

# ModuFlex<sup>®</sup>

**MODULAR EXPANDABLE REAMERS**  
**HARDMETAL/PCD/CBN/CERMET**

可膨胀模块化铰刀

   
Italy Made



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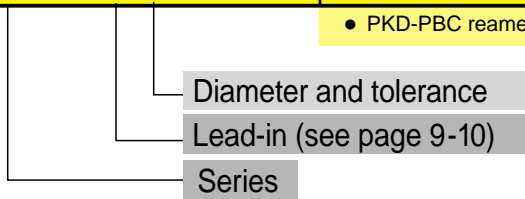
# CODE DESCRIPTION 编码说明

PERTINENT TO THE TOOL ALLOY AND LEAD-IN

## INTEGRAL EXPANDING & FIXED REAMERS EXPANDING REAMERS WITH CUTTING RING EXPANDING & FIXED HEADS

Code	Description
xxxx - ALx - Ø	Hard metal cutting edges K10
xxxx - TNx - Ø	Hard metal cutting edges K10 TIN-coated
xxxx - TCx - Ø	Hard metal cutting edges K10 TiCN-coated
xxxx - TAx - Ø	Hard metal cutting edges K10 TiAlN-coated
xxxx - KLx - Ø	Hard metal cutting edges K05/K10
xxxx - KNx - Ø	Hard metal cutting edges K05/K10 TIN-coated
xxxx - KCx - Ø	Hard metal cutting edges K05/K10 TiCN-coated
xxxx - KAx - Ø	Hard metal cutting edges K05/K10 TiAlN-coated
xxxx - AVx - Ø	Cermet cutting edges P20
xxxx - VNx - Ø	Cermet cutting edges P20 TIN-coated
xxxx - VCx - Ø	Cermet cutting edges P20 TiCN-coated
xxxx - VAx - Ø	Cermet cutting edges P20 TiAlN-coated
xxxx - SVx - Ø	Cermet cutting edges P10/P15
xxxx - SNx - Ø	Cermet cutting edges P10/P15 TIN-coated
xxxx - SCx - Ø	Cermet cutting edges P10/P15 TiCN-coated
xxxx - SAx - Ø	Cermet cutting edges P10/P15 TiAlN-coated

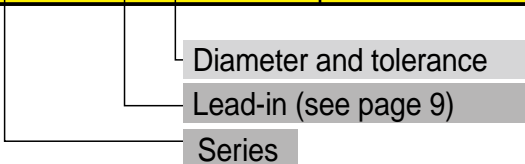
• PKD-PBC reamers on request



**ORDER EXAMPLE:** For reaming an hole Ø 8 H7, expanding reamer series 2421 with hard metal cutting edges TiCN coated and Negative lead-in, quote the following code: 2421-TCN-8 H7.

## CUTTING RINGS

Code	Description
2000 - CTx - Ø	Hard metal cutting edges K10
2TIN - CTx - Ø	Hard metal cutting edges K10 TIN-coated
2TIC - CTx - Ø	Hard metal cutting edges K10 TiCN-coated
2TIA - CTx - Ø	Hard metal cutting edges K10 TiAlN-coated
2000 - KTx - Ø	Hard metal cutting edges K05/K10
2TIN - KTx - Ø	Hard metal cutting edges K05/K10 TIN-coated
2TIC - KTx - Ø	Hard metal cutting edges K05/K10 TiCN-coated
2TIA - KTx - Ø	Hard metal cutting edges K05/K10 TiAlN-coated
2AVC - CTx - Ø	Cermet cutting edges P20
2ANC - CTx - Ø	Cermet cutting edges P20 TIN-coated
2ACC - CTx - Ø	Cermet cutting edges P20 TiCN-coated
2AAC - CTx - Ø	Cermet cutting edges P20 TiAlN-coated
2AVC - STx - Ø	Cermet cutting edges P10/P15
2ANC - STx - Ø	Cermet cutting edges P10/P15 TIN-coated
2ACC - STx - Ø	Cermet cutting edges P10/P15 TiCN-coated
2AAC - STx - Ø	Cermet cutting edges P10/P15 TiAlN-coated
2PKD - CTx - Ø	Multicrystal Diamond cutting edges
2PBC - CTx - Ø	Nitride Cubic of Boron cutting edges



**ORDER EXAMPLE:** For reaming an hole Ø 20 H6, cutting ring with hard metal cutting edges TIN coated and 45° lead-in, quote the following code: 2TIN-CTG-20 H6.

# INTRODUCTION TO THE COLOURS FOR THE IDENTIFICATION OF THE REAMERS

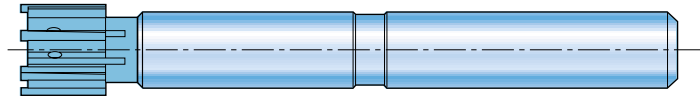
## 颜色的含义

In order to make the reading of this catalogue easier, we have provided to use different colours in the products description.

### BLUE

Indicates the reamers without through tool coolant.

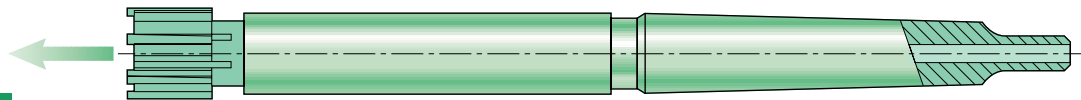
EXAMPLE  
series 2420



### GREEN

Indicates the reamers with central through tool coolant.

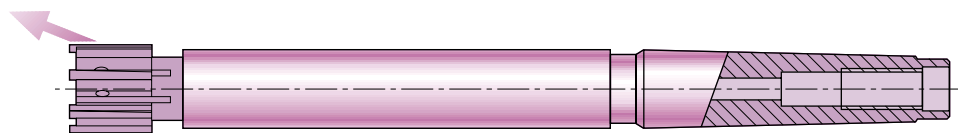
EXAMPLE  
series 2451



### VIOLET

Indicates the reamers with radial through tool coolant.

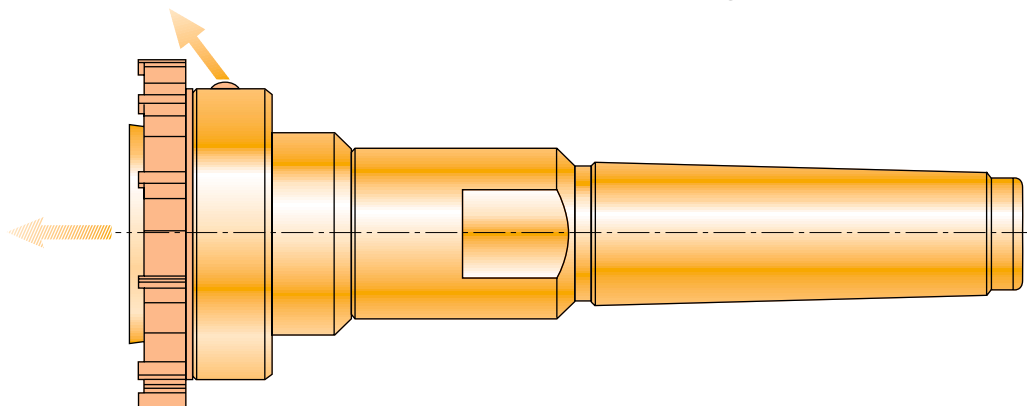
EXAMPLE  
series 3600



### ORANGE

Indicates the reamers with central & radial through tool coolant.

EXAMPLE  
series 4050








### YELLOW

Distinguishes the common sizes pertinent to the series on the same page.

# INTEGRAL EXPANDING & FIXED REAMERS PROGRAMME

整体和可调和不可调铰刀

## SUMMARY


	Series	Page	diameters mm							HIGH SPEED	Short series	Without through tool coolant	Central through tool coolant	Radial through tool coolant	Central & Radial through tool coolant	
			5,80	17,60	20,10	32,10	45,60	79,60	100,60							200,60
			    													
INTEGRAL EXPANDING REAMERS	2400	20								X		○				
	2401	20								X			○			
	2410	16								X		○				
	2430	16								X		○				
	2411	16								X			○			
	2431	16								•			○			
	2420	14								•		○				
	2440	14								•		○				
	2421	14								•			○			
	2441	14								•			○			
	2450	18								•		○				
	2451	18								•			○			
	2480	24										○				
	2481	24											○			
	2490	22										○				
	2491	22											○			
	3600	21								X				○		
3610	17								X				○			
3620	15								•				○			
3650	19								•				○			
3680	25												○			
3690	23												○			
INTEGRAL EXPANDING & FIXED REAMERS FOR HIGH FEEDS	161W	31								•				○		
	1610	31								•				○		
	162W	30								•				○		
	1620	30								•				○		
	3607	29								•				○		
	3617	28								•				○		
	3627	28								•				○		
	3657	29								•				○		

● Ideal application X Possible application


# EXPANDING REAMERS WITH CUTTING RING EXPANDING & FIXED HEADS PROGRAMME

可调刀环 可调和不可调刀头

## SUMMARY

	Series	Page	diameters mm							HIGH SPEED	Long series	Short series	Without through tool coolant	Central through tool coolant	Radial through tool coolant	Central & Radial through tool coolant	
			5,80	17,60	20,10	32,10	45,60	79,60	100,60								200,60
 EXPANDING REAMERS WITH CUTTING RING	2000	48-49								X			○				
	2010	42											○				
	2015	43											○				
	2050	44-45								●			○				
	2500	40-41								X			○				
	2505	40-41								X			○				
	2530	36-37								X			○				
	2535	36-37								X			○				
	2550	38-39								X			○				
	2555	38-39								X			○				
	4000	50-51								X			○				
	4000	50-51								X						○	
	4050	46-47								●			○				
	4050	46-47								●						○	
	4100	52								X					○		
	4150	52								X					○		
	4200	48-49								X					○		
	4250	44-45								●					○		
	4500	54								X					○		
	4505	54								X					○		
4550	53								●					○			
4555	53								●					○			
EXPANDING REAMERS WITH CUTTING RING "COMPOSIT" MODULAR SYSTEM	4330	55								●					○		
	4335	55								●					○		
	4350	56-57													○		
	4355	56-57													○		
	4300	58							*						○		
	4305	58							*						○		

\* Ø 60,59

 FIXED & EXPANDING HEADS			11,80	14,60	17,60	21,60	26,60	32,60	40,60	45,60	HIGH SPEED	Long series	Short series	Without through tool coolant	Central through tool coolant	Radial through tool coolant	Central & Radial through tool coolant								
	Series	Page																							
	7000MC	71																	●						○
	7000MT	72																	X						○
7000MM	73										●						○								

● Ideal application X Possible application

# TECHNICAL INFORMATION AND CUTTING PARAMETERS 切削参数 STANDARD SPEED REAMING

**Hard metal brazed carbide (our ref. H.M.)**

MATERIAL TO WORK	N / mm <sup>2</sup>	Reamer Ø mm	STOCK ALLOWANCE Ø mm	SURFACE SPEED m / min	FEED mm / rev	LUBRICANT
Mild Steel Unalloyed Low alloyed	Up to 600	Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,20 0,15 - 0,25 0,20 - 0,40 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	7 - 15	0,15 - 0,30 0,25 - 0,50 0,30 - 0,80 0,60 - 1,00 0,60 - 1,20 0,80 - 1,50	Emulsible oil Cutting oil
Structural steel Fused Metal		Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,20 0,15 - 0,25 0,20 - 0,30 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50		6 - 10	
Alloy steel Stainless steel	400 - 1000	Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,20 0,15 - 0,25 0,20 - 0,30 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	4 - 8	0,10 - 0,30 0,20 - 0,40 0,30 - 0,60 0,40 - 0,80 0,50 - 0,90 0,60 - 1,20	Emulsible oil Cutting oil
Strongly alloy steel Steel with manganese	800 - 1500	Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,20 0,15 - 0,25 0,20 - 0,30 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	3 - 6	0,10 - 0,20 0,15 - 0,40 0,30 - 0,50 0,30 - 0,70 0,40 - 0,80 0,50 - 1,00	Emulsible oil Cutting oil
Grey cast iron Spheroidal cast iron (pearlitic) Malleable cast iron	Up to 200HB Greater than 200 HB	Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,20 0,15 - 0,30 0,30 - 0,40 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	≤ 200 HB 15 - 30 > 200 HB 10 - 20	0,20 - 0,50 0,40 - 0,60 0,60 - 1,20 0,75 - 1,50 0,80 - 1,60 1,00 - 1,80	Oil Emulsible oil Cutting oil
Spheroidal cast iron (ferritic)	300 - 700	Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,20 0,15 - 0,25 0,20 - 0,30 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	8 - 12	0,15 - 0,30 0,40 - 0,60 0,50 - 1,00 0,75 - 1,50 0,80 - 1,60 1,00 - 1,80	Emulsible oil Cutting oil
Copper and alloys Brass	Up to 500	Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,25 0,15 - 0,25 0,25 - 0,40 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	10 - 18	0,15 - 0,40 0,20 - 0,60 0,25 - 0,90 0,40 - 1,10 0,50 - 1,20 0,60 - 1,50	Emulsible oil
Bronze Bronze phosphorous	Up to 600	Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,25 0,15 - 0,25 0,25 - 0,40 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	10 - 20	0,15 - 0,40 0,25 - 0,60 0,50 - 0,80 0,60 - 1,00 0,70 - 1,10 0,80 - 1,20	Emulsible oil Cutting oil
Alluminium and light alloys	Up to 500	Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,2 0,15 - 0,3 0,20 - 0,4 0,30 - 0,4 0,35 - 0,5 0,40 - 0,5	15 - 30	0,20 - 0,40 0,30 - 0,60 0,40 - 1,00 0,75 - 1,50 0,80 - 1,60 0,90 - 1,80	Emulsible oil Oil Cutting oil
Titanium and alloys		Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,20 0,15 - 0,25 0,20 - 0,30 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	5 - 8	0,15 - 0,30 0,20 - 0,40 0,30 - 0,50 0,40 - 0,60 0,60 - 0,80 0,80 - 1,20	Emulsible oil Cutting oil
Syntetic materials		Up to 10 10 - 22 22 - 40 40 - 50 50 - 70 70 - 100	0,10 - 0,20 0,15 - 0,25 0,20 - 0,30 0,30 - 0,40 0,35 - 0,50 0,40 - 0,50	15 - 30	0,20 - 0,50 0,40 - 0,80 0,50 - 1,40 0,80 - 1,50 0,90 - 1,60 1,00 - 1,80	Compressed air Dry Emulsible oil



# TECHNICAL INFORMATION AND CUTTING PARAMETERS 切削参数 HIGH SPEED & HIGH FEED REAMING

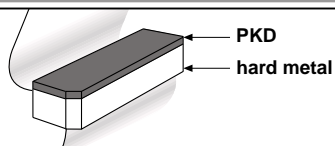
**Hard metal brazed carbide coated TiN - TiCN - TiAlN (our ref. TIN - TIC - TIA)  
Cermet brazed carbide (our ref. AVC)**

\*AVC reamers are available coated TiN, TiCN or TiAlN

MATERIAL TO WORK	N / mm <sup>2</sup>	Reamer Ø mm	STOCK ALLOWANCE Ø mm	H.M. coated TiN - TiCN TiAlN	CERMET AVC *	Lead-in A,G	Lead-in E,N,M
				SURFACE SPEED m / min	SURFACE SPEED m / min	FEED mm / rev	FEED mm / rev
Mild Steel Unalloyed	Up to 600	up to 10	0,08 - 0,15	60 - 80	90 - 300	0,20 - 0,40	0,30 - 0,60
		10 - 18	0,15 - 0,25			0,40 - 0,60	0,40 - 1,00
Low alloyed Structural steel	Greater than 600	18 - 40	0,15 - 0,30	40 - 70	80 - 200	0,50 - 0,80	0,60 - 1,20
		40 - 80	0,20 - 0,40			0,50 - 1,00	0,80 - 1,60
Fused Metal	Greater than 600	over 80	0,25 - 0,50	40 - 70	80 - 200	0,80 - 1,50	1,00 - 2,20
		up to 10	0,08 - 0,15			0,20 - 0,40	0,30 - 0,50
Alloy steel	400 - 1000	10 - 18	0,15 - 0,25	30 - 50	60 - 150	0,30 - 0,60	0,30 - 0,80
		18 - 40	0,15 - 0,30			0,40 - 0,70	0,40 - 1,00
Stainless steel	400 - 1000	40 - 80	0,20 - 0,40	30 - 50	60 - 150	0,50 - 0,80	0,60 - 1,40
		over 80	0,25 - 0,50			0,80 - 1,20	1,00 - 2,00
Strongly alloy steel	800 - 1500	up to 10	0,08 - 0,15	15 - 30	60 - 120	0,15 - 0,30	0,20 - 0,40
		10 - 18	0,15 - 0,25			0,20 - 0,50	0,30 - 0,60
Steel with manganese	800 - 1500	18 - 40	0,15 - 0,30	15 - 30	60 - 120	0,30 - 0,60	0,40 - 0,80
		40 - 80	0,20 - 0,40			0,40 - 0,80	0,50 - 1,00
Grey cast iron	Up to 200HB	over 80	0,25 - 0,50	50 - 70		0,60 - 1,00	0,70 - 1,40
		up to 10	0,08 - 0,15			0,20 - 0,40	0,30 - 0,60
Spheroidal cast iron (pearlitic)	Greater than 200 HB	10 - 18	0,15 - 0,25	50 - 70		0,35 - 0,60	0,50 - 0,80
		18 - 40	0,15 - 0,30			0,40 - 1,00	0,60 - 1,50
Malleable cast iron	Greater than 200 HB	40 - 80	0,20 - 0,40	50 - 70		0,60 - 1,30	0,80 - 1,60
		over 80	0,25 - 0,50			0,80 - 1,70	1,00 - 2,25
Spheroidal cast iron (ferritic)	300 - 700	up to 10	0,08 - 0,15	30 - 50	60 - 120	0,20 - 0,40	0,30 - 0,60
		10 - 18	0,15 - 0,25			0,35 - 0,60	0,50 - 0,80
Copper and alloys	Up to 500	18 - 40	0,15 - 0,30	100 - 200		0,40 - 1,00	0,60 - 1,50
		40 - 80	0,20 - 0,40			0,60 - 1,30	0,80 - 1,60
Brass	Up to 500	over 80	0,25 - 0,50	100 - 200		0,80 - 1,40	
		up to 10	0,08 - 0,15			0,15 - 0,30	
Bronze	Up to 600	10 - 18	0,15 - 0,25	80 - 160	100 - 300	0,20 - 0,40	
		18 - 40	0,15 - 0,30			0,30 - 0,60	
Bronze phosphorous	Up to 600	40 - 80	0,20 - 0,40	80 - 160	100 - 300	0,40 - 0,80	
		over 80	0,25 - 0,50			0,60 - 1,00	
Alluminium and light alloys	Up to 500	up to 10	0,08 - 0,15	100 - 200		0,20 - 0,40	
		10 - 18	0,15 - 0,25			0,40 - 0,70	
Titanium and alloys	Up to 500	18 - 40	0,15 - 0,30	100 - 200		0,50 - 0,80	
		40 - 80	0,20 - 0,40			0,60 - 1,00	
Titanium and alloys	Up to 500	over 80	0,25 - 0,50	100 - 200		0,80 - 1,40	
		up to 10	0,10 - 0,20			0,15 - 0,30	0,15 - 0,30
Titanium and alloys	Up to 500	10 - 18	0,15 - 0,25	20-60		0,20 - 0,40	
		18 - 40	0,20 - 0,40			0,30 - 0,50	
Titanium and alloys	Up to 500	40 - 80	0,30 - 0,40	20-60		0,40 - 0,60	
		over 80	0,30 - 0,50			0,50 - 0,70	

## HIGH SPEED FOR ALUMINIUM REAMING

Aluminium with silicon greater than 10% - brazed carbide with PKD



- Surface speed up to 1500 m/min.
- When using PKD reamers a machine tool with high rigidity and absolute precision is a minimum requirement.
- Each application must be assessed by our technical department.

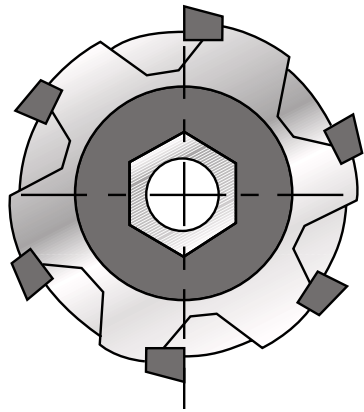


# HEADS TECHNICAL INFORMATION 切削参数 AND CUTTING PARAMETERS

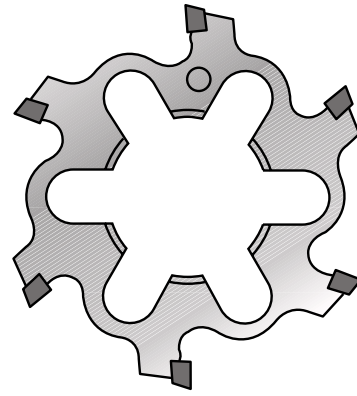
**Hard metal brazed carbide coated TiN-TiCN-TiAlN (our ref. TIN-TIC-TIA)  
Cermet brazed carbide (our ref. AVC)**

				HARD METAL K	H.M. coated TiN - TiCN TiAlN	CERMET	STRAIGHT FLUTES	LEFT HAND HELICAL FLUTES
MATERIAL TO WORK	N/mm <sup>2</sup>	HEAD Ø mm	STOCK ALLOWANCE Ø mm	SURFACE SPEED m/min	SURFACE SPEED m/min	SURFACE SPEED m/min	FEED mm/rev	FEED mm/rev
Mild Steel Unalloyed Low alloyed	Up to 600	11,80 - 21,60	0,15 - 0,25	10 - 20	60 - 80	90 - 300	0,25 - 0,60	0,50 - 1,00
		21,61 - 39,60	0,20 - 0,40				0,30 - 0,80	0,60 - 1,20
Structural steel Fused Metal	Greater than 600	11,80 - 21,60	0,15 - 0,25	7 - 15	40 - 70	80 - 200	0,30 - 0,60	0,40 - 0,80
		21,61 - 39,60	0,20 - 0,40				0,40 - 0,80	0,50 - 1,00
	400 - 1000	11,80 - 21,60	0,15 - 0,25	6 - 10	30 - 50	60 - 150	0,30 - 0,60	0,40 - 0,80
		21,61 - 39,60	0,20 - 0,40				0,40 - 0,80	0,50 - 1,00
Stainless steel		39,61 - 45,59	0,30 - 0,40				0,50 - 0,90	0,60 - 1,20
Strongly alloy steel Steel with manganese	800 - 1500	11,80 - 21,60	0,15 - 0,25	4 - 8	15 - 30	60 - 120	0,25 - 0,50	0,30 - 0,60
		21,61 - 39,60	0,20 - 0,40				0,30 - 0,60	0,40 - 0,80
Malleable cast iron	Up to 200 HB Greater than 200 HB	11,80 - 21,60	0,15 - 0,25	≤ 200 HB 20 - 40 ≥ 200 HB 15 - 30	50 - 70		0,20 - 0,60	0,50 - 1,00
		21,61 - 39,60	0,20 - 0,40				0,30 - 0,70	0,60 - 1,20
Spheroidal cast iron (ferritic)	300 - 700	39,61 - 45,59	0,30 - 0,40	10 - 15	30 - 50	60 - 120	0,40 - 0,80	0,80 - 1,60
		11,80 - 21,60	0,15 - 0,25				0,20 - 0,60	0,50 - 1,00
Copper and alloys Brass	Up to 500	21,61 - 39,60	0,20 - 0,40	60 - 200	100 - 200		0,30 - 0,60	
		39,61 - 45,59	0,30 - 0,40				0,40 - 0,80	
Bronze Bronze phosphorous	Up to 600	11,80 - 21,60	0,15 - 0,25	20 - 40	80 - 160	100 - 300	0,30 - 0,60	0,40 - 1,00
		21,61 - 39,60	0,20 - 0,40				0,50 - 1,20	0,60 - 1,50
Alluminium and light alloys	Up to 500	39,61 - 45,59	0,30 - 0,40	20 - 200			0,40 - 1,00	
		11,80 - 21,60	0,15 - 0,25				0,30 - 0,60	
Titanium and alloys		21,61 - 39,60	0,20 - 0,40	6 - 15	20-60		0,30 - 0,50	
		39,61 - 45,59	0,30 - 0,40				0,40 - 0,60	

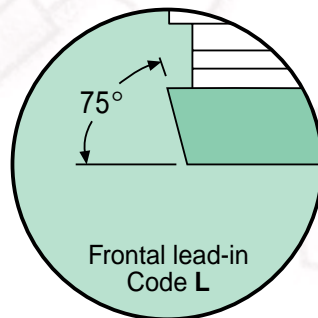
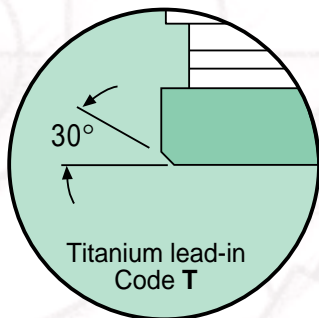
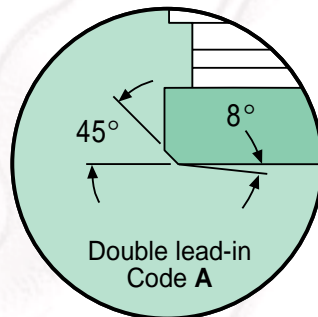
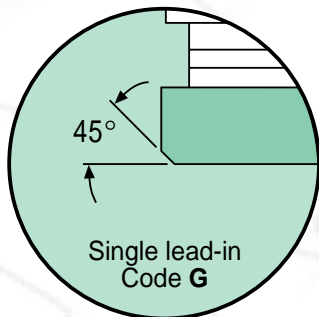
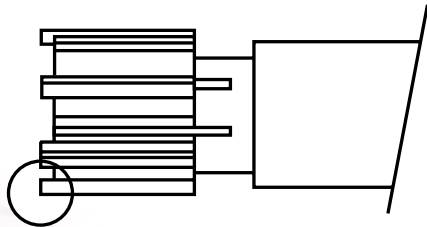
# EXPANDING REAMERS CUTTING GEOMETRY 可调铰刀切削刃



Integral expanding reamer

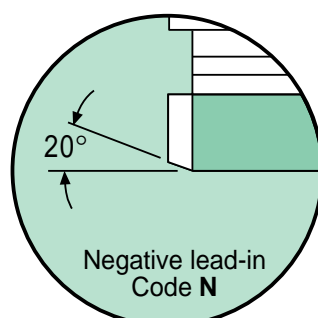
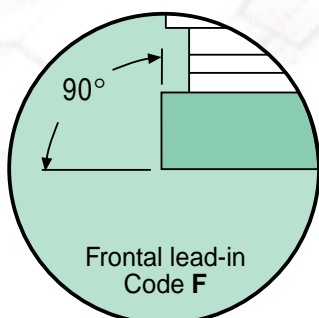


Cutting ring



"L" lead-in to reduce the feed of 40% compared with the values on pages 6-7

"F" lead-in to reduce the feed of 40% compared with the values on pages 6-7



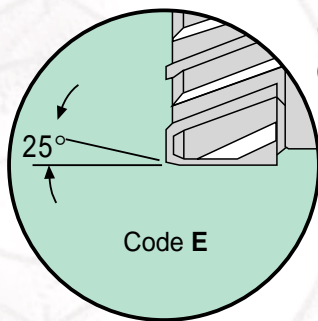
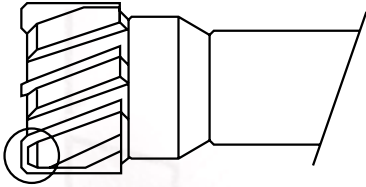
"N" lead-in ideal for through hole. It is possible to increase the feed up to 100% of the values indicated on pages 6-7

# HIGH FEED REAMERS & HEADS CUTTING GEOMETRY

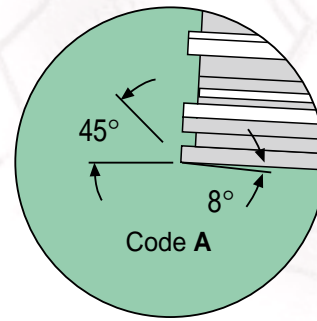
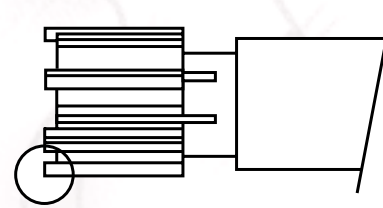
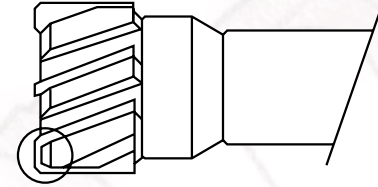
可调铰刀切削刃

## • High feed reamer

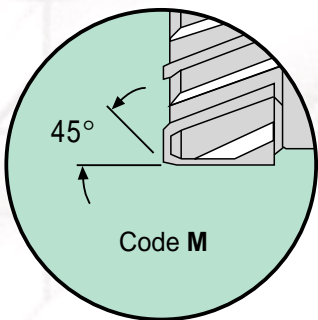
- Left hand helical flutes cutting ring  
(from  $\varnothing$  32,60 up to 200,59)



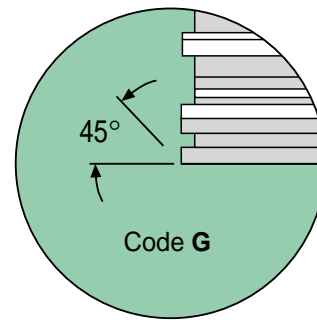
"E" lead-in  
(left hand helical flutes)



"A" lead-in  
(straight flutes)



"M" lead-in  
(left hand helical flutes)



"G" lead-in  
(straight flutes)

N.B.

Lead-in **E** is standard and suitable for the most part of materials: cast iron, steel and aluminium.  
Lead-in **M** can have a better penetration on steel with surface hardness greater than 200 HB.

# EXPANDING REAMERS CUTTING GEOMETRY

可调铰刀切削刃

## Approach angles

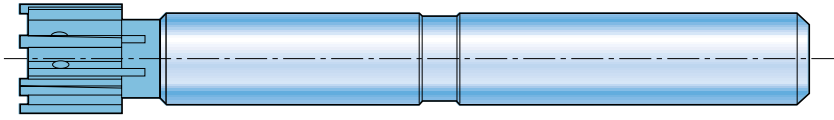
MATERIAL TO WORK	TENSILE STRENGTH	APPROACH ANGLE*
Iron and mild steel (C < 0,2%)	50 Kg / mm <sup>2</sup>	G - A - E
Mild steel (C 0,2 < 0,3%)	60 Kg / mm <sup>2</sup>	N - A - E
Mild steel (C 0,3 < 0,4%)	70 Kg / mm <sup>2</sup>	N - A - E
Mild steel (C 0,4 < 0,5%)	80 Kg / mm <sup>2</sup>	N - A - E
Alloy steel	≤ 80 Kg / mm <sup>2</sup>	G - N - A - E
Alloy steel	90 Kg / mm <sup>2</sup>	G - N - E
Alloy steel	100 Kg / mm <sup>2</sup>	G - N - M
Alloy steel	> 100 Kg / mm <sup>2</sup>	G - N - M
Stainless and refractory steel	from 50 Kg / mm <sup>2</sup> to 90 Kg / mm <sup>2</sup>	G - N - M
Grey, spheroidal and malleable cast iron	from 150 HB to 320 HB	G - N - E
Titanium and titanium alloy		T - E
Tempered steel	48 - 64 HRc	G - N - M
Pure copper		G - N - E
Electrolytic copper		G - N - E
Brass / Bronze		G - N - E
Aluminium alloy < 10% Si		G - A - E
Aluminium alloy > 11% Si		G - E
Magnesium alloy		G - A - E
Thermoplastic material		G - E
Thermosetting resins		G - E
Stiffened synthetic material		G - E

\* Do not use negative lead-in on blind holes

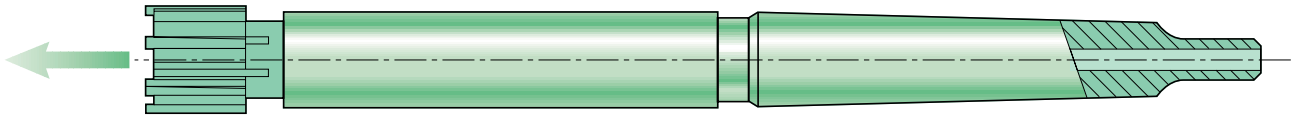
Negative lead-in "N" can be used on large range of materials: please apply to our technical department.

Usually ex-stock: - single lead-in G

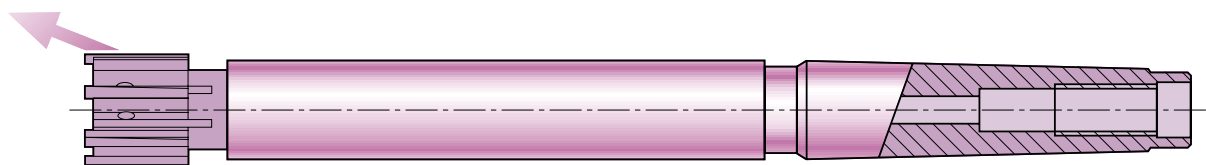
# INTEGRAL EXPANDING REAMERS 整体可调铰刀



Expanding reamers without through tool coolant

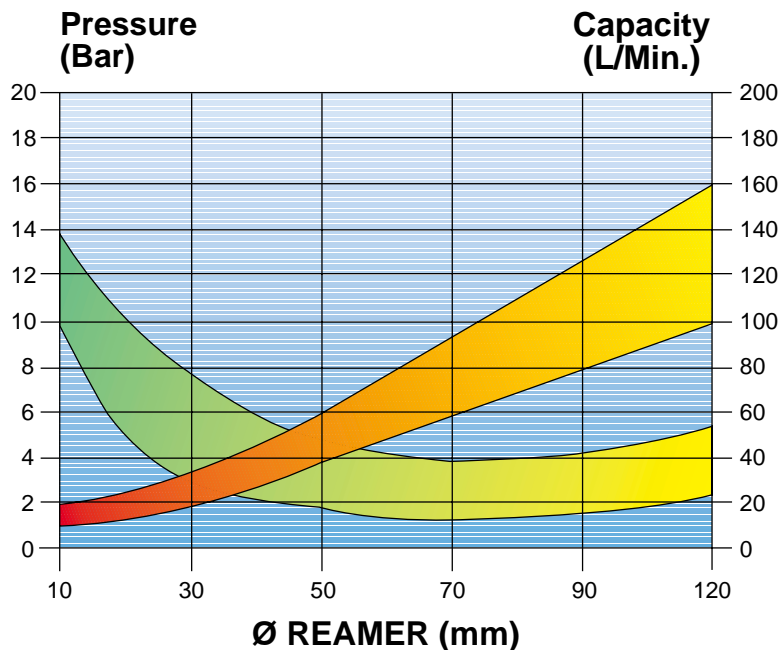


Expanding reamers with central through tool coolant

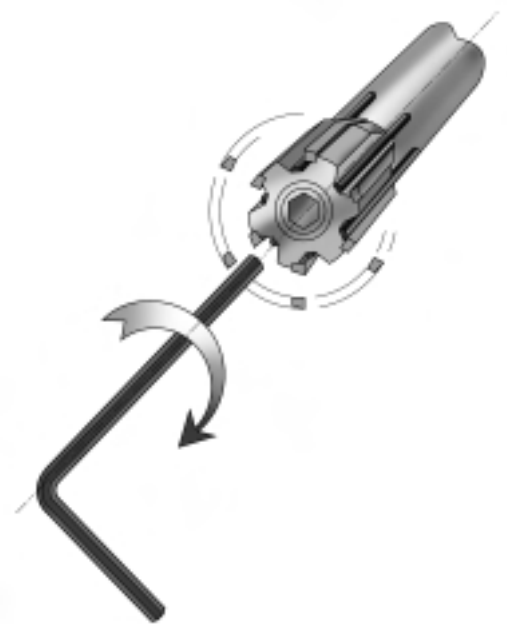


Expanding reamers with radial through tool coolant

## Recommended values for lubricants



It is important to use a good quality lubricant.



