 成品表面光洁度高
- 微型反划刀具采用特殊弹性模量设计 加工可靠性高
- RBS+和RFS刀具尺寸从D=20开始采用内冷方式
- 刀片选择范围广, PCD、硬质合金及高速钢材料 Wendeschneidplatten
- 针对于其它特殊应用领域, 我们可以进行非标设计 欢迎访问我们的网站www.hermann-bilz.de

**Advantages:**

- For spotfacing, chamfering and deep counterboring of areas with difficult access
- For screw head counterbores M3 to M48 in all common materials
- For counterboring up to 1.9 times the bore diameter
- RBS+ and RFS are very stable and rigid with surface treatment and FEM-optimized geometry
- Large E-modulus of solid-carbide RBS-Micro ensure max. stability
- Internal coolant for RFS and RBS+ starting from d=20
- Wide choice of different PCD-, carbide- and HSS-indexable inserts
- For requests of specials e. g. for larger cutting width, in solid carbide or heavy metal, adjustable, for radiuses, grooves and chamfers please use the Technical Questionnaire on page 15 or at [www.hermann-bilz.de](http://www.hermann-bilz.de)

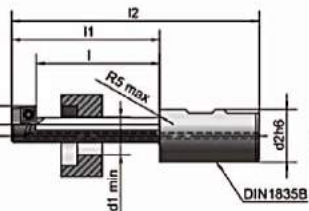




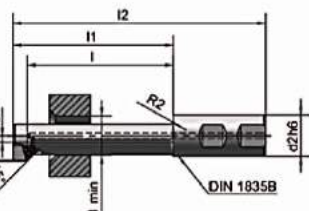
微型反刎刀具  
Reverse boring bar  
RBS-Micro RBSM



反刎沉头孔  
Reverse boring bar RBS+



反刎倒角刀  
Reverse chamfering bar RFS



RBSM/RBS+/RFS

d	d <sub>1min</sub>	l	d <sub>2</sub>	e	l <sub>1</sub>	l <sub>2</sub>	货号 Ord.-No
RBS-Micro RBSM (整体硬质合金, 逆时针方向加工) RBS-Micro RBSM (solid carbide, counter clockwise)							
6,5	3,4	12	8	1,7	15,4	51,4	RBSM 34065
8	4,5	19	10	1,9	23	63	RBSM 45080
10	5,5	23	12	2,4	28	73	RBSM 55100
11	6,6	28	12	2,4	33	78	RBSM 66110

RBS+ (机夹刀片, 逆时针方向加工) RBS+ (indexable insert version, counter clockwise)										
15	9,0	35	20	3,2	45	95	RBS 081509020	100264	TX 206	04
18	10,5	40	25	4,0	52	108	RBS 101810525	TX 25025	TX 108-25	06
20	13,0	45	25	3,7	57	113	RBS 122013025	TX 25025	TX 108-25	06
24	15,0	55	25	4,7	67	123	RBS 142415025	TX 25025	TX 108-25	06
26	17,0	55	25	4,7	67	123	RBS 162617025	TX 25025	TX 108-25	06
30	19,0	65	25	6,0	77	133	RBS 183019025	TX 25025	TX 108-25	06
33	21,0	70	25	6,5	85	141	RBS 203321025	TX 35075	TX 115-35	09
36	23,0	75	32	7,0	90	150	RBS 223623032	TX 35075	TX 115-35	09
40	25,0	85	32	8,0	100	160	RBS 244025032	TX 35075	TX 115-35	09
43	30,0	90	32	7,0	105	165	RBS 274330032	TX 35075	TX 115-35	09
46	30,0	90	32	8,5	105	165	RBS 274630032	TX 35075	TX 115-35	09
48	33,0	105	32	8,0	120	180	RBS 304833032	TX 35075	TX 115-35	09
50	33,0	105	32	9,0	125	185	RBS 305033032	TX 45115	TX 115-45	12
53	36,0	110	40	9,0	130	200	RBS 335336040	TX 45115	TX 115-45	12
54	36,0	110	40	9,5	130	200	RBS 335436040	TX 45115	TX 115-45	12
57	39,0	120	40	9,5	140	210	RBS 365739040	TX 45115	TX 115-45	12
58	39,0	120	40	10,0	140	210	RBS 365839040	TX 45115	TX 115-45	12
66	45,0	135	50	11,0	155	235	RBS 426645050	TX 45115	TX 115-45	12
76	52,0	155	50	12,5	180	260	RBS 487652050	TX 45135	TX 115-45	16

RFS (机夹刀片, 逆时针方向加工) RFS (indexable insert version, clockwise)										
15	10,0	42	16	2,7	48	96	RFS 01 1015	TX 20048	TX 206	06
20	14,0	48	20	3,2	53	103	RFS 01 1420	TX 20048	TX 206	06
23	17,5	57	25	3,0	67	123	RFS 01 1723	TX 22060	TX 207	09
27	21,0	78	25	3,5	87	143	RFS 01 2127	TX 22060	TX 207	09
31	24,0	88	25	4,0	97	153	RFS 01 2431	TX 22060	TX 207	09

