edition 2026

ALVAN®

REAMING SOLUTION

S.C.A.M.I.®

ISO 9001 BUREAU VERITAS Certification

MADE IN ITALY

50 ANNIVERSARY
ANNI
1973 - 2023

Since 1973, S.C.A.M.I. has been producing tools for the superfinishing of holes.

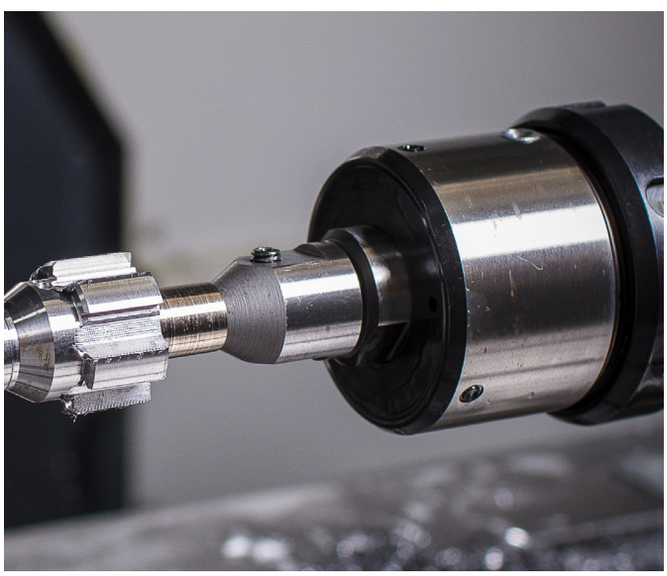
From its headquarter near to Turin, the best solutions to be offered on the world market are studied, designed and tested using the highest performing materials.

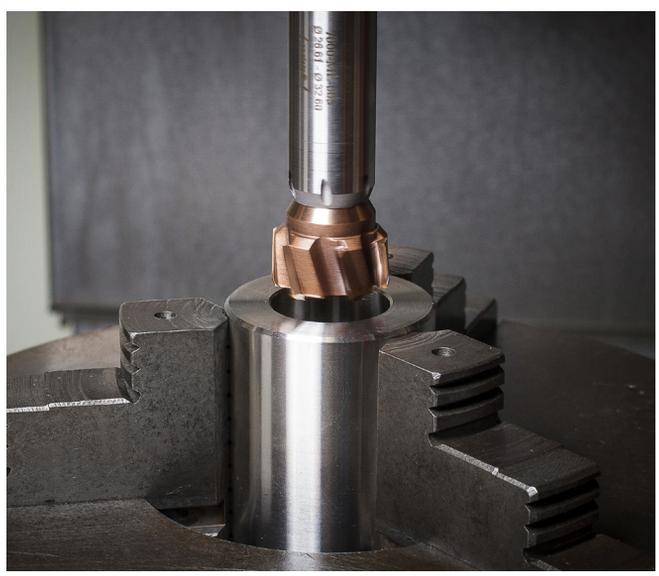
The various ranges of reamers are designed to work different diameters, materials and applications, trying to simplify the operator's work and reduce the downtime.

S.C.A.M.I. also offers an excellent restoration service that is able to bring the worn tool back to the same condition as new ones.

When a particular roughness and diameter tolerance are required that cannot be obtained with drilling, reaming is the solution: a finishing operation for blind or through holes.
The choice of the correct reamer is influenced by the drawing piece, the type of machine and the type of material to be worked.

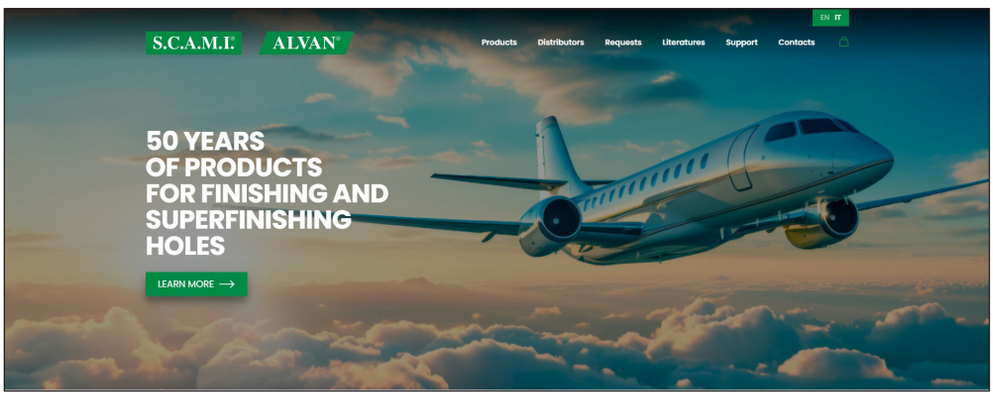
S.C.A.M.I. designs and optimizes the best solutions in the field of precision reaming with ALVAN® brand tools.
ALVAN® tools include fixed and expandable reaming solutions for standard diameters from 5.80 to 200 mm and special solutions and projects on request.

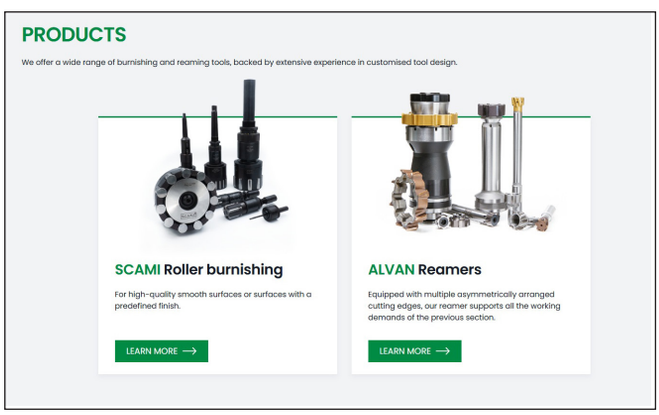




www.scami-alvan.it

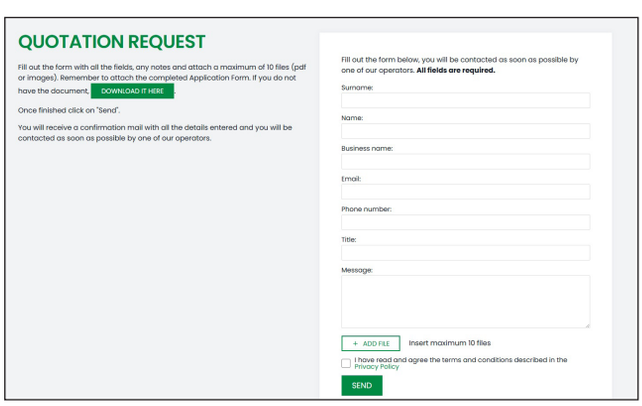
Our new website allows us to be always in contact with our distributors and provide support quickly.





From the website you can discover our products...

...find a distributor in your area...



...send a request...

...but also watch video tutorials on tool assembly...

and **from this year**
you will be supported in the choice of the right tool for your needs!

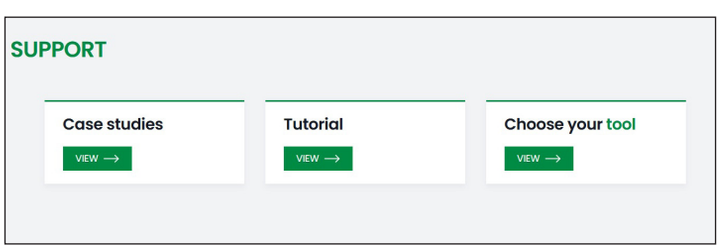


TABLE OF CONTENTS

MONOBLOC REAMERS

Ideal for small productions and small diameters

DIAMETER RANGE: 5,80 ÷ 32,10 mm

COOLANT: Radial through coolant (through holes)
Axial through coolant (blind holes)

SERIES: Short / Long

GEOMETRY: Straight flutes / Helical flutes

SHANK: Cylindrical

SUBSTRATE: Carbide / Cermet / PCD / CBN
Coated or uncoated

BENEFITS:
- High speed reamers for improved productivity
- Fixed solution on request

SUMMARY	Series	Page	DIAMETERS mm					Long series	Short series	Axial coolant	Radial coolant
			5,80	9,60	16,60	20,10	32,10				
Integral expanding reamers	2431	12	√	√	√	√	√	√		√	
	2441	11	√	√	√	√	√		√	√	
	3610	8	√	√	√	√	√	√			√
	3620	7	√	√	√	√	√		√		√
	2201	13	√	√	√					√	
	2206	13	√	√	√					√	
Integral expanding reamers for high feeds	3617	10	√	√	√	√	√	√			√
	3627	9	√	√	√	√	√		√		√

CODE DESCRIPTION

A Series:

3620	Straight flutes - Short series
2441	Straight flutes - Short series
2201	Straight flutes -Short series
2206	Helical flutes - Short series
3610	Straight flutes -Long series
2431	Straight flutes -Long series
3627	Helical flutes - Short series
3617	Helical flutes - Long series

B Cutting material and coating:

Code	Description
KL	Carbide cutting edges K05
KN	Carbide cutting edges K05 - N coated
KC	Carbide cutting edges K05 - C coated
KA	Carbide cutting edges K05 - A coated
KK	Carbide cutting edges K05 - K coated
KH	Carbide cutting edges K05 - H coated
KR	Carbide cutting edges K05 - R coated
KT	Carbide cutting edges K05 - T coated
KD	Carbide cutting edges K05 - D coated
SV	Cermet cutting edges P10
SN	Cermet cutting edges P10 - N coated
SC	Cermet cutting edges P10 - C coated
SA	Cermet cutting edges P10 - A coated
SK	Cermet cutting edges P10 - K coated
SH	Cermet cutting edges P10 - H coated
SR	Cermet cutting edges P10 - R coated
ST	Cermet cutting edges P10 - T coated

N.B. Carbide K10 and Cermet P20 are supplied on request

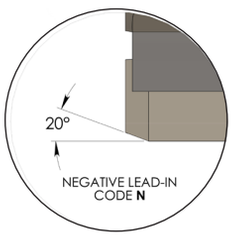
C Lead-in

D Optional request:

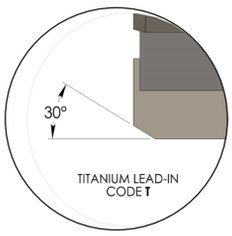
Z= oversized tapering
H= half circular face
K= chipbreaker