The reamers can be expanded for recovering the starting diameter.

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

Series	Diameters		Length	Coolant	Shank	Page
2420 2440	5,80÷32,10		short	without through tool coolant	cylindrical	14
2421 2441	5,80÷32,10		short	central through tool coolant	cylindrical	14
3620	5,80÷32,10		short	radial through tool coolant	cylindrical	15
2410 2430	5,80÷32,10		long	without through tool coolant	cylindrical	16
2411 2431	5,80÷32,10		long	central through tool coolant	cylindrical	16
3610	5,80÷32,10		long	radial through tool coolant	cylindrical	17
2450	5,80÷32,10		short	without through tool coolant	MT DIN 228/B	18
2451	5,80÷32,10		short	central through tool coolant	MT DIN 228/B	18
3650	5,80÷32,10		short	radial through tool coolant	MT DIN 228/A	19
2400	5,80÷32,10		long	without through tool coolant	MT DIN 228/B	20
2401	5,80÷32,10		long	central through tool coolant	MT DIN 228/B	20
3600	5,80÷32,10		long	radial through tool coolant	MT DIN 228/A	21
2490	5,80÷21,10		long with tempered guide	without through tool coolant	cylindrical	22
2491	5,80÷21,10		long with tempered guide	central through tool coolant	cylindrical	22
3690	5,80÷32,10		long with tempered guide	radial through tool coolant	cylindrical	23
2480	5,80÷32,10		long with tempered guide	without through tool coolant	MT DIN 228/B	24
2481	5,80÷32,10		long with tempered guide	central through tool coolant	MT DIN 228/B	24
3680	5,80÷32,10		long with tempered guide	radial through tool coolant	MT DIN 228/A	25

• The above mentioned integral expanding reamers are available with the following brazed carbide:

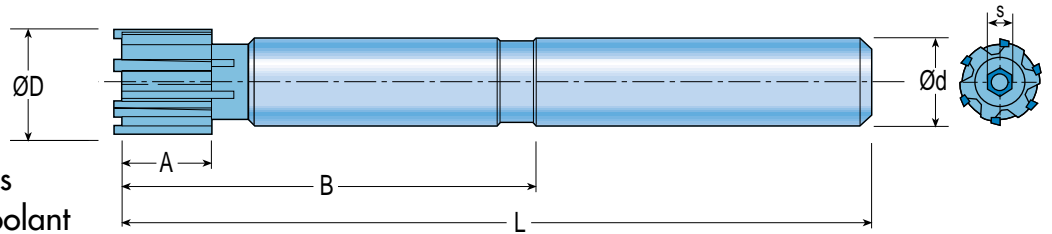
- Hard metal - HM - standard speed reaming (see page 6)
- Hard metal coated - high speed reaming (see page 7)
- Cermet - AVC - high speed reaming (see page 7)
- Diamond - PKD - high speed reaming (on request)
- CBN - PBC - high speed reaming (on request)

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## Cylindrical shank - SHORT SERIES - Brazed carbide

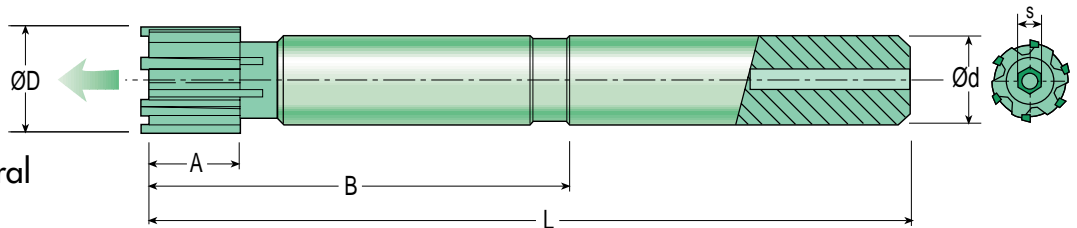
**Series 2420**   **Series 2440**

- through and blind holes  
without through tool coolant



**Series 2421**   **Series 2441**

- blind holes with central  
through tool coolant



### Series 2420-2421      Series 2440-2441

ØD mm	B mm	A mm	L mm	Ø d <sup>h7</sup> mm	B mm	A mm	L mm	Ø d <sup>h7</sup> mm	Number of teeth	S
5,80 - 6,60	40	8	80	10	40	8	80	12	4	2
6,61 - 7,60	40	8	80	10	40	8	80	12	4	2
7,61 - 8,60	40	10	80	10	40	10	80	12	4	2,5
8,61 - 9,60	40	10	80	10	50	10	90	12	4	2,5
9,61 - 10,60	40	10	80	10	50	10	95	12	6	3
10,61 - 11,60	40	10	80	12	60	10	105	12	6	3
11,61 - 12,60	40	10	80	12	60	10	105	12	6	3
12,61 - 13,60	40	10	80	12	60	10	105	12	6	4
13,61 - 14,60	40	10	80	12	70	10	115	12	6	4
14,61 - 15,60	40	10	80	12	70	10	115	12	6	4
15,61 - 16,60	50	10	90	16	80	10	130	16	6	4
16,61 - 17,60	50	10	90	16	80	10	130	16	6	5
17,61 - 18,60	50	12	90	16	90	12	140	16	6	5
18,61 - 19,10	50	12	90	16	90	12	150	20	6	5
19,11 - 20,10	50	12	90	16	100	12	160	20	6	5
20,11 - 21,10	-	-	-	-	100	12	160	20	6	5
21,11 - 22,10	-	-	-	-	100	12	160	20	6	6
22,11 - 23,10	-	-	-	-	100	12	160	20	6	6
23,11 - 24,10	-	-	-	-	100	12	160	20	6	6
24,11 - 25,10	-	-	-	-	100	12	160	20	6	6
25,11 - 26,10	-	-	-	-	110	12	170	25	6	6
26,11 - 27,10	-	-	-	-	110	14	170	25	6	6
27,11 - 28,10	-	-	-	-	110	14	170	25	6	8
28,11 - 29,10	-	-	-	-	110	14	170	25	6	8
29,11 - 30,10	-	-	-	-	110	14	170	25	6	8
30,11 - 31,10	-	-	-	-	110	14	170	25	6	8
31,11 - 32,10	-	-	-	-	110	14	170	25	6	8

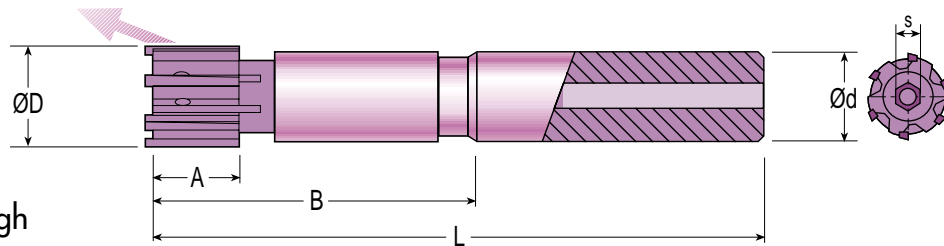


# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## Cylindrical shank - SHORT SERIES - Brazed carbide

**Series  
3620**

- through holes  
with radial through  
tool coolant



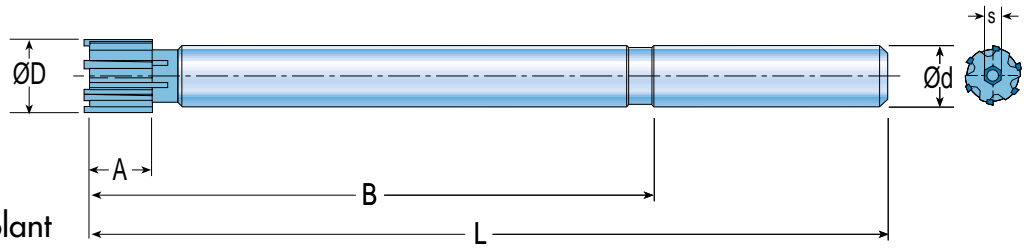
ØD mm	B mm	A mm	L mm	Ø d <sup>h7</sup> mm	Number of teeth	S
5,80 - 6,60	40	8	78	12	4	2
6,61 - 7,60	40	8	78	12	4	2
7,61 - 8,60	40	10	78	12	4	2,5
8,61 - 9,60	50	10	88	12	4	2,5
9,61 - 10,60	50	10	95	12	6	3
10,61 - 11,60	50	10	95	12	6	3
11,61 - 12,60	50	10	95	12	6	3
12,61 - 13,60	50	10	95	12	6	4
13,61 - 14,60	50	10	95	12	6	4
14,61 - 15,60	50	10	95	12	6	4
15,61 - 16,60	50	10	100	16	6	4
16,61 - 17,60	50	10	100	16	6	5
17,61 - 18,60	50	12	100	16	6	5
18,61 - 19,10	60	12	120	20	6	5
19,11 - 20,10	60	12	120	20	6	5
20,11 - 21,10	60	12	120	20	6	5
21,11 - 22,10	60	12	120	20	6	6
22,11 - 23,10	60	12	120	20	6	6
23,11 - 24,10	60	12	120	20	6	6
24,11 - 25,10	60	12	120	20	6	6
25,11 - 26,10	75	12	135	25	6	6
26,11 - 27,10	75	14	135	25	6	6
27,11 - 28,10	75	14	135	25	6	8
28,11 - 29,10	75	14	135	25	6	8
29,11 - 30,10	75	14	135	25	6	8
30,11 - 31,10	75	14	135	25	6	8
31,11 - 32,10	75	14	135	25	6	8

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## Cylindrical shank - LONG SERIES - Brazed carbide

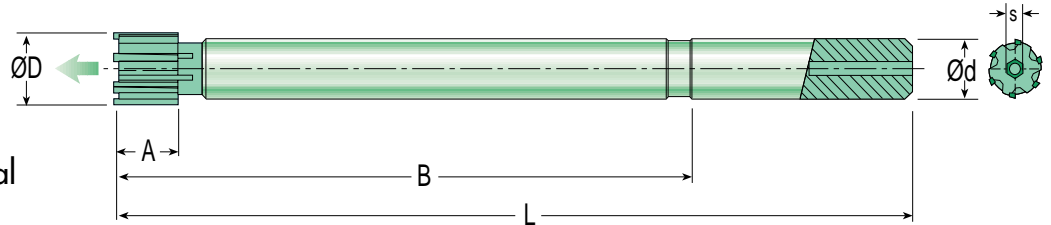
**Series 2410**   **Series 2430**

- through and blind holes  
without through tool coolant



**Series 2411**   **Series 2431**

- blind holes with central  
through tool coolant



### Series 2410-2411

### Series 2430-2431

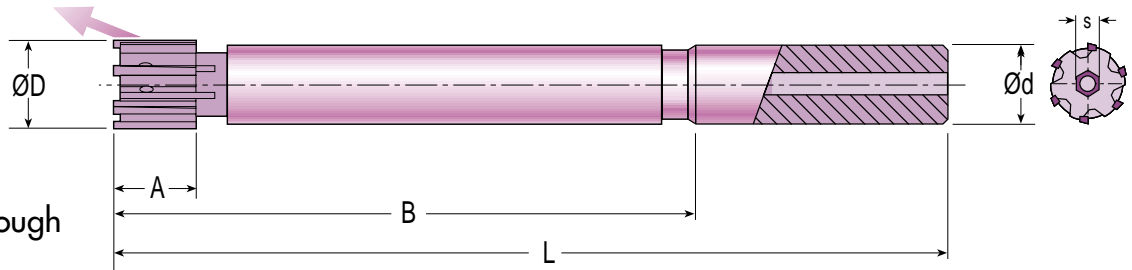
ØD mm	B mm	A mm	L mm	Ø d <sup>h7</sup> mm	B mm	A mm	L mm	Ø d <sup>h7</sup> mm	Number of teeth	S
5,80 - 6,60	57	8	93	5,6	85	8	123	12	4	2
6,61 - 7,60	69	8	109	7,1	85	8	123	12	4	2
7,61 - 8,60	75	10	117	8	85	10	123	12	4	2,5
8,61 - 9,60	81	10	125	9	85	10	123	12	4	2,5
9,61 - 10,60	87	10	133	10	115	10	160	12	6	3
10,61 - 11,60	96	10	142	10	115	10	160	12	6	3
11,61 - 12,60	105	10	151	10	115	10	160	12	6	3
12,61 - 13,60	105	10	151	10	115	10	160	12	6	4
13,61 - 14,60	110	10	160	12,5	115	10	160	12	6	4
14,61 - 15,60	112	10	162	12,5	115	10	160	12	6	4
15,61 - 16,60	120	10	170	12,5	130	10	180	16	6	4
16,61 - 17,60	123	10	175	14	130	10	180	16	6	5
17,61 - 18,60	130	12	182	14	130	12	180	16	6	5
18,61 - 19,10	131	12	189	16	140	12	200	20	6	5
19,11 - 20,10	137	12	195	16	140	12	200	20	6	5
20,11 - 21,10	-	-	-	-	140	12	200	20	6	5
21,11 - 22,10	-	-	-	-	140	12	200	20	6	6
22,11 - 23,10	-	-	-	-	140	12	200	20	6	6
23,11 - 24,10	-	-	-	-	140	12	200	20	6	6
24,11 - 25,10	-	-	-	-	140	12	200	20	6	6
25,11 - 26,10	-	-	-	-	150	12	210	25	6	6
26,11 - 27,10	-	-	-	-	150	14	210	25	6	6
27,11 - 28,10	-	-	-	-	150	14	210	25	6	8
28,11 - 29,10	-	-	-	-	150	14	210	25	6	8
29,11 - 30,10	-	-	-	-	150	14	210	25	6	8
30,11 - 31,10	-	-	-	-	150	14	210	25	6	8
31,11 - 32,10	-	-	-	-	150	14	210	25	6	8

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## Cylindrical shank - LONG SERIES - Brazed carbide

**Series  
3610**

- through holes  
with radial through  
tool coolant



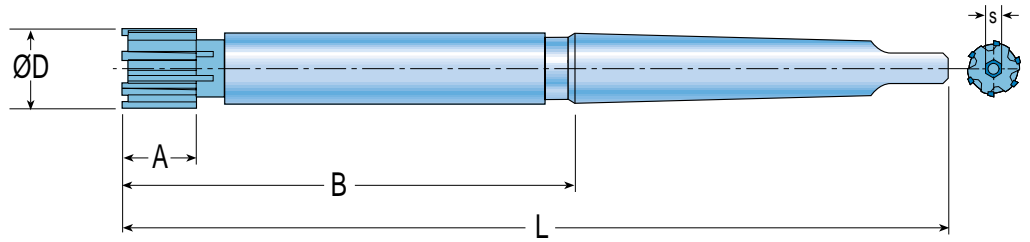
ØD mm	B mm	A mm	L mm	Ø d <sup>h7</sup> mm	Number of teeth	S
5,80 - 6,60	85	8	123	12	4	2
6,61 - 7,60	85	8	123	12	4	2
7,61 - 8,60	85	10	123	12	4	2,5
8,61 - 9,60	85	10	123	12	4	2,5
9,61 - 10,60	115	10	160	12	6	3
10,61 - 11,60	115	10	160	12	6	3
11,61 - 12,60	115	10	160	12	6	3
12,61 - 13,60	115	10	160	12	6	4
13,61 - 14,60	115	10	160	12	6	4
14,61 - 15,60	115	10	160	12	6	4
15,61 - 16,60	130	10	180	16	6	4
16,61 - 17,60	130	10	180	16	6	5
17,61 - 18,60	130	12	180	16	6	5
18,61 - 19,10	140	12	200	20	6	5
19,11 - 20,10	140	12	200	20	6	5
20,11 - 21,10	140	12	200	20	6	5
21,11 - 22,10	140	12	200	20	6	6
22,11 - 23,10	140	12	200	20	6	6
23,11 - 24,10	140	12	200	20	6	6
24,11 - 25,10	140	12	200	20	6	6
25,11 - 26,10	150	12	210	25	6	6
26,11 - 27,10	150	14	210	25	6	6
27,11 - 28,10	150	14	210	25	6	8
28,11 - 29,10	150	14	210	25	6	8
29,11 - 30,10	150	14	210	25	6	8
30,11 - 31,10	150	14	210	25	6	8
31,11 - 32,10	150	14	210	25	6	8

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## MT shank - SHORT SERIES - Brazed carbide

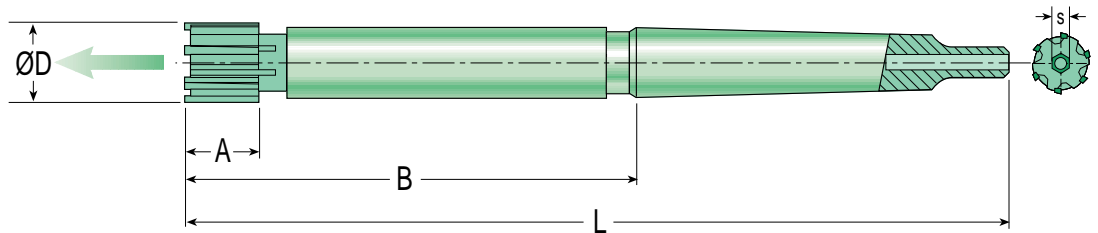
### Series 2450

- through and blind holes without through tool coolant



### Series 2451

- blind holes with central through tool coolant



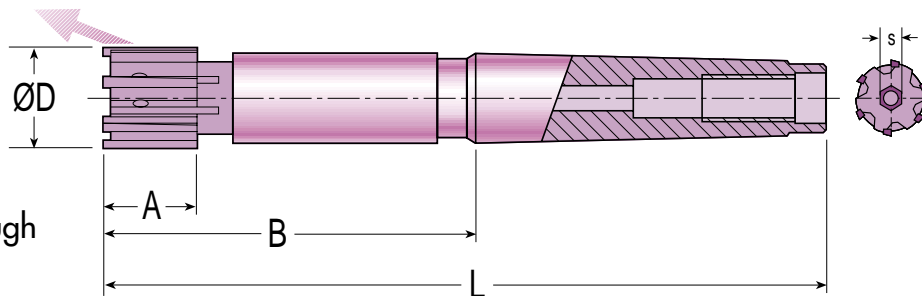
ØD mm	B mm	A mm	L mm	MT shank	Number of teeth	S
5,80 - 6,60	59,5	8	125	1	4	2
6,61 - 7,60	59,5	8	125	1	4	2
7,61 - 8,60	59,5	10	125	1	4	2,5
8,61 - 9,60	59,5	10	125	1	4	2,5
9,61 - 10,60	59,5	10	125	1	6	3
10,61 - 11,60	59,5	10	125	1	6	3
11,61 - 12,60	59,5	10	125	1	6	3
12,61 - 13,60	59,5	10	125	1	6	4
13,61 - 14,60	59,5	10	125	1	6	4
14,61 - 15,60	59,5	10	125	1	6	4
15,61 - 16,60	80	10	160	2	6	4
16,61 - 17,60	80	10	160	2	6	5
17,61 - 18,60	80	12	160	2	6	5
18,61 - 19,10	80	12	160	2	6	5
19,11 - 20,10	80	12	160	2	6	5
20,11 - 21,10	80	12	160	2	6	5
21,11 - 22,10	80	12	160	2	6	6
22,11 - 23,10	101	12	200	3	6	6
23,11 - 24,10	101	12	200	3	6	6
24,11 - 25,10	101	12	200	3	6	6
25,11 - 26,10	101	12	200	3	6	6
26,11 - 27,10	101	14	200	3	6	6
27,11 - 28,10	101	14	200	3	6	8
28,11 - 29,10	101	14	200	3	6	8
29,11 - 30,10	101	14	200	3	6	8
30,11 - 31,10	101	14	200	3	6	8
31,11 - 32,10	101	14	225	4	6	8

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## MT shank DIN 228/A - SHORT SERIES - Brazed carbide

**Series  
3650**

- through holes  
with radial through  
tool coolant



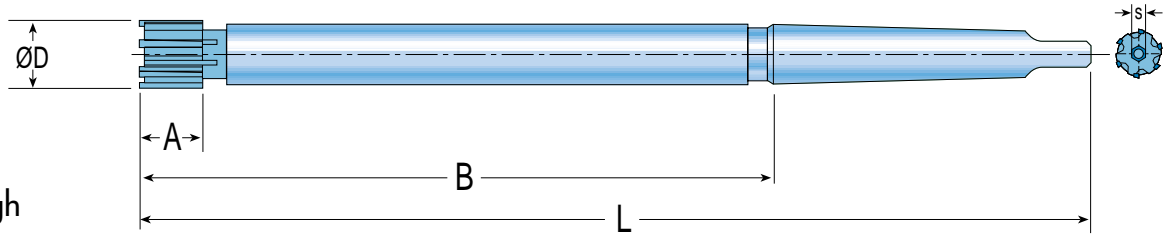
ØD mm	B mm	A mm	L mm	MT shank	Number of teeth	S
5,80 - 6,60	40	8	97	1	4	2
6,61 - 7,60	40	8	97	1	4	2
7,61 - 8,60	40	10	109	2	4	2,5
8,61 - 9,60	50	10	119	2	4	2,5
9,61 - 10,60	50	10	119	2	6	3
10,61 - 11,60	50	10	119	2	6	3
11,61 - 12,60	50	10	119	2	6	3
12,61 - 13,60	50	10	119	2	6	4
13,61 - 14,60	50	10	119	2	6	4
14,61 - 15,60	50	10	119	2	6	4
15,61 - 16,60	50	10	119	2	6	4
16,61 - 17,60	50	10	119	2	6	5
17,61 - 18,60	50	12	119	2	6	5
18,61 - 19,10	60	12	129	2	6	5
19,11 - 20,10	60	12	129	2	6	5
20,11 - 21,10	60	12	129	2	6	5
21,11 - 22,10	60	12	129	2	6	6
22,11 - 23,10	60	12	129	2	6	6
23,11 - 24,10	60	12	129	2	6	6
24,11 - 25,10	60	12	129	2	6	6
25,11 - 26,10	75	12	161	3	6	6
26,11 - 27,10	75	14	161	3	6	6
27,11 - 28,10	75	14	161	3	6	8
28,11 - 29,10	75	14	161	3	6	8
29,11 - 30,10	75	14	161	3	6	8
30,11 - 31,10	75	14	161	3	6	8
31,11 - 32,10	75	14	161	3	6	8

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## MT shank - LONG SERIES - Brazed carbide

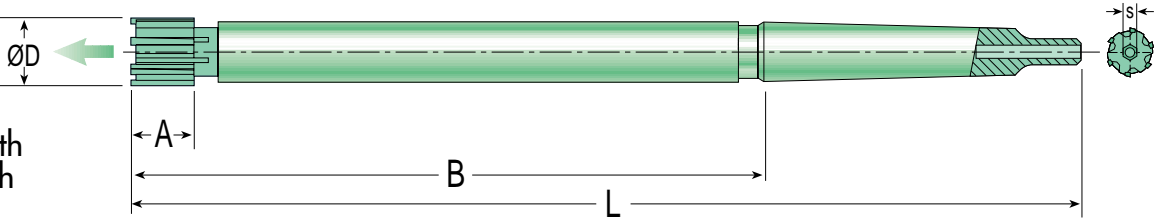
### Series 2400

- through and blind holes without through tool coolant



### Series 2401

- blind holes with central through tool coolant



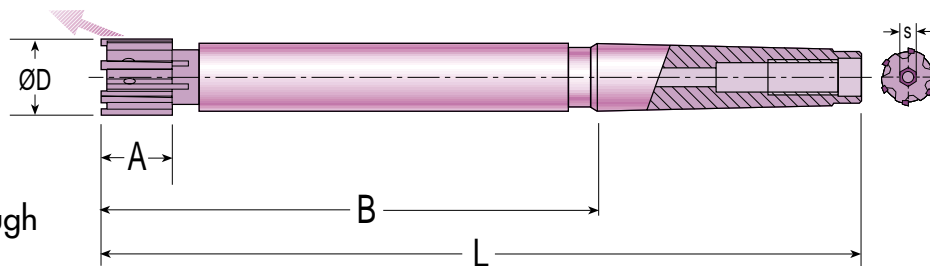
ØD mm	B mm	A mm	L mm	MT shank	Number of teeth	S
5,80 - 6,60	72	8	138	1	4	2
6,61 - 7,60	84	8	150	1	4	2
7,61 - 8,60	90	10	156	1	4	2,5
8,61 - 9,60	96	10	162	1	4	2,5
9,61 - 10,60	103	10	168	1	6	3
10,61 - 11,60	110	10	175	1	6	3
11,61 - 12,60	117	10	182	1	6	3
12,61 - 13,60	117	10	182	1	6	4
13,61 - 14,60	123	10	189	1	6	4
14,61 - 15,60	124	10	204	2	6	4
15,61 - 16,60	130	10	210	2	6	4
16,61 - 17,60	134	10	213	2	6	5
17,61 - 18,60	139	12	219	2	6	5
18,61 - 19,10	143	12	223	2	6	5
19,11 - 20,10	148	12	228	2	6	5
20,11 - 21,10	152	12	232	2	6	5
21,11 - 22,10	157	12	237	2	6	6
22,11 - 23,10	161	12	241	2	6	6
23,11 - 24,10	169	12	268	3	6	6
24,11 - 25,10	169	12	268	3	6	6
25,11 - 26,10	174	12	273	3	6	6
26,11 - 27,10	178	14	277	3	6	6
27,11 - 28,10	178	14	277	3	6	8
28,11 - 29,10	182	14	281	3	6	8
29,11 - 30,10	182	14	281	3	6	8
30,11 - 31,10	186	14	285	3	6	8
31,11 - 32,10	193	14	317	4	6	8

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## MT shank DIN 228/A - LONG SERIES - Brazed carbide

### Series 3600

- through holes  
with radial through  
tool coolant

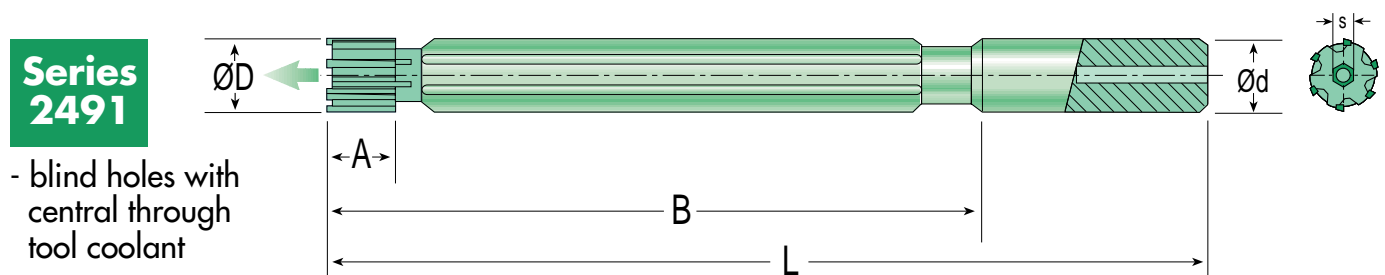
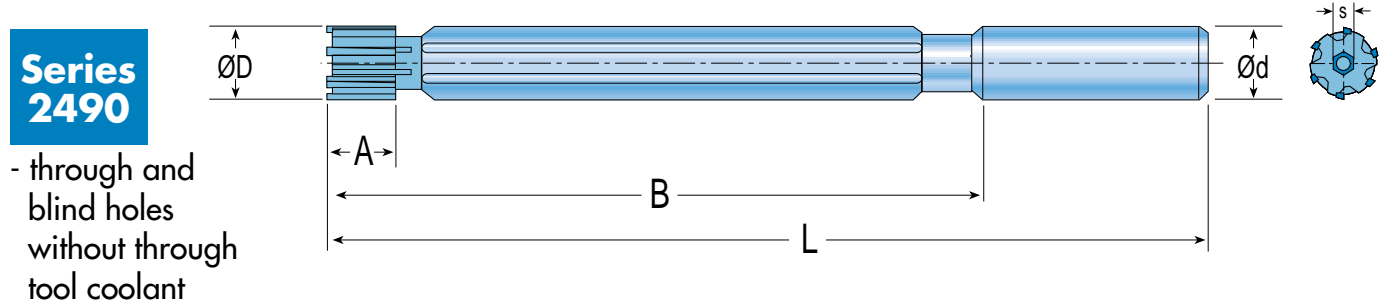


ØD mm	B mm	A mm	L mm	MT shank	Number of teeth	S
5,80 - 6,60	85	8	142	1	4	2
6,61 - 7,60	85	8	142	1	4	2
7,61 - 8,60	85	10	154	2	4	2,5
8,61 - 9,60	85	10	154	2	4	2,5
9,61 - 10,60	115	10	184	2	6	3
10,61 - 11,60	115	10	184	2	6	3
11,61 - 12,60	115	10	184	2	6	3
12,61 - 13,60	115	10	184	2	6	4
13,61 - 14,60	115	10	184	2	6	4
14,61 - 15,60	115	10	184	2	6	4
15,61 - 16,60	130	10	199	2	6	4
16,61 - 17,60	130	10	199	2	6	5
17,61 - 18,60	130	12	199	2	6	5
18,61 - 19,10	140	12	209	2	6	5
19,11 - 20,10	140	12	209	2	6	5
20,11 - 21,10	140	12	209	2	6	5
21,11 - 22,10	140	12	209	2	6	6
22,11 - 23,10	140	12	209	2	6	6
23,11 - 24,10	140	12	209	2	6	6
24,11 - 25,10	140	12	209	2	6	6
25,11 - 26,10	150	12	236	3	6	6
26,11 - 27,10	150	14	236	3	6	6
27,11 - 28,10	150	14	236	3	6	8
28,11 - 29,10	150	14	236	3	6	8
29,11 - 30,10	150	14	236	3	6	8
30,11 - 31,10	150	14	236	3	6	8
31,11 - 32,10	150	14	236	3	6	8



# INTEGRAL EXPANDING REAMERS 整体可调铰刀

**Cylindrical shank - SERIES WITH TEMPERED GUIDE - Brazed carbide**



ØD mm	B mm	A mm	L mm	Ø d <sup>h7</sup> mm	Number of teeth	S
5,80 - 6,60	74	8	100	6	4	2
6,61 - 7,60	74	8	100	7	4	2
7,61 - 8,60	92	10	120	8	4	2,5
8,61 - 9,60	92	10	120	9	4	2,5
9,61 - 10,60	108	10	140	10	6	3
10,61 - 11,60	108	10	140	11	6	3
11,61 - 12,60	110	10	150	12	6	3
12,61 - 13,60	115	10	160	13	6	4
13,61 - 14,60	125	10	170	14	6	4
14,61 - 15,60	130	10	175	15	6	4
15,61 - 16,60	130	10	180	16	6	4
16,61 - 17,60	140	10	190	17	6	5
17,61 - 18,60	145	12	195	18	6	5
18,61 - 19,10	150	12	205	19	6	5
19,11 - 20,10	150	12	205	20	6	5
20,11 - 21,10	155	12	210	21	6	5

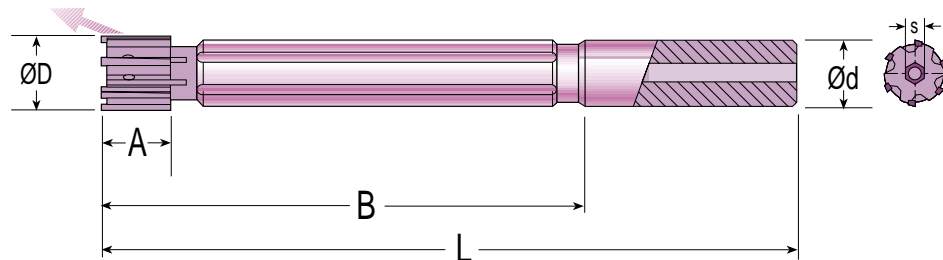
The diameter of the guide is reduced of 0,01-0,015 mm. compared with the nominal diameter D.

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

Cylindrical shank - SERIES WITH TEMPERED GUIDE - Brazed carbide

## Series 3690

- through holes with radial through tool coolant



ØD mm	B mm	A mm	L mm	Ø d <sup>h7</sup> mm	Number of teeth	S
5,80 - 6,60	85	8	123	12	4	2
6,61 - 7,60	85	8	123	12	4	2
7,61 - 8,60	85	10	123	12	4	2,5
8,61 - 9,60	85	10	123	12	4	2,5
9,61 - 10,60	115	10	160	12	6	3
10,61 - 11,60	115	10	160	12	6	3
11,61 - 12,60	115	10	160	12	6	3
12,61 - 13,60	115	10	160	12	6	4
13,61 - 14,60	115	10	160	12	6	4
14,61 - 15,60	115	10	160	12	6	4
15,61 - 16,60	130	10	180	16	6	4
16,61 - 17,60	130	10	180	16	6	5
17,61 - 18,60	130	12	180	16	6	5
18,61 - 19,10	140	12	200	20	6	5
19,11 - 20,10	140	12	200	20	6	5
20,11 - 21,10	140	12	200	20	6	5
21,11 - 22,10	140	12	200	20	6	6
22,11 - 23,10	140	12	200	20	6	6
23,11 - 24,10	140	12	200	20	6	6
24,11 - 25,10	140	12	200	20	6	6
25,11 - 26,10	150	12	210	25	6	6
26,11 - 27,10	150	14	210	25	6	6
27,11 - 28,10	150	14	210	25	6	8
28,11 - 29,10	150	14	210	25	6	8
29,11 - 30,10	150	14	210	25	6	8
30,11 - 31,10	150	14	210	25	6	8
31,11 - 32,10	150	14	210	25	6	8

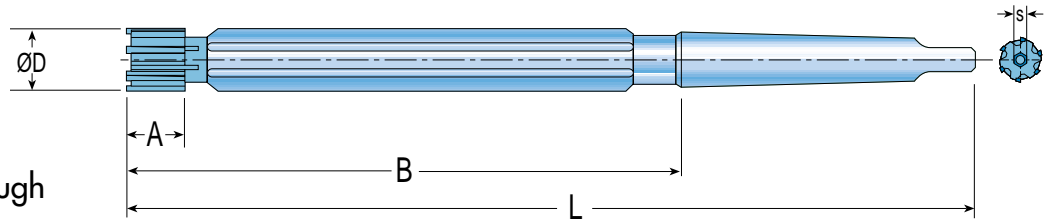
The diameter of the guide is reduced of 0,01-0,015 mm. compared with the nominal diameter D.

