



# Hole Finishing

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## Hole Finishing with Kennametal

Owning the entire process chain from raw materials all the way to reconditioning means Kennametal is almost the only source in the metalworking industry where you can get all types of Hole Finishing tooling, from reaming and fine boring to motion tooling, directly from one hand. Kennametal is capable of offering you customised solutions for your application that are the best fit for your machining challenge without any limitations, in regard to portfolio or capacity.

### PCD Tooling

- Extremely productive and tailored for satisfying your high-volume production needs.
- Several standard PCD grades, like KD1415™ and KD1425™, are available to provide the highest tool life and cutting data as well as unmatched surface and diameter tolerance quality.
- Platforms are available depending on your application and preference from steel to carbide based, adjustable pocket seats, fine-boring components like Romicon™ or FB cartridges, spindle couplings, or SIF™ steerable adaptors.



### Multiflute Reaming

- RMS™, RMB™, and RHM™.
- Highly productive and easy to apply.
- Large, standard, off-the-shelf portfolio of solid carbide, cermet, carbide-tipped, and modular reaming tools, all ground to achieve H7 without any customisation.
- Complex Specials with multiple steps, coupling, and length variations are available.
- Intermediate sizes, grades, and lead chamfers available with short delivery.



## Padded Reaming

- RIQ™ Quattro Cut™ and RIR™.
- Highest precision and surface quality achievable but still easy to apply.
- RIQ is the market-leading reaming technology, enabling you to leave out any back taper adjustment, dramatically reducing setup time and effort while still offering highest accuracy and surface quality and four cutting edges with PCD, CBN, carbide, or cermet.
- RIR provides you the most stable pocket seat and fail-safe clamping, from smallest to largest diameters.
- Combine the large, standard RIQ and RIR insert offering with your customised tool body.



## Fine Boring

- Romicon™ and ModBORE™
- Extremely flexible, covering a very large diameter and length range.
- Offers the latest grade technology by using standard turning inserts.
- Romicon enables diameter modifications directly at the machine by hand without setup equipment or accuracy affecting lock screws.
- ModBORE offers a very large diameter range with each type of tool along with roughing to finishing tooling and can be easily and safely adapted to every KM™ spindle.



## Motion Tooling

- Sophisticated tooling achieves most challenging tasks.
- Large, customised Complex Solution portfolio of:
  - Linear feed out heads.
  - Eccentric actuating heads.
  - Pivot heads.
  - Cylinder boring tools.
  - Line boring bars.
  - Bottle boring tools.
  - Valve seat and guide tools.
  - Machining centre tools.
- Depending on your application and preference, tools are based on the positive-stop-principle; use drawbars, like with engineered solution machines, or don't require machining centre modifications at all.



● first choice  
○ alternate choice

		P	M	K	N	S	H	standard diameter		engineered solution diameter			
								range	accuracy	range	accuracy		
reaming tools		●	●	●	●	○		5-14mm	IT7	1,4-25,4mm	IT6	10 μm	7 μm
		●	●	●	●	○		14-20mm	IT7	14-65mm	IT6	10 μm	7 μm
		●	●	●	●	○		14-20mm	IT6	14-42mm	IT5-IT6	10 μm	7 μm
		●	●	●	●	○		14-42mm	IT7	14-50mm	IT6	10 μm	7 μm
		●	●	●	●	○		14-42mm	IT6	14-42mm	IT5-IT6	10 μm	7 μm
		●	●	●	●	○		—	—	6-300mm	IT5	10 μm	4 μm
		●	●	●	●	○		—	—	16-300mm	IT5	10 μm	4 μm
		●	●	●	●	○		—	—	16-300mm	IT5	10 μm	4 μm
fine-boring tools		●	●	●	●	○		4-100mm	IT6	1,6-100mm	IT6	5 μm	5-10 μm
		●	●	●	●	○		25-139mm	IT6	25-183mm	IT6	5 μm	5-10 μm
		●	●	●	●	○		71-213mm	IT6	10-326mm	IT6	5 μm	5-10 μm
		●	●	○	●	○		>40mm	IT6	40-1600mm	IT6	5 μm	5-10 μm
		●	●	●	●	○		—	—	70-180mm	IT6	5 μm	10-15 μm
		●	●	●	●	○		23,5-153mm	IT9	23,5-153mm	IT9	10 μm	>20 μm
		●	●	●	●	○		9,75-88,1mm	IT7	3,0-88,1mm	IT7	5 μm	5-10 μm
		●	●	●	●	○		9,75-320mm	IT7	3,0-320mm	IT7	5 μm	5-10 μm
		●	●	●	●	○		23,5-153mm	IT7	23,5-153mm	IT7	5 μm	5-10 μm
		●	●	●	●	○		150-2205mm	IT9	150-2205mm	IT9	10 μm	>20 μm
		●	●	●	●	○		150-2205mm	IT7	150-2205mm	IT7	5 μm	>10 μm
		●	○	●	○	○		>28mm	IT7	>28mm	IT7	5 μm	5-10 μm
PCD					●			—	—	10-100mm	IT6	10 μm	10 μm
					●			—	—	5-25mm	IT6	5 μm	7 μm



Cylindricity  
NOTE: Process and application dependant.  
Highly dependant on the premachine hole accuracy.  
Use of high-performance drilling/premachining tools mandatory to reach values.



Position  
NOTE: Process and application dependant.  
Highly dependant on the premachine hole accuracy.  
Use of high-performance drilling/premachining tools mandatory to reach values.

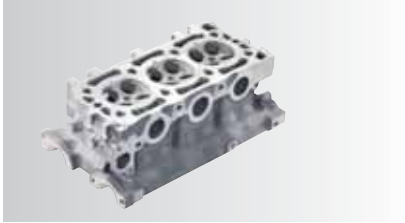
achievable surface quality Ra						capability				cost/part	cycle time	required operator experience	page(s)
P	M	K	N	S	H								
0,5-1,0 µm	0,5-1,0 µm	0,5-1,5 µm	—	0,5-1,0 µm	—	●	●	●	●	moderate	low	low	K94-K97
0,5-1,0 µm	0,5-1,0 µm	0,5-1,5 µm	—	0,5-1,0 µm	—	●	●	● carbide only	● carbide only	moderate	low	low	K98-K101
0,5-1,0 µm	0,5-1,0 µm	0,5-1,5 µm	—	0,5-1,0 µm	—	●	●	● carbide only	● carbide only	moderate	low	moderate	please contact us
0,5-1,0 µm	0,5-1,0 µm	0,5-1,5 µm	—	0,5-1,0 µm	—	●	●	● carbide only	● carbide only	moderate	low	low	K103-K106
0,5-1,0 µm	0,5-1,0 µm	0,5-1,5 µm	—	0,5-1,0 µm	—	●	●	● carbide only	● carbide only	moderate	low	moderate	please contact us
0,5-1,6 µm	0,5-1,6 µm	0,5-1,8 µm	0,1-0,6 µm	<0,8 µm	<0,8 µm	●	●	●	●	low	moderate	high	K118-K119
0,5-1,6 µm	0,5-1,6 µm	0,5-1,8 µm	0,1-0,6 µm	<0,8 µm	<0,8 µm	●	●	●	●	low	moderate	moderate	K119-K121
0,3-1,6 µm	0,3-1,6 µm	0,5-1,8 µm	0,1-0,6 µm	<0,8 µm	—	●	●	●	●	low	moderate	moderate	K119-K121
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	<1,2 µm	●	●	○	○	low	moderate	low	K144-K149
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low	K150-K151
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	<1,2 µm	●	●	○	○	low	moderate	low	K152-K154
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low	K155-K156
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	<1,2 µm	●	●	○	○	low	low-moderate	low	please contact us
1,0-5,0 µm	1,0-5,0 µm	1,0-5,0 µm	1,0-2,0 µm	1,0-5,0 µm	—	●	●	●	●	low	low	low-moderate	K185-K188
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low-moderate	K189
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low-moderate	K190-K191
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	<1,2 µm	●	●	●	●	low	moderate	low-moderate	K194
1,0-5,0 µm	1,0-5,0 µm	1,0-5,0 µm	1,0-2,0 µm	1,0-5,0 µm	—	●	●	●	●	low	low	low-moderate	K196-K197
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	—	●	●	●	●	low	moderate	low-moderate	K196-K197
0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	0,8-2,0 µm	—	●	●	○	○	low	moderate	low-moderate	K200
—	—	—	0,1-0,8 µm	—	—	●	●	●	●	low	very low	moderate	K135-K138
—	—	—	0,1-0,8 µm	—	—	●	●	●	●	low	very low	moderate	K135-K138

Ra Surface roughness

NOTE: Surface roughness values are guidelines and depend on the application, coolant situation, machine, and cutting data applied.



Cylinder Head



Hole Finishing

**RIQ™ QUATTRO CUT™ VALVE SEAT & GUIDE PARENT BORE**

- Valve seat and guide parent bore machining combined.
- Tolerance range 8 µm.
- Cast iron.
- Machining centre with internal coolant.

**CHALLENGE**

**SOLUTION**

- RIQ padded reamer with integrated hydraulic chuck.
- RIQ Full face CBN KB1630™ insert.
- RMS™ reamer for guide parent bore.

**CUTTING DATA**

- vc 425 m/min f 0,10 mm/rev valve seat.
- vc 130 m/min f 0,60 mm/rev valve guide.

**RESULT**

- Four usable cutting edges per CBN insert.
- CBN RIQ insert with 28.000 bore tool life.
- 1.400 bores with regrindable RMS reamer.

**BENEFIT**

- Cost savings due to four edged full face CBN insert.
- No insert back taper adjustment needed.
- Same RPM at both stages saving time of spindle acceleration and deceleration.



Cylinder Head



Polished flutes for improved chip evacuation

Hole Finishing

### PCD SEAT & GUIDE PARENT BORE PCDRSC04RLE

#### CHALLENGE

- Valve seat and guide parent bore machining combined.
- Tolerance range H7.
- Aluminium.
- Machining centre with internal coolant.

#### SOLUTION

- PCD tipped, steel based tool (valve seat) with shrink in PCD tip, carbide based reamer (valve guide) with less than 4 µm total run out.

#### CUTTING DATA

- vc 344 m/min f 0,60 mm/rev valve seat.
- vc 985 m/min f 0,60 mm/rev valve guide.

#### RESULT

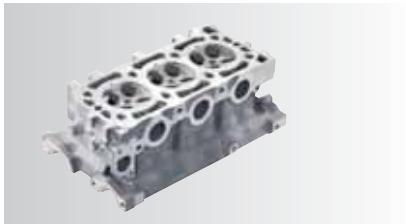
- Tool life of 456.000 bores.

#### BENEFIT

- Productivity increases as same RPM applied to both seat and guide stages.
- Lowest possible run out resulting in higher tool life.



Cylinder Head



RIQ serration defines valve seat angle

Hole Finishing

**RIQ™ QUATTRO CUT™ VALVE SEAT & GUIDE MACHINING**

- Valve guide machining combined with primary and secondary seat angles.
- Sinter metal.
- Concentricity of seat to guide less than 50 µm.
- Machining centre with internal coolant.

**CHALLENGE**

- RIQ Valve Seat tooling with integrated hydraulic chuck.
- RIQ K68™ carbide inserts and solid carbide RMS™ multiflute reamer.

**SOLUTION**

- vc 80 m/min f 0,10 mm/rev valve seat.
- vc 80 m/min f 0,32 mm/rev valve guide.

**CUTTING DATA**

- Tool life of 12.000 valve seats per insert.

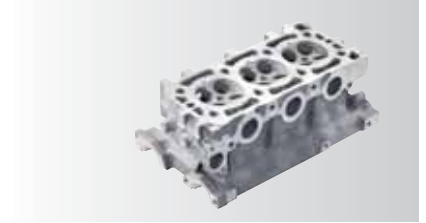
**RESULT**

- Twelve usable cutting edges per carbide insert.
- Due to high precision RIQ pocket seat there is less setup effort as no angular adjustment of the insert is needed.
- Able to adapt RIR™ padded reamer machining the valve guide.

**BENEFIT**



Cylinder Head



RIQ serration defines valve seat angle



Hole Finishing



### RIQ™ QUATTRO CUT™ VALVE SEAT & GUIDE MACHINING

#### CHALLENGE

- Valve guide machining combined with primary and secondary seat angles.
- Sinter metal.
- Concentricity of seat to guide less than 50 µm.
- Transfer line with internal coolant.

#### SOLUTION

- RIQ Valve Seat tooling with carbide bushing for Valve Guide reaming tools.
- RIQ KB1630™ insert with TiN wear indicator.
- RIR™ padded reamer machining.

#### CUTTING DATA

- vc 80 m/min f 0,07 mm/rev valve seat.
- vc 60 m/min f 0,14 mm/rev valve guide.

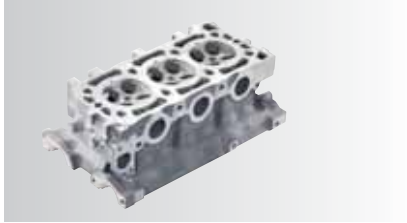
#### RESULT

- Tool life of 18.000 valve seats per roughing insert.
- Tool life of 12.000 valve seats per roughing insert.

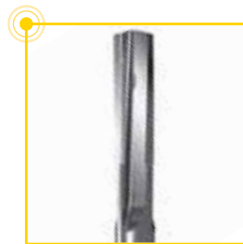
#### BENEFIT

- Twelve usable cutting edges per full face CBN insert.
- Due to high precision RIQ pocket seat there is less setup effort as no angular adjustment of the insert is needed.
- Able to adapt RMS™ solid carbide reamer machining the valve guide.

Cylinder Head



Hole Finishing



Semi finish stage after pilot hole



PCD insert with chipbreaker

**RMS™ VALVE GUIDE MACHINING**

- Valve guide bore  $\varnothing$  6mm (.236").
- Tolerance range 12  $\mu$ m H7.
- Brass material, lead free.
- Concentricity of seat to guide less than 50  $\mu$ m.

**CHALLENGE**

- RMS solid carbide reamer — engineered solution.
- Machining centre — with semi finish stage for picking up pilot hole.
- Transfer line — without semi finish stage.

**SOLUTION**

- vc 30 m/min (98 SFM).
- f 0,42 mm/rev (.017 IPR).

**CUTTING DATA**

- Tool life of 3.000 bores.

**RESULT**

- No presetting is needed.
- Productivity increases due to four effective cutting edges compared to one with padded reamers.

**BENEFIT**

**RIR™ VALVE GUIDE MACHINING**

- Valve guide bore  $\varnothing$  6mm (.236").
- Tolerance range 12  $\mu$ m H7.
- Brass material, lead free.
- Concentricity of seat to guide less than 50  $\mu$ m.

**CHALLENGE**

- RIR padded reamer with PCD guide pads.
- Single edged KD1415™ PCD insert with chip breaker.

**SOLUTION**

- vc 60 m/min (197 SFM).
- f 0,14 mm/rev (.006 IPR).

**CUTTING DATA**

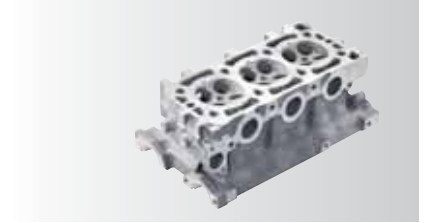
- Tool life of 100 bores.
- Surface finish Rz 6.3  $\mu$ m.

**RESULT**

- Secure process due to very good chip control on lead free brass.

**BENEFIT**

Cylinder Head



Hole Finishing

### MOTION TOOLING VALVE SEAT & GUIDE MACHINING

#### CHALLENGE

- Semi-finish and finish machining of primary seat angle and valve guide in one operation.
- Sinter metal.
- Transfer line with internal coolant.

#### SOLUTION

- Taper turning head with quill for reamer.

#### CUTTING DATA

- vc 271 m/min f 0,05 mm/rev valve seat.
- vc 60 m/min f 0,11 mm/rev valve guide.

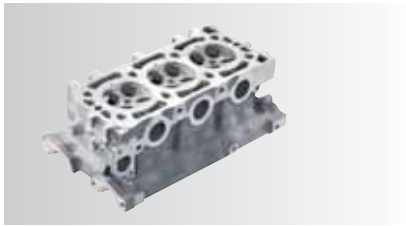
#### RESULT

- Run out of guide to seat 7  $\mu$ m.
- Cylindricity of guide 12  $\mu$ m.

#### BENEFIT

- Higher accuracy of valve seat angles as machining result is independent from insert wear.
- Time saving combination with valve guide reamer.

Cylinder Head



Hole Finishing



Polished flutes in for improved chip evacuation



Chipformer in carbide body

**PCD STEP REAMING PCDCSC22RLE**

- Valve lifter bore  $\varnothing$  12mm (.472").
- Tolerance range 18  $\mu$ m G7.
- Aluminium AISi7Mg.
- Machining centre with internal coolant.

**CHALLENGE**

- PCD tipped, carbide based reamer and counter sinker with internal coolant.
- Four effective cutting and chamfering teeth.
- KD1415™.

**SOLUTION**

- vc 400 m/min (1.312 SFM).
- f 0,10 mm/rev (.004 IPR).

**CUTTING DATA**

- Tool life of 125.000 bores.
- Surface finish better than Rz 1.5  $\mu$ m.

**RESULT**

- Secure process and very good concentricity.

**BENEFIT**

**PCD STEP REAMING PCDCSC02RLE**

- Injector bore  $\varnothing$  7,75–19,5mm (.305–.768").
- Tolerance range 5  $\mu$ m.
- Aluminium G-AISi7Mg.
- Machining centre with internal coolant.

**CHALLENGE**

- PCD tipped, carbide based tool with PCD guide pads at  $\varnothing$  19,5mm and internal coolant.
- Two effective cutting and chamfering teeth.
- KD1415™.

**SOLUTION**

- vc 220 m/min (722 SFM).
- f 0,35 mm/rev (.014 IPR).

**CUTTING DATA**

- Tool life of 400.000 bores.
- Surface finish better than Rz 3  $\mu$ m.

**RESULT**

- Secure process due to chipformer in carbide body improving chip formation.

**BENEFIT**

Cylinder Head



RIQ pocket for indexing without adjustment



### RIQ™ QUATTRO CUT™/RIR™ PADDED REAMING

#### CHALLENGE

- Injector bore  $\varnothing$  10,3–41mm (.406–1.614").
- Tolerance range 18–25  $\mu$ m H7.
- Cast iron GG25.
- Quick-change interface between first and second machining stage.

#### SOLUTION

- First stage: RIR reamer with RIQ profile insert.
- Second stage: RIQ padded multi step reamer.
- Radial actuated KST interface as stages have different tool life due to different diameters.

#### CUTTING DATA

- $v_c$  23–90 m/min       $n = 700$  RPM.
- $f$  0,32 mm/rev      (.025 IPR).

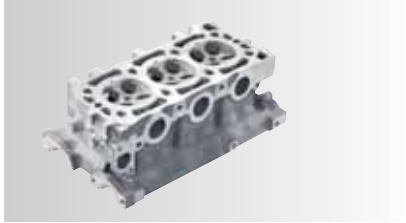
#### RESULT

- Tool life of 1.000 components per insert edge.
- Surface finish better than Rz 16  $\mu$ m.

#### BENEFIT

- No back taper adjustment needed with RIQ inserts.
- Front and back end of tool can be handled independently.
- RIQ pocket seat allows insert indexing without adjustment reaching < 20  $\mu$ m axial run out.

Cylinder Head



Self aligning  
padded reamer

Hole Finishing

### RIQ™ QUATTRO CUT™ PADDED REAMING

- Oil seal bore finishing  $\varnothing$  56,4mm (2.220").
- Tolerance range 30  $\mu$ m H7.
- Aluminium.
- Cambore to oil seal bore self alignment.
- Transfer line with internal coolant.

### CHALLENGE

### SOLUTION

- RIQ padded reamer with two PCD KD1415™ full-face inserts floating on finish machined cam bore.
- Self-aligning reamer body to ensure cam bore to oil seal bore concentricity.

### CUTTING DATA

- vc 326 m/min (1.070 SFM).
- f 0,32 mm/rev (.004 IPR).

### RESULT

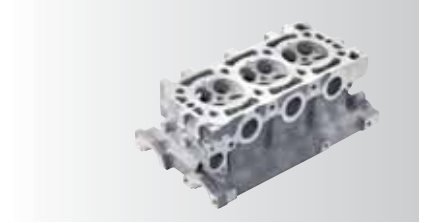
- Tool life of 80.000 cylinder heads.

### BENEFIT

- No insert back taper adjustment needed.
- Cost savings due to four edged full face PCD RIQ insert.



Cylinder Head



Semi finish and finish stage combined

Hole Finishing

### RIQ™ QUATTRO CUT™ PADDED REAMING

#### CHALLENGE

- Cambore finishing  $\varnothing$  25mm (.984").
- Tolerance range 21  $\mu$ m H7.
- Aluminium.
- Deflection less than 20  $\mu$ m over total length.
- Machining centre with internal coolant.

#### SOLUTION

- RIQ padded reamer with two PCD KD1415™ full-face inserts for semi-finishing and two PCD KD1415 full-face inserts for finishing.

#### CUTTING DATA

- vc 334 m/min (1.096 SFM).
- f 0,16 mm/rev (.006 IPR).

#### RESULT

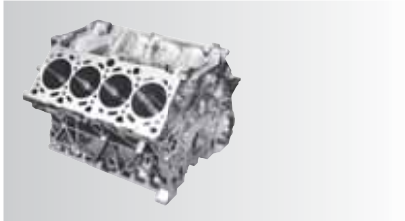
- Tool life of 160.000 cylinder heads.
- Surface finish Ra 0.3  $\mu$ m.

#### BENEFIT

- No insert back taper adjustment is needed.
- Cost savings due to four edged full face PCD RIQ insert.
- Setup time reduction from 8 h with competitive tooling to less than 1/2 h with RIQ.



Cylinder Block



Individual and simultaneous CLB adjustment

Hole Finishing

**ROMICRON™ FINE BORING**

- Cylinder bore  $\varnothing$  78,45mm (3.089").
- Tolerance range 20  $\mu$ m.
- Cast iron GG26.
- Replace low productivity reaming process.
- Machining centre HSK100 with internal coolant.

**CHALLENGE**

**SOLUTION**

- Multicron engineered solutions tool with three finishing cartridges with individual set up and automatic wear compensation with front CLB knob.
- CPGW060204S01015C KB1630.

**CUTTING DATA**

- $v_c$  1.281 m/min (4.200 SFM).
- $f$  0,42 mm/rev (.017 IPR).

**RESULT**

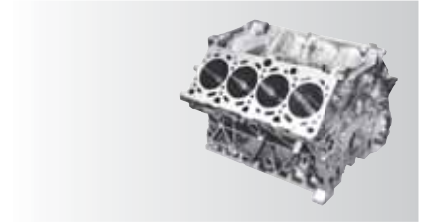
- Tool life of 2.000 components per setup.
- Cylindricity 13  $\mu$ m.
- Surface finish Ra 2.4  $\mu$ m.

**BENEFIT**

- High productivity due to three cutting edges and automatic wear compensation inside of machine.
- Bore tolerance range of 20  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment executed by machine.



Cylinder Block



CLB screw for automatic wear compensation

Hole Finishing

### MOTION TOOLING

### CHALLENGE

- Cylinder bore  $\varnothing$  75mm (2.953").
- Cast iron GG25.
- Semi-finish and finish operation combined in one tool with coolant pressure activated finish stage.
- Machining centre with internal coolant.

### SOLUTION

- Motion tool with feed out cartridges.
- Two channel coolant system with coolant supply for inserts and feed out cartridges.
- Solid CBN inserts with eight cutting edges KB1340™.

### CUTTING DATA

- $v_c$  600 m/min  $f$  0,05 mm/rev semi-finish.
- $v_c$  600 m/min  $f$  0,11 mm/rev finish.

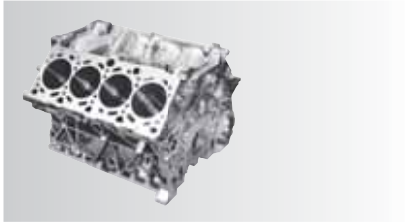
### RESULT

- Tool life of 2.000 bores per tooling setup.
- Cylindricity better than 8  $\mu$ m.

### BENEFIT

- Higher productivity as roughing at forward and finishing at backward movement — with coolant feed out.
- Finish diameter adjustable with CLB process.
- Improved cylindricity than two separate operations.

Cylinder Block



Bayonet quick change system

Hole Finishing

**ROMICRON™ FINE BORING**

- Cylinder bore  $\varnothing$  78,933mm (3.108").
- Cast iron GG25.
- Reduce setup and adjustment effort with roughing and finishing at various cylinder blocks.
- Engineered solutions vertical mill with internal coolant.

**CHALLENGE**

**SOLUTION**

- Romicon engineered solutions tool with quick-change interface and drawbar actuated finish cartridge.
- SNGN090308T00520 KY1615 roughing insert.
- CPMT09T308LF KT315™ finishing insert.

**CUTTING DATA**

- vc 580 m/min f 0,26 mm/rev roughing.
- vc 580 m/min f 0,19 mm/rev finishing.

**RESULT**

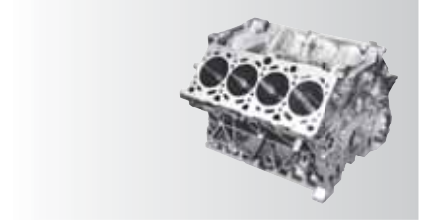
- Tool life of 100 components per setup.
- Cylindricity 13  $\mu$ m.
- Surface finish Ra 1,5  $\mu$ m.

**BENEFIT**

- Bore tolerance easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.
- Weight reduction from 11 kg to 1,8 kg.
- Setup time reduction from 1,5 h to 15 min.
- Secure process resulting in higher cpk value.



Cylinder Block



Hole Finishing

### ROMICRON™ FINE BORING

#### CHALLENGE

- Piston bore Ø 68mm (2.677").
- Tolerance range 30 µm.
- Cast iron.
- Machining centre HSK100A with internal coolant.

#### SOLUTION

- Engineered solution SVS4B head.
- Two semi-finish and one finish cutting edge.
- TPGW110204S01015C KB1630™.

#### CUTTING DATA

- $v_c$  595 m/min (1.952 SFM).
- $f$  0,15 mm/rev (.006 IPR).

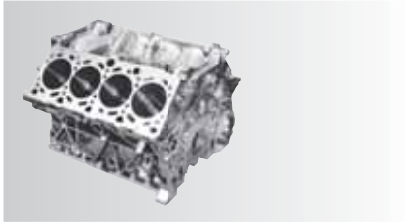
#### RESULT

- Surface finish Ra 0.8 µm.
- Roundness better than 8 µm.

#### BENEFIT

- 80% less adjustment time needed.
- Bore tolerance range of 30 µm easily and consistently achieved due to 1 µm per click in radius adjustment.

Cylinder Block



Hole Finishing

**ROMICRON™ FINE BORING**

- Cylinder bore  $\varnothing$  96,9mm (3.815").
- Tolerance range 30  $\mu$ m.
- Cast iron.
- Machining centre with internal coolant.

**CHALLENGE**

**SOLUTION**

- Romicon standard KR50SVS4B094M head with engineered solution steep taper adaptor with chamfering inserts.
- CPGW060208S01015C KB1630™.

**CUTTING DATA**

- vc 600 m/min (1.969 SFM).
- f 0,30 mm/rev (.012 IPR).

**RESULT**

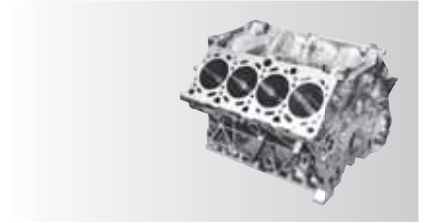
- Tool life of 800 components.
- Surface finish Ra 3  $\mu$ m.

**BENEFIT**

- High productivity increase as a result of 2x cutting speed and 40% higher feed rate compared to previous solution.
- Bore tolerance range of 30  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.



Cylinder Block



Semi and finishing stages combined



Hole Finishing

### ROMICRON™ FINE BORING

#### CHALLENGE

- Cylinder bore  $\varnothing$  103,17mm (4.062").
- Tolerance range 50  $\mu$ m.
- Cast iron.
- Semi-finish and finish operation combined.
- Machining centre HSK100A with internal coolant.

#### SOLUTION

- Romicon engineered solutions tool with two semi-finishing, one finishing and one chamfering cartridges.
- Automatic wear compensation with CLB.
- SCGW09T308S01015C KB1630™.

#### CUTTING DATA

- vc 1.000 m/min (3.281 SFM).
- f 0,25 mm/rev (.010 IPR).

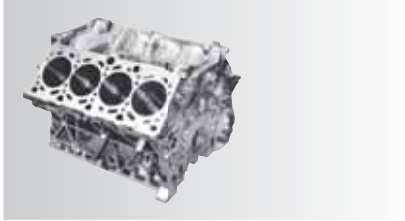
#### RESULT

- Tool life of 450 components per cutting edge.
- Cylindricity less than 17  $\mu$ m.
- Surface finish Ra 2.4  $\mu$ m.

#### BENEFIT

- High productivity due to automatic wear compensation inside of machine.
- 1  $\mu$ m per click in radius adjustment.

Cylinder Block



Individual and simultaneous CLB adjustment

Hole Finishing

### ROMICRON™ FINE BORING

- Cylinder liner  $\varnothing$  127,94mm (5.037").
- Cast iron GGzCrMo250.
- Increase productivity, reduce amount of constant stock for following honing process.
- Custom vertical lathe with internal coolant.

### CHALLENGE

### SOLUTION

- Multicron engineered solution tool with five finishing cartridges with HSK80C adaptor for facing and boring through feed-out system included.
- CPGW060204S01015C KB1630™.

### CUTTING DATA

- $v_c$  1.200 m/min (3.937 SFM).
- $f$  0,50 mm/rev (.020 IPR).

### RESULT

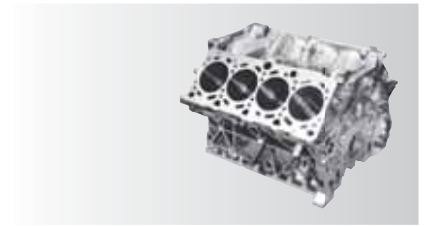
- Tool life of 4.000 components per setup.
- Cylindricity 8  $\mu$ m.
- Surface finish Ra 2,0  $\mu$ m.

### BENEFIT

- High productivity due to five cutting edges.
- Bore tolerance range of 20  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.



Cylinder Block



1  $\mu\text{m}$  per click  
in radius adjustment

### ROMICRON™ FINE BORING

#### CHALLENGE

- Crank bore finishing  $\varnothing$  60mm (2.362").
- Tolerance range 30  $\mu\text{m}$ .
- Cast iron GG25.
- Reduce setup and cycle time.
- Transfer line with internal coolant.

#### SOLUTION

- Line boring bar with Romicron standard cartridges KRMSVS00M055M.
- Semi-finishing and finishing operations in one.
- CPGT060204LF KC5010™.

#### CUTTING DATA

- vc 150 m/min f 0,2 mm/rev semi finish.
- vc 150 m/min f 0,12 mm/rev finish.

#### RESULT

- Tool life of 120 components.
- Surface finish better than Rz 16  $\mu\text{m}$ .
- Roundness better than 5  $\mu\text{m}$ .

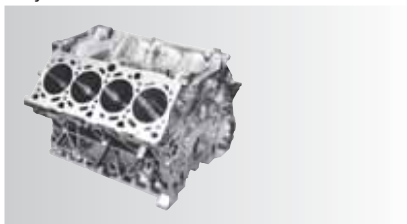
#### BENEFIT

- Semi-finishing operation during forward movement and finishing operation during backward movement of the workpiece.
- Use of standard of the shelf Romicron tooling with engineered solution line boring bar.
- Time saving due to low presetting effort with 1  $\mu\text{m}$  per click in radius adjustment.

Hole Finishing



Cylinder Block



Semi finish and finish stage combined



Hole Finishing

**FINE BORING**

- Crank bore finishing  $\varnothing$  37mm (1.457").
- Tolerance range 5  $\mu$ m.
- Cast iron.
- Maintain tolerance for minimum of 50 bores.
- Machining centre with internal coolant.

**CHALLENGE**

**SOLUTION**

- Line boring bar with tool bits adjusted by differential screw for more sensitivity.
- Dynamically balanced by design with axial holes ensuring highest stiffness of tool.

**CUTTING DATA**

- vc 160 m/min f 0,12 mm/rev semi-finish.
- vc 160 m/min f 0,08 mm/rev finish.

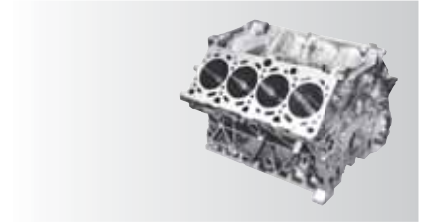
**RESULT**

- Customer proprietary information.

**BENEFIT**

- Use of standard C-style inserts in LF reduce tooling costs in KCK15.
- Reduction of cycle time.
- Easy and fine adjustments ensure a stable process.

Cylinder Block



RIQ chamfering, plunging and reaming insert

Hole Finishing

### RIQ™ QUATTRO CUT™ PADDED REAMING

#### CHALLENGE

- Balancing shaft bore  $\varnothing$  31–39mm.
- Cast iron.
- Reaming of three diameters, machining of three chamfers and one facing operation in one tool.
- Minimum quantity lubrication MQL.

#### SOLUTION

- RIQ padded reamer with one effective cutting edge combining chamfering, counter sinking and reaming stage in one tool, using two reaming RIQ and one special RIQ insert.

#### CUTTING DATA

- $v_c$  100 m/min (328 SFM).
- $f$  0,14 mm/rev (.006 IPR).

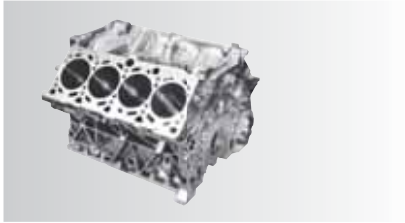
#### RESULT

- Tool life of 8.000 bores per insert.
- Surface finish Rz 10  $\mu$ m.

#### BENEFIT

- No insert back taper adjustment needed.
- Highest angular precision without any adjustment with RIQ at chamfering stage.

Cylinder Block



Hole Finishing



KST pre-loaded taper face contact interface

**RIQ™ QUATTRO CUT™ PADDED REAMING**

- Dowel pin bore Ø 15,341mm (.604").
- Tolerance range 50 µm.
- Cast iron GG26Cr.
- Machining centre with internal coolant.

**CHALLENGE**

- RIQ padded reamer with HSK interface.
- Coated carbide KC6105™ RIQ inserts with four edges.

**SOLUTION**

- vc 70 m/min (328 SFM).
- f 0,13 mm/rev (.005 IPR).

**CUTTING DATA**

- Tool life of 96.000 bores per insert.

**RESULT**

- No insert back taper adjustment needed.

**BENEFIT**

**RHM™ MODULAR REAMING**

- Position bore Ø 20mm (.787").
- Tolerance range 21 µm N7.
- Cast iron GG26Cr.
- Replace padded double-edged reamer.
- Machining centre with internal coolant.

**CHALLENGE**

- Special RHM head with six cutting edges.
- Engineered solution KC6105 TiN coated carbide grade.

**SOLUTION**

- vc 63 m/min (207 SFM).
- f 0,84 mm/rev (.033 IPR).

**CUTTING DATA**

- Tool life of 336m.

**RESULT**

- 8x higher productivity due to higher feed rate.
- Tool life increased by 240% when compared to previous solution.

**BENEFIT**

Conrod



### ROMICRON™ FINE BORING

- Pin bore Ø 58,033mm (2.285").
- Brass.
- Combine finishing of crank and pin bore into one tool to increase productivity.
- Machining centre with internal coolant.

### CHALLENGE

- Romicon engineered-solution tool with two Romicon mechanism in one tool body.
- KC5010™.

### SOLUTION

- vc 450 m/min (1.476 SFM).
- f 0,10 mm/rev (.004 IPR).

### CUTTING DATA

- Tool life of 350 pin bores per insert.
- Surface finish better than Ra 1,0 µm.
- Cylindricity 5 µm.

### RESULT

- Combination tool increases productivity.
- Bore tolerance range of 26 µm easily and consistently achieved due to 1 µm per click in radius adjustment.

### BENEFIT

### ROMICRON™ FINE BORING

- Crank bore Ø 93,777mm (3.692").
- Steel C70.
- Combine finishing of crank and pin bore into one tool to increase productivity.
- Machining centre with internal coolant.

### CHALLENGE

- Romicon engineered solution tool with two Romicon mechanism in one tool body.
- KT315™.

### SOLUTION

- vc 400 m/min (1.312 SFM).
- f 0,10 mm/rev (.004 IPR).

### CUTTING DATA

- Tool life of 260 crank bores per insert.
- Surface finish better than Ra 1,0 µm.
- Cylindricity 5 µm.

### RESULT

- Combination tool increases productivity.
- Bore tolerance range of 26 µm easily and consistently achieved due to 1 µm per click in radius adjustment.

### BENEFIT



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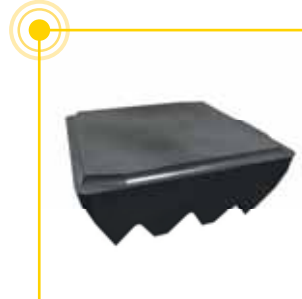
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Conrod



RIQ cermet insert with chip former geometry



### RIQ™ QUATTRO CUT™ PADDED REAMING

#### CHALLENGE

- Pin bore  $\varnothing$  19mm (.748").
- Tolerance range 33  $\mu$ m H8.
- Steel C70.
- Entry/exit inclined and chip control improvement.
- Transfer line with MQL internal coolant.

#### SOLUTION

- RIQ padded reamer with two axial staggered RIQ inserts in microfinishing setup.
- Coated cermet RIQ inserts with four edges and special chip former.

#### CUTTING DATA

- $v_c$  200 m/min (328 SFM).
- $f$  0,20 mm/rev (.006 IPR).

#### RESULT

- Tool life of more than 5.000 components per insert.
- Surface finish Rz 12–14  $\mu$ m.
- Cylindricity 5  $\mu$ m.

#### BENEFIT

- No insert back taper adjustment needed.
- High productivity increase due to higher feed rate when compared to previous fine boring tools.
- Very short chips improve chip evacuation.
- Secure process as surface requirement of Rz 8  $\mu$ m to Rz 16  $\mu$ m are achieved.

Hole Finishing

Conrod



Individual and simultaneous CLB adjustment

Hole Finishing

**ROMICRON™ FINE BORING**

- Crank bore  $\varnothing$  91,24mm (3.592").
- Steel C70.
- Increase productivity with semi-finishing and finishing operations.
- Transfer line with internal coolant.

**CHALLENGE**

**SOLUTION**

- Multicron quick-change engineered-solution tool with three semi-finishing and three finishing cartridges.
- Drawbar CLB adjustment of finishing inserts.
- SCMT09T308LF KT315™.

**CUTTING DATA**

- $v_c$  230 m/min (820 SFM).
- $f$  0,36 mm/rev (.014 IPR).

**RESULT**

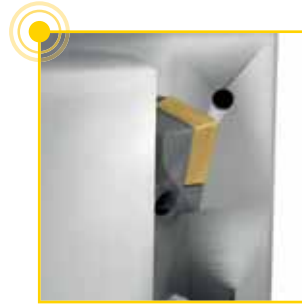
- Tool life of 2,320 conrods per insert.
- Surface finish  $R_a$  1,0  $\mu m$ .
- Cylindricity 2  $\mu m$ .

**BENEFIT**

- High productivity due to three cutting edges.
- Quick-change coupling to enable individual cartridge setup at multicron finishing stage.
- Bore tolerance range of 22  $\mu m$  easily and consistently achieved due to 1  $\mu m$  per click in radius adjustment.



Conrod



Double feed out mechanism



Hole Finishing

### ROMICRON™ MOTION TOOLING

#### CHALLENGE

- Crank bore  $\varnothing$  98,82mm (3.891").
- Tolerance range 26  $\mu$ m.
- Steel C70.
- Drawbar actuated solution to semi-finish, finish, and chamfer both sides of the crank bore.

#### SOLUTION

- Motion tool based on Romicon with double feed out mechanism and fixed insert cartridges.
- SCMT09T308LF KC5010™.

#### CUTTING DATA

- $v_c$  230 m/min (755 SFM).
- $f$  0,12 mm/rev (.005 IPR).

#### RESULT

- Tool life of 600 conrods per insert.
- Surface finish Ra 1.0  $\mu$ m.
- Cylindricity 2  $\mu$ m.

#### BENEFIT

- Very stable and highly productive process as multiple operations are combined.
- Blue print solution for various types of conrods at customer site.



Conrod



Hole Finishing

**ROMICRON™ FINE BORING**

- Pin bore  $\varnothing$  16,77mm (.660").
- Crank bore  $\varnothing$  20,77mm (.818").
- Steel C70.
- Combines roughing, semi-finishing, and finishing operation into one tool.

**CHALLENGE**

**SOLUTION**

- Romicon standard head HSK63ASVUBB2116M with engineered-solution boring bar.
- CPMT060204LF KC5010™.

**CUTTING DATA**

- vc 120 m/min f 0,10 mm/rev roughing.
- vc 120 m/min f 0,05 mm/rev finishing.

**RESULT**

- Tool life of 2.500 components per insert edge.
- Surface finish Ra 0,5  $\mu$ m.
- Cylindricity 3  $\mu$ m.

**BENEFIT**

- Productivity increase due to combination tool.
- Bore tolerance range of 20  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.



Steering Column



Adjustable cartridge with PCD insert

Hole Finishing

### PCD COUNTERSINKING PDCSTM03RLE

#### CHALLENGE

- Bore  $\varnothing$  26,2; 37,6; and 44mm.
- Tolerance range 21  $\mu$ m N7.
- Aluminium G-AISI9Cu3.
- Varying depth of cut ca. 1,5mm.
- Machining centre with internal coolant.

#### SOLUTION

- PCD tipped, steel-based tool with internal coolant.
- Three effective cutting teeth; KD1415™.
- Standard cartridge SCFCR08CA06 achieves required surface finish range.

#### CUTTING DATA

- $v_c$  500 m/min (1.640 SFM).
- $f$  0,30 mm/rev (.012 IPR).

#### RESULT

- Surface finish Ra 1,6–2,3  $\mu$ m.

#### BENEFIT

- Secure process.

Steering Column



Hole Finishing

#### PCD COUNTERSINKING PDCSTA03RLE

- Bore  $\varnothing$  17,07; 39,1; and 50,9mm.
- Tolerance range 21  $\mu$ m N7.
- Aluminium G-AISI10Mg.
- Varying depth of cut ca. 2,5mm.
- Machining centre with internal coolant.

#### CHALLENGE

- PCD tipped, steel-based tool with SIF™ steerable interface and internal coolant.
- Three effective cutting and chamfering teeth.
- KD1415™.

#### SOLUTION

#### CUTTING DATA

- vc 600 m/min (1.969 SFM).
- f 0,30 mm/rev (0,012 IPR).

#### RESULT

- Tool life of 2.000 metres.

#### BENEFIT

- Productivity increased due to higher cutting data.



Gear Housing



### PCD STEP REAMING PCDRSCA04RLE

#### CHALLENGE

- Bearing bore  $\varnothing$  13,5 and 18mm.
- Tolerance range 18  $\mu$ m H7.
- Aluminium G-AISI10Mg.
- Varying depth of cut ca. 0,5mm.
- Machining centre with internal coolant.

#### SOLUTION

- PCD tipped, carbide-based tool shrunk in SIF™ steerable interface with internal coolant.
- Four effective cutting teeth.
- KD1415™.

#### CUTTING DATA

- $v_c$  230 m/min (755 SFM).
- $f$  0,25 mm/rev (0,010 IPR).

#### RESULT

- Surface finish Ra 0,2  $\mu$ m.

#### BENEFIT

- Secure process.

Gear Housing



Adjustable PCD  
pocket seat

Hole Finishing

**PCD COUNTERSINKING PCDCSTMJ04RLE**

- Bearing bore  $\varnothing$  40, 62, 85mm.
- Tolerance range  $25 \mu\text{m}$  S7.
- Aluminium AISi9Cu3.
- Machine three different diameters with one tool.
- Machining centre with internal coolant.

**CHALLENGE**

**SOLUTION**

- PCD tipped, steel-based tool with adjustable pocket seats, SIF™ steerable interface and internal coolant.
- Four effective cutting and chamfering teeth; KD1415™.

**CUTTING DATA**

- $v_c$  630–1.340 m/min       $n = 5.010$  RPM.
- $f$  0,32 mm/rev              (0,013 IPR).

**RESULT**

- Tool life of 500 workpieces.

**BENEFIT**

- Secure process with only 1,2 sec cutting time per operation.
- Higher productivity due to combining three operations into one tool.
- Very stable process without chip control issues.



Gear Housing



Highly uneven spacing

Hole Finishing



**PCD STEP REAMING PCDRSTM06RLE**

**CHALLENGE**

- Bearing bore  $\varnothing$  130mm.
- Tolerance range 25  $\mu$ m S6.
- Aluminium AlSi8Cu3.
- Varying depth of cut ca. 0,5–5mm.
- Machining centre with internal coolant.

**SOLUTION**

- PCD tipped, steel-based tool with HSK interface and internal coolant.
- Six effective cutting and chamfering teeth in positive cutting position; KD1415™.

**CUTTING DATA**

- $v_c$  350 m/min (1.148 SFM).
- $f$  0,60 mm/rev (0,024 IPR).

**RESULT**

- Tool life increase versus previous solution.
- Surface finish Ra 0,2  $\mu$ m.

**BENEFIT**

- Secure process.

Gear Housing



Hole Finishing

#### PCD REAMING PCDRSTA03RLE

- Bearing bore  $\varnothing$  35mm (.984").
- Tolerance range 21  $\mu$ m H7.
- Aluminium G-AlSi10Mg.
- Pre-drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

#### CHALLENGE

#### SOLUTION

- PCD tipped, steel-based tool with SIF™ steerable interface and internal coolant.
- Three effective cutting and chamfering teeth.
- KD1415™.

#### CUTTING DATA

- $v_c$  235 m/min (771 SFM).
- $f$  0,30 mm/rev (0,012 IPR).

#### RESULT

- Tool life of 100.000 holes.
- Surface finish Ra 0,2  $\mu$ m.

#### BENEFIT

- Secure process despite high L/D ratio.
- Very good surface quality.



Gear Housing



### PCD REAMING PCDRSC02RLE

#### CHALLENGE

- Index bore  $\varnothing$  11,5mm (0,435").
- Tolerance range 18  $\mu$ m H7.
- Aluminium G-AISI10Mg.
- Varying depth of cut ca. 3mm.
- Machining centre HSK63A with internal coolant.

#### SOLUTION

- PCD tipped, carbide-based tool with shrink in HSK63A adaptor with internal coolant.
- Two effective cutting and chamfering teeth.
- KD1415™.

#### CUTTING DATA

- $v_c$  1.005 m/min (3,297 SFM).
- $f$  0,16 mm/rev (0,024 IPR).

#### RESULT

- Tool life of 200.000 holes.
- Surface finish Ra 0,2  $\mu$ m.

#### BENEFIT

- Secure process and very good surface quality.
- Very short overhang length resulting in very good stability.

Hole Finishing



Gear Housing



Hole Finishing

### PCD REAMING PCDRSTA04RLE

- Bearing bore  $\varnothing$  80mm (3,150").
- Tolerance range 30  $\mu$ m H7.
- Aluminium G-AISI10Mg.
- Pre-drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

### CHALLENGE

### SOLUTION

- PCD tipped, steel-based tool with SIF™ steerable interface and internal coolant.
- Four effective cutting and chamfering teeth.
- KD1415™.

### CUTTING DATA

- $v_c$  400 m/min (1.312 SFM).
- $f$  0,32 mm/rev (0,013 IPR).

### RESULT

- Tool life of more than 30.000 components.
- Surface finish Ra 0,2  $\mu$ m.

### BENEFIT

- Secure process and very good surface quality.



Gear Housing



Hole Finishing

**PCD MULTI-OPERATION TOOL PCDMSTA04RLE**

**CHALLENGE**

- Bearing bore  $\varnothing$  28 and 90mm.
- Tolerance range 21 and 35  $\mu$ m H7.
- Aluminium G-AlSi10Mg.
- Pre-drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

**SOLUTION**

- PCD tipped, steel-based tool with two individual adjustable SIF™ steerable interfaces and internal coolant.
- Four effective cutting teeth.
- KD1415™.

**CUTTING DATA**

- $v_c$  400 m/min (1.312 SFM).
- $f$  0,32 mm/rev (0,013 IPR).

**RESULT**

- Tool life of more than 95.000 holes.
- Surface finish Ra 0,2  $\mu$ m.

**BENEFIT**

- Secure process and very good surface quality.

Gear Housing



Hole Finishing

### PCD STEP REAMING PCDRSTM04RLE

- Bearing bore  $\varnothing$  80 and 120mm.
- Tolerance range 30 and 35  $\mu$ m H7.
- Aluminium G-AISI7Mg.
- Pre-drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

### CHALLENGE

### SOLUTION

- PCD tipped, steel-based tool with HSK63A interface and internal coolant.
- Four effective cutting teeth.
- KD1415™.

### CUTTING DATA

- $v_c$  800 m/min (2,625 SFM).
- $f$  0,32 mm/rev (0,013 IPR).

### RESULT

- Tool life of more than 400 min.
- Surface finish Ra 0,2  $\mu$ m.

### BENEFIT

- Secure process and very good surface quality.
- Tool life increase versus previous solution.



Gear Housing



Hole Finishing

### PCD COUNTERSINKING PDCSTA03RLE

#### CHALLENGE

- Bearing bore  $\varnothing$  81,25 and 90,3mm.
- Tolerance range 30 and 35  $\mu$ m H7.
- Aluminium G-AlSi7Mg.
- Pre drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

#### SOLUTION

- PCD tipped, steel-based tool with SIF™ steerable interface and internal coolant.
- Three effective cutting and chamfering teeth.
- KD1415™.

#### CUTTING DATA

- $v_c$  400 m/min (1.312 SFM).
- $f$  0,30 mm/rev (0,012 IPR).

#### RESULT

- Tool life of 10.000 components.
- Surface finish Ra 0,2  $\mu$ m.

#### BENEFIT

- Secure process and very good surface quality.

Gear Housing



Hole Finishing

### PCD STEP REAMING PCDRSTA03RLE

- Bearing bore  $\varnothing$  17,984 and 66,037mm.
- Tolerance range 8 and 20  $\mu$ m.
- Aluminium GD-AISI7.
- Pre-drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

### CHALLENGE

### SOLUTION

- PCD tipped, steel-based tool with SIF™ steerable interface and internal coolant.
- Three effective cutting teeth.
- KD1415™.

### CUTTING DATA

- vc 315 m/min    f 0,24 mm/rev     $\varnothing$  17,984 mm.
- vc 1.156 m/min    f 0,15 mm/rev     $\varnothing$  66,037 mm.

### RESULT

- Tool life of 35.000 components.
- Surface finish Ra 0,2  $\mu$ m.

### BENEFIT

- Secure process and very good surface quality.
- Achieves high concentricity and straightness.



Gear Housing



**PCD PROFILE MILLING PCDPSTM04E**

- Retraining grooves  $\varnothing$  60,4 and 90,7mm.
- Tolerance range 60  $\mu$ m.
- Aluminium G-AISI10Mg.
- Pre drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

**CHALLENGE**

- PCD tipped, steel-based tool with HSK63A interface and internal coolant.
- Four effective cutting teeth.
- KD1415™.

**SOLUTION**

- vc 1.500 m/min (4.921 SFM).
- f 0,06 mm/rev (0,002 IPR).

**CUTTING DATA**

- Tool life of 50.000 parts.
- Surface finish better than Ra 0,4  $\mu$ m.

**RESULT**

- Secure process.
- Combining two operations in one tool increases productivity.
- High accuracy in the distance between the two machined grooves.

**BENEFIT**

**PCD PROFILE MILLING PCDPSTM04E**

- Retraining grooves  $\varnothing$  58, 58,6 and 60mm.
- Tolerance range 25  $\mu$ m.
- Aluminium G-AISI10Mg.
- Pre drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

**CHALLENGE**

- PCD tipped, steel based tool with HSK63A interface and internal coolant.
- Four effective cutting teeth.
- KD1415™.

**SOLUTION**

- vc 1.500 m/min (4.921 SFM).
- f 0,06 mm/rev (0,002 IPR).

**CUTTING DATA**

- Tool life of 50.000 work pieces.
- Surface finish better than Ra 0,2  $\mu$ m.

**RESULT**

- Combining machining operations increases productivity.
- Excellent dimensional accuracy.

**BENEFIT**



Differential Housing



Hole Finishing

### ROMICRON™ FINE BORING

- Bearing bores  $\varnothing$  60,22 and 88,85mm.
- Tolerance range 17  $\mu$ m.
- Ductile cast iron GGG50.
- Finishing, back boring, and chamfering in one tool.
- Machining centre HSK100A with internal coolant.

### CHALLENGE

- Dynamically balanced Romicon engineered solution.
- Individual adjustment of fine boring and back boring stages.
- CPGT060204LF KC5010™.

### SOLUTION

### CUTTING DATA

- $v_c$  200 m/min (656 SFM).
- $f$  0,12 mm/rev (0,005 IPR).

### RESULT

- Tool life of 240 components per insert.
- Surface finish Ra 1,6  $\mu$ m.

### BENEFIT

- Bore tolerance range of 17  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.



Differential Housing



SPHX insert for precise 90° shoulder



Hole Finishing

### PCD STEP REAMING

#### CHALLENGE

- Pin bore  $\varnothing$  60mm (2.362").
- Tolerance range 19  $\mu$ m H6.
- Ductile cast iron GGG40.
- Finishing bore and 90° shoulder to  $\varnothing$  55mm.
- Machining centre with internal coolant.

#### SOLUTION

- Standard Romicon KM50SVS2B107M head with engineered solution cartridge.
- SPHX060204R21 KC7215™ standard double-edged countersinking insert.

#### CUTTING DATA

- vc 180 m/min (590 SFM).
- f 0,05 mm/rev (0,002 IPR).

#### RESULT

- Tool life of 4.000 components per insert.
- Surface finish Ra 1,6  $\mu$ m.

#### BENEFIT

- All requirements regarding perpendicularity achieved.
- Bore tolerance range of 19  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.



Differential Housing



Adjustable pocket seat

Hole Finishing

**PCD STEP REAMING PCDRSTA04RLE**

- Bore  $\varnothing$  40 and 55mm (1,575 and 2,165").
- Tolerance range 30  $\mu$ m R7.
- Aluminium GD-AISI10Mg.
- Fine boring two diameters with one tool.
- Machining centre with internal coolant.

**CHALLENGE**

**SOLUTION**

- PCD steel-based fine boring tool with four effective cutting edges, adjustable pocket seats at  $\varnothing$  55mm, SIF™ steerable interface, and internal coolant.
- CCMT060202 KM™ one uncoated carbide.

**CUTTING DATA**

- $v_c$  340 and 520 m/min  $n = 3.000$  RPM.
- $f$  0,60 mm/rev (0,024 IPR).

**RESULT**

- Tool life of more than 15.000 components per insert.
- Surface finish Rz 10–12  $\mu$ m.
- Cylindricity better than 20  $\mu$ m.

**BENEFIT**

- All requirements regarding perpendicularity, roundness, and surface quality between Rz 8  $\mu$ m and Rz 16  $\mu$ m continuously achieved.
- Higher productivity due to combining three operations in one tool.



Water Pump Housing



## PCD COUNTERSINKING PDCSTAO3RLE

### CHALLENGE

- Bore positions of  $\varnothing 21$  and  $24\text{mm}$  (0,827 and 0,945").
- Tolerance range 13 and 33  $\mu\text{m}$ .
- Aluminium AlSi9Cu3.
- Pre drilled hole with 0,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

### SOLUTION

- PCD tipped, steel-based tool with adjustable pocket seats, SIF™ steerable interface and internal coolant.
- Four effective cutting teeth; KD1415™.

### CUTTING DATA

- $v_c$  600 m/min (1.969 SFM).
- $f$  0,12 mm/rev (0,005 IPR).

### RESULT

- Tool life of 80000 components.
- Surface finish Rz 0,8  $\mu\text{m}$  with  $\varnothing 21\text{mm}$  and Rz 12  $\mu\text{m}$  with  $\varnothing 24\text{mm}$ .

