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**Innovation Is
Our Tool**

SWISS  QUALITY

URMA RX large



BRAND-NEW

大, 更大, **RX** 超大
高性能大直径铰削

Big, Bigger, RX Large.
High performance reaming for
big sizes.

能源行业 Energy Industry



要求

- 精度
- 流程可靠性
- 易操作
- 效率

"行星齿轮架" 案例
材料: EN-GJS 400

Requirements

- Precision
- Process reliability
- Simple handling
- Productivity

Example of a "Planet Carrier" Application

Material: EN-GJS 400

Application Data

vc	125	m/min
fz	0.20	mm
z	12	
vf	530	mm/min
ap	0.15	mm
Ø	180 N6	mm
L	2x120	mm
XS	650	mm



机器制造行业 Machine Building Industry



要求

- 精度
- 工艺可靠性
- 低成本
- 易操作性

“泵壳”应用案例
材料: GG25

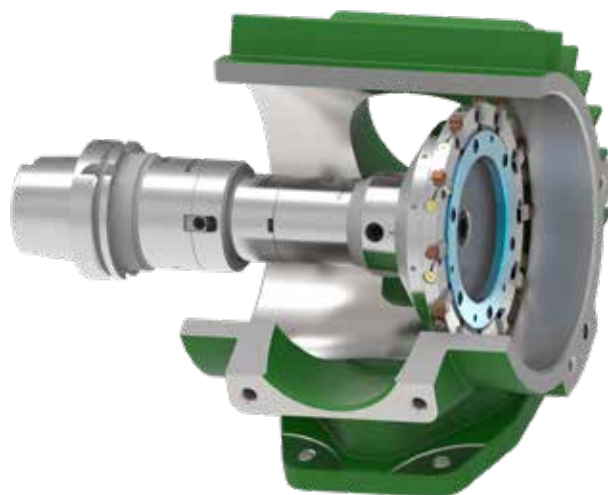
Requirements

- Precision
- Process reliability
- Low costs
- Simple handling

Example of a "Pump Housing" Application
Material: GG25

Application Data

vc	100	m/min
fz	0.15	mm
z	12	
vf	353	mm/min
ap	0.15	mm
Ø	162 H8	mm
L	300	mm
Ra	1.2	µm
XS	350	mm



Ø 139.801 – 200.200 mm

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RX large

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Ø 139.801 - 200.200 mm

优势 Your Advantages



关键点

- 铰削孔径范围 Ø 140 – 200.2mm
- 基于可靠的RX技术。高精度, 易

操作

- 显著的节约得益于高性能切削
- 模块化与刀片技术的结合带来高度灵活性
- 调整简单
- 重磨快速简单
- 全球应用支持及工艺保证

Key Points

- Reaming range Ø 139.801 – 200.2 mm
- High precision and easy handling based on the very reliable RX-technology
- Significant savings thanks to high-performance cutting
- High flexibility due to modularity in combination with insert technology
- No adjustment efforts for the customer
- Quick and easy reconditioning of worn-out reaming heads
- Worldwide application support and process guarantee



系统

- 每10mm 一个直径范围
- 库存刀片，交期短

操作

- 快速，简易的铰刀头更换。
- 减少操作失误和时间

精度

- 铰刀头最高重复定位精度(<4 μ m)
- 精密孔的可靠加工

灵活性

- 易于变换不同槽型和涂层
- 标准部件轻松调整刀具长度
- 无需额外付费即可获得直径范围内任意尺寸与公差

刀片

- 最新的切削材料和涂层得到最好刀具性能及寿命
- 可定制特殊应用槽型
- 拥有专利的刀片技术

节约

- 在保证最大工艺稳定性的前提下，通过高进给来提升效率
- 简单，快速的铰刀头更换，无需额外调整
- 最少的停机时间

可持续性

- 极低的硬质合金比率
- 无限重磨使用的铰刀头
- 无焊接带来的环境污染

The System

- Useable \varnothing -range of 10 mm per system-size
- Short delivery time due to stock inserts

The Handling

- Quick and easy changing of reaming head
- Reduces operating errors to the minimum

The Precision

- Highest positioning accuracy by every change of reaming head (<4 μ m)
- Reliable machining of precise bores

The Flexibility

- Change to a different geometry and/or coating made easy
- Easy adaption of tool length with standard components
- Intermediate sizes and any type of tolerances without surcharge

The Insert

- Latest cutting materials and coatings for best performance and tool life
- Additional application-dedicated geometries available
- Patent pending of insert-technology

The Savings

- Increased productivity through high feed rates while maintaining a maximum of process reliability
- Easy and quick reaming head change – no additional adjustments needed
- Minimized machine down time

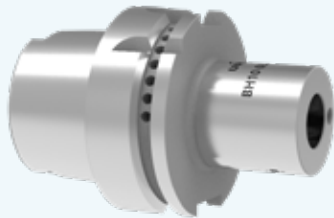
The Sustainability

- Carbide rate reduced to a minimum
- Unlimited reconditioning of reaming head
- No environmental contamination through brazing

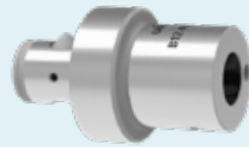
Ø 139.801 - 200.200 mm

钨马 RX large 大直径铰刀
URMA Reaming RX large

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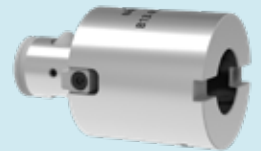


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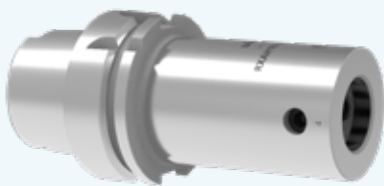
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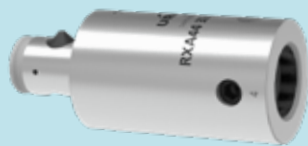
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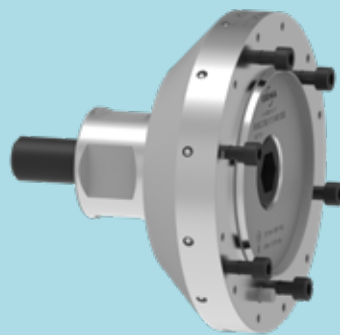
Ø 139.801 - 200.200 mm

Ø 139.801 - 200.200 mm

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Ø 139.801 - 200.200 mm

刀片

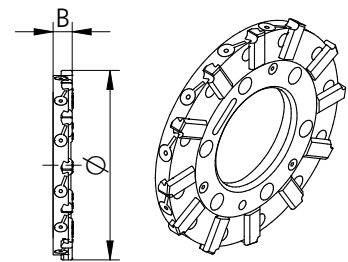
Inserts



直槽刀片

Straight Fluted Reaming Heads (RXEG)

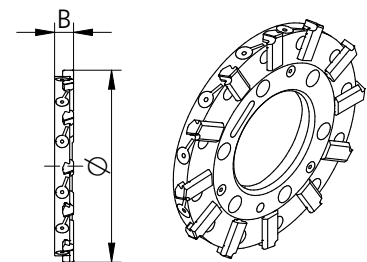
System Size	Ø-Range	B	z	MB	VE	Order Number	Stock
RX 150	139.801 - 149.800	15	12	1	1	RXEG...	▲
RX 160	149.801 - 159.800	15	12	1	1	For order	▲
RX 170	159.801 - 169.800	15	12	1	1	example see	▲
RX 180	169.801 - 179.800	15	12	1	1	page 15	▲
RX 190	179.801 - 189.800	15	12	1	1		▲
RX 200	189.801 - 200.200	15	12	1	1		▲



左旋槽刀片

Left Helical Fluted Reaming Heads (RXEL)

System Size	Ø-Range	B	z	MB	VE	Order Number	Stock
RX 150	139.801 - 149.800	15	12	1	1	RXEL...	▲
RX 160	149.801 - 159.800	15	12	1	1	For order	▲
RX 170	159.801 - 169.800	15	12	1	1	example see	▲
RX 180	169.801 - 179.800	15	12	1	1	page 15	▲
RX 190	179.801 - 189.800	15	12	1	1		▲
RX 200	189.801 - 200.200	15	12	1	1		▲



z 切削刃数
MB 最小订购量
VE 包装数量

z Number of teeth
MB Minimum order quantity
VE Packaging quantity

● 标准库存品
On stock

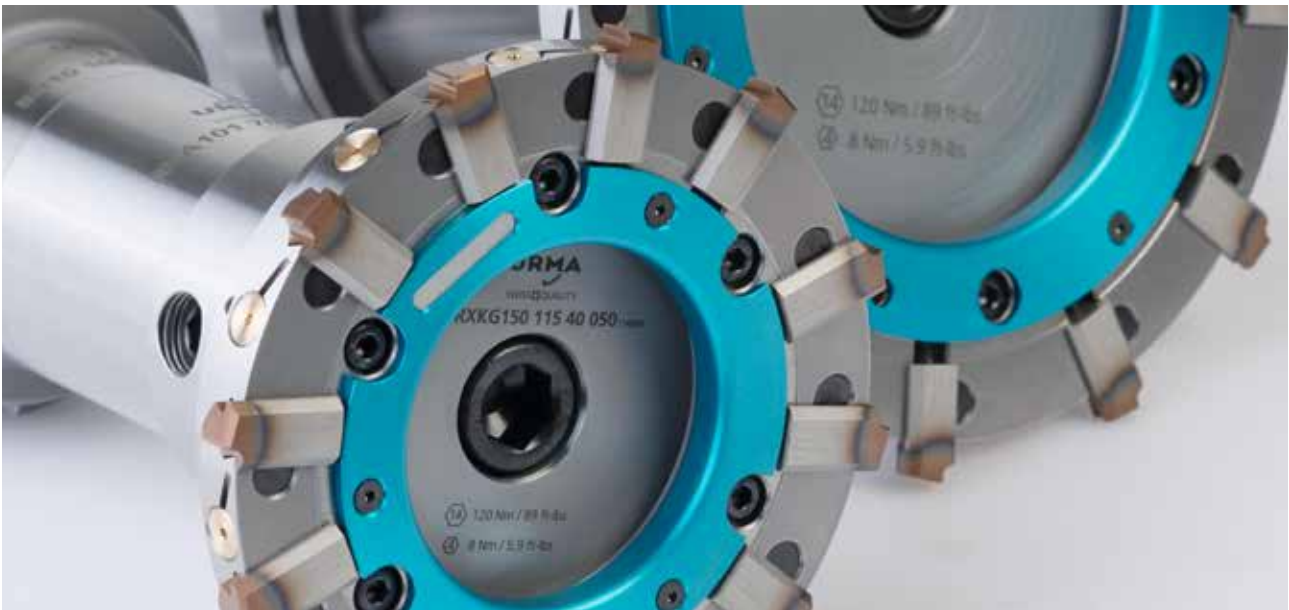
▲ 可加急
Short-term availability

○ 按需定制
Availability on request

所有尺寸单位为毫米
All dimensions in mm

RX large 库存

Stock List RX large



直槽刀片(RXEG)

Straight Fluted Inserts (RXEG)

Ø	URMA Order Number	Stock	
139.801 - 200.200	RXEGxxx.xxxQ-A06 E612R1	▲	不同材料的槽型及参数选择见36页 For Material-specific geometries and cutting data see page 36
	RXEGxxx.xxxQ-G16 E612R1	▲	
	RXEGxxx.xxxQ-C16 E612R1	▲	
	RXEGxxx.xxxQ-A06U2 E612R1	▲	
	RXEGxxx.xxxQ-G16U2 E612R1	▲	
	RXEGxxx.xxxQ-C16U2 E612R1	▲	
	RXEGxxx.xxxQ-A01U3 E614R2	▲	
	RXEGxxx.xxxQ-C11U3 E614R2	▲	
	RXEGxxx.xxxQ-C16 E621C	▲	

左旋槽刀片(RXEL)

Left Helical Fluted Inserts (RXEL)

Ø	URMA Order Number	Stock	
139.801 - 200.200	RXELxxx.xxxQ-C16 E612R1	▲	不同材料的槽型及参数选择见36页 For Material-specific geometries and cutting data see page 36
	RXELxxx.xxxQ-B06 E612R1	▲	
	RXELxxx.xxxQ-C16U2 E612R1	▲	
	RXELxxx.xxxQ-B06U2 E612R1	▲	
	RXELxxx.xxxQ-C16 E621C	▲	
	RXELxxx.xxxQ-A06 E612R1	▲	

● 标准库存品
On stock

▲ 可加急
Short-term availability

○ 按需定制
Availability on request

所有尺寸单位为毫米
All dimensions in mm

刀片尺寸说明

Explanation of Insert Size

对于特殊孔公差订单，直径按照铇马标准处理。取决于公差范围，基准直径为总公差带的65%至80%。

For requests with specifications of bore tolerance, the reaming head diameter is defined by the URMA standard. Depending on the diameter and the tolerance range, the reaming head diameter will be within 65% to 80% of the total bore tolerance range.

铇马标准定义的为目标基准尺寸（Q刀片）。

The diameter specified by the URMA standard is always shown as a target size dimension (Q-insert).

示例1：需要ISO孔公差

直径：160H7

Example 1: Request with ISO bore tolerance

Diameter: 160H7

按铇马标准目标基准直径尺寸为：

直径：160.033mm

Target size diameter according to URMA standard:

Diameter: 160.033mm

铇刀头产品号为：

RXEL160.033Q-A01 E612R1

Reaming head part number:

RXEL160.033Q-A01 E612R1

示例2：需要孔公差

直径：185 +0.030-0.015mm

Example 2: Request with bore tolerance

Diameter: 185 +0.030 -0.015mm

按铇马标准目标基准直径尺寸为：

直径：185.021mm

Target size diameter according URMA standard:

Diameter: 185.021mm

铇刀头产品号为：

RXEL185.021Q-C01 E614R2

Reaming head part number:

RXEG185.021Q-C01 E614R2

示例3：需要铇刀目标基准直径尺寸为：

直径：193.158mm

Example 3: Request with reaming head target size

Diameter: 193.158mm

按铇马标准目标基准直径尺寸为：

直径：193.158mm

Target size diameter according URMA-standard:

Diameter: 193.158mm

铇刀头产品号为：

RXEL193.158Q-B06 E612R1

Reaming head part number:

RXEL193.158Q-B06 E612R1

铇刀头的制造公差始终为 $\pm 0.003\text{mm}$

The reaming head manufacturing tolerance is always $\pm 0.003\text{mm}$

订单示例

Order Example

刀片直径标注方式

Insert diameter

期望的刀片尺寸(Q标注法)

Target size (Q-Insert)

Example	订单示例
	Order example RXEG 156.020Q -A01 U3 E614R2

RXE **RX medium**
系统代码
RX large
system designation

G 排屑槽型代码
(G=直槽; L=左旋槽)
Flute form (G = straight;
L = left-hand helix)

Diameter	156.020 刀片直径标注方式 (mm) Insert diameter (mm)
	Q 定制直径刀片代码 Code for target size insert

A01 切削角度代码
Cutting geometry

Option	U3 刃口处理代码 Edge preparation
--------	--------------------------------------

E6 刀片材质代码
详见31页
Cutting material
For details see page 31

14R 涂层代码
详见31页
Coating
For details see page 31

2 **1=薄涂层**
2=厚涂层
1 = thin coating
2 = thick coating

刃口处理代码 (微处理)
Edge preparation (nano finishing)

U2 细微
刃口处理
Medium
edge-preparation

U3 中等
刃口处理
Large
edge-preparation

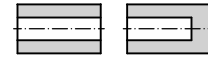
U_ 其他刃口处理
按需定制
Other edge-preparations
on request