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

## MT shank - SERIES WITH TEMPERED GUIDE - Braze carbide

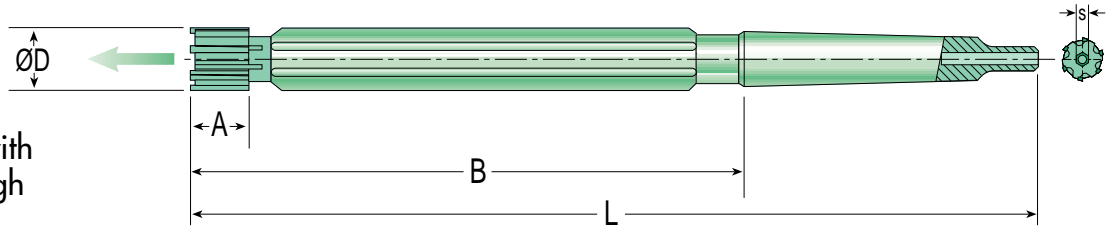
### Series 2480

- through and blind holes without through tool coolant



### Series 2481

- blind holes with central through tool coolant

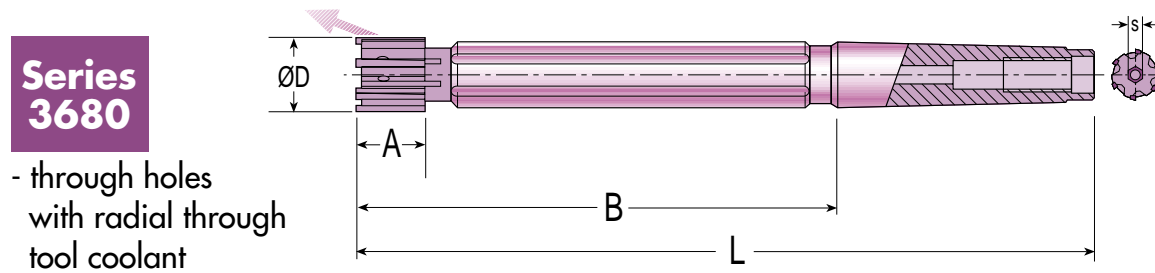


ØD mm	B mm	A mm	L mm	MT shank	Number of teeth	S
5,80 - 6,60	84,5	8	150	1	4	2
6,61 - 7,60	84,5	8	150	1	4	2
7,61 - 8,60	84,5	10	150	1	4	2,5
8,61 - 9,60	94,5	10	160	1	4	2,5
9,61 - 10,60	104,5	10	170	1	6	3
10,61 - 11,60	104,5	10	170	1	6	3
11,61 - 12,60	104,5	10	170	1	6	3
12,61 - 13,60	114,5	10	180	1	6	4
13,61 - 14,60	114,5	10	180	1	6	4
14,61 - 15,60	114,5	10	180	1	6	4
15,61 - 16,60	120	10	200	2	6	4
16,61 - 17,60	130	10	210	2	6	5
17,61 - 18,60	130	12	210	2	6	5
18,61 - 19,10	140	12	220	2	6	5
19,11 - 20,10	140	12	220	2	6	5
20,11 - 21,10	140	12	220	2	6	5
21,11 - 22,10	140	12	220	2	6	6
22,11 - 23,10	141	12	240	3	6	6
23,11 - 24,10	141	12	240	3	6	6
24,11 - 25,10	141	12	240	3	6	6
25,11 - 26,10	151	12	250	3	6	6
26,11 - 27,10	151	14	250	3	6	6
27,11 - 28,10	151	14	250	3	6	8
28,11 - 29,10	151	14	250	3	6	8
29,11 - 30,10	151	14	250	3	6	8
30,11 - 31,10	151	14	250	3	6	8
31,11 - 32,10	151	14	275	4	6	8

The diameter of the guide is reduced of 0,01-0,015 mm. compared with the nominal diameter D.

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

MT shank DIN 228/A - SERIES WITH TEMPERED GUIDE - Brazed carbide



ØD mm	B mm	A mm	L mm	MT shank	Number of teeth	S
5,80 - 6,60	85	8	142	1	4	2
6,61 - 7,60	85	8	142	1	4	2
7,61 - 8,60	85	10	154	2	4	2,5
8,61 - 9,60	85	10	154	2	4	2,5
9,61 - 10,60	115	10	184	2	6	3
10,61 - 11,60	115	10	184	2	6	3
11,61 - 12,60	115	10	184	2	6	3
12,61 - 13,60	115	10	184	2	6	4
13,61 - 14,60	115	10	184	2	6	4
14,61 - 15,60	115	10	184	2	6	4
15,61 - 16,60	130	10	199	2	6	4
16,61 - 17,60	130	10	199	2	6	5
17,61 - 18,60	130	12	199	2	6	5
18,61 - 19,10	140	12	209	2	6	5
19,11 - 20,10	140	12	209	2	6	5
20,11 - 21,10	140	12	209	2	6	5
21,11 - 22,10	140	12	209	2	6	6
22,11 - 23,10	140	12	209	2	6	6
23,11 - 24,10	140	12	209	2	6	6
24,11 - 25,10	140	12	209	2	6	6
25,11 - 26,10	150	12	236	3	6	6
26,11 - 27,10	150	14	236	3	6	6
27,11 - 28,10	150	14	236	3	6	8
28,11 - 29,10	150	14	236	3	6	8
29,11 - 30,10	150	14	236	3	6	8
30,11 - 31,10	150	14	236	3	6	8
31,11 - 32,10	150	14	236	3	6	8

The diameter of the guide is reduced of 0,01-0,015 mm. compared with the nominal diameter D.



整体式可调铰刀（高性能）

INTEGRAL EXPANDABLE REAMERS

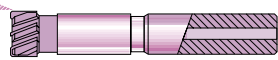

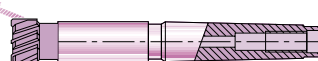
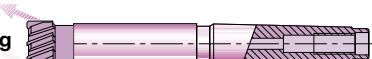




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# HIGH PERFORMANCE 高性能

Today, in the world of mass production, the reaming of holes with dimensional accuracy and good surface roughness has become more evident. To fulfil this requirement we are proud to present our new reaming programme with left hand helical flutes for high feeds.

Series	Diameters		Length	Coolant	Shank	Page
<b>3627</b>	5,80 ÷ 32,10	expanding 	<b>short</b>	<b>radial</b>	<b>cylindrical</b>	<b>28</b>
<b>3617</b>	5,80 ÷ 32,10	expanding 	<b>long</b>	<b>radial</b>	<b>cylindrical</b>	<b>28</b>
<b>3657</b>	5,80 ÷ 32,10	expanding 	<b>short</b>	<b>radial</b>	<b>MT DIN 228/A</b>	<b>29</b>
<b>3607</b>	5,80 ÷ 32,10	expanding 	<b>long</b>	<b>radial</b>	<b>MT DIN 228/A</b>	<b>29</b>
<b>1620</b>	9,60 ÷ 32,10	fixed 	<b>short</b>	<b>radial</b>	<b>cylindrical</b>	<b>30</b>
<b>162W</b>	9,60 ÷ 32,10	fixed 	<b>short</b>	<b>radial</b>	<b>weldon</b>	<b>30</b>
<b>1610</b>	9,60 ÷ 32,10	fixed 	<b>long</b>	<b>radial</b>	<b>cylindrical</b>	<b>31</b>
<b>161W</b>	9,60 ÷ 32,10	fixed 	<b>long</b>	<b>radial</b>	<b>weldon</b>	<b>31</b>

**N.B:** Hard metal type K is suitable for working cast iron and aluminium: please apply to our technical department.

# INTEGRAL EXPANDING REAMERS 整体可调铰刀

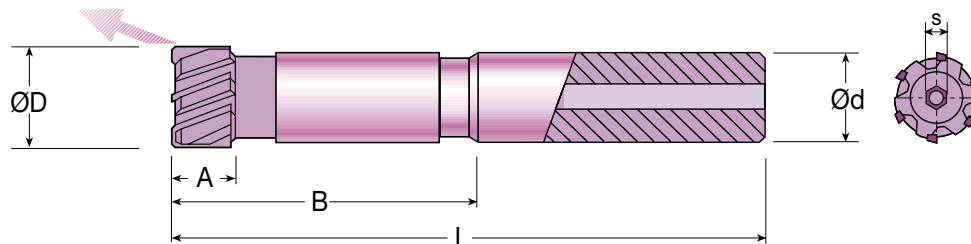
## FOR HIGH FEEDS

### Series 3627

Cylindrical shank  
SHORT SERIES

### Series 3617

Cylindrical shank  
LONG SERIES



### Series 3627

### Series 3617

ØD mm	B mm	A mm	L mm	B mm	A mm	L mm	Ø d <sup>h6</sup> mm	Number of teeth	S
5,80 - 6,60	40	8	80	85	8	123	12	4	2
6,61 - 7,60	40	8	80	85	8	123	12	4	2
7,61 - 8,60	40	10	80	85	10	123	12	4	2,5
8,61 - 9,60	50	10	90	85	10	123	12	4	2,5
9,61 - 10,60	50	10	95	115	10	160	12	6	3
10,61 - 11,60	60	10	105	115	10	160	12	6	3
11,61 - 12,60	60	10	105	115	10	160	12	6	3
12,61 - 13,60	60	10	105	115	10	160	12	6	4
13,61 - 14,60	70	10	115	115	10	160	12	6	4
14,61 - 15,60	70	10	115	115	10	160	12	6	4
15,61 - 16,60	80	10	130	130	10	180	16	6	4
16,61 - 17,60	80	10	130	130	10	180	16	6	5
17,61 - 18,60	90	12	140	130	12	180	16	6	5
18,61 - 19,10	90	12	150	140	12	200	20	6	5
19,11 - 20,10	100	12	160	140	12	200	20	6	5
20,11 - 21,10	100	12	160	140	12	200	20	6	5
21,11 - 22,10	100	12	160	140	12	200	20	6	6
22,11 - 23,10	100	12	160	140	12	200	20	6	6
23,11 - 24,10	100	12	160	140	12	200	20	6	6
24,11 - 25,10	100	12	160	140	12	200	20	6	6
25,11 - 26,10	110	12	170	150	12	210	25	6	6
26,11 - 27,10	110	14	170	150	14	210	25	6	6
27,11 - 28,10	110	14	170	150	14	210	25	6	8
28,11 - 29,10	110	14	170	150	14	210	25	6	8
29,11 - 30,10	110	14	170	150	14	210	25	6	8
30,11 - 31,10	110	14	170	150	14	210	25	6	8
31,11 - 32,10	110	14	170	150	14	210	25	6	8



# INTEGRAL EXPANDING REAMERS 整体可调铰刀

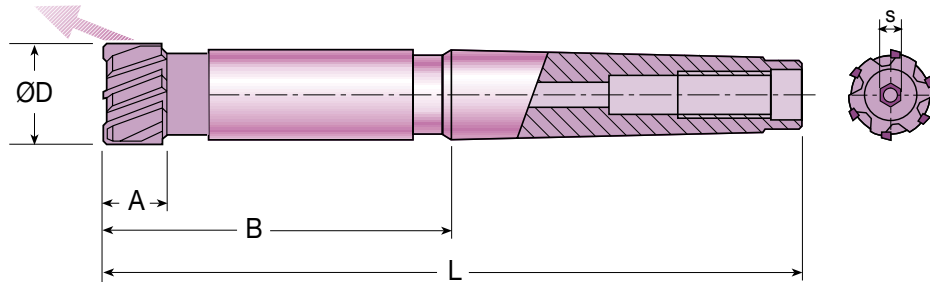
## FOR HIGH FEEDS

### Series 3657

MT shank  
SHORT SERIES

### Series 3607

MT shank  
LONG SERIES



### Series 3657

### Series 3607

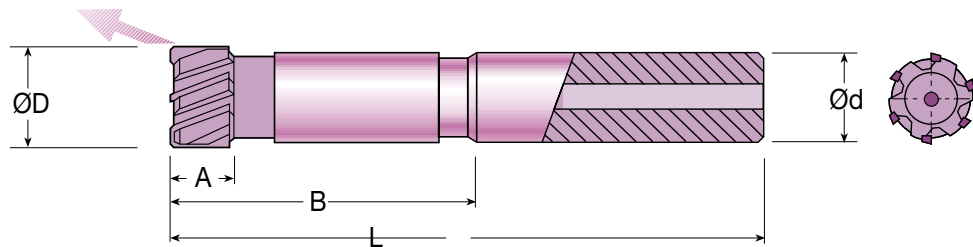
ØD mm	B mm	A mm	L mm	B mm	A mm	L mm	MT shank	Number of teeth	S
5,80 - 6,60	40	8	97	85	8	142	1	4	2
6,61 - 7,60	40	8	97	85	8	142	1	4	2
7,61 - 8,60	40	10	109	85	10	154	2	4	2,5
8,61 - 9,60	50	10	119	85	10	154	2	4	2,5
9,61 - 10,60	50	10	119	115	10	184	2	6	3
10,61 - 11,60	60	10	129	115	10	184	2	6	3
11,61 - 12,60	60	10	129	115	10	184	2	6	3
12,61 - 13,60	60	10	129	115	10	184	2	6	4
13,61 - 14,60	70	10	139	115	10	184	2	6	4
14,61 - 15,60	70	10	139	115	10	184	2	6	4
15,61 - 16,60	80	10	149	130	10	199	2	6	4
16,61 - 17,60	80	10	149	130	10	199	2	6	5
17,61 - 18,60	90	12	159	130	12	199	2	6	5
18,61 - 19,10	90	12	159	140	12	209	2	6	5
19,11 - 20,10	100	12	169	140	12	209	2	6	5
20,11 - 21,10	100	12	169	140	12	209	2	6	5
21,11 - 22,10	100	12	169	140	12	209	2	6	6
22,11 - 23,10	100	12	169	140	12	209	2	6	6
23,11 - 24,10	100	12	169	140	12	209	2	6	6
24,11 - 25,10	100	12	169	140	12	209	2	6	6
25,11 - 26,10	110	12	196	150	12	236	3	6	6
26,11 - 27,10	110	14	196	150	14	236	3	6	6
27,11 - 28,10	110	14	196	150	14	236	3	6	8
28,11 - 29,10	110	14	196	150	14	236	3	6	8
29,11 - 30,10	110	14	196	150	14	236	3	6	8
30,11 - 31,10	110	14	196	150	14	236	3	6	8
31,11 - 32,10	110	14	196	150	14	236	3	6	8

# INTEGRAL FIXED REAMERS 整体不可调铰刀

## FOR HIGH FEEDS

### Series 1620

Cylindrical shank  
SHORT SERIES

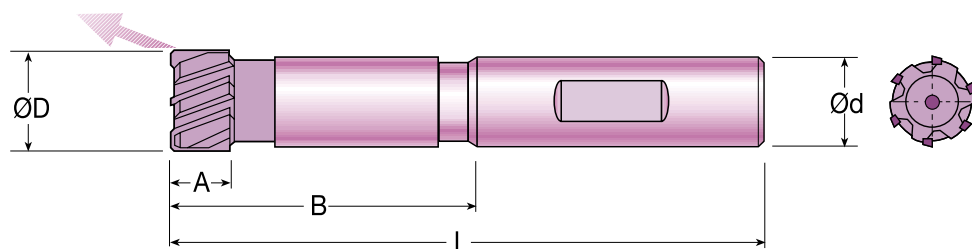


ØD mm	B mm	A mm	L mm	Ød <sup>h6</sup> mm
9,60 - 12,60	60	10	105	12
12,61 - 15,60	70	10	115	12
15,61 - 18,60	80	12	130	16
18,61 - 25,10	100	12	160	20
25,11 - 32,10	110	14	170	25

For holes with minimum tolerance ISO IT7

### Series 162W

Weldon shank  
SHORT SERIES



ØD mm	B mm	A mm	L mm	Ød <sup>h6</sup> mm
9,60 - 12,60	60	10	105	12
12,61 - 15,60	70	10	115	12
15,61 - 18,60	80	12	130	16
18,61 - 25,10	100	12	160	20
25,11 - 32,10	110	14	170	25

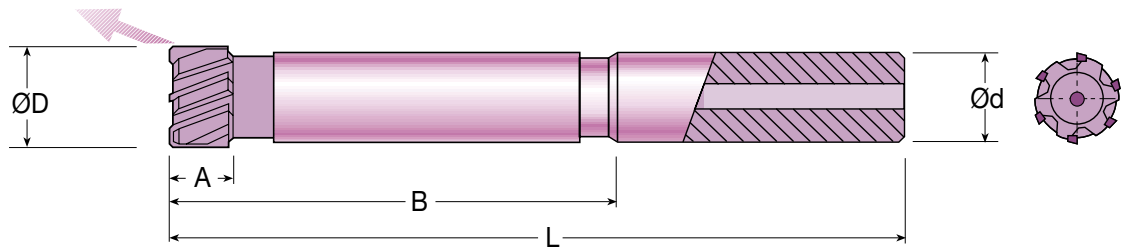
For holes with minimum tolerance ISO IT7

# INTEGRAL FIXED REAMERS 整体不可调铰刀

## FOR HIGH FEEDS

### Series 1610

Cylindrical shank  
LONG SERIES

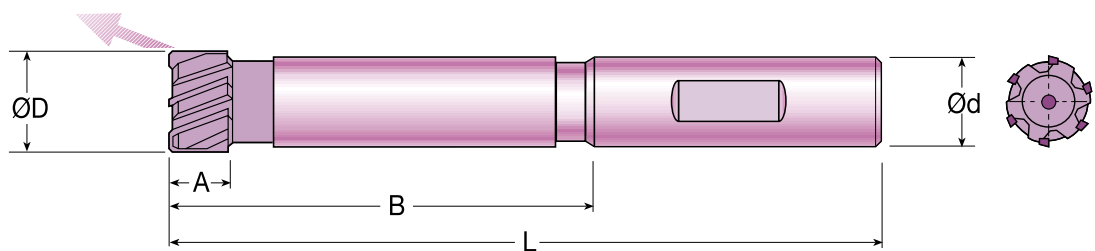


ØD mm	B mm	A mm	L mm	Ød <sup>h6</sup> mm
9,60 - 12,60	115	10	160	12
12,61 - 15,60	115	10	160	12
15,61 - 18,60	130	12	180	16
18,61 - 25,10	140	12	200	20
25,11 - 32,10	150	14	210	25

For holes with minimum tolerance ISO IT7

### Series 161W

Weldon shank  
LONG SERIES



ØD mm	B mm	A mm	L mm	Ød <sup>h6</sup> mm
9,60 - 12,60	115	10	160	12
12,61 - 15,60	115	10	160	12
15,61 - 18,60	130	12	180	16
18,61 - 25,10	140	12	200	20
25,11 - 32,10	150	14	210	25

For holes with minimum tolerance ISO IT7

**NEW**



模块化可调刀环可调铰刀

**EXPANDING REAMERS**

**WITH CUTTING RING**

**ITALY MADE**

**NEW**



[www.westec-corp.com](http://www.westec-corp.com)

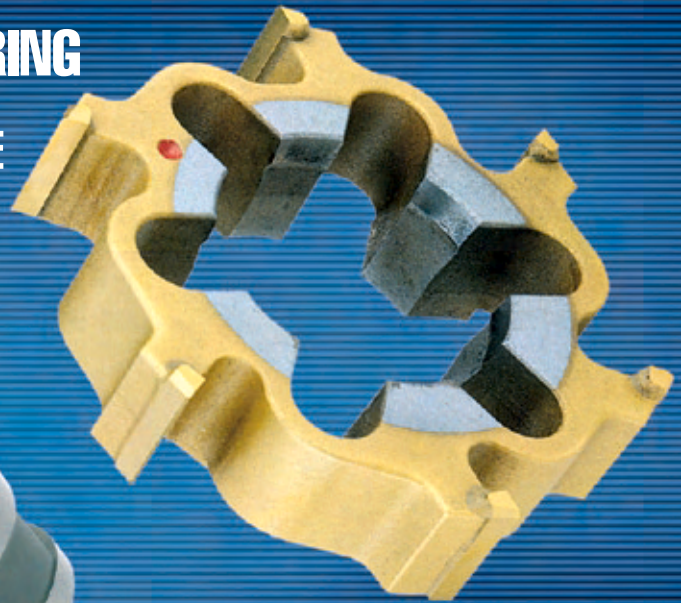


模块化可调刀环可调铰刀

EXPANDING REAMERS

WITH CUTTING RING

ITALY MADE



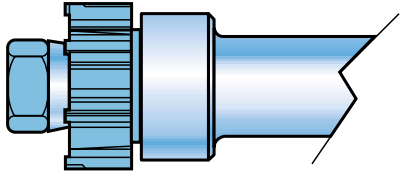
NEW



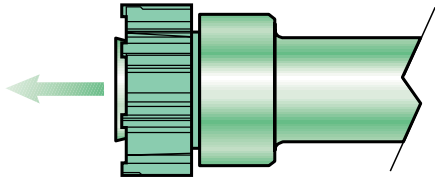
NEW

LEFT HAND HELICAL FLUTES  
from diameter 32,60 to 200,59 mm

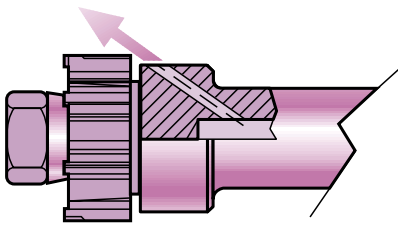
# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀



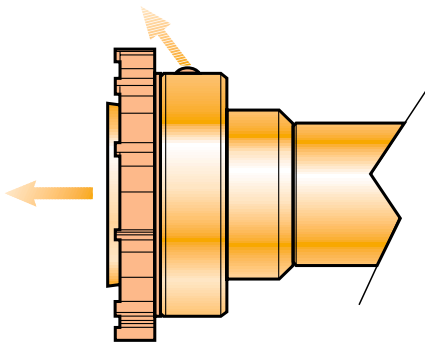
Expanding reamers without coolant



Expanding reamers with central through tool coolant (ideal application for blind holes)

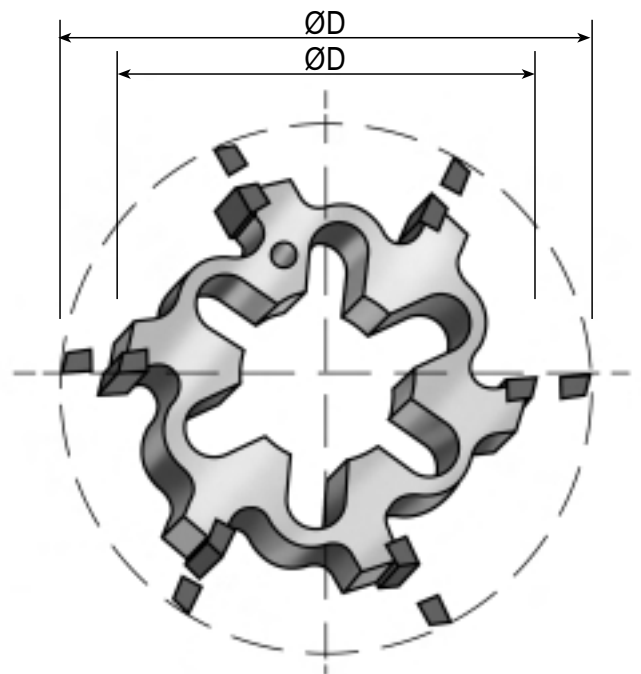
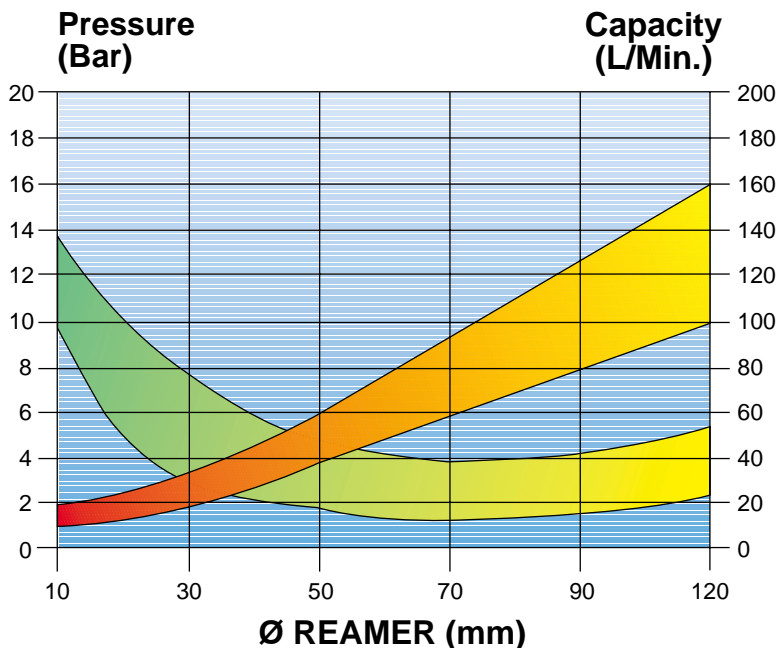


Expanding reamers with radial through tool coolant (ideal application for through holes)



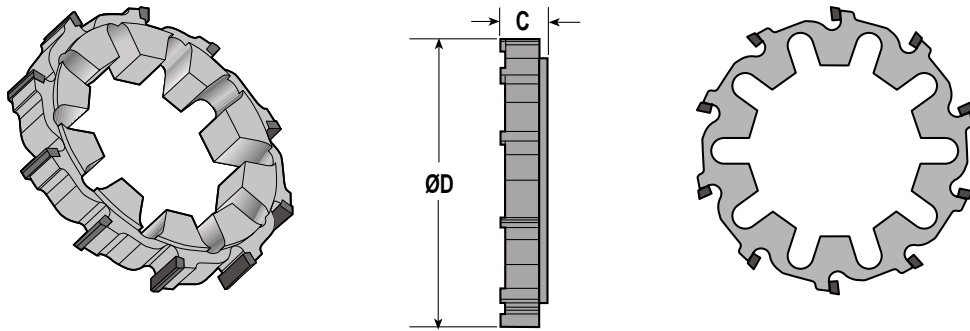
Expanding reamers with central and radial through tool coolant

## Recommended values for lubricants



The cutting rings can be expanded for recovering the starting diameter.

# CUTTING RINGS 刀环直径范围 from diameter 17,60 to 200,59 mm



Ø D mm	C mm	Number of teeth
17,60 - 21,59	11	6
21,60 - 25,59	12	6
25,60 - 32,59	14	6
32,60 - 45,59	16	6
45,60 - 79,59	18,5	6
79,60 - 100,59	18,5	8
100,60 - 110,59	18,5	10
110,60 - 200,59	18,5	12

- The cutting rings are modular and compatible with all the reamers indicated on page 36 to 58.
- We guarantee a regrinding and re-brazing rapid service of the damaged cutting edges (consult our technical department).
- The cutting edges are in an asymmetric way to assure the best roundness of the hole (see page 74).
- Holes with restricted tolerances (ISO 5 and 6) can be supplied and the expansion assures a perfect holding of the reaming diameter.
- Lead-in: cutting rings with G lead-in are usually available from stock (see page 11-12-13).
- Diameters and tolerances: cutting rings of integer metric diameters with H7 tolerances are usually available from stock.
- The cutting rings are manufactured to the middle of the hole tolerance so they must be assembled and adjusted to the same diameter. It is important to comply with this direction in order to have a good working and life of the tool.
- LEFT HAND HELICAL FLUTES CUTTING RINGS from diameter 32,60 to 200,59 mm. ON REQUEST.



# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

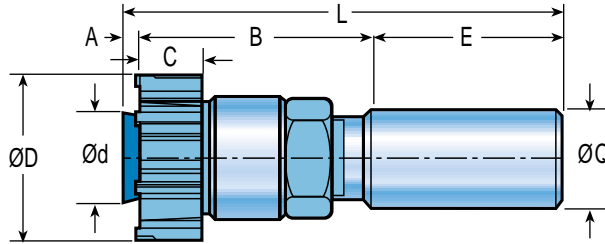
## Cylindrical shank - SHORT SERIES - Brazed carbide (from diameter 17,60 to 45,59 mm)

### Series 2530

- through holes without through tool coolant

### Series 2535

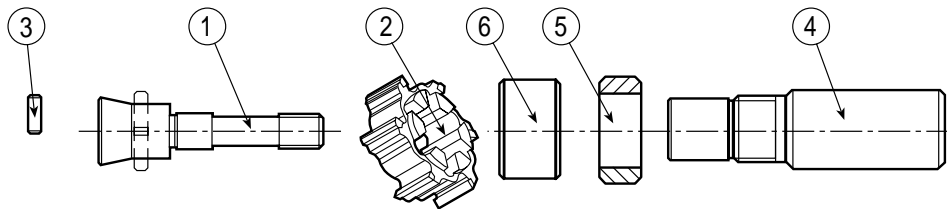
- blind holes without through tool coolant



Expanding reamers with adjustment on the rear of the cutting ring

	series 2530		series 2535								
ØD mm	Ød mm	A mm	Ød mm	A mm	B mm	C mm	E mm	L mm	ØQ <sup>h7</sup> mm	Number of teeth	
17,60 - 21,59	12	3	11,2	1	51	11	40	91	16	6	
21,60 - 25,59	12	3	11,2	1	51	12	40	91	16	6	
25,60 - 32,59	15,8	3,5	15,2	1	51	14	40	91	20	6	
32,60 - 40,59	21,4	4,5	20,3	1	51	16	40	91	20	6	
40,60 - 45,59	25,5	4,5	24,1	1	55	16	36	91	25	6	

## SPARE PARTS



	series 2530		series 2535					
Ø D mm	Complete mandrel without cutting ring	Conical screw with drive pin 1	Complete mandrel without cutting ring	Conical screw with drive pin 1	Drive pin 3	Mandrel 4	Nut 5	Bush 6
17,60 - 21,59	2531-MC-010	2501-VI-016	2531-MC-015	2501-VI-017	2501-CO-010	2531-MA-010	2501-DA-010	2501-BU-010
21,60 - 25,59	2531-MC-020	2501-VI-026	2531-MC-025	2501-VI-027	2501-CO-020	2531-MA-020	2501-DA-020	2501-BU-020
25,60 - 32,59	2531-MC-030	2501-VI-036	2531-MC-035	2501-VI-037	2501-CO-030	2531-MA-030	2501-DA-030	2501-BU-030
32,60 - 40,59	2531-MC-040	2501-VI-046	2531-MC-045	2501-VI-047	2501-CO-040	2531-MA-040	2501-DA-040	2501-BU-040
40,60 - 45,59	2531-MC-050	2501-VI-056	2531-MC-055	2501-VI-057	2501-CO-050	2531-MA-050	2501-DA-050	2501-BU-050

### ② Cutting ring

	Ø D mm	Conical screw second expansion series 2530
	17,60 - 21,59	2501-VI-019
	21,60 - 25,59	2501-VI-029
	25,60 - 32,59	2501-VI-039
	32,60 - 40,59	2501-VI-049
	40,60 - 45,59	2501-VI-059

	Ø D mm	Conical screw second expansion series 2535
	17,60 - 21,59	2501-VI-018
	21,60 - 25,59	2501-VI-028
	25,60 - 32,59	2501-VI-038
	32,60 - 40,59	2501-VI-048
	40,60 - 45,59	2501-VI-058

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

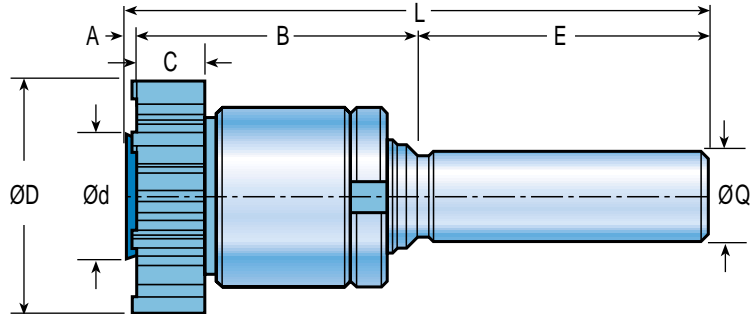
**Cylindrical shank - SHORT SERIES - Brazed carbide (from diameter 45,60 to 100,59 mm)**

## Series 2530

- through holes  
without through tool coolant

## Series 2535

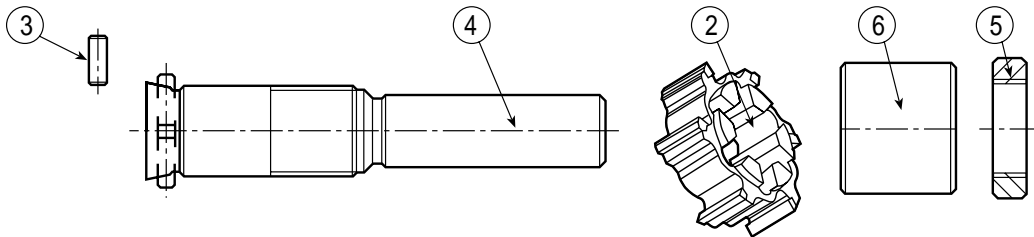
- blind holes  
without through tool coolant



Expanding reamers with adjustment on the rear of the cutting ring

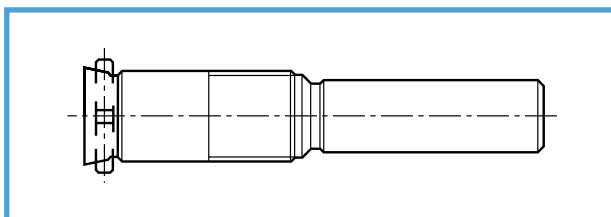
	series 2530		series 2535								
Ø D mm	Ød mm	A mm	Ød mm	A mm	B mm	C mm	E mm	L mm	ØQ <sup>h7</sup> mm	Number of teeth	
45,60 - 60,59	30	7,5	27,8	1,5	62	18,5	65	127	20	6	
60,60 - 79,59	40	10,5	37	1,5	72	18,5	65	137	25	6	
79,60 - 100,59	57	12,5	53,2	1,5	85	18,5	65	150	40	8	

## SPARE PARTS



Ø D mm	series 2530		series 2535		Bush 6	Ring nut 5	Drive pin 3
	Complete mandrel without cutting ring	Mandrel with drive pin 4	Complete mandrel without cutting ring	Mandrel with drive pin 4			
45,60 - 60,59	2530-MC-060	2530-MA-060	2530-MC-065	2530-MA-065	2500-BU-060	2500-GH-060	2500-CO-060
60,60 - 79,59	2530-MC-070	2530-MA-070	2530-MC-075	2530-MA-075	2500-BU-070	2500-GH-070	2500-CO-070
79,60 - 100,59	2530-MC-080	2530-MA-080	2530-MC-085	2530-MA-085	2500-BU-080	2500-GH-080	2500-CO-080

② Cutting ring



series 2535			
Ø D mm	Mandrel second expansion	Ø D mm	Mandrel third expansion
45,60-60,59	2530-MA-066	45,60-60,59	2530-MA-067
60,60-79,59	2530-MA-076	60,60-79,59	2530-MA-077
79,60-100,59	2530-MA-086	79,60-100,59	2530-MA-087

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

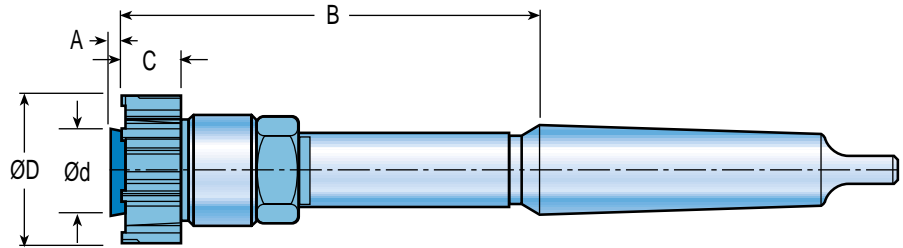
MT shank - SHORT SERIES - Brazed carbide  
(from diameter 17,60 to 45,59 mm)