### BENEFIT

- All requirements regarding perpendicularity, roundness, and surface quality between Rz 8  $\mu\text{m}$  and Rz 15  $\mu\text{m}$  at  $\varnothing 24\text{mm}$  are continuously achieved.

Hole Finishing

Water Pump Housing



Hole Finishing

**PCD MULTI-OPERATION TOOL PCDMSC02CCE**

- Position bore  $\varnothing$  7,9mm (0,311").
- Tolerance range 22  $\mu$ m H8.
- Aluminium AISI9Cu3.
- Combine drilling, back chamfering, and facing.
- Machining centre BT40 with internal coolant.

**CHALLENGE**

- Solid carbide, PCD tipped, steel-based tool with back chamfering capability and internal coolant.
- Two effective cutting teeth.
- KD1415™.

**SOLUTION**

**CUTTING DATA**

- $v_c$  350 m/min (1.148 SFM).
- $f$  0,20 mm/rev (0,008 IPR).

**RESULT**

- Tool life of 50.000 components.
- Surface finish Rz 0,8  $\mu$ m.

**BENEFIT**

- Higher productivity due to combining three operations in one tool.



Water Pump Housing



Hole Finishing

### PCD STEP REAMING PCDRSTM04RLE

#### CHALLENGE

- Bearing bores  $\varnothing$  10,14–18,45mm.
- Tolerance range 3–10  $\mu\text{m}$ .
- Aluminium GD-ALSi9Cu3.
- Pre-casted hole with 0,3mm depth of cut.
- Machining centre HSK32A with internal coolant.

#### SOLUTION

- PCD tipped, steel-based tool with adjustable pocket seats, SIF™ steerable interface and internal coolant.
- Four effective cutting teeth.
- KD1415™.

#### CUTTING DATA

- $v_c$  89–162 m/min  $n = 2800$  RPM.
- $f$  0,4 mm/rev (0,015 IPR).

#### RESULT

- Tool life of 40.000 components.
- Surface finish  $R_z$  0,8  $\mu\text{m}$ .

#### BENEFIT

- The quality criterion with an exact alignment of rightness, concentricity, and a high value of surface quality was reached.

Water Pump Housing



Hole Finishing

#### PCD END MILLING PCDESTM05E

- Face milling of connection face  $\varnothing$  32mm.
- Aluminium AlSi10Mg.
- Casted face with 2,5mm depth of cut.
- Machining centre HSK63A with internal coolant.

#### CHALLENGE

#### SOLUTION

- PCD tipped, steel-based end mill with HSK63A interface and internal coolant.
- Five effective cutting teeth.
- KD1415™.

#### CUTTING DATA

- $v_c$  1.005 m/min (3.294 SFM).
- $f$  0,06 mm/rev (0,002 IPR).

#### RESULT

- Tool life of 3.000 min.
- Surface finish  $R_a$  0,3  $\mu\text{m}$ .

#### BENEFIT

- Very low burr formation.



Planetary Gear Carrier



Chip control geometry

Hole Finishing

### RMS™ MULTIFLUTE REAMING

#### CHALLENGE

- Bearing bores  $\varnothing$  8,8mm (.346").
- Tolerance range 9  $\mu$ m M6.
- Steel 42CrMo4 and 31CrMoV9.
- Increase tool life with long chipping material.
- Machining centre with internal coolant.

#### SOLUTION

- RMS engineered-solution reamer with four effective cutting edges, internal coolant hole, and coolant channels at shank.
- KC6305™ TiAlN coated carbide.

#### CUTTING DATA

- $v_c$  70 m/min (230 SFM.).
- $f$  0,30 mm/rev (0,012 IPR).

#### RESULT

- Tool life of 300 components.
- Surface finish Rz 1,0–2,0  $\mu$ m.

#### BENEFIT

- All requirements regarding perpendicularity, roundness, and surface quality below Rz 4  $\mu$ m are continuously achieved.

Planetary Gear Carrier



Hole Finishing

**ROMICRON™ FINE BORING**

- Bearing bores Ø 35 and 36,5mm.
- Tolerance range 20 µm.
- Steel 20MnCr5.
- Replace padded step reamer.
- Machining centre with internal coolant.

**CHALLENGE**

- Romicon standard heads KR32SVS0B93M and HSK63ASVS0B117M.
- CCMT06020411 KT315™ cermet insert.

**SOLUTION**

- $v_c$  290 m/min (230 SFM).
- $f$  0,10 mm/rev (0,012 IPR).

**CUTTING DATA**

- Surface finish better than Ra 1,0 µm.
- Cylindricity better than 5 µm.

**RESULT**

- More than 25% reduction in machining time.
- Removing setup of padded reamer outside of the machine results in increased up time.
- Bore tolerance range of 20 µm easily and consistently achieved due to 1 µm per click in radius adjustment.

**BENEFIT**



Planetary Gear Carrier



Padded reaming pin machining

### RIQ™ QUATTRO CUT™ PADDED REAMING

#### CHALLENGE

- Bearing pin machining  $\varnothing$  45mm (1.772").
- Tolerance range 16  $\mu$ m k6.
- Ductile cast iron GGG40.
- Surface quality of Rmax 10  $\mu$ m to achieve.
- Special dimensional accuracy requirement.

#### SOLUTION

- RIQ padded reamer with SIF™ steerable tooling interface and special gashing for external coolant supply.
- Balanced by design and fine balanced.

#### CUTTING DATA

- vc 105 m/min (344 SFM).
- f 0,06 mm/rev (0,002 IPR).

#### RESULT

- Surface finish better than Rz 2,5  $\mu$ m.
- Roundness 3  $\mu$ m.
- Cylindricity 6  $\mu$ m.

#### BENEFIT

- No insert back taper adjustment needed.
- Faster setup and less scrap.

Hole Finishing



Brake Caliper



Hole Finishing

### RMB™ MULTIFLUTE REAMING

- Main bore  $\varnothing$  54mm (2,126").
- Tolerance range 50  $\mu$ m.
- Cast iron.
- Machining centre BT50 with internal coolant.

### CHALLENGE

- UpSharp engineered-solution carbide tipped reamer with 12 cutting edges, clamped in standard Shrink Fit holder.
- TiCN coated carbide.

### SOLUTION

### CUTTING DATA

- $v_c$  90 m/min (295 SFM).
- $f$  1,21 mm/rev (0,048 IPR).

### RESULT

- Tool life of 1.500–2.000 components.
- Surface finish Ra 2–2,4  $\mu$ m.

### BENEFIT

- Rigid design enables high feed rates increasing productivity.
- Reduces setup effort by using standard tooling with Shrink Fit adaptor.
- Regrindable up to 5x.



Brake Caliper



### RMS™ MULTIFLUTE REAMING

#### CHALLENGE

- Pin hole  $\varnothing$  12mm (0,472").
- Tolerance range 30  $\mu$ m.
- Cast iron.
- Machining centre HSK63A with internal coolant.

#### SOLUTION

- UpSharp engineered-solution solid carbide reamer with six cutting edges.
- TiCN coated carbide.

#### CUTTING DATA

- $v_c$  75 m/min (246 SFM).
- $f$  0,8 mm/rev (0,031 IPR).

#### RESULT

- Tool life of 5.000 holes.
- Surface finish Ra 1,0  $\mu$ m.

#### BENEFIT

- Productivity increase.
- Longer tool life than competition.
- Ease of use due to shrink technology.

Hole Finishing

Brake Caliper



Hole Finishing

### RIR™ PADDED REAMING

- Main bore  $\varnothing$  60mm (2,362").
- Tolerance range 46  $\mu$ m H8.
- Cast iron.
- Obsolete honing process and produce undercut in the caliper bore.

### CHALLENGE

### SOLUTION

- RIR padded reamer with end cutting radius profile insert.
- Coated carbide RIR insert with two edges.
- KC6305™.

### CUTTING DATA

- $v_c$  70 m/min (230 SFM).
- $f$  0,12 mm/rev (0,005 IPR).

### RESULT

- Tool life of 800 components per insert.
- Surface finish better than Ra 1,6  $\mu$ m.

### BENEFIT

- Bore tolerance range of 46  $\mu$ m easily and consistently achieved.
- Cuts cost by eliminating honing and additional undercut operations.



Brake Caliper



### RIQ™ QUATTRO CUT™ PADDED REAMING

#### CHALLENGE

- Main bore  $\varnothing$  54,02mm (2,127").
- Tolerance range 40  $\mu$ m.
- Cast iron GGG.
- Reduce setup time and cost per part.

#### SOLUTION

- RIQ padded reamer with customer specific shank.
- Coated carbide RIQ insert with four edges.
- KC6305™.

#### CUTTING DATA

- $v_c$  80 m/min (262 SFM).
- $f$  0,40 mm/rev (0,016 IPR).

#### RESULT

- Tool life of 16.000 bores per insert.
- Surface finish better than Ra 1,6  $\mu$ m.

#### BENEFIT

- No insert back taper adjustment needed.
- High cost savings due to more than 100% increase in tool life.

Brake Caliper



Hole Finishing

**PCD REAMING PCDRSTM04RLE**

- Main bore  $\varnothing$  42mm (1,654").
- Tolerance range 8  $\mu$ m.
- Aluminium.
- Varying depth of cut between 1–2mm.
- Machining centre with internal coolant.

**CHALLENGE**

**SOLUTION**

- PCD tipped, steel-based tool with HSK63A interface and internal coolant.
- Four effective cutting teeth.
- KD1415™.

**CUTTING DATA**

- $v_c$  500 m/min (1,640 SFM).
- $f$  1 mm/rev (0,039 IPR).

**RESULT**

- Tool life of 400.000–600.000 bores.
- Surface finish better than Ra 1,6  $\mu$ m.

**BENEFIT**

- Secure process and high tool life.
- Productivity increase compared to previous solution.



Brake Caliper



Producing two different diameter



### RMB™ MULTIFLUTE REAMING

#### CHALLENGE

- Location holes  $\varnothing$  39 and 40mm.
- Tolerance range 39  $\mu$ m H8.
- Cast iron GGG60.
- Produce both diameters with one tool.
- Machining centre with internal coolant.

#### SOLUTION

- RMB engineered-solution carbide tipped reamer with 10 teeth and internal coolant supply.
- KC6305™ TiAlN coated carbide.

#### CUTTING DATA

- $v_c$  70 m/min (230 SFM).
- $f$  3,30 mm/rev (0,130 IPR).

#### RESULT

- Tool life of 5.000 holes.
- Surface finish Rz 20  $\mu$ m better than required Rz 25  $\mu$ m.

#### BENEFIT

- Very stable and highly productive process as multiple operations are combined at very high cutting data.

Brake Master Cylinder



RIQ PCD insert with chip former geometry

Hole Finishing

**RIQ™ QUATTRO CUT™ PADDED REAMING**

- Piston bore Ø 25,431mm (1,001").
- Tolerance range 10 µm.
- Aluminium AISI7.
- Combine multiflute and padded reaming process.
- Round table machine with internal coolant.

**CHALLENGE**

**SOLUTION**

- RIQ padded reamer in angular micro finishing setup with semi- and fine-finishing inserts.
- RIQ full face PCD KD1415™ as finishing insert.

**CUTTING DATA**

- vc 360 m/min (1.181 SFM).
- f 0,24 mm/rev (0,009 IPR).

**RESULT**

- Tool life of 1.600 bores per insert.
- Surface finish better than Ra 0,4 µm.
- Cylindricity 7 µm.

**BENEFIT**

- No insert back taper adjustment needed.
- Higher productivity due to combining two operations in one tool and increasing feed by more than 30%.
- Very stable process without chip control issues.
- Better cylindricity than requested.



Brake Master Cylinder



Hole Finishing

**RIQ™ QUATTRO CUT™ PADDED REAMING**

**CHALLENGE**

- Piston bore  $\varnothing$  25,431mm (1,001").
- Tolerance range 10  $\mu$ m.
- Ductile cast iron.
- Replace honing process with reaming.
- Machining centre with internal coolant.

**SOLUTION**

- RIQ padded reamer in angular micro-finishing setup with semi- and fine-finishing insert.
- RIQ full face PCD KD1415™ as finishing insert.

**CUTTING DATA**

- vc 120 m/min (394 SFM).
- f 0,20 mm/rev (0,008 IPR).

**RESULT**

- Tool life of 1.600 bores per insert.
- Surface finish better than Ra 0,4  $\mu$ m.
- Cylindricity 6  $\mu$ m.

**BENEFIT**

- No insert back taper adjustment needed.
- Higher productivity due to combining two operations in one tool.





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Steering Knuckle



### ROMICRON™ FINE BORING

#### CHALLENGE

- Main bearing bore  $\varnothing$  82mm (3,228").
- Replace setup of padded reamer and cover various diameters with one tool.
- Machining centre with internal coolant.

#### SOLUTION

- Romicon engineered solution. HSK80ASVSB156M SVS4B head.
- CPMT 060204 FW KCK20™.

#### CUTTING DATA

- vc 400 m/min (1,312 SFM).
- f 0,20 mm/rev (0,008 IPR).

#### RESULT

- Tool life of 1.000 components.
- Surface finish 1,2  $\mu$ m.
- Cylindricity better than 6  $\mu$ m.

#### BENEFIT

- Reduce setup time and cost reduction when standard inserts are used.
- Bore tolerance range of 30  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.

Hole Finishing

Steering Knuckle



Very uneven spacing

Hole Finishing

### RMB™ MULTIFLUTE REAMING

- Axle arm  $\varnothing$  52,935mm (2,084").
- Tolerance range 20  $\mu$ m.
- Steel St52-3 and 30MnVS6.
- Surface finish and chip control improvements.
- Machining centre with internal coolant.

### CHALLENGE

- RMB engineered-solution cermet tipped reamer with wide chip flutes.
- 6° left hand helix and special lead geometry.
- KT6215™ TiAlN coated cermet.

### SOLUTION

- vc 20 m/min f 2 mm/rev entering hole.
- vc 90 m/min f 2 mm/rev finish hole.

### CUTTING DATA

- Tool life of 460 components.
- Surface finish Rz 1,3  $\mu$ m.

### RESULT

- More than 30% increase in tool life compared to previous competitive tooling.
- Surface finish Rz 1,3  $\mu$ m better than requested Rz 6,3  $\mu$ m.

### BENEFIT



Suspension Subframe



### RIR™ PADDED REAMING

#### CHALLENGE

- Location hole  $\varnothing$  18,5–23,0mm (0,728–0,906").
- Tolerance range 0,1°.
- Steel.
- Improvement in roundness and angularity.
- Transfer line with internal coolant.

#### SOLUTION

- RIR taper reamer with HSK interface.
- R904S00771 KC6005™ with two edges.

#### CUTTING DATA

- $v_c$  32 m/min (105 SFM).
- $f$  0,133 mm/rev (0,005 IPR).

#### RESULT

- Tool life of 800 bores per insert.
- Surface finish Ra 1,6  $\mu$ m.

#### BENEFIT

- Predictable performance and cost savings because inserts can be reconditioned.
- Easy to set with three clock padded reamer setting fixtures.
- Roundness improvement over competitive solid carbide multiflute reamer.

Mounting Lever



Hole Finishing

### PCD COUNTERSINKING PCDCSTM04RLE

- Reaming pre-casted hole  $\varnothing$  20mm (0,787").
- Tolerance range 21  $\mu$ m H7.
- Aluminium AlSi9Cu3.
- 220mm over hang due to workpiece fixture.
- Machining centre with internal coolant.

### CHALLENGE

### SOLUTION

- PCD tipped, steel-based tool with HSK63A interface and internal coolant.
- Four effective cutting teeth.
- KD1415™.

### CUTTING DATA

- $v_c$  125 m/min (410 SFM).
- $f$  0,70 mm/rev (0,003 IPR).

### RESULT

- Tool life of 60.000 components.
- Surface finish Ra 0,2  $\mu$ m.

### BENEFIT

- Secure process and less scrap than previous competitive solution.
- No adjustment effort due to solid solution.



CV Joint



Hole Finishing

**ROMICRON™ FINE BORING**

**CHALLENGE**

- Central bore  $\varnothing$  28mm (1,102").
- Tolerance range 18  $\mu$ m.
- Steel, hardened.
- Material hardness 61–70 HRC.
- Machining centre with MQL internal coolant.

**SOLUTION**

- Romicon standard head HSK63ASVS00B096M.
- CPGW060208S01015M KB5625™.

**CUTTING DATA**

- $v_c$  110 m/min (361 SFM).
- $f$  0,08 mm/rev (0,003 IPR).

**RESULT**

- Tool life of 500 bores per insert.
- Surface finish Ra 0,3  $\mu$ m.

**BENEFIT**

- Fine adjustments increases productivity resulting in less manufacturing interruptions.
- Bore tolerance range of 18  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.

Turbo Charger



Hole Finishing

#### RIR™ PADDED REAMING

- Bearing bore  $\varnothing$  9,6mm (0,378").
- Tolerance range 9  $\mu$ m H6.
- Cast iron.
- Interrupted cut.
- Lathe with internal coolant.

#### CHALLENGE

#### SOLUTION

- RIR padded reamer in floating toolholder.
- RIR01E1300 KC6005™ coated carbide insert.

#### CUTTING DATA

- $v_c$  50 m/min (164 SFM).
- $f$  0,33 mm/rev (0,013 IPR).

#### RESULT

- Surface finish better than Rz 16  $\mu$ m.
- Cylindricity 10  $\mu$ m.

#### BENEFIT

- Increased productivity due to 2x the feed rate when compared to previous competitive tool.



Turbo Charger



## RMS™ MULTIFLUTE REAMING

### CHALLENGE

- Mounting holes  $\varnothing$  12mm (0,472").
- Tolerance range 18  $\mu$ m H7.
- Ductile cast iron.
- Machining centre with internal coolant.

### SOLUTION

- RMS standard reamer with six effective cutting edges and internal coolant.
- KC6305™ TiAlN coated carbide.

### CUTTING DATA

- $v_c$  20 m/min (66 SFM).
- $f$  0,30 mm/rev (0,012 IPR).

### RESULT

- Tool life of 1.000 components.
- Surface finish better than Rz 10  $\mu$ m.

### BENEFIT

- Productivity and tool life increase compared to previous solution.



Compressor



Hole Finishing

### ROMICRON™ FINE BORING

- Piston bore  $\varnothing$  23,5mm (0,925").
- Tolerance range 18  $\mu$ m.
- Aluminium 12% Si.
- Machining centre BT40 with external coolant.

### CHALLENGE

- Standard SVUBB2 head with KR coupling.
- Standard steel boring bar.
- CPGW060204FST KD1400™.

### SOLUTION

- $v_c$  367 m/min (1.204 SFM).
- $f$  0,07 mm/rev (0,003 IPR).

### CUTTING DATA

- Surface finish Ra 0,6  $\mu$ m.
- Roundness better than 5  $\mu$ m.

### RESULT

- 2x the productivity compared to the current solution.
- 80% less adjustment time needed.
- Bore tolerance range of 18  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.

### BENEFIT



Compressor



## ROMICRON™ FINE BORING

### CHALLENGE

- Piston bore  $\varnothing$  25mm (0,984").
- Tolerance range 21  $\mu$ m.
- Aluminium 15% Si.
- Machining centre BT40 with external coolant.

### SOLUTION

- Engineered-solution SVS00B head with straight shank clamped in hydraulic chuck.
- CPGW060204FST KD1425™.

### CUTTING DATA

- vc 391 m/min (1.283 SFM).
- f 0,20 mm/rev (0,008 IPR).

### RESULT

- Surface finish better than Ra 2,0  $\mu$ m.
- Roundness better than 20  $\mu$ m.

### BENEFIT

- More than 60% reduction in machining time.
- 80% less adjustment time needed.
- Amortisation in less than two months.
- Bore tolerance range of 21  $\mu$ m easily and consistently achieved due to 1  $\mu$ m per click in radius adjustment.

Compressor



Polished flutes improving chip evacuation



Hole Finishing

### PCD COUNTERSINKING PDCSC22RLE

- Bearing hole  $\varnothing$  12–31mm (0,472–1,220").
- Tolerance range 50  $\mu$ m.
- Aluminium G-AISI12.
- Machining centre HSK40 with internal coolant.

### CHALLENGE

### SOLUTION

- PCD tipped, carbide-based tool with four guiding lands, flat-bottom drilling point and internal coolant.
- Two effective cutting and chamfering teeth; KD1415™.

### CUTTING DATA

- $v_c$  440 m/min (1.444 SFM).
- $f$  0,20 mm/rev (0,008 IPR).

### RESULT

- Surface finish  $R_z$  1–2  $\mu$ m.
- Roundness better than 5  $\mu$ m.

### BENEFIT

- Productivity increases due to combining different tools in one.
- Tool life increase versus previous solution.

Compressor



KST pre-loaded taper face contact interface



## RHM MODULAR REAMING

### CHALLENGE

- Piston bore  $\varnothing$  23,5mm (1,220").
- Tolerance range 10  $\mu$ m.
- Cast iron GGG60.
- Machining centre HSK63 with internal coolant.

### SOLUTION

- RHM modular reamer with six cutting edges.
- KT325™ uncoated cermet.
- Standard lead geometry.
- SIF™ steerable tooling.

### CUTTING DATA

- $v_c$  125 m/min (410 SFM).
- $f$  0,75 mm/rev (0,030 IPR).

### RESULT

- Surface finish better than Rz 4  $\mu$ m.

### BENEFIT

- Higher productivity than single-edged padded reamer.

Hydraulic Valve Block



Hole Finishing

### RIR™ PADDED REAMING

- Spool bore  $\varnothing$  18,5mm (0,728").
- Tolerance range 10  $\mu$ m.
- Cast iron.
- Up to 4mm varying depth of cut.
- Machining centre with internal coolant.

### CHALLENGE

### SOLUTION

- RIR padded reamer with up to 100mm long cermet guide pads.
- Engineered solution RIR insert with modified chipformer.

### CUTTING DATA

- vc 70 m/min (230 SFM).
- f 0,125 mm/rev (0,005 IPR).

### RESULT

- Tool life of 400 min per double-edged insert.
- Roundness and straightness within 10  $\mu$ m.

### BENEFIT

- Very stable process control and predictable performance.



Hydraulic Valve Block



**RMS™ MULTIFLUTE REAMING**

**CHALLENGE**

- Rinse slider bore  $\varnothing$  9,534mm (0,375").
- Tolerance range 6  $\mu$ m.
- Ductile cast iron 0.7060.
- Three interrupted cuts at a reaming depth of 100mm.
- Special dimensional accuracy requirement.

**SOLUTION**

- RMS solid carbide reamer engineered solution.
- Special back taper configuration and support margins lands.
- KC6305™ TiAlN coated carbide.

**CUTTING DATA**

- vc 150 m/min (492 SFM).
- f 0,72 mm/rev (0,028 IPR).

**RESULT**

- Tool life of 500 pieces.

**BENEFIT**

- Speed and feed rates are almost 30x faster resulting in higher productivity.
- Less scrap due to consistent accuracy.

Hydraulic Valve Block



Hole Finishing

### PCD COUNTERSINKING PCDCSC02RLE

- Thread core hole  $\varnothing$  24mm (0,945").
- Tolerance range 21  $\mu$ m F7.
- Aluminium AISi9Cu3.
- Pre-drilled hole.
- Machining centre DV40 with internal coolant.

### CHALLENGE

### SOLUTION

- PCD tipped, carbide-based tool with internal coolant.
- Two effective cutting and chamfering teeth.
- KD1415™.

### CUTTING DATA

- $v_c$  360–750 m/min       $n = 7.500$  RPM.
- $f$  0,20 mm/rev      (0,008 IPR).

### RESULT

- Tool life of 100.000 holes.
- Surface finish Ra 0,1  $\mu$ m.

### BENEFIT

- Productivity increase due to combining two operations into one.
- Carbide base increases tool life and accuracy.



ABS Valve Block



### PCD COUNTERSINKING PCDSTA02RLE

#### CHALLENGE

- Bearing bores  $\varnothing$  20,99 and 24,275mm.
- Tolerance range 20  $\mu$ m.
- Aluminium AlSi1.
- Pre-casted hole with 0,15mm depth of cut.
- Machining centre HSK63A with internal coolant.

#### SOLUTION

- PCD tipped, steel-based tool with SIF™ steerable interface and internal coolant.
- Two effective cutting and chamfering teeth.
- KD1415™.

#### CUTTING DATA

- $v_c$  300 m/min (984 SFM).
- $f$  0,35 mm/rev (0,014 IPR).

#### RESULT

- Tool life of 150.000 components.
- Surface finish Ra 0,4–0,6  $\mu$ m.

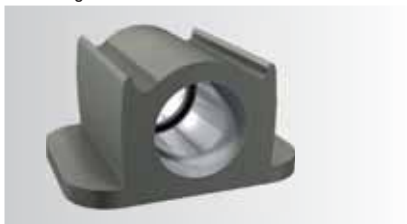
#### BENEFIT

- Very stable process control and predictable performance.
- Very favourable chip creation.

Hole Finishing



Bearing Seat



KST pre-loaded taper face contact interface

Hole Finishing

**RHM™ MODULAR REAMING**

- Reaming  $\varnothing$  35mm (1,378").
- Tolerance range 20  $\mu$ m.
- Carbon steel, annealed, long-chipping.
- Blind hole limiting chip evacuation.
- Machining centre with internal coolant.

**CHALLENGE**

**SOLUTION**

- RHM modular reamer with eight cutting edges.
- KT325™ uncoated cermet.
- Standard lead geometry.
- Short engineered-solution axial clamping tool body.

**CUTTING DATA**

- $v_c$  120 m/min (394 SFM).
- $f$  1,18 mm/rev (0,046 IPR).

**RESULT**

- Tool life of 145.000 holes.
- Surface finish better than Rz 6,3  $\mu$ m.

**BENEFIT**

- Predictable tool life as only 2  $\mu$ m diameter deviation after 10.000 holes.



Bearing Seat



RIQ single adjustment screw setup



FB easy to setup fine-boring cartridges



### RIQ™ QUATTRO CUT™ PADDED REAMING

- Reaming  $\varnothing$  47mm (1,850").
- Tolerance range 19  $\mu$ m N6.
- Aluminium AISi9Cu3.
- Machine four different diameters, two spot faces, and four different chamfers with one tool.

### CHALLENGE

- RIQ padded reamer with full-face PCD KD1415™ insert having four cutting edges.
- SIF™ steerable interface between reaming and fine boring section.

### SOLUTION

- $v_c$  236 m/min (774 SFM).
- $f$  0,08 mm/rev (0,003 IPR).

### CUTTING DATA

- Surface finish better than Rz 16  $\mu$ m.

### RESULT

- No insert back taper adjustment needed.
- Less operations increase productivity.
- Higher accuracy than multiple operations.
- Full-face PCD inserts reduce cost per hole.

### BENEFIT

### FB CARTRIDGE FINEBORING

- Reaming  $\varnothing$  144mm (5,669").
- Tolerance range 40  $\mu$ m H7.
- Aluminium AISi9Cu3.
- Machine two different diameters.

### CHALLENGE

- Standard FB fine-boring cartridges with almost back lash free fine adjustment.
- CCGW060204 KD1415™.

### SOLUTION

- $v_c$  723 m/min (2.372 SFM).
- $f$  0,08 mm/rev (0,003 IPR).

### CUTTING DATA

- Surface finish better than Rz 16  $\mu$ m.

### RESULT

- Radial adjustment does not influence axial adjustment of inserts resulting in faster setup.
- Productivity increase with less operations.
- More accurate than previous solution.

### BENEFIT

Heat Exchanger Plates



KST pre-loaded taper face contact interface

Hole Finishing

**RHM™ MODULAR REAMING**

- Tube holes Ø 25,25mm (0,994").
- Tolerance range 21 µm H7.
- Stainless Steel 304L.
- Machining centre with external coolant.

**CHALLENGE**

- Special RHM head with six cutting edges.
- KC6305™ TiAlN coated carbide.
- Standard tool body with SIF™ steerable backend.

**SOLUTION**

- vc 36 m/min (118 SFM).
- f 0,79 mm/rev (0,031 IPR).

**CUTTING DATA**

- Tool life of 167 m.

**RESULT**

- Higher productivity as a result of a 50% higher feed rate and 2x speed.
- 200% more tool life than previous competitive solution.

**BENEFIT**

**RHM™ MODULAR REAMING**

- Tube holes Ø 25,25mm (0,994").
- Tolerance range 100 µm.
- Alloy steel, long-chipping.
- Machining centre with internal coolant.

**CHALLENGE**

- Special RHM head with six cutting edges.
- KT6215™ TiAlN coated cermet.
- Standard 5xD body clamped into hydraulic chuck.
- KSEM HPGM used for drilling into solid.

**SOLUTION**

- vc 90 m/min (295 SFM).
- f 0,48 mm/rev (0,019 IPR).

**CUTTING DATA**

- After more than 30 minutes, only minor wear is visible.

**RESULT**

- Reduced machining time to less than 60 min per 180 holes.
- Predictable tool life as only 2 µm diameter deviation after 30 minutes.

**BENEFIT**

Heat Exchanger Plates



KST pre-loaded taper face contact interface



### RHM™ MODULAR REAMING

- Tube holes Ø 25,25mm (0,994").
- Tolerance range 21 µm H7.
- Steel, annealed, long-chipping.
- Replace HSS shot core drilling.
- Machining centre with internal coolant.

### CHALLENGE

- Special RHM head with six cutting edges.
- KT325™ uncoated cermet.
- Standard 5 x D body clamped into hydraulic chuck.

### SOLUTION

- vc 84 m/min (276 SFM).
- f 0,49 mm/rev (0,019 IPR).

### CUTTING DATA

- Tool life of 189 m.

### RESULT

- 10x faster when compared to previous competitive core drilling solution.
- 16x higher tool life.

### BENEFIT

### RHM™ MODULAR REAMING

- Tube holes Ø 32mm (1,260").
- Tolerance range 25 µm H7.
- Low alloy steel, annealed.
- Interrupted cut.
- Machining centre with internal coolant.

### CHALLENGE

- Standard RHM head with eight cutting edges.
- KC6305™ TiAlN coated carbide.
- Standard 5 x D body clamped into hydraulic chuck.
- KSEM HPGM used for drilling into solid.

### SOLUTION

- vc 60 m/min (197 SFM).
- f 1,12 mm/rev (0,044 IPR).

### CUTTING DATA

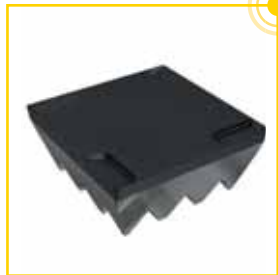
- Tool life of 624 holes.

### RESULT

- Almost 29% productivity increase.
- Close to 25% overall cost reduction due to higher tool life and higher cutting data.

### BENEFIT

Pump Housing



Full-face PCD insert with chipformer geometry



Hole Finishing

**RIQ™ QUATTRO CUT™ PADDED REAMING**

- Piston bore Ø 18,5mm (0,728").
- Tolerance range 21 µm H7.
- Aluminium.
- Heavy interrupted cut and surface finish Rz 6,3.
- Machining centre with internal coolant.

**CHALLENGE**

- RIQ padded reamer with helical chip flute and helical solid carbide guide pad.
- Full-face KD1415™ insert having four cutting edges.
- Positive wiper insert geometry.

**SOLUTION**

- vc 230 m/min (755 SFM).
- f 0,15 mm/rev (0,006 IPR).

**CUTTING DATA**

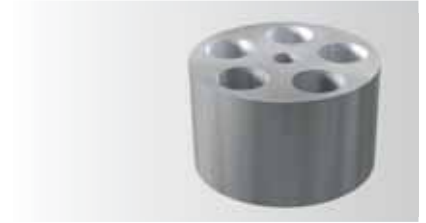
- No chip evacuation issues.
- No burr, marks, or scratches at entrance or exit of interruptions.

**RESULT**

- No insert back taper adjustment needed.
- Half cycle time compared to previous competitive tooling.

**BENEFIT**

Hydraulic Pump



Hole Finishing

### RIR™ PADDED REAMING

#### CHALLENGE

- Piston bore  $\varnothing$  9,365mm (0,369").
- Tolerance range 10  $\mu$ m.
- Ductile cast iron GGG40.
- Machining centre with internal coolant.

#### SOLUTION

- RIR padded reamer with cermet guide pads.
- R901EGS06F AITIN coated carbide.

#### CUTTING DATA

- vc 53 m/min (174 SFM).
- f 0,043 mm/rev (0,002 IPR).

#### RESULT

- 294 bores per double-edged insert.
- Surface finish Ra 0,8  $\mu$ m.

#### BENEFIT

- 200% tool life increase.
- More than 10% reduction in cycle time.
- Consistent quality and stable process due to better chip formation.
- Tolerance achieved was a 50% improvement compared to the previous competitive solution.

Valve Housing



Hole Finishing

### ROMICRON™ FINE BORING

- Various bore  $\varnothing$  170–480mm (6,7–18,9").
- Tolerance range 75  $\mu$ m.
- Cast iron GG25.
- Automated wear compensation at interrupted cut.
- Machining centre HSK100 with internal coolant.

### CHALLENGE

- Semi-standard SVU120 CLB head with engineered-solution diameter extender and automatic wear compensation with CLB.
- CPGW09T308S01015C KB1630™.

### SOLUTION

- vc 800 m/min (2.625 SFM).
- f 0,12 mm/rev (0,005 IPR).

### CUTTING DATA

- Tool life of 1.200 minutes per insert.
- Surface finish better than Rz 16  $\mu$ m.

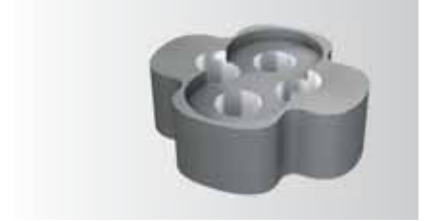
### RESULT

- More than 30% reduction in manufacturing lead time.
- Third shift and weekend without operators.
- 1  $\mu$ m per click in radius adjustment executed by machine.

### BENEFIT



Pump Housing



### ROMICRON™ FINE BORING

#### CHALLENGE

- Bore Ø 38,1mm (1,500").
- Tolerance range 18 µm.
- Cast iron.
- Interrupted cut at figure eight hole.

#### SOLUTION

- Romicon KM50SVS0B103M standard head.
- CPGW2151S0415C KB1645™.

#### CUTTING DATA

- vc 197 m/min (646 SFM).
- f 0,05 mm/rev (0,002 IPR).

#### RESULT

- Tool life of 450 workpieces.
- Surface finish better than Ra 32 µm.
- Roundness better than 8 µm.

#### BENEFIT

- Secure finishing process with no oversized bores.
- Less adjustment effort.
- Amortisation in less than four months.
- Bore tolerance range of 18 µm easily and consistently achieved due to 1 µm per click in radius adjustment.



Wind Energy Housing



Multiple boring heads based on KM63™ shank

Hole Finishing

**KM™ FINE BORING**

- Bearing seat  $\varnothing$  2.700mm (106,3").
- Tolerance range 210  $\mu$ m H7.
- Cast iron GGG40.
- Pull machining – spindle needs to adapt bridge inside workpiece.

**CHALLENGE**

**SOLUTION**

- Welded space frame bridge with KM coupling to adapt cutting units.
- One base bridge to adapt roughing, semi-finish and fine finish head.

**CUTTING DATA**

- $v_c$  240 m/min (787 SFM).
- $f$  0,28 mm/rev (0,011 IPR).

**RESULT**

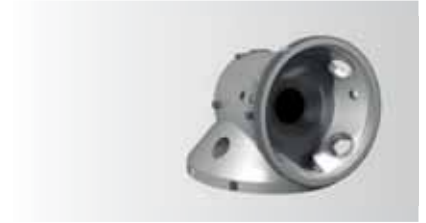
- Customer proprietary information.

**BENEFIT**

- Machining in one workpiece results in a productivity increase.
- Investment saving as only one base bridge needed.
- Ease of use due to KM coupling for fast and accurate cutting unit change.



Wind Energy Housing



Multiple boring heads based on KM63™ shank



### KM™ FINE BORING

#### CHALLENGE

- Bearing seat  $\varnothing$  3000mm (118,1").
- Tolerance range 210  $\mu$ m H7.
- Ductile cast iron GGG40.
- Machining centre without coolant.
- Tolerance range 210  $\mu$ m H7.

#### SOLUTION

- Welded space frame bridge with KM coupling to adapt cutting units.
- One base bridge to adapt roughing, semi-finish, and fine finish head.

#### CUTTING DATA

- vc 240 m/min (787 SFM).
- f 0,28 mm/rev (0,011 IPR).

#### RESULT

- Customer proprietary information.

#### BENEFIT

- Investment saving as only one base bridge and KM cutting units are used for diameter 2.700mm and 3.000mm.
- Ease of use due to KM coupling for fast and accurate cutting unit change.

Hole Finishing



Wind Energy Housing



1  $\mu$ m per click in radius adjustment

Hole Finishing

**ROMICRON™ FINE BORING**

- Flange  $\varnothing$  1260–1400mm (49,6–55,1").
- Tolerance range 125  $\mu$ m H7.
- Cast iron GGG40.
- One base bridge for multiple diameters.
- Machining centre without coolant.

**CHALLENGE**

- Romicon standard modular MF40 element with engineered-solution aluminium bridge.
- CPGT060204/08HP KC5410™.

**SOLUTION**

- $v_c$  200 m/min (650 SFM).
- $f$  0,12 mm/rev (0,005 IPR).

**CUTTING DATA**

- Tool life of 73 min.

**RESULT**

- Investment saving as only one base bridge needed.
- Use of standard off-the-shelf Romicon tool.
- Ease of use due to Romicon.

**BENEFIT**



Synchronous Joint



Balanced by design



Hole Finishing

### ROMICRON™ FINE BORING

#### CHALLENGE

- Pin machining  $\varnothing$  13mm (0,512").
- Tolerance range 6  $\mu$ m.
- Steel 42CrMo4 (4140).
- Machining centre with internal coolant.

#### SOLUTION

- Romicon standard HSK63ASVUBB1095MCLB head with engineered solution pin boring bar.
- TCMT110202FP KTP10™.

#### CUTTING DATA

- $v_c$  160 m/min (525 SFM).
- $f$  0,1 mm/rev (0,004 IPR).

#### RESULT

- Tool life of 300–450 components per insert.
- Surface finish  $R_a$  0,3  $\mu$ m.
- $C_{pk}$  value  $\geq$  1,33.

#### BENEFIT

- Use of standard off-the-shelf Romicon tooling.
- Bore tolerance of 6  $\mu$ m consistently achieved due to 1  $\mu$ m per click in radius adjustment.

Landing Gear



Feed out slide

Hole Finishing

**MOTION TOOLING**

- Bottle boring  $\varnothing$  65–85,3mm (2,559–3,358").
- Steel 34CrNiMo6; 4340M.
- Generate complex rotationally symmetric shape inside pre-machined workpiece.
- Custom machining centre with internal coolant.

**CHALLENGE**

**SOLUTION**

- Motion tool with two slides activated by drawbar.
- Hole shape generated while tool is retracted.
- Engineered-solution insert to improve chip formation.

**CUTTING DATA**

- $v_c$  31 m/min (102 SFM).
- $f$  0,20 mm/rev (0,008 IPR).

**RESULT**

- Customer proprietary information.

**BENEFIT**

- Time savings compared to previous boring bar.
- Bottle boring  $\varnothing$  65–85,3mm (2,559–3,358").
- Steel 34CrNiMo6; 4340M.
- Generate complex rotationally symmetric shape.



# Ream to the Extreme

The RHM™ Modular Reaming System offers performance levels commonly achieved with solid carbide reaming tools. With a unique, preloaded KST coupling, it is best suited to ream IT6 and IT7 high-quality holes in steel, stainless steel, and cast irons.

RHM offers you:

- A market-leading runout accuracy.
- A strong proprietary coupling that enables higher feed rates.
- Latest technology carbide and cermet grades for high cutting speeds and extended tool life.

Experience the advantages at your Authorised Kennametal Distributor or at [www.kennametal.com](http://www.kennametal.com).

[www.kennametal.com](http://www.kennametal.com).

 **KENNAMETAL®**



## RMS™ Multiflute Reaming Tools

RMS™ Multiflute Reaming Tools achieve highest metal removal rates from diameter 5–14mm with no customisation. All standard reamers are ground to an ISO H7 tolerance class hole to address most common applications. Specific coatings and lead configurations enable high-speed machining of steel, stainless steel, cast iron, and non-ferrous materials at accelerated speeds.

### Primary Application

Use standard SIF™ Steerable Hydraulic Chucks or SIF Adaptors for easy compensation of radial runout and angular inaccuracies of the spindle to achieve the highest possible hole straightness and surface quality.

### Features and Benefits

#### Higher Productivity and Profitability

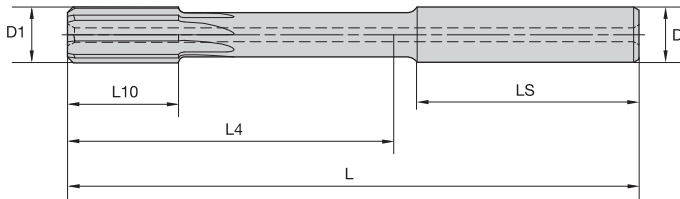
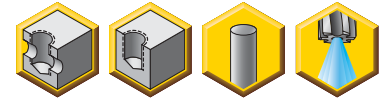
- Longer tool life with increased hole and surface quality due to lapped ground leads.
- Highest metal removal rate at higher speeds and feeds due to reaming-specific grades and substrates.
- Improved straightness and cylindrical form compared to competitive tools and reduced vibration tendency due to unequal flutes.
- All RMS reamers offer internal coolant supply.

#### Customisation

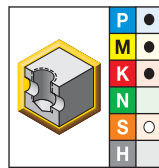
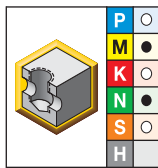
- Diameters 1,40–14,15mm available with and without internal coolant in 0,001mm steps.
- Intermediate diameters of standard program available as Simple Specials with short delivery time.
- Solid cermet reaming tools and tooling for heat-resistant materials are available on request.



- For hole tolerance H7.
- Intermediate sizes ground to achieve IT7 hole tolerance class available.
- Starting with Ø 10mm in IT6 hole tolerance available.



### RMS with Straight Flutes and Internal Coolant



- first choice
- alternate choice

		D1 mm	D	L	L4 mm	L10	LS	Z
K605	RMS05000H7SF	5,00	6,00	74,0	18,0	12,0	36,0	4
	RMS05500H7SF	5,50	6,00	74,0	18,0	12,0	36,0	4
	RMS06000H7SF	6,00	6,00	74,0	18,0	12,0	36,0	4
	RMS06500H7SF	6,50	8,00	91,0	35,0	16,0	36,0	4
	RMS07000H7SF	7,00	8,00	91,0	35,0	16,0	36,0	4
	RMS08000H7SF	8,00	8,00	91,0	35,0	16,0	36,0	6
	RMS09000H7SF	9,00	10,00	103,0	43,0	20,0	40,0	6
	RMS10000H7SF	10,00	10,00	103,0	43,0	20,0	40,0	6
	RMS11000H7SF	11,00	12,00	118,0	53,0	24,0	45,0	6
	RMS12000H7SF	12,00	12,00	118,0	53,0	24,0	45,0	6
	RMS13000H7SF	13,00	14,00	132,0	67,0	28,0	45,0	6
	RMS14000H7SF	14,00	14,00	132,0	67,0	28,0	45,0	6

Hole Finishing

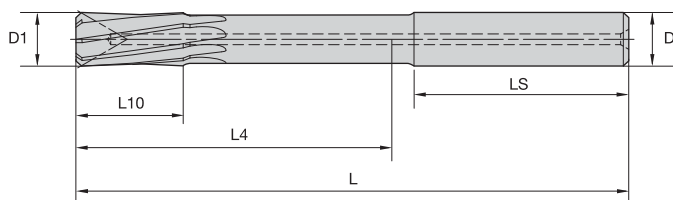
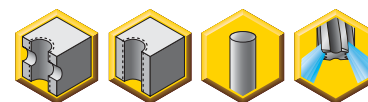
### Dimensions for Engineered-Solution Reamers

D1 min mm	D1 max mm	D mm	L mm	L4 mm	L10 mm	LS mm	Z
4,16	4,79	6	74	32	10	36	4
4,80	5,79	6	74	32	12	36	4
5,80	6,15	6	74	33	12	36	4
6,16	7,15	8	91	49	16	36	4
7,16	7,69	8	91	49	16	36	6
7,70	8,15	8	91	50	16	36	6
8,16	9,59	10	103	57	20	40	6
9,60	10,15	10	103	58	20	40	6
10,16	11,59	12	118	67	24	45	6
11,60	12,15	12	118	68	24	45	6
12,16	14,15	14	118	81	28	45	6

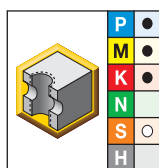
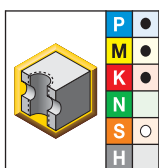
NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.



- For hole tolerance H7.
- Intermediate sizes ground to achieve IT7 hole tolerance class available.
- Starting with Ø 10mm in IT6 hole tolerance available.



### ■ RMS with Helical Flutes and Internal Coolant



- first choice
- alternate choice

Hole Finishing

		D1 mm	D	L	L4 mm	L10	LS	Z
K605	RMS05000H7HF	5,00	6,00	74,0	18,0	12,0	36,0	4
	RMS05500H7HF	5,50	6,00	74,0	18,0	12,0	36,0	4
	RMS06000H7HF	6,00	6,00	74,0	18,0	12,0	36,0	4
	RMS06500H7HF	6,50	8,00	91,0	35,0	16,0	36,0	4
	RMS07000H7HF	7,00	8,00	91,0	35,0	16,0	36,0	4
	RMS08000H7HF	8,00	8,00	91,0	35,0	16,0	36,0	6
	RMS09000H7HF	9,00	10,00	103,0	43,0	20,0	40,0	6
	RMS10000H7HF	10,00	10,00	103,0	43,0	20,0	40,0	6
	RMS11000H7HF	11,00	12,00	118,0	53,0	24,0	45,0	6
	RMS12000H7HF	12,00	12,00	118,0	53,0	24,0	45,0	6
	RMS13000H7HF	13,00	14,00	132,0	67,0	28,0	45,0	6
	RMS14000H7HF	14,00	14,00	132,0	67,0	28,0	45,0	6

### Dimensions for Engineered-Solution Reamers

D1 min mm	D1 max mm	D mm	L mm	L4 mm	L10 mm	LS mm	Z
4,16	4,79	6	74	32	10	36	4
4,80	5,79	6	74	32	12	36	4
5,80	6,15	6	74	33	12	36	4
6,16	7,15	8	91	49	16	36	4
7,16	7,69	8	91	49	16	36	6
7,70	8,15	8	91	50	16	36	6
8,16	9,59	10	103	57	20	40	6
9,60	10,15	10	103	58	20	40	6
10,16	11,59	12	118	67	24	45	6
11,60	12,15	12	118	68	24	45	6
12,16	14,15	14	118	81	28	45	6

NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.

■ RMS

Material Group	K605			KC6305			Metric							
	Cutting Speed – vc			Cutting Speed – vc			Recommended Feed Rate per Tooth							
	Range – m/min			Range – m/min			Tool Diameter (mm)	4,16–7,15		7,16–9,59		9,60–14,00		
	min	Starting Value	max	min	Starting Value	max		Feed/Tooth	min	max	min	max	min	max
P	1	40	60	70	90	120	155	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	2	40	60	70	90	120	155	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	3	35	50	60	75	100	130	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	4	25	40	45	60	80	105	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	4	15	20	25	30	40	55	mm/z	0,04	0,08	0,04	0,10	0,04	0,12
	6	15	20	25	30	40	55	mm/z	0,04	0,08	0,04	0,10	0,04	0,12
M	1	8	10	15	15	20	28	mm/z	0,04	0,08	0,04	0,09	0,04	0,10
	2	8	10	15	15	20	28	mm/z	0,04	0,08	0,04	0,09	0,04	0,10
	3	8	10	15	15	20	28	mm/z	0,04	0,08	0,04	0,09	0,04	0,10
K	1	35	50	60	75	100	130	mm/z	0,05	0,16	0,05	0,18	0,05	0,20
	2	25	40	50	60	90	110	mm/z	0,05	0,14	0,05	0,16	0,05	0,18
	3	20	30	45	60	80	105	mm/z	0,05	0,12	0,05	0,14	0,05	0,16
N	1	110	150	195	–	–	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
	2	110	150	195	–	–	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
	3	110	150	195	–	–	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
	4	110	150	195	–	–	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
	5	105	140	180	–	–	–	mm/z	0,06	0,16	0,06	0,18	0,06	0,20
S	1	8	10	15	15	20	28	mm/z	0,04	0,08	0,04	0,10	0,04	0,12
	2	8	10	15	15	20	28	mm/z	0,04	0,08	0,04	0,10	0,04	0,12
	3	15	20	30	20	30	40	mm/z	0,05	0,10	0,05	0,12	0,05	0,15
	4	15	20	30	20	30	40	mm/z	0,05	0,10	0,05	0,12	0,05	0,15



# RMB™ Multiflute Reaming

The RMB Multiflute Reaming System achieves solid carbide and solid cermet metal removal rates from 14–20mm with no customisation required. All standard reamers are ground to an ISO H7 tolerance class hole to address most applications, giving you an economical solution for large diameter sizes compared to solid carbide reamers. Specific coatings and lead configurations enable high-speed machining of steel, stainless steel, cast iron, and non-ferrous materials at accelerated speeds.

## Primary Application

Use SIF™ Steerable Hydraulic Chucks or SIF Adaptors for easy compensation of radial runout and angular inaccuracies of the spindle to achieve the highest possible hole straightness and surface quality.

## Features and Benefits

### Higher Productivity and Profitability

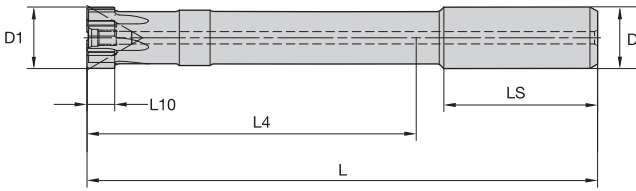
- Longer tool life with increased hole and surface quality due to lapped ground leads.
- Highest metal removal rate at higher speeds and feeds due to reaming specific grades and substrates.
- Improved straightness and cylindrical form compared to competitive tools and reduced vibration tendency due to unequal flutes.
- Adjustment screw at straight-fluted RMB reamers to change internal coolant supply from axial to radial.

### Customisation

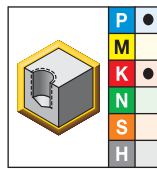
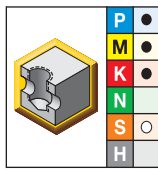
- Diameters up to 50mm available with and without internal coolant in 0,001mm steps.
- Intermediate diameters of standard program available as Simple Specials with short delivery time.
- RMB tooling for machining heat-resistant materials is available on request.



- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Adjustment screw to change internal coolant supply from axial to radial.



### RMB with Straight Flutes and Internal Coolant



- first choice
- alternate choice

		D1 mm	D	L	L4 mm	L10	LS	Z
KC6305	RMB14000H7SF	14,00	16,00	145,0	76,0	8,0	49,0	6
	RMB15000H7SF	15,00	16,00	145,0	76,0	8,0	49,0	6
KT6215	RMB16000H7SF	16,00	20,00	157,0	86,0	8,0	51,0	6
	RMB17000H7SF	17,00	20,00	157,0	86,0	10,0	51,0	6
KT6215	RMB18000H7SF	18,00	20,00	171,0	100,0	10,0	51,0	6
	RMB19000H7SF	19,00	20,00	171,0	100,0	10,0	51,0	6
KT6215	RMB20000H7SF	20,00	20,00	200,0	129,0	10,0	51,0	6

NOTE: Uncoated carbide grade K605™ and uncoated cermet grade KT325™ are available on request.

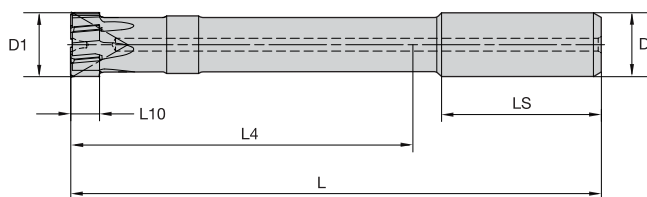
### Dimensions for Engineered-Solution Reamers

D1 min mm	D1 max mm	D mm	L mm	L4 mm	L10 mm	LS mm	Z
14,00	15,99	16,00	145	97	9	48	6
16,00	17,99	20,00	157	107	9	50	6
18,00	19,99	20,00	171	121	9	50	6
20,00	21,99	20,00	200	150	9	50	6
22,00	25,99	20,00	210	160	11	50	6
26,00	29,99	25,00	240	184	11	56	8
30,00	32,00	25,00	270	214	11	56	8

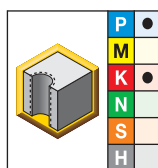
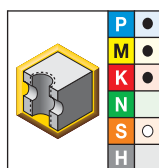
NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.



- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Adjustment screw to change internal coolant supply from axial to radial.



### RMB with Helical Flutes and Internal Coolant



- first choice
- alternate choice

Hole Finishing

		D1 mm	D	L	L4 mm	L10	LS	Z
KC6305	RMB14000H7HF	14,00	16,00	145,0	76,0	8,0	49,0	6
	RMB15000H7HF	15,00	16,00	145,0	76,0	8,0	49,0	6
KT6215	RMB16000H7HF	16,00	20,00	157,0	86,0	8,0	51,0	6
	RMB17000H7HF	17,00	20,00	157,0	86,0	10,0	51,0	6
KT6215	RMB18000H7HF	18,00	20,00	171,0	100,0	10,0	51,0	6
	RMB19000H7HF	19,00	20,00	171,0	100,0	10,0	51,0	6
KT6215	RMB20000H7HF	20,00	20,00	200,0	129,0	10,0	51,0	6

NOTE: Uncoated carbide grade K605™ and uncoated cermet grade KT325™ are available on request.

### Dimensions for Engineered-Solution Reamers

D1 min mm	D1 max mm	D mm	L mm	L4 mm	L10 mm	LS mm	Z
14,00	15,99	16,00	145	97	9	48	6
16,00	17,99	20,00	157	107	9	50	6
18,00	19,99	20,00	171	121	9	50	6
20,00	21,99	20,00	200	150	9	50	6
22,00	25,99	20,00	210	160	11	50	6
26,00	29,99	25,00	240	184	11	56	8
30,00	32,00	25,00	270	214	11	56	8

NOTE: The above dimensions are used when ordering engineered-solution reamers on this page unless otherwise specified.

RMB™

Material Group	KT325			KT6215			K605			KC6305			Metric					
	Cutting Speed – vc			Cutting Speed – vc			Cutting Speed – vc			Cutting Speed – vc			Recommended Feed Rate per Tooth					
	Range – m/min			Range – m/min			Range – m/min			Range – m/min			Tool Diameter (mm)	14.00–19.99		20.00–32.00		
	min	Starting Value	max	min	Starting Value	max	min	Starting Value	max	min	Starting Value	max	Feed/Tooth	min	max	min	max	
P	1	150	180	210	180	210	240	40	60	70	90	120	155	mm/z	0,10	0,22	0,10	0,25
	2	150	180	210	180	210	240	40	60	70	90	120	155	mm/z	0,10	0,22	0,10	0,25
	3	130	160	180	150	180	210	30	40	50	75	100	130	mm/z	0,10	0,22	0,10	0,25
	4	100	130	150	120	150	170	25	40	45	50	80	105	mm/z	0,10	0,22	0,10	0,25
	4	80	100	120	100	130	150	10	20	30	30	40	55	mm/z	0,08	0,2	0,08	0,22
	6	80	100	120	100	130	150	10	20	30	30	40	55	mm/z	0,08	0,2	0,08	0,22
M	1	–	–	–	–	–	–	8	10	15	15	20	28	mm/z	0,08	0,18	0,08	0,2
	2	–	–	–	–	–	–	8	10	15	15	20	28	mm/z	0,08	0,18	0,08	0,2
	3	–	–	–	–	–	–	8	10	15	15	20	28	mm/z	0,08	0,18	0,08	0,2
K	1	150	180	200	180	210	240	30	50	60	80	110	130	mm/z	0,10	0,22	0,10	0,25
	2	130	160	180	150	180	210	25	40	45	65	90	110	mm/z	0,10	0,22	0,10	0,25
	3	100	130	160	120	150	170	20	30	40	50	70	90	mm/z	0,10	0,2	0,10	0,22
N	1	–	–	–	–	–	–	110	150	195	–	–	–	mm/z	0,10	0,30	0,10	0,30
	2	–	–	–	–	–	–	110	150	195	–	–	–	mm/z	0,10	0,30	0,10	0,30
	3	–	–	–	–	–	–	110	150	195	–	–	–	mm/z	0,10	0,30	0,10	0,30
	4	–	–	–	–	–	–	110	150	195	–	–	–	mm/z	0,10	0,30	0,10	0,30
	5	–	–	–	–	–	–	105	140	180	–	–	–	mm/z	0,10	0,30	0,10	0,30
S	1	–	–	–	–	–	–	8	10	15	15	20	28	mm/z	0,10	0,18	0,10	0,20
	2	–	–	–	–	–	–	8	10	15	15	20	28	mm/z	0,10	0,18	0,10	0,20
	3	–	–	–	–	–	–	15	20	30	20	30	40	mm/z	0,10	0,20	0,10	0,20
	4	–	–	–	–	–	–	15	20	30	20	30	40	mm/z	0,10	0,20	0,10	0,20





## RHM™ Modular Reaming System

The RHM Modular Reaming System achieves solid reamer metal removal rates from diameter 14–50mm with no customisation required. All standard reamer heads are ground to achieve an ISO H7 tolerance class addressing most applications. This system gives you fast and easy change of heads using axial actuation toolholders, and replaceable heads eliminate the need for repeating runout check. Specific coatings and lead configurations enable high-speed machining of steel, stainless steel, cast iron, and non-ferrous materials at accelerated speeds.