\* 包含 / incl.   
 \*\* 需单独订购 / order separately

机夹刀片 / Indexable inserts for RBS+ und RFS

RBS +	货号... Ord.-No. ...	材质等级 / Grade					
高精度可转位刀片 Precision ground Indexable Inserts	06 MCEX060204FRH...	AK1	K1		P5	S6	
	09 MCEX090304FRH...	AK1	K1		P5	S6	
	12 MCEX120404FRH...	AK1	K1		P5	S6	
	16 MCEX160604FRH...	AK1	K1		P5	S6	
高精度PCD刀片 Precision PCD-Inserts	06 MCEW060204FR5...					D <sub>1</sub>	
	09 MCEW090304FR5...					D <sub>1</sub>	
	12 MCEW120404FR5...					D <sub>1</sub>	
ISO刀片 ISO-Indexable Inserts	04 CPG04T1043...			P2	P5	P9	
	06 MCMT060204EN...		K1	P2			
	09 MCMT090304EN...		K1	P2			
	12 MCMT120404EN...		K1	P2			
	16 MCMT160604EN...		K1	P2			
RFS							
高精度可转位刀片 Precision ground Indexable Inserts	06 TCEW060104FN...		K1	K9			
	09 TCEW090204FN...		K1	K9			
高精度可转位刀片 Precision ground Indexable Inserts	06 TCEX060104FL...	AK1	K1	K9			
	09 TCEX090204FL...	AK1	K1		P9	S6	
ISO三角刀片 ISO-Indexable Inserts	09 TCMT090204EN...			K9			

材质 / Grades

等级 Grade	DIN ISO 513	材质 Cutting material	应用 Application example
D1	DP-N20	PKD / PCD	铝合金 / Aluminium
AK1	HF-N20	硬质合金 / carbide	铝合金 / Aluminium
K1	HF-K20	硬质合金 / carbide	灰铸铁 / Grey cast iron
K9	HC-K10	硬质合金TIAIN/carbide	铸铁 / Nodular cast iron
P2	HF-P30	硬质合金 / carbide	普通钢 / Steel
P5	HC-K40/P40	硬质合金 TiN / carbide	铸铁 / Nodular cast iron
P9	HC-P10	硬质合金TIAIN/carbide	合金钢 / High alloy steel
S6	-	钴高速钢 TiN / carbide	普通钢 / Steel

定货 / Order example:  
 2件 / Pieces RFS 011015  
 10片 / Pieces TCEX 060104FL K9

切削参数推荐 / Cutting data recommendation

沉头孔尺寸 Counterbore-Ø d mm	普通钢 Low alloy steel		合金钢 High alloy steel		不锈钢 Stainless steel		铸铁 Cast iron		铝合金 Aluminium	
	e.g. CK 45		e.g. 42CrMo4V		e.g. X15Cr13		e.g. GG26, GGG50		e.g. G-AISI112	
硬质合金 / Carbide	Vc	90 - 120	100 - 120	50 - 90	80 - 140	100 - 150				
钴高速钢 / HSS	Vc	20 - 40	15 - 30	15 - 25						
6,5 - 11,0	f	0,05 - 0,1	0,05 - 0,08	0,03 - 0,05	0,04 - 0,1	0,05 - 0,15				
15,0 - 30,0	f	0,03 - 0,1	0,03 - 0,08	0,03 - 0,1	0,04 - 0,12	0,05 - 0,15				
33,0 - 76,0	f	0,06 - 0,12	0,05 - 0,12	0,06 - 0,12	0,08 - 0,15	0,08 - 0,18				

线速度  
Cutting speed Vc (m/min) 进给  
Infeed (mm/rev) 需要冷却 / Sufficient coolant supply needed

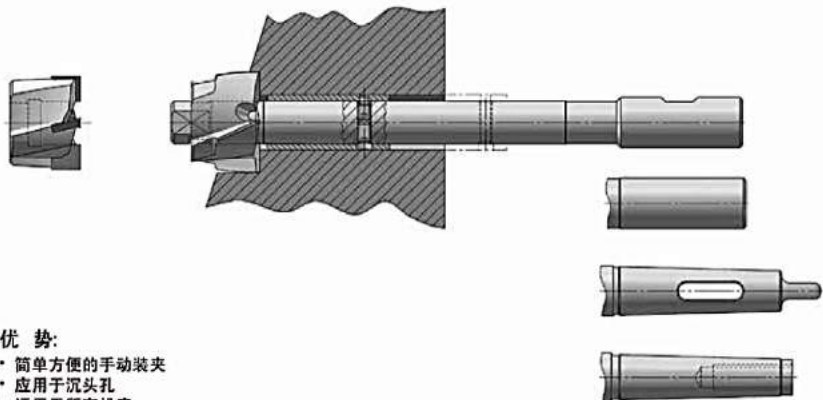


max.  
2,5 x d

GG(G) ALU NE ST(EEL)