## Series 2550

- through holes  
without through tool coolant

## Series 2555

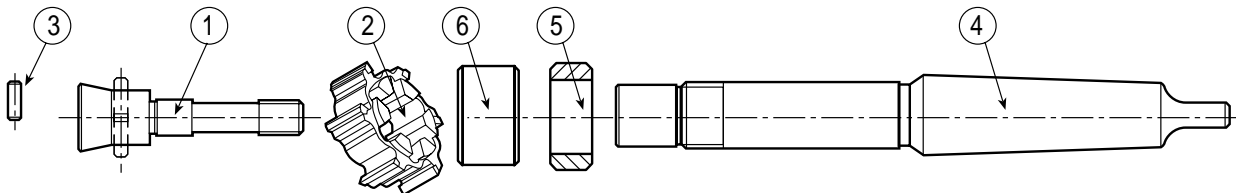
- blind holes  
without through tool coolant



Expanding reamers  
with adjustment on the rear  
of the cutting ring

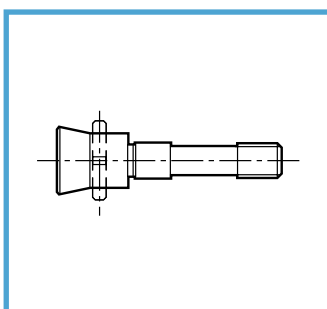
	series 2550		series 2555					
Ø D mm	Ød mm	A mm	Ød mm	A mm	B mm	C mm	MT shank	Number of teeth
17,60 - 21,59	12	3	11,2	1	81	11	2	6
21,60 - 25,59	12	3	11,2	1	81	12	2	6
25,60 - 32,59	15,8	3,5	15,2	1	102	14	3	6
32,60 - 40,59	21,4	4,5	20,3	1	102	16	3	6
40,60 - 45,59	25,5	4,5	24,1	1	102	16	3	6

## SPARE PARTS

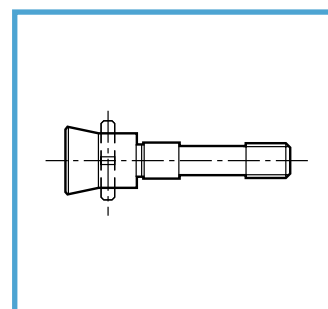


Ø D mm	series 2550		series 2555		Drive pin 3	Mandrel 4	Nut 5	Bush 6
	Complete mandrel without cutting ring	Conical screw with drive pin 1	Complete mandrel without cutting ring	Conical screw with drive pin 1				
17,60 - 21,59	2551-MC-010	2501-VI-016	2551-MC-015	2501-VI-017	2501-CO-010	2551-MA-010	2501-DA-010	2501-BU-010
21,60 - 25,59	2551-MC-020	2501-VI-026	2551-MC-025	2501-VI-027	2501-CO-020	2551-MA-020	2501-DA-020	2501-BU-020
25,60 - 32,59	2551-MC-030	2501-VI-036	2551-MC-035	2501-VI-037	2501-CO-030	2551-MA-030	2501-DA-030	2501-BU-030
32,60 - 40,59	2551-MC-040	2501-VI-046	2551-MC-045	2501-VI-047	2501-CO-040	2551-MA-040	2501-DA-040	2501-BU-040
40,60 - 45,59	2551-MC-050	2501-VI-056	2551-MC-055	2501-VI-057	2501-CO-050	2551-MA-050	2501-DA-050	2501-BU-050

## ② Cutting ring



Ø D mm	Conical screw second expansion series 2550
17,60 - 21,59	2501-VI-019
21,60 - 25,59	2501-VI-029
25,60 - 32,59	2501-VI-039
32,60 - 40,59	2501-VI-049
40,60 - 45,59	2501-VI-059



Ø D mm	Conical screw second expansion series 2555
17,60 - 21,59	2501-VI-018
21,60 - 25,59	2501-VI-028
25,60 - 32,59	2501-VI-038
32,60 - 40,59	2501-VI-048
40,60 - 45,59	2501-VI-058

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

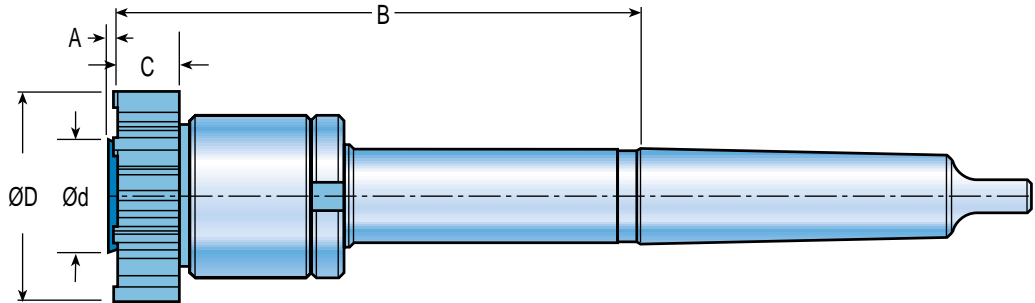
**MT shank - SHORT SERIES - Brazed carbide**  
(from diameter 45,60 to 100,59 mm)

## Series 2550

- through holes without through tool coolant

## Series 2555

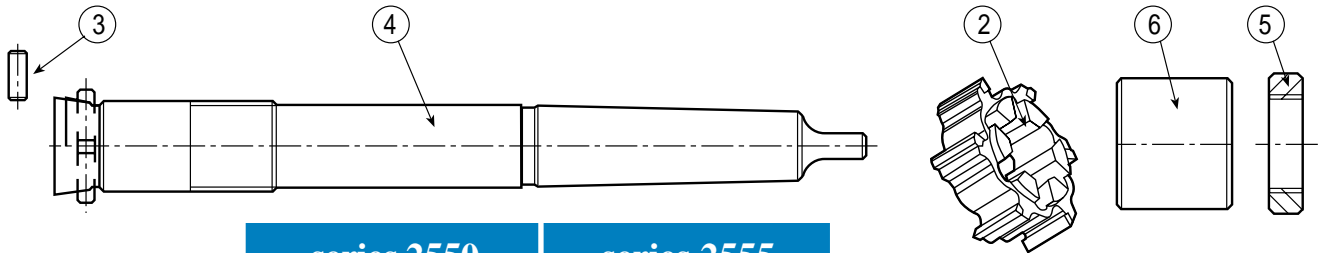
- blind holes without through tool coolant



Expanding reamers with adjustment on the rear of the cutting ring

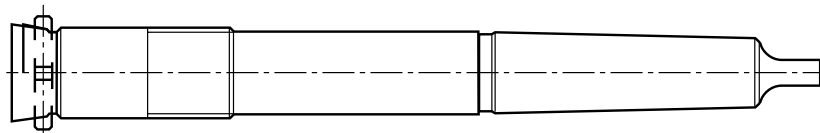
	series 2550			series 2555				
Ø D mm	Ød mm	A mm	Ød mm	A mm	B mm	C mm	MT shank	Number of teeth
45,60 - 60,59	30	7,5	27,8	1,5	104	18,5	3	6
60,60 - 79,59	40	10,5	37	1,5	102	18,5	4	6
79,60 - 100,59	57	12,5	53,2	1,5	102	18,5	5	8

## SPARE PARTS



	series 2550		series 2555				
Ø D mm	Complete mandrel without cutting ring	Mandrel with drive pin 4	Complete mandrel without cutting ring	Mandrel with drive pin 4	Bush 6	Ring nut 5	Drive pin 3
45,60 - 60,59	2550-MC-060	2550-MA-060	2550-MC-065	2550-MA-065	2500-BU-060	2500-GH-060	2500-CO-060
60,60 - 79,59	2550-MC-070	2550-MA-070	2550-MC-075	2550-MA-075	2500-BU-070	2500-GH-070	2500-CO-070
79,60 - 100,59	2550-MC-080	2550-MA-080	2550-MC-085	2550-MA-085	2500-BU-080	2500-GH-080	2500-CO-080

② Cutting ring



series 2555			
Ø D mm	Mandrel second expansion	Ø D mm	Mandrel third expansion
45,60-60,59	2550-MA-066	45,60-60,59	2550-MA-067
60,60-79,59	2550-MA-076	60,60-79,59	2550-MA-077
79,60-100,59	2550-MA-086	79,60-100,59	2550-MA-087

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

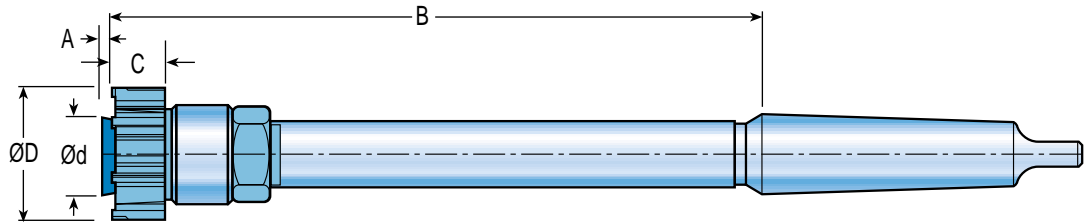
## MT shank - LONG SERIES - Brazed carbide (from diameter 17,60 to 45,59 mm)

### Series 2500

- through holes without through tool coolant

### Series 2505

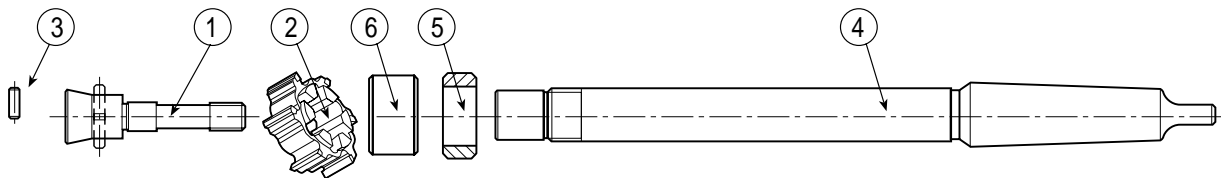
- blind holes without through tool coolant



Expanding reamers with adjustment on the rear of the cutting ring

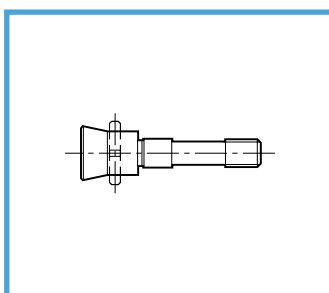
	series 2500		series 2505					
Ø D mm	Ø d mm	A mm	Ø d mm	A mm	B mm	C mm	MT shank	Number of teeth
17,60 - 21,59	12	3	11,2	1	121	11	2	6
21,60 - 25,59	12	3	11,2	1	121	12	2	6
25,60 - 32,59	15,8	3,5	15,2	1	153	14	3	6
32,60 - 40,59	21,4	4,5	20,3	1	179	16	3	6
40,60 - 45,59	25,5	4,5	24,1	1	200	16	3	6

## SPARE PARTS

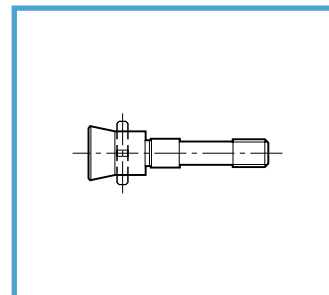


	series 2500		series 2505					
Ø D mm	Complete mandrel without cutting ring	Conical screw with drive pin 1	Complete mandrel without cutting ring	Conical screw with drive pin 1	Drive pin 3	Mandrel 4	Nut 5	Bush 6
17,60 - 21,59	2501-MC-010	2501-VI-016	2501-MC-015	2501-VI-017	2501-CO-010	2501-MA-010	2501-DA-010	2501-BU-010
21,60 - 25,59	2501-MC-020	2501-VI-026	2501-MC-025	2501-VI-027	2501-CO-020	2501-MA-020	2501-DA-020	2501-BU-020
25,60 - 32,59	2501-MC-030	2501-VI-036	2501-MC-035	2501-VI-037	2501-CO-030	2501-MA-030	2501-DA-030	2501-BU-030
32,60 - 40,59	2501-MC-040	2501-VI-046	2501-MC-045	2501-VI-047	2501-CO-040	2501-MA-040	2501-DA-040	2501-BU-040
40,60 - 45,59	2501-MC-050	2501-VI-056	2501-MC-055	2501-VI-057	2501-CO-050	2501-MA-050	2501-DA-050	2501-BU-050

### ② Cutting ring



Ø D mm	Conical screw second expansion series 2500
17,60 - 21,59	2501-VI-019
21,60 - 25,59	2501-VI-029
25,60 - 32,59	2501-VI-039
32,60 - 40,59	2501-VI-049
40,60 - 45,59	2501-VI-059



Ø D mm	Conical screw second expansion series 2505
17,60 - 21,59	2501-VI-018
21,60 - 25,59	2501-VI-028
25,60 - 32,59	2501-VI-038
32,60 - 40,59	2501-VI-048
40,60 - 45,59	2501-VI-058

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

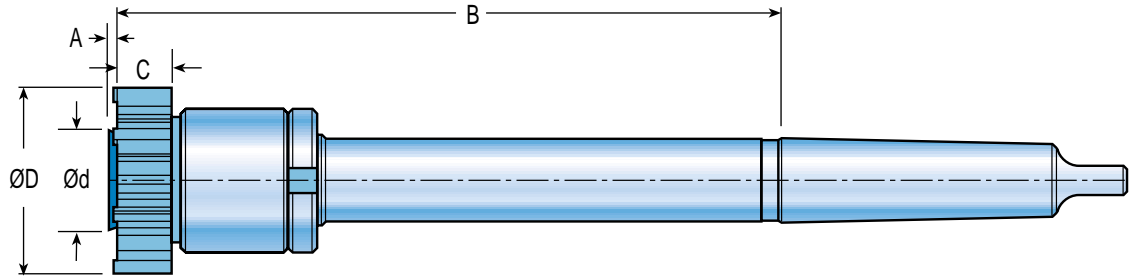
## MT shank - LONG SERIES - Brazed carbide (from diameter 45,60 to 100,59 mm)

### Series 2500

- through holes  
without through  
tool coolant

### Series 2505

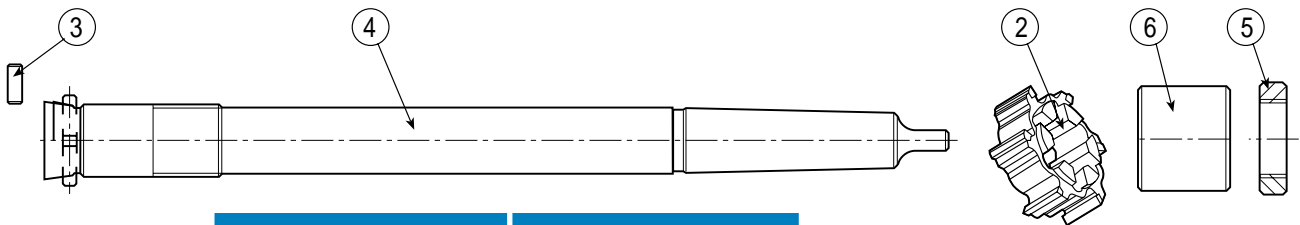
- blind holes  
without through  
tool coolant



Expanding reamers  
with adjustment on the rear  
of the cutting ring

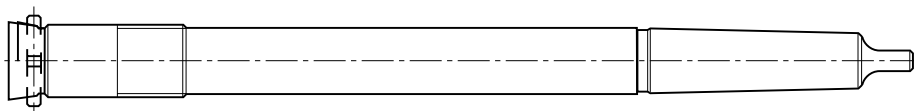
	series 2500			series 2505				
Ø D mm	Ød mm	A mm	Ød mm	A mm	B mm	C mm	MT shank	Number of teeth
45,60 - 60,59	30	7,5	27,8	1,5	214	18,5	3	6
60,60 - 79,59	40	10,5	37	1,5	237	18,5	4	6
79,60 - 100,59	57	12,5	53,2	1,5	245	18,5	5	8

## SPARE PARTS



	series 2500		series 2505				
Ø D mm	Complete mandrel without cutting ring	Mandrel with drive pin 4	Complete mandrel without cutting ring	Mandrel with drive pin 4	Bush 6	Ring nut 5	Drive pin 3
45,60 - 60,59	2500-MC-060	2500-MA-060	2500-MC-065	2500-MA-065	2500-BU-060	2500-GH-060	2500-CO-060
60,60 - 79,59	2500-MC-070	2500-MA-070	2500-MC-075	2500-MA-075	2500-BU-070	2500-GH-070	2500-CO-070
79,60 - 100,59	2500-MC-080	2500-MA-080	2500-MC-085	2500-MA-085	2500-BU-080	2500-GH-080	2500-CO-080

### ② Cutting ring



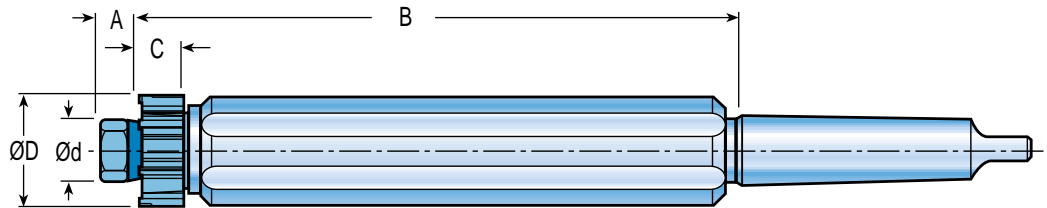
series 2505			
Ø D mm	Mandrel second expansion	Ø D mm	Mandrel third expansion
45,60-60,59	2500-MA-066	45,60-60,59	2500-MA-067
60,60-79,59	2500-MA-076	60,60-79,59	2500-MA-077
79,60-100,59	2500-MA-086	79,60-100,59	2500-MA-087

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## MT shank - TEMPERED GUIDE - Brazed carbide (from diameter 17,60 to 100,59 mm)

### Series 2010

- through holes  
without through  
tool coolant

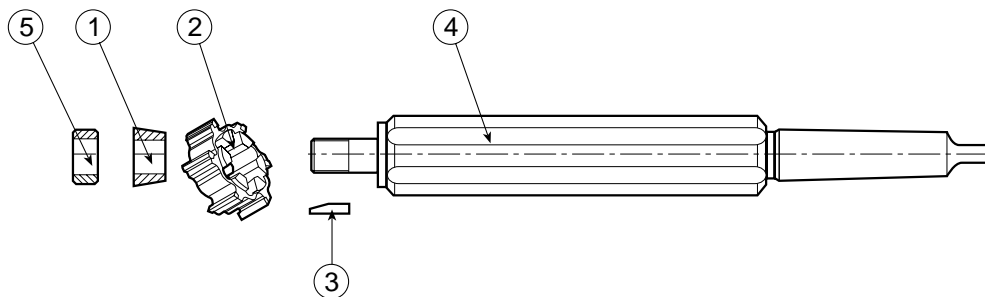


Ø D mm	Ød mm	A mm	B mm	C mm	MT shank	Number of teeth
17,60 - 21,59	12	11	162	11	2	6
21,60 - 25,59	12	11	162	12	2	6
25,60 - 32,59	15,6	11	164	14	3	6
32,60 - 40,59	22	14	197	16	3	6
40,60 - 45,59	25,4	15	227	16	3	6
45,60 - 60,59	30	20,5	228	18,5	4	6
60,60 - 79,59	40	24,5	238	18,5	4	6
79,60 - 100,59	56	28,5	246	18,5	5	8

Expanding reamers  
with adjustment in front  
of the cutting ring

- The diameter of the guide is reduced of 0,010-0,015 mm. compared with the nominal diameter D.
- Guide with different diameters on request.
- A good quality lubricant must be used with this style of reamer.

## SPARE PARTS



Ø D mm	Complete mandrel without cutting ring	Conical ring 1	Drive pin 3	Mandrel 4	Ring nut or nut 5
17,60 - 21,59	2010-MC-Ø*	2010-AC-010	2000-CO-010	2010-MA-Ø*	2000-DA-010
21,60 - 25,59		2010-AC-010	2000-CO-020		2000-DA-010
25,60 - 32,59		2010-AC-020	2000-CO-030		2000-DA-020
32,60 - 40,59		2010-AC-030	2000-CO-040		2000-DA-060
40,60 - 45,59		2010-AC-040	2000-CO-050		2000-DA-090
45,60 - 60,59		2010-AC-050	2000-CO-060		2000-GH-880
60,60 - 79,59		2010-AC-060	2000-CO-070		2000-GH-900
79,60 - 100,59		2010-AC-070	2000-CO-080		2000-GH-920

Ø\*  
diameter and tolerance  
of the hole to ream

② Cutting ring

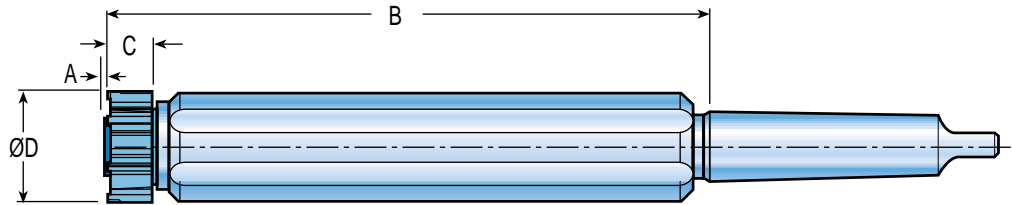


# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## MT shank - TEMPERED GUIDE - Brazed carbide (from diameter 17,60 to 100,59 mm)

### Series 2015

- blind holes without through tool coolant

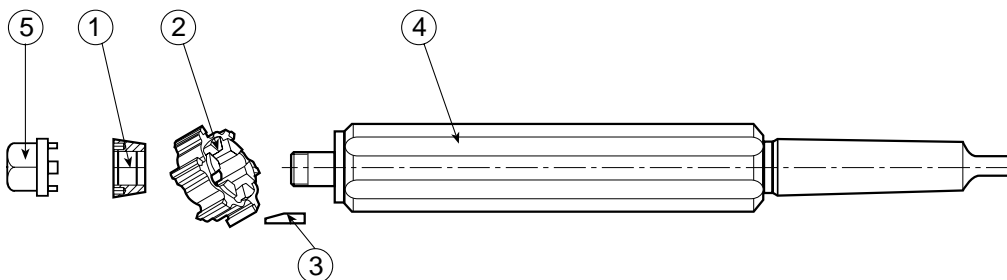


Expanding reamers with adjustment in front of the cutting ring

Ø D mm	A mm	B mm	C mm	MT shank	Number of teeth
17,60 - 21,59	1	162	11	2	6
21,60 - 25,59	1	162	12	2	6
25,60 - 32,59	1	164	14	3	6
32,60 - 40,59	1	197	16	3	6
40,60 - 45,59	1,5	227	16	3	6
45,60 - 60,59	1,5	228	18,5	4	6
60,60 - 79,59	1,5	238	18,5	4	6
79,60 - 100,59	1,5	246	18,5	5	8

- The diameter of the guide is reduced of 0,010-0,015 mm. compared with the nominal diameter D.
- Guide with different diameters on request.
- A good quality lubricant must be used with this style of reamer.

## SPARE PARTS



Ø D mm	Complete mandrel without cutting ring	Conical ring 1	Drive pin 3	Mandrel 4
17,60 - 21,59	2015-MC-Ø*	4001-AC-115	2000-CO-010	2015-MA-Ø
21,60 - 25,59		4001-AC-115	2000-CO-020	
25,60 - 29,59		4001-AC-125	2000-CO-030	
29,60 - 32,59		4001-AC-125	2000-CO-040	
32,60 - 36,59		4001-AC-135	2000-CO-040	
36,60 - 40,59		4001-AC-135	2000-CO-050	
40,60 - 45,59		4001-AC-145	2000-CO-060	
45,60 - 49,59		4001-AC-155	2000-CO-060	
49,60 - 55,59		4001-AC-155	2000-CO-070	
55,60 - 60,59		4001-AC-155	2000-CO-080	
60,60 - 65,59		4001-AC-165	2000-CO-080	
65,60 - 79,59		4001-AC-165	2000-CO-090	
79,60 - 100,59		4001-AC-185	2000-CO-090	

Ø D mm	Key 5
17,60 - 25,59	4001-CH-015
25,60 - 32,59	4001-CH-025
32,60 - 40,59	4001-CH-035
40,60 - 45,59	4001-CH-045
45,60 - 60,59	4001-CH-055
60,60 - 79,59	4001-CH-065
79,60 - 100,59	4001-CH-085

Ø D mm	Conical ring second expansion	Conical ring third expansion
17,60 - 25,59	4001-AC-215	---
25,60 - 32,59	4001-AC-225	4001-AC-325
32,60 - 40,59	4001-AC-235	4001-AC-335
40,60 - 45,59	4001-AC-245	4001-AC-345
45,60 - 60,59	4001-AC-255	4001-AC-355
60,60 - 79,59	4001-AC-265	4001-AC-365
79,60 - 100,59	4001-AC-285	4001-AC-385

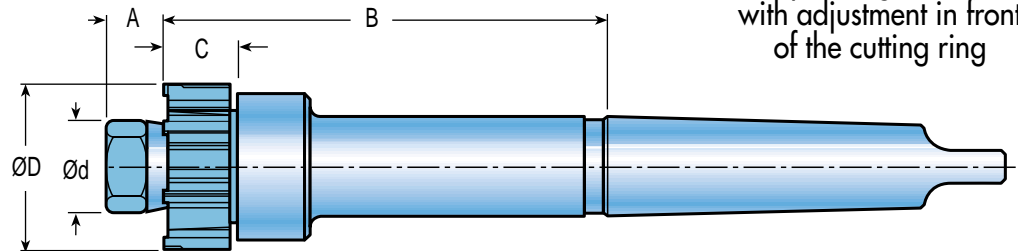
② Cutting ring

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## MT shank - SHORT SERIES - Brazed carbide (from diameter 17,60 to 200,59 mm)

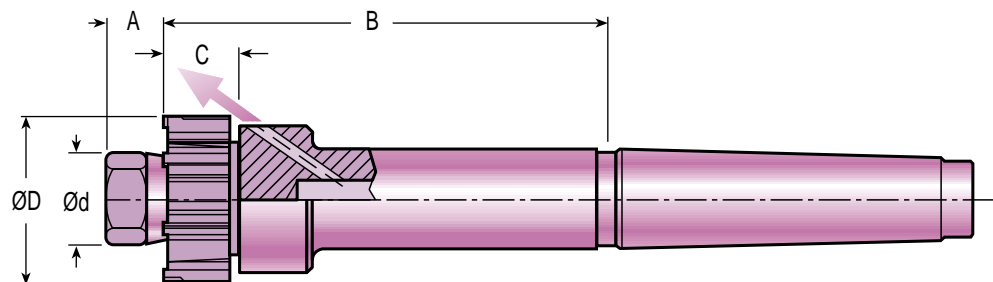
### Series 2050

- through holes without through tool coolant
- Ø 17,60 ÷ 45,59



### Series 4250

- through holes with radial through tool coolant
- Ø 17,60 ÷ 200,59

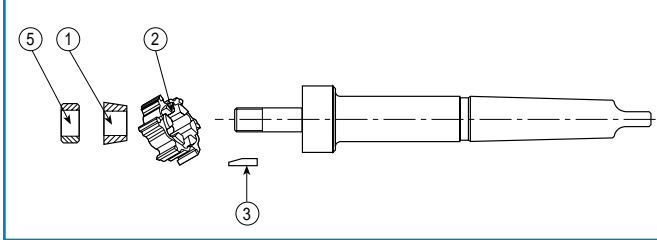


Ø D mm	Ø d mm	series 2050	series 4250	series 2050 - 4250			
		A mm	A mm	B mm	C mm	MT shank	Number of teeth
17,60 - 21,59	12	11	11	81	11	2	6
21,60 - 25,59	12	11	11	81	12	2	6
25,60 - 32,59	15,6	11	11	102	14	3	6
32,60 - 40,59	22	14	14	102	16	3	6
40,60 - 45,59	25,4	15	15	102	16	3	6
45,60 - 60,59	30	-	20,5	105	18,5	3	6
60,60 - 79,59	40	-	24,5	105	18,5	4	6
79,60 - 100,59	56	-	28,5	105	18,5	5	8
100,60 - 110,59	73,8	-	35,5	105	18,5	5	10
110,60 - 115,59	80,8	-	35,5	105	18,5	5	12
115,60 - 125,59	86,8	-	35,5	105	18,5	5	12
125,60 - 139,59	90,8	-	35,5	105	18,5	5	12
139,60 - 145,59	102,8	-	35,5	105	18,5	5	12
145,60 - 155,59	107,8	-	35,5	105	18,5	5	12
155,60 - 165,59	107,8	-	48,5	105	18,5	6	12
165,60 - 175,59	117,8	-	48,5	105	18,5	6	12
175,60 - 185,59	127,8	-	48,5	105	18,5	6	12
185,60 - 195,59	137,8	-	48,5	105	18,5	6	12
195,60 - 200,59	145,8	-	48,5	105	18,5	6	12

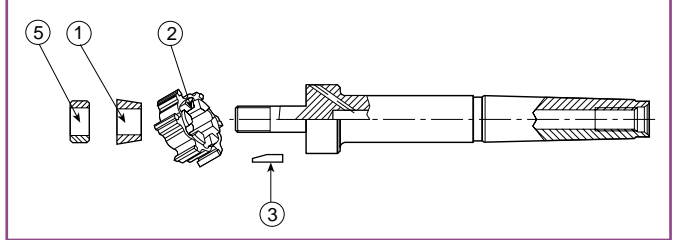
# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## SPARE PARTS

### Series 2050 - Ø 17,60 ÷ 45,59



### Series 4250 - Ø 17,60 ÷ 200,59



	series 2050	series 4250	series 2050 - 4250	series 2050 - 4250	series 2050 - 4250
ØD mm	Complete mandrel without cutting ring	Complete mandrel without cutting ring	Conical ring 1	Ring nut or nut 5	Drive pin 3
17,60 - 21,59	2050-MC-010	4250-MC-010	2010-AC-010	2000-DA-010	2000-CO-010
21,60 - 25,59	2050-MC-020	4250-MC-020	2010-AC-010	2000-DA-010	2000-CO-020
25,60 - 29,59	2050-MC-030	4250-MC-030	2010-AC-020	2000-DA-020	2000-CO-030
29,60 - 32,59	2050-MC-030	4250-MC-030	2010-AC-020	2000-DA-020	2000-CO-030
32,60 - 36,59	2050-MC-040	4250-MC-040	2010-AC-030	2000-DA-060	2000-CO-040
36,60 - 40,59	2050-MC-040	4250-MC-040	2010-AC-030	2000-DA-060	2000-CO-040
40,60 - 45,59	2050-MC-050	4250-MC-050	2010-AC-040	2000-DA-090	*
45,60 - 49,59	-	4250-MC-060	2010-AC-050	2000-GH-880	2000-CO-060
49,60 - 55,59	-	4250-MC-070	2010-AC-050	2000-GH-880	2000-CO-070
55,60 - 60,59	-	4250-MC-070	2010-AC-050	2000-GH-880	2000-CO-070
60,60 - 65,59	-	4250-MC-080	2010-AC-060	2000-GH-900	2000-CO-080
65,60 - 70,59	-	4250-MC-080	2010-AC-060	2000-GH-900	2000-CO-080
70,60 - 79,59	-	4250-MC-090	2010-AC-060	2000-GH-900	2000-CO-090
79,60 - 90,59	-	4250-MC-100	2010-AC-070	2000-GH-920	2000-CO-090
90,60 - 100,59	-	4250-MC-110	2010-AC-070	2000-GH-920	2000-CO-090
100,60 - 110,59	-	4250-MC-120	2060-BU-010	2000-GH-095	2000-CO-090
110,60 - 115,59	-	4250-MC-130	2060-BU-020	2000-GH-095	2000-CO-090
115,60 - 120,59	-	4250-MC-140	2060-BU-030	2000-GH-095	2000-CO-090
120,60 - 125,59	-	4250-MC-150	2060-BU-030	2000-GH-095	2000-CO-090
125,60 - 132,59	-	4250-MC-160	2060-BU-040	2000-GH-095	2000-CO-100
132,60 - 139,59	-	4250-MC-170	2060-BU-040	2000-GH-095	2000-CO-100
139,60 - 145,59	-	4250-MC-180	2060-BU-050	2000-GH-095	2000-CO-100
145,60 - 155,59	-	4250-MC-190	2060-BU-060	2000-GH-095	2000-CO-110
155,60 - 165,59	-	4250-MC-200	2060-BU-070	2000-GH-120	2000-CO-110
165,60 - 175,59	-	4250-MC-210	2060-BU-080	2000-GH-120	2000-CO-110
175,60 - 185,59	-	4250-MC-220	2060-BU-090	2000-GH-120	2000-CO-120
185,60 - 195,59	-	4250-MC-230	2060-BU-100	2000-GH-120	2000-CO-120
195,60 - 200,59	-	4250-MC-240	2060-BU-110	2000-GH-120	2000-CO-120

② Cutting ring

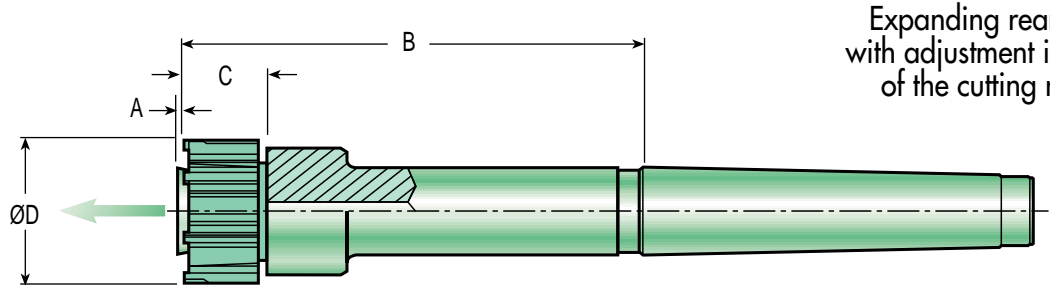
\* Series 2050 drive pin 2000-CO-050 - \* Series 4250 drive pin 2000-CO-060

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

**MT shank - SHORT SERIES - Brazed carbide  
(from diameter 17,60 to 200,59 mm)**

## Series 4050

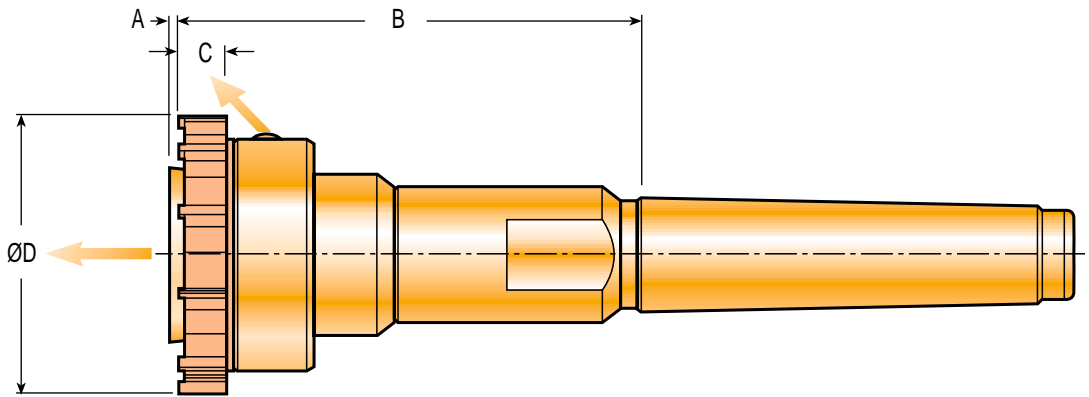
- through and blind holes with central through tool coolant  
Ø 17,60 ÷ 79,59