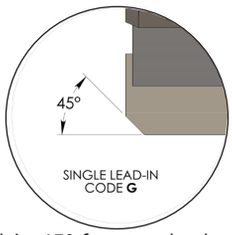
E Diameter and tolerance

LEAD-IN FOR STRAIGHT FLUTES

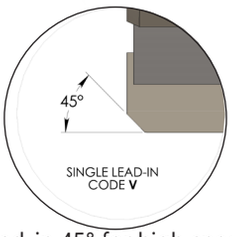


Ideal for through holes

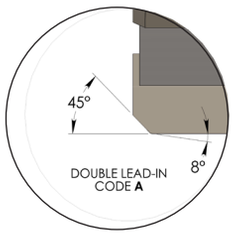


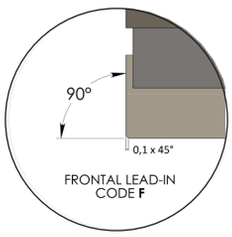


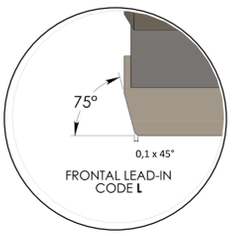
Lead-in 45° for standard speed

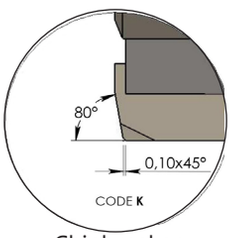


Lead-in 45° for high speed



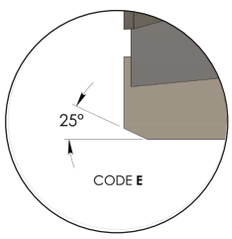


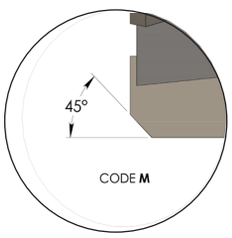




Chipbreaker

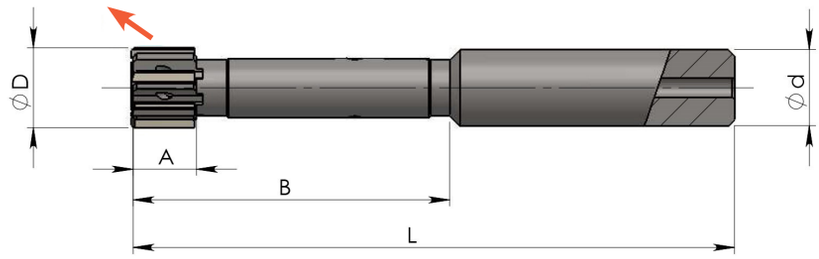
LEAD-IN FOR HELICAL FLUTES



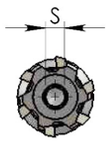


Series 3620
(for through holes)

- Radial through tool coolant
- Cylindrical Shank
- Short Series



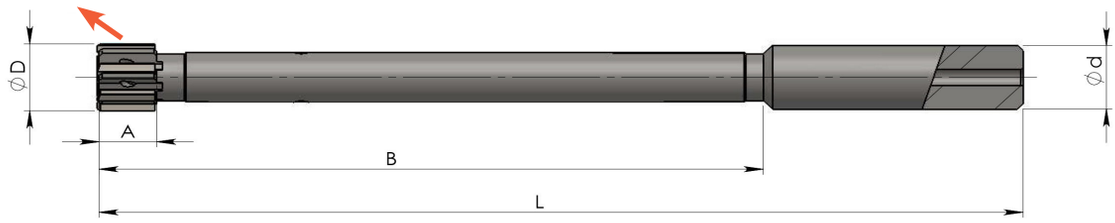
Hexagon socket



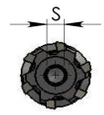
RANGE mm	B mm	A mm	L mm	Ø d^{h7} mm	N. of teeth	S
5,80 - 6,60	40	8	78	12	4	1,5
6,61 - 7,60	40	8	78	12	4	2
7,61 - 8,60	40	10	78	12	4	2,5
8,61 - 9,60	50	10	88	12	4	2,5
9,61 - 10,60	50	10	95	12	6	3
10,61 - 11,60	50	10	95	12	6	3
11,61 - 12,60	50	10	95	12	6	3
12,61 - 13,60	50	10	95	12	6	4
13,61 - 14,60	50	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	16	135	25	6	6
27,11 - 28,10	75	16	135	25	6	8
28,11 - 29,10	75	16	135	25	6	8
29,11 - 30,10	75	16	135	25	6	8
30,11 - 31,10	75	16	135	25	6	8
31,11 - 32,10	75	16	135	25	6	8

Series 3610
(for through holes)

- Radial through tool coolant
- Cylindrical Shank
- Long Series



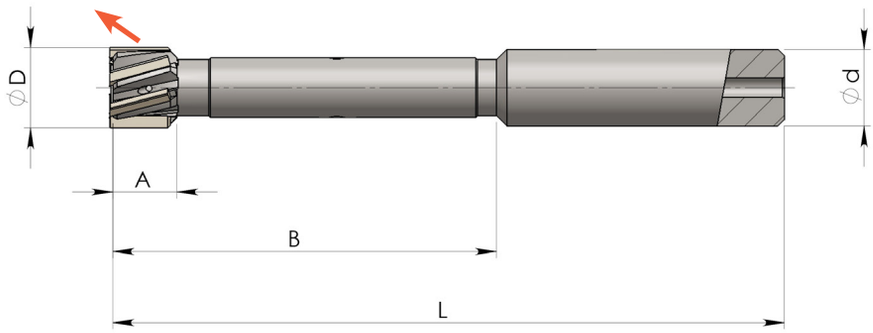
Hexagon socket

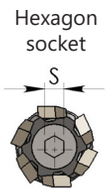


RANGE mm	B mm	A mm	L mm	Ø d^{h7} mm	N. of teeth	S
5,80 - 6,60	85	8	123	12	4	1,5
6,61 - 7,60	85	8	123	12	4	2
7,61 - 8,60	85	10	123	12	4	2,5
8,61 - 9,60	85	10	123	12	4	2,5
9,61 - 10,60	115	10	160	12	6	3
10,61 - 11,60	115	10	160	12	6	3
11,61 - 12,60	115	10	160	12	6	3
12,61 - 13,60	115	10	160	12	6	4
13,61 - 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	16	210	25	6	6
27,11 - 28,10	150	16	210	25	6	8
28,11 - 29,10	150	16	210	25	6	8
29,11 - 30,10	150	16	210	25	6	8
30,11 - 31,10	150	16	210	25	6	8
31,11 - 32,10	150	16	210	25	6	8

Series 3627
(for through holes)

- Radial through tool coolant
- Left hand helical flutes
- Cylindrical Shank
- Short Series

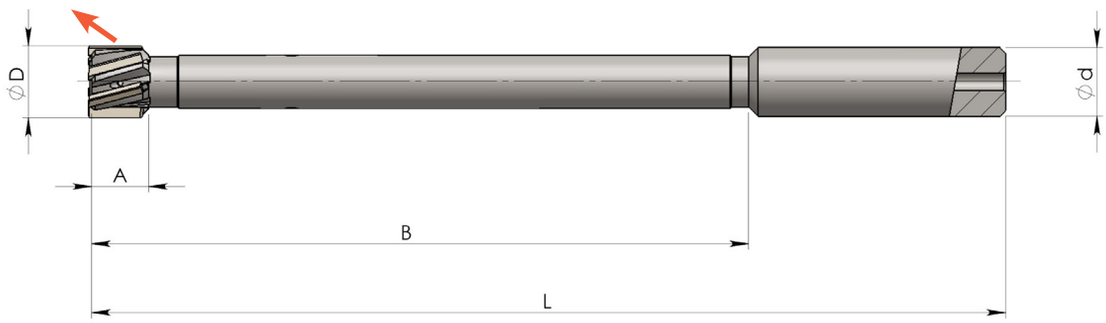


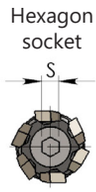


RANGE mm	B mm	A mm	L mm	Ø d^{h7} mm	N. of teeth	S
5,80 - 6,60	40	8	80	12	4	1,5
6,61 - 7,60	40	8	80	12	4	2
7,61 - 8,60	40	10	80	12	4	2,5
8,61 - 9,60	50	10	90	12	4	2,5
9,61 - 10,60	50	10	95	12	6	3
10,61 - 11,60	60	10	105	12	6	3
11,61 - 12,60	60	10	105	12	6	3
12,61 - 13,60	60	10	105	12	6	4
13,61 - 14,60	70	10	115	12	6	4
14,61 - 15,60	70	10	115	12	6	4
15,61 - 16,60	80	10	130	16	6	4
16,61 - 17,60	80	10	130	16	6	5
17,61 - 18,60	90	12	140	16	6	5
18,61 - 19,10	90	12	150	20	6	5
19,11 - 20,10	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	16	170	25	6	6
27,11 - 28,10	110	16	170	25	6	8
28,11 - 29,10	110	16	170	25	6	8
29,11 - 30,10	110	16	170	25	6	8
30,11 - 31,10	110	16	170	25	6	8
31,11 - 32,10	110	16	170	25	6	8

Series 3617
(for through holes)

- Radial through tool coolant
- Left hand helical flutes
- Cylindrical Shank
- Long Series

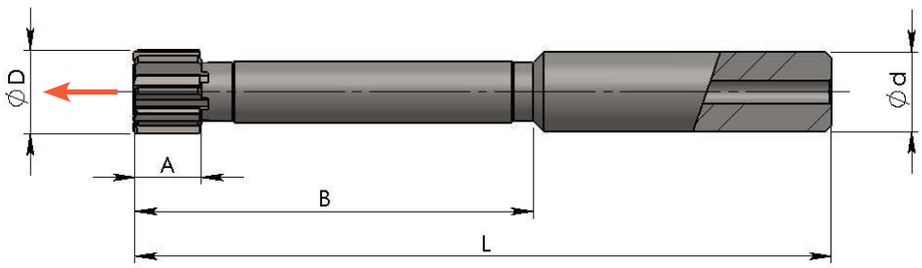




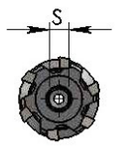
RANGE mm	B mm	A mm	L mm	Ø d^{h7} mm	N. of teeth	S
5,80 - 6,60	85	8	123	12	4	1,5
6,61 - 7,60	85	8	123	12	4	2
7,61 - 8,60	85	10	123	12	4	2,5
8,61 - 9,60	85	10	123	12	4	2,5
9,61 - 10,60	115	10	160	12	6	3
10,61 - 11,60	115	10	160	12	6	3
11,61 - 12,60	115	10	160	12	6	3
12,61 - 13,60	115	10	160	12	6	4
13,61 - 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	16	210	25	6	6
27,11 - 28,10	150	16	210	25	6	8
28,11 - 29,10	150	16	210	25	6	8
29,11 - 30,10	150	16	210	25	6	8
30,11 - 31,10	150	16	210	25	6	8
31,11 - 32,10	150	16	210	25	6	8

Series 2441
(for blind holes)

- Axial through tool coolant
- Cylindrical Shank
- Short Series



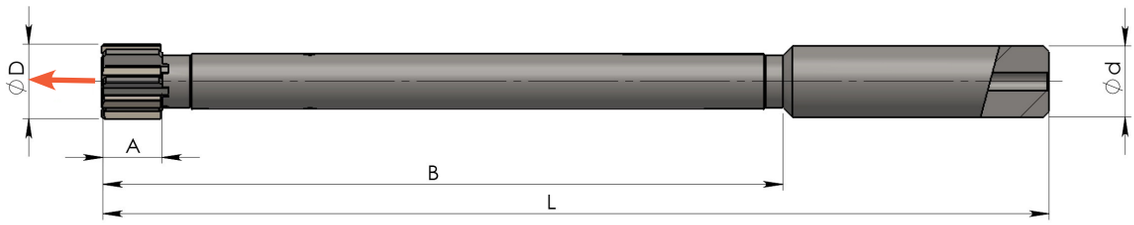
Hexagon socket

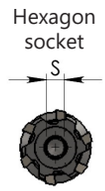


RANGE mm	B mm	A mm	L mm	Ø d^{h7} mm	N. of teeth	S
5,80 - 6,60	40	8	80	12	4	1,5
6,61 - 7,60	40	8	80	12	4	2
7,61 - 8,60	40	10	80	12	4	2,5
8,61 - 9,60	50	10	90	12	4	2,5
9,61 - 10,60	50	10	95	12	6	3
10,61 - 11,60	60	10	105	12	6	3
11,61 - 12,60	60	10	105	12	6	3
12,61 - 13,60	60	10	105	12	6	4
13,61 - 14,60	70	10	115	12	6	4
14,61 - 15,60	70	10	115	12	6	4
15,61 - 16,60	80	10	130	16	6	4
16,61 - 17,60	80	10	130	16	6	5
17,61 - 18,60	90	12	140	16	6	5
18,61 - 19,10	90	12	150	20	6	5
19,11 - 20,10	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	16	170	25	6	6
27,11 - 28,10	110	16	170	25	6	8
28,11 - 29,10	110	16	170	25	6	8
29,11 - 30,10	110	16	170	25	6	8
30,11 - 31,10	110	16	170	25	6	8
31,11 - 32,10	110	16	170	25	6	8