### Primary Application

Use SIF™ Steerable Hydraulic Chucks or SIF Adaptors for easy compensation of radial runout and angular inaccuracies of the spindle to achieve the highest possible hole straightness and surface quality. Radial or axial actuation tool bodies are available at diameter 20mm.

### Features and Benefits

#### Taper-Face Contact with KST Coupling

- Symmetrical torque transmission near head.
- Higher feed rate than conventional reaming tools.
- Better surface quality and tool life due to less tendency to vibrate.
- No need for head to body orientation.

#### Higher Productivity and Profitability

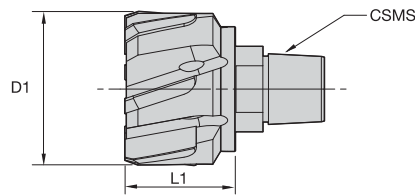
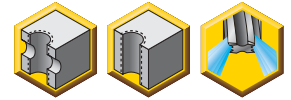
- Longer tool life with increased hole and surface quality due to lapped ground leads.
- Highest metal removal rate at higher speeds and feeds due to reaming specific grades and substrates.
- Improved straightness and cylindrical form compared to competitive tools and reduced vibration tendency due to unequal flutes.

#### Customisation

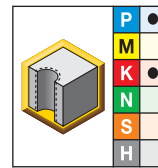
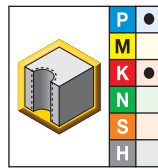
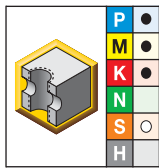
- Diameters up to 50mm available with and without internal coolant in 1 µm steps.
- Intermediate diameters of standard program available with short delivery time.
- RHM tooling for machining heat-resistant materials, as well as different lengths and couplings or shanks, available on request.



- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Please order screw for axial use or pull stud separately.



### RHM Heads with Helical Flutes and Internal Coolant



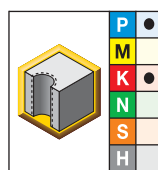
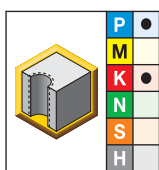
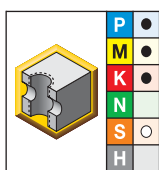
- first choice
- alternate choice

KC6305		KT325		KT6215		CSMS system size	D1 mm	L1 mm	Z
RHM14000KST115H7HF	RHM14000KST115H7HF	RHM14000KST115H7HF	RHM14000KST115H7HF	RHM14000KST115H7HF	RHM14000KST115H7HF	KST115	14,00	13,50	6
RHM14288KST115H7HF	RHM14288KST115H7HF	RHM14288KST115H7HF	RHM14288KST115H7HF	RHM14288KST115H7HF	RHM14288KST115H7HF	KST115	14,29	13,50	6
RHM15000KST115H7HF	RHM15000KST115H7HF	RHM15000KST115H7HF	RHM15000KST115H7HF	RHM15000KST115H7HF	RHM15000KST115H7HF	KST115	15,00	13,50	6
RHM15875KST115H7HF	RHM15875KST115H7HF	RHM15875KST115H7HF	RHM15875KST115H7HF	RHM15875KST115H7HF	RHM15875KST115H7HF	KST115	15,88	13,50	6
RHM16000KST135H7HF	RHM16000KST135H7HF	RHM16000KST135H7HF	RHM16000KST135H7HF	RHM16000KST135H7HF	RHM16000KST135H7HF	KST135	16,00	13,50	6
RHM17000KST135H7HF	RHM17000KST135H7HF	RHM17000KST135H7HF	RHM17000KST135H7HF	RHM17000KST135H7HF	RHM17000KST135H7HF	KST135	17,00	15,50	6
RHM17463KST135H7HF	RHM17463KST135H7HF	RHM17463KST135H7HF	RHM17463KST135H7HF	RHM17463KST135H7HF	RHM17463KST135H7HF	KST135	17,46	15,50	6
RHM18000KST155H7HF	RHM18000KST155H7HF	RHM18000KST155H7HF	RHM18000KST155H7HF	RHM18000KST155H7HF	RHM18000KST155H7HF	KST155	18,00	15,50	6
RHM19000KST155H7HF	RHM19000KST155H7HF	RHM19000KST155H7HF	RHM19000KST155H7HF	RHM19000KST155H7HF	RHM19000KST155H7HF	KST155	19,00	15,50	6
RHM19050KST155H7HF	RHM19050KST155H7HF	RHM19050KST155H7HF	RHM19050KST155H7HF	RHM19050KST155H7HF	RHM19050KST155H7HF	KST155	19,05	15,50	6
RHM20000KST175H7HF	RHM20000KST175H7HF	RHM20000KST175H7HF	RHM20000KST175H7HF	RHM20000KST175H7HF	RHM20000KST175H7HF	KST175	20,00	15,50	6
RHM20640KST175H7HF	RHM20640KST175H7HF	RHM20640KST175H7HF	RHM20640KST175H7HF	RHM20640KST175H7HF	RHM20640KST175H7HF	KST175	20,64	15,50	6
RHM21000KST175H7HF	RHM21000KST175H7HF	RHM21000KST175H7HF	RHM21000KST175H7HF	RHM21000KST175H7HF	RHM21000KST175H7HF	KST175	21,00	15,50	6
RHM22000KST175H7HF	RHM22000KST175H7HF	RHM22000KST175H7HF	RHM22000KST175H7HF	RHM22000KST175H7HF	RHM22000KST175H7HF	KST175	22,00	15,50	6
RHM22230KST175H7HF	RHM22230KST175H7HF	RHM22230KST175H7HF	RHM22230KST175H7HF	RHM22230KST175H7HF	RHM22230KST175H7HF	KST175	22,23	15,50	6
RHM22500KST200H7HF	RHM22500KST200H7HF	RHM22500KST200H7HF	RHM22500KST200H7HF	RHM22500KST200H7HF	RHM22500KST200H7HF	KST200	22,50	16,50	6
RHM23000KST200H7HF	RHM23000KST200H7HF	RHM23000KST200H7HF	RHM23000KST200H7HF	RHM23000KST200H7HF	RHM23000KST200H7HF	KST200	23,00	16,50	6
RHM23810KST200H7HF	RHM23810KST200H7HF	RHM23810KST200H7HF	RHM23810KST200H7HF	RHM23810KST200H7HF	RHM23810KST200H7HF	KST200	23,81	16,50	6
RHM24000KST200H7HF	RHM24000KST200H7HF	RHM24000KST200H7HF	RHM24000KST200H7HF	RHM24000KST200H7HF	RHM24000KST200H7HF	KST200	24,00	16,50	6
RHM25000KST200H7HF	RHM25000KST200H7HF	RHM25000KST200H7HF	RHM25000KST200H7HF	RHM25000KST200H7HF	RHM25000KST200H7HF	KST200	25,00	16,50	6
RHM25400KST200H7HF	RHM25400KST200H7HF	RHM25400KST200H7HF	RHM25400KST200H7HF	RHM25400KST200H7HF	RHM25400KST200H7HF	KST200	25,40	16,50	6
RHM26000KST200H7HF	RHM26000KST200H7HF	RHM26000KST200H7HF	RHM26000KST200H7HF	RHM26000KST200H7HF	RHM26000KST200H7HF	KST200	26,00	16,50	8
RHM26990KST200H7HF	RHM26990KST200H7HF	RHM26990KST200H7HF	RHM26990KST200H7HF	RHM26990KST200H7HF	RHM26990KST200H7HF	KST200	26,99	16,50	8
RHM27000KST200H7HF	RHM27000KST200H7HF	RHM27000KST200H7HF	RHM27000KST200H7HF	RHM27000KST200H7HF	RHM27000KST200H7HF	KST200	27,00	16,50	8
RHM27500KST250H7HF	RHM27500KST250H7HF	RHM27500KST250H7HF	RHM27500KST250H7HF	RHM27500KST250H7HF	RHM27500KST250H7HF	KST250	27,50	16,50	8
RHM28000KST250H7HF	RHM28000KST250H7HF	RHM28000KST250H7HF	RHM28000KST250H7HF	RHM28000KST250H7HF	RHM28000KST250H7HF	KST250	28,00	16,50	8

(continued)



(RHM Heads with Helical Flutes and Internal Coolant continued)



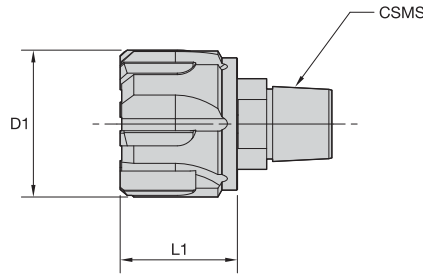
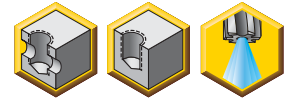
● first choice  
○ alternate choice

Hole Finishing

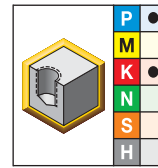
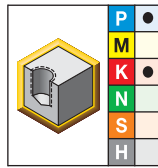
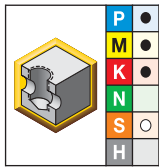
KC6305		KT325		KT6215		CSMS system size	D1 mm	L1 mm	Z
RHM28580KST250H7HF	RHM28580KST250H7HF	RHM28580KST250H7HF	RHM28580KST250H7HF	RHM28580KST250H7HF	RHM28580KST250H7HF	KST250	28,58	16,50	8
RHM29000KST250H7HF	RHM29000KST250H7HF	RHM29000KST250H7HF	RHM29000KST250H7HF	RHM29000KST250H7HF	RHM29000KST250H7HF	KST250	29,00	16,50	8
RHM30000KST250H7HF	RHM30000KST250H7HF	RHM30000KST250H7HF	RHM30000KST250H7HF	RHM30000KST250H7HF	RHM30000KST250H7HF	KST250	30,00	16,50	8
RHM30160KST250H7HF	RHM30160KST250H7HF	RHM30160KST250H7HF	RHM30160KST250H7HF	RHM30160KST250H7HF	RHM30160KST250H7HF	KST250	30,16	16,50	8
RHM31000KST250H7HF	RHM31000KST250H7HF	RHM31000KST250H7HF	RHM31000KST250H7HF	RHM31000KST250H7HF	RHM31000KST250H7HF	KST250	31,00	16,50	8
RHM31750KST250H7HF	RHM31750KST250H7HF	RHM31750KST250H7HF	RHM31750KST250H7HF	RHM31750KST250H7HF	RHM31750KST250H7HF	KST250	31,75	16,50	8
RHM32000KST250H7HF	RHM32000KST250H7HF	RHM32000KST250H7HF	RHM32000KST250H7HF	RHM32000KST250H7HF	RHM32000KST250H7HF	KST250	32,00	16,50	8
RHM32500KST300H7HF	RHM32500KST300H7HF	RHM32500KST300H7HF	RHM32500KST300H7HF	RHM32500KST300H7HF	RHM32500KST300H7HF	KST300	32,50	18,00	8
RHM33000KST300H7HF	RHM33000KST300H7HF	RHM33000KST300H7HF	RHM33000KST300H7HF	RHM33000KST300H7HF	RHM33000KST300H7HF	KST300	33,00	18,00	8
RHM33340KST300H7HF	RHM33340KST300H7HF	RHM33340KST300H7HF	RHM33340KST300H7HF	RHM33340KST300H7HF	RHM33340KST300H7HF	KST300	33,34	18,00	8
RHM34000KST300H7HF	RHM34000KST300H7HF	RHM34000KST300H7HF	RHM34000KST300H7HF	RHM34000KST300H7HF	RHM34000KST300H7HF	KST300	34,00	18,00	8
RHM34930KST300H7HF	RHM34930KST300H7HF	RHM34930KST300H7HF	RHM34930KST300H7HF	RHM34930KST300H7HF	RHM34930KST300H7HF	KST300	34,93	18,00	8
RHM35000KST300H7HF	RHM35000KST300H7HF	RHM35000KST300H7HF	RHM35000KST300H7HF	RHM35000KST300H7HF	RHM35000KST300H7HF	KST300	35,00	18,00	8
RHM36000KST300H7HF	RHM36000KST300H7HF	RHM36000KST300H7HF	RHM36000KST300H7HF	RHM36000KST300H7HF	RHM36000KST300H7HF	KST300	36,00	18,00	8
RHM36510KST300H7HF	RHM36510KST300H7HF	RHM36510KST300H7HF	RHM36510KST300H7HF	RHM36510KST300H7HF	RHM36510KST300H7HF	KST300	36,51	18,00	8
RHM37000KST300H7HF	RHM37000KST300H7HF	RHM37000KST300H7HF	RHM37000KST300H7HF	RHM37000KST300H7HF	RHM37000KST300H7HF	KST300	37,00	18,00	8
RHM37500KST350H7HF	RHM37500KST350H7HF	RHM37500KST350H7HF	RHM37500KST350H7HF	RHM37500KST350H7HF	RHM37500KST350H7HF	KST350	37,50	18,00	8
RHM38000KST350H7HF	RHM38000KST350H7HF	RHM38000KST350H7HF	RHM38000KST350H7HF	RHM38000KST350H7HF	RHM38000KST350H7HF	KST350	38,00	18,00	8
RHM38100KST350H7HF	RHM38100KST350H7HF	RHM38100KST350H7HF	RHM38100KST350H7HF	RHM38100KST350H7HF	RHM38100KST350H7HF	KST350	38,10	18,00	8
RHM39000KST350H7HF	RHM39000KST350H7HF	RHM39000KST350H7HF	RHM39000KST350H7HF	RHM39000KST350H7HF	RHM39000KST350H7HF	KST350	39,00	18,00	8
RHM39690KST350H7HF	RHM39690KST350H7HF	RHM39690KST350H7HF	RHM39690KST350H7HF	RHM39690KST350H7HF	RHM39690KST350H7HF	KST350	39,69	18,00	8
RHM40000KST350H7HF	RHM40000KST350H7HF	RHM40000KST350H7HF	RHM40000KST350H7HF	RHM40000KST350H7HF	RHM40000KST350H7HF	KST350	40,00	18,00	8
RHM41000KST350H7HF	RHM41000KST350H7HF	RHM41000KST350H7HF	RHM41000KST350H7HF	RHM41000KST350H7HF	RHM41000KST350H7HF	KST350	41,00	18,00	8
RHM41280KST350H7HF	RHM41280KST350H7HF	RHM41280KST350H7HF	RHM41280KST350H7HF	RHM41280KST350H7HF	RHM41280KST350H7HF	KST350	41,28	18,00	8
RHM42000KST350H7HF	RHM42000KST350H7HF	RHM42000KST350H7HF	RHM42000KST350H7HF	RHM42000KST350H7HF	RHM42000KST350H7HF	KST350	42,00	18,00	8

NOTE: Uncoated carbide grade K605™ is available on request.

- For hole tolerance H7.
- Intermediate sizes ground to achieve IT6 or IT7 hole tolerance class available.
- Please order screw for axial use or pull stud separately.



### RHM Heads with Straight Flutes and Internal Coolant

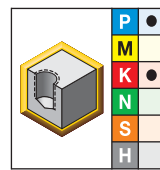
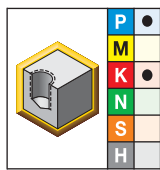
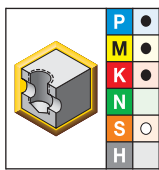


- first choice
- alternate choice

KC6305		KT325		KT6215		CSMS system size	D1 mm	L1 mm	Z
RHM14000KST115H7SF	RHM14000KST115H7SF	RHM14000KST115H7SF	RHM14000KST115H7SF	RHM14000KST115H7SF	RHM14000KST115H7SF	KST115	14,00	13,50	6
RHM14288KST115H7SF	RHM14288KST115H7SF	RHM14288KST115H7SF	RHM14288KST115H7SF	RHM14288KST115H7SF	RHM14288KST115H7SF	KST115	14,29	13,50	6
RHM15000KST115H7SF	RHM15000KST115H7SF	RHM15000KST115H7SF	RHM15000KST115H7SF	RHM15000KST115H7SF	RHM15000KST115H7SF	KST115	15,00	13,50	6
RHM15875KST115H7SF	RHM15875KST115H7SF	RHM15875KST115H7SF	RHM15875KST115H7SF	RHM15875KST115H7SF	RHM15875KST115H7SF	KST115	15,88	13,50	6
RHM16000KST135H7SF	RHM16000KST135H7SF	RHM16000KST135H7SF	RHM16000KST135H7SF	RHM16000KST135H7SF	RHM16000KST135H7SF	KST135	16,00	13,50	6
RHM17000KST135H7SF	RHM17000KST135H7SF	RHM17000KST135H7SF	RHM17000KST135H7SF	RHM17000KST135H7SF	RHM17000KST135H7SF	KST135	17,00	15,50	6
RHM17463KST135H7SF	RHM17463KST135H7SF	RHM17463KST135H7SF	RHM17463KST135H7SF	RHM17463KST135H7SF	RHM17463KST135H7SF	KST135	17,46	15,50	6
RHM18000KST155H7SF	RHM18000KST155H7SF	RHM18000KST155H7SF	RHM18000KST155H7SF	RHM18000KST155H7SF	RHM18000KST155H7SF	KST155	18,00	15,50	6
RHM19000KST155H7SF	RHM19000KST155H7SF	RHM19000KST155H7SF	RHM19000KST155H7SF	RHM19000KST155H7SF	RHM19000KST155H7SF	KST155	19,00	15,50	6
RHM19050KST155H7SF	RHM19050KST155H7SF	RHM19050KST155H7SF	RHM19050KST155H7SF	RHM19050KST155H7SF	RHM19050KST155H7SF	KST155	19,05	15,50	6
RHM20000KST175H7SF	RHM20000KST175H7SF	RHM20000KST175H7SF	RHM20000KST175H7SF	RHM20000KST175H7SF	RHM20000KST175H7SF	KST175	20,00	15,50	6
RHM20640KST175H7SF	RHM20640KST175H7SF	RHM20640KST175H7SF	RHM20640KST175H7SF	RHM20640KST175H7SF	RHM20640KST175H7SF	KST175	20,64	15,50	6
RHM21000KST175H7SF	RHM21000KST175H7SF	RHM21000KST175H7SF	RHM21000KST175H7SF	RHM21000KST175H7SF	RHM21000KST175H7SF	KST175	21,00	15,50	6
RHM22000KST175H7SF	RHM22000KST175H7SF	RHM22000KST175H7SF	RHM22000KST175H7SF	RHM22000KST175H7SF	RHM22000KST175H7SF	KST175	22,00	15,50	6
RHM22230KST175H7SF	RHM22230KST175H7SF	RHM22230KST175H7SF	RHM22230KST175H7SF	RHM22230KST175H7SF	RHM22230KST175H7SF	KST175	22,23	15,50	6
RHM22500KST200H7SF	RHM22500KST200H7SF	RHM22500KST200H7SF	RHM22500KST200H7SF	RHM22500KST200H7SF	RHM22500KST200H7SF	KST200	22,50	16,50	6
RHM23000KST200H7SF	RHM23000KST200H7SF	RHM23000KST200H7SF	RHM23000KST200H7SF	RHM23000KST200H7SF	RHM23000KST200H7SF	KST200	23,00	16,50	6
RHM23810KST200H7SF	RHM23810KST200H7SF	RHM23810KST200H7SF	RHM23810KST200H7SF	RHM23810KST200H7SF	RHM23810KST200H7SF	KST200	23,81	16,50	6
RHM24000KST200H7SF	RHM24000KST200H7SF	RHM24000KST200H7SF	RHM24000KST200H7SF	RHM24000KST200H7SF	RHM24000KST200H7SF	KST200	24,00	16,50	6
RHM25000KST200H7SF	RHM25000KST200H7SF	RHM25000KST200H7SF	RHM25000KST200H7SF	RHM25000KST200H7SF	RHM25000KST200H7SF	KST200	25,00	16,50	6
RHM25400KST200H7SF	RHM25400KST200H7SF	RHM25400KST200H7SF	RHM25400KST200H7SF	RHM25400KST200H7SF	RHM25400KST200H7SF	KST200	25,40	16,50	6
RHM26000KST200H7SF	RHM26000KST200H7SF	RHM26000KST200H7SF	RHM26000KST200H7SF	RHM26000KST200H7SF	RHM26000KST200H7SF	KST200	26,00	16,50	8
RHM26990KST200H7SF	RHM26990KST200H7SF	RHM26990KST200H7SF	RHM26990KST200H7SF	RHM26990KST200H7SF	RHM26990KST200H7SF	KST200	26,99	16,50	8
RHM27000KST200H7SF	RHM27000KST200H7SF	RHM27000KST200H7SF	RHM27000KST200H7SF	RHM27000KST200H7SF	RHM27000KST200H7SF	KST200	27,00	16,50	8
RHM27500KST250H7SF	RHM27500KST250H7SF	RHM27500KST250H7SF	RHM27500KST250H7SF	RHM27500KST250H7SF	RHM27500KST250H7SF	KST250	27,50	16,50	8
RHM28000KST250H7SF	RHM28000KST250H7SF	RHM28000KST250H7SF	RHM28000KST250H7SF	RHM28000KST250H7SF	RHM28000KST250H7SF	KST250	28,00	16,50	8

(continued)

(RHM Heads with Straight Flutes and Internal Coolant continued)



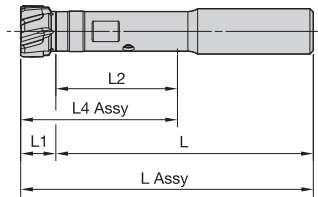
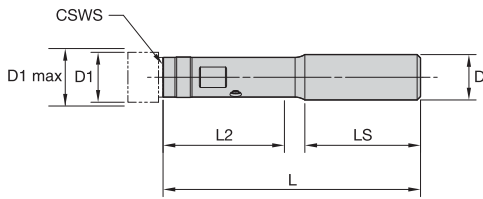
● first choice  
○ alternate choice

Hole Finishing

	KC6305	KT325	KT6215	CSMS system size	D1 mm	L1 mm	Z
	RHM28580KST250H7SF	RHM28580KST250H7SF	RHM28580KST250H7SF	KST250	28,58	16,50	8
	RHM29000KST250H7SF	RHM29000KST250H7SF	RHM29000KST250H7SF	KST250	29,00	16,50	8
	RHM30000KST250H7SF	RHM30000KST250H7SF	RHM30000KST250H7SF	KST250	30,00	16,50	8
	RHM30160KST250H7SF	RHM30160KST250H7SF	RHM30160KST250H7SF	KST250	30,16	16,50	8
	RHM31000KST250H7SF	RHM31000KST250H7SF	RHM31000KST250H7SF	KST250	31,00	16,50	8
	RHM31750KST250H7SF	RHM31750KST250H7SF	RHM31750KST250H7SF	KST250	31,75	16,50	8
	RHM32000KST250H7SF	RHM32000KST250H7SF	RHM32000KST250H7SF	KST250	32,00	16,50	8
	RHM32500KST300H7SF	RHM32500KST300H7SF	RHM32500KST300H7SF	KST300	32,50	18,00	8
	RHM33000KST300H7SF	RHM33000KST300H7SF	RHM33000KST300H7SF	KST300	33,00	18,00	8
	RHM33340KST300H7SF	RHM33340KST300H7SF	RHM33340KST300H7SF	KST300	33,34	18,00	8
	RHM34000KST300H7SF	RHM34000KST300H7SF	RHM34000KST300H7SF	KST300	34,00	18,00	8
	RHM34930KST300H7SF	RHM34930KST300H7SF	RHM34930KST300H7SF	KST300	34,93	18,00	8
	RHM35000KST300H7SF	RHM35000KST300H7SF	RHM35000KST300H7SF	KST300	35,00	18,00	8
	RHM36000KST300H7SF	RHM36000KST300H7SF	RHM36000KST300H7SF	KST300	36,00	18,00	8
	RHM36510KST300H7SF	RHM36510KST300H7SF	RHM36510KST300H7SF	KST300	36,51	18,00	8
	RHM37000KST300H7SF	RHM37000KST300H7SF	RHM37000KST300H7SF	KST300	37,00	18,00	8
	RHM37500KST350H7SF	RHM37500KST350H7SF	RHM37500KST350H7SF	KST350	37,50	18,00	8
	RHM38000KST350H7SF	RHM38000KST350H7SF	RHM38000KST350H7SF	KST350	38,00	18,00	8
	RHM38100KST350H7SF	RHM38100KST350H7SF	RHM38100KST350H7SF	KST350	38,10	18,00	8
	RHM39000KST350H7SF	RHM39000KST350H7SF	RHM39000KST350H7SF	KST350	39,00	18,00	8
	RHM39690KST350H7SF	RHM39690KST350H7SF	RHM39690KST350H7SF	KST350	39,69	18,00	8
	RHM40000KST350H7SF	RHM40000KST350H7SF	RHM40000KST350H7SF	KST350	40,00	18,00	8
	RHM41000KST350H7SF	RHM41000KST350H7SF	RHM41000KST350H7SF	KST350	41,00	18,00	8
	RHM41280KST350H7SF	RHM41280KST350H7SF	RHM41280KST350H7SF	KST350	41,28	18,00	8
	RHM42000KST350H7SF	RHM42000KST350H7SF	RHM42000KST350H7SF	KST350	42,00	18,00	8

NOTE: Uncoated carbide grade K605™ is available on request.

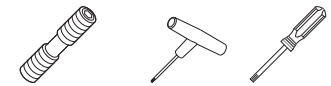
- Tool body shipped with screw for axial use.
- Order reamer head separately.



$L \text{ Assy} = L1 \text{ (RHM Head)} + L \text{ (Shank)}$



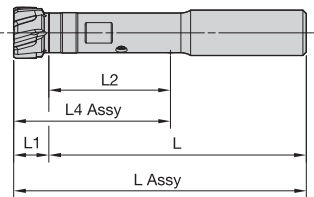
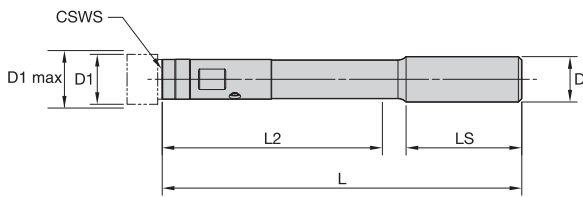
### Round Shank Axial Actuation • Metric • 3 x D



order number	catalogue number	CSWS system size	D1 mm	D1 max mm	D	L	L2	LS	central lock screw	Torx wrench	Torx wrench	Nm
4056174	SS16KST115AR3M	KST115	14,00	15,999	16,00	91,00	35,00	48,00	KST115115AS	—	170.028	3,0
4056175	SS20KST135AR3M	KST135	16,00	17,999	20,00	99,00	39,00	51,00	KST135155AS	—	170.085	4,0
4056176	SS20KST155AR3M	KST155	18,00	19,999	20,00	106,00	45,00	51,00	KST135155AS	—	170.085	4,0
3861185	SS20KST175AR3M	KST175	20,00	22,499	20,00	113,50	51,50	51,00	KST175200AS	TT15	—	5,0
3861186	SS20KST200AR3M	KST200	22,50	27,499	20,00	130,50	65,50	51,00	KST175200AS	TT15	—	5,0
3861187	SS25KST250AR3M	KST250	27,50	32,499	25,00	152,50	80,50	56,00	KST250250AS	TT25	—	9,0
3861188	SS32KST300AR3M	KST300	32,50	37,499	32,00	174,00	94,00	61,00	KST300350AS	TT30	—	13,0
3861189	SS32KST350AR3M	KST350	37,50	42,000	32,00	190,00	108,00	61,00	KST300350AS	TT30	—	13,0

Hole Finishing

- Tool body shipped with screw for axial use.
- Order reamer head separately.



$L \text{ Assy} = L1 \text{ (RHM Head)} + L \text{ (Shank)}$

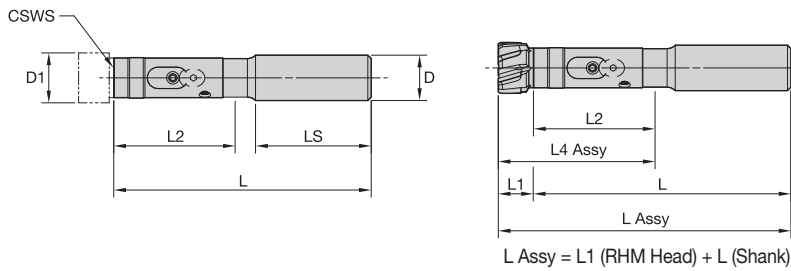


### Round Shank Axial Actuation • Metric • 5 x D



order number	catalogue number	CSWS system size	D1 mm	D1 max mm	D	L	L2	LS	central lock screw	Torx wrench	Torx wrench	Nm
4056177	SS16KST115AR5M	KST115	14,00	15,999	16,00	123,00	67,00	48,00	KST115115AS	—	170.028	3,0
4056178	SS20KST135AR5M	KST135	16,00	17,999	20,00	135,00	75,00	51,00	KST135155AS	—	170.085	4,0
4056179	SS20KST155AR5M	KST155	18,00	19,999	20,00	146,00	85,00	51,00	KST135155AS	—	170.085	4,0
3861190	SS20KST175AR5M	KST175	20,00	22,499	20,00	158,50	96,50	51,00	KST175200AS	TT15	—	5,0
3861191	SS20KST200AR5M	KST200	22,50	27,499	20,00	185,50	120,50	51,00	KST175200AS	TT15	—	5,0
3861192	SS25KST250AR5M	KST250	27,50	32,499	25,00	217,50	145,50	56,00	KST250250AS	TT25	—	9,0
3861193	SS32KST300AR5M	KST300	32,50	37,499	32,00	249,00	169,00	61,00	KST300350AS	TT30	—	13,0
3861194	SS32KST350AR5M	KST350	37,50	42,000	32,00	274,00	192,00	61,00	KST300350AS	TT30	—	13,0

- Tool body shipped with pull stud for radial use.
- Order reamer head separately.



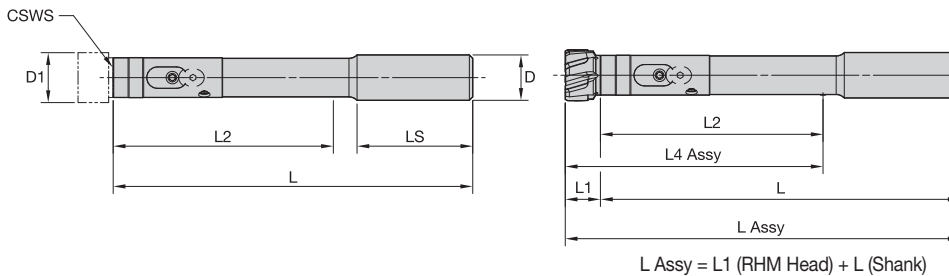
### Round Shank Radial Actuation • Metric • 3 x D



Hole Finishing

order number	catalogue number	CSWS system size	D1 D1 max		D	L	L2	LS	retention knob	clamp set	Torx wrench	Nm
			mm	mm								
3861195	SS20KST175RR3M	KST175	20,00	22,50	20,00	113,50	51,50	51,00	KST175200RK	KST175CS	TT15	5,0
3861196	SS20KST200RR3M	KST200	22,50	27,50	20,00	130,50	65,50	51,00	KST175200RK	KST200CS	TT15	5,0
3861197	SS25KST250RR3M	KST250	27,50	32,50	25,00	152,50	80,50	56,00	KST250250RK	KST250CS	TT25	9,0
3861198	SS32KST300RR3M	KST300	32,50	37,50	32,00	174,00	94,00	61,00	KST300350RK	KST300CS	TT30	13,0
3861199	SS32KST350RR3M	KST350	37,50	42,00	32,00	190,00	108,00	61,00	KST300350RK	KST350CS	TT30	13,0

- Tool body shipped with pull stud for radial use.
- Order reamer head separately.

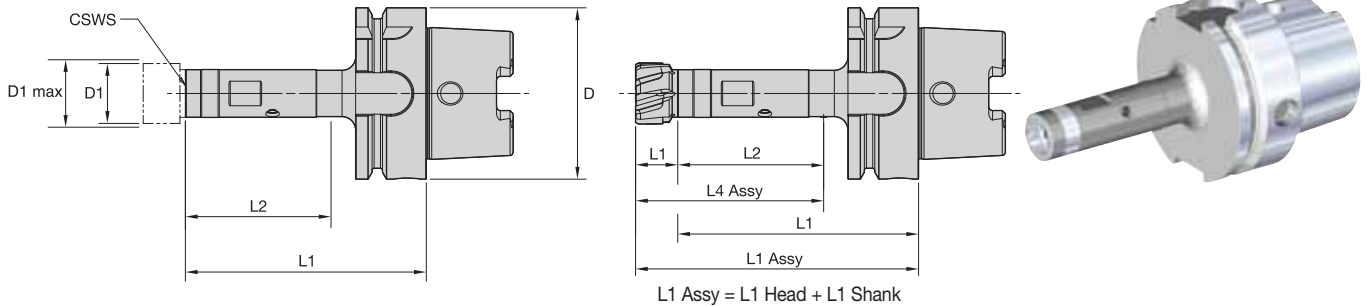


### Round Shank Radial Actuation • Metric • 5 x D



order number	catalogue number	CSWS system size	D1 D1 max		D	L	L2	LS	retention knob	clamp set	Torx wrench	Nm
			mm	mm								
3861200	SS20KST175RR5M	KST175	20,00	22,50	20,00	158,50	96,50	51,00	KST175200RK	KST175CS	TT15	5,0
3861201	SS20KST200RR5M	KST200	22,50	27,50	20,00	185,50	120,50	51,00	KST175200RK	KST200CS	TT15	5,0
3861202	SS25KST250RR5M	KST250	27,50	32,50	25,00	217,50	145,50	56,00	KST250250RK	KST250CS	TT25	9,0
3861203	SS32KST300RR5M	KST300	32,50	37,50	32,00	249,00	169,00	61,00	KST300350RK	KST300CS	TT30	13,0
3861204	SS32KST350RR5M	KST350	37,50	42,00	32,00	274,00	192,00	61,00	KST300350RK	KST350CS	TT30	13,0

- Tool body shipped with screw for axial use.
- Order reamer head separately.



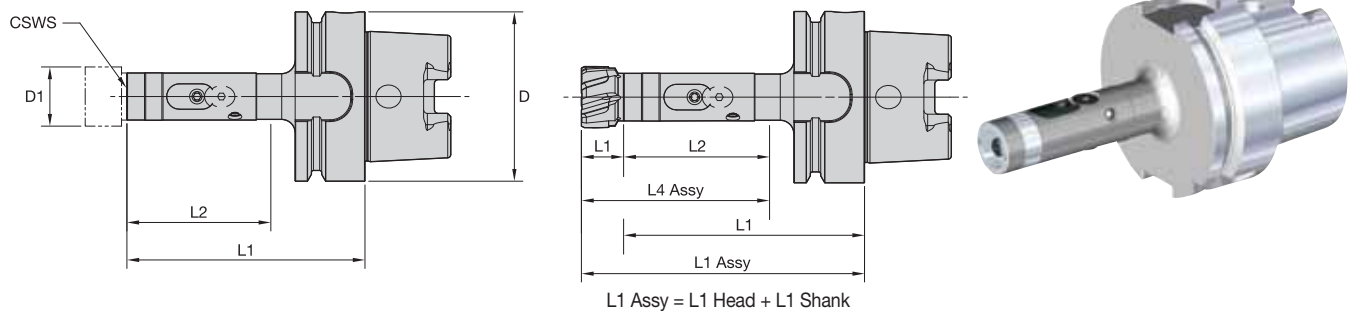
### ■ HSK63A Shank Axial Actuation • 3 x D

order number	catalogue number	CSWS system size	D1		D	L1	L2	central lock screw	Torx wrench	Nm
			mm	mm						
4056180	HSK63AKST115AR3M	KST115	14,00	15,999	63,00	69,00	35,00	KST115115AS	170.028	3,0
4056181	HSK63AKST135AR3M	KST135	16,00	17,999	63,00	74,00	39,00	KST135155AS	170.085	4,0
4056182	HSK63AKST155AR3M	KST155	18,00	19,999	63,00	81,00	45,00	KST135155AS	170.085	4,0
3860911	HSK63AKST175AR3M	KST175	20,00	22,499	63,00	88,50	51,50	KST175200AS	TT15	5,0
3860912	HSK63AKST200AR3M	KST200	22,50	27,499	63,00	105,50	65,50	KST175200AS	TT15	5,0
3860963	HSK63AKST250AR3M	KST250	27,50	32,499	63,00	122,50	80,50	KST250250AS	TT25	9,0
3860964	HSK63AKST300AR3M	KST300	32,50	37,499	63,00	139,00	94,00	KST300350AS	TT30	13,0
3860965	HSK63AKST350AR3M	KST350	37,50	42,000	63,00	155,00	108,00	KST300350AS	TT30	13,0



Hole Finishing

- Tool body shipped with pull stud for radial use.
- Order reamer head separately.

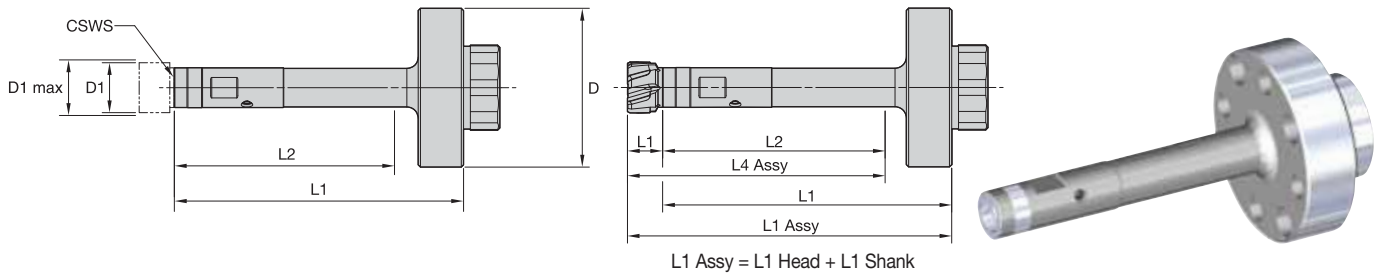


### ■ HSK63A Shank Radial Actuation • 3 x D

order number	catalogue number	CSWS system size	D1		D	L1	L2	retention knob	clamp set	Torx wrench	Nm
			mm	mm							
3860966	HSK63AKST175RR3M	KST175	20,00	22,49	63,00	88,50	51,50	KST175200RK	KST175CS	TT15	5,0
3860967	HSK63AKST200RR3M	KST200	22,50	27,49	63,00	105,50	65,50	KST175200RK	KST200CS	TT15	5,0
3860968	HSK63AKST250RR3M	KST250	27,50	32,49	63,00	122,50	80,50	KST250250RK	KST250CS	TT25	9,0
3860969	HSK63AKST300RR3M	KST300	32,50	37,49	63,00	139,00	94,00	KST300350RK	KST300CS	TT30	13,0
3860970	HSK63AKST350RR3M	KST350	37,50	42,00	63,00	155,00	108,00	KST300350RK	KST350CS	TT30	13,0



- Tool body shipped with screw for axial use.
- Order reamer head separately.

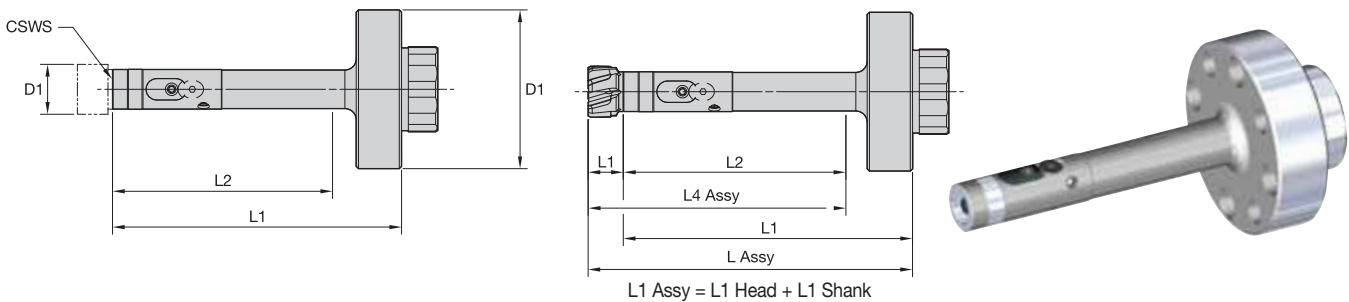


■ SIF70 Shank Axial Actuation • 5 x D

Hole Finishing

order number	catalogue number	CSWS system size	D1 mm	D1 max mm	D	L1	L2	central lock screw	Torx wrench	Nm
4056183	SIF70KST115AR5M	KST115	14,00	15,999	70,00	95,00	67,00	KST115115AS	170.028	3,0
4056184	SIF70KST135AR5M	KST135	16,00	17,999	70,00	104,00	75,00	KST135155AS	170.085	4,0
4056185	SIF70KST155AR5M	KST155	18,00	19,999	70,00	115,00	85,00	KST135155AS	170.085	4,0
3860971	SIF70KST175AR5M	KST175	20,00	22,499	70,00	127,50	96,50	KST175200AS	TT15	5,0
3860972	SIF70KST200AR5M	KST200	22,50	27,499	70,00	154,50	120,50	KST175200AS	TT15	5,0
3860973	SIF70KST250AR5M	KST250	27,50	32,499	70,00	181,50	145,50	KST250250AS	TT25	9,0
3860974	SIF70KST300AR5M	KST300	32,50	37,499	70,00	208,00	169,00	KST300350AS	TT30	13,0
3860975	SIF70KST350AR5M	KST350	37,50	42,000	70,00	233,00	192,00	KST300350AS	TT30	13,0

- Tool body shipped with pull stud for radial use.
- Order reamer head separately.



■ SIF70 Shank Radial Actuation • 5 x D

order number	catalogue number	CSWS system size	D1 mm	D1 max mm	D	L1	L2	retention knob	clamp set	Torx wrench	Nm
3860976	SIF70KST175RR5M	KST175	20,00	22,49	70,00	127,50	96,50	KST175200RK	KST175CS	TT15	5,0
3860977	SIF70KST200RR5M	KST200	22,50	27,49	70,00	154,50	120,50	KST175200RK	KST200CS	TT15	5,0
3860978	SIF70KST250RR5M	KST250	27,50	32,49	70,00	181,50	145,50	KST250250RK	KST250CS	TT25	9,0
3860979	SIF70KST300RR5M	KST300	32,50	37,49	70,00	208,00	169,00	KST300350RK	KST300CS	TT30	13,0
3860980	SIF70KST350RR5M	KST350	37,50	42,00	70,00	233,00	192,00	KST300350RK	KST350CS	TT30	13,0

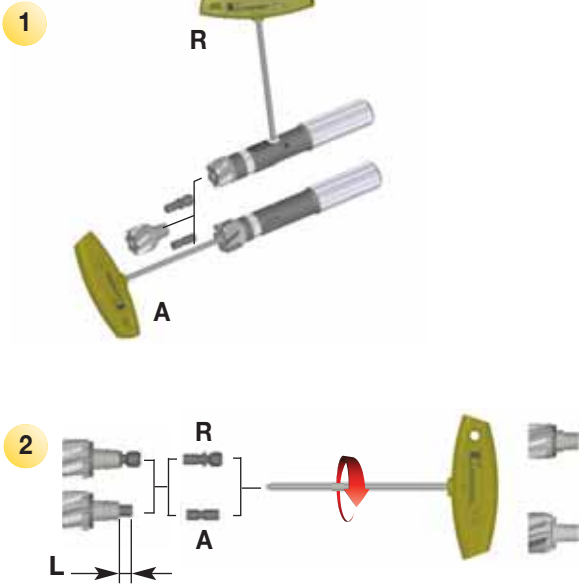
RHM™

Material Group	KT325			KT6215			K605			KC6305			Metric							
	Cutting Speed – vc			Cutting Speed – vc			Cutting Speed – vc			Cutting Speed – vc			Recommended Feed Rate per Tooth							
	Range – m/min			Range – m/min			Range – m/min			Range – m/min			Tool Diameter (mm)	14.00–19.99		20.00–32.00		32.50–42.00		
	min	Starting Value	max	min	Starting Value	max	min	Starting Value	max	min	Starting Value	max		Feed/Tooth	min	max	min	max	min	max
P	1	150	<b>180</b>	210	180	<b>210</b>	240	40	<b>60</b>	70	90	<b>120</b>	155	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	2	150	<b>180</b>	210	180	<b>210</b>	240	40	<b>60</b>	70	90	<b>120</b>	155	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	3	130	<b>160</b>	180	150	<b>180</b>	210	30	<b>40</b>	50	75	<b>100</b>	130	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	4	100	<b>130</b>	150	120	<b>150</b>	170	25	<b>40</b>	45	50	<b>80</b>	105	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	4	80	<b>100</b>	120	100	<b>130</b>	150	10	<b>20</b>	30	30	<b>40</b>	55	mm/z	0,08	0,18	0,08	0,20	0,08	0,22
	6	80	<b>100</b>	120	100	<b>130</b>	150	10	<b>20</b>	30	30	<b>40</b>	55	mm/z	0,08	0,18	0,08	0,20	0,08	0,22
M	1	–	–	–	–	–	–	8	<b>10</b>	15	15	<b>20</b>	28	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
	2	–	–	–	–	–	–	8	<b>10</b>	15	15	<b>20</b>	28	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
	3	–	–	–	–	–	–	8	<b>10</b>	15	15	<b>20</b>	28	mm/z	0,08	0,15	0,08	0,18	0,08	0,20
K	1	150	<b>180</b>	200	180	<b>210</b>	240	30	<b>50</b>	60	80	<b>110</b>	130	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	2	130	<b>160</b>	180	150	<b>180</b>	210	25	<b>40</b>	45	65	<b>90</b>	110	mm/z	0,10	0,20	0,10	0,22	0,10	0,25
	3	100	<b>130</b>	160	120	<b>150</b>	170	20	<b>30</b>	40	50	<b>70</b>	90	mm/z	0,10	0,18	0,10	0,20	0,10	0,22
N	1	–	–	–	–	–	–	110	<b>150</b>	195	–	–	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
	2	–	–	–	–	–	–	110	<b>150</b>	195	–	–	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
	3	–	–	–	–	–	–	110	<b>150</b>	195	–	–	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
	4	–	–	–	–	–	–	110	<b>150</b>	195	–	–	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
	5	–	–	–	–	–	–	105	<b>140</b>	180	–	–	–	mm/z	0,10	0,30	0,10	0,30	0,10	0,30
S	1	–	–	–	–	–	–	8	<b>10</b>	15	15	<b>20</b>	28	mm/z	0,06	0,15	0,10	0,18	0,10	0,20
	2	–	–	–	–	–	–	8	<b>10</b>	15	15	<b>20</b>	28	mm/z	0,06	0,15	0,10	0,18	0,10	0,20
	3	–	–	–	–	–	–	15	<b>20</b>	30	20	<b>30</b>	40	mm/z	0,08	0,18	0,10	0,20	0,10	0,20
	4	–	–	–	–	–	–	15	<b>20</b>	30	20	<b>30</b>	40	mm/z	0,08	0,18	0,10	0,20	0,10	0,20

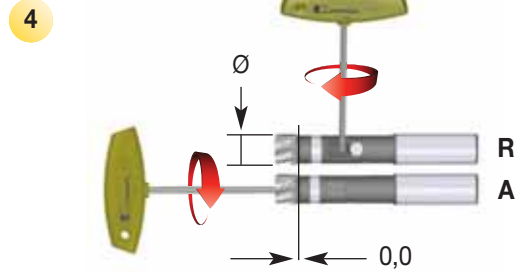
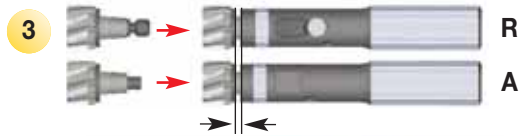




**Assemble**



Ø (mm)		L (mm)
14,000	27,499	5-5,5
27,500	42,000	5,5-6

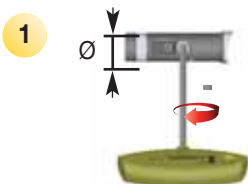


Ø (mm)			(Nm)
14,000	15,999	DT - 8	2
16,000	19,999	DT - 10	3
20,000	27,499	TT - 15	5
27,500	32,499	TT - 25	9
32,500	42,000	TT - 30	13

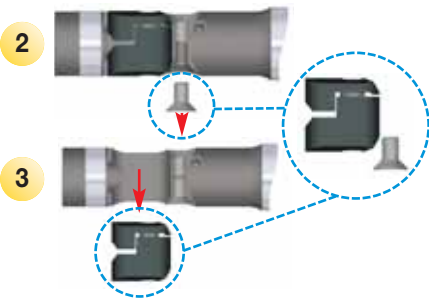
Disassemble 4 → 3 → 2 → 1

Hole Finishing

**Disassemble**



Ø (mm)	Ø (in)			(Nm)	(ft. lbs.)
17,5	0.686	KST175CS	2,5	2,5	1.9
20	0.784	KST200CS	2,5	2,5	1.9
25	0.980	KST250CS	3	5	3.7
30	1.176	KST300CS	4	9	6.7
35	1.373	KST350CS	4	9	6.7

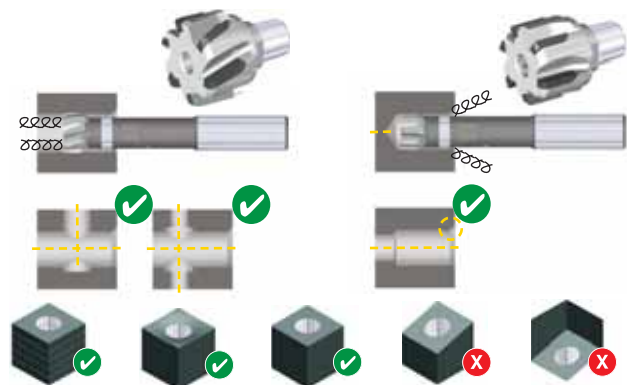


Assemble 3 → 2 → 1

**SIF™**



**Application**



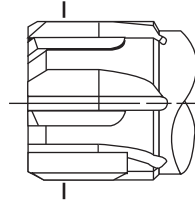
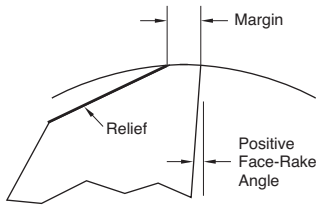
**Coolant flow**



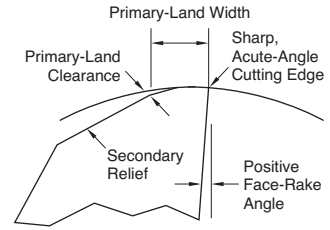
## Basic Design Overview • Multiflute Reaming Tooling

Kennametal offers two basic reaming designs, cylindrical margin land and up sharp. The cylindrical margin land design is used for all standard items of the RMS™, RMB™, and RHM™ reaming platforms. Engineered-solution tooling based on up sharp reaming design offers high hole quality and long tool life in exotic cases and high-temp alloys as only the sharp cutting edges contact with the workpiece.

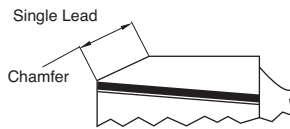
### Cylindrical Margin Reaming “C”



### Up Sharp Reaming “U” & “NC”

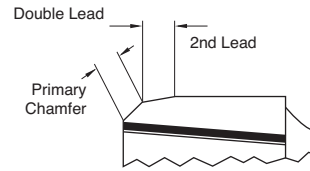


## Basic Lead Differences



### Single Lead

The single lead chamfer design is used with all standard RMS, RMB, and RHM reaming tooling and enables the tool to be applied on various materials without customization. Design can be modified to meet specific applications such as thin walls, straightness correction, etc.



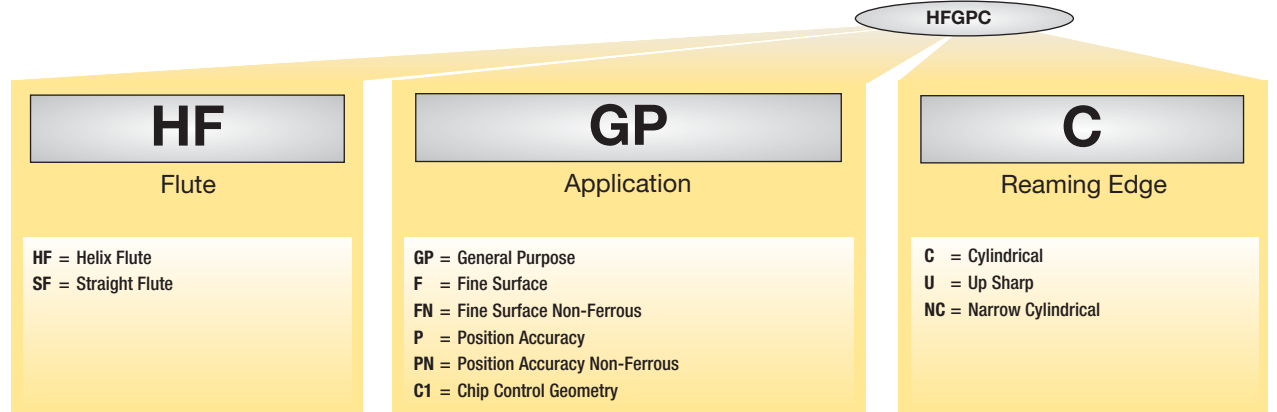
### Double Lead

Double lead designs are available as engineered solutions and enable higher surface quality and feed rates in general. Lead dimensions require customisation regarding the material to be machined for best machining results.

## Lead Design Overview

General Purpose	Surface Finish		Hole Position
<p>HFGP</p> <p>SFGP</p>	<p>HFF</p> <p>SFF</p>	<p>HFFN</p> <p>SFFN</p>	<p>SFP</p> <p>SFPN</p>

## Lead Nomenclature



## General Purpose

	workpiece material	hole type	surface requirement	recommended geometry	design	recommended grade
P	steel	through	IT 7, Ra <0.8 steel	HFGP	C	KT325 and KT6215 (Ra <0.8), KC6305 (Ra <1.6)
		blind		SFGP		
K	cast iron	through	It 7, Ra <1.6 Cl	HFGP	C	KT325 and KT6215 (Ra <0.8), KC6305 (Ra <1.6)
		blind		SFGP		
M	stainless steel	through	IT 7, Ra <1.0	HFGP	C	KC6305
		blind		SFGP		
S	high-temp alloys	through	IT 7, Ra <0.6	HFGP	U	KC6305
		blind		SFGP		
N	non-ferrous	through	IT 7, Ra <0.8	HFGP	C	K605, KD1415
					U	
		blind		SFGP	C	
					U	

## Extra Surface Finish

	workpiece material	hole type	surface requirement	recommended geometry	design	recommended grade
P	steel	through	IT 7, Ra <0.8	HFFN	C	KT325 and KT6215 (Ra <0.4), KC6305 (Ra <0.8)
		blind		SFFN		
K	cast iron	through	IT 7, Ra <0.8	HFFN	C	KT325 and KT6215 (Ra <0.4), KC6305 (Ra <0.8)
		blind		SFFN		
N	non-ferrous	through	IT 7, Ra <0.4	HFFN	C	K605, KD1415
					U	
		blind		SFFN	C	
					U	

## Additional Hole Position Accuracy

	workpiece material	hole type	surface requirement	recommended geometry	design	recommended grade
P	steel	through	IT 7, Ra <0.8 steel	SFP	C	KT325, KT6215, KC6305
		blind				
K	cast iron	through	It 7, Ra <1.6 Cl	SFP	C	KT325, KT6215, KC6305
		blind				
M	stainless steel	through	IT 7, Ra <1.0	SFP	C	KC6305
		blind			NC	
S	high-temp alloys	through	IT 7, Ra <0.6	SFP	U	KC6305
		blind				
N	non-ferrous	through	Ra <0.8	SFP	C	K605, KD1415
		blind			U	
		through	Ra <0.4	SFPN	C	
		blind			U	

## Extra Chip Control

	workpiece material	hole type	surface requirement	recommended geometry	design	recommended grade
P	steel (long chipping)	blind	Ra 0.4–1.6	SFC1	C	KT325, KT6215, KC6305
					U	



## RIQ™ Quattro Cut™ and RIR™ Padded Reamers

### Primary Application

Master the highest precision reaming applications with standard inserts in almost all materials with two unique systems available: RIR for small diameter and RIQ for easy setup in larger diameters.