Expanding reamers with adjustment in front of the cutting ring

## Series 4050

- through and blind holes with central and radial through tool coolant  
Ø 79,60 ÷ 200,59

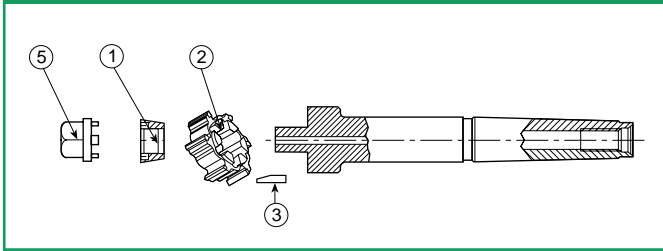


Ø D mm	A mm	B mm	C mm	MT shank	Number of teeth
17,60 - 21,59	1	81	11	2	6
21,60 - 25,59	1	81	12	2	6
25,60 - 32,59	1	102	14	3	6
32,60 - 40,59	1	102	16	3	6
40,60 - 45,59	1	102	16	3	6
45,60 - 60,59	1,5	105	18,5	3	6
60,60 - 79,59	1,5	105	18,5	4	6
79,60 - 100,59	1,5	105	18,5	5	8
100,60 - 110,59	1,5	106	18,5	5	10
110,60 - 115,59	1,5	106	18,5	5	12
115,60 - 125,59	1,5	106	18,5	5	12
125,60 - 139,59	1,5	106	18,5	5	12
139,60 - 145,59	1,5	106	18,5	5	12
145,60 - 155,59	1,5	106	18,5	5	12
155,60 - 165,59	1,5	106	18,5	6	12
165,60 - 175,59	1,5	106	18,5	6	12
175,60 - 185,59	1,5	106	18,5	6	12
185,60 - 195,59	1,5	106	18,5	6	12
195,60 - 200,59	1,5	106	18,5	6	12

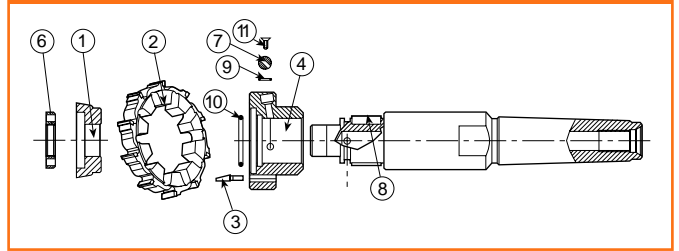
# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## SPARE PARTS

### Series 4050 - Ø 17,60 ÷ 79,59



### Series 4050 - Ø 79,60 ÷ 200,59



ØD mm	Complete mandrel without cutting ring	Key 5	Conical ring 1	Conical ring second expansion	Conical ring third expansion	Drive pin 3	Ring nut 6	Flange 4
17,60 - 21,59	4051-MC-015	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-010	-	-
21,60 - 25,59	4051-MC-025	4001-CH-015	4001-AC-115	4001-AC-215	-	2000-CO-020	-	-
25,60 - 29,59	4051-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-030	-	-
29,60 - 32,59	4051-MC-036	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	2000-CO-040	-	-
32,60 - 36,59	4051-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-040	-	-
36,60 - 40,59	4051-MC-046	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	2000-CO-050	-	-
40,60 - 45,59	4051-MC-055	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	2000-CO-060	-	-
45,60 - 49,59	4051-MC-065	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-060	-	-
49,60 - 55,59	4051-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-070	-	-
55,60 - 60,59	4051-MC-076	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	2000-CO-080	-	-
60,60 - 65,59	4051-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-080	-	-
65,60 - 70,59	4051-MC-086	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090	-	-
70,60 - 79,59	4051-MC-095	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	2000-CO-090	-	-
79,60 - 90,59	4051-MC-105	-	4001-AC-175	4001-AC-275	4001-AC-375	2000-CO-090	4001-GH-015	4001-FL-015
90,60 - 100,59	4051-MC-115	-	4001-AC-175	4001-AC-275	4001-AC-375	2000-CO-090	4001-GH-015	4001-FL-025
100,60 - 110,59	4051-MC-125	-	4001-AC-116	4001-AC-216	4001-AC-316	2000-CO-090	4001-GH-035	4001-FL-035
110,60 - 115,59	4051-MC-135	-	4001-AC-126	4001-AC-226	4001-AC-326	2000-CO-090	4001-GH-035	4001-FL-045
115,60 - 120,59	4051-MC-145	-	4001-AC-136	4001-AC-236	4001-AC-336	2000-CO-090	4001-GH-035	4001-FL-055
120,60 - 125,59	4051-MC-155	-	4001-AC-136	4001-AC-236	4001-AC-336	2000-CO-090	4001-GH-035	4001-FL-065
125,60 - 132,59	4051-MC-165	-	4001-AC-146	4001-AC-246	4001-AC-346	2000-CO-100	4001-GH-035	4001-FL-075
132,60 - 139,59	4051-MC-175	-	4001-AC-146	4001-AC-246	4001-AC-346	2000-CO-100	4001-GH-035	4001-FL-085
139,60 - 145,59	4051-MC-185	-	4001-AC-156	4001-AC-256	4001-AC-356	2000-CO-100	4001-GH-035	4001-FL-095
145,60 - 155,59	4051-MC-195	-	4001-AC-166	4001-AC-266	4001-AC-366	2000-CO-110	4001-GH-035	4001-FL-105
155,60 - 165,59	4051-MC-205	-	4001-AC-176	4001-AC-276	4001-AC-376	2000-CO-110	4001-GH-115	4001-FL-115
165,60 - 175,59	4051-MC-215	-	4001-AC-186	4001-AC-286	4001-AC-386	2000-CO-110	4001-GH-115	4001-FL-125
175,60 - 185,59	4051-MC-225	-	4001-AC-196	4001-AC-296	4001-AC-396	2000-CO-120	4001-GH-115	4001-FL-135
185,60 - 195,59	4051-MC-235	-	4001-AC-117	4001-AC-217	4001-AC-317	2000-CO-120	4001-GH-115	4001-FL-145
195,60 - 200,59	4051-MC-245	-	4001-AC-127	4001-AC-227	4001-AC-327	2000-CO-120	4001-GH-115	4001-FL-155

② Cutting ring

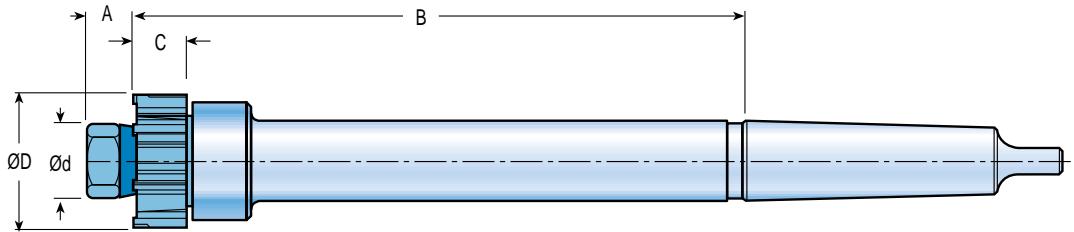
⑦ Ball 4001-SF-010

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## MT shank - LONG SERIES - Brazed carbide (from diameter 17,60 to 200,59 mm)

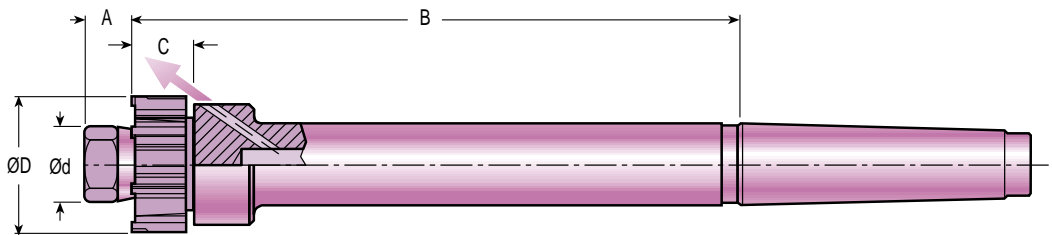
### Series 2000

- through holes without through tool coolant  
 $\varnothing 17,60 \div 45,59$



### Series 4200

- through holes with radial through tool coolant  
 $\varnothing 17,60 \div 200,59$

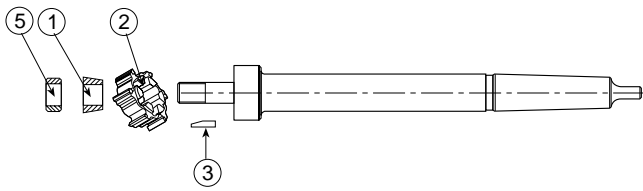


Ø D mm	Ø d mm	Series 2000	Series 4200	Expanding reamers with adjustment in front of the cutting ring			
		A mm	A mm	B mm	C mm	MT shank	Number of teeth
17,60 - 21,59	12	11	11	121	11	2	6
21,60 - 25,59	12	11	11	121	12	2	6
25,60 - 32,59	15,6	11	11	153	14	3	6
32,60 - 40,59	22	14	14	179	16	3	6
40,60 - 45,59	25,4	15	15	201	16	3	6
45,60 - 60,59	30	-	20,5	214	18,5	3	6
60,60 - 79,59	40	-	24,5	237	18,5	4	6
79,60 - 100,59	56	-	28,5	245	18,5	5	8
100,60 - 110,59	73,8	-	35,5	245	18,5	5	10
110,60 - 115,59	80,8	-	35,5	245	18,5	5	12
115,60 - 125,59	86,8	-	35,5	245	18,5	5	12
125,60 - 139,59	90,8	-	35,5	245	18,5	5	12
139,60 - 145,59	102,8	-	35,5	245	18,5	5	12
145,60 - 155,59	107,8	-	35,5	245	18,5	5	12
155,60 - 165,59	107,8	-	48,5	245	18,5	6	12
165,60 - 175,59	117,8	-	48,5	245	18,5	6	12
175,60 - 185,59	127,8	-	48,5	245	18,5	6	12
185,60 - 195,59	137,8	-	48,5	245	18,5	6	12
195,60 - 200,59	145,8	-	48,5	245	18,5	6	12

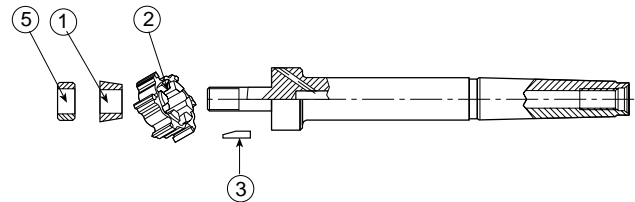
# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## SPARE PARTS

**Series 2000 - Ø 17,60 ÷ 45,59**



**Series 4200 - Ø 17,60 ÷ 200,59**



	series 2000	series 4200	series 2000 - 4200	series 2000 - 4200	series 2000 - 4200
ØD mm	Complete mandrel without cutting ring	Complete mandrel without cutting ring	Conical ring 1	Ring nut or nut 5	Drive pin 3
17,60 - 21,59	2000-MC-010	4200-MC-010	2010-AC-010	2000-DA-010	2000-CO-010
21,60 - 25,59	2000-MC-020	4200-MC-020	2010-AC-010	2000-DA-010	2000-CO-020
25,60 - 29,59	2000-MC-030	4200-MC-030	2010-AC-020	2000-DA-020	2000-CO-030
29,60 - 32,59	2000-MC-030	4200-MC-030	2010-AC-020	2000-DA-020	2000-CO-030
32,60 - 36,59	2000-MC-040	4200-MC-040	2010-AC-030	2000-DA-060	2000-CO-040
36,60 - 40,59	2000-MC-040	4200-MC-040	2010-AC-030	2000-DA-060	2000-CO-040
40,60 - 45,59	2000-MC-050	4200-MC-050	2010-AC-040	2000-DA-090	*
45,60 - 49,59	-	4200-MC-060	2010-AC-050	2000-GH-880	2000-CO-060
49,60 - 55,59	-	4200-MC-070	2010-AC-050	2000-GH-880	2000-CO-070
55,60 - 60,59	-	4200-MC-070	2010-AC-050	2000-GH-880	2000-CO-070
60,60 - 65,59	-	4200-MC-080	2010-AC-060	2000-GH-900	2000-CO-080
65,60 - 70,59	-	4200-MC-080	2010-AC-060	2000-GH-900	2000-CO-080
70,60 - 79,59	-	4200-MC-090	2010-AC-060	2000-GH-900	2000-CO-090
79,60 - 90,59	-	4200-MC-100	2010-AC-070	2000-GH-920	2000-CO-090
90,60 - 100,59	-	4200-MC-110	2010-AC-070	2000-GH-920	2000-CO-090
100,60 - 110,59	-	4200-MC-120	2060-BU-010	2000-GH-095	2000-CO-090
110,60 - 115,59	-	4200-MC-130	2060-BU-020	2000-GH-095	2000-CO-090
115,60 - 120,59	-	4200-MC-140	2060-BU-030	2000-GH-095	2000-CO-090
120,60 - 125,59	-	4200-MC-150	2060-BU-030	2000-GH-095	2000-CO-090
125,60 - 132,59	-	4200-MC-160	2060-BU-040	2000-GH-095	2000-CO-100
132,60 - 139,59	-	4200-MC-170	2060-BU-040	2000-GH-095	2000-CO-100
139,60 - 145,59	-	4200-MC-180	2060-BU-050	2000-GH-095	2000-CO-100
145,60 - 155,59	-	4200-MC-190	2060-BU-060	2000-GH-095	2000-CO-110
155,60 - 165,59	-	4200-MC-200	2060-BU-070	2000-GH-120	2000-CO-110
165,60 - 175,59	-	4200-MC-210	2060-BU-080	2000-GH-120	2000-CO-110
175,60 - 185,59	-	4200-MC-220	2060-BU-090	2000-GH-120	2000-CO-120
185,60 - 195,59	-	4200-MC-230	2060-BU-100	2000-GH-120	2000-CO-120
195,60 - 200,59	-	4200-MC-240	2060-BU-110	2000-GH-120	2000-CO-120

② Cutting ring

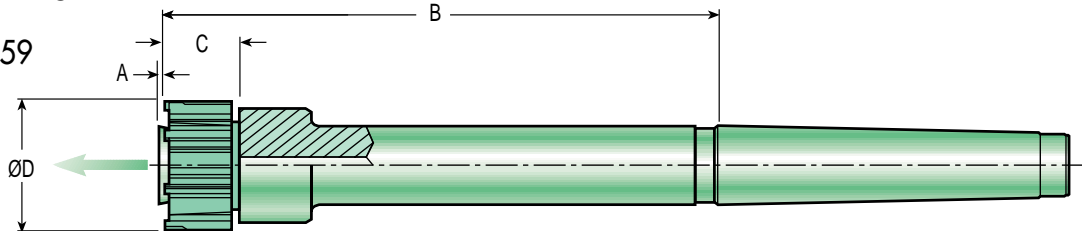
\*Series 2000 drive pin 2000-CO-050 - \*Series 4200 drive pin 2000-CO-060

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## MT shank - LONG SERIES - Brazed carbide (from diameter 17,60 to 200,59 mm)

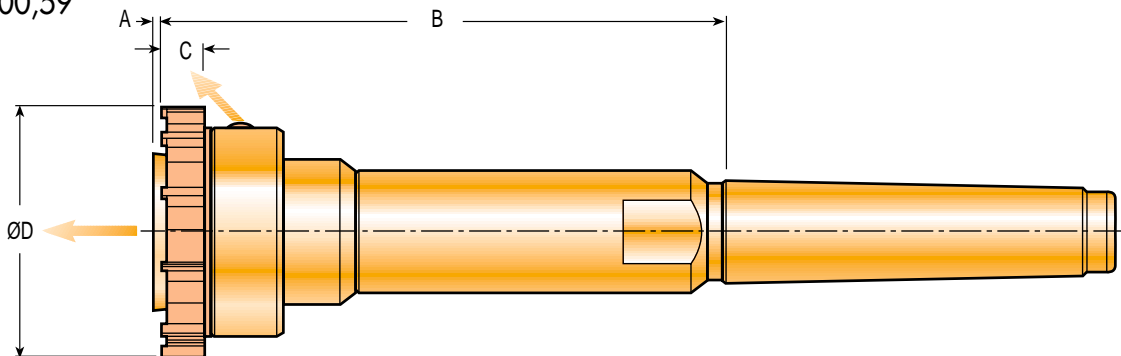
### Series 4000

- through and blind holes with central through tool coolant
- Ø 17,60 ÷ 79,59



### Series 4000

- through and blind holes with central and radial through tool coolant
- Ø 79,60 ÷ 200,59



Expanding reamers  
with adjustment in front  
of the cutting ring

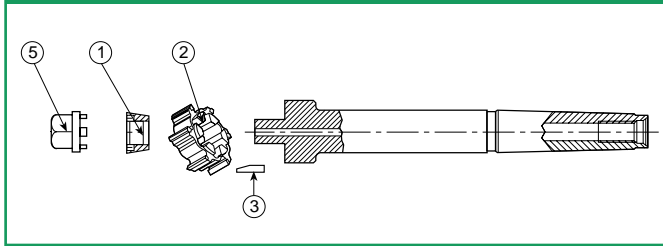
Ø D mm	A mm	B mm	C mm	MT shank	Number of teeth
17,60 - 21,59	1	121	11	2	6
21,60 - 25,59	1	121	12	2	6
25,60 - 32,59	1	153	14	3	6
32,60 - 40,59	1	179	16	3	6
40,60 - 45,59	1	201	16	3	6
45,60 - 60,59	1,5	214	18,5	3	6
60,60 - 79,59	1,5	237	18,5	4	6
79,60 - 100,59	1,5	245	18,5	5	8
100,60 - 110,59	1,5	245	18,5	5	10
110,60 - 115,59	1,5	245	18,5	5	12
115,60 - 200,59	1,5	245	18,5	6	12



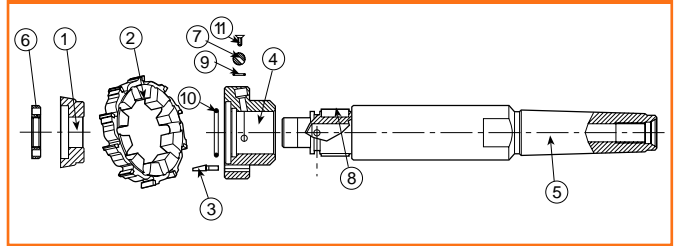
# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

## SPARE PARTS

### Series 4000 - Ø 17,60 ÷ 79,59



### Series 4000 - Ø 79,60 ÷ 200,59



ØD mm	Complete mandrel without cutting ring	Conical ring 1	Conical ring second expansion	Conical ring third expansion	Key 5	Drive pin 3	Ring nut 6	Flange 4
17,60 - 21,59	4001-MC-015	4001-AC-115	4001-AC-215	-	4001-CH-015	2000-CO-010	-	-
21,60 - 25,59	4001-MC-025	4001-AC-115	4001-AC-215	-	4001-CH-015	2000-CO-020	-	-
25,60 - 29,59	4001-MC-035	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	2000-CO-030	-	-
29,60 - 32,59	4001-MC-036	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	2000-CO-040	-	-
32,60 - 36,59	4001-MC-045	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	2000-CO-040	-	-
36,60 - 40,59	4001-MC-046	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	2000-CO-050	-	-
40,60 - 45,59	4001-MC-055	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	2000-CO-060	-	-
45,60 - 49,59	4001-MC-065	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	2000-CO-060	-	-
49,60 - 55,59	4001-MC-075	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	2000-CO-070	-	-
55,60 - 60,59	4001-MC-076	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	2000-CO-080	-	-
60,60 - 65,59	4001-MC-085	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	2000-CO-080	-	-
65,60 - 70,59	4001-MC-086	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	2000-CO-090	-	-
70,60 - 79,59	4001-MC-095	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	2000-CO-090	-	-
79,60 - 90,59	4001-MC-105	4001-AC-175	4001-AC-275	4001-AC-375	-	2000-CO-090	4001-GH-015	4001-FL-015
90,60 - 100,59	4001-MC-115	4001-AC-175	4001-AC-275	4001-AC-375	-	2000-CO-090	4001-GH-015	4001-FL-025
100,60 - 110,59	4001-MC-125	4001-AC-116	4001-AC-216	4001-AC-316	-	2000-CO-090	4001-GH-035	4001-FL-035
110,60 - 115,59	4001-MC-135	4001-AC-126	4001-AC-226	4001-AC-326	-	2000-CO-090	4001-GH-035	4001-FL-045
115,60 - 120,59	4001-MC-145	4001-AC-136	4001-AC-236	4001-AC-336	-	2000-CO-090	4001-GH-035	4001-FL-055
120,60 - 125,59	4001-MC-155	4001-AC-136	4001-AC-236	4001-AC-336	-	2000-CO-090	4001-GH-035	4001-FL-065
125,60 - 132,59	4001-MC-165	4001-AC-146	4001-AC-246	4001-AC-346	-	2000-CO-100	4001-GH-035	4001-FL-075
132,60 - 139,59	4001-MC-175	4001-AC-146	4001-AC-246	4001-AC-346	-	2000-CO-100	4001-GH-035	4001-FL-085
139,60 - 145,59	4001-MC-185	4001-AC-156	4001-AC-256	4001-AC-356	-	2000-CO-100	4001-GH-035	4001-FL-095
145,60 - 155,59	4001-MC-195	4001-AC-166	4001-AC-266	4001-AC-366	-	2000-CO-110	4001-GH-035	4001-FL-105
155,60 - 165,59	4001-MC-205	4001-AC-176	4001-AC-276	4001-AC-376	-	2000-CO-110	4001-GH-115	4001-FL-115
165,60 - 175,59	4001-MC-215	4001-AC-186	4001-AC-286	4001-AC-386	-	2000-CO-110	4001-GH-115	4001-FL-125
175,60 - 185,59	4001-MC-225	4001-AC-196	4001-AC-296	4001-AC-396	-	2000-CO-120	4001-GH-115	4001-FL-135
185,60 - 195,59	4001-MC-235	4001-AC-117	4001-AC-217	4001-AC-317	-	2000-CO-120	4001-GH-115	4001-FL-145
195,60 - 200,59	4001-MC-245	4001-AC-127	4001-AC-227	4001-AC-327	-	2000-CO-120	4001-GH-115	4001-FL-155

② Cutting ring

⑦ Ball 4001-SF-010

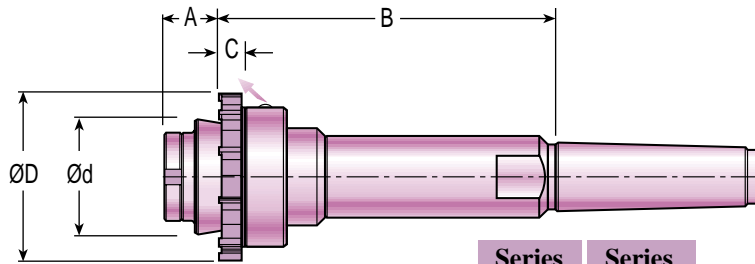
# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

MT shank - SHORT AND LONG SERIES - Brazed carbide (from diameter 79,60 to 200,59 mm)

Expanding reamers with adjustment in front of the cutting ring

## Series 4150

- short series through holes with radial through tool coolant

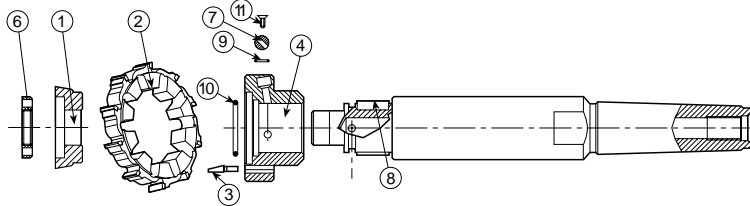


## Series 4100

- long series through holes with radial through tool coolant

Ø D mm	A mm	d mm	Series		C mm	MT shank	Number of teeth
			4150	4100			
79,60 - 100,59	28,5	57	105	245	18,5	5	8
100,60 - 110,59	35,5	73,8	105	245	18,5	5	10
110,60 - 115,59	35,5	80,8	106	245	18,5	5	12
115,60 - 125,59	35,5	86,8	106	245	18,5	5	12
125,60 - 139,59	35,5	90,8	106	245	18,5	5	12
139,60 - 145,59	35,5	102,8	106	245	18,5	5	12
145,60 - 155,59	35,5	107,8	106	245	18,5	5	12
155,60 - 165,59	48,5	107,8	106	245	18,5	6	12
165,60 - 175,59	48,5	117,8	106	245	18,5	6	12
175,60 - 185,59	48,5	127,8	106	245	18,5	6	12
185,60 - 195,59	48,5	137,8	106	245	18,5	6	12
195,60 - 200,59	48,5	145,8	106	245	18,5	6	12

## SPARE PARTS



Ø D mm	Series 4150	Series 4100	Conical ring 1	Drive pin 3	Flange 4	Nut 6
	Complete mandrel without cutting ring	Complete mandrel without cutting ring				
79,60 - 90,59	4051-MC-100	4001-MC-100	2010-AC-070	2000-CO-090	4001- FL- 015	2000-GH-920
90,60 - 100,59	4051-MC-110	4001-MC-110	2010-AC-070	2000-CO-090	4001- FL- 025	2000-GH-920
100,60 - 110,59	4051-MC-120	4001-MC-120	2060-BU-010	2000-CO-090	4001- FL- 035	2000-GH-095
110,60 - 115,59	4051-MC-130	4001-MC-130	2060-BU-020	2000-CO-090	4001- FL- 045	2000-GH-095
115,60 - 120,59	4051-MC-140	4001-MC-140	2060-BU-030	2000-CO-090	4001- FL- 055	2000-GH-095
120,60 - 125,59	4051-MC-150	4001-MC-150	2060-BU-030	2000-CO-090	4001- FL- 065	2000-GH-095
125,60 - 132,59	4051-MC-160	4001-MC-160	2060-BU-040	2000-CO-100	4001- FL- 075	2000-GH-095
132,60 - 139,59	4051-MC-170	4001-MC-170	2060-BU-040	2000-CO-100	4001- FL- 085	2000-GH-095
139,60 - 145,59	4051-MC-180	4001-MC-180	2060-BU-050	2000-CO-100	4001- FL- 095	2000-GH-095
145,60 - 155,59	4051-MC-190	4001-MC-190	2060-BU-060	2000-CO-110	4001- FL- 105	2000-GH-095
155,60 - 165,59	4051-MC-200	4001-MC-200	2060-BU-070	2000-CO-110	4001- FL- 115	2000-GH-120
165,60 - 175,59	4051-MC-210	4001-MC-210	2060-BU-080	2000-CO-110	4001- FL- 125	2000-GH-120
175,60 - 185,59	4051-MC-220	4001-MC-220	2060-BU-090	2000-CO-120	4001- FL- 135	2000-GH-120
185,60 - 195,59	4051-MC-230	4001-MC-230	2060-BU-100	2000-CO-120	4001- FL- 145	2000-GH-120
195,60 - 200,59	4051-MC-240	4001-MC-240	2060-BU-110	2000-CO-120	4001- FL- 155	2000-GH-120

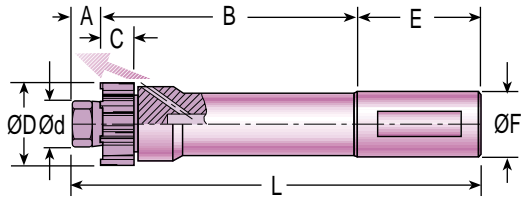
② Cutting ring

⑦ Ball 4001-SF-010

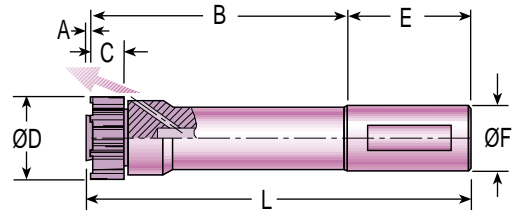
# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

Cylindrical shank - SHORT SERIES - Brazed carbide (from diameter 17,60 to 100,59 mm)

**Series 4550** - through holes with radial through tool coolant

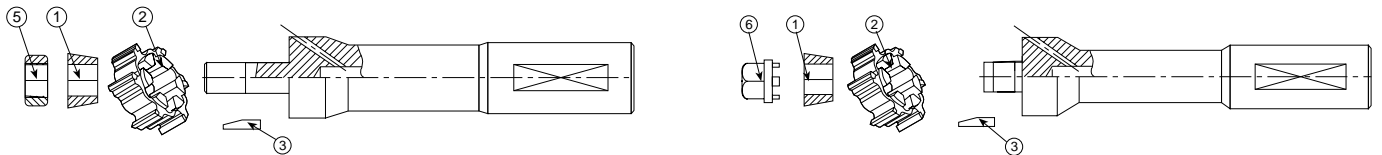


**Series 4555** - blind holes with radial through tool coolant



Ø D mm	series 4550		series 4555		Expanding reamers with adjustment in front of the cutting ring					
	Ød mm	A mm	L mm	A mm	L mm	B mm	C mm	E mm	ØF <sup>h7</sup> mm	Number of teeth
17,60 - 21,59	12	11	142	1	132	81	11	50	20	6
21,60 - 25,59	12	11	142	1	132	81	12	50	20	6
25,60 - 32,59	15,6	11	163	1	153	102	14	50	20	6
32,60 - 40,59	22	14	172	1	159	102	16	56	25	6
40,60 - 45,59	25,4	15	173	1	159	102	16	56	25	6
45,60 - 60,59	30	20,5	185,5	1,5	166,5	105	18,5	60	32	6
60,60 - 79,59	40	24,5	189,5	1,5	166,5	105	18,5	60	32	6
79,60 - 100,59	56	28,5	203,5	1,5	176,5	105	18,5	70	40	8

## SPARE PARTS



Ø D mm	series 4550			series 4555					series	
	Complete mandrel without cutting ring	Conical ring 1	Ring nut or nut 5	Complete mandrel without cutting ring	Key 6	Conical ring 1	Conical ring second expansion	Conical ring third expansion	4550	4555
17,60 - 21,59	4550-MC-010	2010-AC-010	2000-DA-010	4555-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	010	010
21,60 - 25,59	4550-MC-020	2010-AC-010	2000-DA-010	4555-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	020	020
25,60 - 29,59	4550-MC-030	2010-AC-020	2000-DA-020	4555-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	030
29,60 - 32,59	4550-MC-030	2010-AC-020	2000-DA-020	4555-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	040
32,60 - 36,59	4550-MC-040	2010-AC-030	2000-DA-060	4555-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	040
36,60 - 40,59	4550-MC-040	2010-AC-030	2000-DA-060	4555-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	050
40,60 - 45,59	4550-MC-050	2010-AC-040	2000-DA-090	4555-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	060	060
45,60 - 49,59	4550-MC-060	2010-AC-050	20 00-GH-880	4555-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	060	060
49,60 - 55,59	4550-MC-070	2010-AC-050	20 00-GH-880	4555-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	070
55,60 - 60,59	4550-MC-070	2010-AC-050	20 00-GH-880	4555-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	080
60,60 - 65,59	4550-MC-080	2010-AC-060	20 00-GH-900	4555-MC-080	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	080	080
65,60 - 70,59	4550-MC-080	2010-AC-060	20 00-GH-900	4555-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	080	090
70,60 - 79,59	4550-MC-090	2010-AC-060	20 00-GH-900	4555-MC-090	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	090	090
79,60 - 90,59	4550-MC-100	2010-AC-070	20 00-GH-920	4555-MC-100	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	090	090
90,60 - 100,59	4550-MC-110	2010-AC-070	20 00-GH-920	4555-MC-110	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	090	090

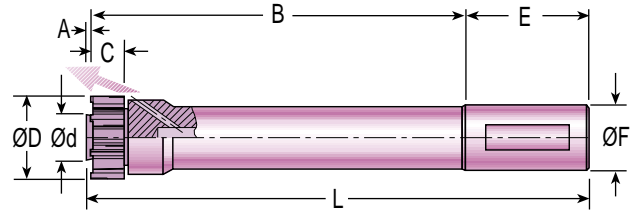
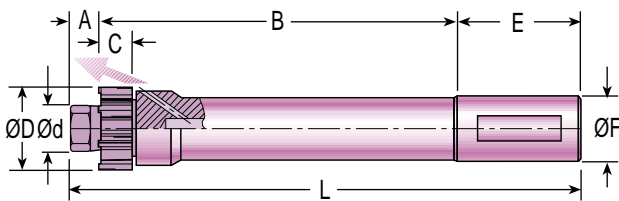
② Cutting ring

# EXPANDING REAMERS WITH CUTTING RING 可调刀环可调铰刀

Cylindrical shank - LONG SERIES - Brazed carbide (from diameter 17,60 to 100,59 mm)

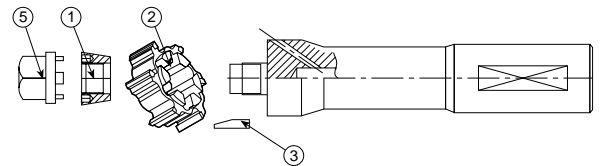
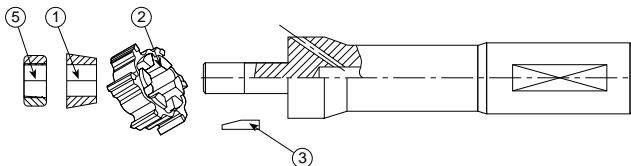
**Series 4500** - through holes with radial through tool coolant

**Series 4505** - blind holes with radial through tool coolant



Ø D mm	Series 4500		Series 4505		Expanding reamers with adjustment in front of the cutting ring					
	Ød mm	A mm	L mm	A mm	L mm	B mm	C mm	E mm	ØF <sup>h7</sup> mm	Number of teeth
17,60 - 21,59	12	11	182	1	172	121	11	50	20	6
21,60 - 25,59	12	11	182	1	172	121	12	50	20	6
25,60 - 32,59	15,6	11	214	1	204	153	14	50	20	6
32,60 - 40,59	22	14	249	1	236	179	16	56	25	6
40,60 - 45,59	25,4	15	272	1	258	201	16	56	25	6
45,60 - 60,59	30	20,5	294,5	1,5	275,5	214	18,5	60	32	6
60,60 - 79,59	40	24,5	321,5	1,5	298,5	237	18,5	60	32	6
79,60 - 100,59	56	28,5	343,5	1,5	316,5	245	18,5	70	40	8