Ø 139.801 - 200.200 mm



刀杆

Insert Holders



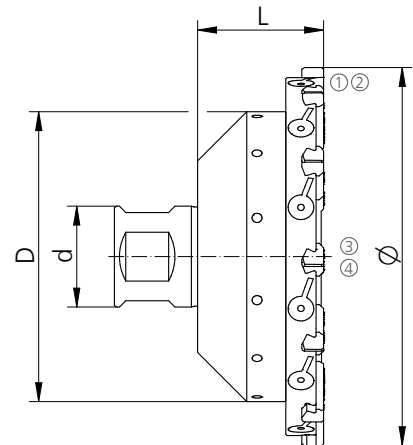
System Size	Ø-Range	L	D	d	kg	Order Number "G"	Stock
RX 150 / RX 160	139.801 - 159.800	50	115	40	2.639	RXKG150 115 40 050	●
RX 170 / RX 180	159.801 - 179.800	50	135	40	3.410	RXKG170 135 40 050	●
RX 190 / RX 200	179.801 - 200.200	50	155	40	4.526	RXKG190 155 40 050	●

发货清单：一套替换螺钉和一把扳手 (推荐使用扭矩扳手，见 27 页)

安装及操作详见 48 至 50 页

Scope of delivery: 1 set of replacement screws and 1 hex allen key (torque wrench is recommended, page 27)

See pages 48 + 50 for details on assembly and handling



Spare Parts

备件

System Size	①	②	③	④
RX 150 / RX 160	C00 22 07	G00 02 05	C00 24 34	G00 02 16
RX 170 / RX 180	C00 22 07	G00 02 05	C00 24 34	G00 02 16
RX 190 / RX 200	C00 22 07	G00 02 05	C00 24 34	G00 02 16

● 标准库存品
On stock

▲ 可加急
Short-term availability

○ 按需定制
Availability on request

所有尺寸单位为毫米
All dimensions in mm

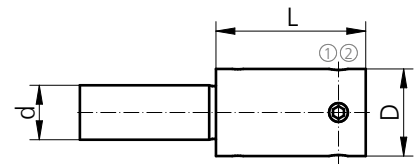
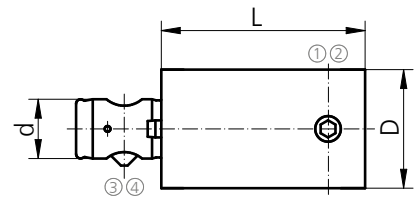
Ø 139.801 - 200.200 mm



接杆(带跳动补偿装置)

Shanks (With Integrated Compensation Device)

System Size	Ø-Range	L	D	MCM	kg	Order Number	Stock
RX 150 - RX 200	139.801 - 200.200	100	76	B 63	2.5	RXA101 76 BM63 100	●
		160	76	B 63	3.9	RXA101 76 BM63 160	●
		100	76	WD 40	2.8	RXA101 76 ZS40 100	▲
		160	76	WD 40	4.2	RXA101 76 ZS40 160	▲



刀杆连接类别

Definition of Clamping Holder

BM = 钨马 Beta 模块(模块化)
WD = 侧压柄 DIN 1835-B (定制)

BM = URMA Beta Module (modular)
WD = Weldon DIN 1835-B (on request)

钨马接口代码

Handling of URMA Match Codes

MCC 刀刃方向的接口代码

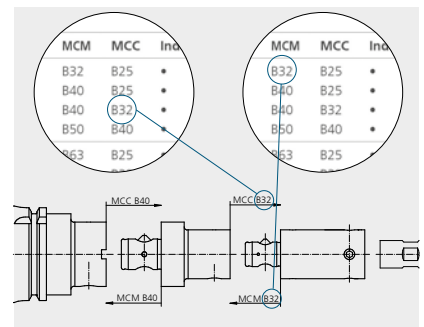
MCM 机床方向的接口代码

MCC和MCM表示刀具组件装配的不同连接特征, 这些代码必须相互匹配。

MCC Match code towards cutting edges

MCM Match code towards machine

MCC and MCM show the different couplings to mount the tool components. These match codes have to correspond.



备件

Spare Parts

System Size	①	②	③	④
RX 150 - RX 200	C00 90 16 (4x)	G00 02 08	Z00 63 21	Z00 63 23

Ø 139.801 - 200.200 mm

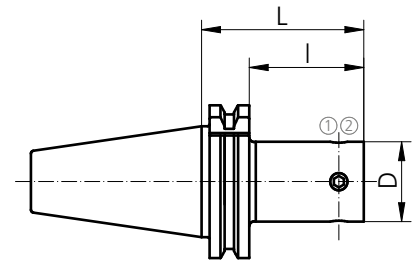


刀柄(带跳动补偿装置)

Adaptors (With Integrated Compensation Device)

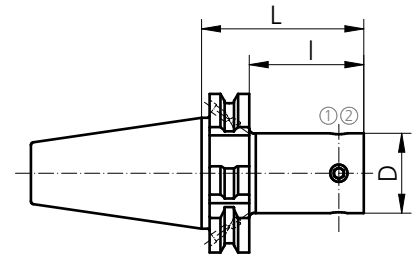
DIN 69871-AD

System Size	Size	L	I	D	kg	Order Number	Stock
RX 150 - RX 200	SK 40	95	76	76	2.2	RXAD10 40A 101 095	●
RX 150 - RX 200	SK 50	95	76	76	4.6	RXAD10 50A 101 095	●



DIN 69871-B

System Size	Size	L	I	D	kg	Order Number	Stock
RX 150 - RX 200	SK 40	95	76	76	2.2	RXAD10 40B 101 095	●
RX 150 - RX 200	SK 50	95	76	76	4.6	RXAD10 50B 101 095	●



备件
Spare Parts

System Size	①	②
RX 150 - RX 200	 C00 90 16 (4x)	 G00 02 08

Ø 139.801 - 200.200 mm

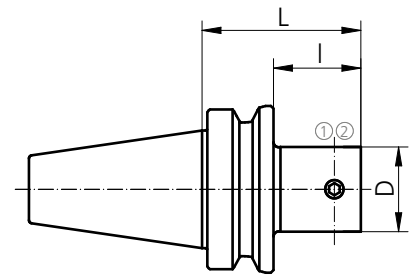


刀柄(带跳动补偿装置)

Adaptors (With Integrated Compensation Device)

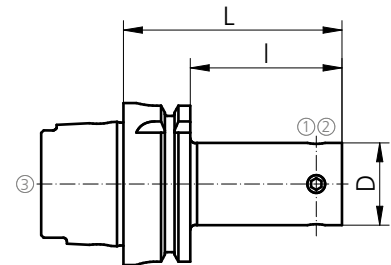
MAS-BT JIS 6339-AD

System Size	Size	L	I	D	kg	Order Number	Stock
RX 150 - RX 200	BT 40	95	-	76	2.5	RXAT10 40A 101 095	●
RX 150 - RX 200	BT 50	95	57	76	5.1	RXAT10 50A 101 095	●



DIN 69893-HSK-A

System Size	Size	L	I	D	kg	Order Number	Stock
RX 150 - RX 200	HSK 63	120	94	76	2.4	RXAH10 63A 101 120*	●
RX 150 - RX 200	HSK 100	130	101	76	5	RXAH10 100A 101 130*	●



* 不包含冷却管

* Coolant tube is not included

备件
Spare Parts

冷却液套管
Coolant Tube

System Size	①	②
RX 150 - RX 200	C00 90 16 (4x)	G00 02 08

Size	③
63	H00 63 01
100	H00 100 01

Ø 139.801 - 200.200 mm



延长杆

Extensions Beta Module

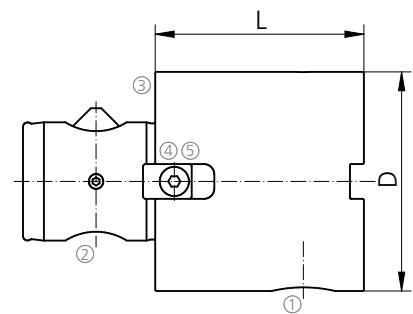
Beta-Beta 延长杆

Extensions Beta-Beta

Beta	L	D	MCM	MCC	kg	Order Number	Stock
63	60	63	B63	B63	1.3	B13 63 63 060	●
63	125	63	B63	B63	2.9	B13 63 63 125	●
80	80	80	B80	B80	2.9	B13 80 80 080	●
80	160	80	B80	B80	6	B13 80 80 160	●
100	80	100	B100	B100	4.9	B13 100 100 080	●
100	180	100	B100	B100	10.9	B13 100 100 180	●

MCM / MCC = "Match Code" 配合接口代码描述详见 17页

MCM / MCC = For "match code" description see page 17



备件

Spare Parts

Beta	①	②	③	④	⑤
63	Z00 63 24	Z00 63 21	Z00 63 23	Z00 63 25	C00 22 05
80	Z00 80 24	Z00 80 21	Z00 80 23	Z00 80 25	C00 22 07
100	Z00 100 24	Z00 100 21	Z00 100 23	Z00 100 25	C00 22 71

● 标准库存品
On stock

▲ 可加急
Short-term availability

○ 按需定制
Availability on request

所有尺寸单位为毫米
All dimensions in mm

Ø 139.801 - 200.200 mm



变径杆

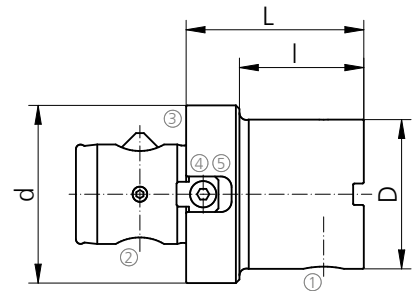
Reducers Beta Module

Beta 变径杆

Reducers Beta-Beta

Beta 1	Beta 2	L	l	D	d	MCM	MCC	kg	Order Number	Stock
80	63	60	35	63	80	B80	B63	2.4	B12 80 63 060	●
100	63	60	35	63	100	B100	B63	3.3	B12 100 63 060	●
100	80	75	50	80	100	B100	B80	3.5	B12 100 80 075	●

MCM / MCC = "Match Code" 配合接口代码描述详见 17 页
 MCM / MCC = For "match code" description see page 17



备件

Spare Parts

Beta	①	②	③	④	⑤
63	Z00 63 24	Z00 63 21	Z00 63 23	Z00 63 25	C00 22 05
80	Z00 80 24	Z00 80 21	Z00 80 23	Z00 80 25	C00 22 07
100	Z00 100 24	Z00 100 21	Z00 100 23	Z00 100 25	C00 22 71

● 标准库存品
On stock

▲ 可加急
Short-term availability

○ 按需定制
Availability on request

所有尺寸单位为毫米
All dimensions in mm

Ø 139.801 - 200.200 mm

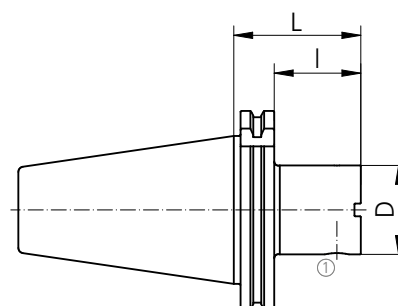


Beta 系统刀柄

System Holders Beta Module

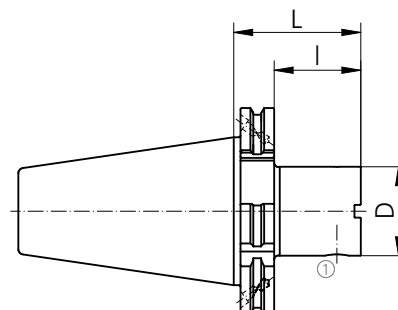
DIN 69871-AD

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
SK 50	63	60	41	63	B63	3.3	BD10 50A 63 060	●
SK 50	80	70	51	80	B80	4.0	BD10 50A 80 070	●
SK 50	100	115	96	100	B100	6.9	BD10 50A 100 115	●



DIN 69871-B

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
SK 50	63	60	41	63	B63	3.3	BD10 50B 63 060	●
SK 50	100	115	96	100	B100	6.9	BD10 50B 100 115	●



MCM / MCC = "Match Code" 配合接口代码描述详见 17 页

MCM / MCC = For "match code" description see page 17

备件

Spare Parts

Beta	①
63	Z00 63 24
80	Z00 80 24
100	Z00 100 24

● 标准库存品
On stock

▲ 可加急
Short-term availability

○ 按需定制
Availability on request

所有尺寸单位为毫米
All dimensions in mm

Ø 139.801 - 200.200 mm

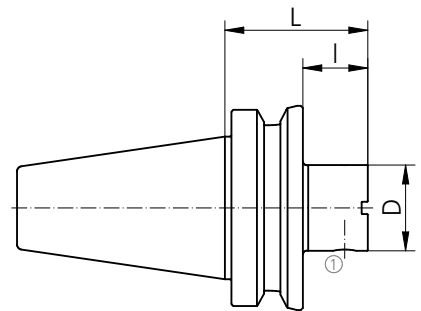


Beta 系统刀柄

System Holders Beta Module

MAS-BT JIS 6339-AD

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
BT 50	63	80	42	63	B63	4.3	BT10 50A 63 080	●
BT 50	80	100	62	80	B80	5.5	BT10 50A 80 100	●
BT 50	100	110	72	100	B100	7.0	BT10 50A 100 110	●



DIN 69893-HSK-A

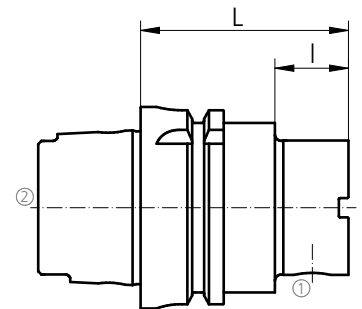
Size	Beta	L	I	D	MCC	kg	Order Number	Stock
HSK 100	63	80	35	63	B63	4.3	BH10 100A 63 080*	●
HSK 100	80	90	45	80	B80	5.5	BH10 100A 80 090*	●
HSK 100	100	100	55	100	B100	7.0	BH10 100A 100 100*	●

* 不包含冷却管

* Coolant tube is not included

MCM / MCC = "Match Code" 配合接口代码描述详见 17 页

MCM / MCC = For "match code" description see page 17



备件
Spare Parts

冷却液套管
Coolant Tube

Beta	①
63	Z00 63 24
80	Z00 80 24
100	Z00 100 24

Size	②
63	H00 63 01
100	H00 100 01

Ø 139.801 - 200.200 mm

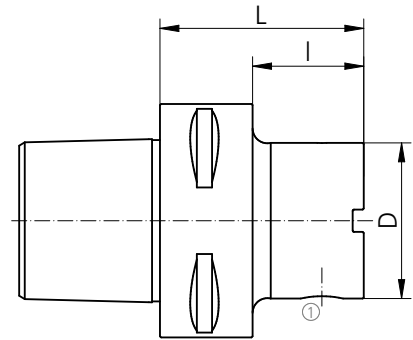
Beta 系统刀柄

System Holders Beta Module



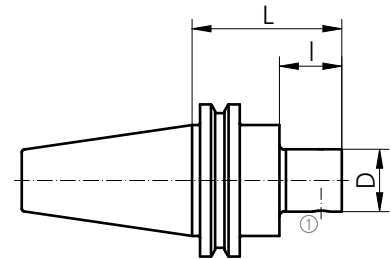
ISO 26623-1-PSC

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
PSC 63	63	65	40	63	B63	1.5	C10 63 63 065	●



ASME B5.50-CAT-AD

Size	Beta	L	I	D	MCC	kg	Order Number	Stock
CAT 50	63	65	30	63	B63	3.0	C6U4-B063	○
CAT 50	80	75	40	80	B80	3.3	C6U4-B080	○
CAT 50	100	125	106	100	B100	4.5	C6U4-B100	○



MCM / MCC = "Match Code" 配合接口代码描述详见 17 页
MCM / MCC = For "match code" description see page 17