The RIQ reamers are available starting at diameter 16mm with four edges for lowest cost per hole. They contain a proprietary pocket seat only requiring setup of the diameter, which is a huge benefit in terms of simplicity over other systems that require the diameter and back taper to be adjusted simultaneously. The RIR padded reamers are also proprietary and are available starting at diameter 6mm with two edges.

### Features and Benefits

#### Higher Productivity and Profitability

- Higher tool life with Kennametal grades.
- User friendly — RIQ padded reamers reduce setup time.
- Make use of four full edges even in PCD or PCBN when using RIQ inserts.

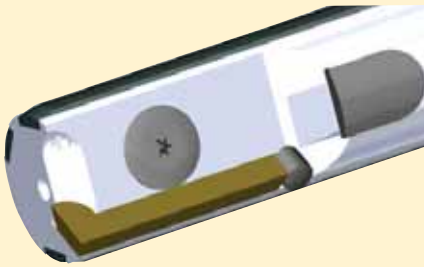

#### Complete Insert Portfolio

- Large offering of available lead geometries — E13, EDS, EGU, EKS, radius, and taper inserts.
- Large offering of grades — coated and uncoated carbide, cermet, PCBN, and PCD.

#### Customisation

- All RIQ tooling is engineered according to your specific needs in diameters 16–350mm with internal coolant.
- All RIR tooling is engineered according to your specific needs in diameters 6–350mm with internal coolant.
- RIR taper reamer for cone-shaped holes is available on request.
- Multiflute and step reaming applications and special blade shapes are available upon request.
- Necessary measuring and adjustment equipment is available as standard.



Application recommendation	RIR	RIQ
	<p>Bore tolerances less than 10 µm (can be greater). Geometric tolerancing down to 2 µm. Skilled workforce experience required. Multidiameter bore possible but less stability during end face machining.</p> 	<p>Bore tolerances less than 10 µm. Geometric tolerancing down to 2 µm. Lower skilled workforce, easier adjustment. Multidiameter bores. Blind bore end face machining, greater stability of insert.</p> 
Pocket seat	Flat with clamping groove in blade.	Serrated. Greater insert stability.
Cutting edges	2 (1 with PCD or CBN and 1 within diameter range 6–8mm)	4 (Including PCD, CBN, and cermet)
Special blade forms	yes	yes
Multiple insets on diameter	no	yes
Blade adjustment	Diameter and back taper.	Diameter only, back taper preset.
Blade adjusting screws	2	1
Number of insert sizes	5	3
Chamfer or seat machining	Possible, but adjustment required on length and angle.	Yes. Angle preset into body. Minimal adjustment for length.
General comments	Requires end users to be familiar with adjusting single blade reamers. High accuracy for single or multiple diameters.	Requires end users not to be familiar with typical adjusting single blade padded reamers. Complex multidiameter bores with chamfers and leads between bores. Multidiameter for high accuracy and higher productivity (feed rate).

Hole Finishing



Micro-Finishing Tool



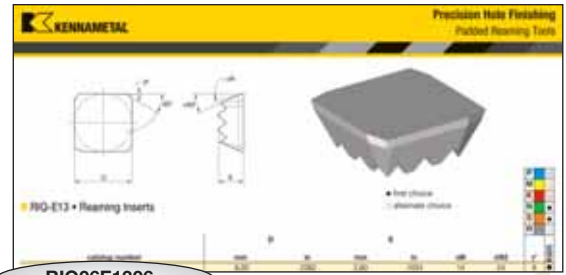
Valve Seat Tool



Tool for Differential Housing

## Blade Identification System

The RIR and RIQ blade part numbers are made up of 10 numbers selected from 5 categories. The first three digits indicate the reamer type, the next two digits are determined by reamer size, and the balance of the numbers allow specific blade configurations and grades.



RIQ06E1306

**RIQ**

Type

RIR = Reamer Insert Rectangular

RIQ = Reamer Insert Quattro Cut™

**06**

Size

### Blade Size

Ø [mm]	RIQ	
16,0–24,99	<b>06</b>	6,0 x 6,0mm
Valve Seat	<b>B7</b>	6,5 x 6,5mm
Valve Seat	<b>07</b>	7,0 x 7,0mm
>25	<b>09</b>	9,0 x 9,0mm
>25	<b>12</b>	12,0 x 12,0mm

Ø [mm]	RIR	
6,0–7,99	<b>A0</b>	10,5 x 2,50mm
8,0–10,99	<b>01</b>	15,0 x 2,80mm
11,0–13,99	<b>02</b>	18,0 x 4,00mm
14,0–17,99	<b>03</b>	20,0 x 4,76mm
18,0–45,99	<b>04</b>	27,0 x 5,56mm
>46	<b>05</b>	27,0 x 6,75mm
Taper Reamer	<b>T4</b>	45,0 x 5,56mm

**E13**

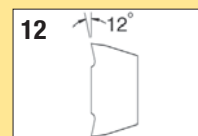
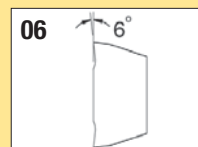
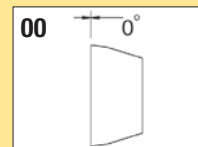
Lead

### Cutting Lead

**06**

Rake

### Rake Angle



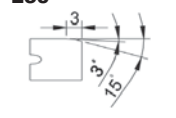
**K605**

Grade

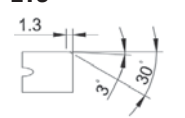
### Grade

Carbide uncoated	<b>K605</b>
Carbide TiN	<b>KC6005</b>
Carbide TiCN	<b>KC6105</b>
Carbide TiAlN	<b>KC6305</b>
Cermet uncoated	<b>KT325</b>
Cermet TiCN	<b>KT6115</b>
Cermet TiAlN	<b>KT6215</b>
PCD	<b>KD1415</b>
CBN	<b>KB1610</b>

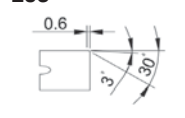
**E30**



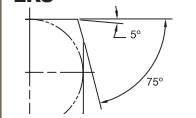
**E13**



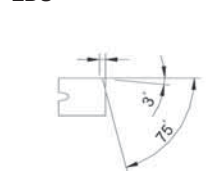
**E06**



**EKS**



**EDS**



Blade Size	0	1	2	3	4
Lead Length	.75	.85	1.0	1.1	1.2

**EGS**

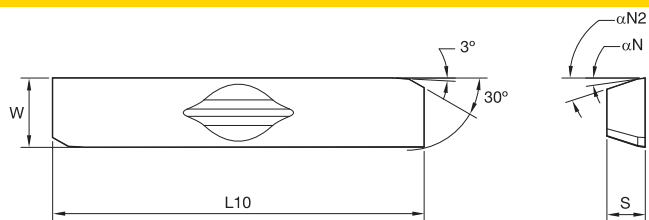


Blade Size	0	1	2	3	4
Lead Length	.25	.35	.50	.60	.70

**S** — Special Blade

**R** — Radius Blade

Hole Finishing



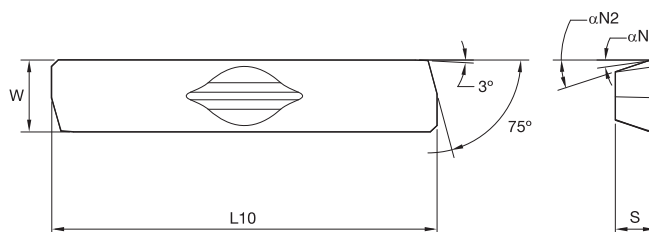
● first choice  
○ alternate choice

P	●	○	○	○	○
M	○	○	○	○	○
K	○	○	○	○	○
N	○	○	○	○	○
S	○	○	○	○	○
H	○	○	○	○	○

■ RIR-E13 • Reaming Inserts

catalogue number	L10 mm	S mm	W mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	K605	KC6005	KC6105	KC6305
RIR00E1300	10,50	1,15	2,00	10	25	—	●	○	○	○
RIRA0E1300	10,50	1,15	2,44	10	27	—	●	○	○	○
RIR01E1312	15,00	1,53	2,80	8	18	12	●	●	●	●
RIR01E1300	15,00	1,55	2,80	8	18	—	●	●	●	●
RIR02E1312	18,00	1,93	4,00	8	18	12	●	●	●	●
RIR02E1300	18,00	1,95	4,00	8	18	—	●	●	●	●
RIR03E1312	20,00	2,33	4,76	8	18	12	●	●	●	●
RIR03E1300	20,00	2,35	4,76	8	18	—	●	●	●	●
RIR04E1312	27,00	3,13	5,56	8	18	12	●	●	●	●
RIR04E1300	27,00	3,15	5,56	8	18	—	●	●	●	●
RIR05E1300	27,00	3,15	6,75	8	18	—	●	○	○	○

Hole Finishing



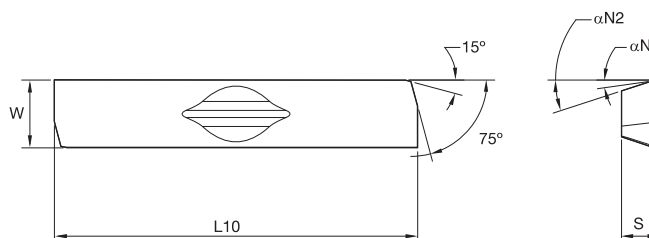
● first choice  
○ alternate choice

P	○	○	○	○	○
M	○	○	○	○	○
K	○	○	○	○	○
N	○	○	○	○	○
S	○	○	○	○	○
H	○	○	○	○	○

■ RIR-EDS • Reaming Inserts

catalogue number	L10 mm	S mm	W mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	K605	KC6005	KC6105	KD1415
RIR01EDS12	15,00	1,53	2,80	8	18	12	●	●	●	○
RIR01EDS00	15,00	1,55	2,80	8	18	—	●	○	○	○
RIR02EDS12	18,00	1,93	4,00	8	18	12	●	●	●	○
RIR02EDS06	18,00	1,95	4,00	8	18	6	●	○	○	○
RIR03EDS12	20,00	2,33	4,76	8	18	12	●	●	●	○
RIR03EDS06	20,00	2,35	4,76	8	18	6	●	○	○	○
RIR04EDS12	27,00	3,13	5,56	8	18	12	●	●	●	○
RIR04EDS06	27,00	3,15	5,56	8	18	6	●	○	○	○

NOTE: All KD1415™ inserts are single tipped except full face at size RIR01.

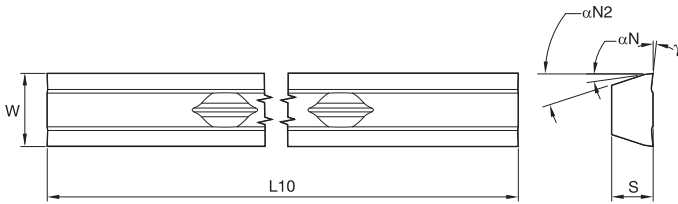


● first choice  
○ alternate choice

P	○	○	○	○	○
M	○	○	○	○	○
K	○	○	○	○	○
N	○	○	○	○	○
S	○	○	○	○	○
H	○	○	○	○	○

■ RIR-EGU • Reaming Inserts

catalogue number	L10 mm	S mm	W mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	KC6105
RIR01EGU00	15,00	1,55	2,80	8	18	—	●
RIR02EGU00	18,00	1,95	4,00	8	18	—	●
RIR03EGU00	20,00	2,35	4,76	8	18	—	●
RIR04EGU00	27,00	3,15	5,56	8	18	—	●
RIR05EGU00	27,00	3,15	6,75	8	18	—	●



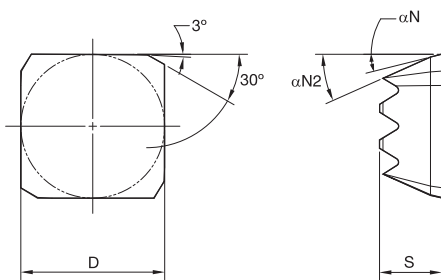
● first choice  
○ alternate choice

P	●
M	○
K	●
N	○
S	○
H	○

### RIR-C45 • Reaming Inserts

catalogue number	L10 mm	S mm	W mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	KC6005
RIRT4C4506	45,00	3,15	5,56	8	18	6	●
RIRT4C4512	45,00	3,15	5,56	8	18	12	●

NOTE: For use with taper reamer bodies.

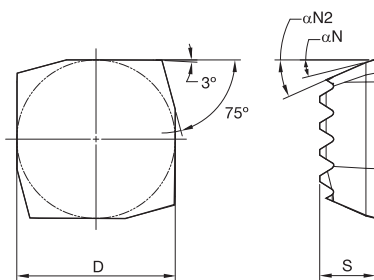


● first choice  
○ alternate choice

P	○
M	○
K	○
N	●
S	●
H	○

### RIQ-E13 • Reaming Inserts

catalogue number	D mm	S mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	K605
RIQ06E1306	6,00	2,60	14	24	6	●
RIQ09E1306	9,00	3,15	14	24	6	●
RIQ12E1306	12,00	3,70	14	18	6	●



● first choice  
○ alternate choice

P	○	○	○
M	○	○	○
K	○	○	○
N	●	○	○
S	○	○	○
H	○	○	○

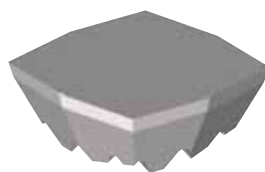
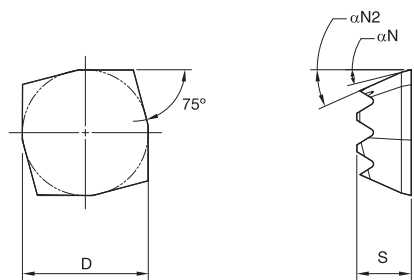
### RIQ-EDS • Reaming Inserts

catalogue number	D mm	S mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	K605	KC6005	KC6105	KD1415
RIQ06EDS06	6,00	2,60	14	24	6	●	○	○	○
RIQ06EDS12	6,00	2,60	20	30	12	●	○	○	○
RIQ09EDS06	9,00	3,15	14	24	6	●	○	○	○
RIQ09EDS12	9,00	3,15	20	30	12	●	○	○	○
RIQ12EDS06	12,00	3,70	14	18	6	●	○	○	○
RIQ12EDS12	12,00	3,70	20	24	12	●	○	○	○

NOTE: All KD1415™ inserts are full face.







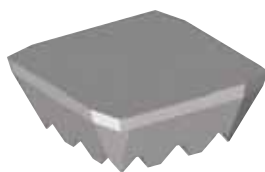
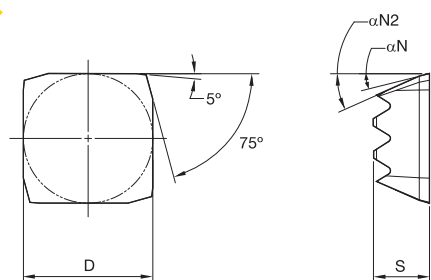
● first choice  
○ alternate choice

P	●	○
M	●	○
K	●	○
N	●	○
S	●	○
H	●	○

■ RIQ-EGS • Reaming Inserts

catalogue number	D mm	S mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	K605
RIQ06EGS06	6,00	2,60	14	24	6	●
RIQ09EGS06	9,00	3,15	14	24	6	●
RIQ12EGS06	12,00	3,70	14	18	6	●

Hole Finishing

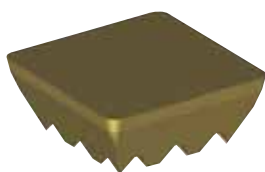
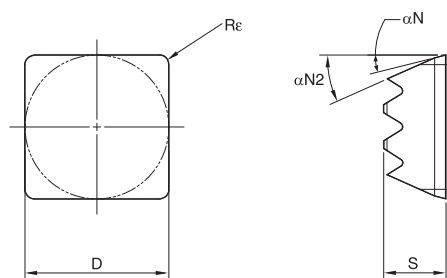


● first choice  
○ alternate choice

P	●	○
M	●	○
K	●	○
N	●	○
S	●	○
H	●	○

■ RIQ-EKS • Reaming Inserts

catalogue number	D mm	S mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	K605
RIQ06EKS06	6,00	2,60	14	24	6	●
RIQ09EKS06	9,00	3,15	14	24	6	●
RIQ12EKS06	12,00	3,70	14	18	6	●



● first choice  
○ alternate choice

P	●	○
M	●	○
K	●	○
N	●	○
S	●	○
H	●	○

■ RIQ-R04 • Reaming Inserts

catalogue number	D mm	S mm	Re mm	$\alpha N$	$\alpha N2$	$\gamma^\circ$	KT325	KB1610
RIQ06R0406	6,00	2,60	0,40	14	24	6	●	●
RIQ09R0400T	9,00	3,15	0,40	8	18	—	●	●
RIQ09R0406	9,00	3,15	0,40	14	24	6	●	●
RIQ12R0406	12,00	3,70	0,40	14	18	6	●	●

■ RIR™/RIQ™

Material Group	Grade	Cutting Speed – vc			Hole Types							
					Metric							
					Recommended Feed Rate per Tooth							
					Range – m/min	Hole Type	1,3	1, 3	2, 4	1, 3, 5	1, 3, 5	1, 3, 5
min	Starting Value	max	Type	E13	E30	E06	EDS	EGS	EGU			
P	1	KC6005	30	60	100	mm/r	0,10 – 0,30	0,10 – 0,40	0,10 – 0,20	–	–	–
	2	KC6005	20	50	90	mm/r	0,10 – 0,30	0,10 – 0,40	0,10 – 0,20	–	–	–
	3	KC6005	20	40	80	mm/r	0,05 – 0,25	0,10 – 0,30	0,10 – 0,20	–	–	–
	4	KC6105	15	30	50	mm/r	0,05 – 0,25	0,10 – 0,30	0,05 – 0,20	–	–	–
	4	KC6105	10	25	40	mm/r	0,05 – 0,20	–	0,05 – 0,20	–	–	–
	6	KC6105	10	25	40	mm/r	0,05 – 0,20	–	0,05 – 0,20	–	–	–
M	1	KC6305	10	25	40	mm/r	0,05 – 0,20	0,10 – 0,25	0,05 – 0,20	–	–	–
	2	KC6305	10	25	40	mm/r	0,05 – 0,20	0,10 – 0,25	0,05 – 0,20	–	–	–
	3	KC6305	10	25	40	mm/r	0,05 – 0,20	–	0,05 – 0,20	–	–	–
K	1	KC6005	20	70	100	mm/r	0,09 – 0,17	0,11 – 0,19	0,12 – 0,21	0,15 – 0,31	0,18 – 0,35	0,20 – 0,39
	2	KC6305	20	60	100	mm/r	0,09 – 0,15	0,11 – 0,18	0,12 – 0,21	0,15 – 0,26	0,18 – 0,30	0,20 – 0,39
	3	KC6305	20	60	100	mm/r	0,07 – 0,13	0,09 – 0,16	0,11 – 0,19	0,13 – 0,23	0,15 – 0,27	0,17 – 0,30
N	1	K605	50	100	250	mm/r	0,10 – 0,40	–	0,10 – 0,25	0,05 – 0,25	0,05 – 0,20	–
	2	K605	50	100	250	mm/r	0,10 – 0,40	–	0,10 – 0,25	0,15 – 0,25	0,05 – 0,20	–
	3	K605	50	100	250	mm/r	0,10 – 0,40	–	0,10 – 0,25	0,15 – 0,25	0,05 – 0,20	–
	4	K605	50	100	250	mm/r	upon request	–	upon request	upon request	upon request	–
	5	K605	50	100	250	mm/r	0,10 – 0,40	–	0,10 – 0,20	0,10 – 0,20	0,05 – 0,15	–
S	1	KC6305	10	25	40	mm/r	0,10 – 0,40	–	0,10 – 0,20	0,15 – 0,25	–	–
	2	KC6305	10	25	40	mm/r	0,10 – 0,40	–	0,10 – 0,20	0,15 – 0,25	–	–
	3	K605	20	20	20	mm/r	0,20 – 0,25	–	0,20 – 0,20	0,10 – 0,20	–	–
	4	K605	20	20	20	mm/r	0,20 – 0,25	–	0,20 – 0,20	0,10 – 0,20	–	–
H	1	KB1610	40	50	80	mm/r	0,20 – 0,25	–	0,10 – 0,20	–	–	–



### Lead Selection

The data chart below is only a guide to allow starting values to be selected. The final data for a particular application is best determined by trial or during the machining process.

● first choice  
○ alternate choice

lead	geometry	application	⊕	DOC* (mm)		Ra (µm)					
				recommended	max	P	M	K	N	S	H
E30		general purpose, good surface finish at higher feeds float reaming	○	0,1–0,15	0.25	0.6	0.8	0.7			
E13		general purpose, thin wall applications	○	0,1–0,15	0.25	0.7	0.8	0.8	0.3	0.8	
E06		reaming close to a shoulder, use when short lead is required	○	0,1–0,15	0.15	0.8	1.0	1.0	0.4	0.8	
EDS		gun reaming, higher surface quality	● ○	0.5	1,00*	0.15		0.7	0.2	0.6	
EGS		gun reaming, higher position quality	●	0.5	1,00*	0.35		1.2	0.3		
EGU		gun reamer	● ○	0,4–0,5	1,00*			0.8			
EKS		gun reaming, higher position quality	●	0.5	1,00*				0.4		
R..		valve seat, hard reaming	● ○	0,05–0,15	0.20	0.3		1.0	0.4		0.4
C..		RIR, taper reaming	● ○	0,1–0,2	0.25	0.6		0.8	0.4		

\*More D.O.C. available upon request.

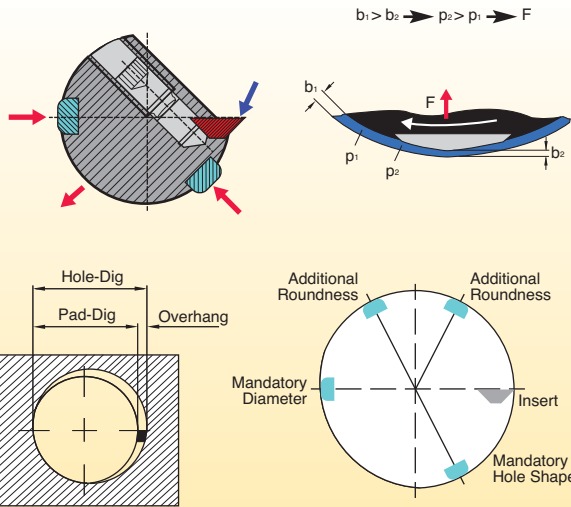
coolant selection		
material type	recommended	alternative
	mineral-oil-based emulsions	semi-synthetic
steel	5%	10%
nickel chrome steel	6%	12%
stainless steel	6%	12%
cast iron	4%	6%
aluminium	6%	12%
zinc alloys	6%	12%
copper	6%	12%
brass	4%	6%

pressure and flow rates		
cut diameter (mm)	flow rate (L/min)	pressure (bar)
6–12	15–20	>10
12–16	20–40	>8
16–20	30–50	>7
20–32	40–75	>5
32–50	65–250	>4
50100	175–350	>3

## Basic Principle

Kennametal's padded reaming tools follow two basic rules. The result, perfectly cylindrical bores with exceptional straightness and superior surface finishes combined with a bore diameter tolerance held to microns:

1. A SINGLE-POINT BORING TOOL SUPPORTED BY BEARING PADS, FLOATING ON A COOLANT FILM.
2. A TOOL MUST DEFLECT ONTO THE PADS, ON ENTERING THE HOLE, IN ORDER TO OBTAIN THE CORRECT SIZE.



Each padded reamer hosts a selection of guide pads that are positioned to resist the cutting forces created during machining. A minimum of two guide pads are necessary guiding the reamer in the predrilled hole.

The lubricant, in the form of coolant, gets between the pad and component surface, resulting in frictionless stability during cutting.

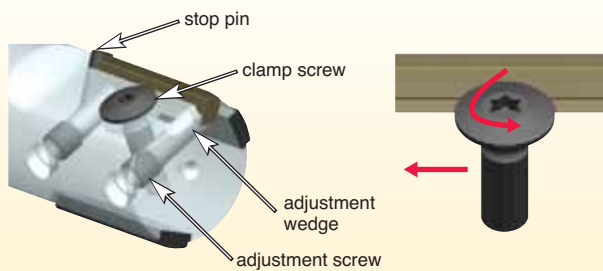
Guide pads are ground slightly smaller than the targeted diameter to machine a certain overhang between guide pads and insert cutting edge necessary for the machining process. Most common is a 10 µm overhang but can vary depending on the material to be cut.

As padded reamers are specifically ground, relative to diameter and tolerance, guide pads are not flexible or adjustable. The pad below the insert ensures hole roundness while the pad opposite to the insert defines the bore diameter. Each further pad improves the roundness, straightness, and bridges over interruptions in the bore area.

These carbide, cermet, PCD, and ceramic guide pads are selected and brazed or bonded to the body depending on coolant availability/type and abrasiveness of the material to be cut. Especially with high L/D ratio tooling (e.g., cam and crank boring bars), bonding of guide pads offers higher precision due to less thermal influence to the steel base body.

material	P	M	K	N	S	H	MQL
carbide	●	○	●	●		○	
cermet	●	○	●			○	
ceramic			●		●		
PCD			○		●		●

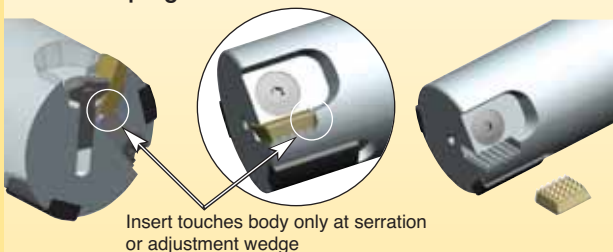
## RIR Clamping



RIR reaming inserts are clamped by a single screw to avoid weakening of the pocket seat against common clamping wedges. This clamp screw has a left-hand thread to securely move the insert axially towards the stop pin until the insert aligns there. The stop pin ensures correct advancement of cutting insert to guiding pad.

Like other types of padded reamers using rectangular reaming inserts, two adjustment screws and wedges are required to adjust diameter and back taper accurately. Therefore, RIR is the preferred solution for diameters below RIQ range.

## RIQ Clamping



There is no need to adjust back taper as this is already predefined by the serrations. Only the overhang of the cutting edge, relative to the guide pads, needs to be adjusted.

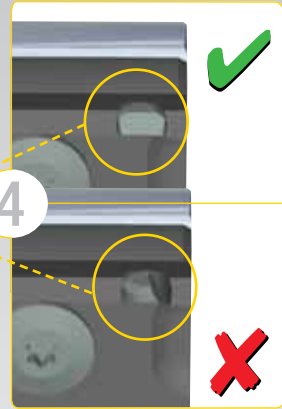
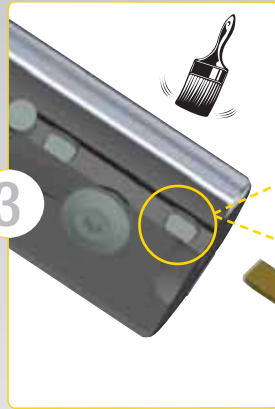
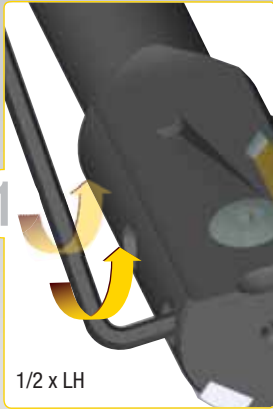
The right-hand clamp screw locks the insert securely onto the high-precision serration. The three cutting edges that are not in use are completely covered by the body while not touching them. All four cutting edges of full-face CBN and PCD inserts can be completely used without the danger of accidentally losing one of them.

## Adjustment Wedge and Screw



The proprietary adjustment wedge prevents any unpredictable rotation. This avoids errors during setup that cause tool damages.

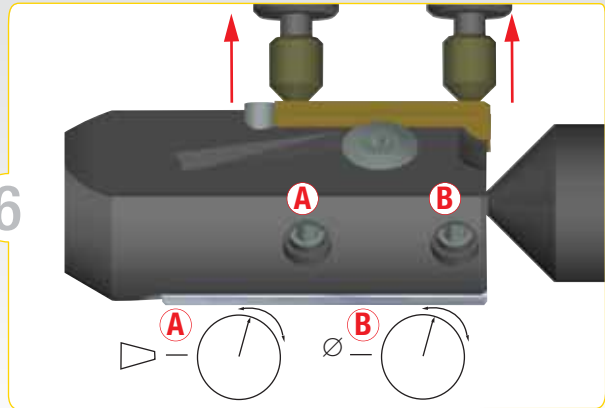
### RIR Tooling Setup



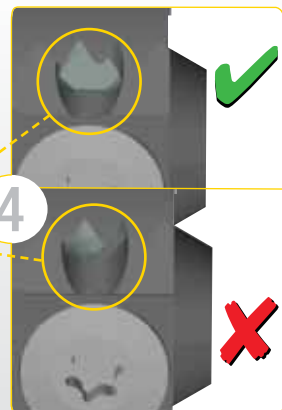
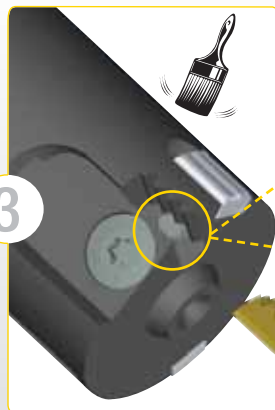
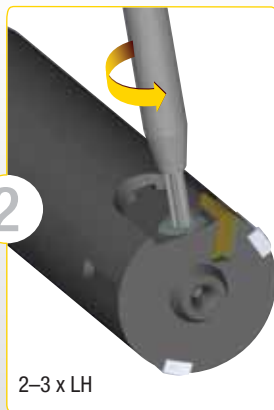
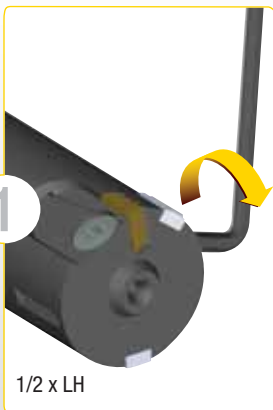
5

LH  
Torque (Nm): see table below.

		Nm
RIR 0	M 1.6-LH	0,3
RIR 1	M 2.5-LH	1,2
RIR 2	M 2.5-LH	1,2
RIR 3	M 3.0-LH	2,2
RIR 4	M 4.5-LH	4,1



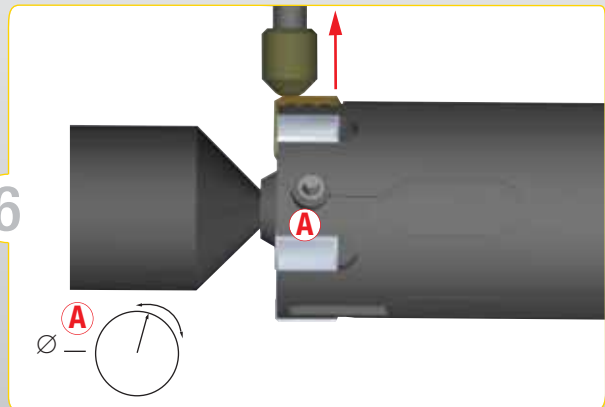
### RIQ Tooling Setup



5

RH  
Torque (Nm): see table below.

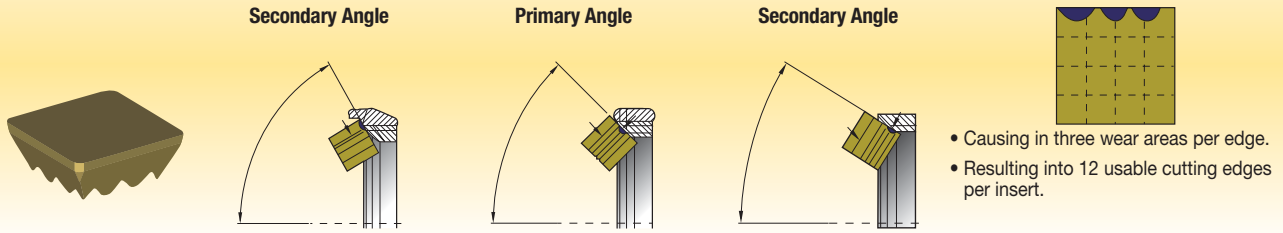
		Nm
RIQ 06	M 3.0-RH	2,2
RIQ 09	M 3.0-RH	2,2
RIQ 12	M 3.0-RH	2,2



Hole Finishing

## Valve Seat Tools • RIQ™ Quattro Cut™ Based Tooling

RIQ technology enables bypassing any angular adjustment of the insert and provides up to 12 cutting edges.



## Valve Seat Tools • Machining Centre Solutions

RIQ valve seat tooling with integrated hydraulic chuck to clamp multiflute RMS™ or RIR™ guide pad reamer.

### Machining Centre • Integrated Hydraulic Chuck

**RMS Multiflute Reamer**  
for regular runout accuracy of valve seat  
to valve guide demands



**RIR Guide Pad Reamer**  
for highest runout accuracy of valve seat  
to valve guide demands



### Machining Centre Process • All Angles Formed to Finish Specifications in TWO Passes

#### Process A (Preferred)

##### Tool 1 • Semi-Finish:

- Finish of secondary angles.
- Semi-finish of primary angles.
- Create pilot bore (short version of RMS or RIR reamer).

##### Tool 2 • Finish:

- Finish of primary angles.
- Finish of guide bore (short version of RMS or RIR reamer).

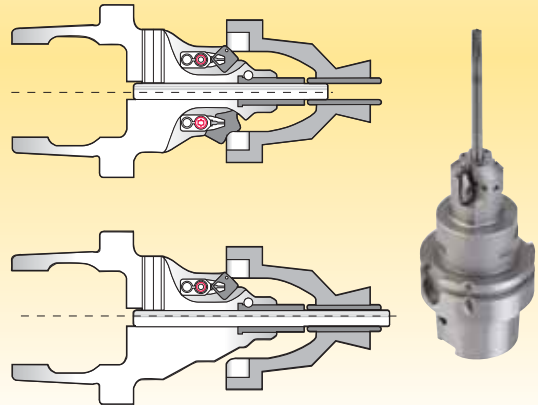
#### Process B (Alternate)

##### Tool 1 • Finish Valve Seat:

- Finish of primary and secondary angles.
- Create pilot bore (short version of RMS or RIR reamer).

##### Tool 2 • Finish Valve Guide:

- Finish of guide bore (short version of RMS or RIR reamer).



## Valve Seat Tools • Transfer Line Solutions

RIQ valve seat tooling with carbide bushing guiding RMS or RIR reamer machining the valve guide on transfer lines.

### Transfer Line • Integrated Carbide Bushing

**Multiflute Reamer RMS**  
for regular runout accuracy of valve seat  
to valve guide demands



**RIR Guide Pad Reamer**  
for highest runout accuracy of valve seat  
to valve guide demands



### Transfer Line Process • All Angles Formed to Finish Specifications in ONE Pass

#### Process A (Preferred)

##### Tool 1 • Semi-Finish:

- Semi-finish of secondary angles.
- Semi-finish of primary angles.

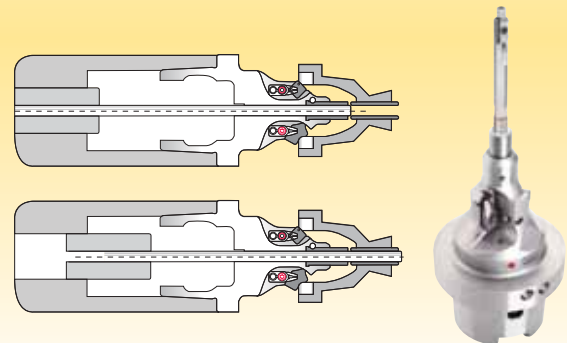
##### Tool 2 • Finish:

- Finish of primary angles.
- Finish of secondary angles.
- Finish of guide bore with feed out multiflute or guide pad reamer (squirt-through type).

#### Process B (Alternate)

##### Tool 1 • Semi-Finish and Finish Combined:

- Finish of primary and secondary seat angles.
- Finish of guide bore with feed out multiflute or guide pad reamer (squirt-through type).



## Application Sheet for Hole Finishing

<b>Sales Eng.:</b>	<b>Sheet:</b>
<b>Q-Number:</b>	<b>Date:</b>
Customer:	Contact person:
Location:	Fax number/e-mail:

### Quotation Processing *Only* with Workpiece Drawing and Filled Out Form

#### Mandatory Fields

Workpiece material:	Hardness/ tensile strength:	(N/mm <sup>2</sup> , HRC, etc.)
Number of holes/year:		
Tool: <input type="checkbox"/> Rotating <input type="checkbox"/> Stationary	Spindle connection: (HSK80A, DV50, BT40, etc.)	
Spindle orientation: <input type="checkbox"/> Horizontal <input type="checkbox"/> Vertical	Tool int. interface: <input type="checkbox"/> No <input type="checkbox"/> SIF <input type="checkbox"/> SIF+HydCh <input type="checkbox"/> SIF+HSK	
Machine situation: <input type="checkbox"/> Rigid <input type="checkbox"/> Weak		
Machine type: <input type="checkbox"/> Machining center <input type="checkbox"/> Transfer line <input type="checkbox"/> Special purpose machine <input type="checkbox"/> Lathe		
Coolant supply: <input type="checkbox"/> Internal <input type="checkbox"/> External <input type="checkbox"/> No	Coolant concentrate: %	
Coolant flow: L/min	Coolant pressure: bar	
Coolant type: <input type="checkbox"/> Soluble <input type="checkbox"/> Semisynthetic <input type="checkbox"/> Synthetic <input type="checkbox"/> MQL		

#### Mandatory Fields if not Defined in the Workpiece Drawing

Nominal hole diameter:	Surface finish:	(N/mm <sup>2</sup> , HRC, etc.)
Hole tolerance: mm (H7, ±0,01, etc.)	Hole type: <input type="checkbox"/> Blind <input type="checkbox"/> Through	
Tolerance target: <input type="checkbox"/> Upper third <input type="checkbox"/> Middle third <input type="checkbox"/> Lower third	Interrupted cut: <input type="checkbox"/> Yes <input type="checkbox"/> No	
CpK-value:	Facing included: <input type="checkbox"/> Yes <input type="checkbox"/> No	
	Maximum lead length: mm	
	Radial stock: mm	
Straightness: mm	Taper: mm	
Roundness:	Cylindricity: mm	
Concentricity: mm	Position: mm	

#### Additional Information

Similar tool:	Required feed rate: mm/min
Required tool life: mm	Required speed: m/min
Required CPP: per hole (€, RMB, etc.)	Required cycle time: sec

Additional information: (e.g., step tool diameters, interferences, weight, or dimensional restrictions, customer reason for change, etc.)

Hole Finishing

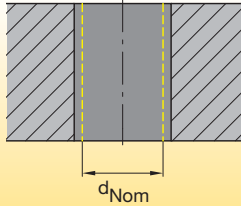
## Reaming Allowances for Multi-Blade Reaming

mm	reaming allowance		
	min	middle	max
1,40–4,80	0,08	0,12	0,20
4,81–9,59	0,10	0,15	0,25
9,60–15,00	0,15	0,20	0,30
15,00–20,00	0,15	0,25	0,35
20,00–50,00	0,20	0,30	0,40

### Causes of and Remedies for Reaming Problems

**problem**

Drill diameter too large



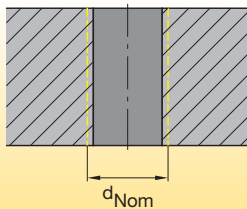
**cause**

1. Reaming tool running out-of-centre.
2. Concentricity of pilot hole and ream machining unsatisfactory.
3. Built-up edge.
4. Unsuitable cooling lubricant.
5. Reaming tool  $\varnothing$  too large.

**possible remedy**

- Use SIF™ equalising adaptor.
- Re-align, use floating head.
- Change cooling lubricant.
- Change cutting speed.
- Measure reamers and send for repairs.

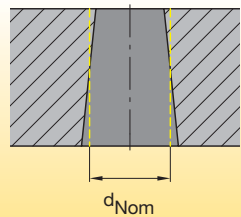
Drill diameter too small



1. Reamer worn.
2. Unsuitable cooling lubricant.
3. Reaming allowance too small.

- Replace and refit tool.
- Change cooling lubricant.
- Increase reaming allowance.

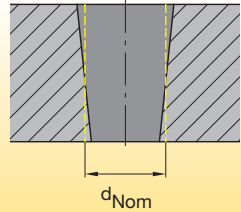
Conical drill profile wider towards drill runout



1. Concentricity of pilot hole and reaming unsatisfactory.
2. Positioning accuracy of pilot hole to reaming.

- Re-align, use SIF equalising adaptor.
- Correct positioning accuracy.

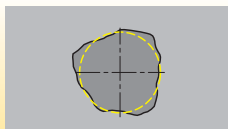
Conical drill profile wider at drill entry point



1. Concentricity of pilot hole and reaming unsatisfactory.
2. Reaming tool skim cutting with ledger.

- Re-align, use floating head.
- Securely clamp reaming tool axially.

Hole out-of-center and/or showing chatter marks



1. Reaming tool running out-of-centre.
2. Slanted cutting surface/asymmetrical cutting.
3. Workpiece twisted.

- Use SIF equalising adaptor.
- Flatten surface before drilling or reaming.
- Take the direction of impact into account when clamping the workpiece.

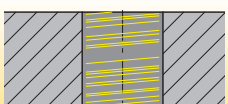
Surface quality does not meet specification



1. Tool cutters worn.
2. Reaming tool running out-of-centre.
3. Incorrect technology data (cutting parameters).
4. Inadequate chip evacuation.

- Replace and refit tool.
- Use SIF equalising adaptor.
- Change cutting parameters in machining range.
- Optimise coolant supply; increase coolant pressure and volume.

Feed grooves



1. Built-up edge.

- Change cooling lubricant.
- Change cutting speed.



# SIF™ Steerable Toolholder

## Primary Application

SIF Steerable Toolholders should be used for easy compensation of radial runout and angular inaccuracies caused by the machine spindle or gravity. SIF tooling improves hole roundness for highest possible hole straightness and surface quality. Runout-optimised reaming tools provide higher process stability and longer tool life.

Use a separate SIF tooling package for each machine to ensure best configuration between reaming tool and spindle and HSK bushes for faster tool change to avoid repeating adjustments.

## Features and Benefits

### Higher Productivity and Profitability

- Easy compensation of radial runout and angular inaccuracies increases process control and tool life.
- Less time-consuming adjustment due to eight radial screws.
- Increase stability due to fewer interfaces by use of RIQ™ Quattro Cut™, RIR™, and RHM™ reaming tooling with SIF backend.

### Versatility

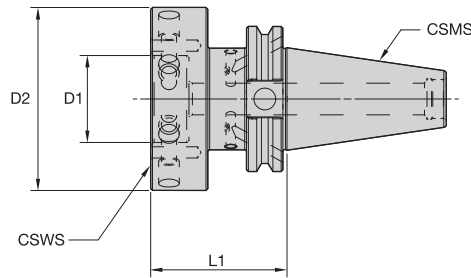
- Standard DV, BT, CV, and HSK adaptors can be used in combination with SIF hydraulic chucks for most precise concentric clamping, highest accuracy, and flexible clamping method using hydraulic chuck sleeves.
- HSK bushes with SIF coupling enables fast tool exchange and eliminates the need for repeated runout adjustment, reducing downtime.

### Customisation

- Different length versions and coupling size combinations are available.

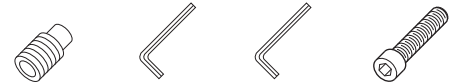


- Through-the-toolholder coolant capability — form AD or form B.
- Suitable for SIF adaptors.



### ■ SIF-CV40 Form B/AD • Metric

order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738505	CV40BSIF80248	CV40	SIF80	80	38	63	121.812	170.004	170.005	125.625	1,77



### ■ SIF-CV50 Form B/AD • Metric

order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738506	CV50BSIF70236	CV50	SIF70	70	38	60	121.808	170.004	170.005	125.625	3,58
3738507	CV50BSIF100236	CV50	SIF100	100	58	60	121.812	170.004	170.006	125.825	4,14



### ■ SIF-BT40 Form B/AD • Metric

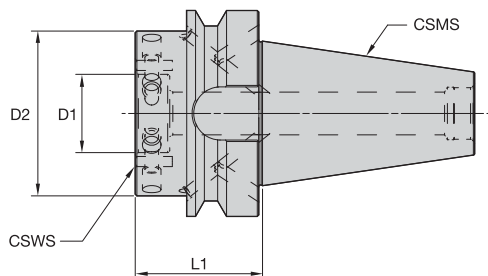
order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738492	BT40BSIF80063M	BT40	SIF80	80	38	63	121.812	170.004	170.005	125.625	1,86



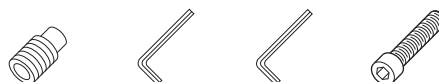
Hole Finishing

Form	Checkmark	Material	Length	Part Number	Thread
Form AD	✓	MS2221S	40	(2x) MS2221S	2,5mm
Form B	↻	MS1296S	50	(2x) MS1296S	3mm

- Through-the-toolholder coolant capability — form AD or form B.
- Suitable for SIF adaptors.



■ SIF-BT50 Form B/AD • Metric



order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738503	BT50BSIF70063M	BT50	SIF70	70	38	63	121.808	170.004	170.005	125.625	4,08
3738504	BT50BSIF100068M	BT50	SIF100	100	58	68	121.812	170.004	170.006	125.825	4,94

Hole Finishing

■ SIF-DV40 Form B/AD • Metric



order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738488	DV40BSIF80061M	DV40	SIF80	80	38	61	121.812	170.004	170.005	125.625	1,83

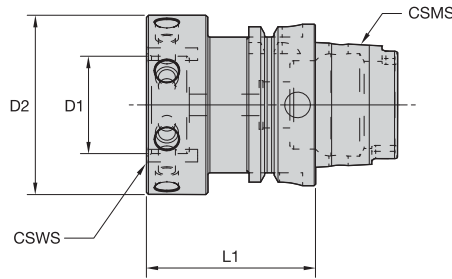
■ SIF-DV50 Form B/AD • Metric



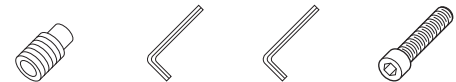
order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738490	DV50BSIF70060M	DV50	SIF70	70	38	60	121.808	170.004	170.005	125.625	3,60
3738491	DV50BSIF100060M	DV50	SIF100	100	58	60	121.812	170.004	170.006	125.825	4,30

	Form AD					
	Form B			40	(2x) MS2221S	2,5mm
				50	(2x) MS1296S	3mm

- Through-the-toolholder coolant capability.
- Suitable for SIF adaptors.



## ■ SIF-HSK63 Form A



order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738508	HSK63ASIF70066M	HSK63A	SIF70	70	38	66	121.808	170.004	170.005	125.625	1,44
3878347	HSK63ASIF80063M	HSK63A	SIF80	80	38	63	121.812	170.004	170.005	125.625	1,50

NOTE: HSK coolant unit and wrench are available and must be ordered separately.



## ■ SIF-HSK80 Form A

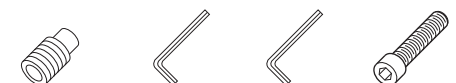


order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738510	HSK80ASIF70066M	HSK80A	SIF70	70	38	66	121.808	170.004	170.005	125.625	2,05

NOTE: HSK coolant unit and wrench are available and must be ordered separately.



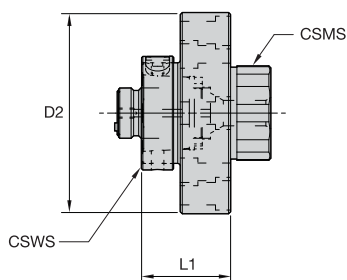
## ■ SIF-HSK100 Form A



order number	catalogue number	CSMS system size	CSWS system size	D2	D1	L1	dog-point set screw	hex wrench	hex wrench	socket-head cap screw	kg
3738511	HSK100ASIF70050M	HSK100A	SIF70	70	38	50	121.808	170.004	170.005	125.625	2,43
3738512	HSK100ASIF100070M	HSK100A	SIF100	100	58	70	121.812	170.004	170.006	125.825	3,84

NOTE: HSK coolant unit and wrench are available and must be ordered separately.

- Through-the-toolholder coolant capability.
- Suitable for SIF adaptors.



■ HSK • SIF80

order number	catalogue number	CSMS system size	CSWS system size	D2	L1
3755429	SIF80HSK32032M	SIF80	HSK32	32	32
3755430	SIF80HSK40035M	SIF80	HSK40	40	35
3755431	SIF80HSK50040M	SIF80	HSK50	50	40

NOTE: HSK coolant unit and wrench are available and must be ordered separately.  
IMPORTANT: Do not overtorque actuation screw. Use torque recommendations referenced above.  
Supplied with actuation mechanism and sealing ring.

Hole Finishing

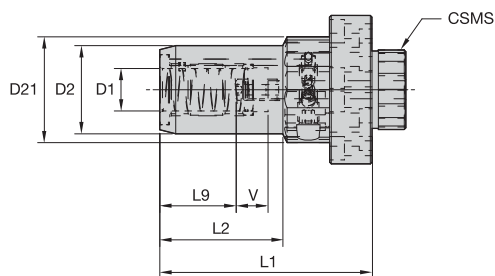
■ HSK • SIF100



order number	catalogue number	CSMS system size	CSWS system size	D2	L1
3755432	SIF100HSK32032M	SIF100	HSK32	32	32
3755453	SIF100HSK40035M	SIF100	HSK40	40	35
3755454	SIF100HSK50040M	SIF100	HSK50	50	40
3755455	SIF100HSK63055M	SIF100	HSK63	63	55

NOTE: HSK coolant unit and wrench are available and must be ordered separately.  
IMPORTANT: Do not overtorque actuation screw. Use torque recommendations referenced above.  
Supplied with actuation mechanism and sealing ring.

- Runout <0,003mm.
- External side actuation adjustment stop, giving 10mm axial adjustment.



### ■ HC HP Line • SIF70

order number	catalogue number	CSMS system size	D1	D2	D21	L1	L2	L9	V	hex wrench	T-handle hex wrench	kg
3667056	SIF70HC12090M	SIF70	12	32	44	90	45	36	10	170.002	170.135	1,13
3667057	SIF70HC20100M	SIF70	20	42	44	100	58	41	10	170.003	170.135	1,35

NOTE: HSK coolant unit and wrench are available and must be ordered separately.  
 IMPORTANT: Do not overtorque clamp screw. Use supplied wrench and tighten by hand until stop is felt.



Hole Finishing



### ■ HC HP Line • SIF80



order number	catalogue number	CSMS system size	D1	D2	D21	L1	L2	L9	V	hex wrench	T-handle hex wrench	kg
3667058	SIF80HC12090M	SIF80	12	32	50	90	45	36	10	170.002	170.135	9,00
3667059	SIF80HC20100M	SIF80	20	42	50	100	58	41	10	170.003	170.135	1,60
3667060	SIF80HC25100M	SIF80	25	50	54	100	51	47	10	170.003	170.136	1,83

NOTE: HSK coolant unit and wrench are available and must be ordered separately.  
 IMPORTANT: Do not overtorque clamp screw. Use supplied wrench and tighten by hand until stop is felt.



### ■ HC HP Line • SIF100



order number	catalogue number	CSMS system size	D1	D2	D21	L1	L2	L9	V	hex wrench	T-handle hex wrench	kg
3667061	SIF100HC12090M	SIF100	12	32	50	90	45	36	10	170.002	170.135	1,98
3667062	SIF100HC20100M	SIF100	20	42	50	100	58	41	10	170.003	170.135	2,20
3668023	SIF100HC25100M	SIF100	25	50	63	100	51	47	10	170.004	170.136	2,56

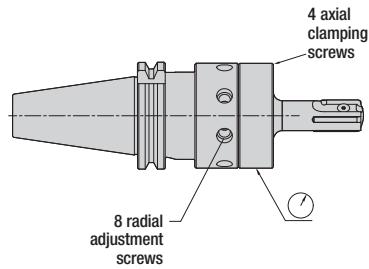
NOTE: HSK coolant unit and wrench are available and must be ordered separately.  
 IMPORTANT: Do not overtorque clamp screw. Use supplied wrench and tighten by hand until stop is felt.

## SIF Tooling Setup

### Step 1: Rough setup of runout at flange

- Set gage (TIR) at SIF flange.
- Tight axial clamping screws 6–8 Nm.
- Use radial adjustment screws to achieve 5 µm runout.

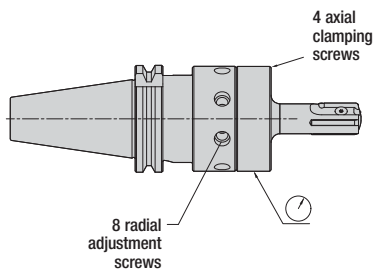
1



### Step 2: Fine setup of runout at flange

- Tight axial clamping screws crosswise:  
SIF70/80 18 Nm.  
SIF100 32 Nm.
- Use radial adjustment screws to achieve 2 µm runout.
- All radial adjustment screws to be clamped tight at 4 Nm.

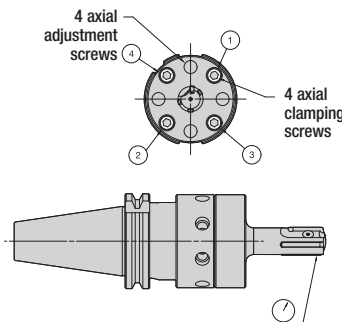
2



### Step 3: Adjustment of runout at front

- Set gage (TIR) at control grind, cylindrical land, or guide pads.
- Use axial adjustment screws to achieve a maximum runout error of 2 µm.
- All axial adjustment screws to be clamped tight at 4 Nm.

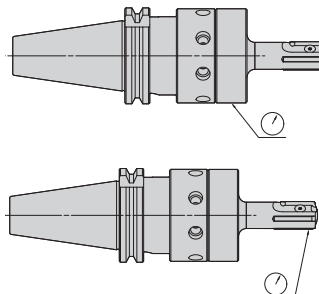
3



### Step 4: Final runout check

- Check using gage (TIR) at flange; no deviation by theory.
- If needed, use radial adjustment screws to set runout below 2 µm.
- Any modification of radial setup demands an axial runout check and adjustment, if necessary.

4



# PCD Customised Tooling

PCD tooling offers the highest productivity and accuracy, reduced tooling costs due to long tool life, and secure process control due to close tolerances, increasing your overall quality and reducing scrap rate and inspection costs.

## Primary Application

Use Kennametal PCD tooling for machining aluminium and aluminium alloys, magnesium, copper, brass, bronze, plastics (GFRP, CFRP), MMC (Metal Matrix Composite), graphite, tungsten carbide green-stages, and ceramic. Choose from various standardised PCD product platforms for drilling, counterboring, and reaming. Steel- and solid carbide-based tool body designs are available for direct spindle coupling with or without adjustable PCD pocket seats or with steerable SIF™ backend.

## Features and Benefits

### Higher Productivity and Profitability

- Highest chip removal rates and less tool changes by using multistep tooling.
- Extremely long tool life even when maintaining very tight tolerances.
- Reduced built-up edge and burr formation, improved concentric hole shape with multistep tooling, and less influence on surface microstructure of the workpiece.