手动装夹系统  
manually operated

手动反划刀  
Reverse counterbore system TU

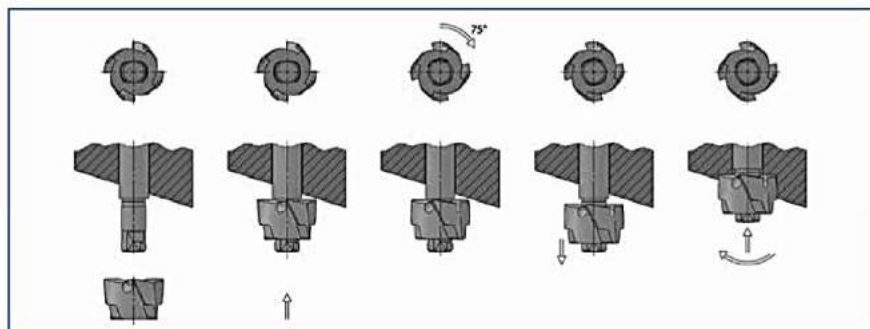


优势:


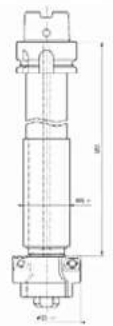
- 简单方便的手动装夹
- 应用于沉头孔
- 适用于所有机床
- 灵活方便快捷的手动换刀
- 切削范围达到2.5d
- 可修模
- 加工尺寸大
- 单支刀杆覆盖不同尺寸刀头

Advantages:


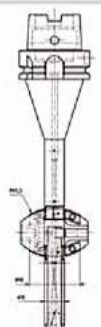
- Manually operated reverse machining
- Spotfacing, counterboring
- Universally applicable on all machine types
- Flat bayonet for quick and reliable manual tool changes
- Large cutting width (up to 2,5 d)
- Multiple regrinds are possible
- Several diameter combinations of counterbores and holders
- The same basic holder (TUHW) plus adjusted guide sleeves (TUB) can cover several guidance diameters



应用案例 / Application example:

客户问题 / The customer's problem	BILZ-解决方案 / The BILZ solution:
<p><b>汽轮机壳</b> Turbine housing</p> 	<p>工件材料 Workpiece material: GS17CrMoV511</p> <p>设备 / Machine tool: 加工中心 Machining Center</p> <p>工艺 Cutting process: 反划 Back counterboring</p>  <p><b>反划沉头孔</b> Back Spotfacer 钻高速钢刀片 HSS inserts</p> <p>d = 125 x 86 Vc = 24 m/min f = 0,2 mm/U / mm/rev</p>

应用案例 / Application example:

客户问题 / The customer's problem	BILZ-解决方案 / The BILZ solution:
<p><b>差速器壳</b> Differential housing</p> 	<p>工件材料 Workpiece material: EN-GJS-600-3</p> <p>设备 / Machine tool: 加工中心 Machining Center</p> <p>工艺 Cutting process: 尺寸 d = 91 - 0,054 球面尺寸 Spherical calotte d = 91 - 0,054 machining completely</p>  <p><b>球面加工</b> Spotfacer with bayonet lock</p> <p>d = 46 mm Vc = 70 m/min f = 0,28/0,2 mm/U / mm/rev Rz 12 μm</p>

切削参数推荐 / Cutting data recommendation:

沉头孔尺寸 Counterbore-Ø d mm		普通钢	合金钢	不锈钢	铸铁	铝合金
		Low alloy steel	High alloy steel	Stainless steel	Cast iron	Aluminium
		e.g. CK 45	e.g. 42CrMo4V	e.g. X15Cr13	e.g. GG26, GGG50	e.g. G-AlSi12
硬质合金/Carbide	Vc	15 - 22	15 - 22	8 - 12	50 - 90	20 - 70
钴高速钢/HSS	Vc	40 - 80	30 - 70	30 - 70	50 - 90	40 - 80
10,0 - 20,0	f	0,09 - 0,20	0,09 - 0,20	0,09 - 0,20	0,10 - 0,20	0,10 - 0,25
21,0 - 36,0	f	0,15 - 0,30	0,12 - 0,25	0,10 - 0,25	0,15 - 0,30	0,15 - 0,30
37,0 - 54,0	f	0,20 - 0,35	0,15 - 0,30	0,12 - 0,30	0,25 - 0,40	0,25 - 0,40
55,0 - 115,0	f	0,20 - 0,40	0,18 - 0,35	0,15 - 0,30	0,30 - 0,60	0,30 - 0,60

线速度  
Cutting speed Vc (m/min)

进给  
Infeed f (mm/rev)

需要冷却 / Sufficient coolant supply needed

沉头孔 / Counterbore TU

$\emptyset$		10,0 - 20,0	
货号 / Ord.-No.			
d	d <sub>1</sub>	HSS	HM braided carbide
沉头孔 / Counterbore- $\emptyset$ 10,0 - 13,0			
10,0		TU1000501	TU1000505
10,4		TU1040501	TU1040505
11,0	5 28	TU1100501	TU1100505
12,0		TU1200501	TU1200505
13,0		TU1300501	TU1300505
沉头孔 / Counterbore- $\emptyset$ 13,5 - 15,0			
13,5		TU1350601	TU1350605
14,0	6 30	TU1400601	TU1400605
14,5		TU1450601	TU1450605
15,0		TU1500601	TU1500605