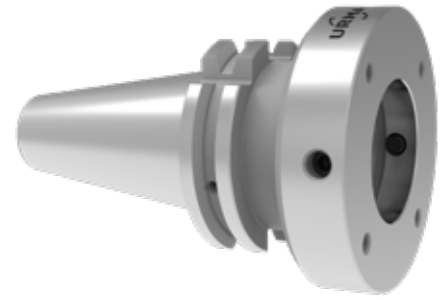
备件 Spare Parts

Beta	①
63	Z00 63 24
80	Z00 80 24
100	Z00 100 24

- 标准库存品
On stock
- ▲ 可加急
Short-term availability
- 按需定制
Availability on request

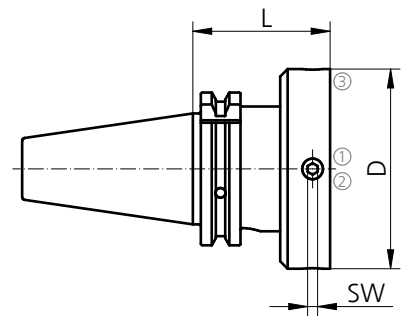
所有尺寸单位为毫米
All dimensions in mm

模块化刀柄
Module Holders



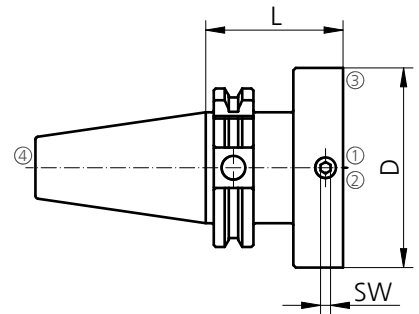
DIN 69871-AD/B

Size	L	D	SW	Order Number	Stock
SK 50	60	100	5	AD10 50AB 100 060	●
SK 50	60	117	5	AD10 50AB 117 060	●
SK 50	60	140	5	AD10 50AB 140 060	○



ASME B5.50-CAT-AD/B*

Size	L	D	SW	Order Number	Stock
CAT 50	60	100	5	AC10 50AB 100 060	●
CAT 50	60	117	5	AC10 50AB 117 060	●
CAT 50	60	140	5	AC10 50AB 140 060	○



* CAT = 英制拉钉且无定位槽

* CAT = metrical pull-stud thread incl. retention knob

备件
Spare Parts

D	①	②
100	C00 03 28	G00 02 06
117	C00 03 28	G00 02 06
140	C00 03 28	G00 02 06

附件
Accessories

D	③	④
40		C97 40 00
50		C97 50 00
100	C00 22 15	
117	C00 22 15	
140	C00 22 64	

● 标准库存品
On stock

▲ 可加急
Short-term availability

○ 按需定制
Availability on request

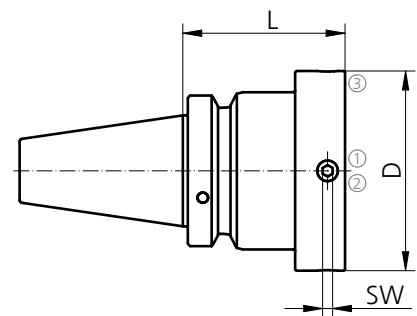
所有尺寸单位为毫米
All dimensions in mm

模块化刀柄
Module Holders



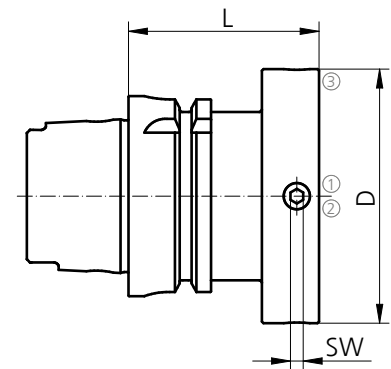
MAS-BT JIS 6339-AD/B

Size	L	D	SW	Order Number	Stock
BT 50	70	100	5	AT10 50AB 100 070	●
BT 50	80	117	5	AT10 50AB 117 080	●
BT 50	80	140	5	AT10 50AB 140 080	○



DIN 69893-HSK-A

Size	L	D	SW	Order Number	Stock
HSK 63	65	100	5	AH10 63A 100 065*	●
HSK 100	55	80	4	AH10 100A 80 055*	●
HSK 100	65	100	5	AH10 100A 100 065*	●
HSK 100	65	117	5	AH10 100A 117 065*	●
HSK 100	75	140	5	AH10 100A 140 075*	○



* Coolant tube is not included

* 不包含冷却管

备件
Spare Parts

D	①	②
100	C00 03 28	G00 02 06
117	C00 03 28	G00 02 06
140	C00 03 28	G00 02 06

附件
Accessories

D	③
100	C00 22 15
117	C00 22 15
140	C00 22 64

冷却液套管
Coolant Tube

Size	④
100	H00 100 01

● 标准库存品
On stock

▲ 可加急
Short-term availability

○ 按需定制
Availability on request

所有尺寸单位为毫米
All dimensions in mm

附件

Accessories

扭矩扳手

Torque Wrench for Reaming Heads

System Size	Torque	Order Number	Stock
RX 150 - RX 200	4 - 20Nm	G00 40 20	▲
	40 - 200Nm	G00 40 40	▲



六角扳手头

Hex Bit Socket

System Size	Size	Order Number	Stock
RX 150 - RX 200	SW4	G00 40 41	▲
	SW14	G00 40 42	▲



测量设备

Measuring Device

Type	Description	Order Number	Stock
Twin T10	电子测量装置, 包括电池。 Electronic measuring instrument, batteries incl.	04430013	○
LRC 6, AA	电池(三个) Batteries (3 pieces)	04768002	○
GT 31	杠杆测头 Lever probe	03210802	○
MGA	可调支架 Magnetic articulated arm	01639022	○



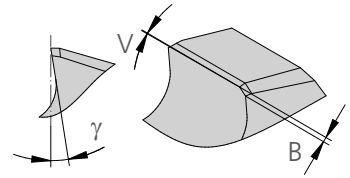
Twin T10



MGA

URMA Reaming RX Large Technology Guide

刀片角度
Cutting Geometries



vf	Geo	直槽 RXG	左旋槽 RXL	孔的类型	fz mm	Ra μm	Zyl.	Pos	FC	MD
	A0	▲		▲ (K1-K8)*	REFERENCE VALUE					
	B0	□	▲	▲	↗	👍	👎	👎	↗	↗
	C0	▲		▲ (K1-K8)*	↗	👍	👎	👎	↗	↗
	C1	▲	▲	▲ (K1-K8)*	↗	👍	👎	👎	↗	↗
	G0	▲	□	▲ (K1-K8)*	↘	👎	👍	👍	↘	↘
	G1	▲	□	▲ (K1-K8)*	↘	=	👍	👍	↘	↘

Geo	γ	B	V	W	ap mm	Ra μm	Zyl.	FC	MD	
STANDARD GEOMETRY (REFERENCE VALUE)										
__1	=	=	↘	=	=	=	=	↗	↗	=
__2	=	↘	=	=	↘	=	=	=	=	↘
__3	=	=	=	↘	=	👍	=	↘	↘	=
__4	=	=	=	↗	=	=	=	↗	↗	=
__5	↗	=	↗	=	=	=	=	↘	↘	=
__6	=	↗	=	=	↗	=	=	=	=	↗
__7	=	↗	=	=	↗	=	=	=	=	↗
__8	=	↗	=	=	↗	=	=	=	=	↗

定义和基本计算公式，见第 56 页

See page 56 for definitions and basic formulas

- B = 倒角长度
- V = 背锥
- W = 刃带宽度
- FC = 切削力
- MD = 扭矩
- γ = 径向前角
- vf = 进给方向

- ▲ = 推荐的
- = 可适用的
- = 可能的
- ↗ = 更高的值
- ↘ = 更低的值
- 👍 = 有助于
- 👎 = 不利于

* 材料分类见 32 页

* See page 32 for material group

- B = Chamfer length
- V = Back taper
- W = Margin width
- FC = Cutting force
- MD = Torque
- γ = Radial rake angle
- vf = Feed direction
- ▲ = Recommended
- = Applicable
- = Possible
- ↗ = Higher value
- ↘ = Lower value
- 👍 = Improved
- 👎 = Worse

刀片材质概览
Cutting Materials Overview

SEE PAGE 32 FOR MATERIAL DETAILS

工件材料 Workpiece Material	ISO材料代码 ISISO Material Code	UFURMA材料代码 UFURMA Material Code	刀片材质 Cutting Materials		涂层 Coating													
			URMA Code	E6	00	01P_	05P_	07R_	08P_	12R_	14R_	17B_	18B_	10C	21C			
			硬质合金 HM / Carbide	不涂层 Uncoated	TiN	AlTiN	iAlN + AlCrN	AlCrN	AlCrN	AlCrN	AlCrN	TiSiN	DLC	DLC				
			涂层厚度 1=薄 2=厚 Coating Thickness: 1 = Thin / 2 = Thick															
				1	2	1	1	2	1	2	1	1	2	1	1			
P	P1		▲	□	□							▲	■		□	□		
	P2		▲	□	□							▲	■		□	□		
	P3		▲	□	□							▲	■		□	□		
	P4		▲	□	□							▲	■		□	□		
	P5		▲	□	□							▲	■		□	□		
	P6		▲	□	□							▲	■		□	□		
	P7		▲	□	□							▲	■		□	□		
M	M1		▲	□	□							▲	■		□	□		
	M2		▲	□	□							▲	■		□	□		
	M3		▲	□	□							▲	■		□	□		
	M4		▲	□	□							▲	■		□	□		
	M5		▲	□	□							▲	■		□	□		
	M6		▲	□	□							▲	■		□	□		
K	K1		▲	□		□	□				□		■	▲	□	□		
	K2		▲	□		□	□				□		■	▲	□	□		
	K3		▲	□		□	□				□		■	▲	□	□		
	K4		▲	□		□	□				□		■	▲	□	□		
	K5		▲	□	□		□	□	□	□	□		■	▲	□	□		
	K6		▲	□	□		□	□	□	□	□		■	▲	□	□		
	K7		▲	□	□		□	□	□	□	□	▲	■	□	□	□		
	K8		▲	□	□		□	□	□	□	□	▲	■	□	□	□		
N	N1		▲	□											▲			
	N2		▲	□											▲	□		
	N3		▲	□											▲	▲		
	N4		▲	□											▲	▲		
	N5		▲	□											□	▲		
	N6		▲	□												▲		
S	S1		▲	□	□							▲	■		□	□		
	S2		▲	□	□							▲	■		□	□		
	S3		▲	□	□							▲	■		□	□		
	S4		▲	□	□							▲	■		□	□		
	S11		▲	□	□							▲	■		□	□		
	S12		▲	□	□							▲	■		□	□		
	S13		▲	□	□							▲	■		□	□		
	S14		▲	□	□							▲	■		□	□		
H	H1		▲	□	□			▲				■	□		□			
	H2		▲	□	□			▲				■	□		□			
	H3		▲	□	□			▲				■	□		□			
SM	SM1		▲	□	□							▲	■		□	□		
	SM2		▲	□	□							▲	■		□	□		
	SM3		▲	□	□							▲	■		□	□		
O	O1		▲	□											▲			
	O2		▲	□											▲			
	O3		▲	□												▲		
	O4		▲	□												▲		

- ▲ = 推荐的 ▲ = Recommended
- = 可适用的 ■ = Applicable
- = 可能的 □ = Possible
- = 按需使用 ○ = On request

材料对照表

Material Comparison Table

钢
Steel

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
P	P1	易切钢	Free-cutting steels	< 600	< 180	1600	0.18	1.0715	11SMn30
	P2	低合金铁素体钢、C < 0.25%、低合金可焊接通用结构钢	Low-alloy ferritic steels, C < 0.25%wt, low-alloy general structural steels	< 700	< 210	1700	0.18	1.0038	S235JRG2
	P3	铁素体及铁素体、珠光体钢, C < 0.25%、可焊接通用结构钢、冷作硬化钢	Ferritic and ferritic / pearlitic steels, C < 0.25%wt, weldable general structural steels, case-hardening steels	< 800	< 240	1800	0.21	1.7131	16MnCr5
	P4	热处理钢、结构钢 C > 0.25%	Heat-treatable steels, construction steels C > 0.25%	< 1000	< 300	1800	0.23	1.1191 1.7225	C45E 42CrMo4
	P5	淬火钢、C > 0.67%、弹簧钢、轴承钢	Through-hardening steels, C > 0.67%wt, spring and bearing steels	700 - 1100	210 - 325	1700	0.27	1.1274 1.2067	C100S 100Cr6
	P6	合金工具钢	Alloyed tool steels	700 - 1200	210 - 350	2200	0.25	1.2601	X165CrMoV12
	P7	高合金工具钢、高速钢(HSS)	High alloyed tool steels, high speed steels (HSS)	> 900	> 260	2300	0.25	1.2083 1.2344	X42Cr13 X40CrMoV5-1

奥氏体及双相不锈钢

Stainless Austenitic Steel and Duplex

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
M	M1	铁素体及马氏体不锈钢	Ferritic & martensitic stainless steels	500 - 900	150 - 260	1700	0.22	1.4005 1.4512 1.4021	X12CrS13 X5CrTi12 X20Cr13
	M2	易切奥氏体不锈钢, 容易加工	Free-cutting austenitic stainless steels, less difficult machinable	500 - 900	150 - 260	1700	0.22	1.4305	X8CrNiS18 9
	M3	低合金奥氏体不锈钢	Low-alloy austenitic stainless steels			2000	0.2	1.4301	X5CrNi18 10
	M4	中合金奥氏体不锈钢	Alloyed austenitic stainless steels			2100	0.2	1.4435	X2CrNiMo18 14 3
	M5	高合金奥氏体不锈钢及双相不锈钢	High-alloy austenitic and duplex stainless steels			2300	0.2	1.4462 1.4548	X2CrNiMoN22 5 3 X5CrNiCuNb17 4 4
	M6	奥氏体、双相及超级双相不锈钢、非常难加工	Austenite, duplex and super duplex, very difficult to machine	700 - 1000	210 - 300	2300	0.2	1.4410	X2CrNiMoN25 7 4

材料对照表

Material Comparison Table

铸铁

Cast Irons

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
K	K1	灰铸铁	Grey cast irons	< 300	< 90	1100	0.25	0.6025	EN-GJL-250 (GG25)
	K2	灰铸铁	Grey cast irons	> 300	> 90	1300	0.27	0.6035	EN-GJL-350 (GG35)
	K3	球墨铸铁 可锻铸铁	Ductil cast irons, Malleable cast irons	< 500	< 150	900	0.25	0.7040	EN-GJS-400-15 (GGG40)
	K4	球墨铸铁 可锻铸铁	Ductil cast irons, Malleable cast irons	< 800	< 210	1400	0.28	0.7060	EN-GJS-600-3 (GGG60)
	K5	奥贝球铁	Austempered ductile irons	< 1100	< 325	1500	0.32		EN-GJS-1000-5
	K6	蠕墨铸铁	Compactet graphite irons	300 - 500	90 - 150				EN-GJV-400
	K7	层状奥氏体铸铁	Austenitic lamellar cast irons	< 400				0.6655	GGL-NiCuCr 15 6 2
	K8	球状奥氏体 蠕墨及球墨铁	Austenitic spheroidal graphite and ductil iron	300 - 600	90 - 180			0.7673	EN-GJSA- XNiMn23-4

有色金属

Non-Ferrous Metals

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
N	N1	可锻铝合金 硅含量 < 2%	Aluminum wrought alloy with Si < 2%	< 300	< 150	600	0.23	3.3535	AlMg3
	N2	铝合金, 硅含量 < 7%	Aluminum alloys, Si < 7%	< 400	< 120	700	0.25	3.2152	AlSi6Cu4
	N3	铝合金 8% < 硅含量 < 15% 及镁合金	Aluminum alloys 8% < Si < 15% and alloys Magnesium	< 400	< 120	700	0.25	3.2163	AlSi9Cu3 AlSi12
	N4	铝合金, 硅含量 > 15%	Aluminum alloys, Si > 15%	> 400	> 120	800	0.25		AlSi17Cu4Mg
	N5	铜合金易加工	Copper alloys, good machinability	< 700	< 210	800	0.2	2.0401 2.1090	CuZn39Pb3 CuSn7Zn4Pb7-C
	N6	铜合金难加工	Copper alloys, more difficult machinability	> 500	> 150	1000	0.25	2.0966	CuAl10Ni5Fe4