Series 2431
(for blind holes)

- Axial through tool coolant
- Cylindrical Shank
- Long Series

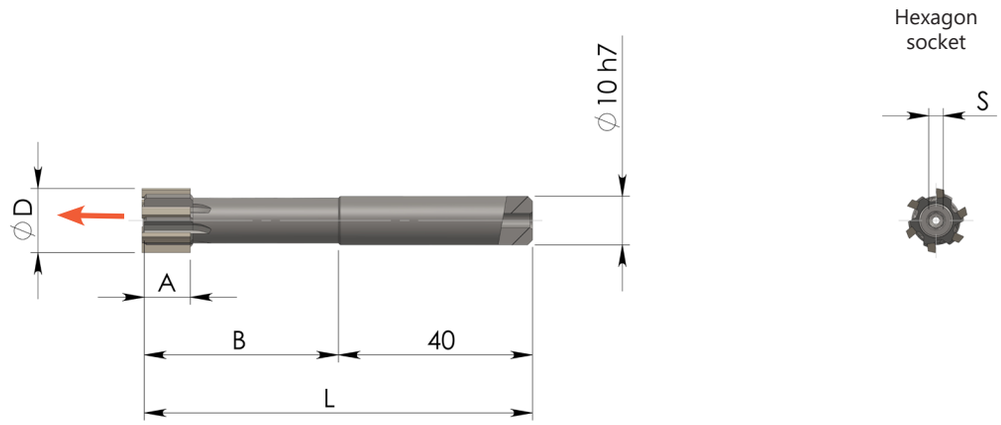




RANGE mm	B mm	A mm	L mm	Ø d^{h7} mm	N. of teeth	S
5,80 - 6,60	85	8	123	12	4	1,5
6,61 - 7,60	85	8	123	12	4	2
7,61 - 8,60	85	10	123	12	4	2,5
8,61 - 9,60	85	10	123	12	4	2,5
9,61 - 10,60	115	10	160	12	6	3
10,61 - 11,60	115	10	160	12	6	3
11,61 - 12,60	115	10	160	12	6	3
12,61 - 13,60	115	10	160	12	6	4
13,61 - 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	16	210	25	6	6
27,11 - 28,10	150	16	210	25	6	8
28,11 - 29,10	150	16	210	25	6	8
29,11 - 30,10	150	16	210	25	6	8
30,11 - 31,10	150	16	210	25	6	8
31,11 - 32,10	150	16	210	25	6	8

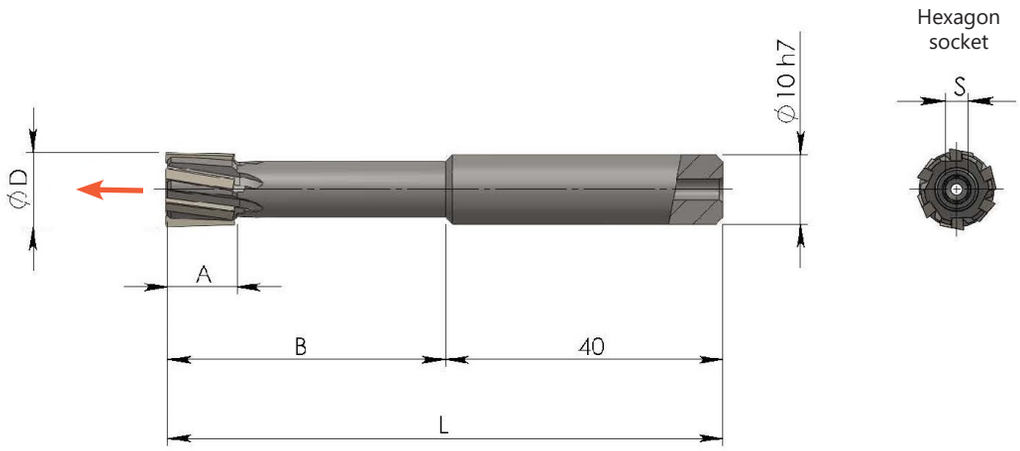
Series 2201
(for blind holes)

- Axial through tool coolant
- Cylindrical Shank
- Short Series
- Only for “Sliding head lathe”



Series 2206
(for blind holes)

- Axial through tool coolant
- Cylindrical Shank
- Short Series
- Only for “Sliding head lathe”



RANGE mm	B mm	A mm	L mm	N. of teeth	S
5,80 - 6,60	25	8	65	4	1,5
6,61 - 7,60	25	8	65	4	2
7,61 - 8,60	40	10	80	4	2,5
8,61 - 9,60	40	10	80	4	2,5
9,61 - 10,60	40	10	80	6	3
10,61 - 11,60	40	10	80	6	3
11,61 - 12,60	40	10	80	6	3
12,61 - 13,60	40	10	80	6	4
13,61 - 14,60	40	10	80	6	4
14,61 - 15,60	40	10	80	6	4
15,61 - 16,60	40	10	80	6	4

- Throw away until Ø 7,60 mm - for bigger diameters rebrazed one time
- Carbide K or Cermet S
- Order minimum 2 pcs (for the new tools)
- Delivered in 2/4 weeks (new and rebrazed ones)

WORKING PARAMETERS

MATERIAL TO WORK	MATERIAL EXAMPLE	ALLOY COATING SPEED	THROUGH HOLE	INTERRUPTED THROUGH HOLE	BLIND HOLE	INTERRUPTED BLIND HOLE
Unalloyed	ST37 ST52	Cermet Uncoated Speed= 150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Low alloyed	C40 C55	Cermet Uncoated Speed= 140 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Structural steel	41CrMo4 100Cr6	Cermet Uncoated Speed= 100÷130 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Fused Metal	H13 X6CrMo4	Cermet Uncoated Speed= 70÷80 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Austenitics stainless steel	AISI 304 L AISI 316 L	Cermet Uncoated Speed= 50÷60 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
Martensitic stainless steel	AISI 416 AISI 430	Cermet Uncoated Speed= 40÷50 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
ADI cast iron	ADI 800 ADI 1000	Carbide H coated Speed=80÷100 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Spheroidal cast iron	GS 400÷700	Cermet K coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Grey cast iron	GG25 GG30	Carbide H coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Alluminium <3% SI	6061 7075	Carbide Uncoated Speed=30÷60 m/min	E-G lead-in otherwise N-M-A lead-in	M-G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in
Alluminium >7% SI	ALSI 12	PCD Uncoated Speed=100÷1000 m/min	G lead-in	G lead-in	G lead-in otherwise F lead-in	G-F lead-in
Copper	EN2.1182 CW004A	Carbide Uncoated Speed=150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in otherwise N lead-in
Bronze	CuSn12	Carbide D coated Speed=80÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Leaded Brass	CuZn39Pb3	Carbide Uncoated Speed=30÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Brass without lead	CW724R	Carbide D coated Speed=80÷120 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Titanium	Ti-6Al-4V	Carbide Uncoated Speed=10÷20 m/min	T lead-in	T lead-in	F-T lead-in	F-T lead-in
Heat Resistant Alloys	Inconel 718 Hastelloy	Carbide K coated Speed=15÷20 m/min	G lead-in	G lead-in	G-F lead-in	G-F lead-in

STOCK ALLOWANCE

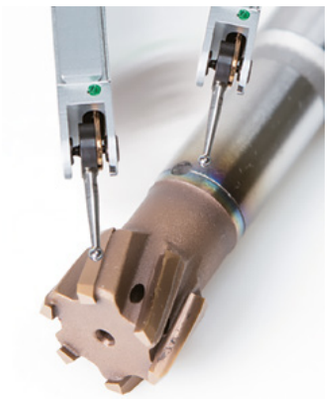
DIAMETER (mm)	STOCK ALLOWANCE ON DIAMETER (mm)
5,80÷17,60	0,10÷0,15
17,61÷21,60	0,10÷0,20
21,61÷32,60	0,10÷0,30

FEED Fz (mm/teeth)

NUMBER OF TEETH	4	6		
LEAD IN	Ø 5,80÷9,60	Ø 9,61÷16,60	Ø16,61÷22,10	Ø22,11÷32,10
A	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18
G	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18
E	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,09÷0,22	Fz=0,10÷0,27
M	Fz=0,06÷0,15	Fz=0,09÷0,20	Fz=0,06÷0,15	Fz=0,07÷0,18
N	Fz=0,06÷0,15	Fz=0,09÷0,20	Fz=0,09÷0,22	Fz=0,10÷0,27
T	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,10÷0,17	Fz=0,10÷0,17
F	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18

N.B. To work interrupted holes, the feed rate must be reduced by 50%.

ASSEMBLY INSTRUCTION



OPERATION 1 - For fixed reamers

Tools are supplied with the diameter corresponding to 2/3 of the required tolerance.
Check the concentricity at the end of the spindle on the machine.
The value have to be until 5 µm.

OPERATION 1 - For expanding reamers

All monobloc reamers are supplied to the requested diameter and set in the middle of the hole tolerance ready for use.

The adjustment can be made to compensate for wear to the cutting edges when the size reaches its lower tolerance.
The maximum expansion is about 1% of the diameter.

To recover the diameter use a screw and turn softly clockwise.

OPERATION 2

Do the measurement only on the two opposite cutting edges identified by the punching

OPERATION 3

Check the concentricity at the end of the spindle on the machine.
The value has to be until 5 µm.

EXPANDING MONOBLOC REAMERS
OLD SERIES - ONLY ON REQUEST

Please Note:

There are some series of reamers no more in the catalog but still available on request. They are supplied in 4/6 weeks from the receipt of the order and it is requested an order minimum of 3 pieces for each diameter.

MORE INFORMATION ARE AVAILABLE ON OUR WEBSITE.