### Product Platform Versatility

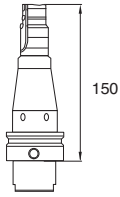
- All PCD drilling, counterboring, and reaming tools are engineered according to your specific needs in diameter, shape, radii, and steps.
- Various PCD grades are available to match your specific material.
- Multistep drilling, profiling, countersinking, and reaming platforms available.
- Coolant channel design for optimised chip evacuation with regular and MQL.
- Steel-based tool body designs are available for direct spindle coupling or enable adjustable pocket seat design for highest accuracy even at larger sizes.
- Carbide-based tool bodies enable highest accuracy and tool life at high L/D ratio applications.
- Tooling designs with SIF steerable interface optimises runout and enables highest accuracy and tool life.
- All PCD tooling is prebalanced by design. Further precision balancing is available on request.



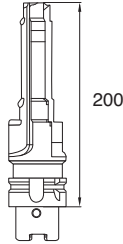


## PCD Tooling Basic Design Overview

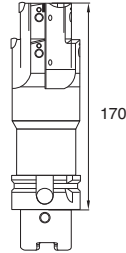
Kennametal offers you certain PCD design platforms to optimally fulfill your machining task. These basic designs are independent, whether you are drilling, countersinking, profiling, reaming, or milling. All tooling designs are capable of internal coolant, MQL coolant, and are balanced by design



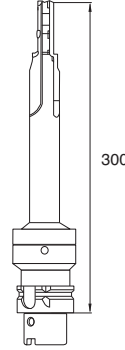
**PCD .. ST** —  
Steel body  
**PCD .. SC** —  
Solid carbide body



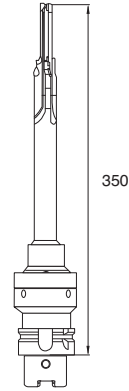
**PCD .. STM** —  
Steel body monoblock



**PCD .. STMJ** —  
Steel body monoblock  
Ø adjustable



**PCD .. STA** —  
Steel body with steerable  
SIF™ backend



**PCD .. SCA** —  
Solid carbide shank and  
steerable SIF backend

Hole Finishing

PCDRSC02CCE

**PCD**

**HF** =  
Helix Flute  
**SF** =  
Straight Flute

**R**

Technology

**D** = Drilling  
**R** = Reaming  
**C** = Countersinking  
**E** = End milling  
**F** = Face milling  
**P** = Profile milling tool  
**M** = Multioperation tool

**SC**

Type

**SC** = Solid carbide body  
**ST** = Steel body  
**STM** = Steel monoblock  
**STMJ** = Steel monoblock adjustable  
**STA** = Steel steerable  
**SCA** = Carbide steerable

**02**

Teeth

**02**  
**03**  
**04**  
...  
**12**  
...  
**22\***

**CC**

Point Geometry

**RL** = Reaming lead  
**CC** = Centre cut  
**CT** = Drill point  
**CTE** = Drill point  
**SW** = Drill point  
**MT** = Drill point

**E**

Coolant

**E** = Emulsion  
**M** = MQL  
**A** = Air  
**D** = Dry

\* Exception for **Type Reamer 22** = 2 teeth + 2 additional land = 4 guiding lands.

## Runout of the Spindle

Depending on spindle runout and/or higher L/D ratios

runout <= 0,005mm		runout >= 0,006mm	
	<b>PCD-ST</b> <b>PCD-SC</b>		<b>PCD-ST</b> or <b>PCD-SC</b> with hydraulic chuck and SIF shank
	<b>PCD-STM</b>		<b>PCD-STA</b> with SIF <b>PCD-SCA</b> with SIF

## PCD Drill-Point Design Overview

### CT

- PCD corner tipped.
- Carbide-based body design.
- Diameter >4,2mm.



Use for general application at moderate cutting speeds up to 12 x D drilling depth.

### CTE

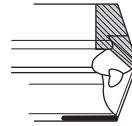
- PCD corner tipped, E point.
- Carbide-based body design.
- Diameter >4,2mm.



Use at precasted holes at moderate cutting speeds up to 12 x D drilling depth.

### SW

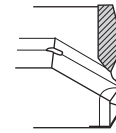
- Full-face sandwich PCD.
- Carbide-based body design.
- Diameter >5mm.



Use at high cutting speeds and abrasive materials up to 5 x D drilling depth.

### MT

- PCD corner tipped.
- Steel- and carbide-based body design.
- Diameter >12mm.



Use for drilling casted surfaces up to 3 x D drilling depth.

## Cutting Edge and Margin Land Requirements

Determine correlations between spindle to edge overhang, amount of cutting, and margin lands for guidance and increased precision.

		number of cutting edges				
		2 flutes	2 flutes	3 flutes	4 flutes	6 flutes
application/shape of bore	overhang	2 lands	2 lands	3 lands	4 lands	6 lands
	short	●	●	●	●	●
	long	○	●	◐	●	●
	short	◐	●	◐	●	●
	long	○	●	○	○	○
	short	◐	●	◐	○	○
	long	○	●	◐	○	○
	short	●	●	●	◐	○
	long	○	●	◐	◐	○



First Choice



Suitable with Limitations



Not Recommended

## Cutting Grade, Tooling Design

Select cutting data and tooling design based on stability and surface quality demands.

material	coolant	drilling	counterboring	reaming	milling	grade
Al <7%	MQL, emulsion	vc = 350–600 m/min	vc = 650–900 m/min	vc = 400–900 m/min	vc = 1.500–5.000 m/min	KD1415
		fz = 0,1–0,4 mm/z	fz = 0,1–0,8 mm/z	fz = 0,1–0,4 mm/z	fz = 0,1–0,25 mm/z	
Al <12%	MQL, emulsion	vc = 200–800 m/min	vc = 650–900 m/min	vc = 400–600 m/min	vc = 1.500–4.000 m/min	KD1415
		fz = 0,1–0,4 mm/z	fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	
Al <12%	emulsion	vc = 100–700 m/min	vc = 650–900 m/min	vc = 400–600 m/min	vc = 1.500–3000 m/min	KD1415
		fz = 0,1–0,3 mm/z	fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	
mg alloys	emulsion	vc = 350–1.000 m/min	vc = 650–900 m/min	vc = 400–600 m/min	vc = 1.500–6.000 m/min	KD1415
		fz = 0,1–0,4 mm/z	fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	
CFRP, GFRP	dry, air	vc = 350–1.800 m/min	vc = 650–900 m/min	vc = 60–200 m/min	vc = 1.500–4.000 m/min	KD1425
		fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	fz = 0,1–0,25 mm/z	

## Quick-Ship Delivery • Tooling Ranges

Please contact us if this special service is available in your region.

Hole Finishing

PCD tool		flutes <sup>1</sup>	chip flute length <sup>2</sup>	cutting diameter	max steps	through coolant	step difference
 non-centre cutting	 reamer, corner tipped	2–6	max 5 x D		2	axial and radial	max 20%
	 countersinker, corner tipped	2–4	max 5 x D	Ø 6–32	3		max 40%
	 milling tool, corner tipped	1–6	max 5 x D		2		max 50%

PCD tool		flutes <sup>1</sup>	chip flute length <sup>2</sup>	cutting diameter	max steps	through coolant	step difference
 centre cutting	 drilling tool, corner tipped	2	max 20 x D	Ø 5–32	3	axial and radial	max 50%
	 counter sinker, centre cut	2–4	max 10 x D				
	 drilling tool, centre cut	2	max 12 x D				

NOTE: 310mm max overall

<sup>1</sup> Depending on the diameter

<sup>2</sup> Based on the max diameter



# Romicron™ Fine-Boring System

## Primary Application

The Romicron PCD tooling portfolio has a diameter range of 4–213mm and reduces setup time and scrap rates while increasing your overall equipment efficiency. This premium fine-boring system can be used in most materials commonly found in metalcutting environments by applying the latest Kennametal Standard ISO Turning Inserts. Its closed loop boring (CLB) provides a unique possibility to automate the insert wear compensation with minimal investment due to the precise 2 µm diameter adjustment per increment. Romicron should be used where extremely close tolerances are critical to the overall process or where fast and easy diameter adjustments are needed.

Hole Finishing

## Features and Benefits

### Higher Productivity and Profitability

- Reduce scrap rates and setup time due to the backlash-free adjustment.
- Make use of the entire tool life of used inserts as diameter adjustment can be done inside of the machine, avoiding routine insert changes in the setup room.
- Avoid time-consuming control cuts or sister tooling.
- No training or experience is needed, resulting in less stress during adjustments.

### Versatility

- Retrofit existing machines to automated wear compensation using the standard CLB pin without any electronic equipment needed besides a measuring device of holes produced.
- Use SVS00B-SVS6B prebalanced heads as the preferred solution for diameter 25–139mm
- SVUBB1 tooling for high-speed applications 4–16,5mm.
- Large diameter range of 6–100mm using SVUBB2 tooling.
- SVU65 and SVU92 for larger diameters of 71–213mm.

### Ease of Adjustment














- No tools are needed so adjustment can take place on the machine tool. Eliminates the need to remove and return the boring head to the presetting area providing increased productivity.
- SEE, FEEL, and HEAR the adjustment mechanism for fail-safe size control.

### Customisation

- Engineered solutions available for multistep or high length-to-diameter tooling.
- Anti-chatter devices and various non-standard machine spindle coupling sizes are available.



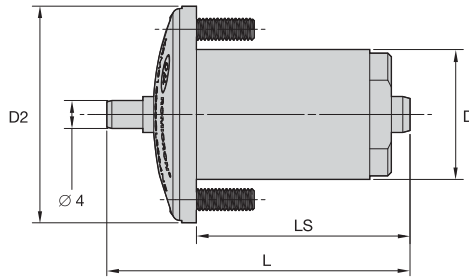
Boring range, coolant capacity, and maximum RPM features for all Romicron boring heads.

	head size	bore range	
<ul style="list-style-type: none"> <li>• 25,000 RPM max.</li> <li>• Balanceable.</li> <li>• 70 bar coolant capacity.</li> <li>• Movable zero reference.</li> </ul>	<b>SVUBB1</b> 4mm  16,5mm		
<ul style="list-style-type: none"> <li>• 10,000 RPM max.</li> <li>• Balanceable.</li> <li>• 70 bar coolant capacity.</li> <li>• Movable zero reference.</li> </ul>	<b>SVUBB2</b> 6mm  25,5mm		
<ul style="list-style-type: none"> <li>• 10,000 RPM.</li> <li>• Prebalanced.</li> <li>• 70 bar coolant capacity.</li> </ul>	<b>SVS00B</b> 25mm  32mm		
<ul style="list-style-type: none"> <li>• 8,000 RPM.</li> <li>• Prebalanced.</li> <li>• 15 bar coolant capacity.</li> </ul>	<b>SVS0B</b> 31,5mm  42,5mm		
Hole Finishing	<ul style="list-style-type: none"> <li>• 6,000 RPM.</li> <li>• Prebalanced.</li> <li>• 15 bar coolant capacity.</li> </ul>	<b>SVS1B</b> 42mm  53mm	
	<ul style="list-style-type: none"> <li>• 6,000 RPM.</li> <li>• Prebalanced.</li> <li>• 15 bar coolant capacity.</li> </ul>	<b>SVS2B</b> 52mm  66mm	
	<ul style="list-style-type: none"> <li>• 6,000 RPM.</li> <li>• Prebalanced.</li> <li>• 15 bar coolant capacity.</li> </ul>	<b>SVS3B</b> 65mm  79mm	
	<ul style="list-style-type: none"> <li>• 4,500 RPM.</li> <li>• Prebalanced.</li> <li>• 20 bar coolant capacity.</li> </ul>	<b>SVS4B</b> 78mm  98mm	
	<ul style="list-style-type: none"> <li>• 4,500 RPM.</li> <li>• Prebalanced.</li> <li>• 20 bar coolant capacity.</li> </ul>	<b>SVS5B</b> 97mm  117mm	
<ul style="list-style-type: none"> <li>• 3,500 RPM.</li> <li>• Prebalanced.</li> <li>• 20 bar coolant capacity.</li> </ul>	<b>SVS6B</b> 116mm  139mm		
<ul style="list-style-type: none"> <li>• 6,000 RPM.</li> <li>• Balanceable.</li> <li>• 20 bar coolant capacity.</li> <li>• Movable zero reference.</li> </ul>	<b>SVU65</b> 71mm  111mm		
<ul style="list-style-type: none"> <li>• 6,000 RPM.</li> <li>• Balanceable.</li> <li>• 20 bar coolant capacity.</li> <li>• Movable zero reference.</li> </ul>	<b>SVU92</b> 101mm  213mm		
<ul style="list-style-type: none"> <li>• 6,000 RPM max.</li> <li>• Balanceable.</li> <li>• 20 bar coolant capacity.</li> <li>• Movable zero reference.</li> </ul>	<b>SVU120</b> 139mm  326mm		

range mm	order number	catalogue number	content		
4,00–16,50	4046076	SVUBB1KR32KIT	KR32SVUBB1060M KRBB10FADRS102C KRBB10SCLDRS4060C KRBB10SCFPR06085C KRBB10SCFPR06110C KRBB10SCFPR06135C		
6,00–25,50	4046077	SVUBB2KR32KITD025M	KR32SVUBB2085M KRBB16SCLDRS4060A KRBB16SCFPR06085A KRBB16SCFPR06110A KRBB16SCFPR06135A KRBB16SCFPR06160A KRBB16SCFPR06190A KRBB16SCFPR06220A		
6,00–25,50	4046078	SVUBB2KR50KITD025M	KR50SVUBB2075M KRBB16SCLDRS4060A KRBB16SCFPR06085A KRBB16SCFPR06110A KRBB16SCFPR06135A KRBB16SCFPR06160A KRBB16SCFPR06190A KRBB16SCFPR06220A		
6,00–100,00	4052608	SVUBB2KR32KITD100M	KR32SVUBB2085M KRBB16SCLDRS4060A KRBB16SCFPR06085A KRBB16SCFPR06110A KRBB16SCFPR06135A KRBB16SCFPR06160A KRBB16SCFPR06190A KRBB16SCFPR06220A	KRDEA046AM KRDE025010M KRDE033010M KRDEA051AM KRDE043010M KRDEA012AM KRDE065012M KRCW032A	
6,00–100,00	4052609	SVUBB2KR50KITD100M	KR50SVUBB2075M KRBB16SCLDRS4060A KRBB16SCFPR06085A KRBB16SCFPR06110A KRBB16SCFPR06135A KRBB16SCFPR06160A KRBB16SCFPR06190A KRBB16SCFPR06220A	KRDEA046AM KRDE025010M KRDE033010M KRDEA051AM KRDE043010M KRDEA012AM KRDE065012M KRCW032A	
25,00–32,00	4046079	SVS00BKR32KIT	KR32SVS00B072M KRCSCFPR061L KRCSCFPR062L KRCSCFPR063L		
31,50–42,50	4046080	SVS0BKR32KIT	KR32SVS0B093M KRCSCFPR061A KRCSCFPR062A KRCSCFPR063A		
42,00–53,00	4046081	SVS1BKR32KIT	KR32SVS1B076M KRCSCFPR061A KRCSCFPR062A KRCSCFPR063A		
52,00–66,00	4046082	SVS2BKR32KIT	KR32SVS2B085M KRCSCFPR061B KRCSCFPR062B KRCSCFPR063B		
65,00–79,00	4046103	SVS3BKR32KIT	KR32SVS3B085M KRCSCFPR061B KRCSCFPR062B KRCSCFPR063B		
78,00–98,00	4046104	SVS4BKR50KIT	KR50SVS4B094M KRCSCFPR061C KRCSCFPR062C KRCSCFPR063C		

Hole Finishing

- For use with SVU CLB (Closed Loop Boring) heads.
- Retractable CLB pin is spring loaded.

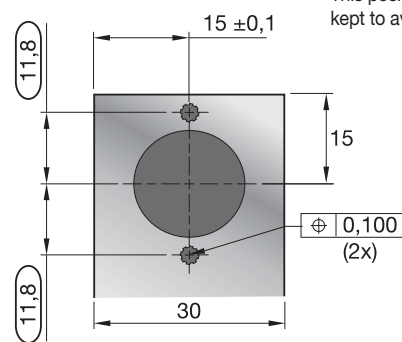
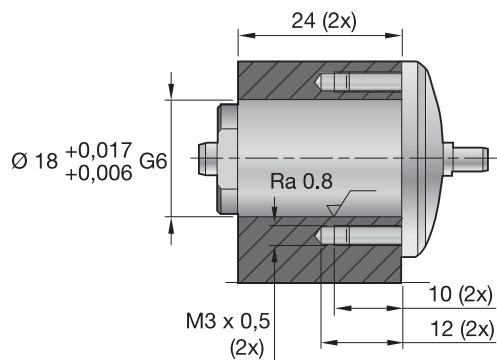


■ Romicron CLB Pin

order number	catalogue number	D mm	D2 mm	LS mm	L mm	kg
4052592	KRM018030CLB004NE	18,0	30,0	29,6	42,0	0,1

Hole Finishing

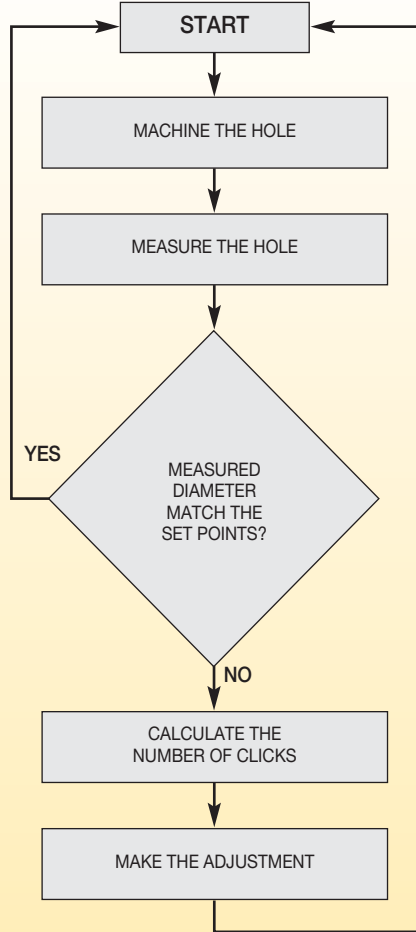
## Mounting Dimensions of the Romicron CLB Pin



**WARNING:**  
This position must be kept to avoid collisions.

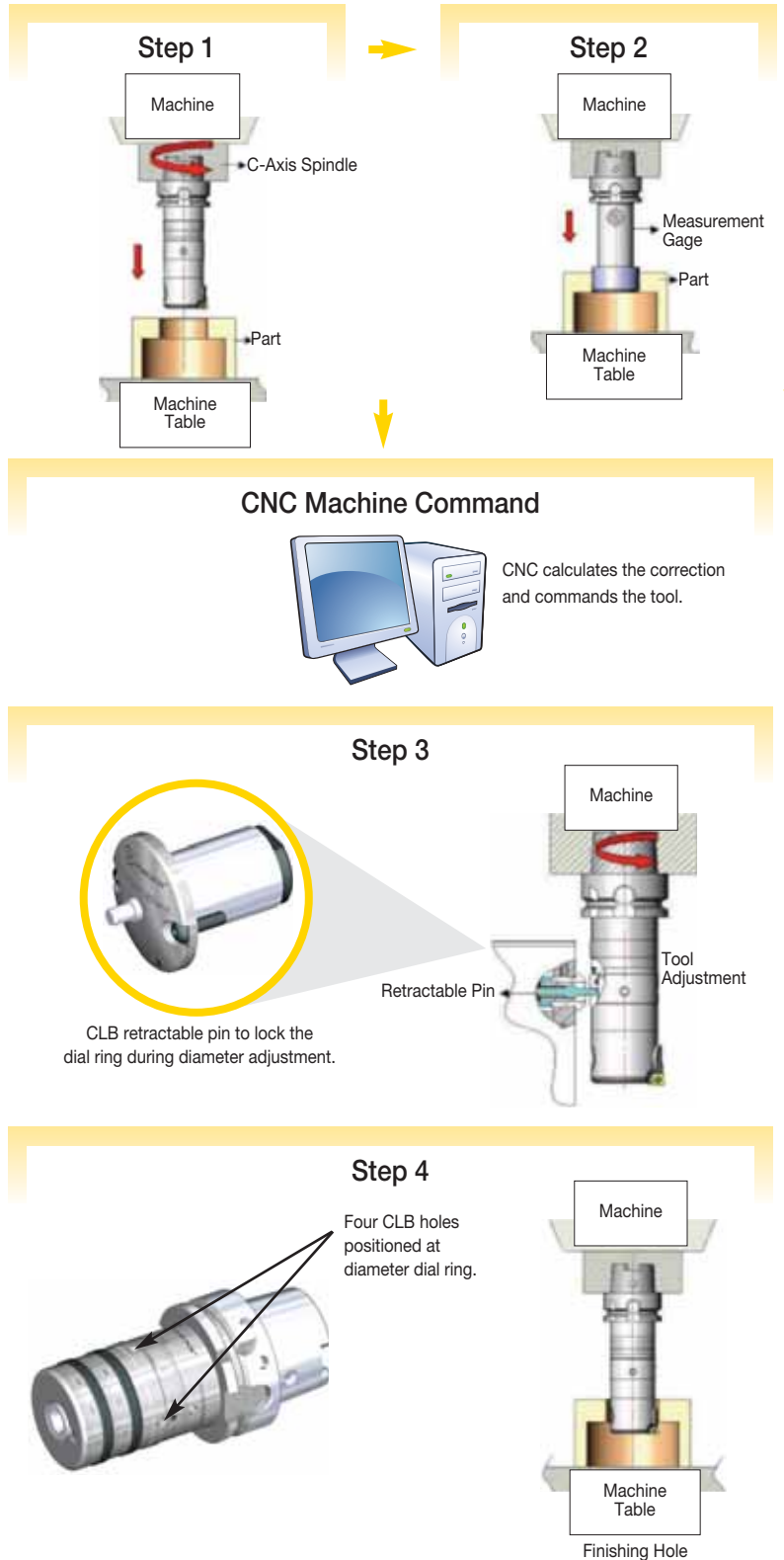
## The Romicon Closed Loop Boring Process

Closed Loop Boring (CLB) provides the unique possibility to automate the insert wear compensation with minimal investment due to the precise 2 µm adjustment in diameter of these tools per increment. Retrofit existing machines to automated wear compensation using the standard CLB pin without any electronic equipment needed besides a measuring device of holes produced.



NOTE: This process is only possible with the Romicon system because it does not require tools to make the adjustment.

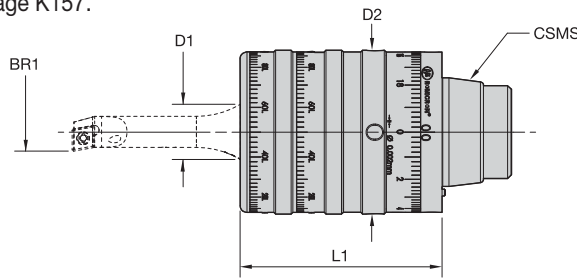
1. A precision system measures the holes after the machine process. The data is sent to the CNC.
2. The values are compared to the set points.
3. If the diameter is in the range of the specified set points, the machine goes to the next hole. Otherwise, the software calculates the necessary increment and automatically adjusts the Romicon using the CLB pin.



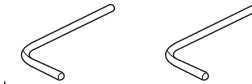
Hole Finishing



- For correct balance ring settings, see page K164.
- Order boring bar separately; see page K145.
- Order taper shank separately; see page K157.



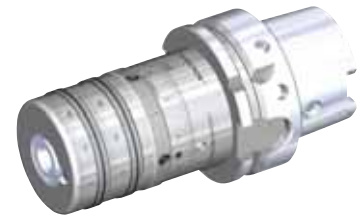
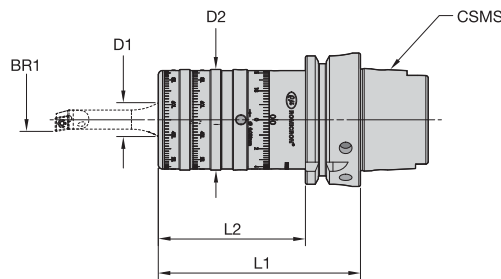
### ■ SVU BB1 • KR Boring Head with CLB Capability



order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	Torx wrench	hex wrench	kg	lbs
4054737	KR32SVUBB1060MCLB	4,000-16,500	KR32	10,0	46,5	58,6	KT8	170.000	0,94	2,07

Hole Finishing

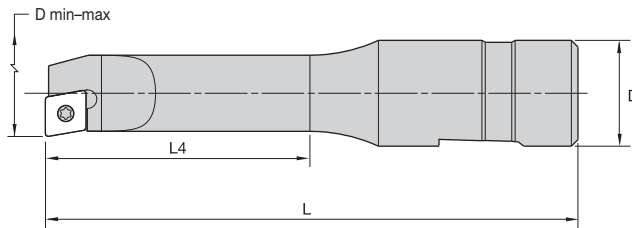
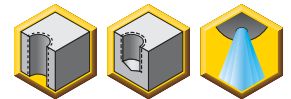
- For correct balance ring settings, see page K164.
- Order boring bar separately; see page K145.



### ■ SVU BB1 • HSK Boring Head with CLB Capability

order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	L2 mm	Torx wrench	radial adjusting screw	kg
4054734	HSK63ASVUBB1095MCLB	4,000-16,500	HSK63A	10,0	46,5	95,5	69,4	KT15	191.282	1,45

- Order inserts separately.



■ **SVU BB1 • Universal Boring Bars**

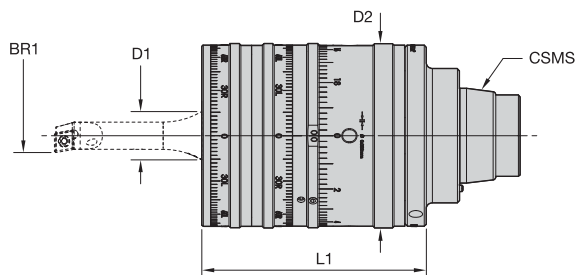


order number	catalogue number	D min mm	D max mm	D mm	L mm	L4 mm	gage insert	insert screw	Torx wrench	kg
2202438	KRBB10FABDRS204C	4,00	7,00	10	57	14	—	—	—	0,05
2202439	KRBB10SCLDR4060C	6,00	9,00	10	54	22	CD..S4T0../CD..1206..	MS1454	FT5	0,05
2202440	KRBB10SCFPR06085C	8,50	11,50	10	58	31	CP..0602../CP..215...	MS1153	FT7	0,08
2202450	KRBB10SCFPR06110C	11,00	14,00	10	60	33	CP..0602../CP..215...	MS1153	FT7	0,08
2202451	KRBB10SCFPR06135C	13,50	16,50	10	65	39	CP..0602../CP..215...	MS1153	FT7	0,09

NOTE: Carbide shank and customized boring bars are available upon request to meet your specific requirements. Please contact Kennametal for a design and quotation.



- For correct balance ring settings, see page K166
- Order boring bar separately, see page K147.
- Order taper shank separately, see page K157.



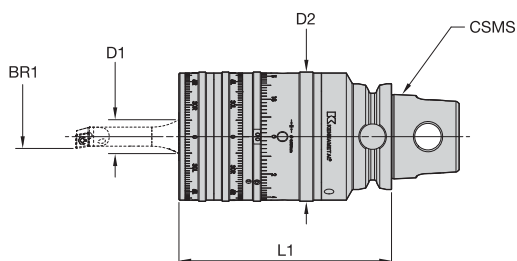
### ■ SVU BB2 • KR Boring Head with CLB Capability



order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	Torx wrench	kg
4054738	KR32SVUBB2085MCLB	6,000-25,500	KR32	16,0	60,0	85,0	KT27	1,81
4054739	KR50SVUBB2075MCLB	6,000-25,500	KR50	16,0	60,0	75,0	KT27	1,61

Hole Finishing

- For correct balance ring settings, see page K166.
- Order boring bar separately, see page K147.

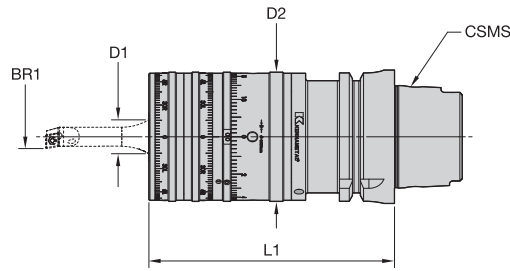


### ■ SVU BB2 • KM™ Boring Head with CLB Capability

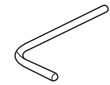


order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	Torx wrench	kg
4054736	KM50TSSVUBB2100MCLB	6,000-25,500	KM50TS	16,0	60,0	100,0	KT27	1,91

- For correct balance ring settings, see page K166.
- Order boring bar separately; see below.



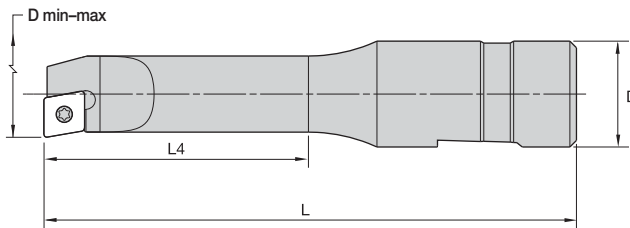
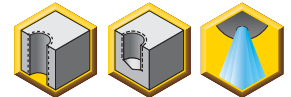
■ SVU BB2 • HSK Boring Head with CLB Capability



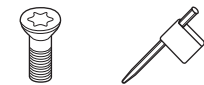
order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	Torx wrench	kg
4054735	HSK63ASVUBB2116MCLB	6,00-25,500	HSK63A	16,0	60,0	116,0	KT27	2,52
4054733	HSK100ASVUBB2124MCLB	6,00-25,500	HSK100A	16,0	60,0	124,4	KT27	4,21

Hole Finishing

- Order inserts separately.

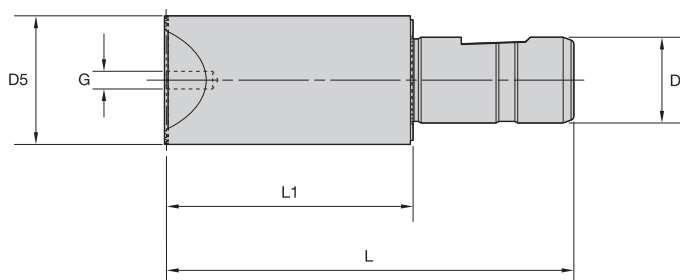


■ SVU BB2 • Universal Boring Bars



order number	catalogue number	D min mm	D max mm	D mm	L mm	L4 mm	gage insert	insert screw	Torx wrench	kg
1522062	KRBB16SCLDRS406A	6,00	9,50	16	62	20	CD..S4T0../CD..1206..	MS1454	FT5	0,06
1522063	KRBB16SCFPR06085A	8,60	12,00	16	68	26	CP..0602../CP..215...	MS1153	FT7	0,06
1522064	KRBB16SCFPR0611A	11,00	14,50	16	78	36	CP..0602../CP..215...	MS1153	FT7	0,08
1522068	KRBB16SCFPR06135A	13,50	17,00	16	80	40	CP..0602../CP..215...	MS1153	FT7	0,09
1522069	KRBB16SCFPR0616A	16,00	19,50	16	90	55	CP..0602../CP..215...	MS1153	FT7	0,11
1522070	KRBB16SCFPR0619A	19,00	22,50	16	90	60	CP..0602../CP..215...	MS1153	FT7	0,12
1522071	KRBB16SCFPR0622A	22,00	25,50	16	90	60	CP..0602../CP..215...	MS1153	FT7	0,15

NOTE: Carbide shank and customized boring bars are available upon request to meet your specific requirements. Please contact Kennametal for a design and quotation.

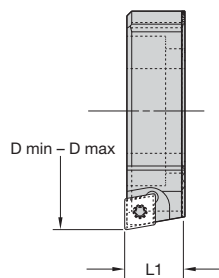


### SVU BB2 • Universal Adaptors

order number	catalogue number	BR1 bore range mm	D mm	D5 mm	G	L mm	L1 mm	kg
2541200	KRDEA046AM	25,500-43,500	16	24,0	M4X0.70	76,4	46,4	0,2
2541201	KRDEA051AM	43,000-65,000	16	25,0	M6X1.00	81,7	51,7	0,2
2541202	KRDEA012AM	65,000-100,000	16	63,5	M8X1.25	42,5	12,5	0,2

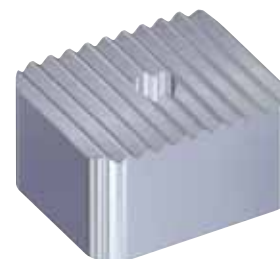
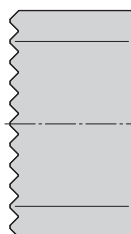
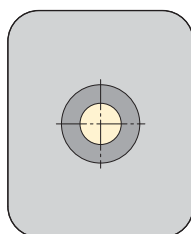
Hole Finishing

• Order inserts separately.



### SVU BB2 • Universal Diameter Extenders

order number	catalogue number	D min mm	D max mm	L1 mm	gage insert	insert screw	Torx wrench	kg
2541213	KRDE025010M	25,50	33,50	10,0	CP..0602..	MS1153	FT7	0,02
2541214	KRDE033010M	33,50	43,50	10,0	CP..0602..	MS1153	FT7	0,02
2541215	KRDE043010M	43,00	65,00	10,0	CP..0602..	MS1153	FT7	0,03
2541216	KRDE065012M	65,00	100,00	12,0	CP..0602..	MS1153	FT7	0,05



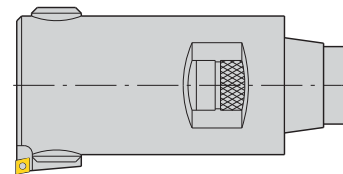
### SVU BB2 • Counterweight

order number	catalogue number	L mm	kg
2541217	KRCW032A	12,0	0,04

NOTE: Counterweight must be used with KRDEA012M adaptor and KRDEA065012M extender.

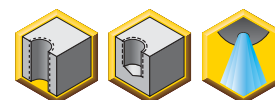
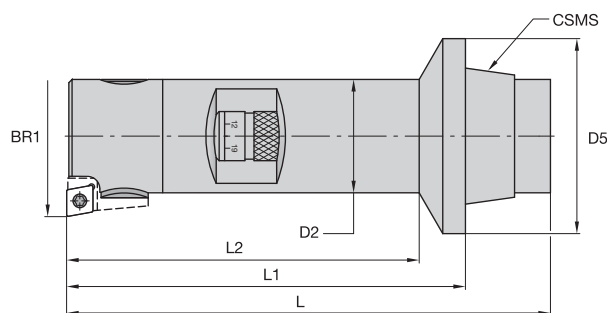
■ SVS System • Tooling Tree

cartridge range	cartridge size	bore range	head size
25–27,5mm	1L	25–32mm	SVS00B
27,25–29,75mm	2L		
29,5–32mm	3L		
31,5–35,5mm	1A	31,5–42,5mm	SVS0B
35–39mm	2A		
38,5–42,5mm	3A		
42–46mm	1A	42–53mm	SVS1B
45,5–49,5mm	2A		
49–53mm	3A		
52–57mm	1B	52–66mm	SVS2B
56,5–61,5mm	2B		
61–66mm	3B		
65–70mm	1B	65–79mm	SVS3B
69,5–74,5mm	2B		
74–79mm	3B		
78–85mm	1C	78–98mm	SVS4B
84,5–91,5mm	2C		
91–98mm	3C		
97–104mm	1C	97–117mm	SVS5B
103,5–110,5mm	2C		
110–117mm	3C		
116–124mm	1D	116–139mm	SVS6B
123,5–131,5mm	2D		
131–139mm	3D		



Hole Finishing

- Order cartridges separately; see page K151.
- Order taper shank separately; see page K157.

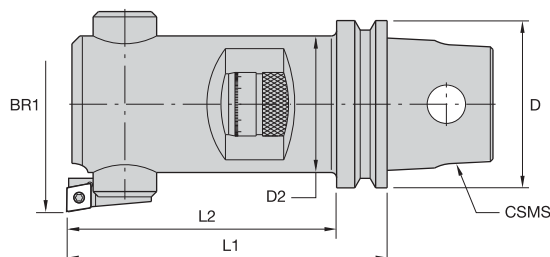
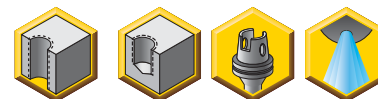


### SVS • KR Boring Heads

order number	catalogue number	BR1 bore range mm	CSMS system size	D2 mm	D5 mm	L mm	L1 mm	L2 mm	kg
1500262	KR32SVS00B072M	25,000-32,000	KR32	23,5	38,0	92,0	72,0	65,0	0,7
1501372	KR32SVS0B093M	31,500-43,500	KR32	30,0	47,0	113,0	93,0	85,0	0,8
1192277	KR32SVS1B076M	42,000-53,000	KR32	38,5	—	96,0	76,0	—	0,8
1192278	KR32SVS2B085M	52,000-66,000	KR32	47,0	—	105,0	85,0	—	1,2
1192279	KR32SVS3B085M	65,000-79,000	KR32	47,0	—	105,0	85,0	—	1,2
1192281	KR50SVS4B094M	78,000-98,000	KR50	65,0	—	119,0	94,0	—	2,4
1279787	KR50SVS5B094M	97,000-117,000	KR50	65,0	—	119,0	94,0	—	3,0
1279793	KR63SVS6B126M	116,000-139,000	KR63	85,0	—	162,0	126,0	—	5,7

Hole Finishing

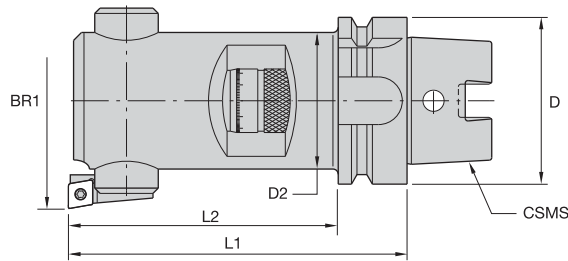
- Order cartridges separately, see page K151.



### SVS • KM™ Boring Heads

order number	catalogue number	BR1 bore range mm	CSMS system size	D mm	D2 mm	L1 mm	L2 mm	kg
1763133	KM40SVS00B080M	25,000-32,000	KM40	40,000	23,5	80,0	65,0	0,7
1746909	KM50SVS00B083M	25,000-32,000	KM50	50,000	23,5	83,0	65,0	0,7
1763333	KM40SVS0B101M	31,500-42,500	KM40	40,000	30,0	101,0	85,0	0,8
1763334	KM50SVS0B103M	31,500-42,500	KM50	50,000	30,0	103,0	85,0	0,9
1763336	KM40SVS1B100M	42,000-53,000	KM40	40,000	38,0	100,0	88,0	1,1
1763338	KM50SVS1B105M	42,000-53,000	KM50	50,000	38,0	105,0	90,0	1,3
1763339	KM40SVS2B104M	52,000-66,000	KM40	40,000	47,0	104,0	92,0	1,5
1746981	KM50SVS2B107M	52,000-66,000	KM50	50,000	47,0	107,0	92,0	1,5
1763373	KM50SVS3B107M	65,000-79,000	KM50	50,000	47,0	107,0	92,0	1,9
1763374	KM63SVS3B107M	65,000-79,000	KM63	63,000	47,0	107,0	92,0	2,1
1763375	KM50SVS4B125M	78,000-98,000	KM50	50,000	65,0	125,0	110,0	2,2
1763378	KM50SVS5B125M	97,000-117,000	KM50	50,000	65,0	125,0	110,0	3,2
1763379	KM63SVS5B110M	97,000-117,000	KM63	63,000	65,0	110,0	92,0	3,2
1763376	KM63SVS4B110M	78,000-98,000	KM63	63,000	65,0	110,0	92,0	2,4
1763382	KM80SVS6B150M	116,000-139,000	KM80	80,000	85,0	150,0	128,0	7,8

• Order cartridges separately.

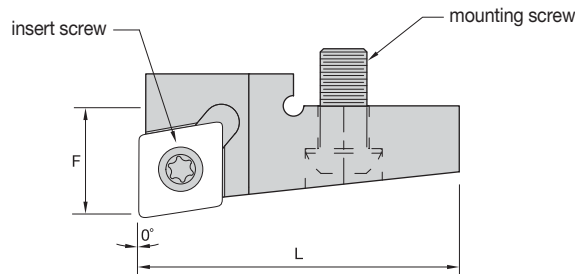


## SVS • HSK Boring Heads

order number	catalogue number	BR1 bore range mm	CSMS system size	D mm	D2 mm	L1 mm	L2 mm	kg
1763096	HSK63ASVS00B096M	25,000-32,000	HSK63A	63,0	23,5	96,0	66,0	1,1
1763098	HSK63ASVS0B117M	31,500-42,500	HSK63A	63,0	30,0	117,0	88,0	1,4
1763100	HSK63ASVS1B116M	42,000-53,000	HSK63A	63,0	38,0	116,0	88,0	1,6
1763114	HSK63ASVS3B121M	65,000-79,000	HSK63A	63,0	47,0	121,0	95,0	1,9
1763112	HSK63ASVS2B121M	52,000-66,000	HSK63A	63,0	47,0	121,0	95,0	1,9
1763118	HSK63ASVS5B139M	97,000-117,000	HSK63A	63,0	65,0	139,0	113,0	5,9
1763116	HSK63ASVS4B139M	78,000-98,000	HSK63A	63,0	65,0	139,0	113,0	3,6

Hole Finishing

• Order inserts separately.



## SVS • Cartridges SCF

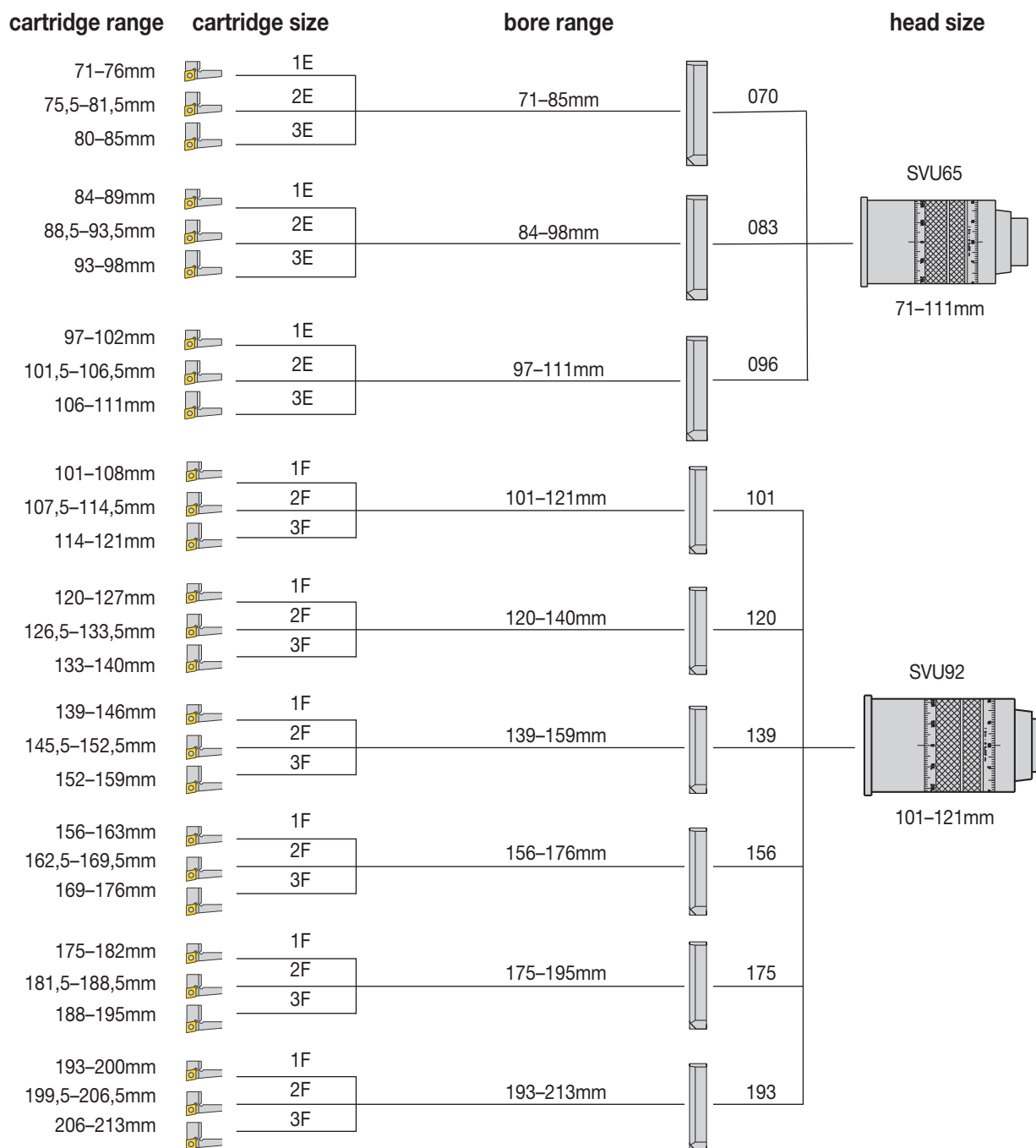
order number	catalogue number	L mm	F mm	gage insert	reference head	cartridge size	kg
1501356	KRCSCFPR061L	19,15	4,76	CP..0602../CP..215...	SVS00B	1L.	0,01
1500650	KRCSCFPR062L	19,15	5,90	CP..0602../CP..215...	KRMSVS00M50049M,SVS00B	2L.	0,01
1501357	KRCSCFPR063L	19,15	7,01	CP..0602../CP..215...	SVS00B	3L.	0,01
1099162	KRCSCFPR061A	23,70	6,45	CP..0602../CP..215...	SVS1B,SVS0B	1A.	0,01
1099163	KRCSCFPR062A	23,70	8,20	CP..0602../CP..215...	SVS1B,SVS0B	2A.	0,01
1099164	KRCSCFPR063A	23,70	9,95	CP..0602../CP..215...	SVS1B,SVS0B	3A.	0,01
1099165	KRCSCFPR061B	24,70	6,45	CP..0602../CP..215...	SVS3B,SVS2B	1B.	0,01
1099166	KRCSCFPR062B	24,70	8,70	CP..0602../CP..215...	SVS3B,SVS2B	2B.	0,01
1099167	KRCSCFPR063B	24,70	10,95	CP..0602../CP..215...	SVS3B,SVS2B	3B.	0,02
1099168	KRCSCFPR061C	30,70	8,45	CP..0602../CP..215...	SVS5B,SVS4B	1C.	0,02
1099169	KRCSCFPR062C	30,70	11,70	CP..0602../CP..215...	SVS5B,SVS4B	2C.	0,03
1099170	KRCSCFPR063C	30,70	14,95	CP..0602../CP..215...	SVS5B,SVS4B	3C.	0,04
1099171	KRCSCFPR061D	38,70	8,45	CP..0602../CP..215...	SVS8B,SVS7B,SVS6B	1D.	0,03
1099172	KRCSCFPR062D	38,70	12,20	CP..0602../CP..215...	SVS8B,SVS7B,SVS6B	2D.	0,05
1099173	KRCSCFPR063D	38,70	15,95	CP..0602../CP..215...	SVS8B,SVS7B,SVS6B	3D.	0,06



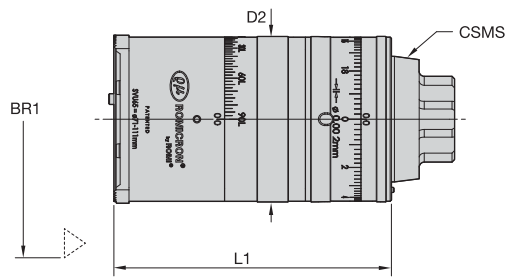
■ SVU System • Tooling Tree



Hole Finishing

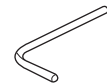


- For correct balance ring settings, see page K172.
- Order diameter extenders, cartridges, and taper shanks separately.

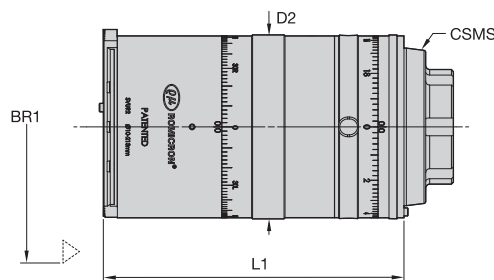
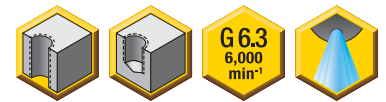


■ SVU65 • KR Boring Head with CLB Capability

order number	catalogue number	BR1 bore range mm	CSMS system size	D2 mm	L1 mm	Torx wrench	kg
1582600	KR50SVU65110MCLB	71,000-111,000	KR50	65,0	110,0	KT27	2,8

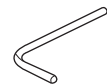


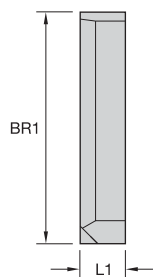
- For correct balance ring settings, see page K174
- Order diameter extenders, cartridges, and taper shanks separately.



■ SVU92 • KR Boring Head with CLB Capability

order number	catalogue number	BR1 bore range mm	CSMS system size	D2 mm	L1 mm	Torx wrench	kg
4054740	KR80SVU92152MCLB	101,000-213,000	KR80	92,0	152,0	KT27	7,5



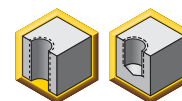
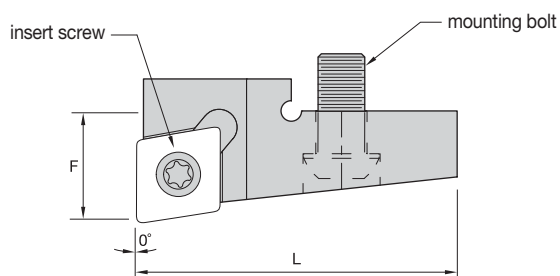


### SVU 65/SVU 92 • Diameter Extenders

order number	catalogue number	BR1 bore range mm	L1 mm	kg
1279736	KRDE070019M	70,000-85,000	19,20	0,22
1279739	KRDE083019M	83,000-98,000	19,20	0,28
1279740	KRDE096019M	96,000-111,000	19,20	0,34
1279741	KRDE101023M	101,000-121,000	23,20	0,57
1279742	KRDE120023M	120,000-140,000	23,20	0,70
1279743	KRDE139026M	139,000-159,000	26,20	0,98
1279745	KRDE156026M	156,000-176,000	26,20	1,14
1279746	KRDE175026M	175,000-195,000	26,20	1,28
1279748	KRDE193026M	193,000-213,000	26,20	1,42

Hole Finishing

• Order inserts separately.

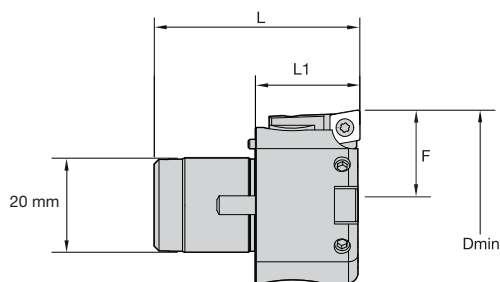


### SVU • Cartridges SCF



order number	catalogue number	reference head	F mm	L mm	gage insert	insert screw	mounting screw	insert Torx wrench	Torx wrench	kg
1099174	KRCSCFPR061E	SVU65	6,75	19,70	CP..0602../CP..215...	MS1375	MS1153	FT7	KT15	0,01
1099175	KRCSCFPR062E	SVU65	9,00	19,70	CP..0602../CP..215...	MS1375	MS1153	FT7	KT15	0,01
1099176	KRCSCFPR063E	SVU65	11,25	19,70	CP..0602../CP..215...	MS1375	MS1153	FT7	KT15	0,01
1099177	KRCSCFPR061F	SVU92	6,75	19,70	CP..0602../CP..215...	MS1375	MS1153	FT7	KT15	0,01
1099178	KRCSCFPR062F	SVU92	10,00	19,70	CP..0602../CP..215...	MS1375	MS1153	FT7	KT15	0,01
1099179	KRCSCFPR063F	SVU92	13,25	19,70	CP..0602../CP..215...	MS1375	MS1153	FT7	KT15	0,02

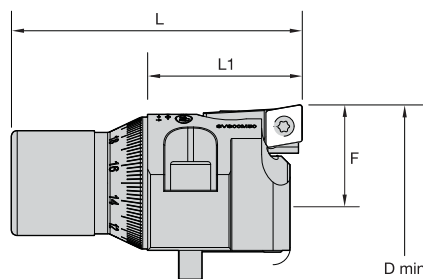
• Cartridge included.



### ■ Axial Mount Modular Unit

order number	catalogue number	D min	L mm	L1 mm	F mm	kg
2541222	KRMSVS00MF40039M	40,000	43,70	22,20	20,20	0,20
2541223	KRMSVS00MF60055M	60,000	57,70	26,00	15,55	0,25

• Cartridge included.

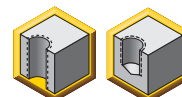
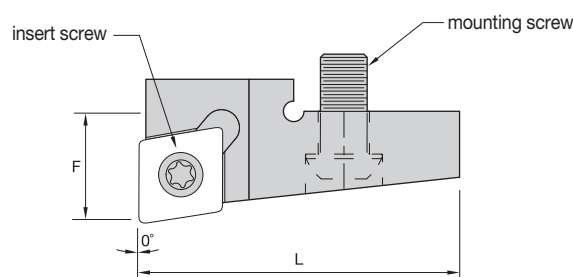


Hole Finishing

### ■ Radial Mount Modular Unit

order number	catalogue number	D min	L mm	L1 mm	F mm	kg	lbs
2541218	KRMSVS00M50049M	50,0	50,8	27,0	25,4	0,17	.40
2202444	KRMSVS00M055M	60,0	55,8	32,0	27,6	0,25	.55
2541219	KRMSVS2M100080M	100,0	80,0	47,7	48,0	0,97	2.10

• Order inserts separately.