$\emptyset$		16,0 - 20,0	
货号 / Ord.-No.			
d	d <sub>1</sub>	HSS	HM braided carbide
沉头孔 / Counterbore- $\emptyset$ 16,0 - 20,0			
16,0		TU1600801	TU1600805
16,5		TU1650801	TU1650805
17,0		TU1700801	TU1700805
17,5	8 32	TU1750801	TU1750805
18,0		TU1800801	TU1800805
19,0		TU1900801	TU1900805
20,0		TU2000801	TU2000805

刀杆 / Holder TUH\*\*

侧固刀杆 / with Cyl. shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e d <sub>2</sub> l
过孔尺寸 / Guidance- $\emptyset$ 5,3 - 7,0	
5,3*	TUH0530500
5,5*	TUH0550500
6,4	TUH0640500
6,6	TUH0660500
7,0	TUH0700500
过孔尺寸 / Guidance- $\emptyset$ 8,4 - 9,5	
8,4	TUH0840600
9,0	TUH0900600
9,5	TUH0950600

刀杆 / Holder TUH\*\*

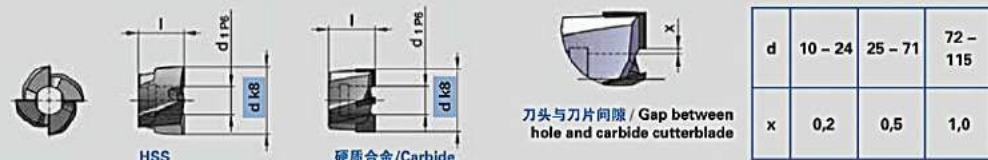
莫氏刀杆 / with MT shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e MK MT l
过孔尺寸 / Guidance- $\emptyset$ 5,3 - 7,0	
5,3*	TUH0530501
5,5*	TUH0550501
6,4	TUH0640501
6,6	TUH0660501
7,0	TUH0700501
过孔尺寸 / Guidance- $\emptyset$ 8,4 - 9,5	
8,4	TUH0840601
9,0	TUH0900601
9,5	TUH0950601

\*只用于TU/HSS / to be used only with TU/HSS

\*\* 所有的刀杆适用于带冷却及润滑的立式加工，订货时请加上“S”，例如：TUHW212125S  
All holders are also available with oil grooves for better coolant and lubrication of counterbore and pilot particularly in vertical position, on short notice. When ordering, please add "S" to Ord.-No.  
Ordering example: TUHW212125S

\*\*\* TUHW刀杆与TU/HSS混合使用时无需用 $\emptyset$ 3轴套  
TUHW holders can be used without sleeve for guidance  $\emptyset$ 3 in combination with TU/HSS only  
可根据客户需求定制 / Intermediate sizes on request

沉头孔 / Counterbore TU



刀杆 / Holder TUH



沉头孔 / Counterbore TU

$\emptyset$		21,0 - 43,0	
货号 / Ord.-No.			
d	d <sub>1</sub> l	HSS	硬质合金 braided carbide
沉头孔 / Counterbore- $\emptyset$ 21,0 - 24,0			
21,0		TU2100901	TU2100905
22,0	9 22	TU2200901	TU2200905
23,0		TU2300901	TU2300905
24,0		TU2400901	TU2400905

$\emptyset$		25,0 - 30,0	
货号 / Ord.-No.			
d	d <sub>1</sub> l	HSS	硬质合金 braided carbide
沉头孔 / Counterbore- $\emptyset$ 25,0 - 30,0			
25,0		TU2501101	TU2501105
26,0		TU2601101	TU2601105
27,0	11 24	TU2701101	TU2701105
28,0		TU2801101	TU2801105
29,0		TU2901101	TU2901105
30,0		TU3001101	TU3001105

$\emptyset$		31,0 - 36,0	
货号 / Ord.-No.			
d	d <sub>1</sub> l	HSS	硬质合金 braided carbide
沉头孔 / Counterbore- $\emptyset$ 31,0 - 36,0			
31,0		TU3101301	TU3101305
32,0		TU3201301	TU3201305
33,0	13 26	TU3301301	TU3301305
34,0		TU3401301	TU3401305
35,0		TU3501301	TU3501305
36,0		TU3601301	TU3601305

$\emptyset$		37,0 - 43,0	
货号 / Ord.-No.			
d	d <sub>1</sub> l	HSS	硬质合金 braided carbide
沉头孔 / Counterbore- $\emptyset$ 37,0 - 43,0			
37,0		TU3701701	TU3701705
38,0		TU3801701	TU3801705
39,0		TU3901701	TU3901705
40,0	17 28	TU4001701	TU4001705
41,0		TU4101701	TU4101705
42,0		TU4201701	TU4201705
43,0		TU4301701	TU4301705

刀杆 TUHW 1支\*\* 2支与轴套\*\*\*  
Holder TUHW 1pc.\*\* / 2pcs. with sleeve\*\*\* 刀杆 / Holder TUH\*\*

侧固刀杆 / with Weldon shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e d <sub>2</sub> l
过孔 / Guidance- $\emptyset$ 10,5 - 11,0	
10,5	9 107 12 185
11,0	
过孔 / Guidance- $\emptyset$ $\geq$ 12,0	
9,0	9 107 12 185
	d <sub>1</sub> l 轴套 / Sleeve
	$\geq$ 2 30 TUB(d)0930