材料对照表

Material Comparison Table

耐热合金

Superalloys

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
S	S1	铁基高温合金	Iron based superalloys	< 800	< 240	2400	0.23	2.4858	NiCr21Mo (Alloy 825)
	S2	铁基高温合金	Iron based superalloys	> 800	> 240	2600	0.23	1.4980	X6NiCrTi- MoVB25-15-2 (Alloy A-286)
	S3	钴基高温合金	Cobalt based superalloys	600 - 1200		2800	0.23	2.4979	CoCr28MoNi (Stellite 21)
	S4	镍基高温合金	Nickel based superalloys	700 - 1500		3100	0.23	2.4668	NiCr19NbMo (Inconel 718)

钛合金

Titanium Alloys

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
S	S11	钛, 低合金 (α)	Titanium, low alloyed (α)	< 800	< 240	1300	0.22	3.7025 3.7035 3.7055	Ti1 (Grade 1) Ti2 (Grade 2) Ti3 (Grade 3)
	S12	钛, 中合金 (近 $\alpha + \beta$)	Titanium, medium alloyed (close to $\alpha + \beta$)	< 1100	< 325	1500	0.22		Ti6Al2Sn 4Zr2Mo0.1Si
	S13	钛, 高合金 ($\alpha + \beta$)	Titanium, high alloyed ($\alpha + \beta$)	900 - 1200	265 - 355	1500	0.22	3.7165	TiAl6V4 (Grade 5)
	S14	钛, 高合金 (β)	Titanium, high alloyed (β)	> 1200	> 355	1700	0.22		Ti10V2Fe3Al Ti5Al5Mo5V3Cr

淬硬钢

Hardened Steels

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
H	H1	表面硬化钢, 可热处理钢, 轴承钢, 工具钢	Case hardening steels, heat-treatable steels, bearing steels, tool steels	1450 - 1800	< 520	3300	0.22		HRC 45 - 52
	H2	表面硬化钢, 可热处理钢, 轴承钢, 工具钢	Case hardening steels, heat-treatable steels, bearing steels, tool steels	1800 - 2100	520 - 600	4100	0.22		HRC 53 - 57
	H3	表面硬化钢, 可热处理钢, 轴承钢, 工具钢高速钢	Case hardening steels, heat-treatable steels, bearing steels, tool steels, high-speed steels	> 2100	> 600	4700	0.22		HRC 58 - 62

材料对照表

Material Comparison Table

粉末冶金材料

Powder Metallurgical Materials

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
SM	SM1	低合金烧结材料	Low alloyed sintered materials	200 - 450	< 135				Sint-D11 / C11
	SM2	中合金烧结材料 镍含量 < 7%	Medium alloyed sintered materials with Ni < 7%	400 - 600	120 - 180				Sint-D31 / C31
	SM3	高、合金烧结材料 镍含量 > 7%	High alloyed sintered materials with Cr and Ni > 7%	400 - 600	120 - 180				Sint-D40 / C40 (AISI 316)

复合材料

Composite Materials

ISO	UMC	描述	Description	Rm [N/mm ²]	HB	Kc1.1	mc	DIN Nr.	示例 Example
O	O1	热塑性聚合物	Thermoplastic polymers			150	0.26		Polyamid 6 (PA 6) Polyoxymethylen (POM)
	O2	热固性塑料	Thermosetting plastics			150	0.26		Epoxyharze (EP)
	O3	增强塑料玻璃纤维 < 50%	Reinforced plastics with < 50% glass fibers			300	0.26		Polyamid 6 mit 30% GF (PA 6 GF30)
	O4	玻璃纤维, 碳纤维芳纶增强塑料	Glass fiber-, carbon fiber- and aramid reinforced plastics			300	0.26		GFK CFK

RX large 铰刀切削参数

Cutting Data RX large



通孔
Through Bore

ISO	UMC	AC	Type	槽型 Geometry	材质 Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200
P	P1	1	RXEL	B06	E612R1	●	120-150-180	0.18-0.25-0.35	0.08-0.10-0.20
		2	RXEL	B06	E612R1	●	100-130-150	0.18-0.22-0.30	
		3	RXEL	C16	E612R1	●	70-100-130	0.12-0.16-0.20	
	P2	1	RXEL	B06	E612R1	●	120-150-180	0.18-0.25-0.35	0.08-0.10-0.20
		2	RXEL	B06	E612R1	●	100-130-150	0.18-0.22-0.30	
		3	RXEL	C16	E612R1	●	70-100-130	0.12-0.16-0.20	
	P3	1	RXEL	B06	E612R1	●	110-140-160	0.18-0.25-0.35	0.08-0.10-0.20
		2	RXEL	B06	E612R1	●	90-120-140	0.18-0.22-0.30	
		3	RXEL	C16	E612R1	●	70-100-120	0.12-0.16-0.20	
	P4	1	RXEL	B06	E612R1	●	110-140-160	0.18-0.22-0.30	0.08-0.10-0.15
		2	RXEL	B06	E612R1	●	90-120-140	0.16-0.20-0.28	
		3	RXEL	C16	E612R1	●	70-100-120	0.10-0.14-0.18	
	P5	1	RXEL	B06	E612R1	●	100-130-150	0.15-0.20-0.25	0.08-0.10-0.15
		2	RXEL	C16	E612R1	●	80-110-130	0.15-0.18-0.22	
		3	RXEL	A06	E612R1	●	70-100-120	0.10-0.14-0.18	
	P6	1	RXEL	C16	E612R1	●	50-80-100	0.10-0.14-0.16	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	40-70-90	0.08-0.10-0.12	
		3	RXEL	A06	E612R1	●	25-50-70	0.06-0.08-0.12	
	P7	1	RXEL	A06	E612R1	●	15-25-40	0.08-0.10-0.12	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	15-20-30	0.06-0.08-0.12	
		3	RXEL	A06	E612R1	●	15-20-30	0.06-0.08-0.10	
M	M1	1	RXEL	B06	E612R1	●	50-80-100	0.15-0.20-0.25	0.08-0.10-0.15
		2	RXEL	B06	E612R1	●	40-70-90	0.15-0.18-0.22	
		3	RXEL	C16	E612R1	●	25-50-70	0.12-0.14-0.18	
	M2	1	RXEL	B06	E612R1	●	50-80-100	0.15-0.20-0.25	0.05-0.10-0.12
		2	RXEL	B06	E612R1	●	40-70-90	0.15-0.18-0.22	
		3	RXEL	C16	E612R1	●	25-50-70	0.12-0.14-0.18	
	M3	1	RXEL	B06	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.12
		2	RXEL	B06	E612R1	●	40-60-80	0.08-0.10-0.12	
		3	RXEL	C16	E612R1	●	25-40-70	0.06-0.08-0.12	
	M4	1	RXEL	C16	E612R1	●	25-40-60	0.08-0.10-0.14	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	20-35-55	0.08-0.10-0.14	
		3	RXEL	A06	E612R1	●	20-30-50	0.08-0.10-0.14	
	M5	1	RXEL	A06	E612R1	●	15-25-35	0.05-0.08-0.12	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	15-25-35	0.05-0.08-0.12	
		3	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.12	
	M6	1	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.12	0.05-0.10-0.12
		2	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.12	
		3	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.12	



AC 应用条件

- 1 工况良好
- 夹具、机床及工件刚性好
- 刀具长径比 < 3xD
- 排屑良好
- 内冷压力大于 20bar

- 2 工况一般
- 夹具、机床及工件刚性略差
- 刀具长径比 < 6xD
- 排屑较差
- 有内冷

- 3 工况极差
- 刚性差
- 刀具长径比 < 8xD
- 排屑差
- 有内冷



AC Application Conditions

- 1 Optimal conditions
- Stable fixture, machine and/or workpiece
- Tool projection length < 3xD
- Optimal chip removal guaranteed
- Internal coolant supply > 20 bar

- 2 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 6xD
- No optimal chip removal guaranteed
- Internal coolant supply available

- 3 Difficult conditions
- Unstable fixture, machine and/or workpiece
- Tool projection length < 8xD
- Critical chip evacuation
- Internal coolant supply available

- 标准库存品 ▲ 可加急
On stock Short-term availability

SEE PAGE 32 FOR MATERIAL DETAILS



通孔带断续切削
Through Bore With Interruption

! 类型		槽型	材质	Stock	Vc	fz 连续切削 fz Full Cut	fz 断续切削 fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
AC	Type	Geometry	Grade					
4	RXEL	C16	E612R1	●	120-150-180	0.16-0.20-0.25	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.08-0.10-0.20
5	RXEL	C16U2	E612R1	●	100-130-150	0.12-0.18-0.22		
6	RXEG	A06U2	E612R1	●	70-100-130	0.10-0.15-0.20		
4	RXEL	C16	E612R1	●	120-150-180	0.16-0.20-0.25		
5	RXEL	C16U2	E612R1	●	100-130-150	0.12-0.18-0.22		
6	RXEG	A06U2	E612R1	●	70-100-130	0.10-0.15-0.20		
4	RXEL	C16	E612R1	●	110-140-160	0.16-0.20-0.25		0.08-0.10-0.20
5	RXEL	C16U2	E612R1	●	90-120-140	0.12-0.18-0.22		
6	RXEG	A06U2	E612R1	●	70-100-120	0.10-0.15-0.20		
4	RXEL	C16	E612R1	●	110-140-160	0.15-0.18-0.22		
5	RXEL	C16U2	E612R1	●	90-120-140	0.12-0.16-0.22		
6	RXEG	A06U2	E612R1	●	70-100-120	0.10-0.12-0.18		
4	RXEL	A06	E612R1	●	100-130-150	0.15-0.18-0.22		0.08-0.10-0.15
5	RXEL	A06	E612R1	●	80-110-130	0.12-0.16-0.22		
6	RXEG	A06U2	E612R1	●	70-100-120	0.10-0.12-0.18		
4	RXEL	A06	E612R1	●	50-80-100	0.08-0.10-0.12		
5	RXEL	A06	E612R1	●	40-70-90	0.06-0.08-0.12		
6	RXEG	A06U2	E612R1	●	25-50-70	0.04-0.08-0.10		
4	RXEL	A06	E612R1	●	15-25-40	0.06-0.08-0.12	0.05-0.10-0.12	
5	RXEL	A06	E612R1	●	15-20-30	0.06-0.08-0.12		
6	RXEG	A06U2	E612R1	●	15-20-30	0.04-0.08-0.10		
4	RXEL	A06	E612R1	●	15-25-40	0.06-0.08-0.12		
5	RXEL	A06	E612R1	●	15-20-30	0.06-0.08-0.12		
6	RXEG	A06U2	E612R1	●	15-20-30	0.04-0.08-0.10		
4	RXEL	C16	E612R1	●	50-80-100	0.14-0.16-0.22	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEL	A06	E612R1	●	40-70-90	0.12-0.15-0.20		
6	RXEG	A06	E612R1	●	25-50-70	0.10-0.14-0.18		
4	RXEL	C16	E612R1	●	50-80-100	0.14-0.16-0.22		
5	RXEL	A06	E612R1	●	40-70-90	0.12-0.15-0.20		
6	RXEG	A06	E612R1	●	25-50-70	0.10-0.14-0.18		
4	RXEL	C16	E612R1	●	40-60-80	0.10-0.12-0.16		0.05-0.10-0.12
5	RXEL	A06	E612R1	●	40-60-80	0.08-0.10-0.12		
6	RXEG	A06	E612R1	●	25-40-70	0.06-0.08-0.12		
4	RXEL	A06	E612R1	●	25-40-60	0.08-0.10-0.14		
5	RXEL	A06	E612R1	●	20-35-55	0.08-0.10-0.14		
6	RXEG	A06	E612R1	●	20-30-50	0.08-0.10-0.14		
4	RXEL	A06	E612R1	●	15-25-35	0.08-0.10-0.12		0.05-0.10-0.12
5	RXEL	A06	E612R1	●	15-25-35	0.05-0.08-0.12		
6	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.12		
4	RXEL	A06	E612R1	●	15-20-30	0.08-0.10-0.12		
5	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.12		
6	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.12		

! AC 应用条件
4 工况良好
- 夹具、机床及工件刚性良好
- 刀具长径比 < 3xD
- 排屑良好
- 轻度对称或非对称断续切削 (< 10%)

5 工况一般
- 夹具、机床及工件刚性略差
- 刀具长径比 < 6xD
- 排屑较差
- 中等对称断续切削 (< 30%)

6 工况极差
- 夹具、机床及工件刚性差
- 刀具长径比 < 8xD
- 排屑差
- 中等对称断续切削 (< 30%)

! AC Application Conditions
4 Optimal conditions
- Stable fixture, machine and/or workpiece
- Tool projection length < 3xD
- Optimal chip removal guaranteed
- Slightly symmetrical and asymmetrical interruption (< 10%)

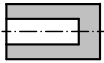
5 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 6xD
- No optimal chip removal guaranteed
- Medium symmetrical interruptions (< 30%)

6 Difficult conditions
- Unstable fixture, machine and/or workpiece
- Tool projection length < 8xD
- No optimal chip removal guaranteed
- Medium symmetrical interruptions (< 30%)

● 标准库存品 ▲ 可加急
On stock Short-term availability

RX large 中径铰刀切削参数

Cutting Data RX large



盲孔
Blind Hole

ISO	UMC	AC	Type	槽型 Geometry	材质 Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200
P	P1	1	RXEG	A06	E612R1	●	120-150-180	0.16-0.20-0.25	0.08-0.10-0.15
		2	RXEG	A06	E612R1	●	100-130-150	0.12-0.18-0.22	
		3	RXEG	G16	E612R1	●	70-100-130	0.08-0.12-0.18	
	P2	1	RXEG	A06	E612R1	●	120-150-180	0.16-0.20-0.25	0.08-0.10-0.15
		2	RXEG	A06	E612R1	●	100-130-150	0.12-0.18-0.22	
		3	RXEG	G16	E612R1	●	70-100-130	0.08-0.12-0.18	
	P3	1	RXEG	A06	E612R1	●	110-140-160	0.16-0.20-0.25	0.08-0.10-0.15
		2	RXEG	A06	E612R1	●	90-120-140	0.12-0.18-0.22	
		3	RXEG	G16	E612R1	●	70-100-120	0.08-0.12-0.18	
	P4	1	RXEG	A06	E612R1	●	110-140-160	0.15-0.18-0.22	0.08-0.10-0.15
		2	RXEG	A06	E612R1	●	90-120-140	0.12-0.16-0.22	
		3	RXEG	G16	E612R1	●	70-100-120	0.08-0.12-0.18	
	P5	1	RXEG	A06	E612R1	●	100-120-140	0.14-0.18-0.20	0.05-0.10-0.12
		2	RXEG	G16	E612R1	●	80-110-130	0.12-0.16-0.20	
		3	RXEG	G16	E612R1	●	70-100-120	0.08-0.12-0.18	
	P6	1	RXEG	A06	E612R1	●	50-80-100	0.10-0.15-0.18	0.05-0.10-0.12
		2	RXEG	G16	E612R1	●	40-70-90	0.08-0.12-0.16	
		3	RXEG	G16	E612R1	●	25-50-70	0.06-0.08-0.12	
	P7	1	RXEG	A06	E612R1	●	15-25-40	0.08-0.12-0.16	0.05-0.10-0.12
		2	RXEG	G16	E612R1	●	15-20-30	0.06-0.08-0.12	
		3	RXEG	G16	E612R1	●	15-20-30	0.06-0.08-0.12	
M	M1	1	RXEG	A06	E612R1	●	50-80-100	0.12-0.15-0.20	0.08-0.10-0.15
		2	RXEG	A06	E612R1	●	40-70-90	0.12-0.15-0.20	
		3	RXEG	G16	E612R1	●	25-50-70	0.10-0.14-0.18	
	M2	1	RXEG	A06	E612R1	●	50-80-100	0.12-0.15-0.20	0.05-0.10-0.12
		2	RXEG	A06	E612R1	●	40-70-90	0.12-0.15-0.20	
		3	RXEG	G16	E612R1	●	25-50-70	0.10-0.14-0.18	
	M3	1	RXEG	A06	E612R1	●	40-60-80	0.10-0.12-0.16	0.05-0.10-0.12
		2	RXEG	A06	E612R1	●	40-60-80	0.08-0.10-0.12	
		3	RXEG	G16	E612R1	●	25-40-70	0.06-0.08-0.12	
	M4	1	RXEG	A06	E612R1	●	25-40-60	0.08-0.10-0.14	0.05-0.10-0.12
		2	RXEG	A06	E612R1	●	20-35-55	0.08-0.10-0.14	
		3	RXEG	G16	E612R1	●	20-30-50	0.08-0.10-0.14	
	M5	1	RXEG	A06	E612R1	●	15-25-35	0.05-0.08-0.12	0.05-0.10-0.12
		2	RXEG	A06	E612R1	●	15-25-35	0.05-0.08-0.12	
		3	RXEG	G16	E612R1	●	15-25-35	0.05-0.08-0.12	
	M6	1	RXEG	A06	E612R1	●	15-20-30	0.05-0.08-0.12	0.05-0.10-0.12
		2	RXEG	A06	E612R1	●	15-20-30	0.05-0.08-0.12	
		3	RXEG	G16	E612R1	●	15-20-30	0.05-0.08-0.12	