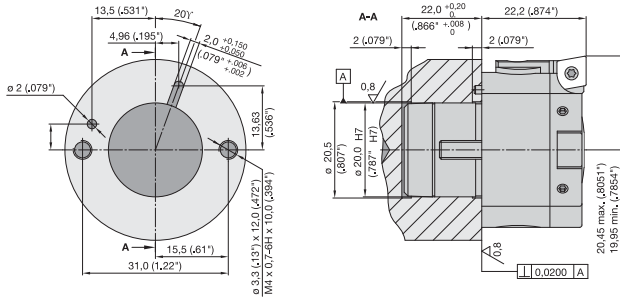


### ■ SVS • Cartridges SCF for Axial and Radial Mount Modular Units



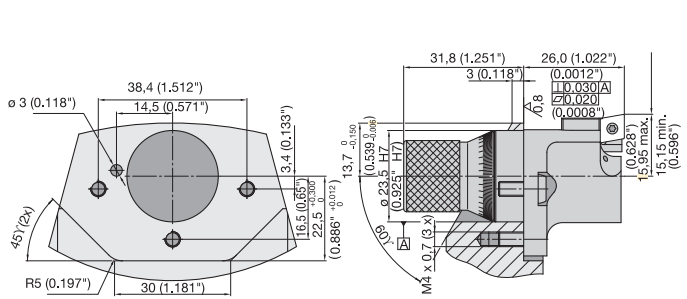
order number	catalogue number	reference head size	gage insert	mounting screw	insert screw	Torx wrench	Torx size	kg
2202449	KRCSCFPR061M	KRMSVS00MF60055M, KRMSVS00M055M, SVS00M	CP..0602../CP..215...	MS2006PKG	MS2005PKG	FT7	T7	0,02
2541220	KRCSCFPR061N	KRMSVS00M50049M	CP..0602../CP..215...	MS2006PKG	MS1153	FT7	T7	0,01
2541221	KRCSCFPR061O	KRMSVS2M100080M	CP..0602../CP..215...	MS1897	MS1153	KT27	T7	0,03
1500650	KRCSCFPR062L	KRMSVS00M50049M, SVS00B	CP..0602../CP..215...	MS2006PKG	MS2005PKG	FT7	T7	0,01

Mounting Dimensions – Axial model KRMSVS00MF40039M



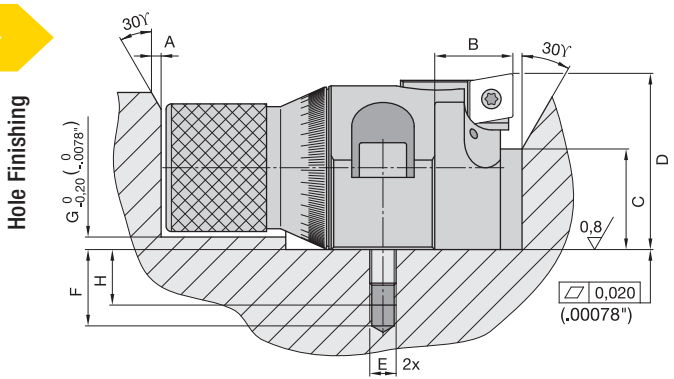
Dimensions in mm (inches)

Mounting Dimensions – Axial model KRMSVS00MF60055M

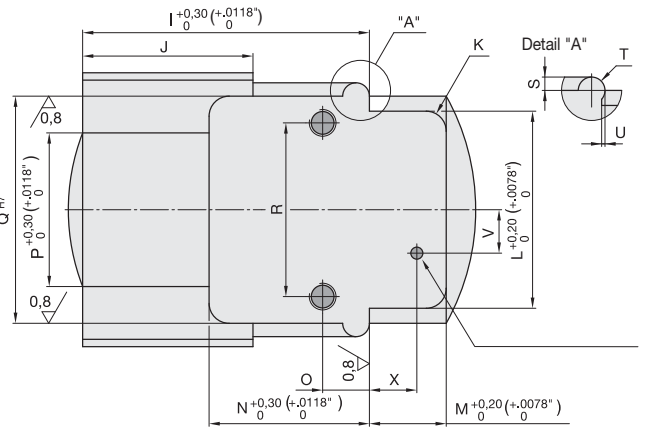


Dimensions in mm (inches)

Mounting Dimensions – Radial Models



Dimensions in mm (inches)

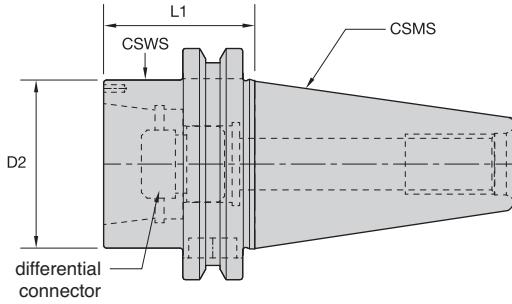


Dimensions in mm (inches)

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dimensions	KRMSVS00M50049M	KRMSVS00M055M	KRMSVS2M100080M
A	1,7	1,7	4,0
B	12,5	15,0	22,7
C	14,5	14,5	28,0
D (mean dimension)	25,4	27,6	48,0
E	M4 x 0,7	M4 x 0,7	M8 x 1,25
F	11,0	12,0	25,0
G	1,5	1,5	1,5
H	8,0	10,0	22,0
I	40,0	41,5	59,0
J	25,5	24,0	34,0
K	3,0	3,0	4,0
L	29,5	30,5	55,0
M	12,0	15,0	24,5
N	20,0	21,0	31,0
O	7,0	11,0	12,5
P	23,0	23,0	40,0
Q	34,0	40,0	65,0
R	26,0	30,5	50,0
S	2,0	1,5	4,0
T	2,0	3,0	4,0
U	0,0	0,5	0,0
V	6,5	7,0	10,5
X	7,1	10,0	15,7

• Differential connector included.



## CV to KR Adaptors AD/B



order number	catalogue number	CSMS system size	CSWS system size	D2 mm	L1 mm	differential connector	kg	reference head
3554366	CV40BKR32157	CV40	KR32	47	40	KRDCKR32M	1,08	SVS00B,0B,1B,2B,3B,SVUBB1,BB2
3554367	CV40BKR50236	CV40	KR50	65	60	KRDCKR50M	1,23	SVS4B,5B,SVU65,SVUBB2
3554368	CV50BKR32157	CV50	KR32	50	40	KRDCKR32M	3,25	SVS00B,0B,1B,2B,3B,SVUBB1,BB2
3554369	CV50BKR50157	CV50	KR50	65	40	KRDCKR50M	3,05	SVS4B,5B,SVU65,SVUBB2
3554370	CV50BKR63236	CV50	KR63	85	60	KRDCKR63M	3,50	SVS6B,7B,8B
3554371	CV50BKR80275	CV50	KR80	95	70	KRDCKR80M	4,28	SVU92,120



## DV to KR DIN 69871 AD/B



order number	catalogue number	CSMS system size	CSWS system size	D2 mm	L1 mm	differential connector	kg	reference head
1263815	DV40BKR32040M	DV40	KR32	44	40	KRDCKR32M	1,00	SVS0B, SVS2B, SVS3B
1539005	DV40BKR32041M	DV40	KR32	44	41	KRDCKR32M	1,00	SVS00B,0B,1B,2B,3B,SVUBB1,BB2
1263816	DV40BKR50060M	DV40	KR50	65	60	KRDCKR50M	1,40	SVS4B,5B,SVU65,SVUBB2
1191970	DV50BKR32040M	DV50	KR32	50	40	KRDCKR32M	2,80	SVS0B, SVS2B, SVS3B
1528328	DV50BKR32041M	DV50	KR32	50	41	KRDCKR32M	2,80	SVS00B,0B,1B,2B,3B,SVUBB1,BB2
1191971	DV50BKR50040M	DV50	KR50	65	40	KRDCKR50M	2,80	SVS4B,5B,SVU65,SVUBB2
1264135	DV50BKR63060M	DV50	KR63	85	60	KRDCKR63M	3,30	SVS6B,7B,8B
1264136	DV50BKR80070M	DV50	KR80	95	70	KRDCKR80M	4,10	SVU92,120

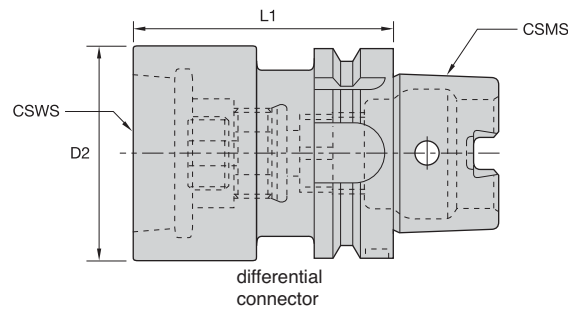
## BT to KR JIS B6339 Adaptors AD/B



order number	catalogue number	CSMS system size	CSWS system size	D2 mm	L1 mm	differential connector	kg	reference head
3554372	BT40BKR32030M	BT40	KR32	50	30	KRDCKR32M	1,20	SVS00B,0B,1B,2B,3B,SVUBB1,BB2
3554373	BT40BKR50050M	BT40	KR50	63	50	KRDCKR50M	1,26	SVS4B,5B,SVU65,SVUBB2
3554374	BT50BKR32040M	BT50	KR32	50	40	KRDCKR32M	3,90	SVS00B,0B,1B,2B,3B,SVUBB1,BB2
3554375	BT50BKR50040M	BT50	KR50	65	40	KRDCKR50M	3,17	SVS4B,5B,SVU65,SVUBB2
3554376	BT50BKR63060M	BT50	KR63	85	60	KRDCKR63M	4,31	SVS6B,7B,8B
3554377	BT50BKR80060M	BT50	KR80	95	60	KRDCKR80M	4,53	SVU92,120

Form	AD	B	CSMS	CSWS	D2	L1
Form AD						
Form B						
			40	(2x) MS2221S	2,5mm	
			50	(2x) MS1296S	3mm	

- Differential connector included.



### ■ HSK Form A to KR Adaptors

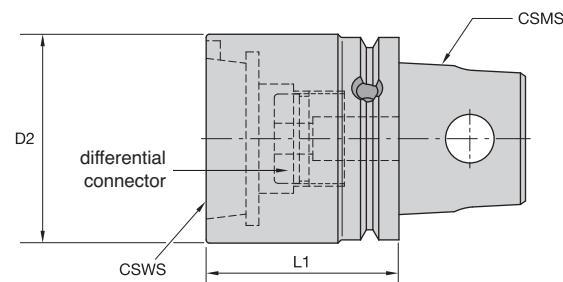


Hole Finishing

order number	catalogue number	CSMS system size	CSWS system size	D2 mm	L1 mm	differential connector	kg	reference head size
1153403	HSK63AKR32075M	HSK63A	KR32	50	75	KRDCKR32M	1,20	SVS00B,0B,1B,2B,3B,SVUBB1,BB2
1153604	HSK63AKR50080M	HSK63A	KR50	65	80	KRDCKR50M	1,60	SVS4B,5B,SVU65,SVUBB2
1153606	HSK100AKR32075M	HSK100A	KR32	50	75	KRDCKR32M	2,20	SVS00B,0B,1B,2B,3B,SVUBB1,BB2
1107188	HSK100AKR50085M	HSK100A	KR50	65	85	KRDCKR50M	3,10	SVS4B,5B,SVU65,SVUBB2
1173988	HSK100AKR63100M	HSK100A	KR63	95	90	KRDCKR63M	4,40	SVS6B,7B,8B
1153612	HSK100AKR80090M	HSK100A	KR80	50	75	KRDCKR80M	2,60	SVU92,120

NOTE: Plug may need to be removed to access the differential screw drive through the HSK taper.

- Differential connector included.

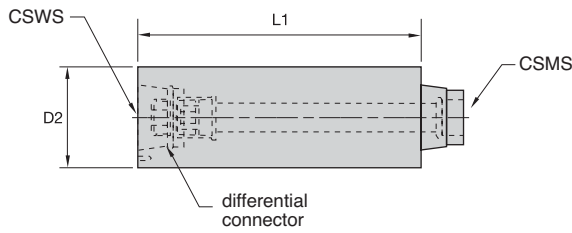


### ■ KM63XMZ to KR Adaptors



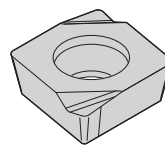
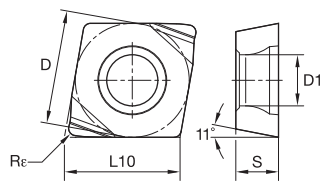
order number	catalogue number	CSMS system size	CSWS system size	D2 mm	L1 mm	differential connector	kg	reference head size
1831590	KM63XMZKR5060Y	KM63XMZ	KR50	65	60	KRDCKR50M	1,40	SVS4B,5B,SVU65,SVUBB2

- Differential connector included.



■ Length Extenders and Spare Differential Connectors

order number	catalogue number	CSWS system size	CSMS system size	D2 mm	L1 mm	kg	reference head
1279772	KR32KR32038050M	KR32	KR32	38	50	0,45	SVS00B,1B
1192275	KR32KR32038100M	KR32	KR32	38	100	0,82	SVS00B,1B
1279775	KR32KR32047050M	KR32	KR32	47	50	0,69	SVS0B,2B,3B,SVUBB1
1192276	KR32KR32047100M	KR32	KR32	47	100	1,28	SVS0B,2B,3B,SVUBB1
1279783	KR50KR50056050M	KR50	KR50	56	50	0,82	SVS4B, SVS5B, SVU65, SVUBB2
1279785	KR50KR50065050M	KR50	KR50	65	50	1,16	SVS4B,5B,SVU65,SVUBB2
1192280	KR50KR50065100M	KR50	KR50	65	100	2,25	SVS4B,5B,SVU65,SVUBB2
1279791	KR63KR63085050M	KR63	KR63	85	50	2,00	SVS6B,7B,8B
1279792	KR63KR63085100M	KR63	KR63	85	100	4,02	SVS6B,7B,8B
1279797	KR80KR80095050M	KR80	KR80	95	50	2,50	SVU92,120
1279798	KR80KR80095100M	KR80	KR80	95	100	5,00	SVU92,120



- first choice
- alternate choice

P	■	■
M	■	■
K	■	■
N	■	●
S	■	■
H	■	■

■ CPGT - FWL20

ISO catalogue number	ANSI catalogue number	D mm	D1 mm	L10 mm	S mm	Re mm	
CPGT060204FWL20	CPGT2151FWL20	6,35	2,85	6,45	2,38	0,40	● KC5410



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Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r			
		-LF	-UF	-FP	-FW	min	Starting Value	max	-LF	-UF	-FP	-FW
P	1	KCP05				180	435	495	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—
		—	—	KTP10	—	180	435	495	—	—	0,06 - 0,25	—
		KT315	—	—	KT315	180	400	495	0,06 - 0,25	—	—	0,08 - 0,30
		KCP10				180	395	465	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—
		KC9110	—	—	—	180	395	495	0,06 - 0,25	0,04 - 0,16	—	—
		KCP25				140	280	360	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16
	KC9125				140	280	360	0,06 - 0,10	0,04 - 0,08	—	—	—
	2	KCP05				180	265	400	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—
		—	—	KTP10	—	180	265	400	—	—	0,06 - 0,25	—
		KT315	—	—	KT315	190	270	390	0,06 - 0,25	—	—	0,08 - 0,30
		KCP10				180	240	330	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—
		KC9110	—	—	—	180	240	330	0,06 - 0,25	0,04 - 0,16	—	—
		KCP25				145	195	320	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16
	KC9125				145	195	320	0,06 - 0,10	0,04 - 0,08	—	—	—
	3	KCP05				180	205	275	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—
		—	—	KTP10	—	180	205	275	—	—	0,06 - 0,25	—
		KT315	—	—	KT315	180	210	275	0,06 - 0,25	—	—	0,08 - 0,30
		KCP10				160	190	250	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—
		KC9110	—	—	—	155	190	240	0,06 - 0,25	0,04 - 0,16	—	—
		KCP25				135	155	225	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16
	KC9125				135	155	225	0,06 - 0,10	0,04 - 0,08	—	—	—
	4	KCP05				90	160	220	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—
		—	—	KTP10	—	90	160	220	—	—	0,06 - 0,25	—
		KT315	—	—	KT315	90	180	220	0,06 - 0,25	—	—	0,08 - 0,30
KCP10				90	145	195	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—		
KC9110		—	—	—	90	145	195	0,06 - 0,25	0,04 - 0,16	—	—	
KCP25				75	105	180	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16		
KC9125				75	105	180	0,06 - 0,10	0,04 - 0,08	—	—	—	
5	KCP05				150	240	315	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
	—	—	KTP10	—	150	240	315	—	—	0,06 - 0,25	—	
	KT315	—	—	KT315	150	250	315	0,06 - 0,25	—	—	0,08 - 0,30	
	KCP10				150	215	300	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
	KC9110	—	—	—	150	215	300	0,06 - 0,25	0,04 - 0,16	—	—	
	KCP25				120	195	255	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16	
KC9125				120	195	255	0,06 - 0,10	0,04 - 0,08	—	—	—	
6	KCP05				140	200	300	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
	—	—	KTP10	—	140	200	300	—	—	0,06 - 0,25	—	
	KT315	—	—	KT315	140	200	300	0,06 - 0,25	—	—	0,08 - 0,30	
	KCP10				120	180	275	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
	KC9110	—	—	—	120	180	225	0,06 - 0,25	0,04 - 0,16	—	—	
	KCP25				105	150	225	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16	
KC9125				105	150	225	0,06 - 0,10	0,04 - 0,08	—	—	—	

Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r			
		-LF	-UF	-FP	-FW	min	Starting Value	max	-LF	-UF	-FP	-FW
M	1	—	—	KTP10	—	140	230	315	—	—	0,06 - 0,25	—
		KT315	—	—	KT315	140	230	315	0,06 - 0,25	—	—	0,08 - 0,30
		KC5010	—	—	KC5010	130	215	245	0,06 - 0,25	—	—	0,08 - 0,30
		KCM15	—	KCM15	—	105	180	240	0,06 - 0,12	—	0,06 - 0,12	—
	2	KC9225	—	—	KC9225	105	180	240	0,06 - 0,12	—	—	0,08 - 0,16
		—	—	KTP10	—	140	215	295	—	—	0,06 - 0,25	—
		KT315	—	—	KT315	140	215	295	0,06 - 0,25	—	—	0,08 - 0,30
		KC5010	—	—	KC5010	130	200	245	0,06 - 0,25	—	—	0,08 - 0,30
	3	KCM15	—	KCM15	—	105	165	250	0,06 - 0,12	—	0,06 - 0,12	—
		KC9225	—	—	KC9225	100	160	230	0,06 - 0,12	—	—	0,08 - 0,16
		—	—	KTP10	—	140	200	300	—	—	0,06 - 0,25	—
		KT315	—	—	KT315	140	200	300	0,06 - 0,25	—	—	0,08 - 0,30
3	KC5010	—	—	KC5010	130	185	230	0,06 - 0,25	—	—	0,08 - 0,30	
	KCM15	—	KCM15	—	115	150	255	0,06 - 0,12	—	0,06 - 0,12	—	
3	KC9225	—	—	KC9225	110	150	230	0,06 - 0,12	—	—	0,08 - 0,16	

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Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r				
		-LF	-UF	-FP	-FW	min	Starting Value	max	-LF	-UF	-FP	-FW	
K	1		KCK20	—	KCK20		200	300	540	0,06 - 0,25	—	0,06 - 0,25	0,08 - 0,30
			KT315	—	—	KT315	165	275	490	0,06 - 0,25	—	—	0,08 - 0,30
			KC9315	—	—	—	110	275	450	0,06 - 0,25	—	—	—
	2		KCK20	—	KCK20		150	240	420	0,06 - 0,25	—	0,06 - 0,25	0,08 - 0,30
			KT315	—	—	KT315	180	275	360	0,06 - 0,25	—	—	0,08 - 0,30
			KC5010	—	—	KC5010	100	200	265	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
			KC9315	—	—	—	145	260	360	0,06 - 0,25	—	—	—
			KC9320	—	—	—	140	240	330	0,06 - 0,12	—	—	—
	3		KCK20	—	KCK20		140	210	350	0,06 - 0,25	—	0,06 - 0,25	0,08 - 0,30
			KT315	—	—	KT315	180	230	320	0,06 - 0,25	—	—	0,08 - 0,30
			KC5010	—	—	KC5010	120	150	225	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
			KC9315	—	—	—	145	215	275	0,06 - 0,25	—	—	—
KC9320			—	—	—	140	210	260	0,06 - 0,12	—	—	—	

Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r				
		-LF	-FWL20	—	—	min	Starting Value	max	-LF	-FWL20	—	—	
N	1		KC5410	—	—	200	550	1000	0,10 - 0,40	0,20 - 0,50	—	—	
			KC5410	—	—	200	550	1000	0,10 - 0,20	—	—	—	
			—	—	KD1400	—	450	765	3000	—	—	0,06 - 0,15	—
	2		—	—	KD1425	—	375	580	1150	—	—	0,06 - 0,25	—
			—	—	KD1400	—	400	650	1250	—	—	0,06 - 0,15	—
	3		KC5410	—	—	125	275	525	0,10 - 0,40	0,20 - 0,50	—	—	
			—	—	KD1425	—	250	500	875	—	—	0,06 - 0,25	—
			KC5410	—	—	125	275	525	0,10 - 0,20	—	—	—	
	5		—	—	KD1400	—	375	520	1000	—	—	0,06 - 0,12	—
			KC5410	—	—	—	125	200	375	0,10 - 0,40	—	—	—
		KC5410	—	—	—	125	200	375	0,10 - 0,20	—	—	—	
		—	—	—	—	125	200	375	0,10 - 0,20	—	—	—	

Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r				
		-LF	-UF	-FP	-FW	min	Starting Value	max	-LF	-UF	-FP	-FW	
S	1		—	—	KCU10	—	30	55	125	—	—	0,06 - 0,25	—
			K313	—	—	—	10	30	60	0,06 - 0,25	—	—	—
			KC5010	—	—	KC5010	30	55	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
			—	—	KCU10	—	30	55	125	—	—	0,06 - 0,25	—
			KC5010	—	—	KC5010	30	55	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
			—	—	KCU25	—	10	40	50	—	—	0,06 - 0,12	—
	2		KC5025	—	—	—	10	40	50	0,06 - 0,10	—	—	—
			—	—	KCU10	—	30	35	125	—	—	0,06 - 0,25	—
			K313	—	—	—	10	35	60	0,06 - 0,25	—	—	—
			KC5010	—	—	KC5010	30	60	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
			—	—	KCU10	—	30	35	125	—	—	0,06 - 0,25	—
			KC5010	—	—	KC5010	30	60	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
	3		—	—	KCU25	—	10	30	50	—	—	0,06 - 0,12	—
			KC5025	—	—	—	10	30	50	0,06 - 0,10	—	—	—
			—	—	KCU10	—	30	70	125	—	—	0,06 - 0,25	—
			K313	—	—	—	10	40	60	0,06 - 0,25	—	—	—
			KC5010	—	—	KC5010	30	70	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
			—	—	KCU10	—	30	35	125	—	—	0,06 - 0,25	—
	4		KC5010	—	—	KC5010	30	70	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
			—	—	KCU25	—	25	40	60	—	—	0,06 - 0,12	—
			KC5025	—	—	—	25	40	60	0,06 - 0,10	—	—	—
			—	—	KCU10	—	45	70	140	—	—	0,06 - 0,25	—
			K313	—	—	—	15	45	65	0,06 - 0,25	—	—	—
			KC5010	—	—	KC5010	45	70	140	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
	—	—	KCU10	—	45	70	140	—	—	0,06 - 0,25	—		
	KC5010	—	—	KC5010	45	70	140	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30		
	—	—	KCU25	—	25	55	90	—	—	0,06 - 0,12	—		
	KC5025	—	—	—	15	55	90	0,06 - 0,10	—	—	—		



Hole Finishing

## Romicron Assembly Instructions

The required parts for the adaptor assembly are identified on Figures 1 and 2. The SVS model is shown. The instructions are also valid to the SVU and SVUBB models

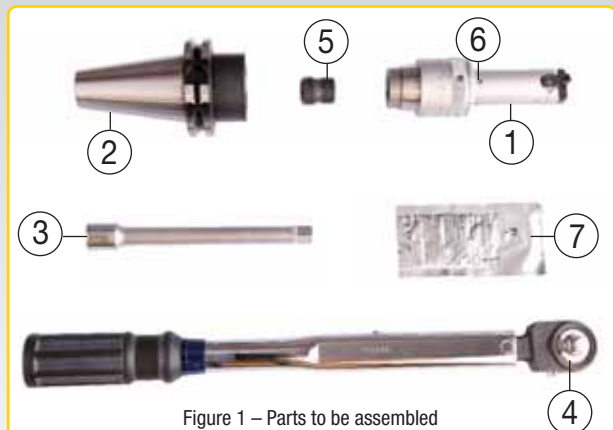


Figure 1 – Parts to be assembled

1	Boring head
2	Taper shank
3	Square extension (3/8" or 1/2")
4	Torque wrench
5	Differential connector
6	Positioning pin
7	Lubricant ASL-3G

**WARNING:**

Before starting the assembly procedure, ensure that all surfaces to be assembled together are free of dirt and completely clean.



Figure 2 – Assembled Tool



A. Remove the Differential Connector (5) from the Taper Shank (2).



B. Lubricate the thread on the Differential Connector (5) with Lubricant ASL-3G (7), supplied with the Taper Shank (2).



C. Screw the Differential Connector (5) into the rear thread on the Boring Head (1) until the end of the thread. At this time it is not necessary to tighten the Differential Connector (5). Remember that the Differential Connector (5) has two different screws, so there is no way to assemble the wrong side

## Romicron Assembly Instructions



D. Screw the front end of the Taper Shank (2) onto the Differential Connector (5), now located at the back on the Boring Head (1). Screw carefully until the Positioning Pin (6) gently touches the Taper (2) face. Stop!



F. Insert the square end of the Extension (3) through the Taper Shank (2) and into the Differential Connector (5). Keeping the Positioning Pin (6) and the positioning slot aligned, turn the Extensions (3) counter-clockwise until you see that two Romicron faces are meshing. Ensure that the Positioning Pin (6) is inserted into the slot on the Taper Shank (2).



E. Unscrew the Taper Shank (2) a little bit until the Positioning Pin (6) is aligned with the positioning slot mark in the Taper Shank (2) face.



G. Tighten the Differential Connector (5) with the specified required torque, as shown on the table below. Use the Torque Wrench (4) to do this.

### Tightening Torque Specifications

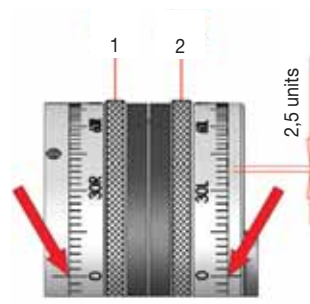
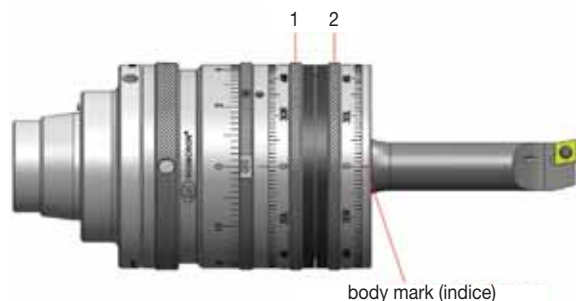
joint size	Torque Nm	drive square
KR32	30	3/8"
KR50	40	3/8"
KR63	55	1/2"
KR80	65	1/2"

Following these procedures will result in a rigid surface contact between the taper and the boring head face.

1. The balancing dials are identified on the figure below.

2. Ensure that the zero mark of dial 02 is coincident with Romicron Body Mark, and the zero mark 01 is coincident with the zero mark on dial 02.

3. Read the position values of the dials 01 and 02 on the table. For example, to machine a 10mm diameter, the positions are 01 = 24R and 02 = 22R.



### Balancing Table • SVU-BB1 Boring Head

Hole Finishing

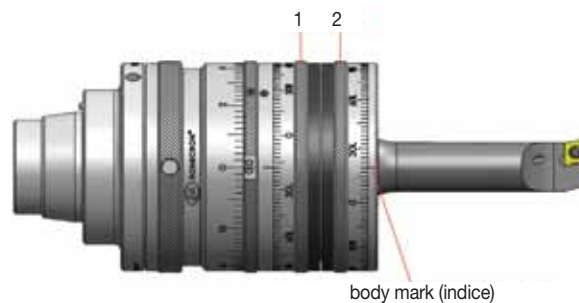
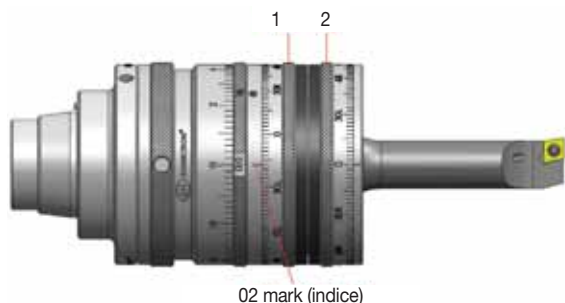
KRBB10FABDRS204C 4-6,4mm				KRBB10SCLDR4060C 6-9mm				KRBB10SCFPR06085C 8,5-11,5mm						
diameter mm	ring 1		ring 2	diameter mm	ring 1		ring 2	diameter mm	ring 1		ring 2			
4	40	L	58	L	6	34	L	66	L	8,5	34	L	66	L
4,1	42	L	58	L	6,1	36	L	66	L	8,6	36	L	68	L
4,2	42	L	54	L	6,2	36	L	64	L	8,7	36	L	64	L
4,3	44	L	54	L	6,3	38	L	62	L	8,8	38	L	62	L
4,4	44	L	50	L	6,4	38	L	62	L	8,9	36	L	60	L
4,5	46	L	50	L	6,5	40	L	60	L	9	40	L	60	L
4,6	46	L	48	L	6,6	40	L	58	L	9,1	40	L	58	L
4,7	46	L	46	L	6,7	40	L	56	L	9,2	42	L	56	L
4,8	46	L	42	L	6,8	40	L	54	L	9,3	40	L	54	L
4,9	46	L	40	L	6,9	42	L	52	L	9,4	42	L	52	L
5	22	R	20	R	7	42	L	54	L	9,5	42	L	50	L
5,1	32	R	26	R	7,1	54	R	60	R	9,6	40	L	46	L
5,2	40	R	32	R	7,2	54	R	60	R	9,7	38	L	42	L
5,3	44	R	34	R	7,3	60	R	60	R	9,8	30	L	32	L
5,4	48	R	36	R	7,4	70	R	72	R	9,9	24	R	22	R
5,5	50	R	36	R	7,5	42	R	40	R	10	24	R	22	R
5,6	52	R	34	R	7,6	48	R	44	R	10,1	26	R	22	R
5,7	54	R	34	R	7,7	50	R	42	R	10,2	44	R	38	R
5,8	56	R	32	R	7,8	50	R	42	R	10,3	48	R	38	R
5,9	58	R	32	R	7,9	52	R	40	R	10,4	52	R	38	R
6	60	R	30	R	8	54	R	40	R	10,5	52	R	38	R
6,1	62	R	30	R	8,1	54	R	38	R	10,6	56	R	36	R
6,2	64	R	28	R	8,2	56	R	38	R	10,7	56	R	36	R
6,3	66	R	28	R	8,3	58	R	36	R	10,8	58	R	34	R
6,4	68	R	24	R	8,4	58	R	34	R	10,9	58	R	32	R
—	—	—	—	—	8,5	60	R	36	R	11	62	R	32	R
—	—	—	—	—	8,6	62	R	34	R	11,1	60	R	30	R
—	—	—	—	—	8,7	62	R	32	R	11,2	62	R	28	R
—	—	—	—	—	8,8	62	R	32	R	11,3	62	R	28	R
—	—	—	—	—	8,9	66	R	28	R	11,4	68	R	26	R
—	—	—	—	—	9	66	R	28	R	11,5	68	R	26	R

(continued)

(Balancing Table • SVU-BB1 Boring Head continued)

4. The dial 01 must be positioned first. Moving the dial, adjust the position of dial 01. Use the mark reference located on dial 02. The dial resolution is 2 units of table values.

5. Now adjust the position for dial 02. Use the mark reference located on the Romicron body. After the adjustment of dial 02, the Romicron is correctly balanced.



KRBB10SCFPR06110C 11–14mm				KRBB10SCFPR06135C 13,5–16,5mm					
diameter mm	ring 1		ring 2	diameter mm	ring 1		ring 2		
11	32	L	66	L	13,5	34	L	62	L
11,1	34	L	64	L	13,6	36	L	60	L
11,2	34	L	62	L	13,7	38	L	58	L
11,3	36	L	60	L	13,8	38	L	56	L
11,4	36	L	58	L	13,9	40	L	56	L
11,5	38	L	58	L	14	42	L	44	L
11,6	38	L	56	L	14,1	42	L	52	L
11,7	40	L	54	L	14,2	44	L	50	L
11,8	40	L	52	L	14,3	42	L	46	L
11,9	40	L	52	L	14,4	34	L	36	L
12	38	L	46	L	14,5	18	L	20	L
12,1	34	L	42	L	14,6	10	R	6	R
12,2	26	L	30	L	14,7	18	R	10	R
12,3	24	R	22	R	14,8	40	R	30	R
12,4	28	L	26	L	14,9	44	R	32	R
12,5	44	L	38	R	15	48	R	34	R
12,6	44	R	36	R	15,1	48	R	32	R
12,7	50	R	40	R	15,2	50	R	30	R
12,8	50	R	38	R	15,3	52	R	30	R
12,9	52	R	36	R	15,4	56	R	32	R
13	52	R	36	R	15,5	54	R	28	R
13,1	54	R	34	R	15,6	58	R	28	R
13,2	54	R	32	R	15,7	60	R	26	R
13,3	56	R	32	R	15,8	64	R	26	R
13,4	56	R	30	R	15,9	64	R	26	R
13,5	60	R	28	R	16	66	R	24	R
13,6	60	R	28	R	16,1	66	R	22	R
13,7	62	R	26	R	16,2	70	R	20	R
13,8	64	R	26	R	16,3	74	R	18	R
13,9	68	R	24	R	16,4	76	R	16	R
14	68	R	24	R	16,5	78	R	14	R

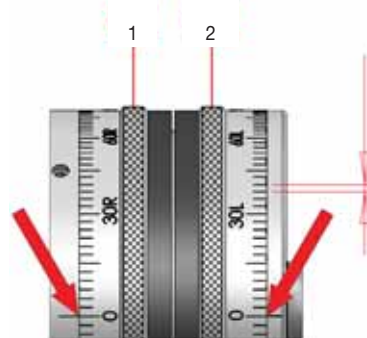
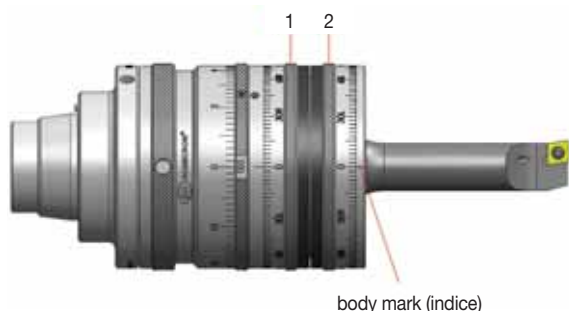


Hole Finishing

1. The balancing dials are identified on the figure below.

2. Ensure that the zero mark of dial O2 is coincident with Romicon Body Mark, and the zero mark dial O1 is coincident with the zero mark on dial O2.

3. Read the position values of the dials O1 and O2 on the table. For example, to machine a 10mm diameter, the positions are O1 = 17L and O2 = 20LR.



### Balancing Table • SVU-BB2 Boring Head

Hole Finishing

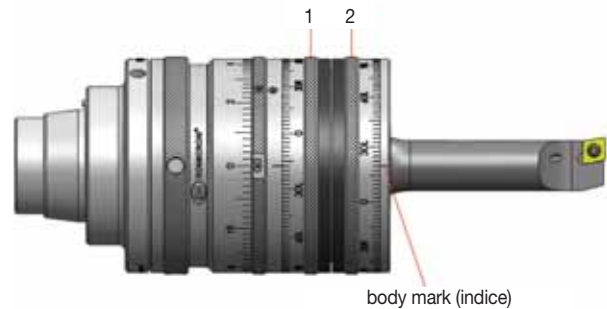
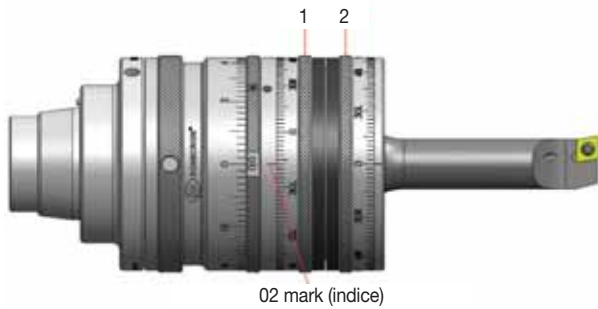
KRBB16SCLDRS406A 6–9,5mm				KRBB16SCFPR06085A 8,5–12mm				KRBB16SCFPR0611A 11–14,5mm				KRBB16SCFPR06135A 13,5–17mm			
diameter	ring 1		ring 2		diameter	ring 1		ring 2		diameter	ring 1		ring 2		
mm					mm					mm					
6	67.5	L	67.5	L	8,5	67.5	L	67.5	L	11	67.5	L	70	L	
6,1	62.5	L	62.5	L	8,6	62.5	L	62.5	L	11,1	60	L	62.5	L	
6,2	57.5	L	57.5	L	8,7	57.5	L	57.5	L	11,2	57.5	L	60	L	
6,3	55	L	55	L	8,8	52.5	L	55	L	11,3	52.5	L	55	L	
6,4	50	L	50	L	8,9	50	L	50	L	11,4	47.5	L	50	L	
6,5	47.5	L	47.5	L	9	47.5	L	47.5	L	11,5	45	L	47.5	L	
6,6	45	L	45	L	9,1	42.5	L	45	L	11,6	42.5	L	45	L	
6,7	40	L	40	L	9,2	40	L	40	L	11,7	37.5	L	42.5	L	
6,8	37.5	L	37.5	L	9,3	37.5	L	37.5	L	11,8	35	L	37.5	L	
6,9	35	L	35	L	9,4	35	L	35	L	11,9	32.5	L	35	L	
7	32.5	L	32.5	L	9,5	30	L	32.5	L	12	30	L	32.5	L	
7,1	30	L	30	L	9,6	27.5	L	30	L	12,1	27.5	L	30	L	
7,2	27.5	L	27.5	L	9,7	25	L	27.5	L	12,2	25	L	27.5	L	
7,3	25	L	25	L	9,8	22.5	L	25	L	12,3	22.5	L	25	L	
7,4	22.5	L	22.5	L	9,9	20	L	22.5	L	12,4	17.5	L	25	L	
7,5	20	L	20	L	10	17.5	L	20	L	12,5	15	L	22.5	L	
7,6	17.5	L	17.5	L	10,1	15	L	17.5	L	12,6	12.5	L	20	L	
7,7	15	L	15	L	10,2	12.5	L	15	L	12,7	10	L	17.5	L	
7,8	12.5	L	12.5	L	10,3	10	L	15	L	12,8	5	L	17.5	L	
7,9	10	L	12.5	L	10,4	7.5	L	12.5	L	12,9	2.5	L	15	L	
8	7.5	L	10	L	10,5	5	L	10	L	13	2.5	R	15	L	
8,1	5	L	7.5	L	10,6	0	L	10	L	13,1	10	R	17.5	L	
8,2	2.5	L	5	L	10,7	5	R	10	L	13,2	25	R	30	L	
8,3	2.5	R	5	L	10,8	45	R	45	L	13,3	62.5	L	65	R	
8,4	10	L	12.5	R	10,9	10	L	15	R	13,4	17.5	L	22.5	R	
8,5	0	R	5	R	11	2.5	L	10	R	13,5	5	L	15	R	
8,6	2.5	R	7.5	R	11,1	2.5	R	10	R	13,6	0	R	15	R	
8,7	7.5	R	7.5	R	11,2	5	R	12.5	R	13,7	5	R	15	R	
8,8	10	R	10	R	11,3	10	R	12.5	R	13,8	7.5	R	17.5	R	
8,9	12.5	R	12.5	R	11,4	12.5	R	15	R	13,9	10	R	20	R	
9	12.5	R	15	R	11,5	15	R	17.5	R	14	15	R	20	R	
9,1	15	R	17.5	R	11,6	17.5	R	20	R	14,1	17.5	R	22.5	R	
9,2	17.5	R	20	R	11,7	20	R	22.5	R	14,2	20	R	25	R	
9,3	20	R	22.5	R	11,8	22.5	R	25	R	14,3	22.5	R	27.5	R	
9,4	22.5	R	25	R	11,9	25	R	27.5	R	14,4	25	R	30	R	
9,5	25	R	27.5	R	12	27.5	R	30	R	14,5	27.5	R	32.5	R	

(continued)

(Balancing Table • SVU-BB2 Boring Head continued)

4. The dial 01 must be positioned first. Moving the dial, adjust the position of dial 01. Use the mark reference located on dial 02. The dial resolution is 2 units of table values.

5. Now adjust the position for dial 02. Use the mark reference located on the Romicron body. After the adjustment of dial 02, the Romicron is correctly balanced.



KRBB16SCFPR0616A 16–19,5mm				KRBB16SCFPR0619A 19–22,5mm				KRBB16SCFPR0622A 22–25,5mm			
diameter	ring 1		ring 2	diameter	ring 1		ring 2	diameter	ring 1		ring 2
mm		L		mm		L		mm		L	
16	65	L	72.5	19	60	L	75	22	57.5	L	80
16,1	57.5	L	65	19,1	55	L	70	22,1	50	L	72.5
16,2	52.5	L	62.5	19,2	50	L	65	22,2	45	L	70
16,3	47.5	L	57.5	19,3	45	L	60	22,3	37.5	L	65
16,4	42.5	L	52.5	19,4	40	L	57.5	22,4	32.5	L	62.5
16,5	40	L	50	19,5	35	L	52.5	22,5	27.5	L	60
16,6	35	L	47.5	19,6	30	L	50	22,6	22.5	L	57.5
16,7	32.5	L	45	19,7	27.5	L	47.5	22,7	20	L	55
16,8	27.5	L	42.5	19,8	22.5	L	45	22,8	15	L	52.5
16,9	25	L	40	19,9	20	L	42.5	22,9	10	L	52.5
17	20	L	37.5	20	15	L	42.5	23	5	L	50
17,1	17.5	L	35	20,1	10	L	40	23,1	0	R	50
17,2	12.5	L	32.5	20,2	5	L	40	23,2	7.5	R	52.5
17,3	10	L	30	20,3	0	L	40	23,3	12.5	R	52.5
17,4	5	L	30	20,4	5	R	40	23,4	20	R	55
17,5	0	L	30	20,5	10	R	40	23,5	30	R	60
17,6	5	R	30	20,6	17.5	R	42.5	23,6	40	R	65
17,7	12.5	R	32.5	20,7	27.5	R	47.5	23,7	52.5	R	75
17,8	22.5	R	37.5	20,8	40	R	57.5	23,8	67.5	R	90
17,9	35	R	47.5	20,9	57.5	R	72.5	23,9	77.5	L	97.5
18	60	R	67.5	21	80	R	92.5	24	60	L	82.5
18,1	75	L	82.5	21,1	65	L	77.5	24,1	47.5	L	72.5
18,2	45	L	55	21,2	45	L	60	24,2	35	L	62.5
18,3	25	L	40	21,3	30	L	50	24,3	25	L	57.5
18,4	15	L	32.5	21,4	20	L	45	24,4	17.5	L	55
18,5	7.5	L	30	21,5	12.5	L	40	24,5	10	L	52.5
18,6	2.5	L	30	21,6	5	L	40	24,6	5	L	50
18,7	2.5	R	30	21,7	0	L	40	24,7	2.5	R	50
18,8	7.5	R	30	21,8	5	R	40	24,8	7.5	R	50
18,9	12.5	R	32.5	21,9	10	R	40	24,9	12.5	R	52.5
19	15	R	35	22	12.5	R	42.5	25	17.5	R	52.5
19,1	20	R	35	22,1	17.5	R	42.5	25,1	20	R	55
19,2	22.5	R	37.5	22,2	22.5	R	45	25,2	25	R	57.5
19,3	27.5	R	40	22,3	25	R	47.5	25,3	30	R	60
19,4	30	R	42.5	22,4	30	R	50	25,4	35	R	62.5
19,5	35	R	45	22,5	35	R	52.5	25,5	40	R	67.5

(continued)



(Balancing Table • Universal Applications SVU-BB2 Boring Head continued)

**KRDEA046AM • KRDE025010M 25,5–34,4mm**

diameter mm	ring 1		ring 2		diameter mm	ring 1		ring 2		diameter mm	ring 1		ring 2	
25,5	62,5	L	65	L	28,5	57,5	L	60	L	31,5	52,5	L	55	L
25,6	57,5	L	60	L	28,6	52,5	L	55	L	31,6	47,5	L	50	L
25,7	50	L	52,5	L	28,7	45	L	50	L	31,7	42,5	L	45	L
25,8	45	L	47,5	L	28,8	40	L	45	L	31,8	37,5	L	42,5	L
25,9	40	L	45	L	28,9	37,5	L	40	L	31,9	32,5	L	37,5	L
26,0	35	L	40	L	29,0	32,5	L	37,5	L	32,0	27,5	L	35	L
26,1	32,5	L	35	L	29,1	27,5	L	32,5	L	32,1	25	L	30	L
26,2	27,5	L	32,5	L	29,2	25	L	30	L	32,2	20	L	27,5	L
26,3	22,5	L	30	L	29,3	20	L	27,5	L	32,3	17,5	L	22,5	L
26,4	20	L	25	L	29,4	15	L	25	L	32,4	12,5	L	22,5	L
26,5	62,5	L	65	L	29,5	55	L	57,5	L	32,5	50	L	55	L
26,6	55	L	57,5	L	29,6	50	L	52,5	L	32,6	45	L	50	L
26,7	50	L	52,5	L	29,7	45	L	47,5	L	32,7	40	L	45	L
26,8	45	L	47,5	L	29,8	40	L	45	L	32,8	37,5	L	40	L
26,9	40	L	42,5	L	29,9	35	L	40	L	32,9	32,5	L	37,5	L
27,0	35	L	40	L	30,0	32,5	L	35	L	33,0	27,5	L	32,5	L
27,1	30	L	35	L	30,1	27,5	L	32,5	L	33,1	22,5	L	30	L
27,2	25	L	32,5	L	30,2	22,5	L	30	L	33,2	20	L	25	L
27,3	22,5	L	27,5	L	30,3	20	L	25	L	33,3	15	L	22,5	L
27,4	17,5	L	25	L	30,4	15	L	22,5	L	33,4	12,5	L	20	L
27,5	60	L	62,5	L	30,5	55	L	57,5	L	33,5	50	L	52,5	L
27,6	52,5	L	55	L	30,6	47,5	L	52,5	L	33,6	45	L	47,5	L
27,7	47,5	L	50	L	30,7	42,5	L	47,5	L	33,7	40	L	42,5	L
27,8	42,5	L	45	L	30,8	37,5	L	42,5	L	33,8	35	L	40	L
27,9	37,5	L	42,5	L	30,9	35	L	37,5	L	33,9	30	L	35	L
28,0	32,5	L	37,5	L	31,0	30	L	35	L	34,0	27,5	L	32,5	L
28,1	30	L	35	L	31,1	25	L	32,5	L	34,1	22,5	L	27,5	L
28,2	25	L	30	L	31,2	22,5	L	27,5	L	34,2	20	L	25	L
28,3	20	L	27,5	L	31,3	17,5	L	25	L	34,3	15	L	22,5	L
28,4	17,5	L	25	L	31,4	12,5	L	22,5	L	34,4	10	L	20	L

**KRDEA046AM • KRDE033010M 33,5–44,4mm**

diameter mm	ring 1		ring 2		diameter mm	ring 1		ring 2		diameter mm	ring 1		ring 2	
33,5	55	L	57,5	L	36,5	47,5	L	52,5	L	39,5	42,5	L	47,5	L
33,6	50	L	52,5	L	36,6	42,5	L	47,5	L	39,6	37,5	L	42,5	L
33,7	45	L	47,5	L	36,7	37,5	L	42,5	L	39,7	32,5	L	37,5	L
33,8	40	L	42,5	L	36,8	35	L	37,5	L	39,8	27,5	L	35	L
33,9	35	L	40	L	36,9	30	L	35	L	39,9	25	L	30	L
34,0	30	L	35	L	37,0	25	L	32,5	L	40,0	20	L	27,5	L
34,1	25	L	32,5	L	37,1	22,5	L	27,5	L	40,1	15	L	25	L
34,2	22,5	L	27,5	L	37,2	17,5	L	25	L	40,2	10	L	22,5	L
34,3	17,5	L	25	L	37,3	12,5	L	22,5	L	40,3	7,5	L	20	L
34,4	12,5	L	22,5	L	37,4	7,5	L	20	L	40,4	2,5	L	17,5	L
34,5	52,5	L	57,5	L	37,5	47,5	L	50	L	40,5	40	L	45	L
34,6	47,5	L	50	L	37,6	42,5	L	45	L	40,6	35	L	40	L
34,7	42,5	L	47,5	L	37,7	37,5	L	40	L	40,7	30	L	37,5	L
34,8	37,5	L	42,5	L	37,8	32,5	L	37,5	L	40,8	27,5	L	32,5	L
34,9	32,5	L	37,5	L	37,9	27,5	L	35	L	40,9	22,5	L	30	L
35,0	27,5	L	35	L	38,0	25	L	30	L	41,0	17,5	L	27,5	L
35,1	25	L	30	L	38,1	20	L	27,5	L	41,1	15	L	22,5	L
35,2	20	L	27,5	L	38,2	15	L	25	L	41,2	10	L	20	L
35,3	15	L	25	L	38,3	10	L	22,5	L	41,3	5	L	20	L
35,4	10	L	22,5	L	38,4	5	L	20	L	41,4	0	R	17,5	L
35,5	50	L	55	L	38,5	45	L	47,5	L	41,5	37,5	L	42,5	L
35,6	45	L	50	L	38,6	40	L	42,5	L	41,6	35	L	37,5	L
35,7	40	L	45	L	38,7	35	L	40	L	41,7	30	L	35	L
35,8	35	L	40	L	38,8	30	L	35	L	41,8	25	L	32,5	L
35,9	30	L	37,5	L	38,9	25	L	32,5	L	41,9	22,5	L	27,5	L
36,0	27,5	L	32,5	L	39,0	22,5	L	27,5	L	42,0	17,5	L	25	L
36,1	22,5	L	30	L	39,1	17,5	L	25	L	42,1	12,5	L	22,5	L
36,2	17,5	L	27,5	L	39,2	15	L	22,5	L	42,2	7,5	L	20	L
36,3	15	L	22,5	L	39,3	10	L	20	L	42,3	2,5	L	17,5	L
36,4	10	L	20	L	39,4	5	L	17,5	L	42,4	5	R	20	L

(continued)

(Balancing Table • Universal Applications SVU-BB2 Boring Head continued)

**KRDEA051AM • KRDE043010M 43–65,9mm**

diameter mm	ring 1	ring 2	diameter mm	ring 1	ring 2	diameter mm	ring 1	ring 2	diameter mm	ring 1	ring 2								
43,0	55	L	65	L	46,0	42.5	L	55	L	49,0	32.5	L	47.5	L	52,0	25	L	40	L
43,1	47.5	L	57.5	L	46,1	37.5	L	50	L	49,1	27.5	L	42.5	L	52,1	20	L	37.5	L
43,2	40	L	52.5	L	46,2	30	L	45	L	49,2	22.5	L	40	L	52,2	12.5	L	35	L
43,3	35	L	47.5	L	46,3	25	L	42.5	L	49,3	17.5	L	35	L	52,3	7.5	L	32.5	L
43,4	30	L	42.5	L	46,4	20	L	37.5	L	49,4	12.5	L	32.5	L	52,4	0	L	32.5	L
43,5	22.5	L	40	L	46,5	15	L	35	L	49,5	5	L	32.5	L	52,5	7.5	R	32.5	L
43,6	17.5	L	37.5	L	46,6	7.5	L	32.5	L	49,6	2.5	R	32.5	L	52,6	20	R	37.5	L
43,7	12.5	L	32.5	L	46,7	2.5	L	30	L	49,7	12.5	R	35	L	52,7	42.5	R	52.5	L
43,8	5	L	32.5	L	46,8	7.5	R	32.5	L	49,8	27.5	R	42.5	L	52,8	85	L	92.5	R
43,9	2.5	R	32.5	L	46,9	17.5	R	35	L	49,9	60	R	70	L	52,9	40	L	52.5	R
44,0	50	L	60	L	47,0	40	L	52.5	L	50,0	30	L	45	L	53,0	22.5	L	37.5	L
44,1	42.5	L	55	L	47,1	35	L	47.5	L	50,1	25	L	40	L	53,1	17.5	L	35	L
44,2	37.5	L	50	L	47,2	27.5	L	42.5	L	50,2	20	L	37.5	L	53,2	10	L	32.5	L
44,3	32.5	L	45	L	47,3	22.5	L	40	L	50,3	12.5	L	35	L	53,3	2.5	L	32.5	L
44,4	25	L	42.5	L	47,4	17.5	L	35	L	50,4	7.5	L	32.5	L	53,4	5	R	32.5	L
44,5	20	L	37.5	L	47,5	12.5	L	32.5	L	50,5	0	L	32.5	L	53,5	15	R	35	L
44,6	15	L	35	L	47,6	5	L	32.5	L	50,6	7.5	R	32.5	L	53,6	30	R	45	L
44,7	10	L	32.5	L	47,7	2.5	R	32.5	L	50,7	20	R	37.5	L	53,7	62.5	R	72.5	L
44,8	2.5	L	30	L	47,8	12.5	R	35	L	50,8	40	R	52.5	L	53,8	57.5	L	67.5	R
44,9	7.5	R	32.5	L	47,9	27.5	R	42.5	L	50,9	87.5	R	95	L	53,9	27.5	L	42.5	R
45,0	47.5	L	57.5	L	48,0	37.5	L	50	L	51,0	27.5	L	42.5	L	54,0	20	L	37.5	L
45,1	40	L	52.5	L	48,1	30	L	45	L	51,1	22.5	L	40	L	54,1	12.5	L	35	L
45,2	35	L	47.5	L	48,2	25	L	40	L	51,2	17.5	L	35	L	54,2	7.5	L	32.5	L
45,3	30	L	42.5	L	48,3	20	L	37.5	L	51,3	10	L	35	L	54,3	0	L	32.5	L
45,4	22.5	L	40	L	48,4	15	L	35	L	51,4	5	L	32.5	L	54,4	7.5	R	32.5	L
45,5	17.5	L	35	L	48,5	7.5	L	32.5	L	51,5	2.5	R	30	L	54,5	20	R	37.5	L
45,6	12.5	L	32.5	L	48,6	0	L	32.5	L	51,6	12.5	R	32.5	L	54,6	45	R	55	L
45,7	5	L	32.5	L	48,7	7.5	R	32.5	L	51,7	30	R	45	L	54,7	82.5	L	90	R
45,8	2.5	R	32.5	L	48,8	20	R	37.5	L	51,8	60	R	70	L	54,8	40	L	52.5	R
45,9	12.5	R	35	L	48,9	40	R	52.5	L	51,9	60	L	70	R	54,9	20	L	37.5	R
55,0	17.5	L	35	L	58,0	7.5	L	32.5	L	61,0	5	R	32.5	L	64,0	25	R	40	L
55,1	10	L	32.5	L	58,1	0	R	30	L	61,1	15	R	35	L	64,1	55	R	65	L
55,2	2.5	L	32.5	L	58,2	10	R	32.5	L	61,2	35	R	47.5	L	64,2	67.5	L	77.5	R
55,3	5	R	32.5	L	58,3	22.5	R	40	L	61,3	75	R	82.5	L	64,3	32.5	L	45	R
55,4	15	R	35	L	58,4	47.5	R	57.5	L	61,4	50	L	60	R	64,4	15	L	35	R
55,5	32.5	R	45	L	58,5	75	L	82.5	R	61,5	25	L	40	R	64,5	5	L	32.5	R
55,6	65	R	75	L	58,6	35	L	47.5	R	61,6	10	L	32.5	R	64,6	2.5	R	32.5	R
55,7	55	L	65	R	58,7	17.5	L	37.5	R	61,7	0	L	30	R	64,7	10	R	32.5	R
55,8	27.5	L	42.5	R	58,8	5	L	32.5	R	61,8	5	R	32.5	R	64,8	15	R	35	R
55,9	12.5	L	35	R	58,9	2.5	R	32.5	R	61,9	12.5	R	35	R	64,9	22.5	R	37.5	R
56,0	12.5	L	35	L	59,0	2.5	L	32.5	L	62,0	10	R	32.5	L	65,0	37.5	R	50	L
56,1	7.5	L	32.5	L	59,1	5	R	32.5	L	62,1	25	R	40	L	65,1	80	R	87.5	L
56,2	0	R	32.5	L	59,2	15	R	35	L	62,2	52.5	R	62.5	L	65,2	47.5	L	57.5	R
56,3	10	R	32.5	L	59,3	35	R	47.5	L	62,3	70	L	77.5	R	65,3	22.5	L	40	R
56,4	22.5	R	40	L	59,4	72.5	R	80	L	62,4	35	L	47.5	R	65,4	7.5	L	32.5	R
56,5	47.5	R	57.5	L	59,5	52.5	L	62.5	R	62,5	15	L	35	R	65,5	0	L	32.5	R
56,6	80	L	87.5	R	59,6	25	L	40	R	62,6	5	L	32.5	R	65,6	7.5	R	32.5	R
56,7	37.5	L	50	R	59,7	10	L	32.5	R	62,7	2.5	R	32.5	R	65,7	12.5	R	35	R
56,8	17.5	L	35	R	59,8	2.5	L	32.5	R	62,8	10	R	32.5	R	65,8	17.5	R	37.5	R
56,9	7.5	L	32.5	R	59,9	5	R	32.5	R	62,9	15	R	35	R	65,9	25	R	40	R
57,0	10	L	32.5	L	60,0	0	R	30	L	63,0	17.5	R	37.5	L	—	—	—	—	—
57,1	2.5	L	32.5	L	60,1	10	R	32.5	L	63,1	37.5	R	50	L	—	—	—	—	—
57,2	5	R	32.5	L	60,2	25	R	40	L	63,2	77.5	R	85	L	—	—	—	—	—
57,3	15	R	35	L	60,3	50	R	60	L	63,3	47.5	L	57.5	R	—	—	—	—	—
57,4	32.5	R	45	L	60,4	72.5	L	80	R	63,4	22.5	L	40	R	—	—	—	—	—
57,5	67.5	R	77.5	L	60,5	35	L	47.5	R	63,5	10	L	32.5	R	—	—	—	—	—
57,6	52.5	L	62.5	R	60,6	15	L	35	R	63,6	0	L	30	R	—	—	—	—	—
57,7	25	L	40	R	60,7	5	L	32.5	R	63,7	7.5	R	32.5	R	—	—	—	—	—
57,8	10	L	32.5	R	60,8	2.5	R	32.5	R	63,8	12.5	R	35	R	—	—	—	—	—
57,9	2.5	L	32.5	R	60,9	10	R	32.5	R	63,9	17.5	R	37.5	R	—	—	—	—	—