	CODE	SERIES	SHANK	HOLE	COOLANT	Ø RANGE	TEETH
EXPANDING REAMERS	2420	short	cylindrical	through & blind	no	5,80÷20,10	straight
	2421	short	cylindrical	blind	axial	5,80÷20,10	straight
	2440	short	cylindrical	through & blind	no	5,80÷32,10	straight
	2430	long	cylindrical	through & blind	no	5,80÷32,10	straight
	2450	short	Morse Taper	through & blind	no	5,80÷32,10	straight
	3650	short	Morse Taper	through	radial	5,80÷32,10	straight
	2400	long	Morse Taper	through & blind	no	5,80÷32,10	straight
	3600	long	Morse Taper	through	radial	5,80÷32,10	straight
FIXED REAMERS	1610	long	cylindrical	through	radial	9,60÷32,10	helical flutes
	161W	long	Morse Taper	through	radial	9,60÷32,10	helical flutes
	1620	short	cylindrical	through	radial	9,60÷32,10	helical flutes
	162W	short	Morse Taper	through	radial	9,60÷32,10	helical flutes

SERIES 5000

DIAMETER RANGE: 9,61 ÷ 32,60 mm

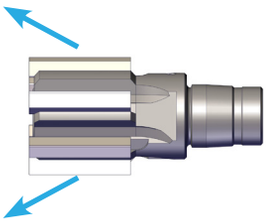
SHANK: Cylindrical / Composit

SUBSTRATE: Carbide / Cermet / PCD / CBN
Coated or uncoated

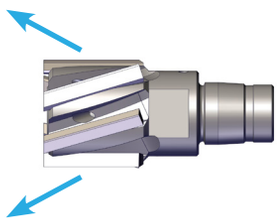
COOLANT: Radial through coolant (through holes)
Axial through coolant (blind holes)

GEOMETRY: Straight flutes / Helical flutes

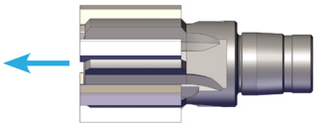
BENEFITS:
- Easy to use
- Ready to use, presetted diameter
- Expanding heads only
- Throw away heads



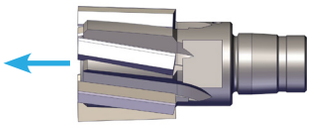
SERIES 5400:
Straight flutes
Radial coolant



SERIES 5700:
Left hand helical flutes
Radial coolant



SERIES 5401:
Straight flutes
Axial coolant



SERIES 5600:
Right hand helical flutes
Axial coolant

CODE DESCRIPTION

A Series:

5400	Straight flutes with radial coolant
5401	Straight flutes with axial coolant
5600	Right hand helical flutes with axial coolant
5700	Left hand helical flutes with radial coolant

B Cutting material and coating:

Code	Description
KL	Carbide cutting edges
KN	Carbide cutting edges - N coated
KC	Carbide cutting edges - C coated
KA	Carbide cutting edges - A coated
KK	Carbide cutting edges - K coated
KH	Carbide cutting edges - H coated
KR	Carbide cutting edges - R coated
KT	Carbide cutting edges - T coated
KD	Carbide cutting edges - D coated
SV	Cermet cutting edges
SN	Cermet cutting edges - N coated
SC	Cermet cutting edges - C coated
SA	Cermet cutting edges - A coated
SK	Cermet cutting edges - K coated
SH	Cermet cutting edges - H coated
SR	Cermet cutting edges - R coated
ST	Cermet cutting edges - T coated

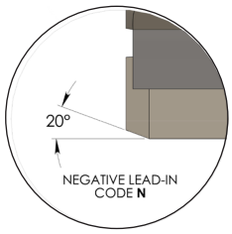
C Lead-in

D Optional request:

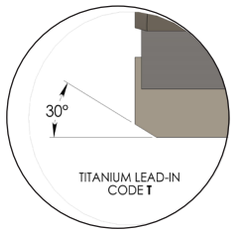
Z= oversized tapering
H= half circular face
K= chipbreaker

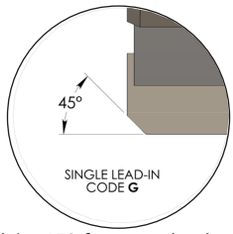
E Diameter and tolerance

LEAD-IN FOR STRAIGHT FLUTES

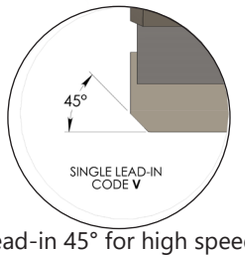


Ideal for through holes

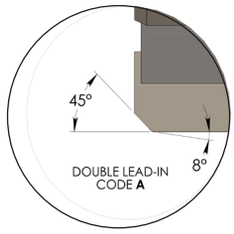


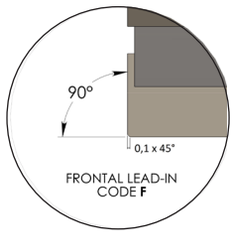


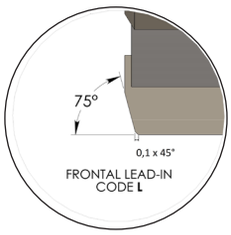
Lead-in 45° for standard speed

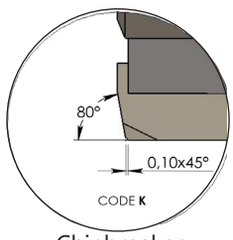


Lead-in 45° for high speed



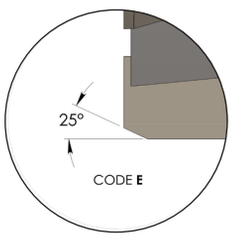


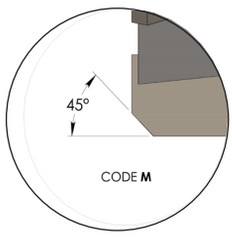




Chipbreaker

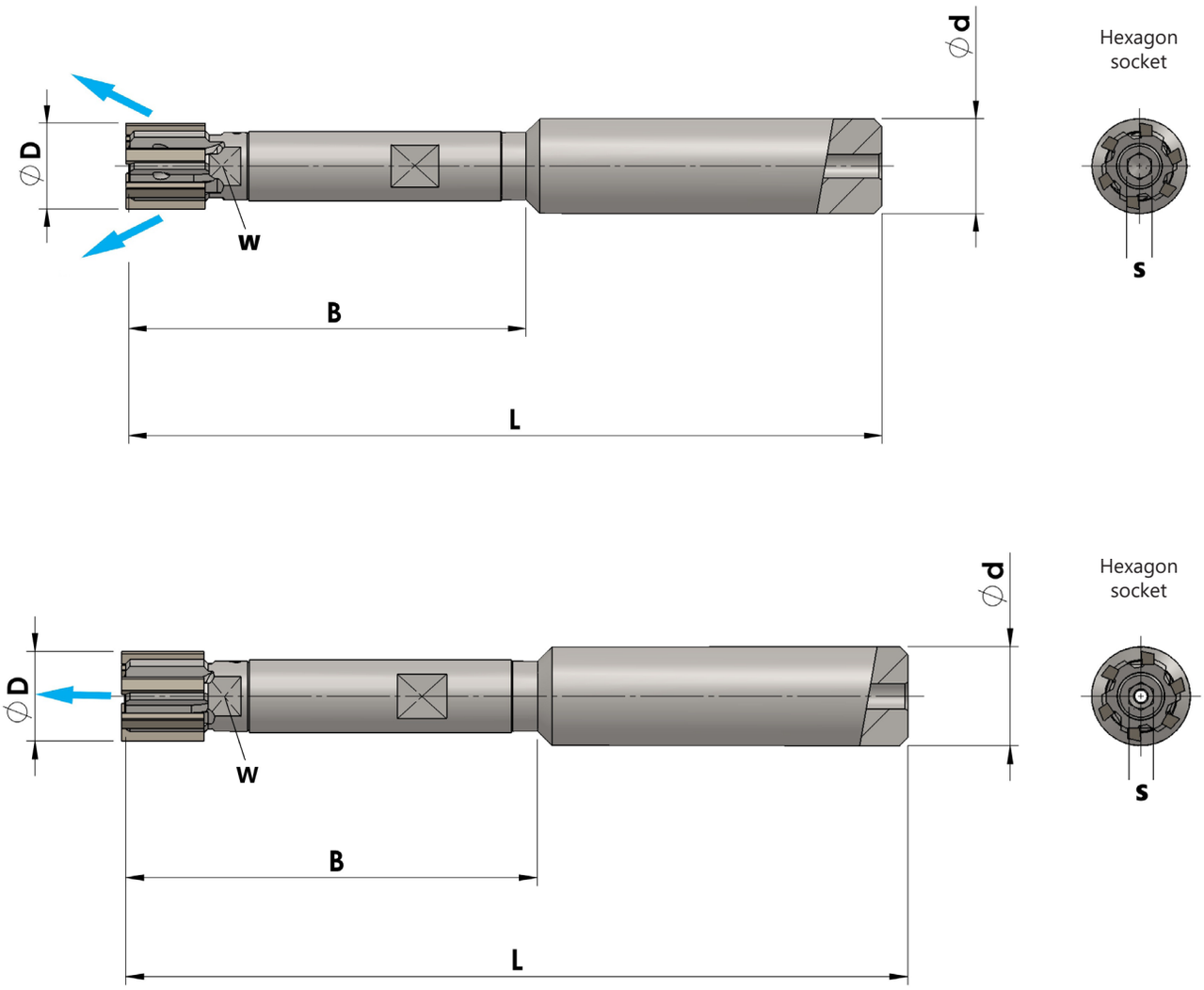
LEAD-IN FOR HELICAL FLUTES





Head Mandrel 5000-MC

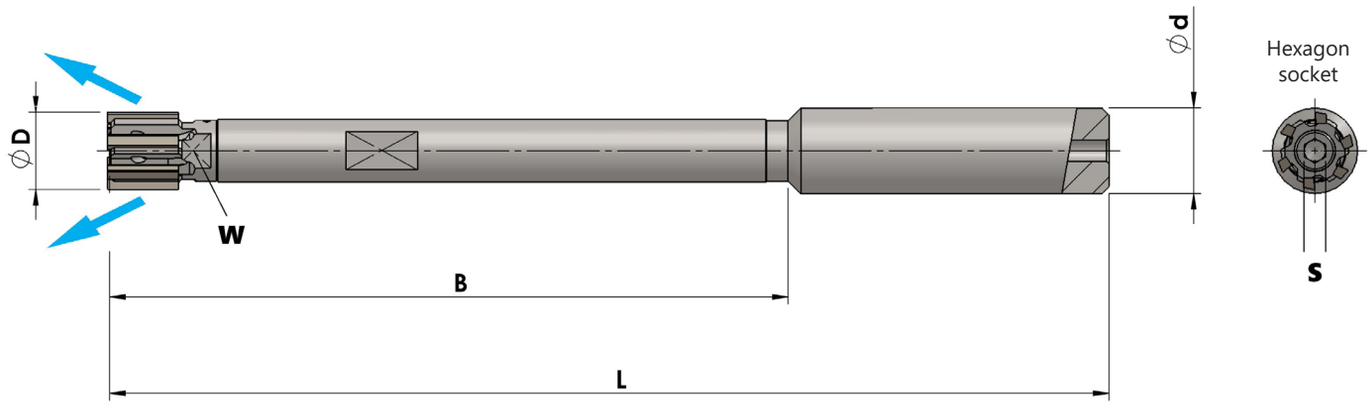
- Cylindrical Shank - SHORT SERIES
- For through holes with radial tool coolant
- For blind holes with axial tool coolant