AC 应用条件

- 1 工况良好
- 夹具、机床及工件刚性好
- 刀具长径比 < 3xD
- 排屑良好
- 内冷压力大于 20bar

- 2 工况一般
- 夹具、机床及工件刚性略差
- 刀具长径比 < 6xD
- 排屑较差
- 有内冷

- 3 工况极差
- 刚性差
- 刀具长径比 < 8xD
- 排屑差
- 有内冷



AC Application Conditions

- 1 Optimal conditions
- Stable fixture, machine and/or workpiece
- Tool projection length < 3xD
- Optimal chip removal guaranteed
- Internal coolant supply > 20 bar

- 2 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 6xD
- No optimal chip removal guaranteed
- Internal coolant supply available

- 3 Difficult conditions
- Unstable fixture, machine and/or workpiece
- Tool projection length < 8xD
- Critical chip evacuation
- Internal coolant supply available

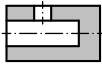
● 标准库存品

On stock

▲ 可加急

Short-term availability

SEE PAGE 32 FOR MATERIAL DETAILS



盲孔带断续切削
Blind Hole With Interruption

! 类型		槽型	材质	Stock	Vc	fz 连续切削 fz Full Cut	fz 断续切削 fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200	
AC	Type	Geometry	Grade						
4	RXEG	A06	E612R1	●	120-150-180	0.16-0.20-0.25	fz 连续切削值降低 30-50% reduce fz full cut 30 - 50%	0.08-0.10-0.15	
5	RXEG	A06U2	E612R1	●	100-130-150	0.12-0.18-0.22			
6	RXEG	G16U2	E612R1	●	70-100-130	0.08-0.12-0.18			
4	RXEG	A06	E612R1	●	120-150-180	0.16-0.20-0.25			
5	RXEG	A06U2	E612R1	●	100-130-150	0.12-0.18-0.22			
6	RXEG	G16U2	E612R1	●	70-100-130	0.08-0.12-0.18			
4	RXEG	A06	E612R1	●	110-140-160	0.16-0.20-0.25		0.08-0.10-0.15	
5	RXEG	A06U2	E612R1	●	90-120-140	0.12-0.18-0.22			
6	RXEG	G16U2	E612R1	●	70-100-120	0.08-0.12-0.18			
4	RXEG	A06	E612R1	●	110-140-160	0.15-0.18-0.22			
5	RXEG	A06U2	E612R1	●	90-120-140	0.12-0.16-0.22			
6	RXEG	G16U2	E612R1	●	70-100-120	0.08-0.12-0.18			
4	RXEG	A06	E612R1	●	100-120-140	0.14-0.18-0.20		0.05-0.10-0.12	
5	RXEG	G16U2	E612R1	●	80-110-130	0.12-0.16-0.20			
6	RXEG	G16U2	E612R1	●	70-100-120	0.08-0.12-0.18			
4	RXEG	A06U2	E612R1	●	50-80-100	0.10-0.15-0.18			
5	RXEG	G16U2	E612R1	●	40-70-90	0.08-0.12-0.16			
6	RXEG	G16U2	E612R1	●	25-50-70	0.06-0.08-0.12			
4	RXEG	A06U2	E612R1	●	15-25-40	0.08-0.12-0.16	0.05-0.10-0.12		
5	RXEG	G16U2	E612R1	●	15-20-30	0.06-0.08-0.12			
6	RXEG	G16U2	E612R1	●	15-20-30	0.06-0.08-0.12			
4	RXEG	A06	E612R1	●	50-80-100	0.12-0.15-0.20		fz 连续切削值降低 30-50% reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEG	A06	E612R1	●	40-70-90	0.10-0.14-0.18			
6	RXEG	G16	E612R1	●	25-50-70	0.10-0.14-0.18			
4	RXEG	A06	E612R1	●	50-80-100	0.12-0.15-0.20			
5	RXEG	A06	E612R1	●	40-70-90	0.10-0.14-0.18			
6	RXEG	G16	E612R1	●	25-50-70	0.10-0.14-0.18			
4	RXEG	A06	E612R1	●	40-60-80	0.10-0.12-0.16	0.05-0.10-0.12		
5	RXEG	A06	E612R1	●	40-60-80	0.06-0.08-0.12			
6	RXEG	G16	E612R1	●	25-40-70	0.06-0.08-0.12			
4	RXEG	A06	E612R1	●	25-40-60	0.08-0.10-0.14			
5	RXEG	G16	E612R1	●	20-35-55	0.08-0.10-0.14			
6	RXEG	G16	E612R1	●	20-30-50	0.08-0.10-0.14			
4	RXEG	A06	E612R1	●	15-25-35	0.05-0.08-0.12	0.05-0.10-0.12		
5	RXEG	G16	E612R1	●	15-25-35	0.05-0.08-0.12			
6	RXEG	G16	E612R1	●	15-25-35	0.05-0.08-0.12			
4	RXEG	A06	E612R1	●	15-20-30	0.05-0.08-0.12			
5	RXEG	G16	E612R1	●	15-20-30	0.05-0.08-0.12			
6	RXEG	G16	E612R1	●	15-20-30	0.05-0.08-0.12			

! AC 应用条件
4 工况良好
- 夹具、机床及工件刚性良好
- 刀具长径比 < 5xD
- 排屑良好
- 轻度对称或非对称断续切削 (< 10%)

5 工况一般
- 夹具、机床及工件刚性略差
- 刀具长径比 < 7xD
- 排屑较差
- 中等对称断续切削 (< 30%)

6 工况极差
- 夹具、机床及工件刚性差
- 刀具长径比 < 9xD
- 排屑差
- 中等对称断续切削 (< 30%)

! AC Application Conditions
4 Optimal conditions
- Stable fixture, machine and/or workpiece
- Tool projection length < 5xD
- Optimal chip removal guaranteed
- Slightly symmetrical and asymmetrical interruption (< 10%)

5 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 7xD
- No optimal chip removal guaranteed
- Medium symmetrical interruptions (< 30%)

6 Difficult conditions
- Unstable fixture, machine and/or workpiece
- Tool projection length < 9xD
- No optimal chip removal guaranteed
- Medium symmetrical interruptions (< 30%)

● 标准库存品 ▲ 可加急
On stock Short-term availability

RX large 中径铰刀切削参数

Cutting Data RX large



通孔
Through Bore

ISO	UMC	AC	Type	槽型 Geometry	材质 Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200
K	K1	1	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20	
	K2	1	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20	
	K3	1	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20	
	K4	1	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20	
	K5	1	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20	
		3	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18	
	K6	1	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20	
		3	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18	
	K7	1	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.15
		2	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14	
		3	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12	
	K8	1	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.15
		2	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14	
		3	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12	
N	N1	1	RXEL	C16	E621C	●	180-250-320	0.18-0.25-0.35	0.08-0.10-0.15
		2	RXEL	C16	E621C	●	160-220-280	0.18-0.22-0.30	
		3	RXEL	C16	E621C	●	140-180-220	0.15-0.18-0.22	
	N2	1	RXEL	C16	E621C	●	180-250-320	0.18-0.25-0.35	0.08-0.10-0.15
		2	RXEL	C16	E621C	●	160-220-280	0.18-0.22-0.30	
		3	RXEL	C16	E621C	●	140-180-220	0.15-0.18-0.22	
	N3	1	RXEL	C16	E621C	●	180-250-320	0.18-0.25-0.35	0.05-0.10-0.15
		2	RXEL	C16	E621C	●	160-220-280	0.18-0.22-0.30	
		3	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20	
	N4	1	RXEL	C16	E621C	●	140-180-220	0.18-0.22-0.30	0.05-0.10-0.15
		2	RXEL	C16	E621C	●	140-180-220	0.16-0.20-0.28	
		3	RXEL	C16	E621C	●	140-160-200	0.12-0.16-0.20	
	N5	1	RXEL	C16	E621C	●	140-180-220	0.16-0.20-0.28	0.05-0.10-0.15
		2	RXEL	C16	E621C	●	140-160-200	0.16-0.20-0.28	
		3	RXEL	C16	E621C	●	120-140-180	0.12-0.16-0.20	
	N6	1	RXEL	C16	E621C	●	50-70-100	0.12-0.18-0.25	0.05-0.10-0.15
		2	RXEL	C16	E621C	●	50-70-100	0.12-0.16-0.22	
		3	RXEL	C16	E621C	●	40-60-80	0.12-0.16-0.22	



AC 应用条件

- 1 工况良好
- 夹具、机床及工件刚性好
- 刀具长径比 < 3xD
- 排屑良好
- 内冷压力大于 20bar

- 2 工况一般
- 夹具、机床及工件刚性略差
- 刀具长径比 < 6xD
- 排屑较差
- 有内冷

- 3 工况极差
- 刚性差
- 刀具长径比 < 8xD
- 排屑差
- 有内冷



AC Application Conditions

- 1 Optimal conditions
- Stable fixture, machine and/or workpiece
- Tool projection length < 3xD
- Optimal chip removal guaranteed
- Internal coolant supply > 20 bar

- 2 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 6xD
- No optimal chip removal guaranteed
- Internal coolant supply available

- 3 Difficult conditions
- Unstable fixture, machine and/or workpiece
- Tool projection length < 8xD
- Critical chip evacuation
- Internal coolant supply available

- 标准库存品 ▲ 可加急

SEE PAGE 33 FOR MATERIAL DETAILS



通孔带断续切削
Through Bore With Interruption

! 类型		槽型	材质	Stock	Vc	fz 连续切削 fz Full Cut	fz 断续切削 fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
AC	Type	Geometry	Grade					
4	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.10-0.15-0.25
5	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30		0.10-0.15-0.25
5	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25		0.10-0.15-0.20
5	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20		
6	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18		
4	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25		
5	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20		
6	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18		
4	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16		0.05-0.10-0.15
5	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14		
6	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12		
4	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16		
5	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14		
6	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12		
4	RXEL	C16	E621C	●	180-250-320	0.18-0.22-0.30	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEL	C16	E621C	●	160-220-280	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	180-250-320	0.18-0.22-0.30		
5	RXEL	C16	E621C	●	160-220-280	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	180-250-320	0.18-0.22-0.30		0.08-0.10-0.15
5	RXEL	C16	E621C	●	160-220-280	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	180-250-320	0.18-0.22-0.30		
5	RXEL	C16	E621C	●	160-220-280	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	140-180-220	0.18-0.22-0.30		0.05-0.10-0.15
5	RXEL	C16	E621C	●	140-180-220	0.16-0.20-0.28		
6	RXEL	C16	E621C	●	140-160-200	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	140-180-220	0.16-0.20-0.28		
5	RXEL	C16	E621C	●	140-160-200	0.16-0.20-0.28		
6	RXEG	G16	E621C	●	120-140-180	0.12-0.16-0.20		
4	RXEL	C16	E621C	●	50-70-100	0.12-0.18-0.25		0.05-0.10-0.15
5	RXEL	C16	E621C	●	50-70-100	0.12-0.16-0.22		
6	RXEG	G16	E621C	●	40-60-80	0.10-0.14-0.20		



AC 应用条件

- 4 工况良好
- 夹具、机床及工件刚性好
- 刀具长径比 < 5xD
- 排屑良好
- 轻度对称或非对称断续切削 (< 10%)

- 5 工况一般
- 夹具、机床及工件刚性略差
- 刀具长径比 < 7xD
- 排屑较差
- 中等对称断续切削 (< 30%)

- 6 工况较差
- 夹具、机床及工件刚性差
- 刀具长径比 < 9xD
- 排屑差
- 中等对称断续切削 (< 30%)



AC Application Conditions

- 4 Optimal conditions
- Stable fixture, machine and/or workpiece
- Tool projection length < 5xD
- Optimal chip removal guaranteed
- Slightly symmetrical and asymmetrical interruption (< 10%)

- 5 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 7xD
- No optimal chip removal guaranteed
- Medium symmetrical interruptions (< 30%)

- 6 Difficult conditions
- Unstable fixture, machine and/or workpiece
- Tool projection length < 9xD
- No optimal chip removal guaranteed
- Medium symmetrical interruptions (< 30%)

- 标准库存品 On stock
▲ 可加急 Short-term availability

RX large 中径铰刀切削参数

Cutting Data RX large



盲孔
Blind Hole

ISO	UMC	AC	Type	槽型 Geometry	材质 Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200
K	K1	1	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20	
	K2	1	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20	
	K3	1	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30	0.10-0.15-0.25
		2	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20	
	K4	1	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25	
		3	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20	
	K5	1	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20	
		3	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18	
	K6	1	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25	0.10-0.15-0.20
		2	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20	
		3	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18	
	K7	1	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.15
		2	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14	
		3	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12	
	K8	1	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16	0.05-0.10-0.15
		2	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14	
		3	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12	
N	N1	1	RXEG	G16	E621C	●	180-250-320	0.18-0.22-0.30	0.08-0.10-0.15
		2	RXEG	G16	E621C	●	160-220-280	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20	
	N2	1	RXEG	G16	E621C	●	180-250-320	0.18-0.22-0.30	0.08-0.10-0.15
		2	RXEG	G16	E621C	●	160-220-280	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20	
	N3	1	RXEG	G16	E621C	●	180-250-320	0.18-0.22-0.30	0.05-0.10-0.15
		2	RXEG	G16	E621C	●	160-220-280	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20	
	N4	1	RXEG	G16	E621C	●	140-180-220	0.18-0.22-0.30	0.05-0.10-0.15
		2	RXEG	G16	E621C	●	140-180-220	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	140-160-200	0.12-0.16-0.20	
	N5	1	RXEG	G16	E621C	●	140-180-220	0.16-0.20-0.28	0.05-0.10-0.15
		2	RXEG	G16	E621C	●	140-160-200	0.16-0.20-0.28	
		3	RXEG	G16	E621C	●	120-140-180	0.12-0.16-0.20	
	N6	1	RXEG	G16	E621C	●	50-70-100	0.12-0.18-0.25	0.05-0.10-0.12
		2	RXEG	G16	E621C	●	50-70-100	0.12-0.16-0.22	
		3	RXEG	G16	E621C	●	40-60-80	0.10-0.14-0.20	



AC 应用条件

- 1 工况良好
 - 夹具、机床及工件刚性好
 - 刀具长径比 < 3xD
 - 排屑良好
 - 内冷压力大于 20bar

- 2 工况一般
 - 夹具、机床及工件刚性略差
 - 刀具长径比 < 6xD
 - 排屑较差
 - 有内冷

- 3 工况极差
 - 刚性差
 - 刀具长径比 < 8xD
 - 排屑差
 - 有内冷



AC Application Conditions

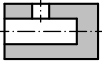
- 1 Optimal conditions
 - Stable fixture, machine and/or workpiece
 - Tool projection length < 3xD
 - Optimal chip removal guaranteed
 - Internal coolant supply > 20 bar