## SPARE PARTS



Ø D mm	Series 4500			Series 4505					Series	
	Complete mandrel without cutting ring	Conical ring 1	Ring nut or nut 5	Complete mandrel without cutting ring	Key 6	Conical ring 1	Conical ring second expansion	Conical ring third expansion	4500	4505
17,60 - 21,59	4500-MC-010	2010-AC-010	2000-DA-010	4505-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	010	010
21,60 - 25,59	4500-MC-020	2010-AC-010	2000-DA-010	4505-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	020	020
25,60 - 29,59	4500-MC-030	2010-AC-020	2000-DA-020	4505-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	030
29,60 - 32,59	4500-MC-030	2010-AC-020	2000-DA-020	4505-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	040
32,60 - 36,59	4500-MC-040	2010-AC-030	2000-DA-060	4505-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	040
36,60 - 40,59	4500-MC-040	2010-AC-030	2000-DA-060	4505-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	050
40,60 - 45,59	4500-MC-050	2010-AC-040	2000-DA-090	4505-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	060	060
45,60 - 49,59	4500-MC-060	2010-AC-050	2000-GH-880	4505-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	060	060
49,60 - 55,59	4500-MC-070	2010-AC-050	2000-GH-880	4505-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	070
55,60 - 60,59	4500-MC-070	2010-AC-050	2000-GH-880	4505-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	080
60,60 - 65,59	4500-MC-080	2010-AC-060	2000-GH-900	4505-MC-080	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	080	080
65,60 - 70,59	4500-MC-080	2010-AC-060	2000-GH-900	4505-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	080	090
70,60 - 79,59	4500-MC-090	2010-AC-060	2000-GH-900	4505-MC-090	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	090	090
79,60 - 90,59	4500-MC-100	2010-AC-070	2000-GH-920	4505-MC-100	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	090	090
90,60 - 100,59	4500-MC-110	2010-AC-070	2000-GH-920	4505-MC-110	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	090	090

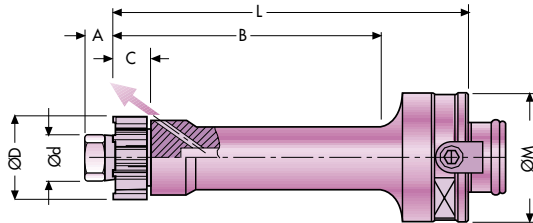
② Corona tagliente

# 模块化可调刀环可调铰刀

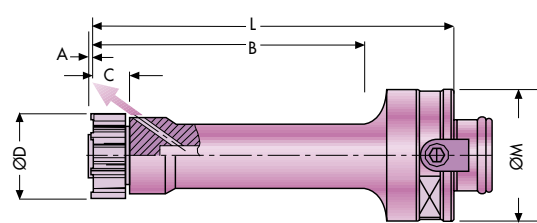
## EXPANDING REAMERS WITH CUTTING RING "COMPOSIT" MODULAR SYSTEM

Modular Composit shank — EXTRA SHORT SERIES Brazed carbide (from diam. 17,60 to 100,59 mm)

**Series 4330** - through holes with radial through tool coolant



**Series 4335** - blind holes with radial through tool coolant

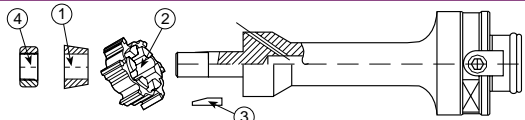


Expanding reamers with adjustment in front of the cutting ring

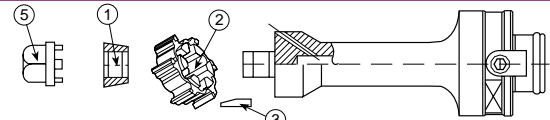
ØD mm	Series 4330		Series 4335		B mm	L mm	C mm	Mod. shank ØM	Number of teeth
	Ød mm	A mm	A mm						
17,60 - 21,59	12	11	1		55	75	11	50	6
21,60 - 25,59	12	11	1		55	75	12	50	6
25,60 - 32,59	15,6	11	1		60	80	14	50	6
32,60 - 40,59	22	14	1		60	80	16	50	6
40,60 - 45,59	25,4	15	1		60	80	16	50	6
45,60 - 60,59	30	20,5	1,5		60	80	18,5	50	6
60,60 - 79,59	40	24,5	1,5		65	90	18,5	63	6
79,60 - 100,59	56	28,5	1,5		65	90	18,5	63	8

### SPARE PARTS

#### Series 4330



#### Series 4335



ØD mm	Series 4330			Series 4335					Series 4330   4335	
	Complete mandrel without cutting ring	Conical ring 1	Ring nut or nut 4	Complete mandrel without cutting ring	key 5	Conical ring 1	Conical ring second expansion	Conical ring third expansion	Drive pin 2000 - CO 3	
17,60 - 21,59	4330-MC-010	2010-AC-010	2000-DA-010	4335-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	010	010
21,60 - 25,59	4330-MC-020	2010-AC-010	2000-DA-010	4335-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	020	020
25,60 - 29,59	4330-MC-030	2010-AC-020	2000-DA-020	4335-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	030
29,60 - 32,59	4330-MC-030	2010-AC-020	2000-DA-020	4335-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	040
32,60 - 36,59	4330-MC-040	2010-AC-030	2000-DA-060	4335-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	040
36,60 - 40,59	4330-MC-040	2010-AC-030	2000-DA-060	4335-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	050
40,60 - 45,59	4330-MC-050	2010-AC-040	2000-DA-090	4335-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	060	060
45,60 - 49,59	4330-MC-060	2010-AC-050	2000-GH-880	4335-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	060	060
49,60 - 55,59	4330-MC-070	2010-AC-050	2000-GH-880	4335-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	070
55,60 - 60,59	4330-MC-070	2010-AC-050	2000-GH-880	4335-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	080
60,60 - 65,59	4330-MC-080	2010-AC-060	2000-GH-900	4335-MC-080	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	080	080
65,60 - 70,59	4330-MC-080	2010-AC-060	2000-GH-900	4335-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	080	090
70,60 - 79,59	4330-MC-090	2010-AC-060	2000-GH-900	4335-MC-090	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	090	090
79,60 - 90,59	4330-MC-100	2010-AC-070	2000-GH-920	4335-MC-100	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	090	090
90,60 - 100,59	4330-MC-110	2010-AC-070	2000-GH-920	4335-MC-110	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	090	090

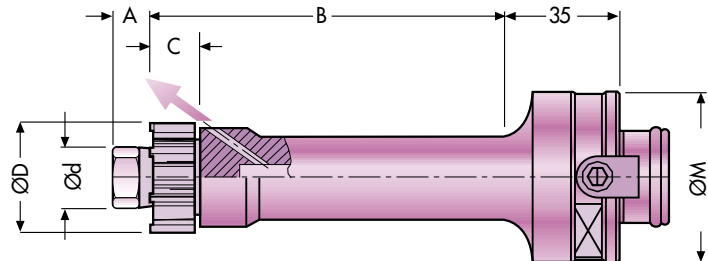
# EXPANDING REAMERS WITH CUTTING RING

"COMPOSIT" MODULAR SYSTEM 模块化可调刀环可调铰刀

## Modular Composit shank — SHORT SERIES Braze carbide (from diam. 17,60 to 200,59 mm)

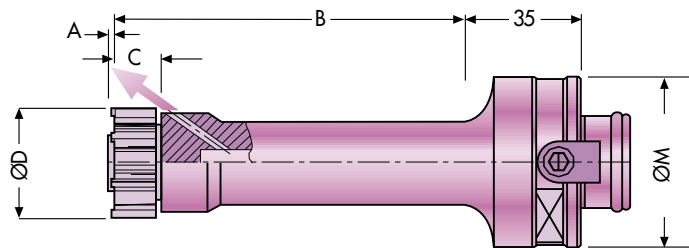
### Series 4350

- through holes with radial through tool coolant  
Ø 17,60 ÷ 200,59 mm



### Series 4355

- blind holes with radial through tool coolant  
Ø 17,60 ÷ 100,59 mm



Expanding reamers  
with adjustment  
in front of the cutting ring

ØD mm	Series 4355		Series 4350		B mm	C mm	Modular shank ØM	Number of teeth
	A mm	Ød mm	A mm	A mm				
17,60 - 21,59	1	12	11	81	11	50	6	
21,60 - 25,59	1	12	11	81	12	50	6	
25,60 - 32,59	1	15,6	11	102	14	50	6	
32,60 - 40,59	1	22	14	102	16	50	6	
40,60 - 45,59	1	25,4	15	102	16	50	6	
45,60 - 60,59	1,5	30	20,5	105	18,5	50	6	
60,60 - 79,59	1,5	40	24,5	105	18,5	63	6	
79,60 - 100,59	1,5	56	28,5	105	18,5	63	8	
100,60 - 110,59	-	73,8	35,5	105	18,5	80	10	
110,60 - 115,59	-	80,8	35,5	105	18,5	80	12	
115,60 - 125,59	-	86,8	35,5	105	18,5	80	12	
125,60 - 139,59	-	90,8	35,5	105	18,5	80	12	
139,60 - 145,59	-	102,8	35,5	105	18,5	80	12	
145,60 - 155,59	-	107,8	35,5	105	18,5	80	12	
155,60 - 165,59	-	107,8	48,5	105	18,5	80	12	
165,60 - 175,59	-	117,8	48,5	105	18,5	80	12	
175,60 - 185,59	-	127,8	48,5	105	18,5	80	12	
185,60 - 195,59	-	137,8	48,5	105	18,5	80	12	
195,60 - 200,59	-	145,8	48,5	105	18,5	80	12	

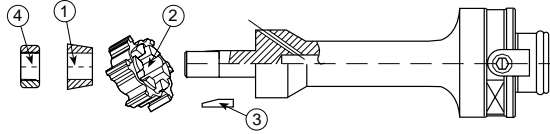


# EXPANDING REAMERS WITH CUTTING RING "COMPOSIT" MODULAR SYSTEM

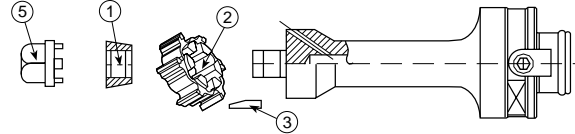
模块化可调刀环可调铰刀

## SPARE PARTS

### Series 4350 - Ø 17,60 ÷ 200,59



### Series 4355 - Ø 17,60 ÷ 100,59



ØD mm	Series 4350			Series 4355					Series 4350-4355	
	Complete mandrel without cutting ring	Conical ring 1	Ring nut or nut 4	Complete mandrel without cutting ring	key 5	Conical ring 1	Conical ring second expansion	Conical ring third expansion	Drive pin 2000 - CO 3	CO 3
17,60 - 21,59	4350-MC-010	2010-AC-010	2000-DA-010	4355-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	010	010
21,60 - 25,59	4350-MC-020	2010-AC-010	2000-DA-010	4355-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	020	020
25,60 - 29,59	4350-MC-030	2010-AC-020	2000-DA-020	4355-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	030
29,60 - 32,59	4350-MC-030	2010-AC-020	2000-DA-020	4355-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	040
32,60 - 36,59	4350-MC-040	2010-AC-030	2000-DA-060	4355-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	040
36,60 - 40,59	4350-MC-040	2010-AC-030	2000-DA-060	4355-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	050
40,60 - 45,59	4350-MC-050	2010-AC-040	2000-DA-090	4355-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	060	060
45,60 - 49,59	4350-MC-060	2010-AC-050	2000-GH-880	4355-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	060	060
49,60 - 55,59	4350-MC-070	2010-AC-050	2000-GH-880	4355-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	070
55,60 - 60,59	4350-MC-070	2010-AC-050	2000-GH-880	4355-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	080
60,60 - 65,59	4350-MC-080	2010-AC-060	2000-GH-900	4355-MC-080	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	080	080
65,60 - 70,59	4350-MC-080	2010-AC-060	2000-GH-900	4355-MC-085	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	080	090
70,60 - 79,59	4350-MC-090	2010-AC-060	2000-GH-900	4355-MC-090	4001-CH-065	4001-AC-165	4001-AC-265	4001-AC-365	090	090
79,60 - 90,59	4350-MC-100	2010-AC-070	2000-GH-920	4355-MC-100	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	090	090
90,60 - 100,59	4350-MC-110	2010-AC-070	2000-GH-920	4355-MC-110	4001-CH-085	4001-AC-185	4001-AC-285	4001-AC-385	090	090
100,60 - 110,59	4350-MC-120	2060-BU-010	2000-GH-095	-	-	-	-	-	090	-
110,60 - 115,59	4350-MC-130	2060-BU-020	2000-GH-095	-	-	-	-	-	090	-
115,60 - 120,59	4350-MC-140	2060-BU-030	2000-GH-095	-	-	-	-	-	090	-
120,60 - 125,59	4350-MC-150	2060-BU-030	2000-GH-095	-	-	-	-	-	090	-
125,60 - 132,59	4350-MC-160	2060-BU-040	2000-GH-095	-	-	-	-	-	100	-
132,60 - 139,59	4350-MC-170	2060-BU-040	2000-GH-095	-	-	-	-	-	100	-
139,60 - 145,59	4350-MC-180	2060-BU-050	2000-GH-095	-	-	-	-	-	100	-
145,60 - 155,59	4350-MC-190	2060-BU-060	2000-GH-095	-	-	-	-	-	110	-
155,60 - 165,59	4350-MC-200	2060-BU-070	2000-GH-120	-	-	-	-	-	110	-
165,60 - 175,59	4350-MC-210	2060-BU-080	2000-GH-120	-	-	-	-	-	110	-
175,60 - 185,59	4350-MC-220	2060-BU-090	2000-GH-120	-	-	-	-	-	120	-
185,60 - 195,59	4350-MC-230	2060-BU-100	2000-GH-120	-	-	-	-	-	120	-
195,60 - 200,59	4350-MC-240	2060-BU-110	2000-GH-120	-	-	-	-	-	120	-

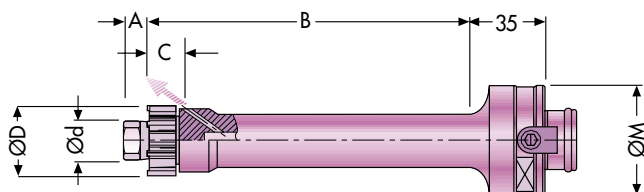
② Cutting ring



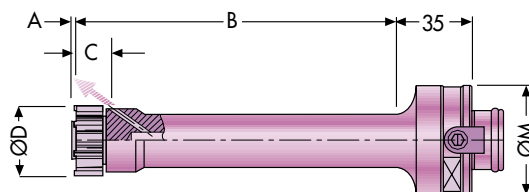
# 模块化可调刀环可调铰刀 EXPANDING REAMERS WITH CUTTING RING "COMPOSIT" MODULAR SYSTEM

Modular Composit shank — LONG SERIES Brazed carbide (from diam. 17,60 to 60,59 mm)

**Series 4300** - through holes with radial through tool coolant



**Series 4305** - blind holes with radial through tool coolant

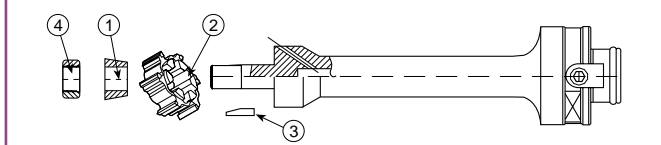


Expanding reamers with adjustment in front of the cutting ring

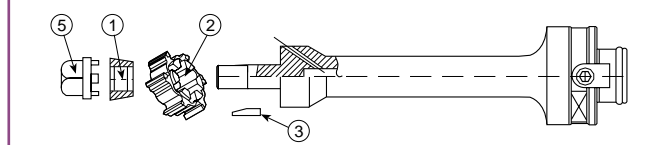
Ø D mm	series 4305		series 4300		B mm	C mm	Mod. shank ØM	Number of teeth
	A mm	Ød mm	A mm					
17,60 - 21,59	1	12	11		121	11	50	6
21,60 - 25,59	1	12	11		121	12	50	6
25,60 - 32,59	1	15,6	11		153	14	50	6
32,60 - 40,59	1	22	14		179	16	50	6
40,60 - 45,59	1	25,4	15		201	16	50	6
45,60 - 60,59	1,5	30	20,5		214	18,5	50	6

## SPARE PARTS

### Series 4300



### Series 4305



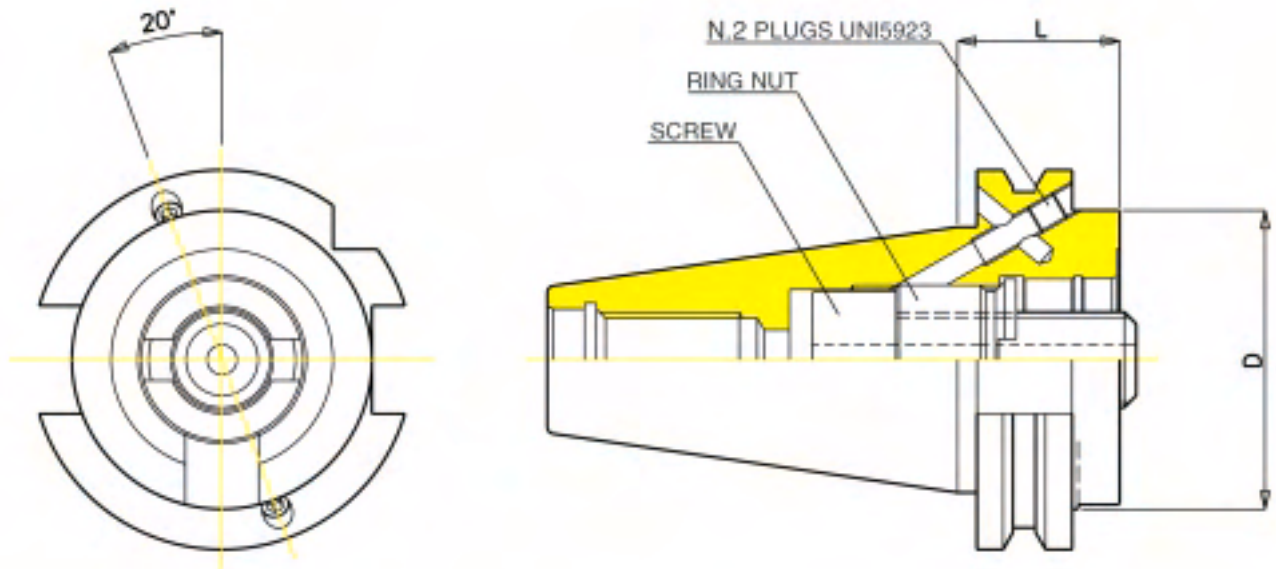
Ø D mm	series 4300			series 4305					series 4300   4305	
	Complete mandrel without cutting ring	Conical ring 1	Ring nut or nut 4	Complete mandrel without cutting ring	key 5	Conical ring 1	Conical ring second expansion	Conical ring third expansion	Drive pin 2000 - CO 3	
17,60 - 21,59	4300-MC-010	2010-AC-010	2000-DA-010	4305-MC-010	4001-CH-015	4001-AC-115	4001-AC-215	-	010	010
21,60 - 25,59	4300-MC-020	2010-AC-010	2000-DA-010	4305-MC-020	4001-CH-015	4001-AC-115	4001-AC-215	-	020	020
25,60 - 29,59	4300-MC-030	2010-AC-020	2000-DA-020	4305-MC-030	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	030
29,60 - 32,59	4300-MC-030	2010-AC-020	2000-DA-020	4305-MC-035	4001-CH-025	4001-AC-125	4001-AC-225	4001-AC-325	030	040
32,60 - 36,59	4300-MC-040	2010-AC-030	2000-DA-060	4305-MC-040	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	040
36,60 - 40,59	4300-MC-040	2010-AC-030	2000-DA-060	4305-MC-045	4001-CH-035	4001-AC-135	4001-AC-235	4001-AC-335	040	050
40,60 - 45,59	4300-MC-050	2010-AC-040	2000-DA-090	4305-MC-050	4001-CH-045	4001-AC-145	4001-AC-245	4001-AC-345	060	060
45,60 - 49,59	4300-MC-060	2010-AC-050	2000-GH-880	4305-MC-060	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	060	060
49,60 - 55,59	4300-MC-070	2010-AC-050	2000-GH-880	4305-MC-070	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	070
55,60 - 60,59	4300-MC-070	2010-AC-050	2000-GH-880	4305-MC-075	4001-CH-055	4001-AC-155	4001-AC-255	4001-AC-355	070	080

② Cutting ring

# 模块化刀柄系统

## BASIC SHANKS

### DIN 69871/1 B + A<sup>[1]</sup>

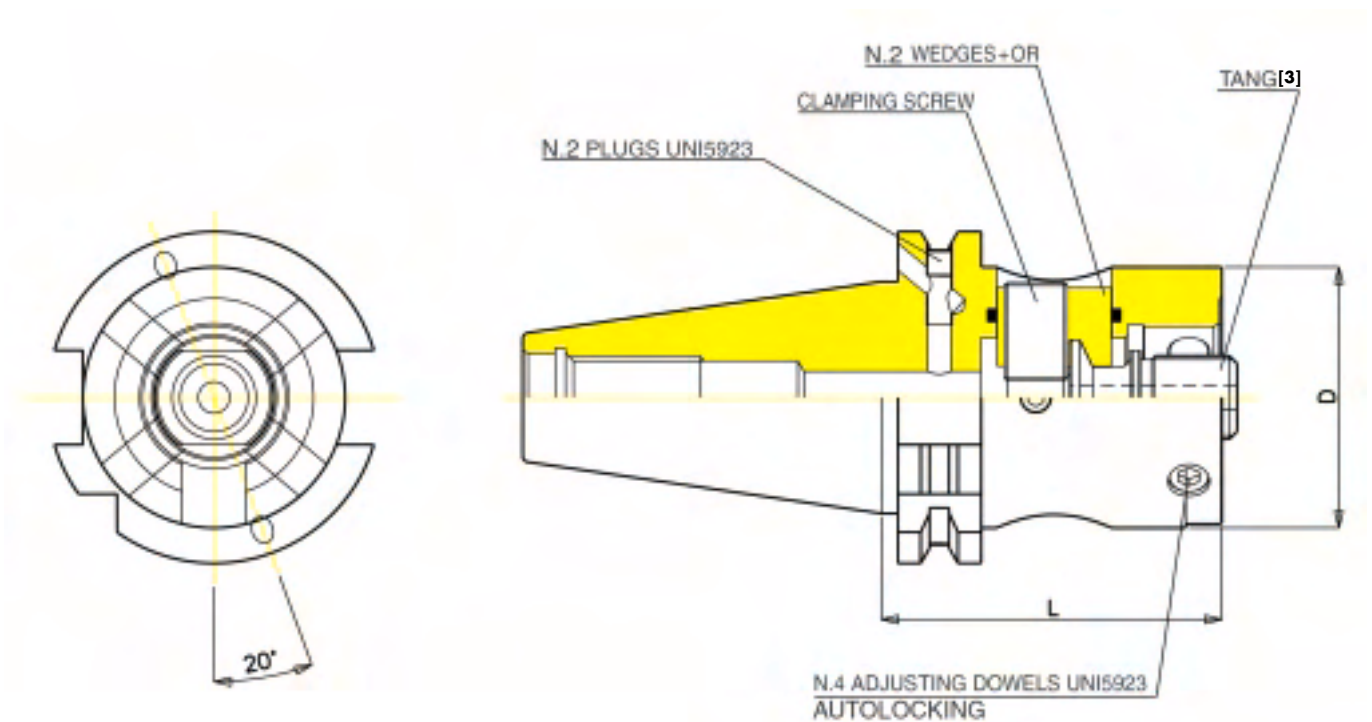


ORDER CODE	ISO	MODULAR REDUCER D	L	STANDARD EQUIPMENT			ACCESSORIES	
				screw	ring nut	plugs	modular screw key	modular ring nut key
02B.40.50.27	40	50	27	TAB2808	TAB2809	M5x5TG	hexagon 10	ATR8851
02B.40.63.50	40	63	50	TAB9038	TAB2793	M5x5TG	hexagon 12	ATR8851
02B.40.80.50	40	80	50	TAB9038	TAB2793	M5x5TG	hexagon 12	ATR8851
02B.45.50.27	45	50	27	TAB2808	TAB2809	M5x5TG	hexagon 10	ATR8851
02B.45.63.27	45	63	27	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851
02B.45.63.50	45	63	50	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851
02B.45.80.50	45	80	50	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851
02B.50.50.27	50	50	27	TAB2808	TAB2809	M5x5TG	hexagon 10	ATR8851
02B.50.50.50	50	50	50	TAB2808	TAB2809	M5x5TG	hexagon 10	ATR8851
02B.50.63.27	50	63	27	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851
02B.50.63.50	50	63	50	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851
02B.50.80.27	50	80	27	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851
02B.50.80.50	50	80	50	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851

[1] Basic shanks can be converted into DIN 69871/1A coolant by screwing the two plugs clockwise to the end of their stroke

# 模块化刀柄系统

## BASIC SHANKS DIN 69871/1 B + A<sup>[1]</sup> MODULAR WITH LATERAL CLAMPING<sup>[2]</sup> AND RADIAL ADJUSTMENT



ORDER CODE	ISO	MODULAR REDUCER D	L	STANDARD EQUIPMENT					ACCESSORIES	
				wedges+OR	clamping screw	adjusting dowels	plugs	TANG	clamping screw key	tang key
02B.40.50L.65	40	50	65	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hexagon 6	fixed 18
02B.40.63L.85	40	63	85	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	hexagon 6	fixed 24
02B.45.50L.70	45	50	70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hexagon 6	fixed 18
02B.45.63L.70	45	63	70	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	hexagon 6	fixed 24
02B.50.50L.70	50	50	70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hexagon 6	fixed 18
02B.50.63L.70	50	63	70	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	hexagon 6	fixed 24
02B.50.80L.70	50	80	70	ATR18775.2.3	ATR18775.1	M8x1x20G	M5x5TG	ATT14104	hexagon 6	fixed 24

[1] Basic shanks can be converted into DIN 69871/1A coolant by screwing the two plugs clockwise to the end of their stroke.

[2] The modular system has lateral clamping which enables efficient quick release of the tools.

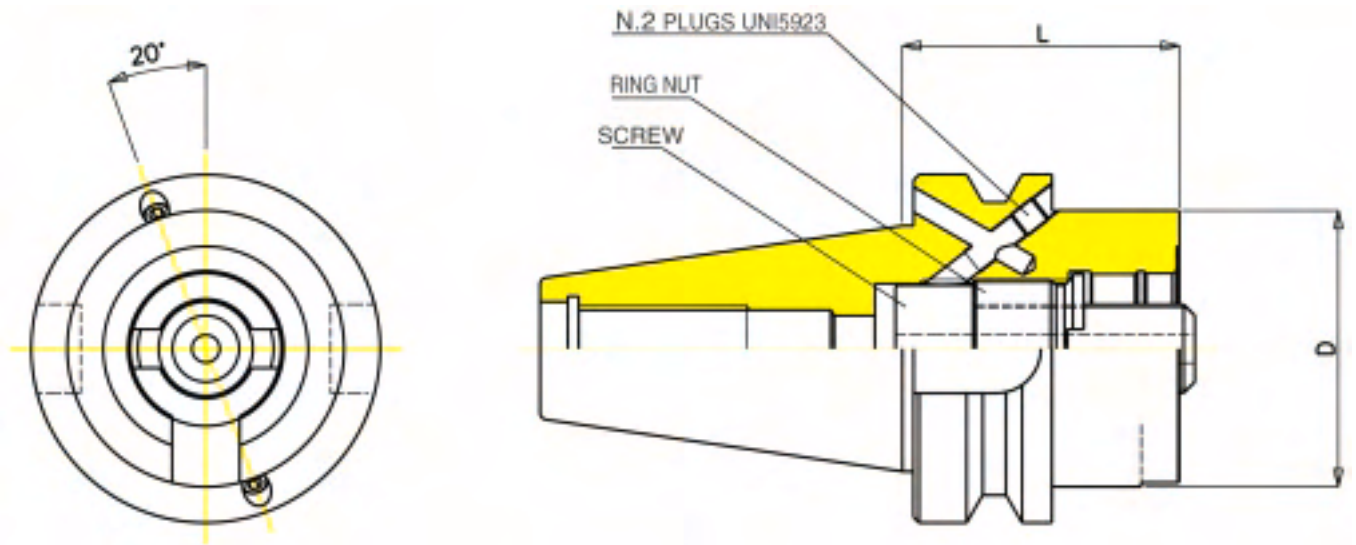
Light torque exerted on the clamping screw transmits high axial forces which provide stiffness and extreme accuracy to the assembly.

[3] All adaptors and tools with modular shanks require their respective tang fitted before assembly to the system with lateral clamping.

# 模块化刀柄系统

## BASIC SHANKS

### JMTBA MAS-403 BT B+BT<sup>[1]</sup>

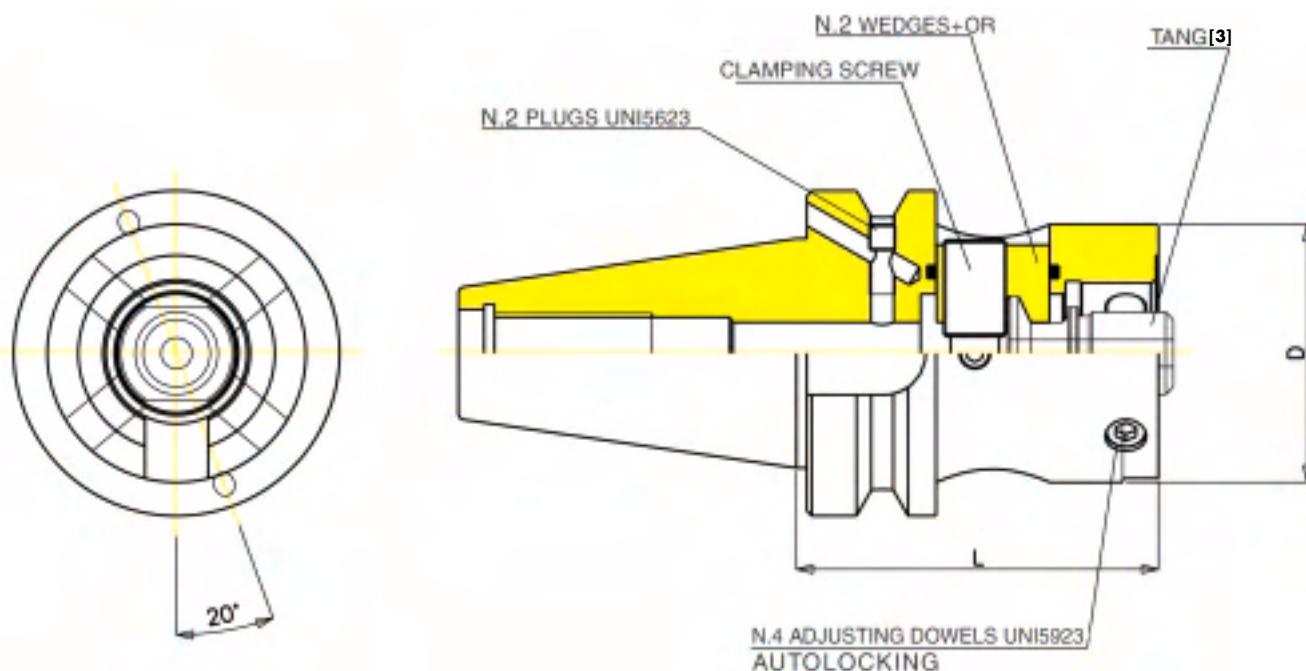


ORDER CODE	BT	MODULAR REDUCER D	L	STANDARD EQUIPMENT			ACCESSORIES	
				screw	ring nut	plugs	modular screw key	modular ring nut key
BTB.40.50.50	40	50	50	TAB2808	TAB2809	M5x5TG	hexagon 10	ATR8851
BTB.40.63.50	40	63	50	TAB9038	TAB2793	M5x5TG	hexagon 12	ATR8851
BTB.50.50.50	50	50	50	TAB2808	TAB2809	M5x5TG	hexagon 10	ATR8851
BTB.50.63.50	50	63	50	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851
BTB.50.80.50	50	80	50	TAB2795	TAB2793	M5x5TG	hexagon 14	ATR8851

[1] Basic shanks can be converted into MAS-403 BT coolant by screwing the two plugs clockwise to the end of their stroke.

# 模块化刀柄系统

## BASIC SHANKS JMTBA MAS-403 BT B+BT MODULAR WITH LATERAL CLAMPING<sup>[2]</sup> AND RADIAL ADJUSTMENT



Max radial adjustment:  $\pm 0,2$  mm on  $\varnothing$

ORDER CODE	BT	MODULAR REDUCER D	L	STANDARD EQUIPMENT					ACCESSORIES	
				wedges+OR	clamping screw	adjusting dowels	plugs	TANG <sup>[3]</sup>	clamping screw key	tang key
BTB.40.50L.70	40	50	70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hexagon 6	fixed 18
BTB.40.63L.80	40	63	80	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	hexagon 6	fixed 24
BTB.50.50L.90	50	50	90	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hexagon 6	fixed 18
BTB.50.63L.90	50	63	90	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	hexagon 6	fixed 24
BTB.50.80L.90	50	80	90	ATR18775.2.3	ATR18775.1	M8x1x20G	M5x5TG	ATT14104	hexagon 6	fixed 24

[1] Basic shanks can be converted into MAS-403 BT coolant by screwing the two plugs clockwise to the end of their stroke.

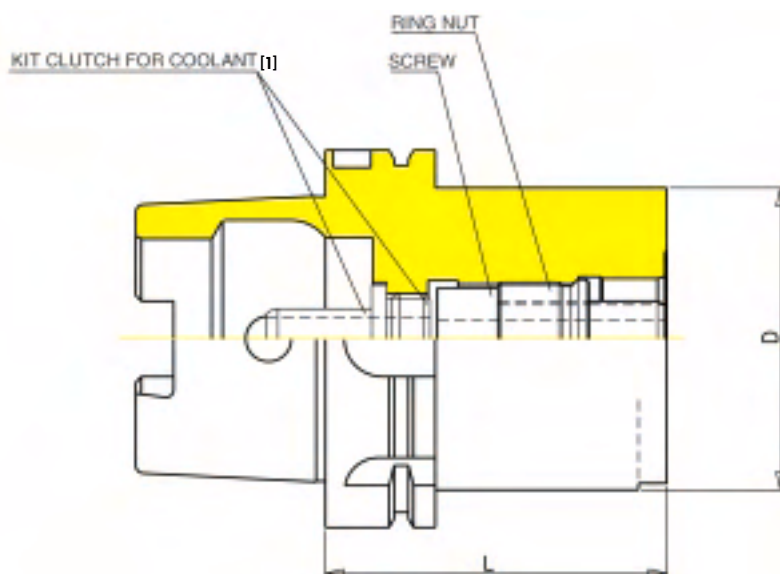
[2] The modular system has lateral clamping which enables efficient quick release of the tools.

Light torque exerted on the clamping screw transmits high axial forces which provide stiffness and extreme accuracy to the assembly.

[3] All adaptors and tools with modular shanks require their respective tang fitted before assembly to the system with lateral clamping.