(continued)



(Balancing Table • Universal Applications SVU-BB2 Boring Head continued)

### KRDEA012AM • KRDE065012M 65–82,9mm

diameter mm	ring 1		ring 2		diameter mm	ring 1		ring 2		diameter mm	ring 1		ring 2	
65,0	5	L	37,5	R	68,0	12,5	R	37,5	R	71,0	25	R	45	R
65,1	2,5	R	37,5	R	68,1	17,5	R	40	R	71,1	32,5	R	47,5	R
65,2	10	R	37,5	R	68,2	22,5	R	42,5	R	71,2	37,5	R	52,5	R
65,3	15	R	40	R	68,3	27,5	R	47,5	R	71,3	42,5	R	57,5	R
65,4	20	R	42,5	R	68,4	32,5	R	50	R	71,4	47,5	R	62,5	R
65,5	25	R	45	R	68,5	40	R	55	R	71,5	55	R	67,5	R
65,6	30	R	47,5	R	68,6	45	R	60	R	71,6	65	R	77,5	R
65,7	35	R	52,5	R	68,7	52,5	R	65	R	71,7	65	R	77,5	R
65,8	42,5	R	57,5	R	68,8	60	R	72,5	R	71,8	65	R	77,5	R
65,9	47,5	R	62,5	R	68,9	70	R	82,5	R	71,9	65	R	77,5	R
66,0	2,5	R	35	R	69,0	17,5	R	40	R	72,0	30	R	47,5	R
66,1	7,5	R	37,5	R	69,1	22,5	R	42,5	R	72,1	35	R	52,5	R
66,2	12,5	R	40	R	69,2	27,5	R	45	R	72,2	40	R	55	R
66,3	20	R	40	R	69,3	32,5	R	50	R	72,3	47,5	R	60	R
66,4	25	R	45	R	69,4	37,5	R	52,5	R	72,4	55	R	67,5	R
66,5	30	R	47,5	R	69,5	45	R	57,5	R	72,5	62,5	R	75	R
66,6	35	R	52,5	R	69,6	50	R	62,5	R	72,6	80	R	90	R
66,7	40	R	55	R	69,7	57,5	R	70	R	72,7	80	R	90	R
66,8	47,5	R	60	R	69,8	67,5	R	80	R	72,8	80	R	90	R
66,9	55	R	67,5	R	69,9	67,5	R	80	R	72,9	80	R	90	R
67,0	7,5	R	37,5	R	70,0	22,5	R	42,5	R	73,0	40	R	55	R
67,1	12,5	R	40	R	70,1	27,5	R	45	R	73,1	47,5	R	60	R
67,2	17,5	R	42,5	R	70,2	32,5	R	50	R	73,2	52,5	R	65	R
67,3	22,5	R	45	R	70,3	37,5	R	52,5	R	73,3	62,5	R	75	R
67,4	30	R	47,5	R	70,4	42,5	R	57,5	R	73,4	75	R	87,5	R
67,5	35	R	50	R	70,5	50	R	62,5	R	73,5	75	R	87,5	R
67,6	40	R	55	R	70,6	57,5	R	70	R	73,6	75	R	87,5	R
67,7	45	R	60	R	70,7	65	R	77,5	R	73,7	75	R	87,5	R
67,8	52,5	R	65	R	70,8	65	R	77,5	R	73,8	75	R	87,5	R
67,9	60	R	72,5	R	70,9	65	R	77,5	R	73,9	75	R	87,5	R
74,0	40	R	55	R	77,0	55	R	67,5	R	80,0	22,5	L	45	L
74,1	45	R	60	R	77,1	65	R	77,5	R	80,1	17,5	L	42,5	L
74,2	52,5	R	65	R	77,2	65	R	77,5	R	80,2	12,5	L	40	L
74,3	60	R	72,5	R	77,3	65	R	77,5	R	80,3	5	L	40	L
74,4	70	R	82,5	R	77,4	65	R	77,5	R	80,4	2,5	R	40	L
74,5	70	R	82,5	R	77,5	65	R	77,5	R	80,5	10	R	40	L
74,6	70	R	82,5	R	77,6	65	R	77,5	R	80,6	22,5	R	45	L
74,7	70	R	82,5	R	77,7	65	R	77,5	R	80,7	37,5	R	55	L
74,8	70	R	82,5	R	77,8	65	R	77,5	R	80,8	65	R	77,5	L
74,9	70	R	82,5	R	77,9	65	R	77,5	R	80,9	70	L	82,5	R
75,0	52,5	R	65	R	78,0	62,5	R	75	R	81,0	20	L	42,5	L
75,1	57,5	R	70	R	78,1	82,5	R	92,5	R	81,1	12,5	L	40	L
75,2	70	R	82,5	R	78,2	82,5	R	92,5	R	81,2	5	L	40	L
75,3	70	R	82,5	R	78,3	82,5	R	92,5	R	81,3	0	R	37,5	L
75,4	70	R	82,5	R	78,4	82,5	R	92,5	R	81,4	10	R	40	L
75,5	70	R	82,5	R	78,5	82,5	R	92,5	R	81,5	20	R	45	L
75,6	70	R	82,5	R	78,6	82,5	R	92,5	R	81,6	35	R	52,5	L
75,7	70	R	82,5	R	78,7	82,5	R	92,5	R	81,7	57,5	R	72,5	L
75,8	70	R	82,5	R	78,8	82,5	R	92,5	R	81,8	75	L	87,5	R
75,9	70	R	82,5	R	78,9	82,5	R	92,5	R	81,9	45	L	60	R
76,0	50	R	62,5	R	79,0	75	R	87,5	R	82,0	15	L	40	L
76,1	57,5	R	70	R	79,1	75	R	87,5	R	82,1	7,5	L	40	L
76,2	67,5	R	80	R	79,2	75	R	87,5	R	82,2	0	L	40	L
76,3	67,5	R	80	R	79,3	75	R	87,5	R	82,3	7,5	R	40	L
76,4	67,5	R	80	R	79,4	75	R	87,5	R	82,4	17,5	R	42,5	L
76,5	67,5	R	80	R	79,5	75	R	87,5	R	82,5	30	R	50	L
76,6	67,5	R	80	R	79,6	75	R	87,5	R	82,6	52,5	R	67,5	L
76,7	67,5	R	80	R	79,7	75	R	87,5	R	82,7	82,5	L	95	R
76,8	67,5	R	80	R	79,8	75	R	87,5	R	82,8	50	L	65	R
76,9	67,5	R	80	R	79,9	75	R	87,5	R	82,9	30	L	50	R

(continued)

(Balancing Table • Universal Applications SVU-BB2 Boring Head continued)

**KRDEA012AM • KRDE065012M 83–100mm**

diameter mm	ring 1		ring 2		diameter mm	ring 1		ring 2		diameter mm	ring 1		ring 2	
83,0	10	L	40	L	86,0	10	R	40	L	89,0	42.5	R	57.5	L
83,1	2.5	L	37.5	L	86,1	20	R	45	L	89,1	72.5	R	85	L
83,2	5	R	40	L	86,2	35	R	52.5	L	89,2	62.5	L	75	R
83,3	15	R	42.5	L	86,3	57.5	R	72.5	L	89,3	37.5	L	55	R
83,4	27.5	R	47.5	L	86,4	75	L	87.5	R	89,4	22.5	L	45	R
83,5	47.5	R	62.5	L	86,5	45	L	60	R	89,5	10	L	40	R
83,6	77.5	R	90	L	86,6	27.5	L	47.5	R	89,6	0	L	37.5	R
83,7	55	L	70	R	86,7	15	L	42.5	R	89,7	5	R	40	R
83,8	32.5	L	50	R	86,8	5	L	40	R	89,8	12.5	R	40	R
83,9	17.5	L	42.5	R	86,9	2.5	R	40	R	89,9	17.5	R	42.5	R
84,0	5	L	37.5	L	87,0	17.5	R	42.5	L	90,0	65	R	77.5	L
84,1	2.5	R	37.5	L	87,1	30	R	50	L	90,1	70	L	82.5	R
84,2	12.5	R	40	L	87,2	52.5	R	67.5	L	90,2	40	L	57.5	R
84,3	25	R	47.5	L	87,3	82.5	L	95	R	90,3	22.5	L	45	R
84,4	42.5	R	57.5	L	87,4	50	L	65	R	90,4	12.5	L	40	R
84,5	72.5	R	85	L	87,5	30	L	50	R	90,5	2.5	L	37.5	R
84,6	62.5	L	75	R	87,6	17.5	L	42.5	R	90,6	5	R	37.5	R
84,7	37.5	L	55	R	87,7	7.5	L	40	R	90,7	10	R	40	R
84,8	22.5	L	45	R	87,8	2.5	R	37.5	R	90,8	17.5	R	42.5	R
84,9	10	L	40	R	87,9	7.5	R	40	R	90,9	22.5	R	45	R
85,0	2.5	R	40	L	88,0	27.5	R	47.5	L	91,0	75	L	87.5	R
85,1	10	R	40	L	88,1	47.5	R	62.5	L	91,1	47.5	L	62.5	R
85,2	22.5	R	45	L	88,2	77.5	R	90	L	91,2	27.5	L	47.5	R
85,3	37.5	R	55	L	88,3	55	L	70	R	91,3	15	L	42.5	R
85,4	65	R	77.5	L	88,4	35	L	52.5	R	91,4	5	L	40	R
85,5	70	L	82.5	R	88,5	17.5	L	42.5	R	91,5	2.5	R	40	R
85,6	40	L	57.5	R	88,6	7.5	L	40	R	91,6	10	R	40	R
85,7	22.5	L	45	R	88,7	0	R	40	R	91,7	15	R	42.5	R
85,8	12.5	L	40	R	88,8	7.5	R	40	R	91,8	22.5	R	45	R
85,9	2.5	L	37.5	R	88,9	12.5	R	42.5	R	91,9	27.5	R	47.5	R
92,0	50	L	65	R	95,0	12.5	L	40	R	98,0	7.5	R	40	R
92,1	30	L	50	R	95,1	2.5	L	37.5	R	98,1	12.5	R	42.5	R
92,2	17.5	L	42.5	R	95,2	5	R	37.5	R	98,2	20	R	42.5	R
92,3	7.5	L	40	R	95,3	10	R	40	R	98,3	25	R	47.5	R
92,4	2.5	R	37.5	R	95,4	17.5	R	42.5	R	98,4	30	R	50	R
92,5	7.5	R	40	R	95,5	22.5	R	45	R	98,5	37.5	R	55	R
92,6	15	R	40	R	95,6	27.5	R	47.5	R	98,6	42.5	R	60	R
92,7	20	R	45	R	95,7	35	R	52.5	R	98,7	50	R	65	R
92,8	25	R	47.5	R	95,8	40	R	57.5	R	98,8	57.5	R	72.5	R
92,9	32.5	R	50	R	95,9	47.5	R	62.5	R	98,9	70	R	82.5	R
93,0	35	L	52.5	R	96,0	5	L	40	R	99,0	12.5	R	40	R
93,1	17.5	L	42.5	R	96,1	2.5	R	40	R	99,1	17.5	R	42.5	R
93,2	7.5	L	40	R	96,2	10	R	40	R	99,2	25	R	45	R
93,3	0	R	37.5	R	96,3	15	R	42.5	R	99,3	30	R	50	R
93,4	7.5	R	40	R	96,4	22.5	R	45	R	99,4	35	R	52.5	R
93,5	12.5	R	42.5	R	96,5	27.5	R	47.5	R	99,5	42.5	R	57.5	R
93,6	20	R	42.5	R	96,6	32.5	R	52.5	R	99,6	47.5	R	62.5	R
93,7	25	R	47.5	R	96,7	40	R	55	R	99,7	55	R	70	R
93,8	30	R	50	R	96,8	45	R	60	R	99,8	67.5	R	80	R
93,9	37.5	R	55	R	96,9	52.5	R	67.5	R	99,9	67.5	R	80	R
94,0	22.5	L	45	R	97,0	2.5	R	37.5	R	100,0	17.5	R	42.5	R
94,1	10	L	40	R	97,1	7.5	R	40	R	100,1	22.5	R	45	R
94,2	2.5	L	40	R	97,2	15	R	40	R	100,2	27.5	R	47.5	R
94,3	5	R	40	R	97,3	20	R	45	R	100,3	35	R	52.5	R
94,4	12.5	R	40	R	97,4	25	R	47.5	R	100,4	40	R	57.5	R
94,5	17.5	R	42.5	R	97,5	32.5	R	50	R	100,5	47.5	R	62.5	R
94,6	25	R	45	R	97,6	37.5	R	55	R	100,6	55	R	70	R
94,7	30	R	50	R	97,7	45	R	60	R	100,7	65	R	77.5	R
94,8	35	R	52.5	R	97,8	50	R	65	R	100,8	65	R	77.5	R
94,9	42.5	R	57.5	R	97,9	60	R	72.5	R	100,9	65	R	77.5	R

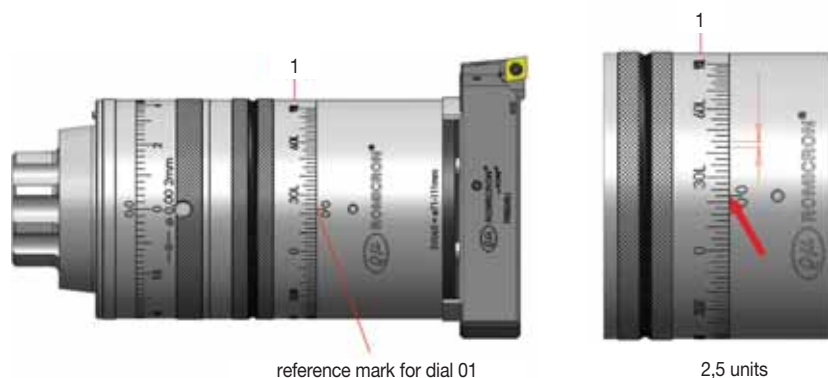


### Balancing Table • SVU-65 Boring Head

1. The balancing dial 01 is identified on the figure below. The dial resolution is 2,5 units of table values.

2. Read the position value of the dial 01 on the table. For example, to machine a 76,2 mm diameter, the position is 01 = 22,5 L.

3. By moving dial 01, adjust its position, observing its proper reference mark, according to the read value.



Hole Finishing

KRDE070019M						KRDE083019M								
KRCSCFPR061E 71-76mm			KRCSCFPR062E 75,5-81,5mm			KRCSCFPR063E 80-85mm			KRCSCFPR061E 84-89mm			KRCSCFPR062E 88,5-93,5mm		
diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting	
70,99	40	L	75,49	35	L	80,01	30	L	84,00	47.5	L	88,49	40	L
71,12	37.5	L	75,59	32.5	L	80,16	27.5	L	84,12	45	L	88,65	37.5	L
71,27	35	L	75,77	30	L	80,34	25	L	84,25	42.5	L	88,80	35	L
71,42	32.5	L	75,95	27.5	L	80,52	22.5	L	84,38	40	L	88,95	32.5	L
71,60	30	L	76,10	25	L	80,70	20	L	84,51	37.5	L	89,08	30	L
71,78	27.5	L	76,28	22.5	L	80,87	17.5	L	84,66	35	L	89,26	27.5	L
71,96	25	L	76,48	20	L	81,08	15	L	84,81	32.5	L	89,41	25	L
72,14	22.5	L	76,66	17.5	L	81,25	12.5	L	84,96	30	L	89,56	22.5	L
72,31	20	L	76,84	15	L	81,46	10	L	85,12	27.5	L	89,74	20	L
72,49	17.5	L	77,04	12.5	L	81,64	7.5	L	85,27	25	L	89,89	17.5	L
72,69	15	L	77,22	10	L	81,84	5	L	85,42	22.5	L	90,07	15	L
72,87	12.5	L	77,42	7.5	L	82,02	2.5	L	85,60	20	L	90,22	12.5	L
73,08	10	L	77,62	5	L	82,22	0	—	85,78	17.5	L	90,40	10	L
73,25	7.5	L	77,80	2.5	L	82,42	2.5	R	85,93	15	L	90,58	7.5	L
73,46	5	L	78,00	0	—	82,60	5	R	86,11	12.5	L	90,75	5	L
73,66	2.5	L	78,21	2.5	R	82,80	7.5	R	86,28	10	L	90,93	2.5	L
73,86	0	—	78,38	5	R	82,98	10	R	86,46	7.5	L	91,11	0	—
74,04	2.5	R	78,59	7.5	R	83,19	12.5	R	86,64	5	L	91,29	2.5	R
74,24	5	R	78,77	10	R	83,36	15	R	86,82	2.5	L	91,47	5	R
74,45	7.5	R	78,97	12.5	R	83,57	17.5	R	87,00	0	—	91,64	7.5	R
74,63	10	R	79,15	15	R	83,74	20	R	87,17	2.5	R	91,80	10	R
74,83	12.5	R	79,35	17.5	R	83,92	22.5	R	87,33	5	R	91,97	12.5	R
75,01	15	R	79,53	20	R	84,10	25	R	87,50	7.5	R	92,15	15	R
75,21	17.5	R	79,71	22.5	R	84,28	27.5	R	87,68	10	R	92,33	17.5	R
75,39	20	R	79,88	25	R	84,46	30	R	87,86	12.5	R	92,48	20	R
75,57	22.5	R	80,06	27.5	R	84,61	32.5	R	88,04	15	R	92,66	22.5	R
75,74	25	R	80,24	30	R	84,79	35	R	88,21	17.5	R	92,81	25	R
75,92	27.5	R	80,42	32.5	R	84,94	37.5	R	88,37	20	R	92,96	27.5	R
76,00	30	R	80,49	35	R	84,99	40	R	88,54	22.5	R	93,12	30	R
—	—	—	—	—	—	—	—	—	88,70	25	R	93,27	32.5	R
—	—	—	—	—	—	—	—	—	88,85	27.5	R	93,42	35	R
—	—	—	—	—	—	—	—	—	89,00	30	R	93,50	37.5	R

(continued)

(Balancing Table • SVU-65 Boring Head continued)

KRDE083019M			KRDE096019M								
KRCSCFPR063E 93–98mm			KRCSCFPR061E 97–102mm			KRCSCFPR062E 101,5–106,5mm			KRCSCFPR063E 106–111mm		
diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting	
92,99	35	L	97,00	55	L	101,50	45	L	105,99	37.5	L
93,14	32.5	L	97,05	52.5	L	101,60	42.5	L	106,17	35	L
93,29	30	L	97,16	50	L	101,73	40	L	106,32	32.5	L
93,45	27.5	L	97,28	47.5	L	101,85	37.5	L	106,45	30	L
93,60	25	L	97,38	45	L	101,98	35	L	106,58	27.5	L
93,78	22.5	L	97,51	42.5	L	102,13	32.5	L	106,73	25	L
93,93	20	L	97,61	40	L	102,26	30	L	106,88	22.5	L
94,11	17.5	L	97,74	37.5	L	102,41	27.5	L	107,04	20	L
94,26	15	L	97,87	35	L	102,54	25	L	107,19	17.5	L
94,44	12.5	L	98,02	32.5	L	102,69	22.5	L	107,34	15	L
94,62	10	L	98,15	30	L	102,84	20	L	107,49	12.5	L
94,79	7.5	L	98,30	27.5	L	103,00	17.5	L	107,65	10	L
94,95	5	L	98,45	25	L	103,15	15	L	107,82	7.5	L
95,12	2.5	L	98,58	22.5	L	103,30	12.5	L	107,98	5	L
95,30	0	—	98,73	20	L	103,48	10	L	108,13	2.5	L
95,48	2.5	R	98,88	17.5	L	103,63	7.5	L	108,31	0	—
95,66	5	R	99,06	15	L	103,78	5	L	108,46	2.5	R
95,83	7.5	R	99,21	12.5	L	103,96	2.5	L	108,61	5	R
96,01	10	R	99,36	10	L	104,11	0	—	108,79	7.5	R
96,19	12.5	R	99,52	7.5	L	104,27	2.5	R	108,94	10	R
96,34	15	R	99,70	5	L	104,44	5	R	109,09	12.5	R
96,52	17.5	R	99,85	2.5	L	104,60	7.5	R	109,25	15	R
96,67	20	R	100,03	0	—	104,75	10	R	109,40	17.5	R
96,85	22.5	R	100,18	2.5	R	104,90	12.5	R	109,55	20	R
97,00	25	R	100,33	5	R	105,08	15	R	109,70	22.5	R
97,16	27.5	R	100,51	7.5	R	105,23	17.5	R	109,86	25	R
97,31	30	R	100,66	10	R	105,38	20	R	110,01	27.5	R
97,46	32.5	R	100,81	12.5	R	105,54	22.5	R	110,13	30	R
97,61	35	R	100,97	15	R	105,69	25	R	110,29	32.5	R
97,76	37.5	R	101,14	17.5	R	105,82	27.5	R	110,41	35	R
97,89	40	R	101,30	20	R	105,97	30	R	110,54	37.5	R
97,99	42.5	R	101,45	22.5	R	106,10	32.5	R	110,67	40	R
—	—	—	101,57	25	R	106,25	35	R	110,79	42.5	R
—	—	—	101,73	27.5	R	106,38	37.5	R	110,90	45	R
—	—	—	104,39	30	R	106,43	40	R	111,00	47.5	R
—	—	—	102,01	32.5	R	106,53	42.5	R	—	—	—

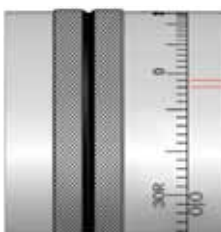


### ■ Balancing Table • SVU-92 Boring Head

1. The balancing dial 01 is identified on the figure below. The dial resolution is 2,0 units of table values.



reference mark for dial 01



2,0 units

2. Read the position value of the dial 01 on the table. For example, to machine a 76,2 mm diameter, the position is 01 = 22,5 L.

3. By moving dial 01, adjust its position, observing its proper reference mark, according to the read value.

Hole Finishing

KRDE101023M						KRDE120023M								
KRCSCFPR061F 101–108mm			KRCSCFPR062F 107,5–114,5mm			KRCSCFPR063F 114–121mm			KRCSCFPR061F 120–127mm			KRCSCFPR062F 126,5–133,5mm		
diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting	
100,99	36	L	107,49	34	L	114,00	30	L	119,99	40	L	126,49	36	L
101,19	34	L	107,62	32	L	114,22	28	L	120,19	38	L	126,72	34	L
101,40	32	L	107,80	30	L	114,40	26	L	120,35	36	L	126,90	32	L
101,57	30	L	108,00	28	L	114,60	24	L	120,52	34	L	127,08	30	L
101,78	28	L	108,20	26	L	114,81	22	L	120,70	32	L	127,25	28	L
101,98	26	L	108,41	24	L	115,01	20	L	120,88	30	L	127,43	26	L
102,18	24	L	108,61	22	L	115,24	18	L	121,06	28	L	127,61	24	L
102,39	22	L	108,81	20	L	115,44	16	L	121,23	26	L	127,81	22	L
102,59	20	L	109,02	18	L	115,67	14	L	121,41	24	L	127,99	20	L
102,79	18	L	109,25	16	L	115,87	12	L	121,62	22	L	128,19	18	L
103,02	16	L	109,45	14	L	116,10	10	L	121,79	20	L	128,40	16	L
103,23	14	L	109,68	12	L	116,31	8	L	122,00	18	L	128,57	14	L
103,45	12	L	109,88	10	L	116,54	6	L	122,20	16	L	128,78	12	L
103,66	10	L	110,11	8	L	116,76	4	L	122,38	14	L	128,98	10	L
103,89	8	L	110,34	6	L	116,97	2	L	122,58	12	L	129,18	8	L
104,11	6	L	110,57	4	L	117,20	0	—	122,78	10	L	129,39	6	L
104,32	4	L	110,77	2	L	117,42	2	R	122,99	8	L	129,59	4	L
104,55	2	L	111,00	0	—	117,65	4	R	123,19	6	L	129,79	2	L
104,78	0	—	111,23	2	R	117,86	6	R	123,39	4	L	130,00	0	—
105,00	2	R	111,46	4	R	118,08	8	R	123,60	2	L	130,20	2	R
105,23	4	R	111,66	6	R	118,31	10	R	123,80	0	—	130,40	4	R
105,44	6	R	111,89	8	R	118,52	12	R	124,00	2	R	130,61	6	R
105,66	8	R	112,12	10	R	118,75	14	R	124,21	4	R	130,81	8	R
105,89	10	R	107,19	12	R	118,95	16	R	124,41	6	R	131,01	10	R
106,10	12	R	112,55	14	R	119,18	18	R	124,61	8	R	131,22	12	R
106,32	14	R	112,75	16	R	119,38	20	R	124,82	10	R	131,42	14	R
106,53	16	R	112,98	18	R	119,58	22	R	125,02	12	R	131,62	16	R
106,76	18	R	113,18	20	R	119,79	24	R	125,22	14	R	131,80	18	R
106,96	20	R	113,39	22	R	119,99	26	R	125,43	16	R	132,00	20	R
107,16	22	R	113,59	24	R	120,19	28	R	125,63	18	R	132,18	22	R
107,37	24	R	113,79	26	R	120,37	30	R	125,81	20	R	132,38	24	R
107,57	26	R	114,00	28	R	120,57	32	R	126,01	22	R	132,56	26	R
107,77	28	R	114,20	30	R	120,75	34	R	126,19	24	R	132,74	28	R
107,98	30	R	114,38	32	R	120,93	36	R	126,37	26	R	132,92	30	R
108,00	32	R	114,50	34	R	121,01	38	R	126,57	28	R	133,10	32	R
—	—	—	—	—	—	—	—	—	126,75	30	R	133,27	34	R
—	—	—	—	—	—	—	—	—	126,92	32	R	133,45	36	R
—	—	—	—	—	—	—	—	—	127,00	34	R	133,50	38	R

(continued)

(Balancing Table • SVU-92 Boring Head continued)

KRDE120023M			KRDE139026M								
KRCSCFPR063F 133–140mm			KRCSCFPR061F 139–146mm			KRCSCFPR062F 145,5–152,5mm			KRCSCFPR063F 152–159mm		
diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting	
132,99	34	L	138,99	50	L	145,49	44	L	151,99	40	L
133,10	32	L	139,09	48	L	145,67	42	L	152,12	38	L
133,27	30	L	139,22	46	L	145,80	40	L	152,27	36	L
133,45	28	L	139,34	44	L	145,95	38	L	152,40	34	L
133,63	26	L	139,47	42	L	146,08	36	L	152,55	32	L
133,81	24	L	139,60	40	L	146,23	34	L	152,70	30	L
133,99	22	L	139,73	38	L	146,35	32	L	152,86	28	L
134,19	20	L	139,88	36	L	146,51	30	L	153,01	26	L
134,37	18	L	140,00	34	L	146,66	28	L	153,16	24	L
134,57	16	L	140,16	32	L	146,81	26	L	153,31	22	L
134,77	14	L	140,31	30	L	146,99	24	L	153,49	20	L
134,98	12	L	140,46	28	L	147,14	22	L	153,64	18	L
135,18	10	L	140,61	26	L	147,29	20	L	153,82	16	L
135,36	8	L	140,77	24	L	147,47	18	L	153,97	14	L
135,56	6	L	140,92	22	L	147,62	16	L	154,15	12	L
135,76	4	L	141,10	20	L	147,80	14	L	154,33	10	L
135,97	2	L	141,25	18	L	147,96	12	L	154,48	8	L
136,17	0	—	141,43	16	L	148,13	10	L	154,66	6	L
136,37	2	R	141,58	14	L	148,31	8	L	154,84	4	L
136,58	4	R	141,76	12	L	148,49	6	L	155,02	2	L
162,18	6	R	141,94	10	L	148,64	4	L	155,19	0	—
136,98	8	R	142,11	8	L	148,82	2	L	155,35	2	R
137,19	10	R	142,27	6	L	149,00	0	—	155,52	4	R
137,39	12	R	142,44	4	L	149,17	2	R	155,70	6	R
137,59	14	R	142,62	2	L	149,35	4	R	155,88	8	R
137,80	16	R	142,80	0	—	149,53	6	R	156,03	10	R
137,97	18	R	142,98	2	R	149,68	8	R	156,21	12	R
138,18	20	R	143,15	4	R	149,86	10	R	156,39	14	R
138,38	22	R	143,31	6	R	150,04	12	R	156,54	16	R
138,56	24	R	143,48	8	R	150,19	14	R	156,72	18	R
138,73	26	R	143,66	10	R	150,37	16	R	156,87	20	R
138,91	28	R	143,84	12	R	150,55	18	R	157,05	22	R
139,09	30	R	143,99	14	R	150,70	20	R	157,20	24	R
139,27	32	R	144,17	16	R	150,85	22	R	157,35	26	R
139,45	34	R	144,32	18	R	151,03	24	R	157,51	28	R
139,60	36	R	144,50	20	R	151,18	26	R	157,66	30	R
139,78	38	R	144,65	22	R	151,33	28	R	157,81	32	R
139,93	40	R	144,83	24	R	151,49	30	R	157,96	34	R
140,00	42	R	144,98	26	R	151,64	32	R	158,09	36	R
—	—	—	145,14	28	R	151,79	34	R	158,24	38	R
—	—	—	145,29	30	R	151,92	36	R	158,37	40	R
—	—	—	145,44	32	R	152,07	38	R	158,50	42	R
—	—	—	145,57	34	R	152,20	40	R	158,62	44	R
—	—	—	145,72	36	R	152,32	42	R	158,75	46	R
—	—	—	145,87	38	R	152,45	44	R	158,88	48	R
—	—	—	145,97	40	R	152,50	46	R	158,98	50	R
—	—	—	146,00	42	R	—	—	—	159,00	52	R



(continued)



(Balancing Table • SVU-92 Boring Head continued)

### KRDE156026M

KRCSCFPR061F 156-163mm			KRCSCFPR062F 162,5-169,5mm			KRCSCFPR063F 169-176mm		
diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting	
156,01	56	L	162,51	50	L	169,01	44	L
156,11	54	L	162,61	48	L	169,11	42	L
156,21	52	L	162,71	46	L	169,24	40	L
156,31	50	L	162,81	44	L	169,37	38	L
156,41	48	L	162,94	42	L	169,49	36	L
156,51	46	L	163,07	40	L	169,62	34	L
156,62	44	L	163,20	38	L	169,75	32	L
156,74	42	L	163,32	36	L	169,90	30	L
156,87	40	L	163,45	34	L	170,03	28	L
157,00	38	L	163,58	32	L	170,18	26	L
157,12	36	L	163,70	30	L	170,33	24	L
157,25	34	L	163,86	28	L	170,46	22	L
157,38	32	L	164,01	26	L	170,61	20	L
157,53	30	L	164,13	24	L	170,76	18	L
157,66	28	L	164,29	22	L	170,92	16	L
157,81	26	L	164,44	20	L	171,07	14	L
157,94	24	L	164,59	18	L	171,22	12	L
158,09	22	L	164,74	16	L	171,37	10	L
158,24	20	L	164,90	14	L	171,55	8	L
158,39	18	L	165,05	12	L	171,70	6	L
158,55	16	L	165,20	10	L	171,86	4	L
158,70	14	L	165,35	8	L	172,01	2	L
158,85	12	L	165,53	6	L	172,19	0	—
159,00	10	L	165,68	4	L	172,34	2	R
159,18	8	L	165,84	2	L	172,49	4	R
159,33	6	L	165,99	0	—	172,64	6	R
159,49	4	L	166,17	2	R	172,82	8	R
159,64	2	L	166,32	4	R	172,97	10	R
159,82	0	—	166,47	6	R	173,13	12	R
159,97	2	R	166,62	8	R	173,28	14	R
160,12	4	R	166,80	10	R	173,43	16	R
160,27	6	R	166,95	12	R	173,58	18	R
160,45	8	R	167,11	14	R	173,74	20	R
160,60	10	R	167,26	16	R	173,89	22	R
160,76	12	R	167,41	18	R	174,04	24	R
160,91	14	R	167,56	20	R	174,17	26	R
161,06	16	R	167,72	22	R	174,32	28	R
161,21	18	R	167,87	24	R	174,45	30	R
161,37	20	R	168,00	26	R	174,60	32	R
161,52	22	R	168,15	28	R	174,73	34	R
161,67	24	R	168,28	30	R	174,85	36	R
161,82	26	R	168,43	32	R	174,98	38	R
161,95	28	R	168,55	34	R	175,11	40	R
162,10	30	R	168,68	36	R	175,23	42	R
162,23	32	R	168,81	38	R	175,34	44	R
162,36	34	R	168,94	40	R	175,46	46	R
162,51	36	R	169,06	42	R	175,56	48	R
162,64	38	R	169,16	44	R	175,67	50	R
162,74	40	R	169,29	46	R	175,77	52	R
162,86	42	R	169,39	48	R	175,87	54	R
162,99	44	R	169,49	50	R	175,95	56	R
162,99	46	R	169,49	52	R	176,00	58	R

(continued)

Hole Finishing

(Balancing Table • SVU-92 Boring Head continued)

**KRDE175026M**

KRCSCFPR061F 175–182mm			KRCSCFPR062F 181,5–188,5mm			KRCSCFPR063F 188–195mm		
diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting	
175,01	64	L	181,51	56	L	188,0108	48	L
175,06	62	L	181,56	54	L	188,1124	46	L
175,13	60	L	181,64	52	L	188,214	44	L
175,21	58	L	181,74	50	L	188,3156	42	L
175,29	56	L	181,84	48	L	188,4426	40	L
175,36	54	L	181,94	46	L	188,5442	38	L
175,46	52	L	182,04	44	L	188,6712	36	L
175,56	50	L	182,14	42	L	188,7982	34	L
175,64	48	L	182,27	40	L	188,8998	32	L
175,74	46	L	182,37	38	L	189,0268	30	L
175,87	44	L	182,50	36	L	189,1792	28	L
175,97	42	L	182,63	34	L	189,3062	26	L
176,07	40	L	182,75	32	L	189,4332	24	L
176,20	38	L	182,88	30	L	189,5602	22	L
176,30	36	L	183,01	28	L	189,7126	20	L
176,43	34	L	183,13	26	L	189,8396	18	L
176,56	32	L	183,26	24	L	189,992	16	L
176,68	30	L	183,41	22	L	190,1444	14	L
176,81	28	L	183,54	20	L	190,2714	12	L
176,96	26	L	183,69	18	L	190,4238	10	L
177,09	24	L	183,82	16	L	114,3762	8	L
177,22	22	L	183,97	14	L	190,7286	6	L
177,37	20	L	184,12	12	L	190,8556	4	L
177,50	18	L	184,25	10	L	191,008	2	L
177,65	16	L	184,40	8	L	191,1604	0	—
177,80	14	L	184,56	6	L	191,3128	2	R
177,93	12	L	184,71	4	L	191,4652	4	R
178,08	10	L	184,86	2	L	191,6176	6	R
178,23	8	L	184,99	0	—	191,7446	8	R
178,38	6	L	185,14	2	R	191,897	10	R
178,54	4	L	185,29	4	R	192,0494	12	R
178,66	2	L	185,45	6	R	192,2018	14	R
178,82	0	—	185,60	8	R	192,3288	16	R
178,97	2	R	185,75	10	R	192,4812	18	R
179,12	4	R	185,88	12	R	192,6082	20	R
179,27	6	R	186,03	14	R	192,7606	22	R
179,43	8	R	186,18	16	R	192,8876	24	R
179,55	10	R	186,31	18	R	193,04	26	R
179,71	12	R	186,46	20	R	193,167	28	R
179,86	14	R	186,59	22	R	193,294	30	R
180,01	16	R	186,74	24	R	193,421	32	R
180,14	18	R	186,87	26	R	193,548	34	R
180,29	20	R	186,99	28	R	193,675	36	R
180,42	22	R	187,12	30	R	193,7766	38	R
180,57	24	R	187,25	32	R	193,9036	40	R
180,70	26	R	187,38	34	R	194,0052	42	R
180,82	28	R	187,50	36	R	194,1068	44	R
180,95	30	R	187,63	38	R	194,2338	46	R
181,08	32	R	187,73	40	R	194,3354	48	R
181,20	34	R	187,86	42	R	194,4116	50	R
181,33	36	R	187,96	44	R	194,5132	52	R
181,46	38	R	188,06	46	R	194,6148	54	R
181,56	40	R	188,16	48	R	194,691	56	R
181,69	42	R	188,26	50	R	194,7672	58	R
181,79	44	R	188,37	52	R	194,8434	60	R
181,89	46	R	188,44	54	R	194,9196	62	R
181,99	48	R	188,49	56	R	194,9958	64	R
181,99	50	R	—	—	—	194,9958	66	R



(continued)

(Balancing Table • SVU-92 Boring Head continued)

### KRDE193026M

KRCSCFPR061F 193–200mm			KRCSCFPR062F 199,5–206,5mm			KRCSCFPR063F 206–213mm		
diameter mm	balancing ring setting		diameter mm	balancing ring setting		diameter mm	balancing ring setting	
192,99	64	L	199,49	54	L	205,994	46	L
193,07	62	L	199,62	52	L	206,1464	44	L
193,14	60	L	199,72	50	L	206,248	42	L
193,22	58	L	199,80	48	L	206,375	40	L
193,29	56	L	199,90	46	L	206,4766	38	L
193,37	54	L	200,03	44	L	206,6036	36	L
193,47	52	L	200,13	42	L	206,7306	34	L
193,57	50	L	200,23	40	L	206,8576	32	L
193,65	48	L	200,36	38	L	206,9846	30	L
193,75	46	L	200,48	36	L	207,1116	28	L
193,88	44	L	200,61	34	L	207,2386	26	L
193,98	42	L	200,71	32	L	207,391	24	L
194,08	40	L	200,86	30	L	207,518	22	L
194,21	38	L	200,99	28	L	207,6704	20	L
194,34	36	L	201,12	26	L	207,7974	18	L
194,46	34	L	201,24	24	L	207,9498	16	L
194,59	32	L	201,40	22	L	208,1022	14	L
194,72	30	L	201,52	20	L	208,2292	12	L
194,84	28	L	201,68	18	L	208,3816	10	L
194,97	26	L	201,80	16	L	208,534	8	L
195,10	24	L	201,96	14	L	208,6864	6	L
195,25	22	L	202,11	12	L	208,8388	4	L
195,38	20	L	202,26	10	L	208,9912	2	L
195,53	18	L	202,41	8	L	209,1182	0	—
195,68	16	L	202,54	6	L	209,2706	2	R
195,81	14	L	202,69	4	L	209,423	4	R
195,96	12	L	202,84	2	L	209,5754	6	R
196,11	10	L	203,00	0	—	209,7278	8	R
196,27	8	L	203,15	2	R	209,8802	10	R
196,42	6	L	203,30	4	R	210,0326	12	R
196,57	4	L	203,45	6	R	210,1596	14	R
196,70	2	L	203,61	8	R	210,312	16	R
196,85	0	—	203,76	10	R	210,4644	18	R
197,00	2	R	203,89	12	R	210,5914	20	R
197,15	4	R	204,04	14	R	210,7438	22	R
197,31	6	R	204,19	16	R	210,8708	24	R
197,46	8	R	204,32	18	R	210,9978	26	R
197,61	10	R	204,47	20	R	211,1502	28	R
197,76	12	R	204,60	22	R	211,2772	30	R
197,89	14	R	204,75	24	R	211,4042	32	R
198,04	16	R	204,88	26	R	211,5312	34	R
198,20	18	R	205,03	28	R	211,6582	36	R
198,32	20	R	205,16	30	R	211,7598	38	R
198,48	22	R	205,28	32	R	84,8868	40	R
198,60	24	R	205,41	34	R	211,9884	42	R
198,76	26	R	205,54	36	R	212,1154	44	R
198,88	28	R	205,64	38	R	212,217	46	R
199,01	30	R	205,77	40	R	212,3186	48	R
199,14	32	R	205,87	42	R	212,4202	50	R
199,26	34	R	205,99	44	R	212,4964	52	R
199,39	36	R	206,10	46	R	212,598	54	R
199,52	38	R	206,20	48	R	212,6742	56	R
199,62	40	R	206,30	50	R	212,7758	58	R
199,75	42	R	206,38	52	R	212,852	60	R
199,85	44	R	206,48	54	R	212,9028	62	R
199,95	46	R	206,50	56	R	212,979	64	R
200,00	48	R	—	—	—	213,0044	66	R

Hole Finishing



# The **EDGE** to **PERFORM**

## Multicron Fine-Boring Tooling

Multiple edges allow respective increase of feed rate to increase productivity and metal removal rate (MRR).

- Engineered solutions are available starting at diameter 78mm with two independent adjustable Romicron™ edges.
- Combination of semi-finishing and finishing cutting operations in one tool are also possible.
- Romicron edges can be set up independently and adjusted to compensate for insert wear with one central dial to enable CLB as well.

Experience the advantages at your Authorised Kennametal Distributor or at [www.kennametal.com](http://www.kennametal.com).

[www.kennametal.com](http://www.kennametal.com)

 **KENNAMETAL®**



## ModBORE™

One system from highly flexible roughing and fine-boring heads to large bridge tooling with optimum amount of tooling components.

### Primary Application

This premium boring line enables rough to fine-boring operations using one system with a large diameter range from 9,75–2.205mm. ModBORE can be used in most materials commonly found in the metalcutting environment by applying the latest technology in Kennametal Standard ISO Turning Inserts.

## Features and Benefits

### Complete System

- Twin blade heads for roughing to semi-finishing operations starting from diameter 23,5mm.
- Fine-boring heads for finishing for diameters 9,75–2.205mm.
- Bridge tooling for large diameters up to 2.205mm standard with both roughing and fine-finishing heads.
- Through-coolant capability in all series.

### Resolution

- Fine adjustable roughing heads.
- 0,01mm diameter adjustment respective 2  $\mu$ m with easy-to-read large vernier scale with fine-boring heads.

### Product Variety

- KM™ shanks for adaptation to all spindles via respective adaptors.
- HSK shanks for direct adaptation.
- Inch shanks as most economic variant for adaptation via respective adaptors.

### Customisation

- Engineered solutions available.
- Anti-chatter devices available.
- Cartridges can be designed into standard boring heads for added versatility.





## ModBORE™ Fine-Boring System

Based on KM™, HSK, and inch SSF couplings, match all spindle specifications direct or indirect via adaptors. The ModBORE Fine-Boring System utilises standard ISO/ANSI turning inserts for maximum performance and flexibility.

### RBHT • Twin Cutters for Rough and Semi-Finish Boring

- Diameters 23,5–153mm.
- KM, HSK, and inch straight shank back end versions available.
- Special preloaded serration and ground support face ensures very stable connection, minimises cutting vibration, and maximises position accuracy while enabling easy diameter adjustment.
- Large selection of blades sets:
  - Staggered — efficient machining of large depths of cut.
  - 70° — for challenging applications requiring stable corner radii and full utilisation of inserts.
  - 90° — most precise machining results.
- Generous clearance and through coolant enables free chip flow and improves tool life.
- All insert holders allow positive standard turning inserts for lowest cutting forces. Starting with diameter 65,5mm, additional insert holders for negative standard turning inserts enable even higher feed rates for maximum metal removal rates.



### FBHO • Offset Boring Bar Heads for Fine Finish

- Diameters 9,75–88,1mm.
- KM, HSK, and inch straight shank back end versions available.
- Use of a precision-ground micrometric screw enables fine adjustment of 2 µm via vernier scale. The large, TiN-coated dial is easy to adjust and easy to read. The force- and form-fixed adjustment mechanism is almost free of any backlash and play.
- Standard steel and carbide boring bars can be adjusted in length by pushing them deep into the body for maximum stability.
- Through coolant directed to the cutting edge improves tool life, surface finish, and chip evacuation.



## FBHM • Offset Boring Bar and Cartridge Heads for Fine Finish

- Diameters 9,75–320mm.
- KM-TS, HSK, CV, DV, and BT steep taper back end versions available.
- Use of a precision-ground micrometric screw enables fine adjustment of 2 µm via vernier scale. The large, TiN-coated dial is easy to adjust and easy to read. The force- and form-fixed adjustment mechanism is almost free of any backlash and play.
- Standard steel and carbide boring bars adjust in length by pushing them deep into the body for maximum stability.
- Aluminium diameter extender with insert cartridges and counterweight are used for diameters starting at 86mm for maximum flexibility.
- Through coolant directed to the cutting edge improves tool life, surface finish, and chip evacuation.



## FBHS • Cartridge Boring Heads for Fine Finish

- Diameters 23,5–153mm.
- KM™, HSK, and inch straight shank back end versions available.
- Use of a precision-ground micrometric screw enables fine adjustment of 2 µm via vernier scale. The large, TiN-coated dial is easy to adjust and easy to read. The force- and form-fixed adjustment mechanism is almost free of any backlash and play.
- Large selection of insert holders:
  - 95° — for use of Wiper turning inserts.
  - 90° regular diameter — for most efficient machining of large depths of cut.
  - 90° oversized diameter — for enhanced use of boring head diameter capabilities.
- Generous clearance and through coolant directed to the cutting edge improves tool life, surface finish, and chip evacuation.



## BT • Bridge Tools for Rough and Finish Boring

- Diameters 150–2.205mm.
- Highly sophisticated ground serration between consoles/slides and heads as well as T-style bolt clamping provides highest cutting force transmission capabilities, sensitive adjustment, and avoids diameter changes when heads are clamped.
- Only 10 bridge consoles are needed for diameters up to 655mm.
- KM, HSK, and various steep taper adaptors with console corresponding ground serration are available as standard. Through coolant to the cutting edge improves tool life and surface finish.
- Diameters 650–2.205mm are covered with only three aluminium-based consoles and two sets of steel slides for mounting rough and finish boring heads for direct spindle or shell mill adaptor clamping.
- 90° roughing head sets ensure precise height alignment and, by use of negative standard turning inserts, highest metal removal rates.
- New counterweight for better dynamic balancing supplements the fine-boring head with precision-ground micrometric screw enabling fine adjustment of 2 µm via vernier scale.





■ **FBHM Fine-Boring Kits**

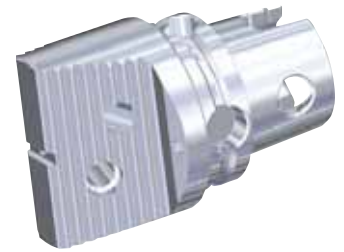
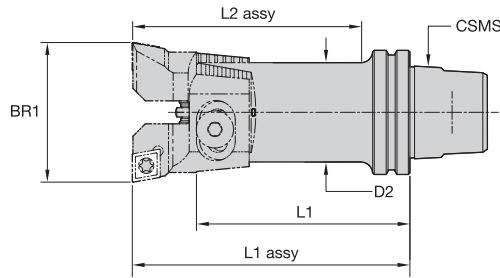
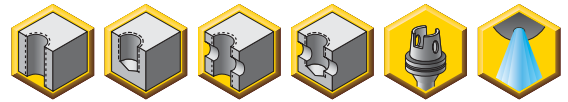
range mm	order number	catalogue number	content
9,75-164,0	4057101	<b>KM50TSFBHMKIT164M</b>	KM50TSFBHM1677 AFB09075SCFCR06 AFB13085SCFCR06 AFB17100SCFCR06 AFB21110SCFCR09 AFB24115SCFCR09 AFM29115 AFM47115 EBM8015086 AFM29SCFPR06 AFM47SCFPR09
9,75-164,0	4057098	<b>HSK63FBHMKIT164M</b>	HSK63FBHM1696 AFB09075SCFCR06 AFB13085SCFCR06 AFB17100SCFCR06 AFB21110SCFCR09 AFB24115SCFCR09 AFM29115 AFM47115 EBM8015086 AFM29SCFPR06 AFM47SCFPR09
9,75-164,0	4057099	<b>DV40FBHMKIT164M</b>	DV40FBHM1691 AFB09075SCFCR06 AFB13085SCFCR06 AFB17100SCFCR06 AFB21110SCFCR09 AFB24115SCFCR09 AFM29115 AFM47115 EBM8015086 AFM29SCFPR06 AFM47SCFPR09
9,75-164,0	4057100	<b>BT40FBHMKIT164M</b>	BT40FBHM1691 AFB09075SCFCR06 AFB13085SCFCR06 AFB17100SCFCR06 AFB21110SCFCR09 AFB24115SCFCR09 AFM29115 AFM47115 EBM8015086 AFM29SCFPR06 AFM47SCFPR09



Hole Finishing



• Order blade sets separately; see page K186.



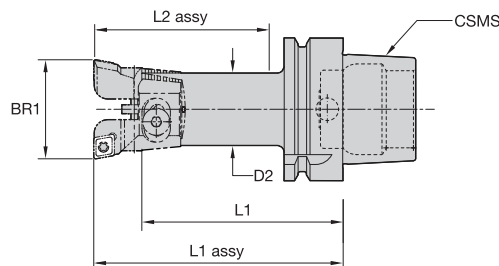
■ RBHT • KM™ Rough-Boring Twin Cutters



order number	catalogue number	BR1 bore range mm	CSMS system size	D2 mm	L1 mm	L1 assy mm	L2 assy mm	blade screw	washer	pin
3586519	KM32RBHT24	23,500-30,500	KM32	20,0	75,4	90,0	76,0	840.142.200	841.142.200	841.342.200
3586520	KM32RBHT30	29,500-40,000	KM32	25,0	83,8	100,0	86,0	840.142.250	841.142.250	841.342.200
3586521	KM40RBHT40	39,500-50,500	KM40	32,0	68,8	90,0	74,0	840.142.320	841.142.320	841.342.200
3586522	KM50RBHT50	49,500-66,500	KM50	42,0	62,2	90,0	70,0	840.142.420	841.142.200	841.342.420
3586543	KM50RBHT66	65,500-87,500	KM50	55,0	63,0	100,0	100,0	840.142.550	841.142.550	841.342.420
3586544	KM50RBHT87	86,500-115,500	KM50	72,0	70,5	120,0	120,0	840.142.720	841.142.720	841.342.420
3586545	KM63UTRBHT87	86,500-115,500	KM63UT	72,0	70,5	120,0	120,0	840.142.720	841.142.720	841.342.420
3586546	KM63UTRBHT115	114,500-153,000	KM63UT	94,0	83,2	150,0	150,0	840.142.940	841.142.940	841.342.420

Hole Finishing

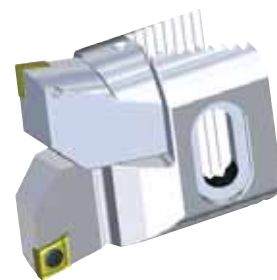
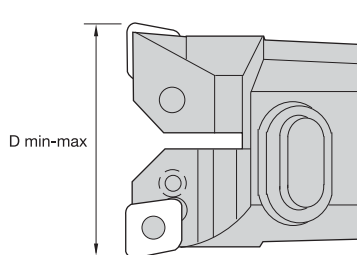
• Order blade sets separately; see page K186.