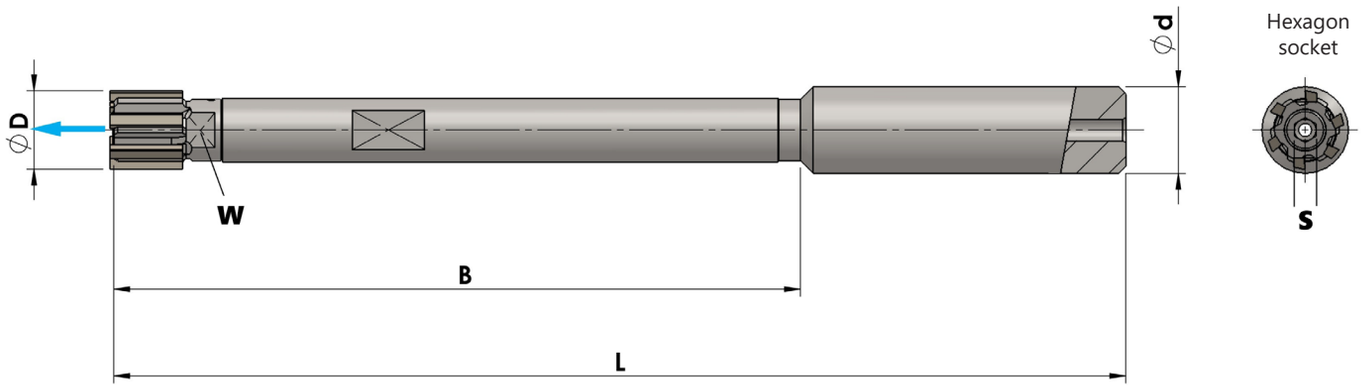


MANDREL CODE	Ø D (mm)	B (mm)	L (mm)	Ød h6 (mm)	W	S (mm)
5000-MC-001	9,60÷11,60	50	95	12	5000-CH-007	3
5000-MC-002	11,61÷14,60	50	95	12	5000-CH-008	3,5
5000-MC-003	14,61÷17,60	65	113	16	5000-CH-010	4
5000-MC-004	17,61÷21,60	75	125	20	5000-CH-012	5
5000-MC-005	21,61÷26,60	85	135	20	5000-CH-015	6
5000-MC-006	26,61÷32,60	105	161	25	5000-CH-019	8

Head Mandrel 5000-ML

- Cylindrical Shank - LONG SERIES
- For through holes with radial tool coolant
- For blind holes with axial tool coolant

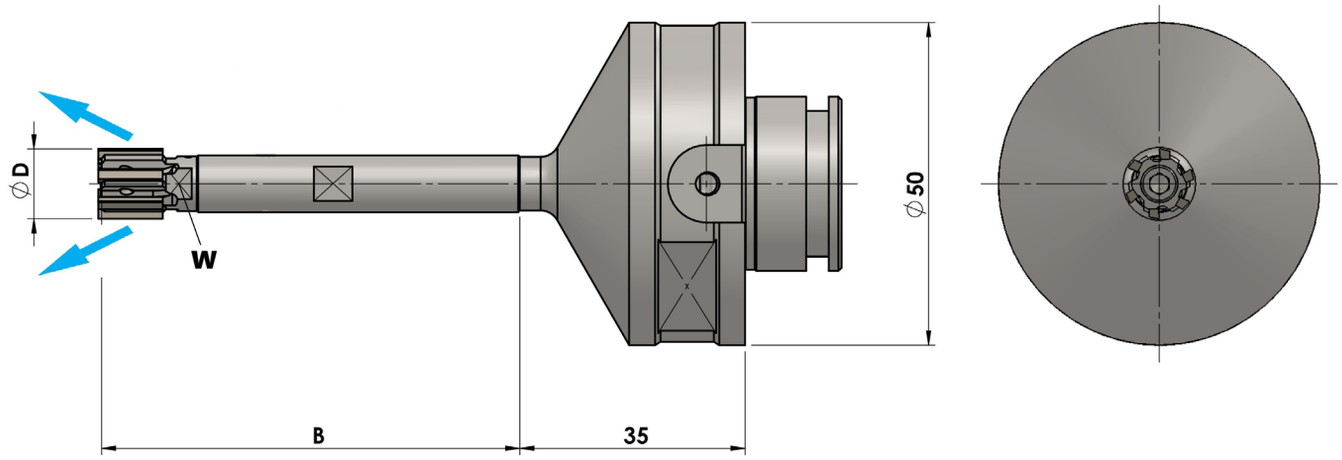


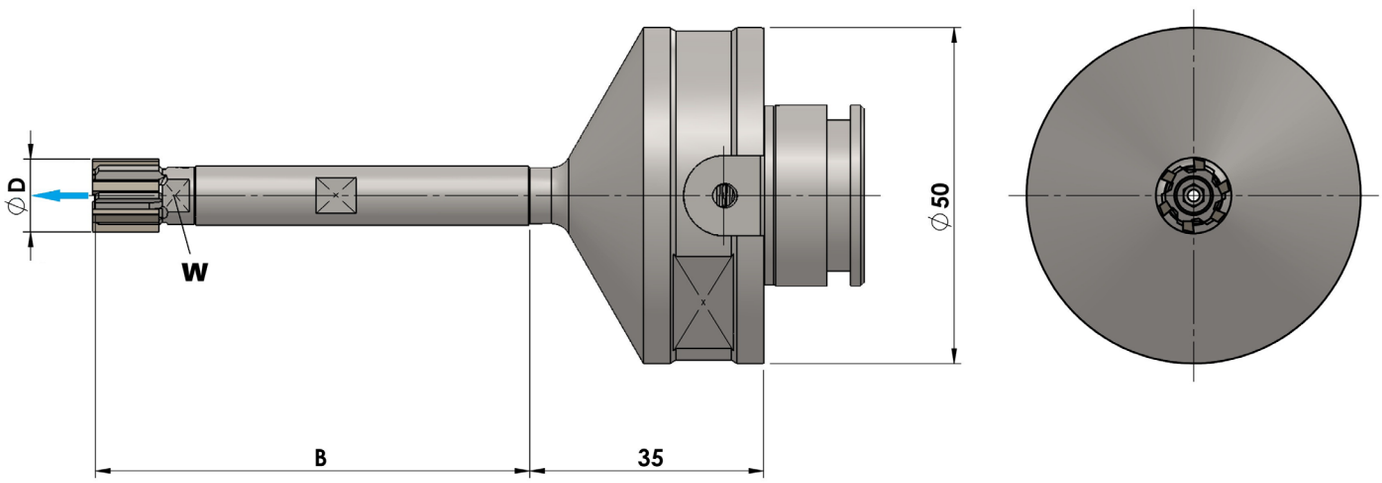


MANDREL CODE	Ø D (mm)	B (mm)	L (mm)	Ød h6 (mm)	W	S (mm)
5000-ML-001	9,60÷11,60	95	140	12	5000-CH-007	3
5000-ML-002	11,61÷14,60	95	140	12	5000-CH-008	3,5
5000-ML-003	14,61÷17,60	105	153	16	5000-CH-010	4
5000-ML-004	17,61÷21,60	125	175	20	5000-CH-012	5
5000-ML-005	21,61÷26,60	145	195	20	5000-CH-015	6
5000-ML-006	26,61÷32,60	165	221	25	5000-CH-019	8

Head Mandrel 5000-MM

- Modular Shank
- For through holes with radial tool coolant
- For blind holes with axial tool coolant





MANDREL CODE	Ø D (mm)	B (mm)	W
5000-MM-001	9,60÷11,60	65	5000-CH-007
5000-MM-002	11,61÷14,60	65	5000-CH-008
5000-MM-003	14,61÷17,60	80	5000-CH-010
5000-MM-004	17,61÷21,60	100	5000-CH-012
5000-MM-005	21,61÷26,60	110	5000-CH-015
5000-MM-006	26,61÷32,60	120	5000-CH-019

WORKING PARAMETERS

MATERIAL TO WORK	MATERIAL EXAMPLE	ALLOY COATING SPEED	THROUGH HOLE	INTERRUPTED THROUGH HOLE	BLIND HOLE	INTERRUPTED BLIND HOLE
Unalloyed	ST37 ST52	Cermet Uncoated Speed= 150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Low alloyed	C40 C55	Cermet Uncoated Speed= 140 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Structural steel	41CrMo4 100Cr6	Cermet Uncoated Speed= 100÷130 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Fused Metal	H13 X6CrMo4	Cermet Uncoated Speed= 70÷80 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Austenitics stainless steel	AISI 304 L AISI 316 L	Cermet Uncoated Speed= 50÷60 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
Martensitic stainless steel	AISI 416 AISI 430	Cermet Uncoated Speed= 40÷50 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
ADI cast iron	ADI 800 ADI 1000	Carbide H coated Speed=80÷100 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Spheroidal cast iron	GS 400÷700	Cermet K coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Grey cast iron	GG25 GG30	Carbide H coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Alluminium <3% SI	6061 7075	Carbide Uncoated Speed=30÷60 m/min	E-G lead-in otherwise N-M-A lead-in	M-G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in
Alluminium >7% SI	ALSI 12	PCD Uncoated Speed=100÷1000 m/min	G lead-in	G lead-in	G lead-in otherwise F lead-in	G-F lead-in
Copper	EN2.1182 CW004A	Carbide Uncoated Speed=150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in otherwise N lead-in
Bronze	CuSn12	Carbide D coated Speed=80÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Leaded Brass	CuZn39Pb3	Carbide Uncoated Speed=30÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Brass without lead	CW724R	Carbide D coated Speed=80÷120 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Titanium	Ti-6Al-4V	Carbide Uncoated Speed=10÷20 m/min	T lead-in	T lead-in	F-T lead-in	F-T lead-in
Heat Resistant Alloys	Inconel 718 Hastelloy	Carbide K coated Speed=15÷20 m/min	G lead-in	G lead-in	G-F lead-in	G-F lead-in

STOCK ALLOWANCE

DIAMETER (mm)	STOCK ALLOWANCE ON DIAMETER (mm)
9,60÷17,60	0,10÷0,15
17,61÷21,60	0,10÷0,20
21,61÷32,60	0,10÷0,30

FEED Fz (mm/teeth)

NUMBER OF TEETH	6		
LEAD IN	Ø 9,61÷16,60	Ø16,61÷22,10	Ø22,11÷32,60
A	Fz=0,06÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18
G	Fz=0,06÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18
E	Fz=0,06÷0,13	Fz=0,09÷0,22	Fz=0,10÷0,27
M	Fz=0,09÷0,20	Fz=0,06÷0,15	Fz=0,07÷0,18
N	Fz=0,09÷0,20	Fz=0,09÷0,22	Fz=0,10÷0,27
T	Fz=0,05÷0,13	Fz=0,10÷0,17	Fz=0,10÷0,27
F	Fz=0,06÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18

N.B. To work interrupted holes, the feed rate must be reduced by 50%.

ASSEMBLY INSTRUCTION

OPERATION 1

Clean the mating surfaces thoroughly.
Insert the head into the mandrel and screw it in by hand in a clockwise direction

OPERATION 2

Close with the key until the flat surface of the head interface is completely in contact with the mandrel.

OPERATION 3

To compensate for wear during use by acting on the front expansion screw.
Take care to hold the head still with the fixed wrech
(this operation is not shown in the figure).