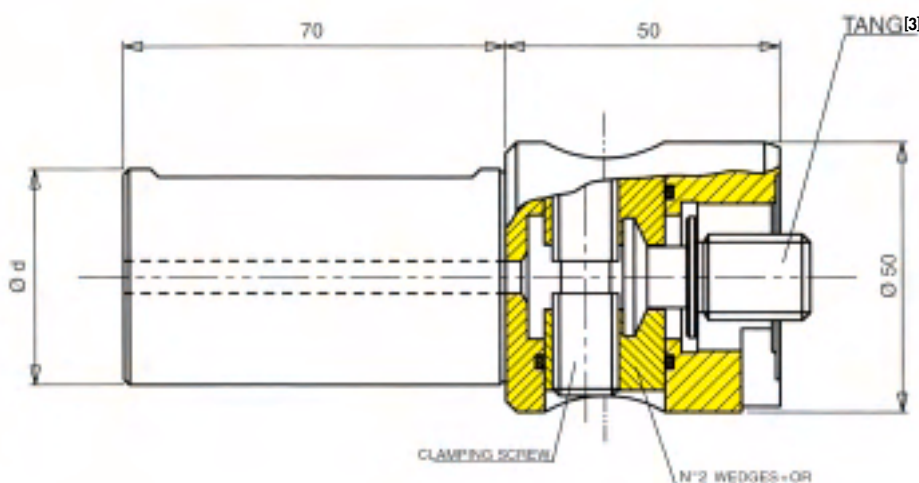
# 模块化刀柄系统 BASIC SHANKS HSK-A DIN 69893/1



ORDER CODE	HSK	MODULAR REDUCER D	L	STANDARD EQUIPMENT		ACCESSORIES			
				screw	ring nut	modular screw key	modular ring nut key	key kit clutch for coolant	kit clutch for coolant <sup>[1]</sup>
HSK-A.63.50.75	63	50	75	TAB2808	TAB2809	hexagon 10	ATR8851	ATR23856	ATT23728
HSK-A.63.63.85	63	63	85	TAB2795	TAB2793	hexagon 14	ATR8851	ATR23856	ATT23728
HSK-A.100.50.80	100	50	80	TAB2808	TAB2809	hexagon 10	ATR8851	ATR23856	ATT23656
HSK-A.100.63.90	100	63	90	TAB2795	TAB2793	hexagon 14	ATR8851	ATR23856	ATT23656
HSK-A.100.80.90	100	80	90	TAB2795	TAB2793	hexagon 14	ATR8851	ATR23856	ATT23656

[1] coolant clutch kits are supplied separately on request.

## CYLINDRICAL BASIC SHANKS



ORDER CODE	D	STANDARD EQUIPMENT				ACCESSORIES	
		wedges+OR	clamping screw	adjusting dowels	TANG <sup>[3]</sup>	tang key	clamping screw key
CIL.25.50.50	25	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	fixed 18	hexagon 6
CIL.32.50.50	32	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	fixed 18	hexagon 6
CIL.40.50.50	40	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	fixed 18	hexagon 6

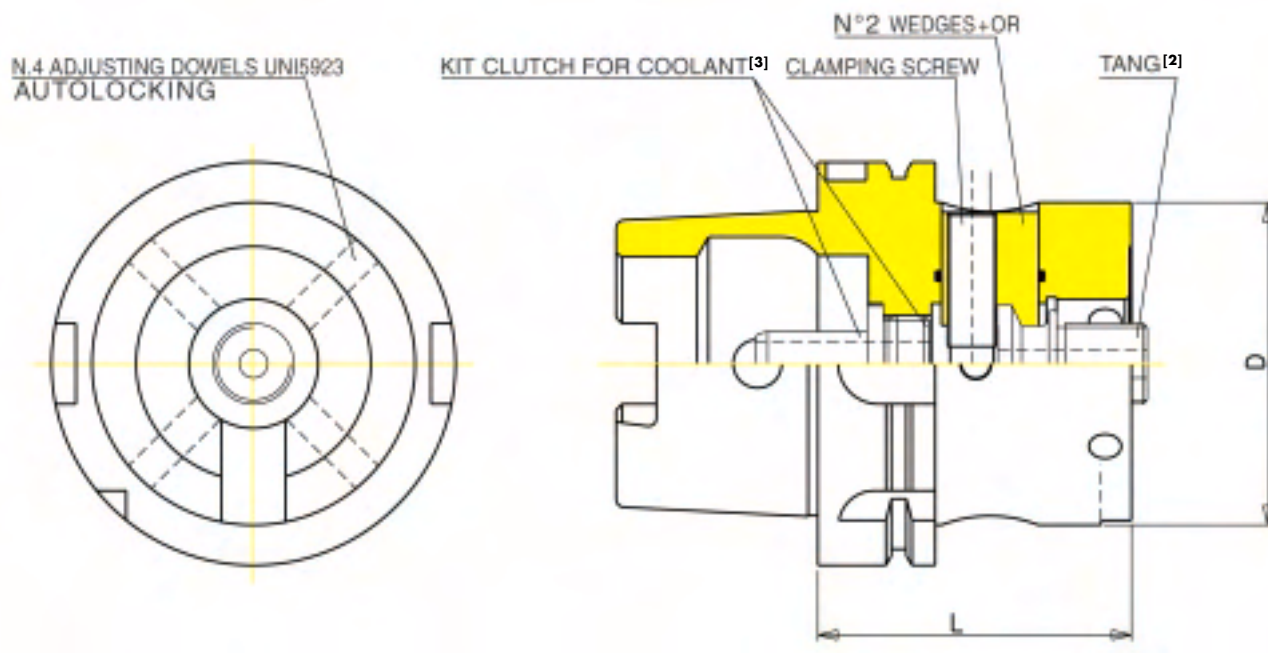


# 模块化刀柄系统

## BASIC SHANKS HSK-A DIN 69893/1

### MODULAR WITH LATERAL CLAMPING<sup>[1]</sup>

### AND RADIAL ADJUSTMENT

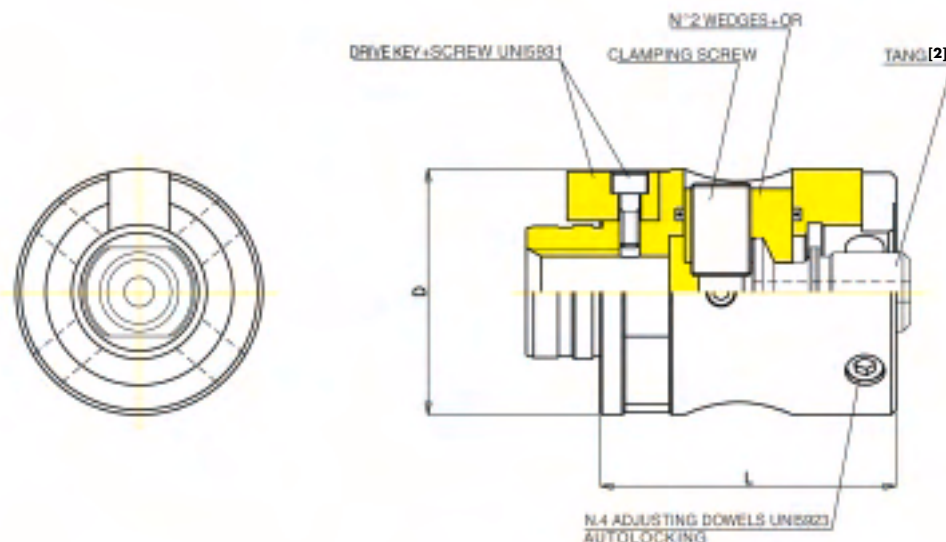


Max radial adjustment  $\pm 0,2$  mm on  $\varnothing$

ORDER CODE	HSK	MODULAR REDUCER D	L	STANDARD EQUIPMENT			ACCESSORIES			
				wedges+OR	clamping screw	adjusting dowels	clamping screw key	tang key <sup>[2]</sup>	key kit clutch for coolant	kit clutch for coolant <sup>[3]</sup>
HSK-A.63.50L.70	63	50	70	ATR14102.2.3	ATR14102.1	M8x1x10G	hexagon 6	fixed 18 ATT14103	ATR23856	ATT23728
HSK-A.63.63L.75	63	63	75	ATR41613.4	ATR14108.1	M8x1x14G	hexagon 6	fixed 24 ATT14104	ATR23856	ATT23728
HSK-A.100.50L.80	100	50	80	ATR14102.2.3	ATR14102.1	M8x1x10G	hexagon 6	fixed 18 ATT14103	ATR23856	ATT23656
HSK-A.100.63L.80	100	63	80	ATR14108.2.3	ATR14108.1	M8x1x14G	hexagon 6	fixed 24 ATT14104	ATR23856	ATT23656
HSK-A.100.80L.80	100	80	80	ATR18775.2.3	ATR18775.1	M8x1x20G	hexagon 6	fixed 24 ATT14104	ATR23856	ATT23656

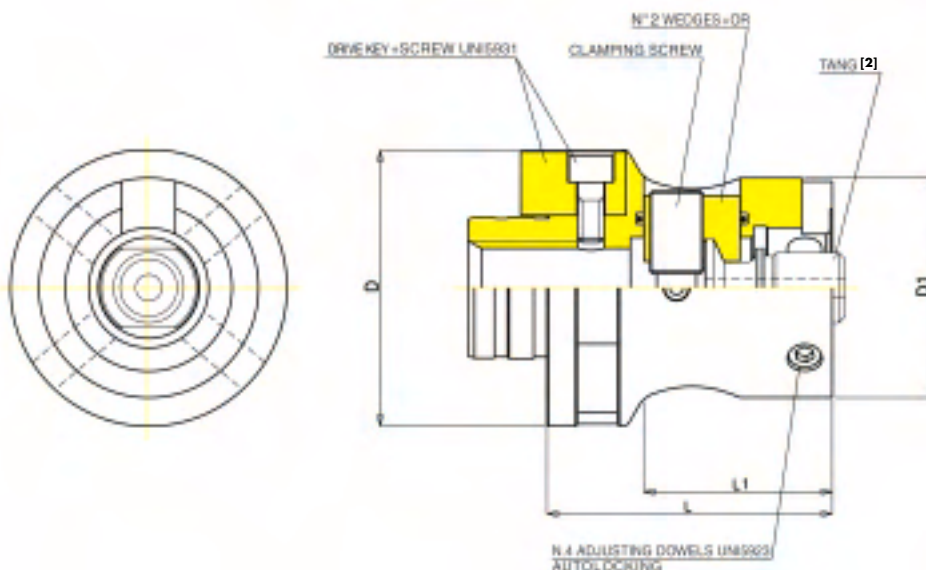
- [1]** The modular system has lateral clamping which enables efficient quick release of the tools.  
Light torque exerted on the clamping screw transmits high axial forces which provide stiffness and extreme accuracy to the assembly.
- [2]** All adaptors and tools with modular shanks require their respective tang fitted before assembly to the system with lateral clamping.
- [3]** Coolant clutch kits are supplied separately on request.

# 模块化刀柄系统 MODULAR EXTENSIONS WITH LATERAL CLAMPING<sup>[1]</sup> AND RADIAL ADJUSTMENT



Max radial adjustment  $\pm 0,2$  mm on  $\varnothing$

ORDER CODE	MODULAR SHANK D	L	STANDARD EQUIPMENT						ACCESSORIES	
			drive key	screw	wedges+OR	clamping screw	adjusting dowels	TANG <sup>[2]</sup>	clamping screw key	tang key
10.50.50L.60	50	60	TAB3924	M4x8V	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	hexagon 6	fixed 18
10.63.63L.80	63	80	TAB3923.1	M6x12V	ATR14108.2.3	ATR14108.1	M8x1x14G	ATT14104	hexagon 6	fixed 24
10.80.80L.80	80	80	TAB3923.2	M6x16V	ATR18775.2.3	ATR18775.1	M8x1x20G	ATT14104	hexagon 6	fixed 24



Max radial adjustment  $\pm 0,2$  mm on  $\varnothing$

ORDER CODE	MOD. SHANK D	MOD. RED. D1	L	L1	STANDARD EQUIPMENT						ACCESSORIES	
					drive key	screw	wedges+OR	clamping screw	adjusting dowels	TANG <sup>[2]</sup>	clamping screw key	tang key
15.63.50L.65	63	50	65	43	TAB3923.1	M6x12V	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	hexagon 6	fixed 18

[1] The modular system has lateral clamping which enables efficient quick release of the tools.

Light torque exerted on the clamping screw transmits high axial forces which provide stiffness and extreme accuracy to the assembly.

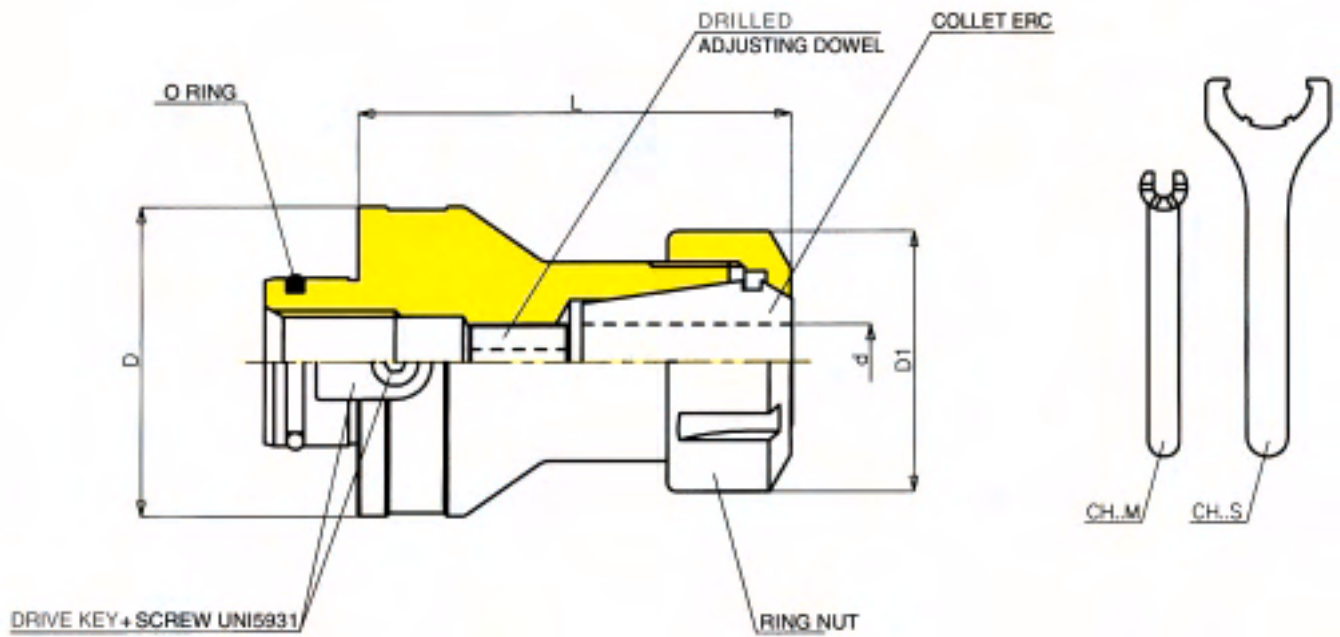
[2] All adaptors and tools with modular shanks require their respective tang fitted before assembly to the system with lateral clamping.

# 模块化刀柄系统

## COLLET CHUCK ADAPTORS

### ERC DIN 6499-B

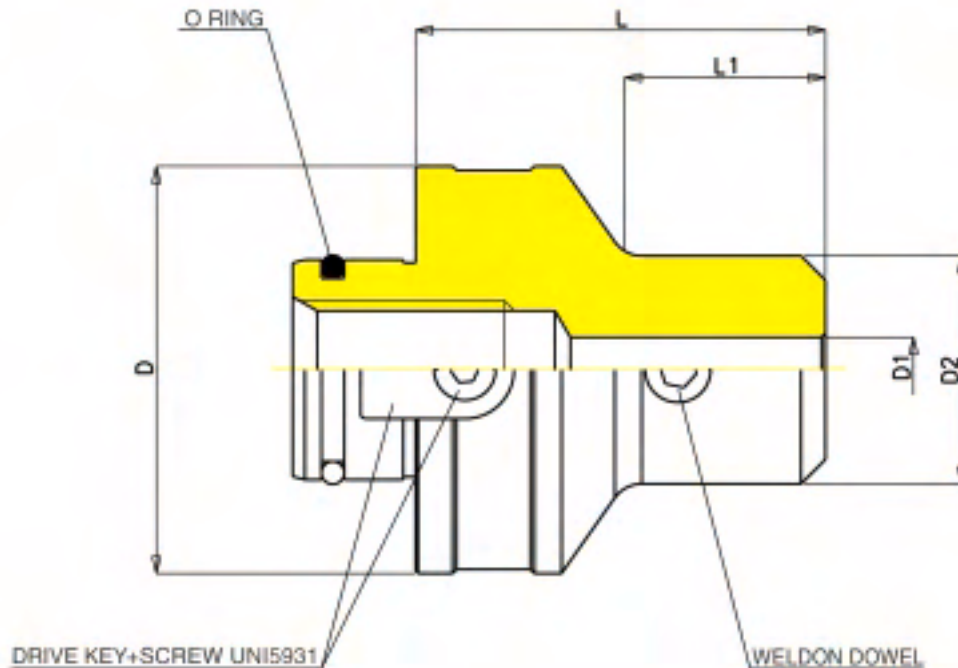
## FOR SHANKS WITH RADIAL ADJUSTMENT



ORDER CODE	MODULAR SHANK D	COLLET REDUCER	D	D1	L	STANDARD EQUIPMENT					ACCESSORIES	
						ring nut	drive key	screw	dowel	O ring	ring nut key	adjusting dowel key
30.50R.25.70	50	ERC25	0.5÷16	42	70	G25S	TAB3924	M4x8V	M12x16GF	130	CH25S	hexagon 6
30.50R.32.70	50	ERC32	1÷20	50	70	G32S	TAB3924	M4x8V	M16x15x18GF	130	CH32S	hexagon 8
30.63R.32.90	63	ERC32	1÷20	50	90	G32S	TAB3923.1	M6x12V	M12x16GF	1400	CH32S	hexagon 6
30.63R.40.90	63	ERC40	2÷30	63	90	G40S	TAB3923.1	M6x12V	M20x2x20GF	1400	CH40S	hexagon 10
30.80R.32.90	80	ERC32	1÷20	50	90	G32S	TAB3923.2	M6x16V	M12x16GF	1400	CH32S	hexagon 6
30.80R.40.90	80	ERC40	2÷30	63	90	G40S	TAB3923.2	M6x16V	M20x2x20GF	1400	CH40S	hexagon 10

# 模块化刀柄系统

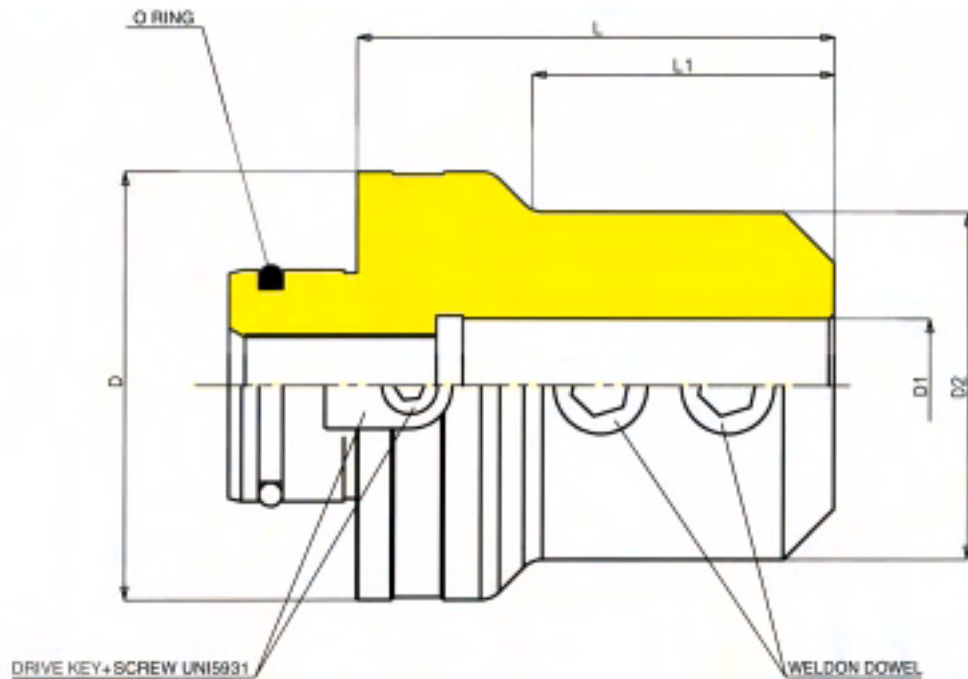
## WELDON ADAPTORS [D1=6÷20] FOR SHANKS WITH RADIAL ADJUSTMENT



Max radial adjustment  $\pm 0,2$  mm on  $\varnothing$

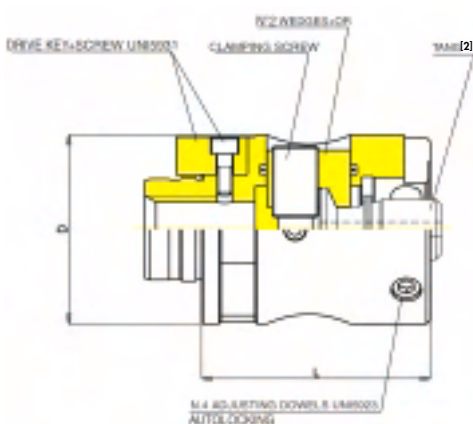
ORDER CODE	MODULAR SHANK D	D1	D2	L	L1	STANDARD EQUIPMENT				ACCESSORIES
						drive key	screw	dowel	O ring	adjusting dowel key
35.50R.06.50	50	6	25	50	22.5	TAB3924	M4x8V	M6x8G	130	hexagon 3
35.50R.08.50	50	8	28	50	24.5	TAB3924	M4x8V	M8x8G	130	hexagon 4
35.50R.10.50	50	10	35	50	26.5	TAB3924	M4x8V	M10x10G	130	hexagon 5
35.50R.12.60	50	12	42	60	38.5	TAB3924	M4x8V	M12x12G	130	hexagon 6
35.50R.14.60	50	14	44	60	42	TAB3924	M4x8V	M12x12G	130	hexagon 6
35.50R.16.60	50	16	48	60	40	TAB3924	M4x8V	M14x14G	130	hexagon 6
35.50R.18.60	50	18	50	60	-	TAB3924	M4x8V	M14x14G	130	hexagon 6
35.50R.20.60	50	20	52	60	41	TAB3924	M4x8V	M16x2x14G	130	hexagon 8
35.63R.08.60	63	8	28	60	28	TAB3923.1	M6x12V	M8x8G	1400	hexagon 4
35.63R.10.70	63	10	35	70	40	TAB3923.1	M6x12V	M10x10G	1400	hexagon 5
35.63R.12.70	63	12	42	70	42	TAB3923.1	M6x12V	M12x12G	1400	hexagon 6
35.63R.14.60	63	14	44	60	32	TAB3923.1	M6x12V	M12x12G	1400	hexagon 6
35.63R.16.70	63	16	48	70	44	TAB3923.1	M6x12V	M14x14G	1400	hexagon 6
35.63R.18.70	63	18	50	70	40	TAB3923.1	M6x12V	M14x14G	1400	hexagon 6
35.63R.20.70	63	20	52	70	45	TAB3923.1	M6x12V	M16x2x14G	1400	hexagon 8

# 模块化刀柄系统 WELDON ADAPTORS [D1=25÷32] FOR SHANKS WITH RADIAL ADJUSTMENT



ORDER CODE	MODULAR SHANK D	D1	D2	L	L1	STANDARD EQUIPMENT				ACCESSORIES
						drive key	screw	dowel	O ring	weldon dowel
40.50R.06.50	50	25	65	80	61	TAB3924	M4x8V	M18x2x18G	130	hexagon 8
40.50R.08.50	50	32	72	80	65	TAB3924	M4x8V	M20x2x18G	130	hexagon 10
40.63R.10.50	63	25	65	80	58	TAB3923.1	M6x12V	M18x2x18G	1400	hexagon 8
40.63R.12.60	63	32	72	80	-	TAB3923.1	M6x12V	M20x2x18G	1400	hexagon 10
40.80R.14.60	80	25	65	80	50.5	TAB3923.2	M6x16V	M18x2x18G	1400	hexagon 8
40.80R.16.60	80	32	72	80	54	TAB3923.2	M6x16V	M20x2x18G	1400	hexagon 10

## OPERATING INSTRUCTIONS FOR LATERAL MODULAR SHANK



- Remove the tang from the lateral modular shank by loosening the clamping screw.
- Assemble the tang to the adaptor spigot which matches the lateral modular shank.
- Insert the adaptor with its tang into the reducer bore of the lateral modular shank.
- Lock the adaptor by tightening the clamping screw.

### ASSEMBLY FOR RADIAL ADJUSTING

**Note: Only adaptors with modular reducer spigot are suitable for radial adjustment**

Complete the operations mentioned above then proceed as follows:

- Lightly tighten the clamping screw so that the tang is still able to move in a radial direction.
- Correct eccentricity with the 4 adjusting dowels by bringing them into contact with the tang.
- Tighten the clamping screw to lock the tang.
- Re-check for eccentricity, if required use the 4 adjusting dowels to correct and restore the value.
- Tighten the clamping screw to lock the adaptor.

**N.B. do not operate on items marked with red paint.**



模块化可更换刀头铰刀(可调和不可调)

**MODULAR EXPANDABLE & FIXED HEADS**

**ITALY MADE**





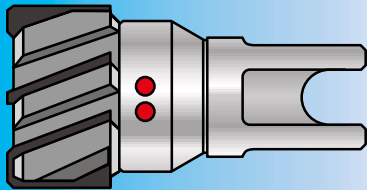
# HEADS 可调和不可调刀头

from diameter 11,80 to 45,60 mm

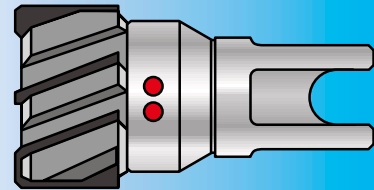
## FIXED HEADS

## EXPANDING HEADS

### Series 7700

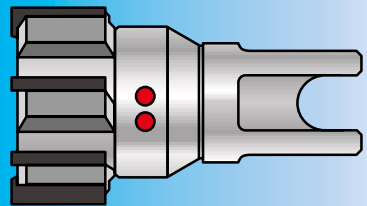


### Series 7705

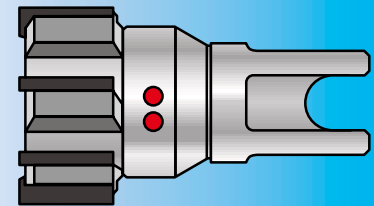


LEFT HAND HELICAL FLUTES

### Series 7400



### Series 7405



STRAIGHT FLUTES

## CODE DESCRIPTION 6 CUTTINGS HEADS

Code	Description
xxxx - KLx - Ø	Hard metal cutting edges K05/K10
xxxx - KNx - Ø	Hard metal cutting edges K05/K10 TIN-coated
xxxx - KCx - Ø	Hard metal cutting edges K05/K10 TICN-coated
xxxx - KAx - Ø	Hard metal cutting edges K05/K10 TIALN-coated
xxxx - SVx - Ø	Cermet cutting edges P10/P15
xxxx - SNx - Ø	Cermet cutting edges P10/P15 TIN-coated
xxxx - SCx - Ø	Cermet cutting edges P10/P15 TICN-coated
xxxx - SAx - Ø	Cermet cutting edges P10/P15 TIALN-coated

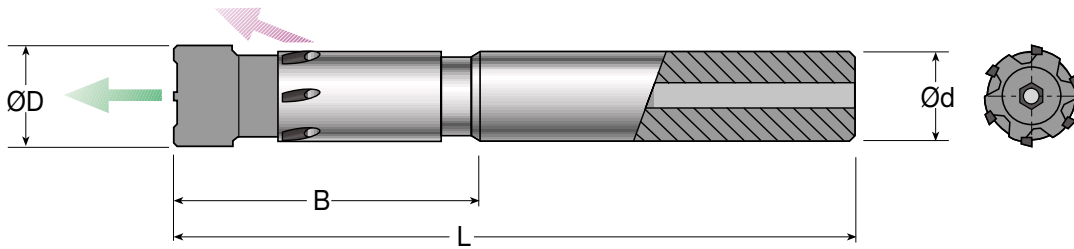
Diameter and tolerance

Lead-in (see page 9-10)

Series: 7700 Fixed heads left hand helical flutes  
7705 Expanding heads left hand helical flutes  
7400 Fixed heads straight flutes  
7405 Expanding heads straight flutes

# HEADS MANDRELS 刀头配套刀杆

## Series 7000-MC with Cylindrical shank



Mandrel code without head & screw	ØD mm	B mm	L mm	Ød <sup>h6</sup> mm	Locking screw fixed heads		Locking screw expanding heads	
					Through holes	Blind holes	Through holes	Blind holes
7000-MC-001	11,80 - 12,60	50	95	12	7000-VI-001	7001-VI-001	7000-VI-012	7001-VI-012
	12,61 - 13,60						7000-VI-013	7001-VI-013
	13,61 - 14,60						7000-VI-014	7001-VI-014
7000-MC-002	14,61 - 15,60	65	113	16	7000-VI-002	7001-VI-002	7000-VI-015	7001-VI-015
	15,61 - 16,60						7000-VI-016	7001-VI-016
	16,61 - 17,60						7000-VI-017	7001-VI-017
7000-MC-003	17,61 - 18,60	75	125	20	7000-VI-003	7001-VI-003	7000-VI-018	7001-VI-018
	18,61 - 19,60						7000-VI-019	7001-VI-019
	19,61 - 20,60						7000-VI-020	7001-VI-020
	20,61 - 21,60						7000-VI-021	7001-VI-021
7000-MC-004	21,61 - 22,60	85	135	20	7000-VI-004	7001-VI-004	7000-VI-022	7001-VI-022
	22,61 - 23,60						7000-VI-023	7001-VI-023
	23,61 - 24,60						7000-VI-024	7001-VI-024
	24,61 - 25,60						7000-VI-025	7001-VI-025
	25,61 - 26,60						7000-VI-026	7001-VI-026
7000-MC-005	26,61 - 27,60	105	161	25	7000-VI-005	7001-VI-005	7000-VI-027	7001-VI-027
	27,61 - 28,60						7000-VI-028	7001-VI-028
	28,61 - 29,60						7000-VI-029	7001-VI-029
	29,61 - 30,60						7000-VI-030	7001-VI-030
	30,61 - 31,60						7000-VI-031	7001-VI-031
	31,61 - 32,60						7000-VI-032	7001-VI-032

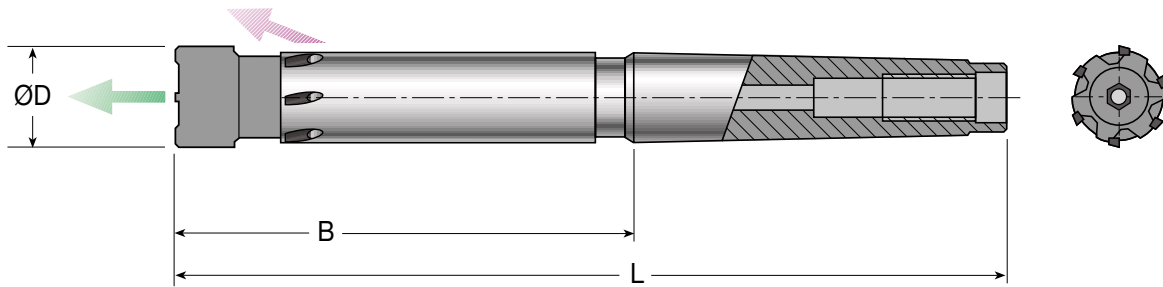
All mandrels are provided with radial through tool coolant.

**1<sup>st</sup> note** through hole reaming - order adjustment screw to suit through holes.

**2<sup>nd</sup> note** blind hole reaming - order adjustment screw to suit blind holes. That drilled screws allows central through tool coolant.

# HEADS MANDRELS 刀头配套刀杆

## Series 7000-MT with MT shank



Mandrel code without head & screw	ØD mm	B mm	L mm	Ød <sup>h6</sup> mm	Locking screw fixed heads		Locking screw expanding heads	
					Through holes	Blind holes	Through holes	Blind holes
7000-MT-001	11,80 - 12,60	95	164	2	7000-VI-001	7001-VI-001	7000-VI-012	7001-VI-012
	12,61 - 13,60						7000-VI-013	7001-VI-013
	13,61 - 14,60						7000-VI-014	7001-VI-014
7000-MT-002	14,61 - 15,60	105	174	2	7000-VI-002	7001-VI-002	7000-VI-015	7001-VI-015
	15,61 - 16,60						7000-VI-016	7001-VI-016
	16,61 - 17,60						7000-VI-017	7001-VI-017
7000-MT-003	17,61 - 18,60	125	194	2	7000-VI-003	7001-VI-003	7000-VI-018	7001-VI-018
	18,61 - 19,60						7000-VI-019	7001-VI-019
	19,61 - 20,60						7000-VI-020	7001-VI-020
	20,61 - 21,60						7000-VI-021	7001-VI-021
7000-MT-004	21,61 - 22,60	145	231	3	7000-VI-004	7001-VI-004	7000-VI-022	7001-VI-022
	22,61 - 23,60						7000-VI-023	7001-VI-023
	23,61 - 24,60						7000-VI-024	7001-VI-024
	24,61 - 25,60						7000-VI-025	7001-VI-025
	25,61 - 26,60						7000-VI-026	7001-VI-026
7000-MT-005	26,61 - 27,60	165	251	3	7000-VI-005	7001-VI-005	7000-VI-027	7001-VI-027
	27,61 - 28,60						7000-VI-028	7001-VI-028
	28,61 - 29,60						7000-VI-029	7001-VI-029
	29,61 - 30,60						7000-VI-030	7001-VI-030
	30,61 - 31,60						7000-VI-031	7001-VI-031
	31,61 - 32,60						7000-VI-032	7001-VI-032

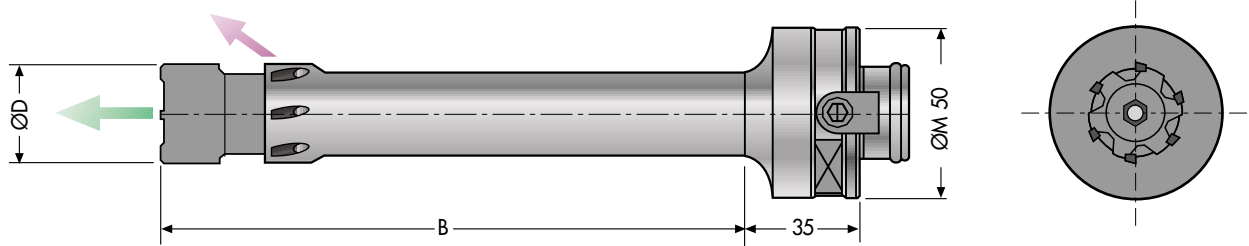
All mandrels are provided with radial through tool coolant.

**1<sup>st</sup> note** through hole reaming - order adjustment screw to suit through holes.

**2<sup>nd</sup> note** blind hole reaming - order adjustment screw to suit blind holes. That drilled screws allows central through tool coolant.