侧固刀杆 / with Weldon shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e d <sub>2</sub> l
过孔 / Guidance- $\emptyset$ 12,0 - 13,5	
12,0	
13,0	11 130 12 205
13,5	
过孔 / Guidance- $\emptyset$ $\geq$ 14,0	
11,0	11 130 12 205
	d <sub>1</sub> l 轴套 / Sleeve
	$\geq$ 4 35 TUB(d)1135

侧固刀杆 / with Weldon shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e d <sub>2</sub> l
过孔 / Guidance- $\emptyset$ 15,0 - 15,5	
15,0	13 150 16 230
15,5	
过孔 / Guidance- $\emptyset$ $\geq$ 16,0	
13,0	13 150 16 230
	d <sub>1</sub> l 轴套 / Sleeve
	$\geq$ 6 40 TUB(d)1340

侧固刀杆 / with Weldon shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e d <sub>2</sub> l
过孔 / Guidance- $\emptyset$ 19,0	
19,0	17 167 20 252
过孔 / Guidance- $\emptyset$ $\geq$ 22,0	
17,0	17 167 20 252
	d <sub>1</sub> l 轴套 / Sleeve
	$\geq$ 2 50 TUB(d)1750

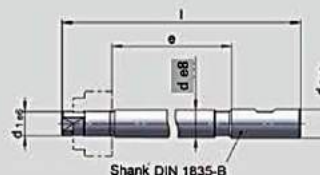
莫氏刀杆 / with MT shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e MK MT l
过孔 / Guidance- $\emptyset$ 10,5 - 16,0	
10,5	
11,0	
12,0	
13,0	9 118 2 220
13,5	
14,0	
15,0	
16,0	

莫氏刀杆 / with MT shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e MK MT l
过孔 / Guidance- $\emptyset$ 12,0 - 20,0	
12,0	
13,0	
13,5	
14,0	
15,0	
16,0	11 135 3 259
17,0	
17,5	
18,0	
19,0	
20,0	

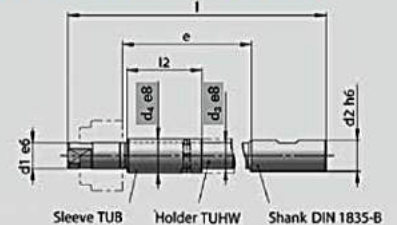
莫氏刀杆 / with MT shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e MK MT l
过孔 / Guidance- $\emptyset$ 15,0 - 25,0	
15,0	
16,0	
17,0	
17,5	
18,0	
19,0	13 154 3 280
20,0	
21,0	
22,0	
23,0	
24,0	
25,0	

莫氏刀杆 / with MT shank	
货号 / Ord.-No.	
d	d <sub>1</sub> e MK MT l
过孔 / Guidance- $\emptyset$ 19,0 - 30,0	
19,0	
20,0	
21,0	
22,0	
23,0	17 172 3 301
24,0	
25,0	
26,0	
28,0	
30,0	

刀杆 / Holder TUHW



刀杆 / Holder TUHW 双轴套 / 2pcs. with sleeve



沉头孔 / Counterbore TU				刀杆 TUHW** 2支与轴套*** Holder TUHW** 2pcs. with sleeve***				刀杆 / Holder TUH**							
∅ 44,0 – 62,0				侧面刀杆 / with Weldon shank				莫氏刀杆 / with MT shank							
货号 / Ord.-No.				货号 Ord.-No.				货号 Ord.-No.							
d	d <sub>1</sub>	l	HSS 硬质合金 braced carbide	d <sub>3</sub>	d <sub>1</sub>	e	d <sub>2</sub>	l	d	d <sub>1</sub>	e	MK MT	l	货号 Ord.-No.	
沉头孔- / Counterbore-∅ 44,0 – 48,0				过孔尺寸- / Guidance-∅ ≥22,0 2支 / 2pcs.				过孔尺寸- / Guidance-∅ 22,0 – 33,0							
44,0			TU4401901 TU4401905	19,0	19	183	20	272	22,0					TUH2201903	
45,0			TU4501901 TU4501905						23,0					TUH2301903	
46,0	19	32	TU4601901 TU4601905						24,0					TUH2401903	
47,0			TU4701901 TU4701905						25,0					TUH2501903	
48,0			TU4801901 TU4801905						26,0	19	188	3	321	TUH2601903	
									28,0					TUH2801903	
									30,0					TUH3001903	
									32,0					TUH3201903	
									33,0					TUH3301903	

沉头孔- / Counterbore-∅ 49,0 – 54,0				过孔尺寸- / Guidance-∅ ≥24,0 2支 / 2pcs.				过孔尺寸- / Guidance-∅ 24,0 – 36,0						
49,0			TU4902101 TU4902105	21,0	21	199	25	296	24,0					TUH2402104
50,0			TU5002101 TU5002105						25,0					TUH2502104
51,0	21	34	TU5102101 TU5102105						26,0					TUH2602104
52,0			TU5202101 TU5202105						28,0					TUH2802104
53,0			TU5302101 TU5302105						30,0	21	205	4	364	TUH3002104
54,0			TU5402101 TU5402105						32,0					TUH3202104
									33,0					TUH3302104
									35,0					TUH3502104
									36,0					TUH3602104