- 2 Suboptimal conditions
 - Slightly unstable fixture, machine and/or workpiece
 - Tool projection length < 6xD
 - No optimal chip removal guaranteed
 - Internal coolant supply available

- 3 Difficult conditions
 - Unstable fixture, machine and/or workpiece
 - Tool projection length < 8xD
 - Critical chip evacuation
 - Internal coolant supply available

● 标准库存品 ▲ 可加急

SEE PAGE 33 FOR MATERIAL DETAILS



盲孔带断续切削
Blind Hole With Interruption

! 类型		槽型	材质	Stock	Vc	fz 连续切削 fz Full Cut	fz 断续切削 fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
AC	Type	Geometry	Grade					
4	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.10-0.15-0.25
5	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	90-120-160	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	80-110-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	70-90-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	120-140-180	0.16-0.22-0.30		
5	RXEG	A01U3	E614R2	●	100-120-140	0.12-0.18-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25		
5	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20		
6	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18		
4	RXEG	A01U3	E614R2	●	60-80-100	0.12-0.18-0.25		
5	RXEG	A01U3	E614R2	●	60-80-100	0.10-0.15-0.20		
6	RXEG	G16U2	E612R1	●	50-70-90	0.10-0.12-0.18		
4	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16		
5	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14		
6	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12		
4	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.14-0.16		
5	RXEG	A06U2	E612R1	●	40-60-80	0.10-0.12-0.14		
6	RXEG	G16U2	E612R1	●	25-40-70	0.08-0.10-0.12		
4	RXEG	G16	E621C	●	180-250-320	0.18-0.25-0.35	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.08-0.10-0.15
5	RXEG	G16	E621C	●	160-220-280	0.18-0.22-0.30		
6	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	180-250-320	0.18-0.25-0.35		
5	RXEG	G16	E621C	●	160-220-280	0.18-0.22-0.30		
6	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	180-250-320	0.18-0.25-0.35		
5	RXEG	G16	E621C	●	160-220-280	0.18-0.22-0.30		
6	RXEG	G16	E621C	●	140-180-220	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	140-180-220	0.18-0.22-0.30		
5	RXEG	G16	E621C	●	140-180-220	0.16-0.20-0.28		
6	RXEG	G16	E621C	●	140-160-200	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	140-180-220	0.16-0.20-0.28		
5	RXEG	G16	E621C	●	140-160-200	0.16-0.20-0.28		
6	RXEG	G16	E621C	●	120-140-180	0.12-0.16-0.20		
4	RXEG	G16	E621C	●	50-70-100	0.12-0.18-0.25		
5	RXEG	G16	E621C	●	50-70-100	0.12-0.16-0.22		
6	RXEG	G16	E621C	●	40-60-80	0.10-0.14-0.20		



AC 应用条件

- 4 工况良好
- 夹具、机床及工件刚性好
- 刀具长径比<5xD
- 排屑良好
- 轻度对称或非对称断续切削 (<10%)

- 5 工况一般
- 夹具、机床及工件刚性略差
- 刀具长径比<7xD
- 排屑较差
- 中等对称断续切削(<30%)

- 6 工况较差
- 夹具、机床及工件刚性差
- 刀具长径比 < 9xD
- 排屑差
- 中等对称断续切削(<30%)



AC Application Conditions

- 4 Optimal conditions
- Stable fixture, machine and/or workpiece
- Tool projection length < 5xD
- Optimal chip removal guaranteed
- Slightly symmetrical and asymmetrical interruption (< 10%)

- 5 Suboptimal conditions
- Slightly unstable fixture, machine and/or workpiece
- Tool projection length < 7xD
- No optimal chip removal guaranteed
- Medium symmetrical interruptions (< 30%)

- 6 Difficult conditions
- Unstable fixture, machine and/or workpiece
- Tool projection length < 9xD
- No optimal chip removal guaranteed
- Medium symmetrical interruptions (< 30%)

- 标准库存品 ▲ 可加急
On stock Short-term availability

RX large 中径铰刀切削参数

Cutting Data RX large



通孔
Through Bore

ISO	UMC	AC	Type	槽型 Geometry	材质 Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200	
S	S1	1	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14	0.05-0.10-0.12	
		2	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
		3	RXEL	A06	E612R1	●	15-25-35	0.06-0.10-0.14		
	S2	1	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.12	0.05-0.10-0.12	
		2	RXEL	A06	E612R1	●	20-30-45	0.05-0.08-0.12		
		3	RXEL	A06	E612R1	●	15-25-35	0.05-0.08-0.12		
	S3	1	RXEL	A06	E612R1	●	15-20-35	0.06-0.10-0.12	0.05-0.08-0.10	
		2	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.10		
		3	RXEL	A06	E612R1	●	8-15-25	0.05-0.08-0.10		
	S4	1	RXEL	A06	E612R1	●	12-18-25	0.05-0.08-0.10	0.05-0.08-0.10	
		2	RXEL	A06	E612R1	●	8-15-20	0.05-0.08-0.10		
		3	RXEL	A06	E612R1	●	5-12-20	0.05-0.08-0.10		
	S	S11	1	RXEL	A06	E612R1	●	20-40-60	0.06-0.10-0.14	0.05-0.10-0.12
			2	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14	
3			RXEL	A06	E612R1	●	15-25-30	0.06-0.10-0.14		
S12		1	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14	0.05-0.10-0.12	
		2	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.14		
		3	RXEL	A06	E612R1	●	15-25-30	0.06-0.10-0.14		
S13		1	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.14	0.05-0.10-0.12	
		2	RXEL	A06	E612R1	●	15-25-30	0.05-0.08-0.10		
		3	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.10		
S14		1	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.10	0.05-0.08-0.10	
		2	RXEL	A06	E612R1	●	10-18-25	0.05-0.08-0.10		
		3	RXEL	A06	E612R1	●	8-15-20	0.05-0.08-0.10		
H	H1	1	RXEG	A06	E612R1	●	15-25-30	0.04-0.06-0.08	0.05-0.08-0.10	
		2	RXEG	A06	E612R1	●	10-18-25	0.04-0.06-0.08		
		3	RXEG	A06	E612R1	●	8-15-20	0.04-0.06-0.08		
	H2	1	RXEG	A06	E607R1	▲	10-18-25	0.04-0.06-0.08	0.05-0.08-0.10	
		2	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08		
		3	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08		
	H3	1	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07	0.05-0.08-0.10	
		2	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
		3	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
SM	SM1	1	RXEL	B06	E612R1	●	120-150-180	0.18-0.25-0.35	0.08-0.10-0.20	
		2	RXEL	B06	E612R1	●	100-130-150	0.18-0.22-0.30		
		3	RXEL	C16	E612R1	●	70-100-130	0.12-0.16-0.20		
	SM2	1	RXEL	B06	E612R1	●	110-140-160	0.18-0.22-0.30	0.08-0.10-0.20	
		2	RXEL	B06	E612R1	●	90-120-140	0.15-0.20-0.25		
		3	RXEL	C16	E612R1	●	70-100-120	0.12-0.15-0.20		
	SM3	1	RXEL	A06	E612R1	●	40-60-80	0.10-0.14-0.18	0.05-0.10-0.12	
		2	RXEL	A06	E612R1	●	40-60-80	0.08-0.12-0.16		
		3	RXEL	A06	E612R1	●	25-40-70	0.06-0.10-0.14		
O	O1	1	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20		
		3	RXEL	C16	E610C	▲	40-60-80	0.10-0.13-0.16		
	O2	1	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20		
		3	RXEL	C16	E610C	▲	40-60-80	0.10-0.13-0.16		
	O3	1	RXEL	C16	E621C	●	40-50-60	0.10-0.15-0.20	0.08-0.10-0.20	
		2	RXEL	C16	E621C	●	40-50-60	0.10-0.15-0.20		
		3	RXEL	C16	E621C	●	40-50-60	0.10-0.13-0.16		
	O4	1	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10	0.08-0.10-0.20	
		2	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10		
		3	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10		

SEE PAGE 34/35 FOR MATERIAL DETAILS

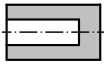


通孔带断续切削
Through Bore With Interruption

AC	Type	Geometry	Grade	Stock	Vc	fz 连续切削 fz Full Cut	fz 断续切削 fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
4	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.05-0.10-0.12
5	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
6	RXEG	A06U2	E612R1	●	15-25-35	0.06-0.10-0.14		
4	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.12		
5	RXEL	A06	E612R1	●	20-30-45	0.05-0.08-0.12		
6	RXEG	A06U2	E612R1	●	15-25-35	0.05-0.08-0.12		
4	RXEL	A06	E612R1	●	15-20-35	0.06-0.10-0.12		
5	RXEL	A06	E612R1	●	10-18-30	0.05-0.08-0.10		
6	RXEG	A06U2	E612R1	●	8-15-25	0.05-0.08-0.10		
4	RXEL	A06	E612R1	●	12-18-25	0.05-0.08-0.10		
5	RXEL	A06	E612R1	●	8-15-20	0.05-0.08-0.10		
6	RXEG	A06U2	E612R1	●	5-12-20	0.05-0.08-0.10		
4	RXEL	A06	E612R1	●	20-40-60	0.06-0.10-0.14		
5	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
6	RXEG	A06U2	E612R1	●	15-25-30	0.06-0.10-0.14		
4	RXEL	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
5	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.14		
6	RXEG	A06U2	E612R1	●	15-25-30	0.06-0.10-0.14		
4	RXEL	A06	E612R1	●	20-30-45	0.06-0.10-0.14		
5	RXEL	A06	E612R1	●	15-25-30	0.05-0.08-0.10		
6	RXEG	A06U2	E612R1	●	10-18-30	0.05-0.08-0.10		
4	RXEL	A06	E612R1	●	15-20-30	0.05-0.08-0.10		
5	RXEL	A06	E612R1	●	10-18-25	0.05-0.08-0.10		
6	RXEG	A06U2	E612R1	●	8-15-20	0.05-0.08-0.10		
4	RXEG	A06	E612R1	●	15-25-30	0.04-0.06-0.08	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.05-0.08-0.10
5	RXEG	A06	E612R1	●	10-18-25	0.04-0.06-0.08		
6	RXEG	A06	E612R1	●	8-15-20	0.04-0.06-0.08		
4	RXEG	A06	E607R1	▲	10-18-25	0.04-0.06-0.08		
5	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08		
6	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08		
4	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
5	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
6	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
4	RXEL	C16	E612R1	●	120-150-180	0.18-0.22-0.30		
5	RXEL	C16U2	E612R1	●	100-130-150	0.15-0.20-0.25		
6	RXEG	A06U2	E612R1	●	70-100-130	0.12-0.16-0.20		
4	RXEL	C16	E612R1	●	110-140-160	0.15-0.20-0.25		
5	RXEL	C16U2	E612R1	●	90-120-140	0.12-0.18-0.22		
6	RXEG	A06U2	E612R1	●	70-100-120	0.12-0.15-0.20		
4	RXEL	A06	E612R1	●	40-60-80	0.10-0.14-0.18		
5	RXEL	A06	E612R1	●	40-60-80	0.08-0.12-0.16		
6	RXEG	A06	E612R1	●	25-40-70	0.06-0.10-0.14		
4	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.08-0.10-0.20
5	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20		
6	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16		
4	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20		
5	RXEL	C16	E610C	▲	40-60-80	0.10-0.15-0.20		
6	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16		
4	RXEL	C16	E621C	●	40-50-60	0.10-0.15-0.20		
5	RXEL	C16	E621C	●	40-50-60	0.10-0.15-0.20		
6	RXEG	G16	E621C	●	40-50-60	0.10-0.13-0.16		
4	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10		
5	RXEL	C16	E621C	●	30-50-60	0.05-0.08-0.10		
6	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10		

RX large 中径铰刀切削参数

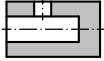
Cutting Data RX large



盲孔
Blind Hole

ISO	UMC	AC	Type	槽型 Geometry	材质 Grade	Stock	Vc	fz	Radial / Stock Removal ap Ø 139.801-200.200		
S	S1	1	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14	0.05-0.10-0.12		
		2	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14			
		3	RXEG	A06	E612R1	●	15-25-35	0.06-0.10-0.14			
	S2	1	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.12	0.05-0.10-0.12		
		2	RXEG	A06	E612R1	●	20-30-45	0.05-0.08-0.12			
		3	RXEG	A06	E612R1	●	15-25-35	0.05-0.08-0.12			
	S3	1	RXEG	A06	E612R1	●	15-20-35	0.06-0.10-0.12	0.05-0.08-0.10		
		2	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.10			
		3	RXEG	A06	E612R1	●	8-15-25	0.05-0.08-0.10			
	S4	1	RXEG	A06	E612R1	●	12-18-25	0.05-0.08-0.10	0.05-0.08-0.10		
		2	RXEG	A06	E612R1	●	8-15-20	0.05-0.08-0.10			
		3	RXEG	A06	E612R1	●	5-12-20	0.05-0.08-0.10			
	H	H1	1	RXEG	A06	E612R1	●	15-25-30	0.04-0.06-0.08	0.05-0.08-0.10	
			2	RXEG	G16	E612R1	●	10-18-25	0.04-0.06-0.08		
			3	RXEG	G16	E612R1	●	8-15-20	0.04-0.06-0.08		
		H2	1	RXEG	A06	E607R1	▲	10-18-25	0.04-0.06-0.08	0.05-0.08-0.10	
			2	RXEG	G16	E607R1	▲	8-15-20	0.04-0.06-0.08		
			3	RXEG	G16	E607R1	▲	8-15-20	0.04-0.06-0.08		
		H3	1	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07	0.05-0.08-0.10	
			2	RXEG	G16	E607R1	▲	8-10-15	0.03-0.05-0.07		
			3	RXEG	G16	E607R1	▲	8-10-15	0.03-0.05-0.07		
		SM	SM1	1	RXEG	A06	E612R1	●	120-150-180	0.18-0.22-0.30	0.08-0.10-0.20
				2	RXEG	A06	E612R1	●	100-130-150	0.15-0.20-0.25	
				3	RXEG	G16	E612R1	●	70-100-130	0.10-0.16-0.20	
SM2	1		RXEG	A06	E612R1	●	110-140-160	0.15-0.20-0.25	0.08-0.10-0.20		
	2		RXEG	A06	E612R1	●	90-120-140	0.12-0.18-0.22			
SM3	1		RXEG	A06	E612R1	●	70-100-120	0.10-0.15-0.20	0.05-0.10-0.12		
	2	RXEG	A06	E612R1	●	40-60-80	0.10-0.12-0.16				
O	O1	1	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20	0.08-0.10-0.20		
		2	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20			
		3	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16			
	O2	1	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20	0.08-0.10-0.20		
		2	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20			
		3	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16			
	O3	1	RXEG	G16	E621C	●	40-50-60	0.10-0.15-0.20	0.08-0.10-0.20		
		2	RXEG	G16	E621C	●	40-50-60	0.10-0.15-0.20			
		3	RXEG	G16	E621C	●	40-50-60	0.10-0.13-0.16			
	O4	1	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10	0.08-0.10-0.20		
		2	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10			
		3	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10			