# HEADS MANDRELS 刀头配套刀杆

## Series 7000-MM with Modular Composit shank



Mandrel code without head & screw	ØD mm	B mm	Locking screw fixed heads		Locking screw expanding heads	
			Through holes	Blind holes	Through holes	Blind holes
7000-MM-001	11,80 - 12,60	65	7000-VI-001	7001-VI-001	7000-VI-012	7001-VI-012
	12,61 - 13,60				7000-VI-013	7001-VI-013
	13,61 - 14,60				7000-VI-014	7001-VI-014
7000-MM-002	14,61 - 15,60	80	7000-VI-002	7001-VI-002	7000-VI-015	7001-VI-015
	15,61 - 16,60				7000-VI-016	7001-VI-016
	16,61 - 17,60				7000-VI-017	7001-VI-017
7000-MM-003	17,61 - 18,60	90	7000-VI-003	7001-VI-003	7000-VI-018	7001-VI-018
	18,61 - 19,60				7000-VI-019	7001-VI-019
	19,61 - 20,60				7000-VI-020	7001-VI-020
	20,61 - 21,60				7000-VI-021	7001-VI-021
7000-MM-004	21,61 - 22,60	100	7000-VI-004	7001-VI-004	7000-VI-022	7001-VI-022
	22,61 - 23,60				7000-VI-023	7001-VI-023
	23,61 - 24,60				7000-VI-024	7001-VI-024
	24,61 - 25,60				7000-VI-025	7001-VI-025
	25,61 - 26,60				7000-VI-026	7001-VI-026
7000-MM-005	26,61 - 27,60	110	7000-VI-005	7001-VI-005	7000-VI-027	7001-VI-027
	27,61 - 28,60				7000-VI-028	7001-VI-028
	28,61 - 29,60				7000-VI-029	7001-VI-029
	29,61 - 30,60				7000-VI-030	7001-VI-030
	30,61 - 31,60				7000-VI-031	7001-VI-031
	31,61 - 32,60				7000-VI-032	7001-VI-032
7000-MM-006	32,61 - 33,60	120	7000-VI-006	7001-VI-006	7000-VI-033	7001-VI-033
	33,61 - 34,60				7000-VI-034	7001-VI-034
	34,61 - 35,60				7000-VI-035	7001-VI-035
	35,61 - 36,60				7000-VI-036	7001-VI-036
	36,61 - 37,60				7000-VI-037	7001-VI-037
	37,61 - 38,60				7000-VI-038	7001-VI-038
	38,61 - 39,60				7000-VI-039	7001-VI-039
	39,61 - 40,60				7000-VI-040	7001-VI-040
7000-MM-007	40,61 - 41,60	120	7000-VI-007	7001-VI-007	7000-VI-041	7001-VI-041
	41,61 - 42,60				7000-VI-042	7001-VI-042
	42,61 - 43,60				7000-VI-043	7001-VI-043
	43,61 - 44,60				7000-VI-044	7001-VI-044
	44,61 - 45,60				7000-VI-045	7001-VI-045

All mandrels are provided with radial through tool coolant.

**1<sup>st</sup> note** through hole reaming - order adjustment screw to suit through holes.

**2<sup>nd</sup> note** blind hole reaming - order adjustment screw to suit blind holes. That drilled screws allows central through tool coolant.

# 可调和不可调铰刀使用说明

## EXPANDING & FIXED REAMERS INSTRUCTIONS

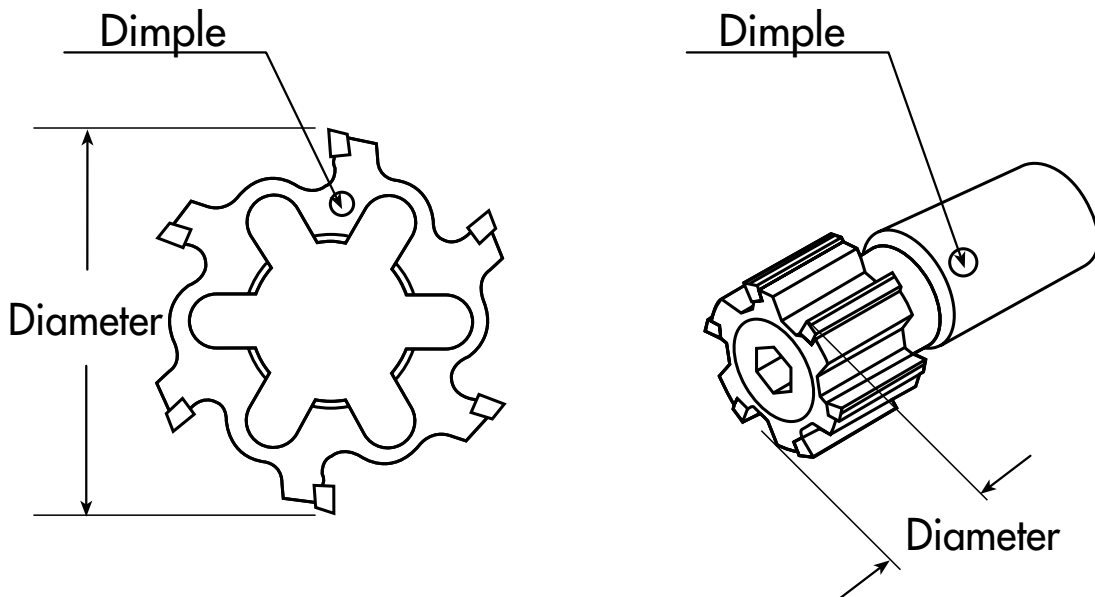
### 1) Diameter measurement

The diameter of the reamers and of the cutting rings is measured with a micrometer. We recommend the use of a comparator style micrometer with at least a  $2\mu\text{m}$  resolution to avoid micro chipping of the cutting edges.

To allow setting of the reamer, two cutting edges are exactly  $180^\circ$  opposed. These are marked with a coloured dimple (see diagram below).

Measurement must be taken from the front of the cutting edges only.

The red dimple indicates that the tool has been ground with a single lead-in angle (code G), the blue dimple indicates a double lead-in angle (code A).



### 2) Tolerance

All the reamers are ground to the requested diameter and set to nominal tolerance for expanding reamers and  $3/4$  of minimum tolerance for fixed reamers.

### 3) Expanding reamers adjustment

The adjustment must be made to compensate for wear to the cutting edges when the size reaches its lower tolerance.

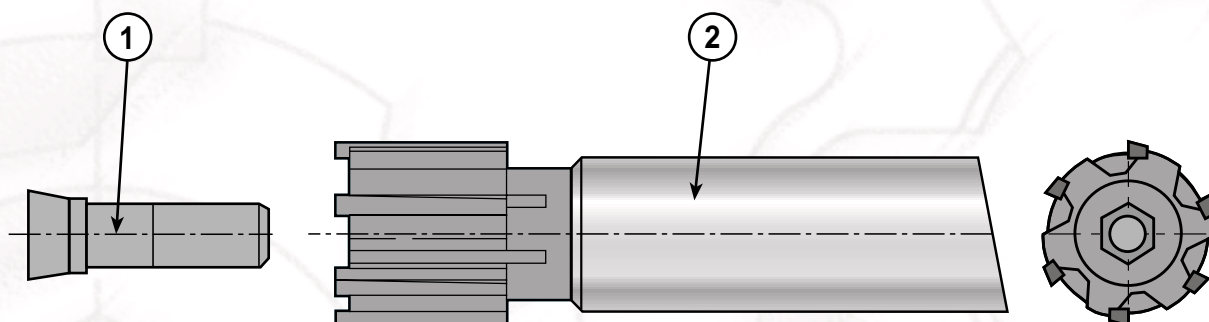
This operation can be repeated several times until the surface finish of the hole deteriorates to an unacceptable level, then the reamer must be reground. The maximum expansion is about 1% of the diameter for the integral reamers and about 4% of the diameter for the cutting rings.

## **Assembly - Adjustment - Disassembly**

**Series 2400 - 2410 - 2430 - 2420 - 2440 - 2450 - 2480 - 2490**  
from diam. 5,80 to 32,10 mm

**Series 2401 - 2411 - 2431 - 2421 - 2441 - 2451 - 2481 - 2491**  
from diam. 5,80 to 32,10 mm

**Series 3600 - 3610 - 3620 - 3650 - 3680 - 3690**  
from diam. 5,80 to 32,10 mm



### **1) Adjustment procedure**

Turn the **right hand threaded** screw (item 1) slowly clockwise, while checking the diameter setting of the reamer (item 2) with a micrometer.  
When the required diameter is achieved, the tool is ready for use.



# 可调铰刀使用说明 EXPANDING REAMERS INSTRUCTIONS

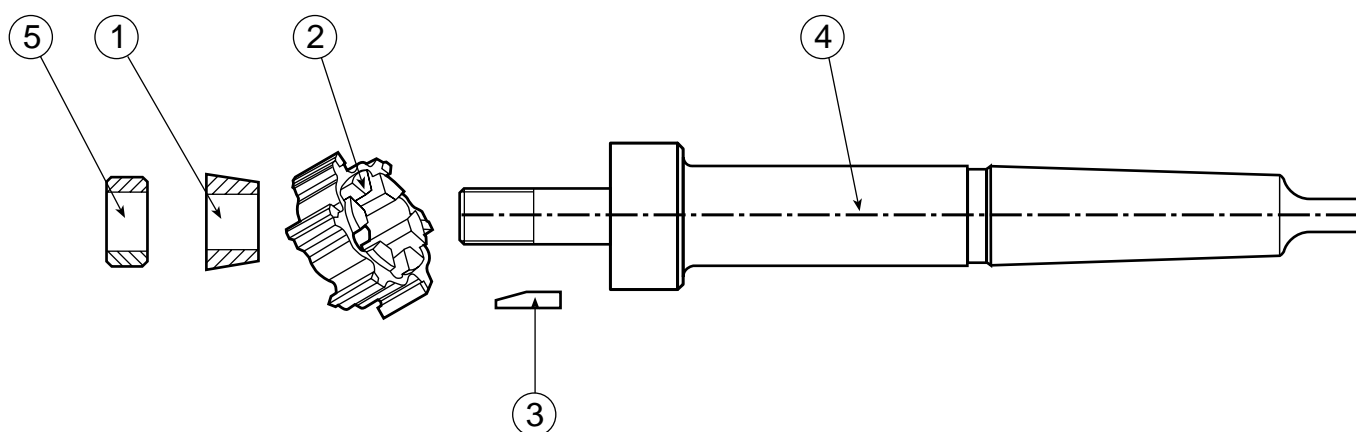
## Assembly - Adjustment - Disassembly EXPANDING REAMERS WITH CUTTING RING with assembly and adjustment in the front

Series 2000-2010-2050 from diam. 17,60 to 100,59 mm

Series 4550-4500-4330 from diam. 17,60 to 100,59 mm

Series 4200-4250-4350 from diam. 17,60 to 200,59 mm

Series 4300 from diam. 17,60 to 60,59 mm



### 1) Assembly

Insert the cutting ring (item 2) on the mandrel (item 4) with the drive pins (item 3) assembled. Insert the conical ring (item 1). Screw the nut (item 5) and lock it manually: **the thread is left handed.**

We recommend lubricating the thread and the conical surface of contact between the cutting ring and the conical ring with antifriction Molycote grease.

### 2) Adjustment procedure

Turn the nut slowly, checking the diameter setting of the cutting ring with a micrometer, paying attention that the drive pins are in traction in the opposite direction to the cutting action of the reamer.

When the required diameter is achieved, the tool is ready for use.

### 3) Disassembly

Unscrew the nut. Remove the components from the mandrel.

# 可调铰刀使用说明

## EXPANDING REAMERS

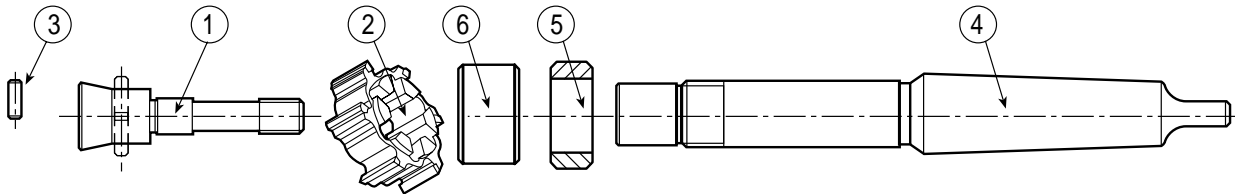
### INSTRUCTIONS

#### Assembly - Adjustment - Disassembly

### EXPANDING REAMERS WITH CUTTING RING

with assembly and adjustment on the rear

**Series 2500 - 2505 - 2530 - 2535 - 2550 - 2555**  
**from diam. 17,60 to 45,59 mm**



### 1) Assembly

Screw the nut (item 5) on the mandrel (item 4): **the thread is right handed**.  
 Insert the bush (item 6) on the mandrel.

Mount the cutting ring (item 2) onto the conical screw (item 1) and over the drive pins (item 3). Tighten the conical screw onto the mandrel, taking care that the contact surfaces are very clean. Look the screw to the torque setting stated in table 1. We recommend lubricating the thread and the conical surface of contact between the cutting ring and the conical ring with antifriction Molycote grease.

### 2) Adjustment procedure

Turn the nut slowly, checking the diameter setting of the cutting ring with a micrometer, paying attention that the drive pins are in tranction, in the opposite direction to the cutting action of the reamer. When the required diameter is achived, the tool is ready for use.

### 3) Disassembly

Loosen the nut and remove the screw. Remove the components from the mandrel.

**Use a dynamometric key to avoid breaking the conical screw**

Diameter mm	Torque settings Kgm
18 - 25	1,4 - 1,6
26 - 32	2,2 - 2,5
33 - 40	3,6 - 4
41 - 45	4,6 - 5

table 1

# 可调铰刀使用说明

## EXPANDING REAMERS

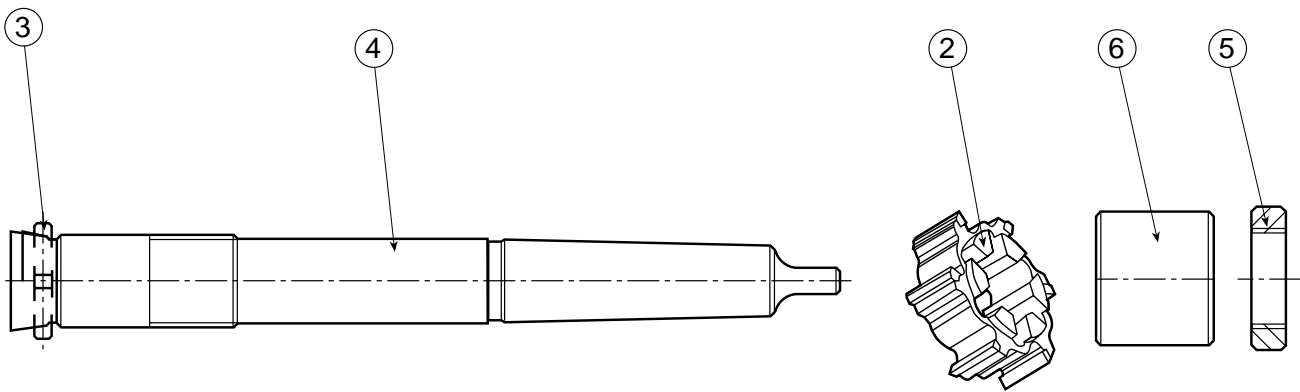
### INSTRUCTIONS

#### Assembly - Adjustment - Disassembly

### EXPANDING REAMERS WITH CUTTING RING

with assembly and adjustment on the rear

Series 2500 - 2505 - 2530 - 2535 - 2550 - 2555  
from diam. 45,60 to 100,59 mm



### 1) Assembly

Mount the cutting ring (item 2) and the bush (item 6) onto the mandrel (item 4). Screw the ring nut (item 5) onto the mandrel and lock it manually: **the thread is right handed.**

We recommend lubricating the thread and the conical surface of contact between the cutting ring and the mandrel with antifriction Molycote grease.

### 2) Adjustment procedure

Turn the ring nut slowly, checking the diameter setting of the cutting ring with a micrometer, paying attention that the drive pins (item 3) are in traction in the opposite direction to the cutting action of the reamer.

When the required diameter is achieved, the tool is ready for use.

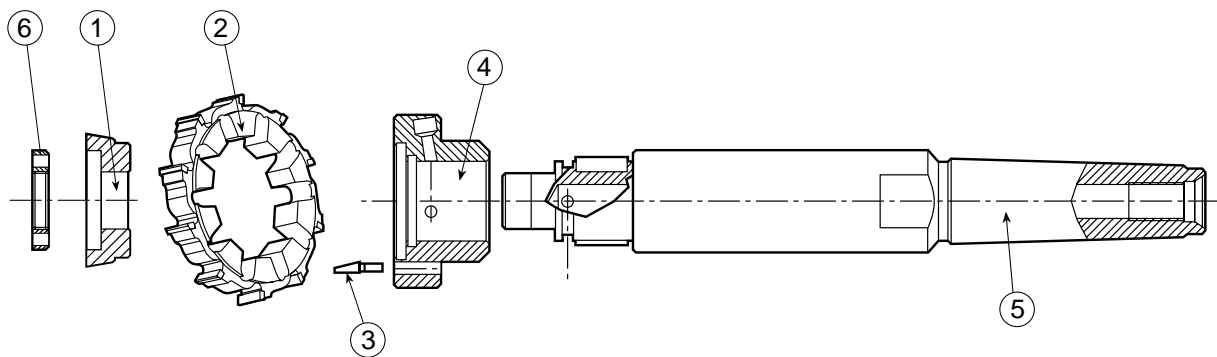
### 3) Disassembly

Unscrew the ring nut. Remove the components from the mandrel.

**Assembly - Adjustment - Disassembly**  
**EXPANDING REAMERS WITH CUTTING RING**  
 with assembly and adjustment in the front

**Series 4000 - 4050**  
 from diam. 79,60 to 200,59 mm

**Series 4100 - 4150**  
 from diam. 79,60 to 200,59 mm



**1) Assembly**

With the drive pins (item 3) assembled, mount the flange (item 4) onto the mandrel (item 5). Assemble the cutting ring (item 2) so that the slot on the left side of the dimple is mounted onto the drive pins. Insert the conical ring (item 1). Screw the ring nut (item 6) onto the mandrel and tighten manually, so that the conical ring makes contact with the cutting ring: **the thread is left handed**. We recommend lubricating the thread and the conical surface of contact between the cutting ring and the conical ring with antifriction Molycote grease.

**2) Adjustment procedure**

Turn the ring nut slowly (using a pin spanner) checking the diameter setting of the cutting ring with a micrometer, paying attention that the drive pins are in traction, in the opposite direction to the cutting action of reamer. When the required diameter is achieved, the tool is ready for use.

**3) Disassembly**

Unscrew the ring nut. Remove the components from the mandrel.

# 可调铰刀使用说明

## EXPANDING REAMERS

### INSTRUCTIONS

#### Assembly - Adjustment - Disassembly

### EXPANDING REAMERS WITH CUTTING RING

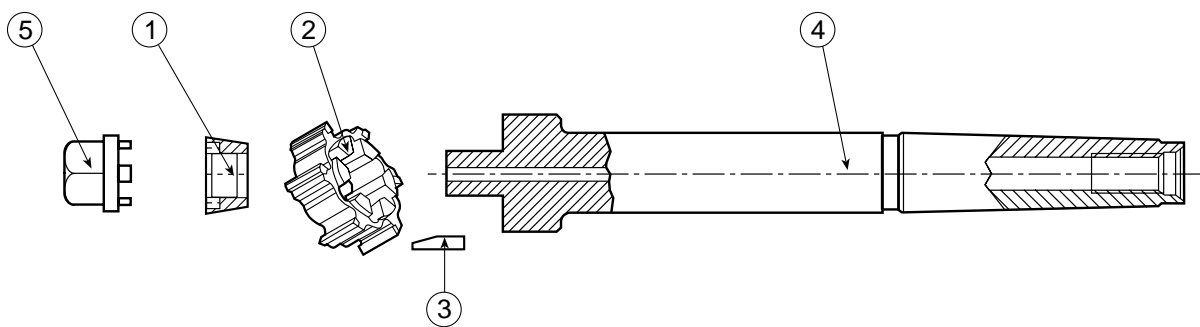
with assembly and adjustment in the front

Series 2015 from diam. 17,60 to 100,59 mm

Series 4000 - 4050 from diam. 17,60 to 79,59 mm

Series 4355-4505-4555 from diam. 17,60 to 100,59 mm

Series 4305 from diam. 17,60 to 60,59 mm



### 1) Assembly

Mount the cutting ring (item 2) onto the mandrel (item 4) with the drive pins (item 3) assembled. Screw the conical ring nut onto the mandrel and lock it manually: **the thread is left handed.**

Lubricate the thread and the conical surface of contact between the cutting ring and the conical ring with antifriction Molycote grease.

### 2) Adjustment procedure

Turn the conical ring nut slowly using a pin spanner (item 5) supplied with reamers from diameter 17,60 to 40,59 mm, checking the diameter setting of the cutting ring with a micrometer. When the required diameter is achieved unscrew the conical ring until there is a click and the drive pins are in traction in the opposite direction to the cutting action of the reamer.

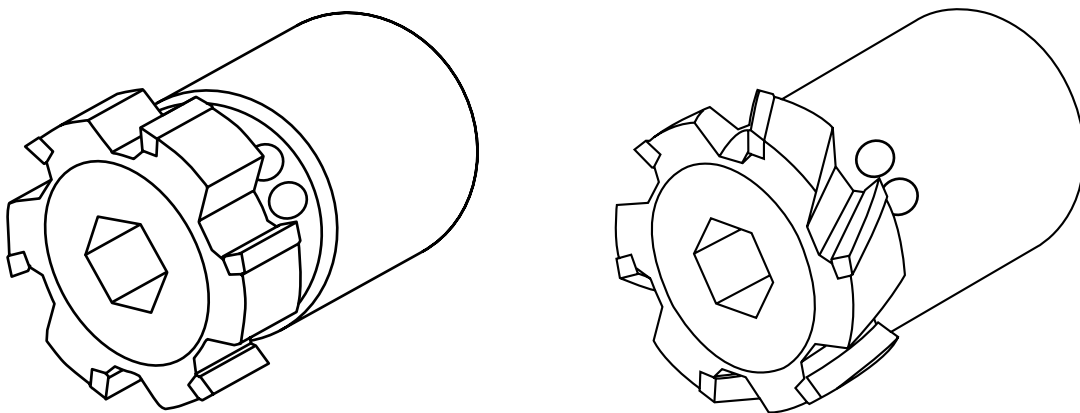
The reamer is ready for use.

### 3) Disassembly

Unscrew the conical ring nut. Remove the components from the mandrel.

## 1) Diameter measurement

The diameter of the heads is measured with a micrometer. To avoid micro chipping of the cutting edges, we would recommend the use of a comparator style micrometer with at least  $2\mu\text{m}$  resolution. The cutting edges are of an asymmetric design with two cutting edges exactly  $180^\circ$  opposed to allow setting. These are marked with a coloured dimple (see diagram below). Measurement must be taken from the front of the cutting edges only.



## 2) Tolerance

All the heads are ground to the requested diameter and set to nominal tolerance for expanding heads and  $2/3$  of minimum tolerance for fixed heads.

## 3) Expanding heads adjustment

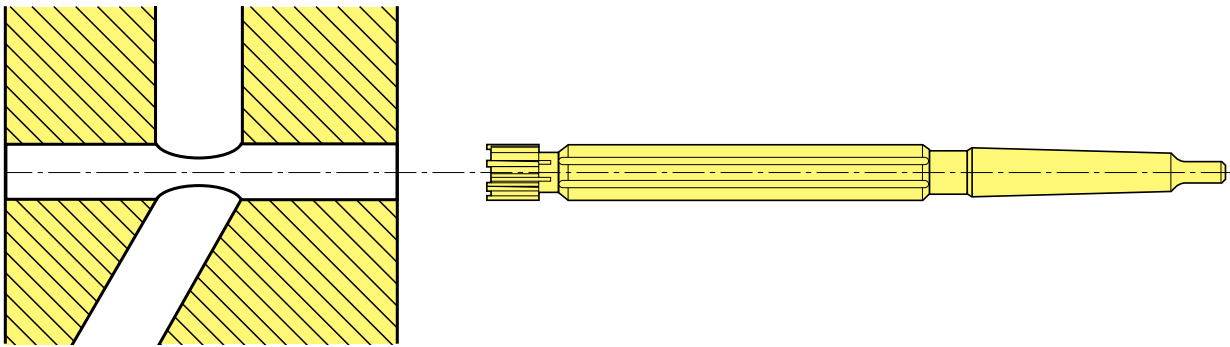
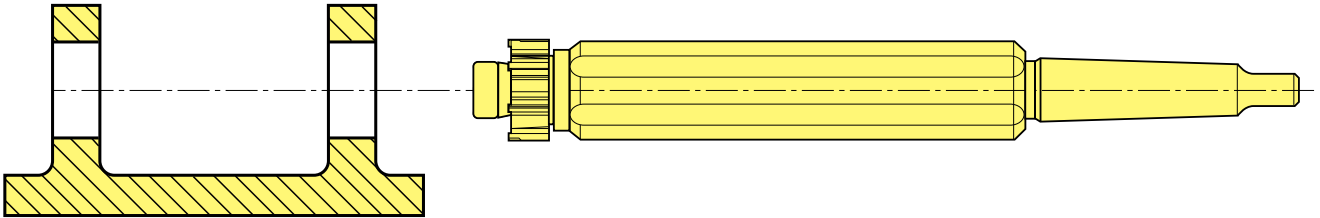
When the size reaches its lower tolerance the head can be adjusted to compensate for wear to the cutting edges.

This operation can be repeated several times until the surface finish of the hole deteriorates to an unacceptable level.

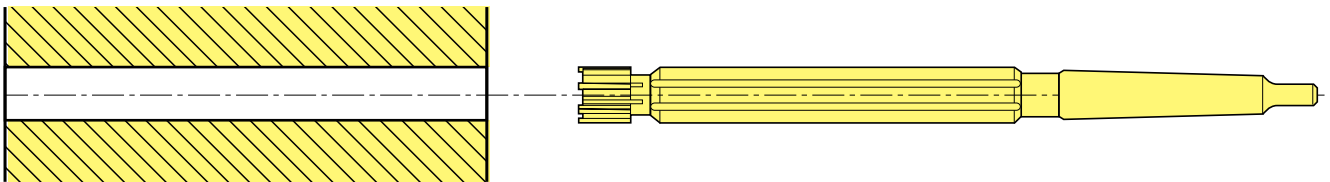


# APPLICATIONS of the expanding reamers with guide

1) In the working of interrupted holes, when the interruption is equal or longer than the cutting edge.



2) In the working of long holes, when there are doubts about the alignment between hole and piece.



N.B.: A plentiful supply of coolant is essential.

# PRACTICAL SUGGESTIONS

## for the use of the reamers 铰刀问题

### - Remedies to possible difficulties -

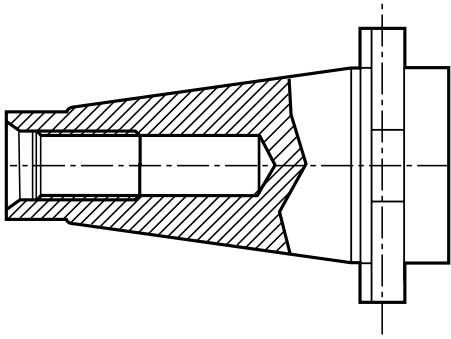
DEFECT	CAUSE	REMEDY
1) HOLE TOO LARGE	<ul style="list-style-type: none"> <li>a) The reamer is running eccentric to the centre line of the machine spindle.</li> <li>b) Excessive misalignment reamer works also at the end of the tapered part.</li> <li>c) Material build up on cutting edges.</li> <li>d) The reamer diameter is too large.</li> </ul>	<ul style="list-style-type: none"> <li>a) Use the S.C.A. system.</li> <li>b) Rectify misalignment or use S.C.A. system.</li> <li>c) Replace the coolant or change the cutting speed.</li> <li>d) Use smaller reamer or regrind existing one.</li> </ul>
2) HOLE TOO SMALL	<ul style="list-style-type: none"> <li>a) The reamer diameter is too small.</li> <li>b) The reamer diameter is worn.</li> <li>c) The coolant is not suitable.</li> <li>d) Stock allowance too small.</li> <li>e) The cutting speed is too low.</li> </ul>	<ul style="list-style-type: none"> <li>a) Use larger reamer.</li> <li>b) Expand, regrind or replace the reamer.</li> <li>c) Replace the coolant.</li> <li>d) Increase the stock allowance.</li> <li>e) Increase the cutting speed.</li> </ul>
3) TAPERED HOLE	<ul style="list-style-type: none"> <li>a) Excessive misalignment.</li> </ul>	<ul style="list-style-type: none"> <li>a) Correct misalignment or use the S.C.A. system.</li> </ul>
4) BURR AT THE ENTRY OF THE HOLE	<ul style="list-style-type: none"> <li>a) Excessive misalignment.</li> </ul>	<ul style="list-style-type: none"> <li>a) Correct misalignment or use the S.C.A. system.</li> </ul>
5) THE HOLE IS NOT STRAIGHT	<ul style="list-style-type: none"> <li>a) Concentricity and alignment error between the workpiece and the tool.</li> <li>b) Asymmetrical cutting or angled surfaces.</li> </ul>	<ul style="list-style-type: none"> <li>a) Correct misalignment or use the S.C.A. system.</li> <li>b) Create a chamfer on the lead-in.</li> </ul>
6) QUALITY OF THE WORK SURFACE UNSATISFACTORY	<ul style="list-style-type: none"> <li>a) One cutting edge is chipped.</li> <li>b) The lead-in is irregular.</li> <li>c) Back taper on the cutting edges too great.</li> <li>d) Excessive misalignment.</li> <li>e) Cutting data not correct.</li> <li>f) Poor chip evacuation.</li> </ul>	<ul style="list-style-type: none"> <li>a) Regrind the reamer.</li> <li>b) Regrind the reamer.</li> <li>c) Regrind the reamer.</li> <li>d) Correct misalignment or use the S.C.A. system.</li> <li>e) Verify cutting data.</li> <li>f) Verify coolant volume and pressure or use internal through tool coolant.</li> </ul>
7) THE REAMER CREATES EXCESSIVE TORQUE LOADING	<ul style="list-style-type: none"> <li>a) Back taper on the cutting edges too small.</li> <li>b) The radially ground land is too wide.</li> <li>c) The coolant is not suitable.</li> </ul>	<ul style="list-style-type: none"> <li>a) Regrind the reamer.</li> <li>b) Regrind the reamer.</li> <li>c) Replace the coolant.</li> </ul>

**Our technical department is available to assist in:**

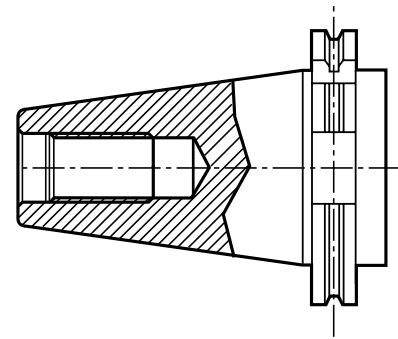
- 1) *Establishing optimum cutting data.*
- 2) *Verifying alignment problems.*
- 3) *Supply of correct regrinding data.*

## SHANKS 刀柄说明

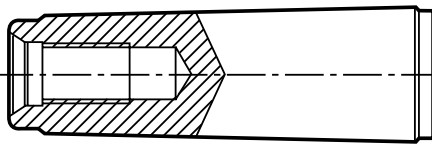
All expanding reamers are available with various standard (see examples below) and special shanks on request.



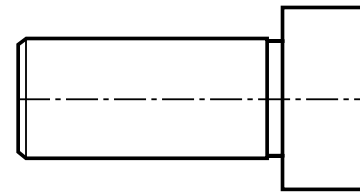
**DIN 2080 40/45/50**



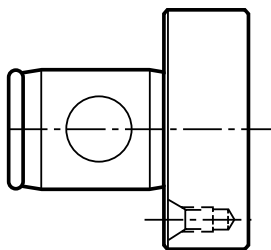
**DIN 69871-A 40/45/50**



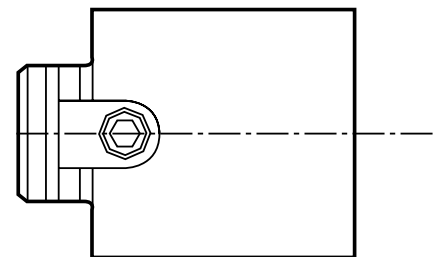
**DIN 228 CM 1/2/3/4/5 Type A**



**Cylindrical**



**ABS® ... KOMET licence\***

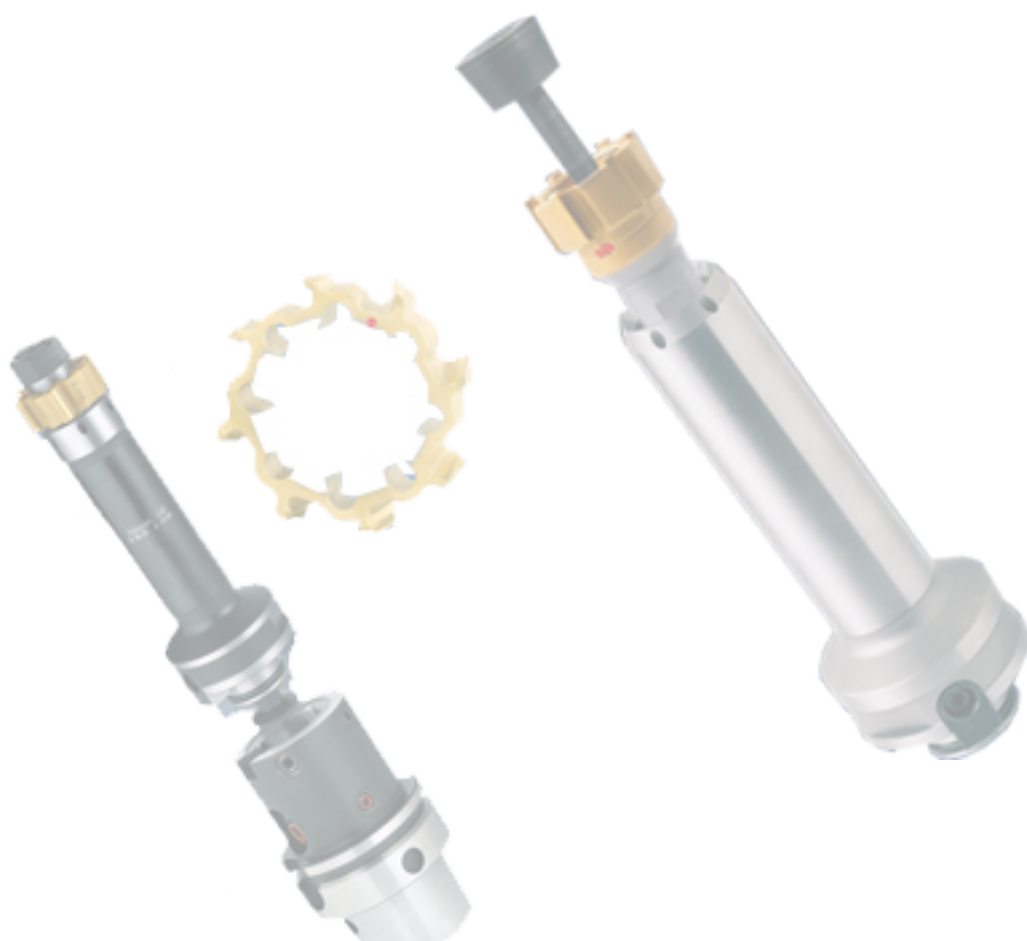


**VARILOK ... SANDVIK**

\* Manufactured under KOMET licence, owner of the patent.



## 机床工具专家之选



微信公众平台账号



**EMT**  
EMT  
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