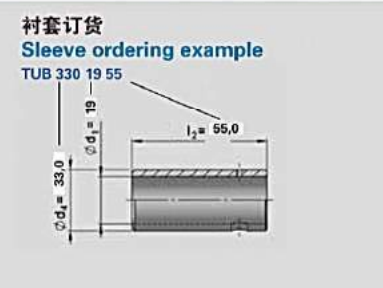
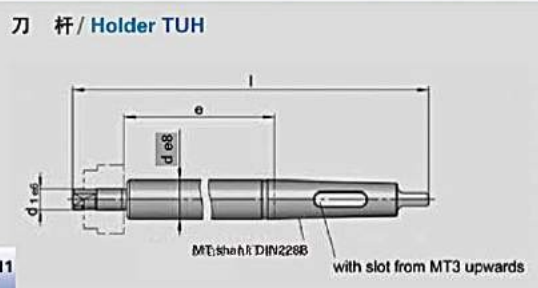
沉头孔- / Counterbore-∅ 55,0 – 62,0				过孔尺寸- / Guidance-∅ ≥28,0 2支 / 2pcs.				过孔尺寸- / Guidance-∅ 28,0 – 39,0						
55,0			TU5502501 TU5502505	25,0	25	218	25	317	28,0					TUH2802504
56,0			TU5602501 TU5602505						30,0					TUH3002504
57,0			TU5702501 TU5702505						32,0					TUH3202504
58,0			TU5802501 TU5802505						33,0	25	224	4	385	TUH3302504
59,0	25	36	TU5902501 TU5902505						35,0					TUH3502504
60,0			TU6002501 TU6002505						36,0					TUH3602504
61,0			TU6102501 TU6102505						39,0					TUH3902504
62,0			TU6202501 TU6202505											

例如沉头孔d=45, 过孔d<sub>4</sub>=25H9  
Ordering example for counterbore d = 45 and through/hole d<sub>4</sub> = 25H9

沉头孔 / Counterbore d = 45, HSS	TU	450	19 01
刀杆 / Holder		TUHW	19 19 20
轴套 / Sleeve* d <sub>4</sub> = 25	TUB	250	19 55

或: 刀杆 1支 / alternative: one-piece-holder  
刀杆 / Holder d = 25, MK 3 TUH 250 19 03

订货发货: THUW2支, 4支衬套  
(衬套需单独订) / Scope of delivery for TUHW (2pcs.-version) complete with 4 threaded pins to secure the sleeve; TUB sleeves must be ordered separately.  
\* 过孔尺寸为2倍 需订2支衬套 / for double guidance length: order 2pcs. TUB



沉头孔 / Counterbore TU				刀杆 TUHW** 2支与轴套*** Holder TUHW** 2pcs. with sleeve***				刀杆 / Holder TUH**							
∅ 63,0 – 115,0				侧面刀杆 / with Weldon shank				莫氏刀杆 / with MT shank							
货号 / Ord.-No.				货号 Ord.-No.				货号 Ord.-No.							
d	d <sub>1</sub>	l	HSS 硬质合金 braced carbide	d <sub>3</sub>	d <sub>1</sub>	e	d <sub>2</sub>	l	d	d <sub>1</sub>	e	MK MT	l	货号 Ord.-No.	
沉头孔- / Counterbore-∅ 63,0 – 71,0				过孔尺寸- / Guidance-∅ ≥32,0 2支 / 2pcs.				过孔尺寸- / Guidance-∅ 32,0 – 45,0							
63,0			TU6302801 TU6302805	28,0	28	235	32	341	32,0					TUH3202804	
64,0			TU6402801 TU6402805						33,0					TUH3302804	
65,0			TU6502801 TU6502805						35,0					TUH3502804	
66,0			TU6602801 TU6602805						36,0	28	241	4	405	TUH3602804	
67,0	28	38	TU6702801 TU6702805						39,0					TUH3902804	
68,0			TU6802801 TU6802805						40,0					TUH4002804	
69,0			TU6902801 TU6902805						42,0					TUH4202804	
70,0			TU7002801 TU7002805						45,0					TUH4502804	
71,0			TU7102801 TU7102805												

沉头孔- / Counterbore-∅ 74,0 – 80,0				过孔尺寸- / Guidance-∅ ≥33,0 2支 / 2pcs.				过孔尺寸- / Guidance-∅ 33,0 – 36,0						
74,0			TU7403001 TU7403005	30,0	30	250	32	364	33,0					TUH3303005
76,0			TU7603001 TU7603005						36,0	30	256	5	460	TUH3603005
78,0			TU7803001 TU7803005											
80,0			TU8003001 TU8003005											

沉头孔- / Counterbore-∅ 82,0 – 90,0				过孔尺寸- / Guidance-∅ ≥39,0 2支 / 2pcs.				过孔尺寸- / Guidance-∅ 36,0 – 48,0						
82,0			TU8203501 TU8203505	35,0	35	250	40	374	36,0					TUH3603505
85,0	35	50	TU8503501 TU8503505						39,0					TUH3903505
90,0			TU9003501 TU8503505						42,0	35	258	5	460	TUH4203505
									45,0					TUH4503505
									48,0					TUH4803505