SERIES 6000

DIAMETER RANGE: 32,61 ÷ 100,60 mm - available
100,61 ÷ 150,00 mm - on request

COOLANT: Radial through coolant (through holes)
Axial through coolant (blind holes)

SHANK: Modular system only

GEOMETRY: Straight flutes / Helical flutes

SUBSTRATE: Carbide / Cermet / PCD / CBN
Coated or uncoated

BENEFITS:
- Easy to use
- Ready to use, presetted diameter
- Expanding heads only

CODE DESCRIPTION

A Series:

6400	Straight flutes with radial coolant
6401	Straight flutes with axial coolant
6700	Left hand helical flutes with radial coolant

B Cutting material and coating:

Code	Description
KL	Carbide cutting edges K05
KI	Carbide cutting edges K05 - I coated
KK	Carbide cutting edges K05 - K coated
KR	Carbide cutting edges K05 - R coated
SV	Cermet cutting edges P10
SK	Cermet cutting edges P10 - K coated
SR	Cermet cutting edges P10 - R coated

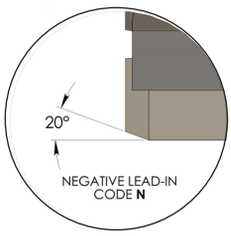
C Lead-in

D Optional request:

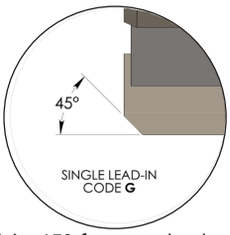
Z= oversized tapering
H= half circular face

E Diameter and tolerance

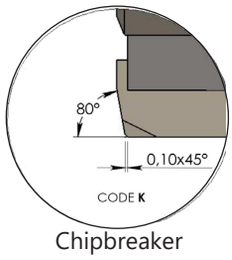
LEAD-IN FOR STRAIGHT FLUTES



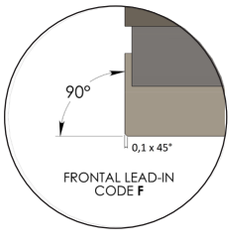
Ideal for through holes



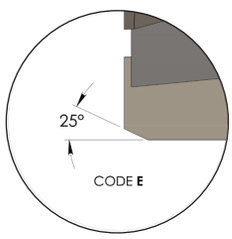
Lead-in 45° for standard speed

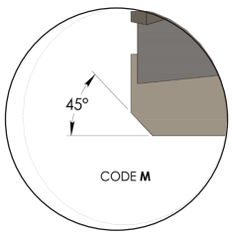


Chipbreaker

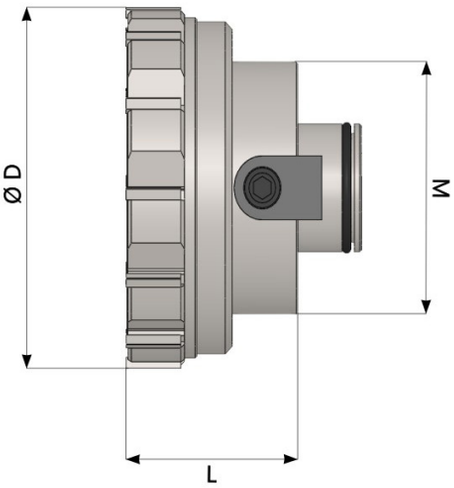


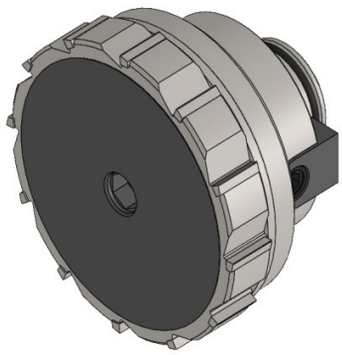
LEAD-IN FOR HELICAL FLUTES



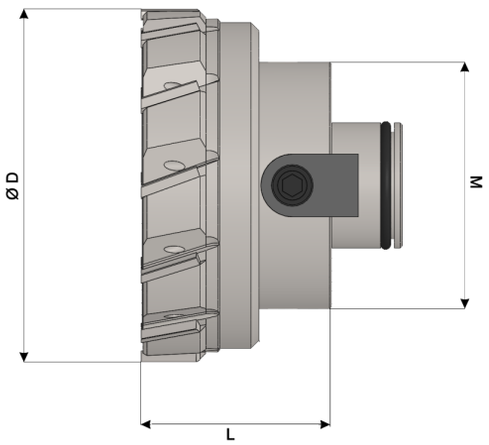


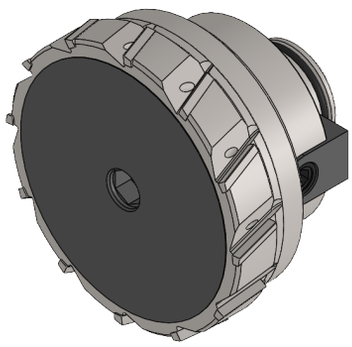
Series
6400 - 6401
(for through and blind holes)





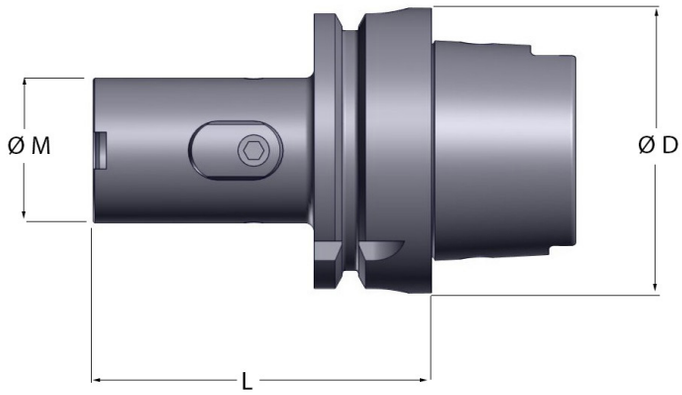
Series
6700
(for through holes)





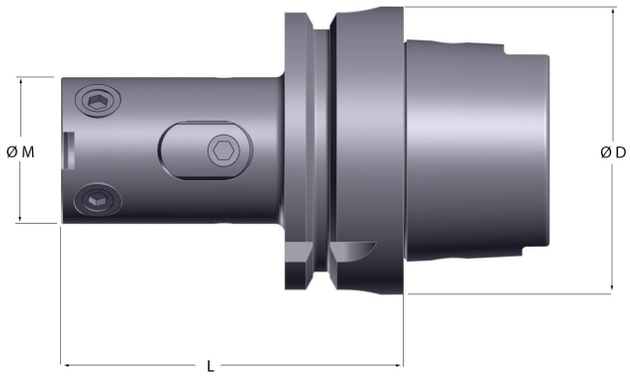
RANGE	MODULAR	CUTTING EDGES	LENGTH
32,61÷37,60	M24A	8	38 mm
37,61÷45,60	M32A	8	38 mm
45,61÷56,60	M40A	10	42 mm
56,61÷68,60	M50	10	46 mm
68,61÷79,60	M63	10	48 mm
79,61÷100,60	M63	12	48 mm

HSK-A DIN 69893/1
Modular with lateral clamping



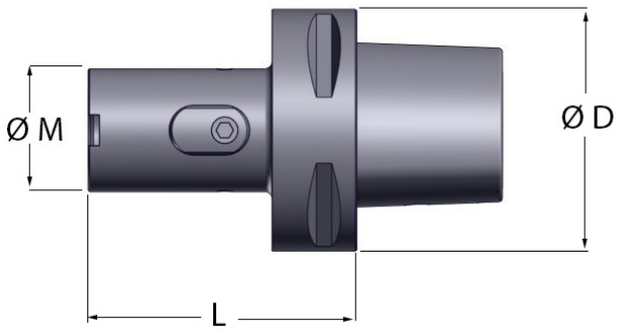
CODE	D	L	M
HSK-A.63.M24A.75	63	75	26
HSK-A.63.M32A.75	63	75	32
HSK-A.63.M40A.75	63	75	40
HSK-A.63.M50A.70	63	70	50
HSK-A.63.M63A.75	63	75	63

HSK-A DIN 69893/1
Modular with lateral clamping & radial adjustement



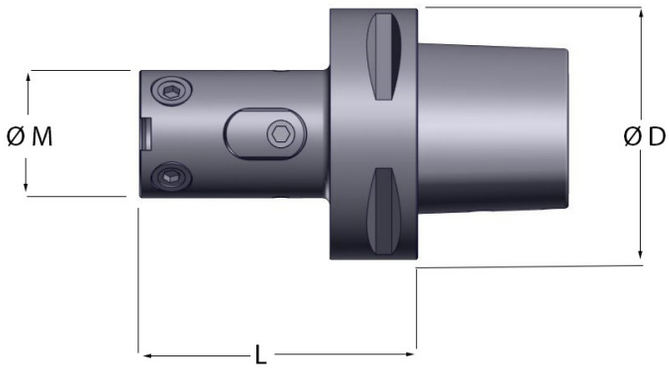
CODE	D	L	M
HSK-A.63.M24AR.75	63	75	26
HSK-A.63.M32AR.75	63	75	32
HSK-A.63.M40AR.75	63	75	40
HSK-A.63.50L.70	63	70	50
HSK-A.63.63L.75	63	75	63

POLYGONAL MODULAR SHANK (ISO26623-1) with lateral clamping



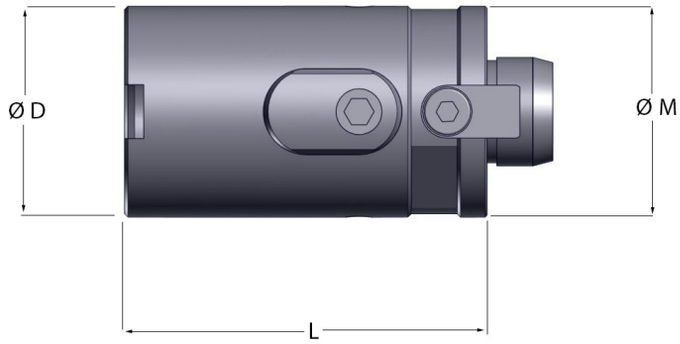
CODE	D	L	M
PSC63.M24A.70	63	70	26
PSC63.M32A.70	63	70	32
PSC63.M40A.70	63	70	40
PSC63.M50A.70	63	70	50
PSC63.M63A.70	63	70	63

POLYGONAL MODULAR SHANK (ISO26623-1) with lateral clamping & radial adjustement



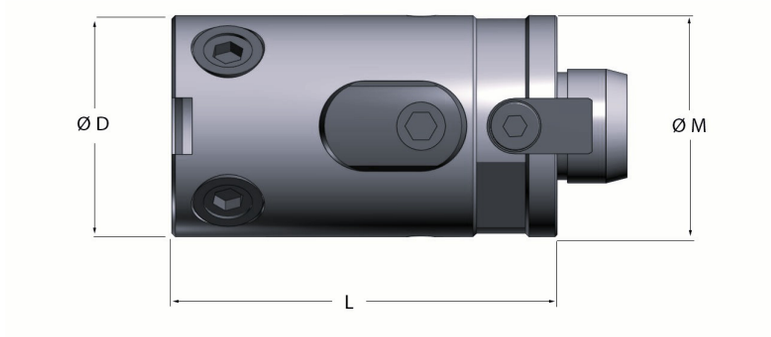
CODE	D	L	M
PSC63.M24AR.70	63	70	26
PSC63.M32AR.70	63	70	32
PSC63.M40AR.70	63	70	40
PSC63.50L.70	63	70	50
PSC63.63L.70	63	70	63