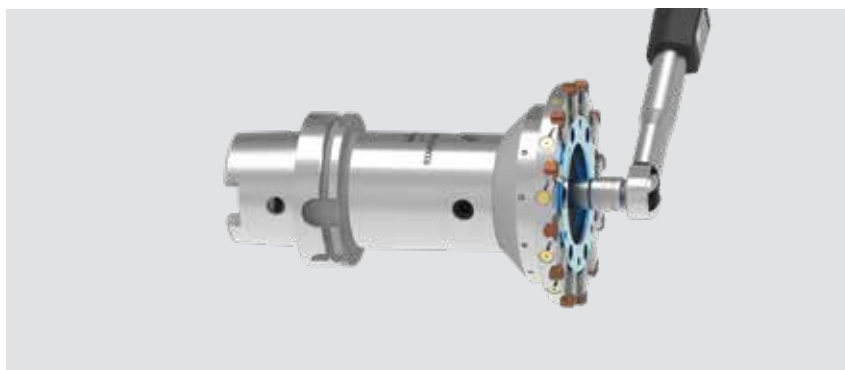
SEE PAGE 34/35 FOR MATERIAL DETAILS



盲孔带断续切削
Blind Hole With Interruption

! 类型		槽型	材质	Stock	Vc	fz 连续切削 fz Full Cut	fz 断续切削 fz Interrupted	Radial / Stock Removal ap Ø 139.801-200.200
AC	Type	Geometry	Grade					
4	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.05-0.10-0.12
5	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
6	RXEG	A06U2	E612R1	●	15-25-35	0.06-0.10-0.14		
4	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.12		
5	RXEG	A06	E612R1	●	20-30-45	0.05-0.08-0.12		
6	RXEG	A06U2	E612R1	●	15-25-35	0.05-0.08-0.12		
4	RXEG	A06	E612R1	●	15-20-35	0.06-0.10-0.12		
5	RXEG	A06	E612R1	●	10-18-30	0.05-0.08-0.10		
6	RXEG	A06U2	E612R1	●	8-15-25	0.05-0.08-0.10		
4	RXEG	A06	E612R1	●	12-18-25	0.05-0.08-0.10		
5	RXEG	A06	E612R1	●	8-15-20	0.05-0.08-0.10		
6	RXEG	A06U2	E612R1	●	5-12-20	0.05-0.08-0.10		
4	RXEG	A06	E612R1	●	20-40-60	0.06-0.10-0.14		
5	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
6	RXEG	A06U2	E612R1	●	15-25-30	0.06-0.10-0.14		
4	RXEG	A06	E612R1	●	20-35-45	0.06-0.10-0.14		
5	RXEG	A06	E612R1	●	20-30-45	0.06-0.10-0.14		
6	RXEG	A06U2	E612R1	●	15-25-30	0.06-0.10-0.14		
4	RXEG	A06	E612R1	●	15-25-30	0.04-0.06-0.08	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.05-0.08-0.10
5	RXEG	A06	E612R1	●	10-18-25	0.04-0.06-0.08		
6	RXEG	A06	E612R1	●	8-15-20	0.04-0.06-0.08		
4	RXEG	A06	E607R1	▲	10-18-25	0.04-0.06-0.08		
5	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08		
6	RXEG	A06	E607R1	▲	8-15-20	0.04-0.06-0.08		
4	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
5	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
6	RXEG	A06	E607R1	▲	8-10-15	0.03-0.05-0.07		
4	RXEG	A06	E612R1	●	140-180-220	0.18-0.22-0.30		
5	RXEG	A06	E612R1	●	110-140-170	0.15-0.20-0.25		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.16-0.20		
4	RXEG	A06	E612R1	●	120-140-160	0.15-0.20-0.25		
5	RXEG	A06U2	E612R1	●	100-120-150	0.12-0.18-0.22		
6	RXEG	G16U2	E612R1	●	80-100-120	0.10-0.15-0.20		
4	RXEG	A06	E612R1	●	40-60-80	0.10-0.14-0.18		
5	RXEG	A06U2	E612R1	●	40-60-80	0.08-0.12-0.16		
6	RXEG	G16U2	E612R1	●	25-40-70	0.06-0.10-0.14		
4	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20	fz 连续切削降低30-50% reduce fz full cut 30 - 50%	0.08-0.10-0.20
5	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20		
6	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16		
4	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20		
5	RXEG	G16	E610C	▲	40-60-80	0.10-0.15-0.20		
6	RXEG	G16	E610C	▲	40-60-80	0.10-0.13-0.16		
4	RXEG	G16	E621C	●	40-50-60	0.10-0.15-0.20		
5	RXEG	G16	E621C	●	40-50-60	0.10-0.15-0.20		
6	RXEG	G16	E621C	●	40-50-60	0.10-0.13-0.16		
4	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10		
5	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10		
6	RXEG	G16	E621C	●	30-50-60	0.05-0.08-0.10		

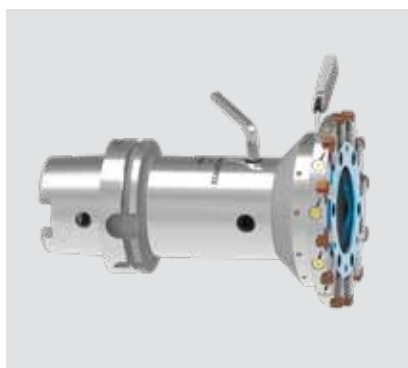
操作 Handling



1

组装刀具

Assemble the tool.



2

在机床中调整跳动

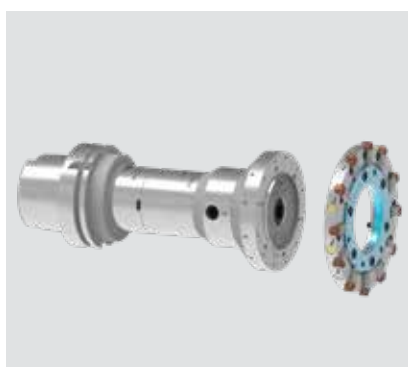
Run-out adjustment in
the machine.



3

刀具使用

Tool in use.



4

刀具寿命结束后卸下铰刀头

After tool life ends disassemble
used reaming head.



5

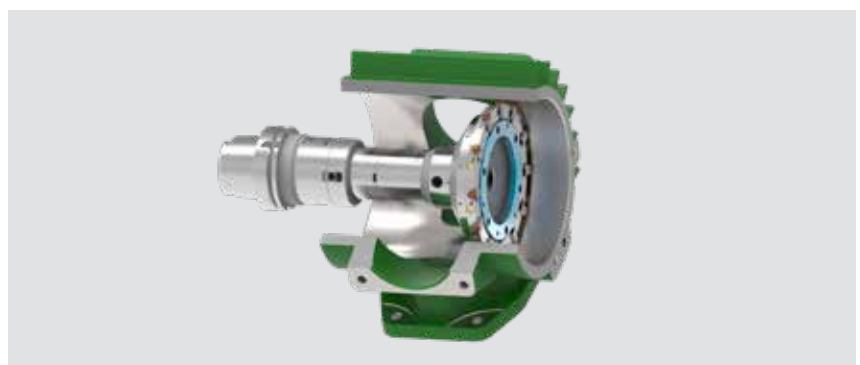
安装新的铰刀头

Assemble new reaming head.

6

继续加工

Continue machining.



重磨描述

Reconditioning Versions

1

使用刀具，刀具寿命结束后，铰刀头可以返回到铇马或合作伙伴处
 Tool in use. After tool life ends, the reaming head can be returned to the URMA partner.



a



or

b



2

- a) 铰刀头可以重磨成原来的尺寸和槽型
- b) 铰刀头可以重磨成原来的尺寸和槽型

- a) Reaming head can be reconditioned to same size and geometry.
- b) Reaming head can be reconditioned to other size and/or geometry.

3

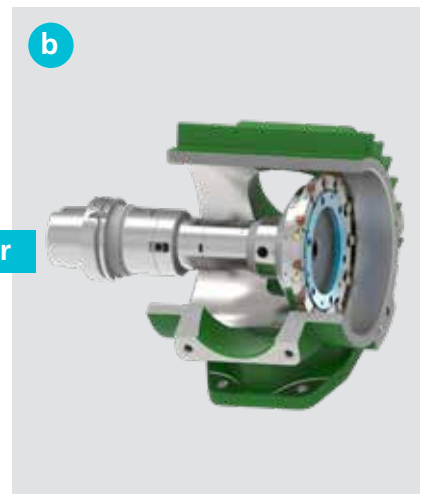
- a) 刀具用于加工原孔
- b) 刀具用于加工其他孔

- a) Use tool in the same bore.
- b) Use tool in a different bore.

a

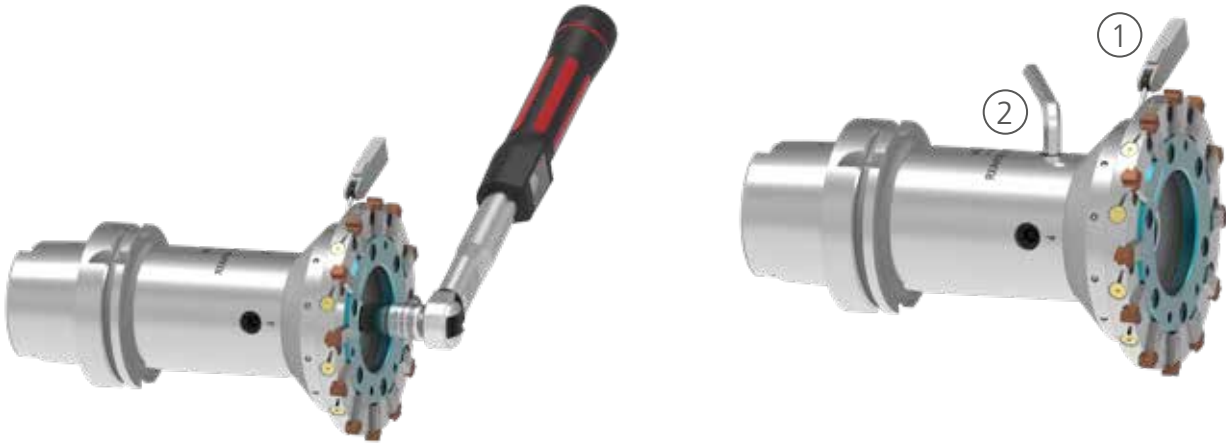


b



带内置跳动补偿装置刀杆的说明

Instruction for Shanks With Integrated Compensation Device



步骤:

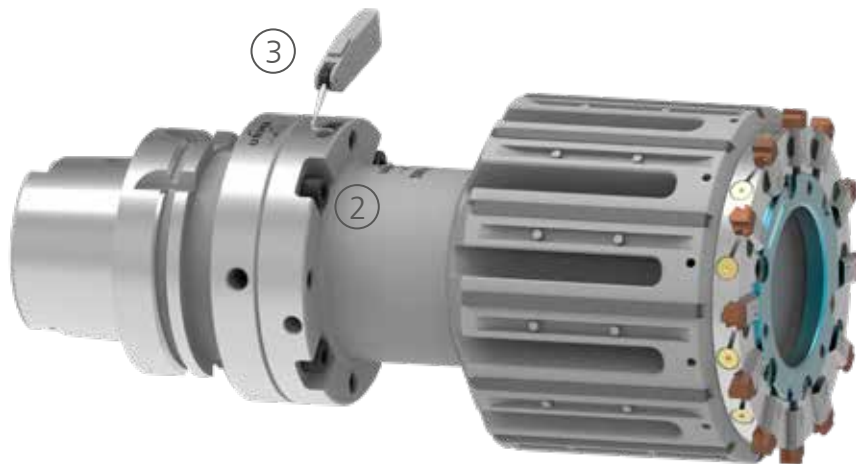
1. 以70Nm/52 ft-lbs的力矩锁紧中心螺钉。
2. 将刀柄装到机床主轴上
3. 将千分表测头置于铰刀杆跳动检测区域 ①。
4. 检测对称的两个调整螺钉对应位置的跳动，通过调整螺钉将跳动调整到两个数值的中间值。检测所有四个调整螺钉对应位置的跳动，如有需要，重复前一步骤。锁紧四个螺钉，确保径向跳动 < 0.005 mm。
5. 以160Nm/118 ft-lbs的力矩锁紧中心螺钉。
6. 请二次锁紧后再次确认刀具跳动，如有必要，再次进行调整。

Procedure:

1. Secure central clamping screw with 70Nm / 52 ft-lbs.
2. Load the tool into the machine spindle.
3. Set the indicator (with 1 μ m / 0,0001 inch resolution) on the marked run-out area ① on the shank.
4. Measure run-out of the two adjustment screw ② axes. Compensate half value of the total run-out error by using the adjustment screws. Check run-out on all four axle points and repeat the adjustment if necessary. Tighten all screws that do not fit tightly, considering the run-out < 0,005 mm in diameter.
5. Tighten the central clamping screw with 160Nm / 118 ft-lbs.
6. Check the run-out again and re-adjust if necessary.

非标刀具法兰接口刀柄跳动调整说明

Instruction for Compensation Module With Special Tools



法兰刀柄用于例如导条刀的跳动调整。径向和角度偏差均可被修正。

The compensation module is used, for example, to adjust the run-out of guide pad tools. Axis as well as angle errors can be adjusted.

准备刀具

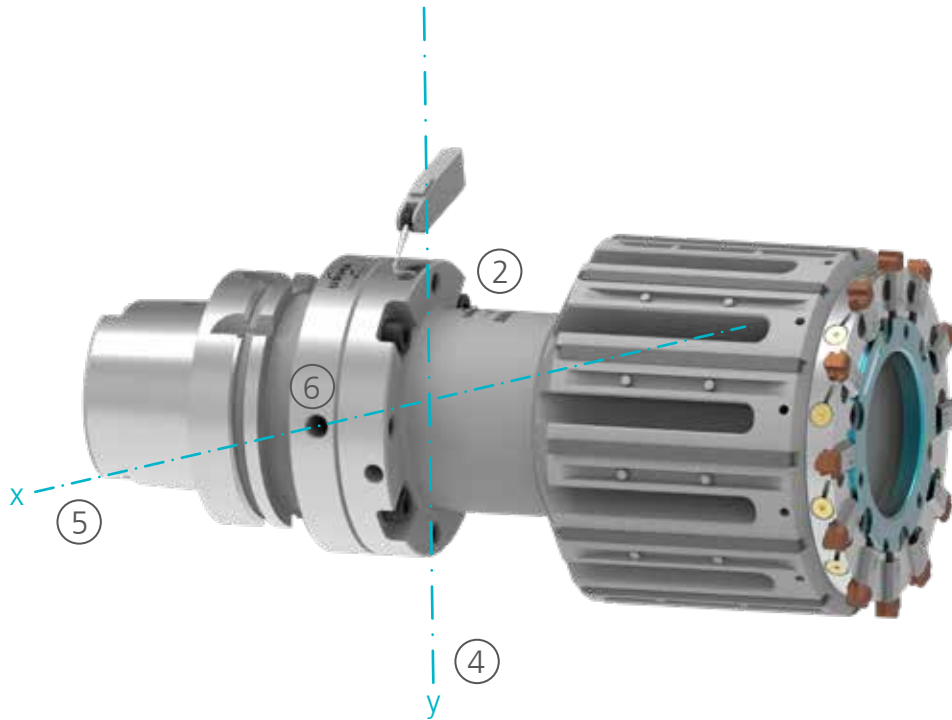
1. 安装之前应确保四个角度调整螺钉未与法兰柄端面接触。
2. 将刀具装在跳动调整模块刀柄上，轻微上紧②锁紧螺钉（即：旋紧螺钉至顶到刀体，再上紧 $\frac{1}{4}$ 圈）。
3. 将刀具装到机床主轴上。
4. 将千分表（ $1\mu\text{m}/0.0001\text{inch}$ 精度）测头置于刀具法兰直径③

Prepare the Tool:

1. Before assembling, it must be ensured that none of the pressure pad discs on the face side stick out.
2. Assemble the tool on the compensation module, tightening the clamping screws ② slightly (i.e. tighten the screw until it has contact to the face, then tighten $\frac{1}{4}$ turn).
3. Load the tool into the machine spindle.
4. Set the indicator (with $1\ \mu\text{m} / 0,0001\ \text{inch}$ resolution) on the tool flange diameter ③.