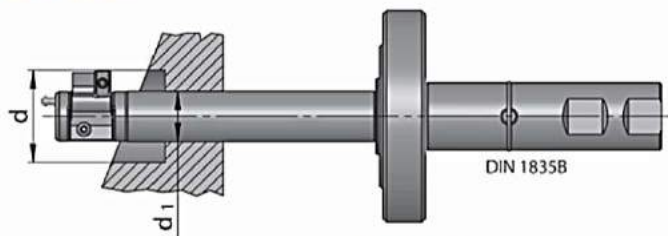
沉头孔- / Counterbore-∅ 92,0 – 100,0				过孔尺寸- / Guidance-∅ ≥45,0 2支 / 2pcs.				过孔尺寸- / Guidance-∅ 42,0 – 52,0						
92,0			TU9204001 TU9204005	40,0	40	260	40	394	42,0					TUH4204005
95,0			TU9504001 TU9504005						45,0					TUH4504005
98,0	40	60	TU9804001 TU9804005						48,0	40	266	5	480	TUH4804005
100,0			TU10004001 TU10004005						52,0					TUH5204005

沉头孔- / Counterbore-∅ 105,0 – 115,0				过孔尺寸- / Guidance-∅ ≥48,0 2支 / 2pcs.				过孔尺寸- / Guidance-∅ 48,0 – 62,0						
105,0			TU10504501 TU10504505	45,0	45	250	50	404	48,0					TUH4804505
107,0			TU10704501 TU10704505						52,0	45	256	5	480	TUH5204505
110,0	45	70	TU11004501 TU11004505						62,0					TUH6204505
112,0			TU11204501 TU11204505											
115,0			TU11504501 TU11504505											





飞轮式自动反划刀  
Autofacer with flywheel

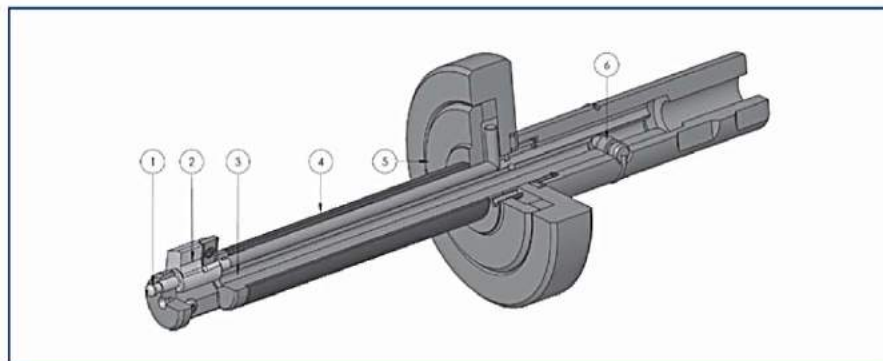


优势:

- 通过主轴快速旋转, 打开刀夹
- 适用于自动推拉切削, 沉头孔切削及导角切削
- 大直径沉头孔切削(2.2X $d_1$ , from  $d_1=12,5$ )
- 适用于各种主轴高转速机床

Advantages:

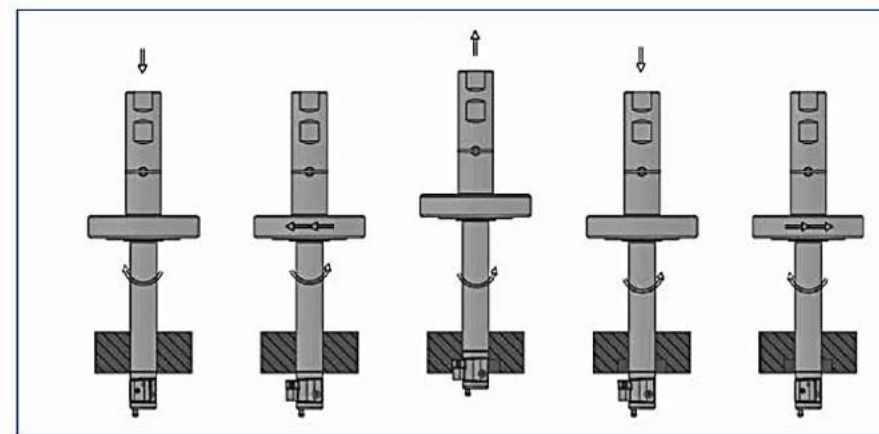
- Easy and safe activation by inertia of flywheel when fast reversing the spindle rotation
- Automatic (forward and) backward spotfacing, counterboring, chamfering
- Big cutting width (up to 2.2 x  $d_1$ , from  $d_1 = 12,5$ )
- Applicable on all machines with fast accelerating spindle



- ① 锁销
- ② 刀夹
- ③ 中心冷却  $d_1=15,5\text{mm}$
- ④ 旋转导向轴套  $d_1=15,5\text{mm}$
- ⑤ 飞轮
- ⑥ 拉力保护锁销 ( $d_1 = 31,5 \text{ mm}$ )