MODULAR ADAPTERS
with lateral clamping



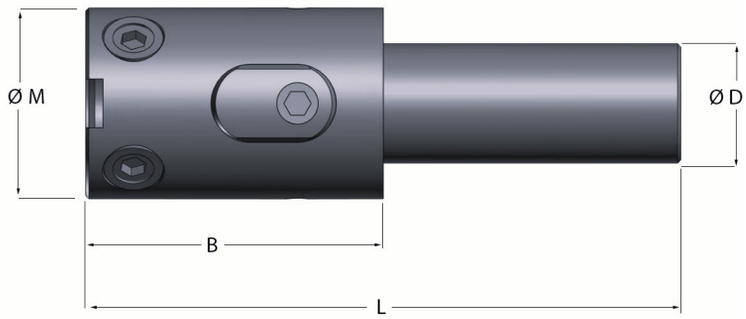
CODE	D	L	M
10.24.M24A.50	26	50	24
10.32.M32A.55	32	55	32
10.40.M40A.60	40	60	40

MODULAR ADAPTERS
with lateral clamping & radial adjustement



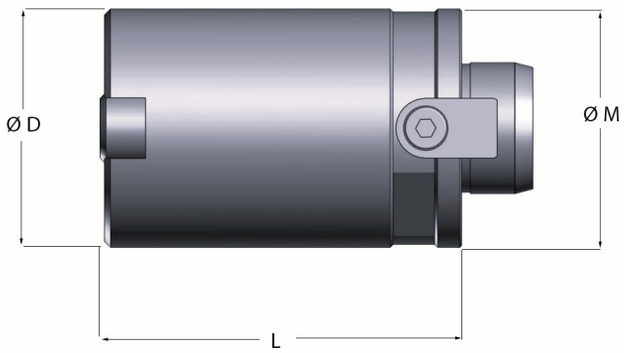
CODE	D	L	M
10.24.M24AR.50	26	50	24
10.32M32AR.55	32	55	32
10.40.M40AR.60	40	60	40
10.50.50L.60	50	60	50
10.63.63L.80	63	80	63

ADJUSTING CYLINDRICAL BASIC SHANK
(FLAT ON REQUEST)



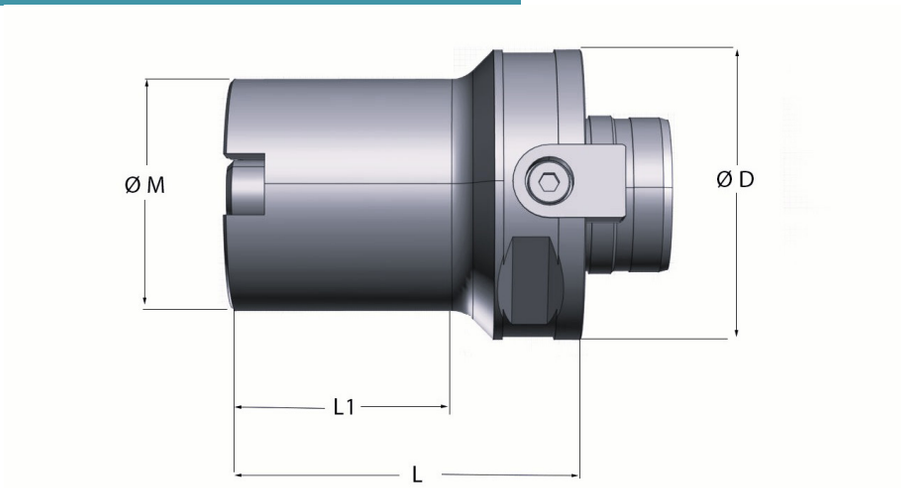
CODE	D	B	L	M
15.C16.M24AR.50	16	50	98	26
15.C20.M32AR.50	20	50	100	32
15.C25.M40AR.50	25	50	110	40
15.C32.M50L.50	32	50	120	50
15.C40.M63L.50	40	50	120	63

MODULAR EXTENSION



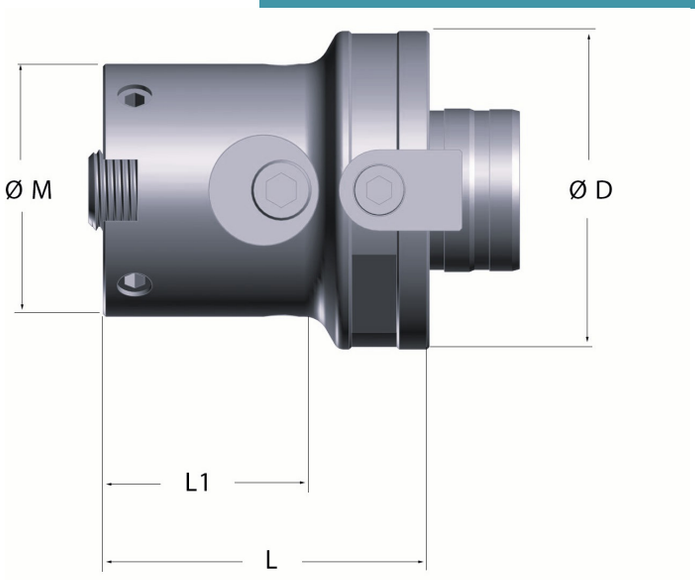
CODE	D	L	M
10.24.24.80	24	80	24
10.32.32.120	32	120	32
10.32.32.50	32	50	32
10.32.32.80	32	80	32
10.40.40.120	40	120	40
10.40.40.90	40	90	40
10.50.50.60	50	60	50
10.50.50.100	50	100	50
10.63.63.80	63	80	63
10.63.63.120	63	120	63

MODULAR REDUCTIONS



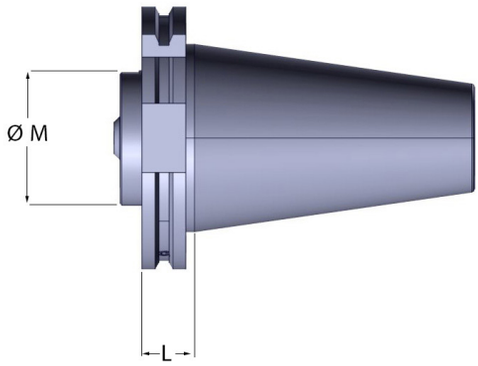
CODE	D	L	M	L1
15.50.24.50	50	50	24	27
15.50.32.60	50	60	32	35
15.50.40.60	50	60	40	40
15.63.40.60	63	60	40	35
15.63.50.60	63	60	50	31.5

ADJUSTABLE MODULAR REDUCTIONS



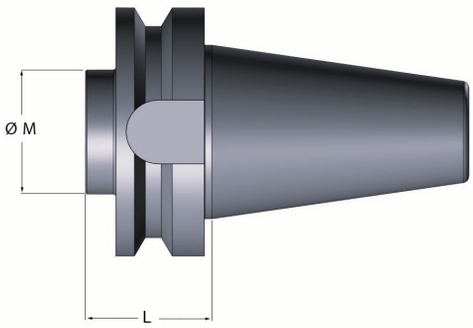
CODE	D	L	M	L1
15.63.50L.65	63	65	50	43

BASIC SHANKS DIN 69871/1 B+A



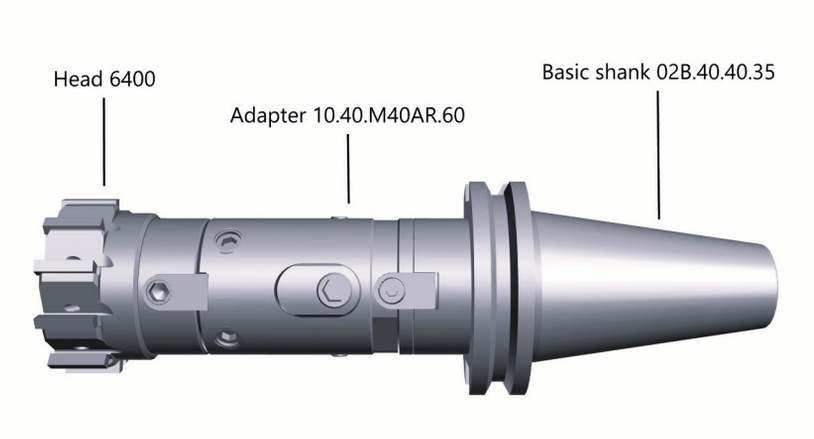
CODE	L	M	ISO
02B.40.24.35	35	24	40
02B.40.32.35	35	32	40
02B.40.40.35	35	40	40
02B.40.50.27	27	50	40
02B.40.50.50	50	50	40
02B.40.63.50	50	63	40
02B.50.50.27	27	50	50
02B.50.50.50	50	50	50
02B.50.63.27	27	63	50
02B.50.63.50	50	63	50

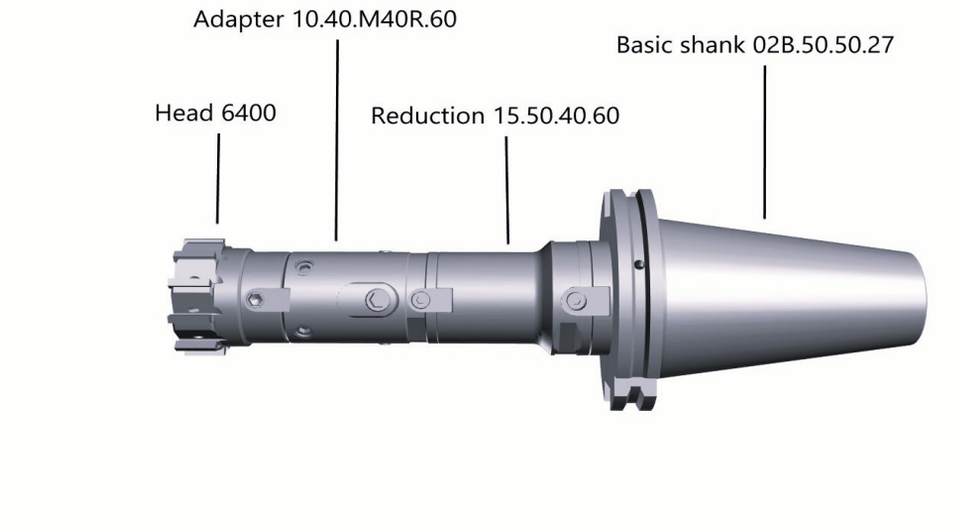
BASIC SHANKS JMTBA MAS-403 BT B+BT

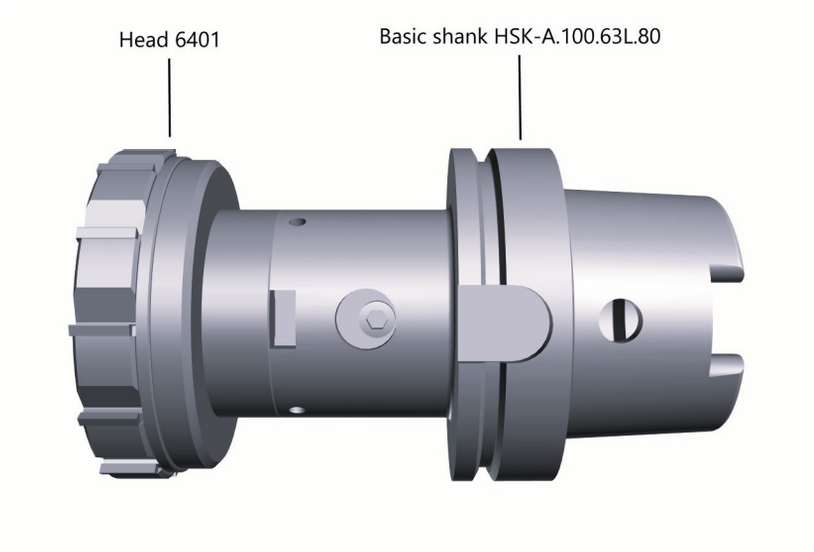


CODE	L	M	ISO
BTB.40.24.35	24	35	40
BTB.40.32.35	32	35	40
BTB.40.40.35	40	35	40
BTB.40.50.50	50	50	40
BTB.40.63.50	63	50	40
BTB.50.50.50	50	50	50
BTB.50.63.50	63	50	50