■ RBHT • HSK Rough-Boring Twin Cutters



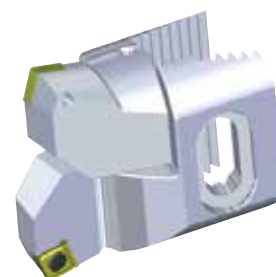
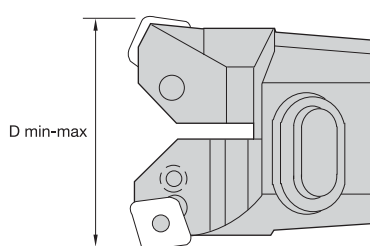
order number	catalogue number	BR1 bore range mm	CSMS system size	D2 mm	L1 mm	L1 assy mm	L2 assy mm	blade screw	washer	pin
3586547	HSK63RBHT24	23,500-30,500	HSK63A	20,0	75,4	90,0	64,1	840.142.200	841.142.200	841.342.200
3586548	HSK63RBHT30	29,500-40,000	HSK63A	25,0	88,8	105,0	79,1	840.142.250	841.142.250	841.342.200
3586549	HSK63RBHT40	39,500-50,500	HSK63A	32,0	92,2	110,0	84,1	840.142.320	841.142.320	841.342.200
3586550	HSK63RBHT50	49,500-66,500	HSK63A	42,0	92,2	120,0	94,1	840.142.420	841.142.420	841.342.200
3586551	HSK63RBHT66	65,500-87,500	HSK63A	55,0	95,5	125,0	125,0	840.142.550	841.142.720	841.342.420
3586563	HSK63RBHT87	86,500-115,500	HSK63A	72,0	95,5	145,0	145,0	840.142.720	841.142.720	841.342.420



■ RBHT • 90° Blade Sets



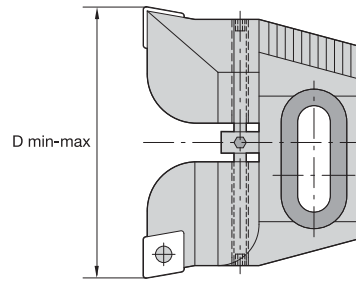
order number	catalogue number	D min mm	D max mm	gage insert	adjusting screw	insert screw	shim	shim pin	toggle lever	Torx wrench	Torx size
3556346	MB24RBHT06F	23,50	30,50	CC..0602..	848.200.407	843.006.000	—	—	—	FT7	T7
3556347	MB30RBHT06F	29,50	40,10	CC..0602..	848.250.409	843.006.000	—	—	—	FT7	T7
3556348	MB40RBHT09F	39,50	50,50	CC..09T3..	848.320.413	843.009.000	—	—	—	FT15	T15
3556349	MB50RBHT09F	49,50	66,50	CC..09T3..	848.420.614	843.009.000	—	—	—	FT15	T15
3556350	MB66RBHT12F	65,50	87,50	CC..1204..	848.550.620	843.012.000	—	—	—	FT20	T20
3556352	MB66RBHT12LF	65,50	87,50	CN..1204..	847.012.000	—	845.012.000	844.012.000	846.012.000	—	—
3556393	MB87RBHT12F	86,50	115,50	CC..1204..	848.720.000	843.012.000	—	—	—	FT20	T20
3556394	MB87RBHT16LF	86,50	115,50	CN..1606..	847.016.000	—	845.016.000	844.016.000	846.016.000	—	—
3556395	MB115RBHT12F	114,50	153,00	CC..1204..	848.940.640	843.012.000	—	—	—	FT20	T20
3556396	MB115RBHT16LF	114,50	153,00	CN..1606..	847.016.000	—	845.016.000	844.016.000	846.016.000	—	—



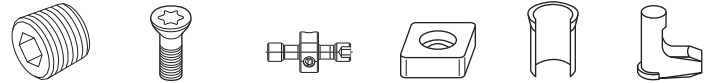
■ RBHT • 70° Blade Sets



order number	catalogue number	D min mm	D max mm	gage insert	adjusting screw	insert screw	shim	shim pin	toggle lever	Torx wrench	Torx size	hex size
3556397	MB24RBHT06K	23,50	30,50	CC..0602..	848.200.407	843.006.000	—	—	—	FT7	T7	—
3556398	MB30RBHT06K	29,50	40,10	CC..0602..	848.250.409	843.006.000	—	—	—	FT7	T7	—
3556399	MB40RBHT09K	39,50	50,50	CC..09T3..	848.320.413	843.009.000	—	—	—	FT15	T15	—
3556400	MB50RBHT09K	49,50	66,50	CC..09T3..	848.420.614	843.009.000	—	—	—	FT15	T15	—
3556401	MB66RBHT12K	65,50	87,50	CC..1204..	848.550.620	843.012.000	—	—	—	FT20	T20	—
3556402	MB66RBHT12LK	65,50	87,50	CN..1204..	847.012.000	—	845.012.000	844.012.000	846.012.000	—	—	3mm
3556403	MB87RBHT12K	86,50	115,50	CC..1204..	848.720.000	843.012.000	—	—	—	FT20	T20	—
3556404	MB87RBHT16LK	86,50	115,50	CN..1606..	847.016.000	—	845.016.000	844.016.000	846.016.000	—	—	3mm
3556405	MB115RBHT16LK	114,50	153,00	CN..1606..	847.016.000	—	845.016.000	844.016.000	846.016.000	—	—	3mm



■ RBHT • 90° Simultaneous Adjusting Blade Sets

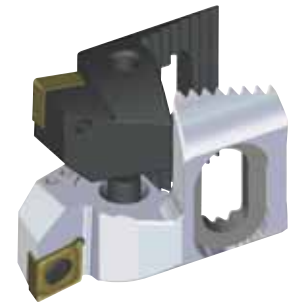
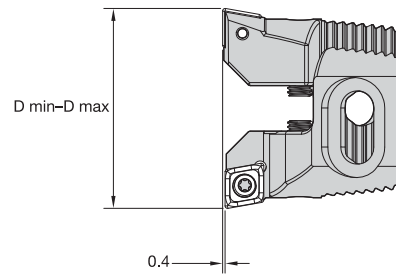
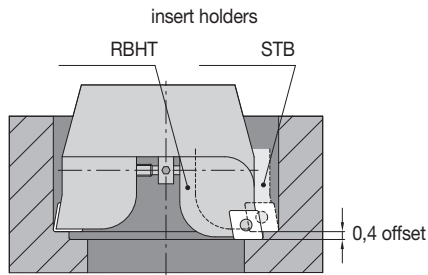


order number	catalogue number	D min mm	D max mm	gage insert	flat point socket set screw	insert screw	simultaneous adj spindle	shim	shim pin	toggle lever
2652965	SYB24RBHT06F	23,50	30,50	CC..0602..	848.200.407	843.006.000	848.200.005	—	—	—
2652967	SYB30RBHT06F	29,50	40,10	CC..0602..	848.250.409	843.006.000	848.250.005	—	—	—
2652968	SYB40RBHT09F	39,50	50,50	CC..09T3..	848.320.413	843.009.000	848.320.005	—	—	—
2652969	SYB50RBHT09F	49,50	66,50	CC..09T3..	848.420.614	843.009.000	848.420.005	—	—	—
2652971	SYB66RBHT12LF	65,50	87,50	CN..1204..	847.012.000	—	848.550.005	845.012.000	844.012.000	846.012.000
2652970	SYB66RBHT12F	65,50	87,50	CN..1204..	843.012.000	—	848.550.005	—	—	—
2652972	SYB87RBHT12F	86,50	115,50	CC..1204..	843.012.000	—	848.720.005	—	—	—
2652983	SYB87RBHT16LF	86,50	115,50	CN..1606..	847.016.000	—	848.720.005	845.016.000	844.016.000	846.016.000
2652984	SYB115RBHT16LF	114,50	153,00	CN..1606..	847.016.000	—	848.720.005	845.016.000	844.016.000	846.016.000

Hole Finishing

■ Reference Insert Blade Sets

BR1		90° lead blade sets		70° lead blade sets		90° lead simultaneous adjusting blade sets		90° lead split depth-of-cut blade	
mm	in								
23.500–30.500	.9252–1.2008	MB24RBHT06F	—	MB24RBHT06K	—	SYB24RBHT06F	—	SDB24RBHT06F	—
29.500–40.000	1.1614–1.5748	MB30RBHT06F	—	MB30RBHT06K	—	SYB30RBHT06F	—	SDB30RBHT06F	—
39.500–50.500	1.5551–1.9882	MB40RBHT09F	—	MB40RBHT09K	—	SYB40RBHT09F	—	SDB40RBHT09F	—
49.500–66.500	1.9488–2.6181	MB50RBHT09F	—	MB50RBHT09K	—	SYB50RBHT09F	—	SDB50RBHT09F	—
65.500–87.500	2.5787–3.4449	MB66RBHT12F	MB66RBHT12LF	MB66RBHT12K	MB66RBHT12LK	SYB66RBHT12F	SYB66RBHT12LF	SDB66RBHT12F	SDB66RBHT12LF
86.500–115.500	3.4055–4.5472	MB87RBHT12F	MB87RBHT16LF	MB87RBHT12K	MB87RBHT16LK	SYB87RBHT12F	SYB87RBHT16LF	SDB87RBHT12F	SDB87RBHT16LF
114.500–153.000	4.5079–6.0236	MB115RBHT12F	MB115RBHT16LF	—	MB115RBHT16LK	—	SYB115RBHT16LF	SDB115RBHT12F	SDB115RBHT16LF



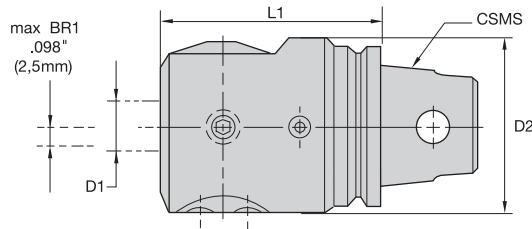
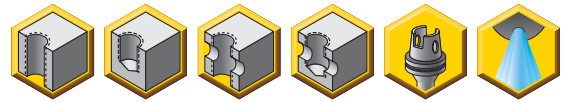
■ RBHT • 90° Split Depth of Cut Blade Sets



order number	catalogue number	D min mm	D max mm	gage insert	adjustment screw	insert screw	shim	shim pin	toggle lever
4063996	SDB24RBHT06F	23,50	30,50	CC..0602..	848.200.407	843.006.000	—	—	—
4063997	SDB30RBHT06F	29,50	40,10	CC..0602..	848.250.409	843.006.000	—	—	—
4063998	SDB40RBHT09F	39,50	50,50	CC..09T3..	848.320.413	843.009.000	—	—	—
4063999	SDB50RBHT09F	49,50	66,50	CC..09T3..	848.420.614	843.009.000	—	—	—
4064000	SDB66RBHT12F	65,50	87,50	CC..1204..	848.550.620	843.012.000	—	—	—
4064001	SDB66RBHT12LF	65,50	87,50	CN..1204..	847.012.000	—	845.012.000	844.012.000	846.012.000
4064002	SDB87RBHT12F	86,50	115,50	CC..1204..	848.720.000	843.012.000	—	—	—
4064203	SDB87RBHT16LF	86,50	115,50	CN..1606..	847.016.000	—	845.016.000	844.016.000	846.016.000
4064204	SDB115RBHT16LF	114,50	153,00	CN..1606..	847.016.000	—	845.016.000	844.016.000	846.016.000
4064205	SDB115RBHT12F	114,50	153,00	CC..1204..	848.940.640	843.012.000	—	—	—

Hole Finishing

- Order boring bars separately for required diameter; see page K192.
- 0,01mm diameter adjustment respective 2 µm with vernier scale.

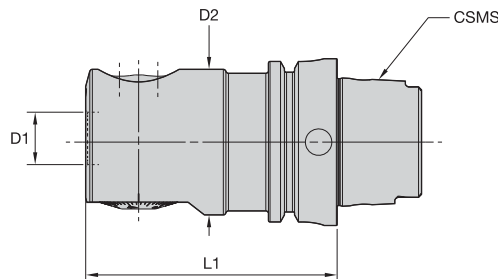
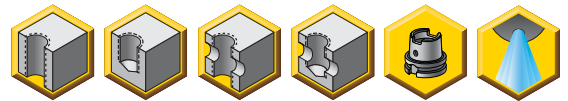


■ FBHO • KM™ Offset Boring Head

order number	catalogue number	CSMS system size	D1 mm	D2 mm	L1 mm	ModBORE FBHO parts package
1131111	KM40FBHO1660	KM40	16	55,0	60,0	PKG7001
1132036	KM50FBHO1670	KM50	16	55,0	70,0	PKG7001

Hole Finishing

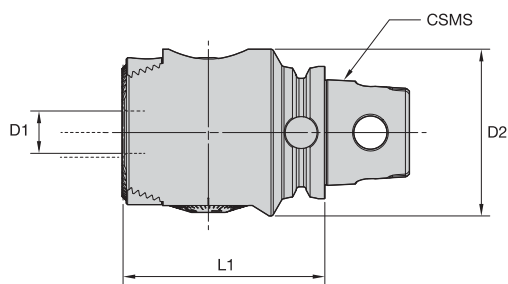
- Order boring bars separately for required diameter; see page K192.
- 0,01mm diameter adjustment respective 2 µm with vernier scale.



■ FBHO • HSK Boring Head

order number	catalogue number	CSMS system size	D1 mm	D2 mm	L1 mm	ModBORE FBHO parts package
2651037	HSK63FBHO1695	HSK63A	16	55	95,0	PKG7001

- Order boring bars, diameter extension bridge, and cartridges separately.
- 0,01mm diameter adjustment respective 2 µm with vernier scale.

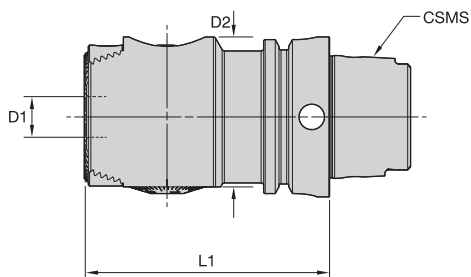
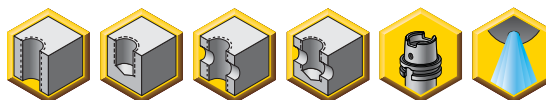


■ **FBHM • KM™ Boring Head**

order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	ModBORE FBHS parts package	kg
4057060	KM50TSFBHM1677	9,750-164,000	KM50TS	16,0	63,0	76,6	PKG-8001	1,5

Hole Finishing

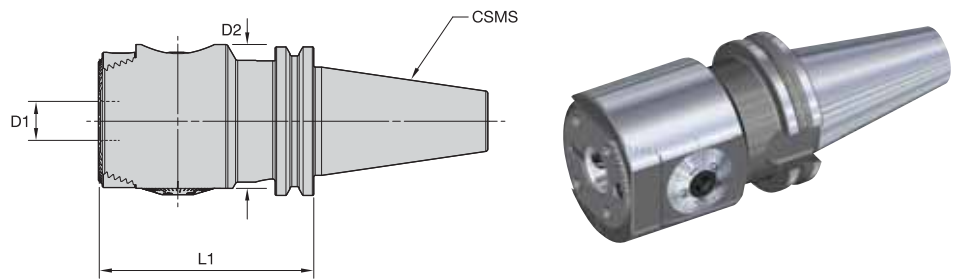
- Order boring bars, diameter extension bridge, and cartridges separately.
- 0,01mm diameter adjustment respective 2 µm with vernier scale.



■ **FBHM • HSK Boring Head**

order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	ModBORE FBHS parts package	kg
4057057	HSK63FBHM1696	9,750-164,000	HSK63A	16,0	63,0	95,0	PKG-8001	2,0

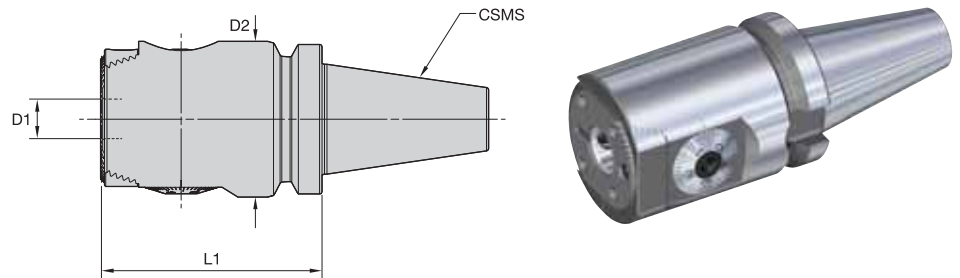
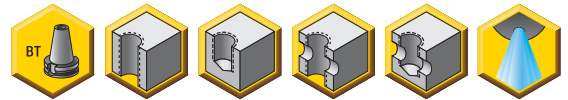
- Order boring bars, diameter extension bridge, and cartridges separately.
- 0,01mm diameter adjustment respective 2 µm with vernier scale.



### ■ FBHM • DV40 Boring Head

order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	ModBORE FBHS parts package	kg
4057058	DV40FBHM1691	9,750-154,000	DV40	—	63,0	90,0	PKG-8001	2,1

- Order boring bars, diameter extension bridge, and cartridges separately.
- 0,01mm diameter adjustment respective 2 µm with vernier scale.



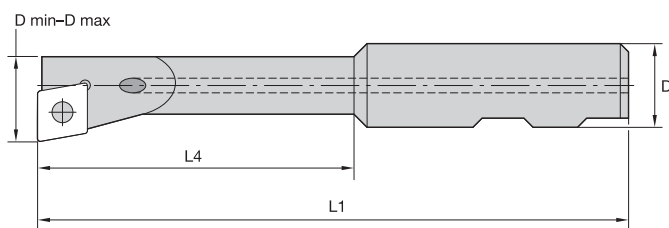
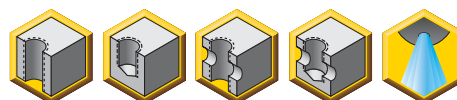
### ■ FBHM • BT40 Boring Head

order number	catalogue number	BR1 bore range mm	CSMS system size	D1 mm	D2 mm	L1 mm	ModBORE FBHS parts package	kg
4057059	BT40FBHM1691	9,750-164,000	BT40	16,0	63,0	90,0	PKG-8001	2,2

Hole Finishing



• Order inserts separately.



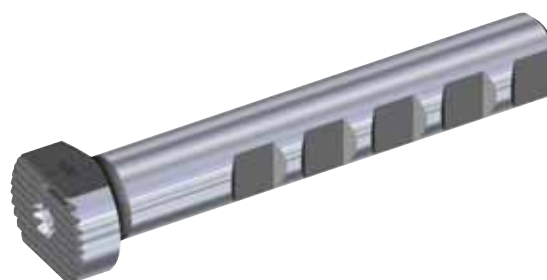
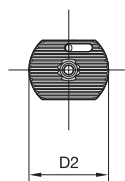
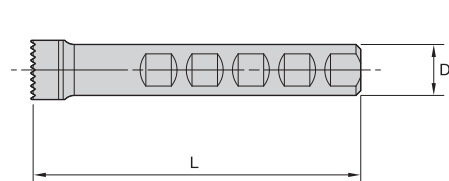
■ FBHO/FBHM • Universal Boring Bars



Hole Finishing

order number	catalogue number	D min mm	D max mm	D	L1 mm	L4 mm	gage insert	insert screw	Torx size
1125110	AFB09075SCFCR06	9,75	14,75	16	75,0	30,0	CC..0602../CC..215..	PKG2025	T7
1133883	AFB13085SCFCR06	13,75	18,75	16	85,0	40,0	CC..0602../CC..215..	PKG2025	T7
1133894	AFB17100SCFCR06	17,75	22,75	16	100,0	55,0	CC..0602../CC..215..	PKG2025	T7
1137835	AFB21110SCFCR09	21,75	26,75	16	110,0	60,0	CC..09T3../CC..325..	PKG3242	T15
1128324	AFB24115SCFCR09	24,75	29,75	16	115,0	65,0	CC..09T3../CC..325..	PKG3242	T15
1126838	AFB27115SCFCR09	27,75	32,75	16	115,0	70,0	CC..09T3../CC..325..	PKG3242	T15
1120731	AFB31115SCFCR09	31,75	36,75	16	115,0	70,0	CC..09T3../CC..325..	PKG3242	T15
1127271	AFB34115SCFCR09	34,75	39,75	16	115,0	70,0	CC..09T3../CC..325..	PKG3242	T15
2651038	AFB38115SCFPR09	38,75	44,10	16	115,0	85,0	CC..09T3../CC..325..	PKG3242	T15
2651039	AFB42115SCFPR09	42,75	48,10	16	115,0	85,0	CC..09T3../CC..325..	PKG3242	T15
2651040	AFB47115SCFPR09	47,75	53,10	16	115,0	85,0	CC..09T3../CC..325..	PKG3242	T15

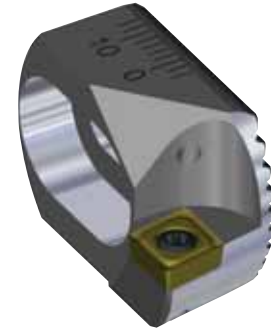
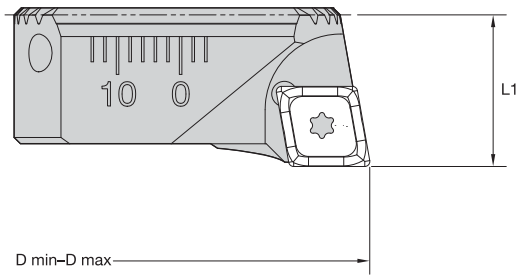
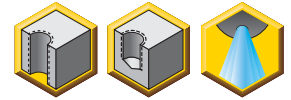
• Order AFM insert cartridge separately.



■ FBHO/FBHM • AFM Boring Bars

order number	catalogue number	BR1 bore range mm	D mm	D2 mm	L mm
4057061	AFM29115	29,8	16,0	25,0	103,000
4057062	AFM47115	47,8	16,0	44,0	101,580

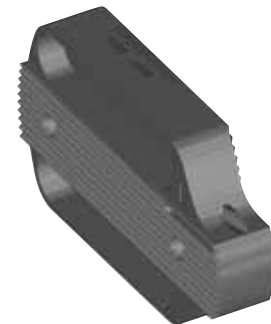
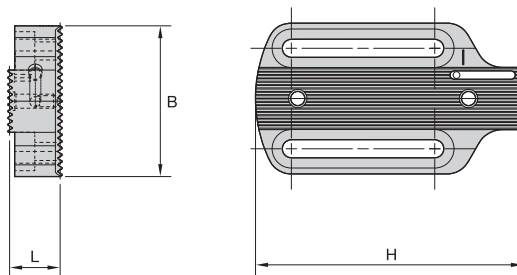
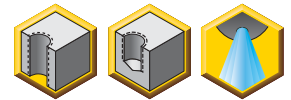
- For use with AFM boring bars.
- Order insert separately.



### ■ AFM • Insert Cartridges

order number	catalogue number	D min mm	D max mm	L1 mm	gage insert	ModBORE parts package	insert screw I.D. drive size
4057093	AFM29SCFPR06	30	48	12	CC..0602../CC..215..	PKG2025	T7
4057094	AFM47SCFPR09	48	88	14	CC..09T3../CC..325..	PKG3242	T15

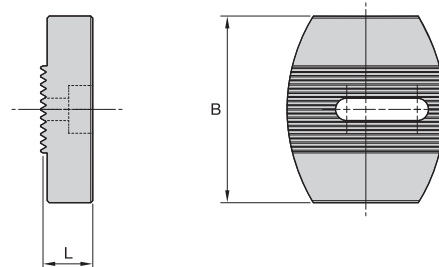
- For use with FBHM insert holders and FBHM counterweight.
- Order AFM47SCFPR09 insert cartridge separately to achieve diameter range.



### ■ FBHM • Extension Bridge

order number	catalogue number	BR1 bore range mm	B mm	H mm	L mm
4057095	EBM8015086	86,000-164,000	45,0	80,0	15,0

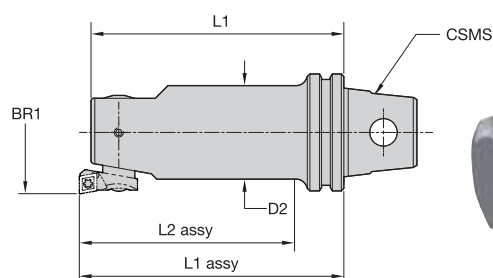
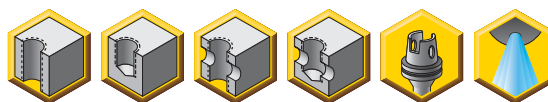
- For use with FBHM extension bridge.



### ■ FBHM • Counterweight

order number	catalogue number	B mm	L mm
4057096	886038045	45	12

- 0,01mm diameter adjustment respective 2 µm with vernier scale.
- Internal coolant directed to indexable insert.
- Order insert cartridges separately for required bore range; see page K195.



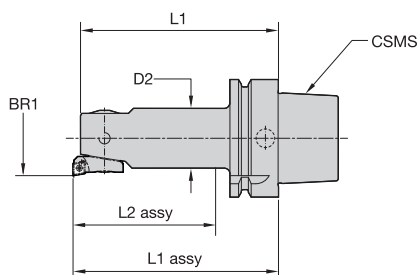
■ FBHS • KM™ Fine-Boring Single Cutters

Hole Finishing

order number	catalogue number	BR1 bore range mm	CSMS system size	D2 mm	L1 mm	L1 assy mm	L2 assy mm	cartridge mounting screw	lock screw
3586572	KM32FBHS24	23,900-37,100	KM32	20,0	86,0	90,0	76,1	880.252.200	881.252.200
3586573	KM32FBHS31	30,900-47,100	KM32	25,0	96,0	100,0	86,1	880.252.250	881.252.250
3586574	KM40FBHS40	39,900-59,100	KM40	32,0	86,0	90,0	74,0	880.252.320	881.252.320
3586575	KM50FBHS51	50,900-81,100	KM50	42,0	86,0	90,0	70,0	880.252.420	881.252.420
3586576	KM50FBHS67	66,900-105,100	KM50	55,0	96,0	100,0	100,0	880.252.550	881.252.550
3586577	KM50FBHS87	86,900-154,100	KM50	72,0	116,0	120,0	120,0	880.252.550	881.252.720
3586578	KM63UTFBHS87	86,900-154,100	KM63UT	72,0	115,0	120,0	120,0	880.252.550	881.252.720
3586579	KM63UTFBHS116	115,900-191,100	KM63UT	96,0	145,0	150,0	150,0	880.252.550	881.252.940



- 0,01mm diameter adjustment respective 2 µm with vernier scale.
- Internal coolant directed to indexable insert.
- Order insert cartridges separately for required bore range; see page K195.



■ FBHS • HSK Fine-Boring Single Cutters

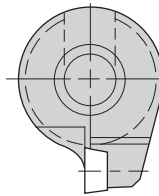
order number	catalogue number	BR1 bore range mm	CSMS system size	D2 mm	L1 mm	L1 assy mm	L2 assy mm	cartridge mounting screw	lock screw
3586580	HSK63FBHS24	23,900-37,100	HSK63A	20,0	86,0	90,0	61,1	880.252.200	881.252.200
3586581	HSK63FBHS31	30,900-47,100	HSK63A	25,0	101,0	105,0	76,1	880.252.250	881.252.250
3586582	HSK63FBHS40	39,900-59,100	HSK63A	32,0	106,0	110,0	81,1	880.252.320	881.252.320
3586583	HSK63FBHS51	50,900-81,100	HSK63A	42,0	116,0	120,0	91,1	880.252.420	881.252.420
3586584	HSK63FBHS67	66,900-105,100	HSK63A	55,0	121,0	125,0	99,1	880.252.550	881.252.550
3586585	HSK63FBHS87	86,900-154,100	HSK63A	72,0	141,0	145,0	145,0	880.252.550	881.252.720



**Reference Insert Cartridges**

BR1 mm	insert cartridges			
	90° lead		95° lead	
23,900-31,100	R24FBHS06	—	R24FBHS06LF	—
29,900-37,100	R30FBHS06	—	—	—
30,900-40,100	R31FBHS06	—	R31FBHS06LF	—
37,900-47,100	F38FBHS06	—	—	—
39,900-51,100	R40FBHS06	—	R40FBHS06LF	—
47,900-59,100	R48FBHS06	—	—	—
50,900-67,100	R51FBHS06	—	R51FBHS06LF	—
64,900-81,100	R65FBHS06	—	—	—
66,900-87,100	R67FBHS06	R67FBHS09	—	R67FBHS09LF
84,900-105,100	R85FBHS06	R85FBHS09	—	—
86,900-116,100	R67FBHS06	R67FBHS09	—	R67FBHS09LF
104,900-134,100	R85FBHS06	R85FBHS09	—	—
115,900-154,100	R67FBHS06	R67FBHS09	—	R67FBHS09LF
133,900-171,100	R85FBHS06	R85FBHS09	—	—
153,900-191,100	—	R125FBHS09	—	—

• Order inserts separately.



Hole Finishing

**90° Lead • Insert Holders for FBHS Fine-Boring Heads**

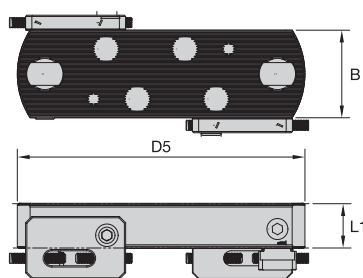
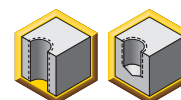

order number	catalogue number	gage insert	Torx size	insert screw
1137487	R24FBHS06	CC..0602../CC..215..	T7	843.006.000
2649548	R30FBHS06	CC..0602../CC..215..	T7	843.006.000
1133669	R31FBHS06	CC..0602../CC..215..	T7	843.006.000
2649549	R38FBHS06	CC..0602../CC..215..	T7	843.006.000
1135369	R40FBHS06	CC..0602../CC..215..	T7	843.006.000
2649550	R48FBHS06	CC..0602../CC..215..	T7	843.006.000
1137479	R51FBHS06	CC..0602../CC..215..	T7	843.006.000
2649551	R65FBHS06	CC..0602../CC..215..	T7	843.006.000
1834274	R67FBHS06	CC..0602../CC..215..	T7	843.006.000
1137505	R67FBHS09	CC..09T3../CC..325..	T15	843.009.000
2649552	R85FBHS06	CC..0602../CC..215..	T7	843.006.000
2649553	R85FBHS09	CC..09T3../CC..325..	T15	843.009.000
2649554	R125FBHS09	CC..09T3../CC..325..	T15	843.009.000

• Order inserts separately.

**95° Lead • Insert Holders for FBHS**


order number	catalogue number	gage insert	insert screw I.D. drive size	insert screw
2649555	R24FBHS06LF	CC..0602../CC..215..	T7	843.006.000
2649556	R31FBHS06LF	CC..0602../CC..215..	T7	843.006.000
2649557	R40FBHS06LF	CC..0602../CC..215..	T7	843.006.000
2649558	R51FBHS06LF	CC..0602../CC..215..	T7	843.006.000
2649559	R67FBHS09LF	CC..09T3../CC..325..	T15	843.009.000

- Match extension bridge series to adaptor.



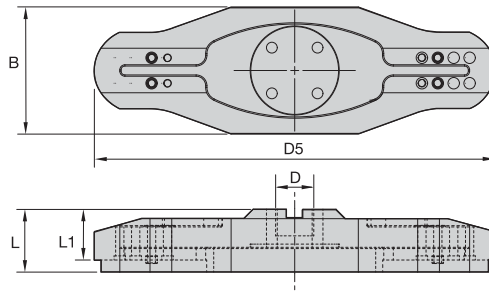
■ Small-Scale Extension Bridges

Hole Finishing

order number	catalogue number	BR1 bore range mm	max RPM	extension bridge series	B mm	D5 mm	L1 mm	spare parts package	hex size	kg
1133280	EB13030150	150,000-205,000	1250	A	70,0	130,0	30,0	PKG156502	8 mm	1,95
1125085	EB18030200	200,000-255,000	1000	A	70,0	180,0	30,0	PKG156502	8 mm	2,77
1132857	EB23035250	250,000-305,000	850	B	70,0	230,0	35,0	PKG156502	8 mm	4,00
1126830	EB28035300	300,000-355,000	700	B	70,0	280,0	35,0	PKG156502	8 mm	5,14
1121703	EB33040350	350,000-405,000	600	B	70,0	330,0	40,0	PKG156502	8 mm	6,86
1140602	EB38040400	400,000-455,000	530	C	70,0	380,0	40,0	PKG156502	8 mm	7,95
1121036	EB43040450	450,000-505,000	480	C	70,0	430,0	40,0	PKG156502	8 mm	9,23
1270619	EB48040500	500,000-550,000	440	C	70,0	480,0	40,0	PKG156502	8 mm	10,23
1270620	EB53050550	550,000-605,000	400	C	70,0	530,0	50,0	PKG156502	8 mm	13,91
1270621	EB58050600	600,000-655,000	370	C	70,0	580,0	50,0	PKG156502	8 mm	15,32



- For use with shell mill adaptors or direct connection to the machine spindle.
- Order bridge slides separately.



### Large Scale Extension Bridge

order number	catalogue number	BR1 bore range mm	D mm	D5 mm	B mm	L mm	L1 mm	kg
4057204	EB630128650	650,000-1105,000	60,0	630,0	200,0	99,0	84,0	17,2
4057205	EB10801281100	1100,000-1655,000	60,0	1080,0	200,0	99,0	84,0	28,1
4057206	EB16301281650	1650,000-2205,000	60,0	1630,0	200,0	99,0	84,0	43,0

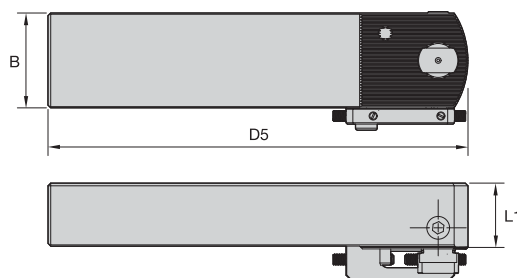
max RPMs	
BR1 bore range (mm)	max RPM
650-705	300
700-755	285
750-805	270
800-855	255
850-905	240
900-955	225
950-1005	210
1000-1055	195
1050-1105	180

max RPMs	
BR1 bore range (mm)	max RPM
1100-1155	170
1150-1205	163
1200-1255	156
1250-1305	149
1300-1355	142
1350-1405	135
1400-1455	128
1450-1505	121
1500-1555	114
1550-1605	107
1600-1655	100

max RPMs	
BR1 bore range (mm)	max RPM
1650-1705	95
1700-1755	90
1750-1805	85
1800-1855	80
1850-1905	75
1900-1955	70
1950-2005	65
2000-2055	60
2050-2105	55
2100-2155	50
2150-2205	45

Hole Finishing

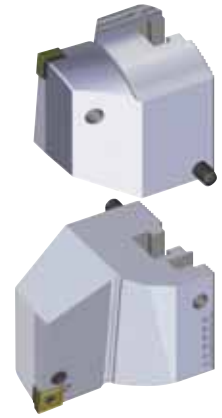
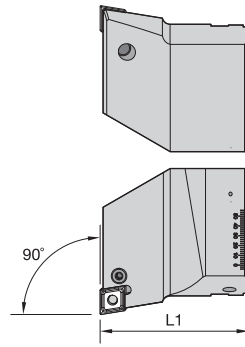
- For use with large-scale bridge extensions.
- Delivered as a set of two.



### Bridge Slides

order number	catalogue number	BR1 bore range mm	B mm	D5 mm	L1 mm	spare parts package	kg
4057207	EBSLD1105	650,000-1105,000	70,0	310,0	48,0	PKG156502	7,0
4057208	EBSLD2205	1100,000-2205,000	70,0	360,0	48,0	PKG156502	7,9

- Packaged as a matched set of two to enable twin cutting operations.

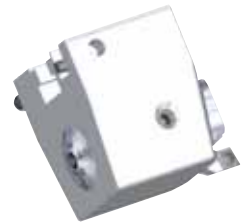
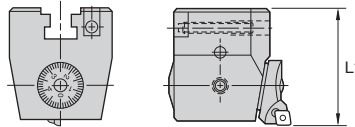


■ 90° Lead • Bridge Tool Rough Boring Head

Hole Finishing

order number	catalogue number	L1 mm	gage insert	spare parts package	insert screw I.D. drive size	kg
1624878	EBURF1975PKG	75,0	CN..1906../CN..64..	PKG7994	4 mm	1,6

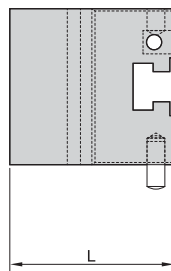
- Insert holder included.
- 0,01mm diameter adjustment respective 2 µm with vernier scale.
- Use with counterweight for balance.



■ 90° Lead • Bridge Tool Fine-Boring Head

order number	catalogue number	L1 mm	cartridge	spare parts package	wrench size adjusting screw	kg
1135375	EBUFF0975	75,0	R67-FBHS-09	PKG0002	5 mm	2,1

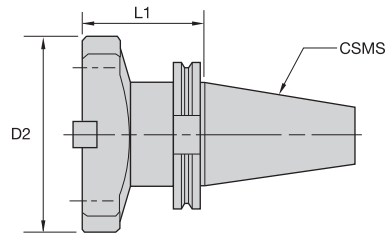
- Use to balance the extension bridge when using an EBUFF fine-boring head.



■ Bridge Tool Counterweight

order number	catalogue number	L mm	kg
4062443	EBUCW0074	74	2,1

- Extension bridge required.
- Order extension bridge separately; see page K196.
- Order coolant cartridge set separately; see page K200.
- Match adaptor and extension bridge series.



■ CV Bridge Tool Adaptors

order number	catalogue number	CSMS system size	extension bridge series	D1 mm	D1 max mm	D2 mm	L1 mm	spare parts package	socket-head cap screw
1122185	CV50BT13069	CV50	A,B,C	150	655	130,0	69,1	PKG1565	MS1085PKG



Hole Finishing

■ DV Bridge Tool Adaptors

order number	catalogue number	CSMS system size	extension bridge series	D1 mm	D1 max mm	D2 mm	L1 mm	spare parts package	socket-head cap screw
1263825	DV40BT13069	DV50	A	150	255	130	69	PKG1565	MS1085PKG
1133581	DV50BT13069	DV50	A,B,C	150	655	130	69	PKG1565	MS1085PKG

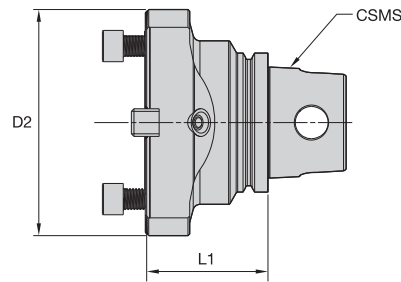


■ BT Bridge Tool Adaptors

order number	catalogue number	CSMS system size	extension bridge series	D1 mm	D1 max mm	D2 mm	L1 mm	spare parts package	socket-head cap screw
1121711	BT50BT13088	BT50	A,B,C	150	655	130	88	PKG1565	MS1085PKG



- Extension bridge required.
- Order extension bridge separately; see page K196.
- Match adaptor and extension bridge series.

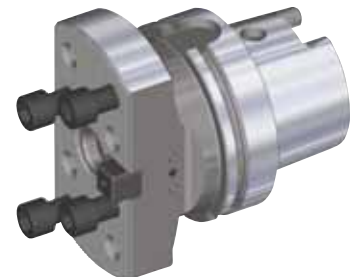
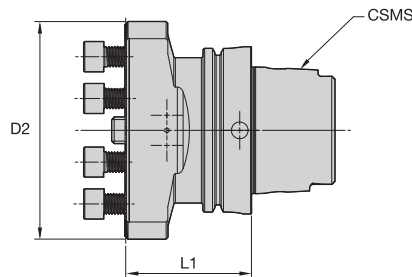


■ **KM™ Bridge Tool Adaptors**

order number	catalogue number	CSMS system size	extension bridge series	D1 mm	D1 max mm	D2 mm	L1 mm	spare parts package	socket-head cap screw
1135802	KM63BT13065	KM63	A	150	305	130,0	65,0	PKG1565	MS1085PKG
1197315	KM80BT13070	KM80	B,A	150	405	130,0	70,0	PKG1565	MS1085PKG

Hole Finishing

- Extension bridge required.
- Order extension bridge separately; see page K196.
- Match adaptor and extension bridge series.

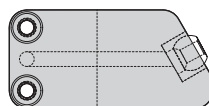


■ **HSK Bridge Tool Adaptors**

order number	catalogue number	CSMS system size	extension bridge series	D2 mm	L1 mm	spare parts package	socket-head cap screw
4062112	HSK100BT13075	HSK100A	A,B,C	130,0	75,0	PKG1565	MS1085PKG

**Coolant Cartridge for Bridge Tool Adaptor**

- Use at bridge tool adaptor to direct the coolant towards the insert.
- Delivered as a set of two with mounting screws.



■ **Coolant Cartridge**

order number	catalogue number
4062111	920028015

**ModBORE™ • Roughing • Metric**

Material Group	Condition	Geometry			Cutting Speed m/min			Feed Rate mm/r		
		-MP	-MN	-MF	min	Starting Value	max	-MP	-MN	-MF
P	1	—	KCP05	—	180	435	495	—	0,16 - 0,63	—
		—	KCP10		180	395	360	0,10 - 0,40	0,16 - 0,63	0,10 - 0,40
		—	KC9110		180	395	360	—	0,16 - 0,63	0,10 - 0,40
	2	—	KCP25		125	275	360	0,10 - 0,20	0,16 - 0,31	0,10 - 0,20
		—	KC9125		155	280	360	—	0,16 - 0,31	0,10 - 0,20
		—	KCP05	—	180	265	400	—	0,16 - 0,63	—
	3	—	KCP10		180	240	470	0,10 - 0,40	0,16 - 0,63	0,10 - 0,40
		—	KC9110		180	250	340	—	0,16 - 0,63	0,10 - 0,40
		—	KCP25		125	195	280	0,10 - 0,20	0,16 - 0,31	0,10 - 0,20
	4	—	KC9125		140	200	295	—	0,16 - 0,31	0,10 - 0,20
		—	KCP05	—	180	205	275	—	0,16 - 0,63	—
		—	KCP10		160	190	350	0,10 - 0,40	0,16 - 0,63	0,10 - 0,40
	5	—	KC9110		155	190	235	—	0,16 - 0,63	0,10 - 0,40
		—	KCP25		135	155	225	0,10 - 0,20	0,16 - 0,31	0,10 - 0,20
		—	KC9125		135	155	225	—	0,16 - 0,31	0,10 - 0,20
	6	—	KCP05	—	90	160	220	—	0,16 - 0,63	—
		—	KCP10		90	145	235	0,10 - 0,40	0,16 - 0,63	0,10 - 0,40
		—	KC9110		90	145	195	—	0,16 - 0,63	0,10 - 0,40
	7	—	KCP25		75	105	180	0,10 - 0,20	0,16 - 0,31	0,10 - 0,20
		—	KC9125		75	110	175	—	0,16 - 0,31	0,10 - 0,20
		—	KCP05	—	150	240	315	—	0,16 - 0,63	—
	8	—	KCP10		150	215	300	0,10 - 0,40	0,16 - 0,63	0,10 - 0,40
		—	KC9110		150	215	300	—	0,16 - 0,63	0,10 - 0,40
		—	KCP25		120	195	260	0,10 - 0,20	0,16 - 0,31	0,10 - 0,20
9	—	KC9125		120	195	260	—	0,16 - 0,31	0,10 - 0,20	
	—	KCP05	—	140	200	300	—	0,16 - 0,63	—	
	—	KCP10		110	180	270	0,10 - 0,40	0,16 - 0,63	0,10 - 0,40	
10	—	KC9110		120	180	225	—	0,16 - 0,63	0,10 - 0,40	
	—	KCP25		105	150	225	0,10 - 0,20	0,16 - 0,31	0,10 - 0,20	
	—	KC9125		105	150	225	—	0,16 - 0,31	0,10 - 0,20	



Material Group	Condition	Geometry			Cutting Speed m/min			Feed Rate mm/r		
		-MP	-MF	—	min	Starting Value	max	-MP	-MF	—
M	1	KCM15		—	100	180	240	0,10 - 0,40	0,08 - 0,30	—
		KC5010	—	—	130	215	250	0,10 - 0,40	—	—
		KC9225		—	175	185	250	0,10 - 0,40	0,08 - 0,30	—
	2	KCM25		—	90	150	200	0,10 - 0,20	0,08 - 0,15	—
		KC9240		—	90	120	135	0,10 - 0,20	0,08 - 0,15	—
		KCM15		—	110	165	250	0,10 - 0,40	0,08 - 0,30	—
	3	KC5010	—	—	125	200	250	0,10 - 0,40	—	—
		KC9225		—	110	170	230	0,10 - 0,40	0,08 - 0,30	—
		KCM25		—	90	150	225	0,10 - 0,20	0,08 - 0,15	—
	4	KC9240		—	80	105	135	0,10 - 0,20	0,08 - 0,15	—
		KCM15		—	110	150	250	0,10 - 0,40	0,08 - 0,30	—
		KC5010	—	—	110	150	230	0,10 - 0,40	—	—
	5	KC9225		—	110	150	230	0,10 - 0,40	0,08 - 0,30	—
		KCM25		—	90	120	200	0,10 - 0,20	0,08 - 0,15	—
		KC9240		—	80	90	135	0,10 - 0,20	0,08 - 0,15	—

■ ModBORE™ • Roughing • Metric

Material Group	Condition	Geometry			Cutting Speed m/min			Feed Rate mm/r		
		-MP	-MW	—	min	Starting Value	max	-MP	-MW	—
K	1	KCK20		—	220	300	540	0,10 - 0,40	0,16 - 1,00	—
		—	KT315	—	160	275	490	—	0,16 - 1,00	—
		KCK20		—	220	275	350	0,10 - 0,40	0,16 - 1,00	—
		—	KC9315	—	150	275	350	—	0,16 - 1,00	—
		KCK20		—	140	210	340	0,10 - 0,20	0,16 - 0,45	—
		—	KC9325	—	70	210	340	—	0,16 - 0,45	—
	2	KCK20		—	220	275	350	0,10 - 0,40	0,16 - 1,00	—
		—	KT315	—	180	275	360	—	0,16 - 1,00	—
		KCK20		—	220	275	350	0,10 - 0,40	0,16 - 1,00	—
		—	KC9315	—	130	260	340	—	0,16 - 1,00	—
		KCK20		—	220	275	350	0,10 - 0,20	0,16 - 0,45	—
		—	KC9315	—	130	260	340	—	0,16 - 1,00	—
3	KCK20		—	110	150	230	0,10 - 0,40	0,16 - 1,00	—	
	—	KT315	—	170	230	360	—	0,16 - 1,00	—	
	KCK20		—	110	150	230	0,10 - 0,40	0,16 - 1,00	—	
	—	KC9315	—	130	215	350	—	0,16 - 1,00	—	
	KCK20		—	110	150	230	0,10 - 0,20	0,16 - 0,45	—	
	—	KC9315	—	130	215	350	—	0,16 - 1,00	—	

Hole Finishing

Material Group	Condition	Geometry			Cutting Speed m/min			Feed Rate mm/r		
		-HP	—	—	min	Starting Value	max	-HP	—	—
N	1	KC5410	—	—	200	550	1000	0,16 - 0,63	—	—
		—	KD1400	—	450	765	2500	—	0,25 - 0,63	—
	2	KC5410	—	—	200	550	1000	0,16 - 0,31	—	—
		—	KD1425	—	300	520	900	—	0,25 - 0,63	—
	3	—	KD1425	—	300	520	900	—	0,25 - 0,40	—
		KC5410		—	100	275	500	0,16 - 0,63	—	—
		—	K313	—	120	260	490	0,16 - 0,63	—	—
		KC5410		—	100	275	500	0,16 - 0,31	—	—
	5	KC5410		—	100	200	350	0,16 - 0,63	—	—
		KC5410		—	100	200	350	0,16 - 0,31	—	—

Material Group	Condition	Geometry			Cutting Speed m/min			Feed Rate mm/r		
		-MP	-FP	-UP	min	Starting Value	max	-MP	-FP	-UP
S	1	KCU10		—	30	55	115	0,10 - 0,40	0,06 - 0,25	—
		KC5010			30	55	115	0,10 - 0,40	0,06 - 0,25	0,16 - 0,50
		KCU25		—	10	40	55	0,10 - 0,20	0,06 - 0,12	—
		KC9240	—	KC9240	10	40	60	0,10 - 0,20	—	0,16 - 0,27
		KCU10		—	30	60	120	0,10 - 0,40	0,06 - 0,25	—
		KC5010			30	60	115	0,10 - 0,40	0,06 - 0,25	0,16 - 0,50
	2	KCU25		—	10	30	55	0,10 - 0,20	0,06 - 0,12	—
		KC9240	—	KC9240	10	30	55	0,10 - 0,20	—	0,16 - 0,27
		KCU10		—	30	70	115	0,10 - 0,40	0,06 - 0,25	—
		KC5010			30	70	115	0,10 - 0,40	0,06 - 0,25	0,16 - 0,50
		KCU25		—	20	40	55	0,10 - 0,20	0,06 - 0,12	—
		KC9240	—	KC9240	20	40	60	0,10 - 0,20	—	0,16 - 0,27
	3	KCU10		—	45	70	140	0,10 - 0,40	0,06 - 0,25	—
		KC5010			45	70	170	0,10 - 0,40	0,06 - 0,25	0,16 - 0,50
		KCU25		—	20	55	90	0,10 - 0,20	0,06 - 0,12	—
		KC9240	—	KC9240	15	55	90	0,10 - 0,20	—	0,16 - 0,27
KCU10		—	45	70	140	0,10 - 0,40	0,06 - 0,25	—		
KC5010			45	70	170	0,10 - 0,40	0,06 - 0,25	0,16 - 0,50		
4	KCU25		—	20	55	90	0,10 - 0,20	0,06 - 0,12	—	
	KC9240	—	KC9240	15	55	90	0,10 - 0,20	—	0,16 - 0,27	

Condition: S = Stable cutting conditions; U = Unstable cutting conditions; I = Interrupted cutting conditions  
Pocket seat: I = Inboard insert; O = Outboard insert

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Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r				
		-LF	-UF	-FP	-FW	min	Starting Value	max	-LF	-UF	-FP	-FW	
P	1	○	KCP05		—	180	435	495	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
			—	—	KTP10	—	180	435	495	—	—	0,06 - 0,25	—
			KT315	—	—	KT315	180	400	495	0,06 - 0,25	—	—	0,08 - 0,30
	1	○	KCP10		—	180	395	465	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
			KC9110		—	180	395	495	0,06 - 0,25	0,04 - 0,16	—	—	
			KCP25				140	280	360	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16
	1	○	KC9125		—	140	280	360	0,06 - 0,10	0,04 - 0,08	—	—	
			KCP05		—	180	265	400	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
			—	—	KTP10	—	180	265	400	—	—	0,06 - 0,25	—
	2	○	KT315	—	—	KT315	190	270	390	0,06 - 0,25	—	—	0,08 - 0,30
			KCP10		—	180	240	330	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
			KC9110		—	180	240	330	0,06 - 0,25	0,04 - 0,16	—	—	
	2	○	KCP25				145	195	320	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16
			KC9125		—	145	195	320	0,06 - 0,10	0,04 - 0,08	—	—	
			KCP05		—	180	205	275	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
	3	○	—	—	KTP10	—	180	205	275	—	—	0,06 - 0,25	—
			KT315	—	—	KT315	180	210	275	0,06 - 0,25	—	—	0,08 - 0,30
			KCP10		—	160	190	250	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
	3	○	KC9110		—	155	190	240	0,06 - 0,25	0,04 - 0,16	—	—	
			KCP25				135	155	225	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16
			KC9125		—	135	155	225	0,06 - 0,10	0,04 - 0,08	—	—	
	4	○	KCP05		—	90	160	220	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—	
			—	—	KTP10	—	90	160	220	—	—	0,06 - 0,25	—
			KT315	—	—	KT315	90	180	220	0,06 - 0,25	—	—	0,08 - 0,30
4	○	KCP10		—	90	145	195	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—		
		KC9110		—	90	145	195	0,06 - 0,25	0,04 - 0,16	—	—		
		KCP25				75	105	180	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16	
4	○	KC9125		—	75	105	180	0,06 - 0,10	0,04 - 0,08	—	—		
		KCP05		—	150	240	315	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—		
		—	—	KTP10	—	150	240	315	—	—	0,06 - 0,25	—	
5	○	KT315	—	—	KT315	150	250	315	0,06 - 0,25	—	—	0,08 - 0,30	
		KCP10		—	150	215	300	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—		
		KC9110		—	150	215	300	0,06 - 0,25	0,04 - 0,16	—	—		
5	○	KCP25				120	195	255	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16	
		KC9125		—	120	195	255	0,06 - 0,10	0,04 - 0,08	—	—		
		KCP05		—	140	200	300	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—		
6	○	—	—	KTP10	—	140	200	300	—	—	0,06 - 0,25	—	
		KT315	—	—	KT315	140	200	300	0,06 - 0,25	—	—	0,08 - 0,30	
		KCP10		—	120	180	275	0,06 - 0,25	0,04 - 0,16	0,06 - 0,25	—		
6	○	KC9110		—	120	180	225	0,06 - 0,25	0,04 - 0,16	—	—		
		KCP25				105	150	225	0,06 - 0,10	0,04 - 0,08	0,06 - 0,12	0,08 - 0,16	
		KC9125		—	105	150	225	0,06 - 0,10	0,04 - 0,08	—	—		



Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r				
		-LF	-UF	-FP	-FW	min	Starting Value	max	-LF	-UF	-FP	-FW	
M	1	—	—	KTP10	—	140	230	315	—	—	0,06 - 0,25	—	
		KT315	—	—	KT315	140	230	315	0,06 - 0,25	—	—	0,08 - 0,30	
		KC5010	—	—	KC5010	130	215	245	0,06 - 0,25	—	—	0,08 - 0,30	
	1	○	KCM15	—	KCM15	—	105	180	240	0,06 - 0,12	—	0,06 - 0,12	—
			KC9225	—	—	KC9225	105	180	240	0,06 - 0,12	—	—	0,08 - 0,16
			—	—	KTP10	—	140	215	295	—	—	0,06 - 0,25	—
	2	○	KT315	—	—	KT315	140	215	295	0,06 - 0,25	—	—	0,08 - 0,30
			KC5010	—	—	KC5010	130	200	245	0,06 - 0,25	—	—	0,08 - 0,30
			KCM15	—	KCM15	—	105	165	250	0,06 - 0,12	—	0,06 - 0,12	—
	2	○	KC9225	—	—	KC9225	100	160	230	0,06 - 0,12	—	—	0,08 - 0,16
			—	—	KTP10	—	140	200	300	—	—	0,06 - 0,25	—
			KT315	—	—	KT315	140	200	300	0,06 - 0,25	—	—	0,08 - 0,30
3	○	KC5010	—	—	KC5010	130	185	230	0,06 - 0,25	—	—	0,08 - 0,30	
		KCM15	—	KCM15	—	115	150	255	0,06 - 0,12	—	0,06 - 0,12	—	
		KC9225	—	—	KC9225	110	150	230	0,06 - 0,12	—	—	0,08 - 0,16	

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Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r				
		-LF	-UF	-FP	-FW	min	Starting Value	max	-LF	-UF	-FP	-FW	
K	1	KCK20	—	KCK20		200	300	540	0,06 - 0,25	—	0,06 - 0,25	0,08 - 0,30	
		KT315	—	—	KT315	165	275	490	0,06 - 0,25	—	—	0,08 - 0,30	
		KC9315	—	—	—	110	275	450	0,06 - 0,25	—	—	—	
	2	C	KC9320	—	—	—	100	240	400	0,06 - 0,12	—	—	—
			KCK20	—	KCK20		150	240	420	0,06 - 0,25	—	0,06 - 0,25	0,08 - 0,30
		O	KT315	—	—	KT315	180	275	360	0,06 - 0,25	—	—	0,08 - 0,30
			KC5010	—	—	KC5010	100	200	265	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
			KC9315	—	—	—	145	260	360	0,06 - 0,25	—	—	—
			KC9320	—	—	—	140	240	330	0,06 - 0,12	—	—	—
	3	C	KCK20	—	KCK20		140	210	350	0,06 - 0,25	—	0,06 - 0,25	0,08 - 0,30
			KT315	—	—	KT315	180	230	320	0,06 - 0,25	—	—	0,08 - 0,30
		O	KC5010	—	—	KC5010	120	150	225	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30
KC9315			—	—	—	145	215	275	0,06 - 0,25	—	—	—	
KC9320			—	—	—	140	210	260	0,06 - 0,12	—	—	—	
KC9320			—	—	—	140	210	260	0,06 - 0,12	—	—	—	

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Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r				
		-LF	—	—	—	min	Starting Value	max	-LF	—	—	—	
N	1	KC5410	—	—	—	200	550	1000	0,10 - 0,40	—	—	—	
		KC5410	—	—	—	200	550	1000	0,10 - 0,20	—	—	—	
		—	KD1400	—	—	450	765	3000	—	0,06 - 0,15	—	—	
	2	C	—	KD1425	—	—	375	580	1150	—	0,06 - 0,25	—	—
			—	KD1400	—	—	400	650	1250	—	0,06 - 0,15	—	—
	3	C	KC5410	—	—	—	125	275	525	0,10 - 0,40	—	—	—
			—	KD1425	—	—	250	500	875	—	0,06 - 0,25	—	—
		O	KC5410	—	—	—	125	275	525	0,10 - 0,20	—	—	—
			—	KD1400	—	—	375	520	1000	—	0,06 - 0,12	—	—
	5	C	KC5410	—	—	—	125	200	375	0,10 - 0,40	—	—	—
			KC5410	—	—	—	125	200	375	0,10 - 0,20	—	—	—

Material Group	Condition	Geometry				Cutting Speed m/min			Feed Rate mm/r				
		-LF	-UF	-FP	-FW	min	Starting Value	max	-LF	-UF	-FP	-FW	
S	1	—	—	KCU10	—	30	55	125	—	—	0,06 - 0,25	—	
		K313	—	—	—	10	30	60	0,06 - 0,25	—	—	—	
		KC5010	—	—	KC5010	30	55	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30	
		—	—	KCU10	—	30	55	125	—	—	0,06 - 0,25	—	
		KC5010	—	—	KC5010	30	55	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30	
		—	—	KCU25	—	10	40	50	—	—	0,06 - 0,12	—	
	2	C	—	—	KCU10	—	30	35	125	—	—	0,06 - 0,25	—
			K313	—	—	—	10	35	60	0,06 - 0,25	—	—	—
		KC5010	—	—	KC5010	30	60	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30	
		—	—	KCU10	—	30	35	125	—	—	0,06 - 0,25	—	
		KC5010	—	—	KC5010	30	60	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30	
		—	—	KCU25	—	10	30	50	—	—	0,06 - 0,12	—	
	3	C	—	—	KCU10	—	30	70	125	—	—	0,06 - 0,25	—
			K313	—	—	—	10	40	60	0,06 - 0,25	—	—	—
		KC5010	—	—	KC5010	30	70	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30	
		—	—	KCU10	—	30	35	125	—	—	0,06 - 0,25	—	
		KC5010	—	—	KC5010	30	70	120	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30	
		—	—	KCU25	—	25	40	60	—	—	0,06 - 0,12	—	
	4	C	—	—	KCU10	—	45	70	140	—	—	0,06 - 0,25	—
			K313	—	—	—	15	45	65	0,06 - 0,25	—	—	—
		KC5010	—	—	KC5010	45	70	140	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30	
		—	—	KCU10	—	45	70	140	—	—	0,06 - 0,25	—	
		KC5010	—	—	KC5010	45	70	140	0,06 - 0,25	0,04 - 0,16	—	0,08 - 0,30	
		—	—	KCU25	—	25	55	90	—	—	0,06 - 0,12	—	
C	KC5025	—	—	—	15	55	90	0,06 - 0,10	—	—	—		

**Application Data • Maximum RPM**

	Application Diameter				RPM max	
	D1		D1			
	min (mm)	max (mm)	min (in)	max (in)		
<b>ModBORE™ RBHT</b> 	24	31	0.9449	1.2205	12000	
	31	40	1.2205	1.5748	10000	
	40	51	1.5748	2.0079	8000	
	51	67	2.0079	2.6378	6500	
	67	87	2.6378	3.4252	5000	
	87	116	3.4252	4.5669	4000	
	116	153	4.5669	6.0236	3000	
<b>ModBORE FBHS</b> 	24	31	0.9449	1.2205	<b>balanced</b> 12000	<b>unbalanced</b> 9000
	31	40	1.2205	1.5748	10000	7500
	40	51	1.5748	2.0079	8000	5250
	51	67	2.0079	2.6378	6500	4000
	67	87	2.6378	3.4252	5000	3000
	87	116	3.4252	4.5669	4000	2500
	116	171	4.5669	6.7323	3000	1750
<b>ModBORE FBHO</b> 	3	20	0.1181	0.7874	<b>boring bar out of center</b> <b>max 0,5mm (.02")</b> 16000	<b>0,5-2,5mm (.02-.1")</b> 6000
	20	48	0.7874	1.8898	12000	4000
	48	88	1.8898	3.4646	8000	2000
<b>ModBORE FBHM</b> 	3	20	0.1181	0.7874	<b>boring bar out of center</b> <b>max 0,5mm (.02")</b> 16000	<b>0,5-2,5mm (.02-.1")</b> 6000
	20	48	0.7874	1.8898	12000	4000
	48	88	1.8898	3.4646	8000	2000
	86	164	3.3858	6.4567	1000	—
	164	320	6.4567	12.5984	500	—
	—	—	0.0000	0.0000	—	—
	—	—	0.0000	0.0000	—	—
<b>ModBORE Bridge Tools</b> 	150	205	5.9055	8.0709	1250	
	200	255	7.8740	10.0394	1000	
	250	305	9.8425	12.0079	850	
	300	355	11.8110	13.9764	700	
	350	405	13.7795	15.9449	600	
	400	455	15.7480	17.9134	530	
	450	505	17.7165	19.8819	480	
	500	555	19.6850	21.8504	440	
550	605	21.6535	23.8189	400		
600	655	23.6220	25.7874	380		


  
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