- ① Pivot pin for cutter blade activation, enables quick change
- ② Master holder with indexable insert, respectively carbide cutter blade
- ③ Internal coolant from  $d_1 = 15,5 \text{ mm}$
- ④ Rotating guide sleeve from  $d_1 = 15,5 \text{ mm}$
- ⑤ Activating mechanism with flywheel ensures reliable cutter blade positioning
- ⑥ Safety shear pin protects from overstressing (up to  $d_1 = 31,5 \text{ mm}$ )

飞轮式自动反划刀应用图示  
Autofacer with flywheel, function



锥形自动反划刀  
Autofacer cone activated



优势:

- 当主轴反转, 工件内圆锥形的刀夹自动打开,
- 可实现反划沉头孔导角
- 安全可靠的设计, 避免撞刀风险
- 适用于低转速的主轴机床

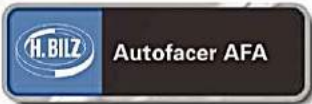
Advantages:

- Cone grips the face of workpiece for easy and safe activation when reversing the spindle rotation
- Automatic backward spotfacing, counterboring, chamfering
- Lean design avoids collisions
- Applicable on all machines also with slow accelerating spindle

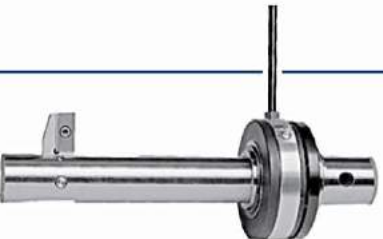



自动反划刀根据客户需求量身定制  
如有任何需求请参看 (P.15) 技术资料

Autofacers are designed individually for each specific application.  
For requests and orders please use the Technical Questionnaire (P. 17).





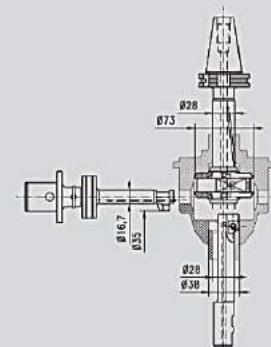
各式自动反刍刀  
Further Autofacer versions

	<p>超大倍径自动反刍刀 3 x d Extended spotface diameter up to 3 x d</p>
	<p>扭矩开关式自动反刍刀 Torque bar activated</p>
	<p>气压或中心冷却压力式自动反刍刀(最小15bar) Air or coolant activated (min. 15 bar)</p>
	<p>高精度可调刀片式自动反刍刀 For high precision tolerances with adjustable inserts</p>

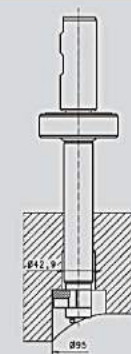
应用案例 / Application example:

客户问题 / The customer's problem	BILZ 解决方案 / The BILZ solution:
<p><b>差速器壳</b> Differential housing</p>  <p>工件材料 Workpiece material: GGG 60</p> <p>设备 / Machine tool: 加工中心 Machining Center</p> <p>工艺 Cutting process: 保证同轴度的推拉式切削 / Spotfacing, forward and backward in one machining step</p>	<p><b>双片刀夹自动反刍刀</b> Autofacer with double inserts</p>  <p><math>d = 40 \times 88 (2,2 \times d)</math> <math>V_c = 90 \text{ m/min}</math> <math>f = 0,02 \text{ mm/U / mm/rev}</math> <math>R_z &lt; 10 \text{ } \mu\text{m}</math></p>

差速器壳



汽轮机壳



船用设备支架



金属加工相关信息表  
/To determine tool requirements  
for quotations and orders:

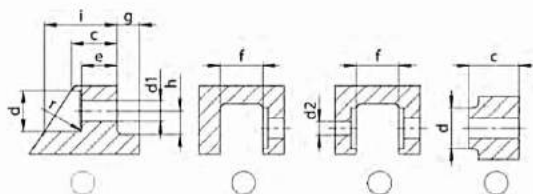
公司 /Customer

.....  
.....  
.....

部门 /Department

Tel. .... Fax .....  
Email .....

工 件 / Workpiece 请根据图片选择 / Mark application or include a part print



D ..... ± ..... i .....
D <sub>1</sub> ..... ± ..... R .....
D <sub>2</sub> ..... ± ..... G .....
E ..... H .....
C ..... F .....

待加工孔数量 / Bores per year: .....

材 料 / Material ..... / ..... HRC

排 削 / Chips:  短削 / Short  长削 / Long

冷 却 / Coolant

 中心内冷 / Internal coolant  
 干切 / Dry  MMS 微量润滑 冷却液 / Emulsion  润滑油 / Oil  
..... bar ..... l/min

加工设备 / Machine

型号 / Type ..... / ..... kW

主轴型号 / Spindle type

 卧加 / Horizontal  立加 / Vertical刀具 / Tool:  旋转 / Rotating  夹持 / Fix

刀具 / Tool (特殊选项 / Specifications optional)

描述 / Description .....

涂层 / Coating:  TiAlN  TiN .....

选项 / Options:

柄部接口 / Shank .....

 HSS  VHM / Carbide  WSP / Index inserts

数量 / Quantity .....

 PKD / PCD  HM / Brazed carbide

目前正在使用的刀具 / Tools used so far

结构 / Sketch