刀具径向调整 - 步骤一:

Radial alignment of the tool - Step 1:



5. 通过径向调整螺钉⑥将法兰模块的跳动调整到 $2\ \mu\text{m}$ / 0.0001inch 以内。
 - a. 检测两个对称跳动调整螺钉⑥对应位置的跳动 (首先调整轴⑤)
 - b. 通过调整螺钉将刀体调整到两个跳动值的中间位置。然后松开调整螺钉。
 - c. 将千分表读数归零。
 - d. 180° 旋转刀体, 检测另一侧跳动。如有必要, 再次调整 (参见“b”)。
 - e. 按照相同步骤调整轴④。
 - f. 如有必要再次调整轴⑤。调整完成后所有调整螺钉都必须处于锁紧状态。



所有调整螺钉⑥在完成调整后必须锁紧。

6. 上紧锁紧螺钉②
7. 再次检测法兰模块的跳动, 确保小于 $\rightarrow 3\ \mu\text{m}$ / 0.0001inch 。

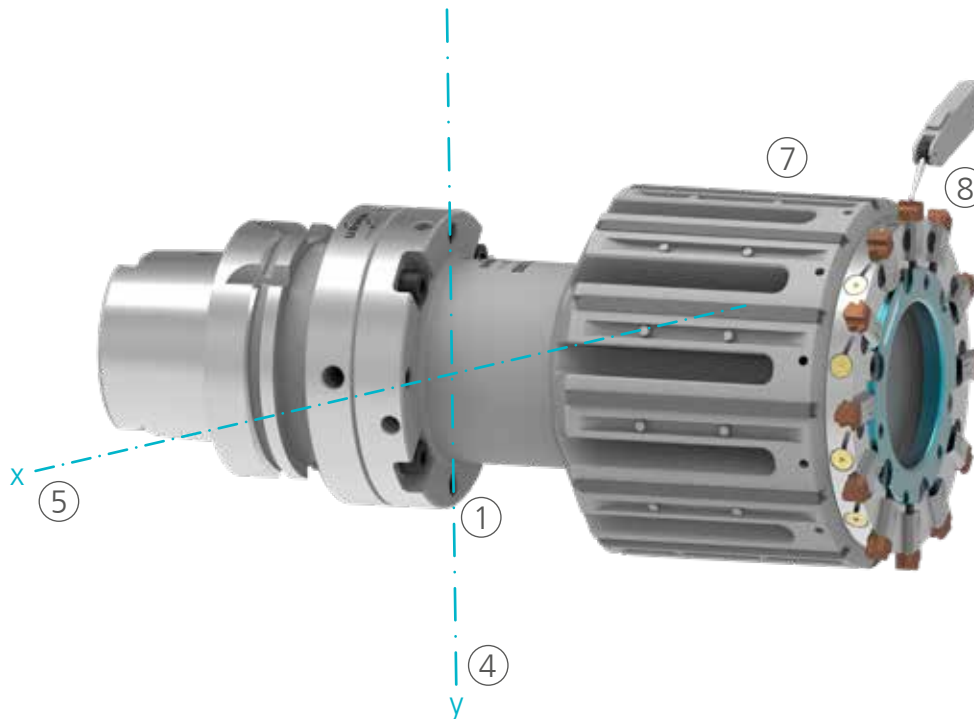
5. Align the flange module in $2\ \mu\text{m}$ / 0.0001 inch by using the radial adjustment screws ⑥.
 - a. Check run-out error with two opposing radial adjustment screws ⑥ (1st adjustment axis ⑤).
 - b. Correct the value difference of the axis by half, using the corresponding adjusting screw. Loosen the adjusting screw afterwards.
 - c. Set indicator to “0” value.
 - d. Check the “0” value by turning the tool to 180° and correct if necessary (see “b”).
 - e. Use the same alignment procedure for the second adjustment axis ④.
 - f. If necessary readjust the first axis ⑤.



All adjustment screws ⑥ must be tightened after completion of the adjustment process.

6. Tighten the clamping screws ②.
7. Check the run-out of the flange module again \rightarrow max. $3\ \mu\text{m}$ / 0.0001 inch .

刀具角度调整 - 步骤二:
Aligning the tool angle - Step 2:



8. 将千分表测头置于刀具前端⑧处:
- 切削刃或者标准检测刀片(刀片订货号可在“钨马铰刀”样本找到)
 - 刀杆RX 锥面 (刀片定位面)
 - 导条上
9. 通过轴向调整螺钉 1 将角度偏差调整到 $2\mu\text{m}$ 以内 (操作参见“5 b - f 项”)



建议每个方向 (0和 90°) 只用一个调整螺钉①来调整角度偏差。

10. 在⑦处检测导条的同心度, 最大 $\rightarrow 3\mu\text{m} / 0.0001\text{inch}$.

8. Set the indicator in front ⑧:
- on cutting edge or run-out indicating insert (order number can be found in the “URMA Reaming” catalogue).
 - on RX-taper of the shank (interface).
 - on guide pads.
9. Set the angular error to $2\mu\text{m}$ by using the axial adjusting screws ① (proceed as described in “point 5 b. to f.”).



It is recommended to use max. one adjustment screw ① per axis (0 and 90°) to adjust the angular error.

10. Check the alignment on the guide pads ⑦
 \rightarrow max. $3\mu\text{m} / 0.0001\text{inch}$.

加工中心问题解答

Troubleshooting Machining Centres

	孔太大 Hole too large				锥孔 Tapered hole				孔有振纹 Hole shows chatter marks	
	振动 Vibration	跳动偏差 Run-out error	积屑瘤 Built-up edges	单边余量 (ap) Radial depth of cut	夹紧变形 Deformation by clamping	材料厚度不均匀 Uneven material thickness	设备 Machine	排屑 Chip flow	振动 Vibration	跳动偏差 Run-out error
切削参数 Cutting Data										
进给(fz) Feed (fz)	↑		↓					↑/↓	↑	
转速(min ⁻¹) Spindle speed (min ⁻¹)	↓		↑						↓	
单边余量(ap) Radial depth of cut	↑		↑	↓		⚠		↓	↑	
刀具 Tool										
倒角 Chamfer angle	↑					↑			↑	
跳动 Run out	⚠	⚠								⚠
检查连接状态 Check the connection	⚠	⚠								⚠
检查磨损/更换刀片 Check the wear / change the insert			⚠						⚠	
浮动刀柄 Floating chuck										●/⚠
缩径刀杆 Diameter reduced holder										●/⚠
跳动补偿刀柄 Compensation chuck		●/⚠								●/⚠
工件 Workpiece										
夹具/夹紧力 Workpiece fixture	⚠				⚠/↓				⚠	
夹具/夹紧力 Clamping pressure	⚠				⚠/↓				⚠	
机床 Machine										
冷却液浓度 Coolant mixture	↑		↑					⚠	↑	
主轴角偏差 Angle-error of spindle							⚠			
轴向角偏差 Angle-error of axis							⚠			
进料机构振动 Vibrations from bar-feeder										
加工 Machining										
排屑 Chip flow				⚠				⚠		
冷却液压力 Coolant pressure	⚠/↓		⚠					↑	⚠/↓	
槽型径向力 Radial pressure from geometry	↓		⚠	⚠		↓			↓	
入口转速 Spindle speed on entry	↓		⚠				⚠		↓	
进退同进给 Feed in feed out										

操作：尽可能一次只做一项调整

Handling: If possible, apply only one modification at once.

↑ 提升
Increase, improve↓ 降低
Reduce, decrease⚠ 检查、优化
Check, optimize● 使用
Apply

表面质量不佳 (检测) Surface quality unsatisfactory (measurable)					表面质量不佳 (目视) Surface quality unsatisfactory (optically)				纹路 Retraction marks			孔偏小或孔形缺陷 Hole too small or shape defect			
振动 Vibration	积屑瘤 Built-up edges	跳动偏差 Run-out error	切削角度 代码		进给 Feed rate	跳动偏差 Run-out error	切削角度 代码		积屑瘤 Built-up edges	工件径向收缩 Radial compression of material		刀具磨损 Tool wear	工件径向收缩 Radial compression through clamping		单边余量 (ap) Radial depth of cut
			设备 Machine	设备 Machine			Radial compression of material	Radial compression through clamping		Radial compression of material	Radial compression through clamping				
↑	↓								↓						
↓	↑								↑						
										↓/↑			↑	↓	↑
↑			↓				↑			↑			↑	↑	
		⚠				⚠			⚠						
		⚠													
⚠	⚠		⚠						⚠	⚠		⚠	⚠		
		•/⚠				•/⚠			•/⚠	•/⚠					
		•/⚠				•/⚠			•/⚠	•/⚠					
		•/⚠				•/⚠			•/⚠						
⚠								⚠			⚠/↓		⚠/↓	⚠/↓	
⚠								⚠			⚠/↓		⚠/↓	⚠/↓	
↑	↑							↑	↑	↓			↓		
								⚠							
								⚠							
			⚠										⚠		⚠
⚠	⚠							⚠			⚠				
↓							⚠		⚠	↓			↓	↓	
↓															
						•				•			•		

定义和基本公式

Definitions and Basic Formulas

编号	
a _p	切削深度
n	转速
D/d	孔径
v _c	切削速度
v _f	进给率
f	每转进给
f _z	每刀进给
z	齿数
l _f	进给距离
R _a	算术中心线平均值
R _t	峰谷高度
R _z	峰谷高度平均值
R _m	拉伸强度
t _c	每件切削时间
γ	径向前角
ε	刀尖角
h	铁屑厚度
mc	材料常数
kc1.1	切屑力主值
kc	特定切削力
F _c	切削力
b	铁屑宽度
P _c	必要的驱动功率
η	效率
M _d	扭矩

○	圆度
⊘	圆柱度
⊕	位置度
◎	同轴度
↻	圆周跳动

切削速度	$v_c = \frac{\pi \cdot d \cdot n}{1000}$	m/min
Cutting speed		
进给	$v_f = f \cdot n$	mm/min
Feed rate	$v_f = f_z \cdot z \cdot n$	
切削力(每刃)	$F_c = b \cdot h \cdot k_c$	N
Cutting force (per cutting edge)		

Designation	
Depth of cut [mm]	
Speed [min ⁻¹]	
Bore diameter [mm]	
Cutting speed [m/min]	
Feed rate [mm/min]	
Feed per rotation [mm]	
Feed per tooth [mm]	
Number of cutting edges	
Feed distance [mm]	
Arithmetic centre line average value [μm]	
Peak-to-valley height [μm]	
Average peak-to-valley height [μm]	
Tensile strength [N/mm ²]	
Machining time [min]	
Radial rake angle [Degrees]	
Apex angle [Degrees]	
Chip thickness [mm]	
Material constant	
Main value cutting force [N/mm ²]	
Specific cutting force [N/mm ²]	
Cutting force [N]	
Chip width [mm]	
Necessary drive power [kW]	
Degree of efficiency	
Torque [Nm]	

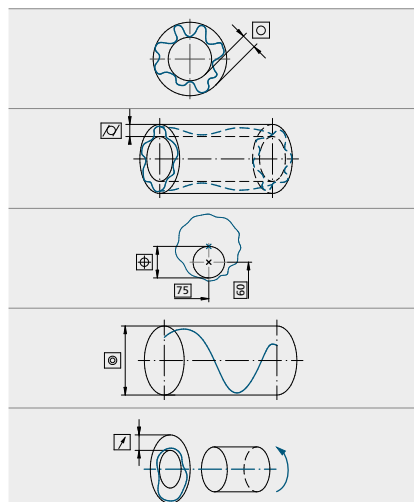
Circularity
Cylindricity
Position
Concentricity
Circular runout

速度	$n = \frac{v_c \cdot 1000}{\pi \cdot d}$	min ⁻¹
Speed		
加工时间	$t_c = \frac{l_f}{f \cdot n}$	min
Machining time		
功率要求	$P_c = \frac{b \cdot h \cdot k_c \cdot v_c \cdot z}{60 \cdot 10^3 \cdot \eta}$	kW
Power requirement		

Spanungsbreite / Chip width

a _p	h
0.05	0.07
0.08	0.11
0.10	0.14
0.15	0.21
0.20	0.28
0.25	0.35

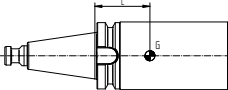
	Ra	Rz
N8	1.6 - 3.2	8.4 - 15
N7	0.8 - 1.6	4.0 - 8.4
N6	0.4 - 0.8	2.2 - 4.0
N5	0.2 - 0.4	1.6 - 2.8
N4	0.1 - 0.2	1.0 - 2.8
N3	0.05 - 0.1	0.8 - 1.1



特定切削力	$k_c = \frac{k_{c1.1}}{h^{mc}}$	N
Specific cutting force		
扭矩	$M_d = \frac{(D^2 - d^2) \cdot f \cdot k_c}{8 \cdot 10^3}$	Nm
Torque		

加工分析 Machining Study

发送者 * Sender	Number
公司 Company	铎马分销商 URMA distributor
地址 Address	联系人 Contact

机床 Machine-tool					
机床类型 Machine type and manufacturer					
卧式 * Horizontal <input type="checkbox"/>	立式 * Vertical <input type="checkbox"/>			刀具旋转 * Tool rotating <input type="checkbox"/>	
主轴接口 * Spindle holder	尺寸 * Size	Execution	类别 * Max. tool weight	kg	
DIN 69893-HSK <input type="checkbox"/>	20 <input type="checkbox"/> 25 <input type="checkbox"/>	A <input type="checkbox"/>		mm	
DIN 69871 <input type="checkbox"/>	30 <input type="checkbox"/> 32 <input type="checkbox"/>	B <input type="checkbox"/>			
MAS-BT <input type="checkbox"/>	40 <input type="checkbox"/> 50 <input type="checkbox"/>	C <input type="checkbox"/>			
圆柱柄 DIN 1835 Cylinder shank DIN 1835 <input type="checkbox"/>	63 <input type="checkbox"/> 80 <input type="checkbox"/>	D <input type="checkbox"/>			
DIN 69880 VDI <input type="checkbox"/>	100 <input type="checkbox"/> <input type="checkbox"/>	E <input type="checkbox"/>			

冷却液 Lubricant			
油 * Oil <input type="checkbox"/>	微量润滑 * 1) MLS 1) <input type="checkbox"/>	乳化液 * Emulsion <input type="checkbox"/>	混合比 Ratio of mixture
有内冷 * Internal coolant supply <input type="checkbox"/>			冷却液压力 (bar)* Coolant pressure (bar)

工件 Workpiece		
工件名称 Designation	材料代码 * Material number	热处理状态 (硬度) * Treatment condition (hardness)

加工要求 Machining requirements		
孔径-Ø * Bore ø	孔深 * Bore length	预加工孔径-Ø * Pre-machining ø
公差 * Tolerance	干涉长度 Interfering contours mm	预加工方式 * Method of pre-machining
其他公差要求 Additional tolerance requirements	○ ⊙ ⊕	盲孔 * Blind Hole <input type="checkbox"/>
表面质量 (µm) * Surface quality (µm)	R _a <input type="checkbox"/> R _z <input type="checkbox"/> R _t <input type="checkbox"/>	断续切削 * Cutting interruption <input type="checkbox"/>
日期 * Date		

附件：请附上图纸 *
Attachement: your application sketch

* 必填项
Mandatory fields

1) 微量润滑系统 (微润滑)
Minimal lubrication system (mist coolant)

Fax +41 62 889 20 28
customerservice@urma.ch

Ø 7.600 - 13.100 mm	RX small
Ø 11.900 - 140.600 mm	RX medium
Ø 139.801 - 200.200 mm	RX large



铍马 **RX** 铰刀组合

URMA RX Reamer Portfolio

RX 铰刀特点

- 更低的单孔成本
- 更多材质和槽型
- 调整简单
- 工艺可靠性
- 持久的精度
- 刀具寿命长
- 更换铰刀片
- 操作简单
- 重复定位精度高

RX Facts

- Lower costs per bore
- Wide variety of grades and geometries
- Low adjustment efforts

Process Reliability

- Constant precision
- Long tool life

Changing Reaming Inserts

- Easy handling
- Maximum positioning accuracy

URMA Tools

Drilling, Boring & Reaming





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