ASSEMBLY EXAMPLES







WORKING PARAMETERS

MATERIAL TO WORK	MATERIAL EXAMPLE	ALLOY COATING SPEED	THROUGH HOLE	INTERRUPTED THROUGH HOLE	BLIND HOLE	INTERRUPTED BLIND HOLE
Unalloyed	ST37 ST52	Cermet Uncoated Speed= 150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Low alloyed	C40 C55	Cermet Uncoated Speed= 140 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Structural steel	41CrMo4 100Cr6	Cermet Uncoated Speed= 100÷130 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Fused Metal	H13 X6CrMo4	Cermet Uncoated Speed= 70÷80 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Austenitics stainless steel	AISI 304 L AISI 316 L	Cermet Uncoated Speed= 50÷60 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
Martensitic stainless steel	AISI 416 AISI 430	Cermet Uncoated Speed= 40÷50 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
ADI cast iron	ADI 800 ADI 1000	Hard Metal H coated Speed=80÷100 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Spheroidal cast iron	GS 400÷700	Cermet K coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Grey cast iron	GG25 GG30	Hard Metal H coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Alluminium <3% SI	6061 7075	Hard Metal Uncoated Speed=30÷60 m/min	E-G lead-in otherwise N-M-A lead-in	M-G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in
Alluminium >7% SI	ALSI 12	PCD Uncoated Speed=100÷1000 m/min	G lead-in	G lead-in	G lead-in otherwise F lead-in	G-F lead-in
Copper	EN2.1182 CW004A	Hard Metal Uncoated Speed=150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in otherwise N lead-in
Bronze	CuSn12	Hard Metal D coated Speed=80÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Leaded Brass	CuZn39Pb3	Hard Metal Uncoated Speed=30÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Brass without lead	CW724R	Hard Metal D coated Speed=80÷120 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Titanium	Ti-6Al-4V	Hard Metal Uncoated Speed=10÷20 m/min	T lead-in	T lead-in	F-T lead-in	F-T lead-in
Heat Resistant Alloys	Inconel 718 Hastelloy	Hard Metal K coated Speed=15÷20 m/min	G lead-in	G lead-in	G-F lead-in	G-F lead-in

STOCK ALLOWANCE

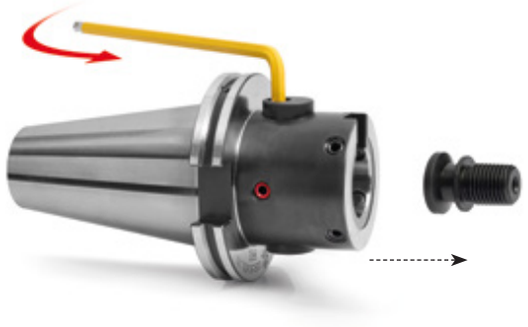
DIAMETER (mm)	STOCK ALLOWANCE ON DIAMETER (mm)
32,61÷56,60	0,10÷0,30
56,61÷100,60	0,15÷0,35

FEED Fz (mm/teeth)

NUMBER OF TEETH	8	10	12
LEAD IN	Ø 32,60÷45,60	Ø45,61÷79,60	Ø79,61÷100,60
A	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,15
G	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,15
E	Fz=0,06÷0,15	Fz=0,09÷0,20	Fz=0,09÷0,22
M	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,15
N	Fz=0,06÷0,15	Fz=0,09÷0,20	Fz=0,09÷0,22
T	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,10÷0,17
F	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,15

N.B. To work interrupted holes, the feed rate must be reduced by 50%.

ASSEMBLY INSTRUCTION



OPERATION 1

Open the locking cylinders and remove the tie rod

OPERATION 2

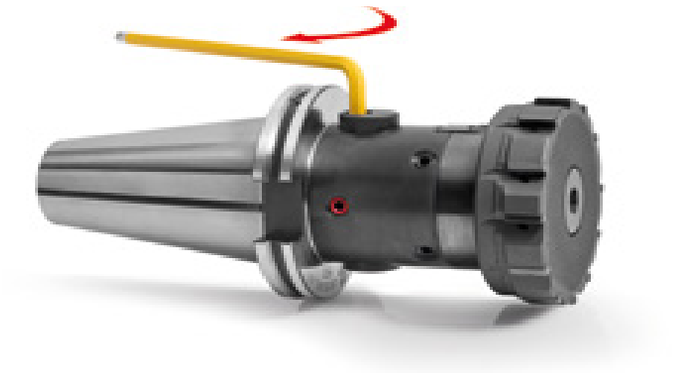
Insert the tie rod into the head and screw

OPERATION 3

Loosen the 4 radial adjustment screws

OPERATION 4

Insert the head with the tie rod into the mandrel



OPERATION 5

Close the locking cylinders until they come into contact with the tie rod.

OPERATION 6

Center the head within 0.01 mm by acting on the 4 radial adjustment screws.

OPERATION 7

Close the locking cylinders completely.

OPERATION 8

Check in the machine that the concentricity on the head is within 0.01 mm.

OPERATION 9

Compensation for wear during use by acting on the front expansion screw.

SERIES 7000

The interchangeable heads

DIAMETER RANGE: 11,80 ÷ 80,60 mm

SERIES: Short / Long

SHANK: Cylindrical or Composit

BENEFITS:
- Heads are either fixed or expanding for improved the productivity
- Straight, left or right hand helical flutes making through or blind holes achievable

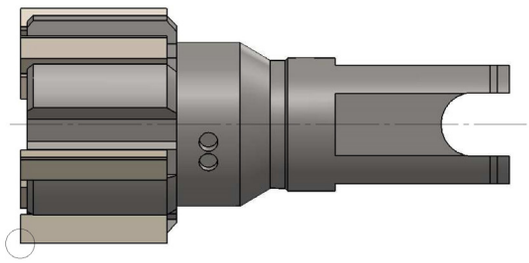
COOLANT: Radial through coolant (through holes)
Axial through coolant (blind holes)

GEOMETRY: Straight flutes / Helical flutes

SUBSTRATE: Carbide / Cermet / PCD / CBN
Coated or uncoated

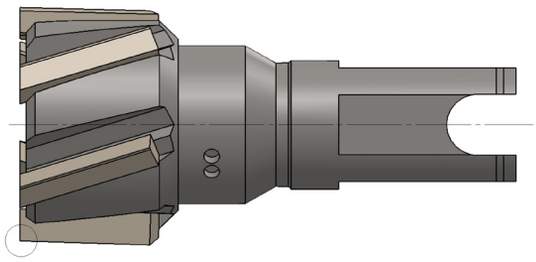
STRAIGHT FLUTES

Fixed Head Series 7400
&
Expanding Head Series 7405



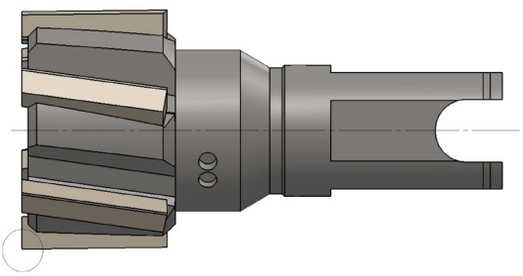
LEFT HAND HELICAL FLUTES

Fixed Head Series 7700
&
Expanding Head Series 7705



RIGHT HAND HELICAL FLUTES

Fixed Head Series 7600
&
Expanding Head Series 7605



SUMMARY	Series	Page	DIAMETERS mm			Long series	Short series	Axial coolant	Axial & Radial coolant
			11,80	60,60	80,60				
Fixed & Expanding heads	7000-MC	46	√	√	√		√		√
	7000-ML	48	√	√	√	√			√
	7000-MM	50	√	√	√		√		√
	7001-MC	46	√	√	√		√	√	
	7001-ML	48	√	√	√	√		√	
	7001-MM	50	√	√	√		√	√	

CODE DESCRIPTION

A Series:

7400	Fixed heads with straight flutes
7405	Expanding heads with straight flutes
7600	Fixed heads with right hand helical flutes
7605	Expanding heads with right hand helical flutes
7700	Fixed heads with left hand helical flutes
7705	Expanding heads with left hand helical flutes

B Cutting material and coating:

Code	Description
KL	Carbide cutting edges K05
KN	Carbide cutting edges K05 - N coated
KC	Carbide cutting edges K05 - C coated
KA	Carbide cutting edges K05 - A coated
KK	Carbide cutting edges K05 - K coated
KH	Carbide cutting edges K05 - H coated
KR	Carbide cutting edges K05 - R coated
KT	Carbide cutting edges K05 - T coated
KD	Carbide cutting edges K05 - D coated
SV	Cermet cutting edges P10
SN	Cermet cutting edges P10 - N coated
SC	Cermet cutting edges P10 - C coated
SA	Cermet cutting edges P10 - A coated
SK	Cermet cutting edges P10 - K coated
SH	Cermet cutting edges P10 - H coated
SR	Cermet cutting edges P10 - R coated
ST	Cermet cutting edges P10 - T coated

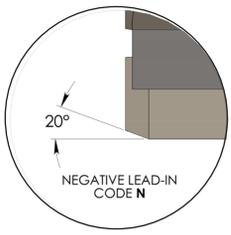
C Lead-in

D Optional request:

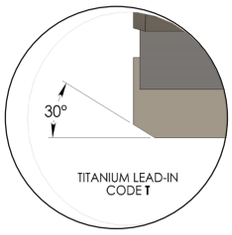
Z= oversized tapering
H= half circular face
K= chipbreaker

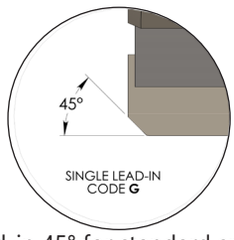
E Diameter and tolerance

LEAD-IN FOR STRAIGHT FLUTES

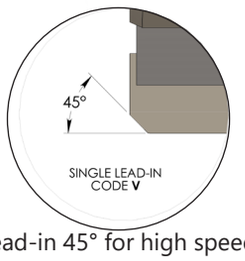


Ideal for through holes

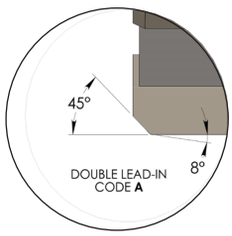


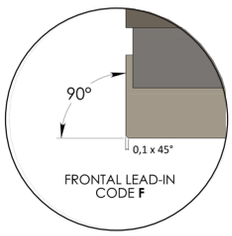


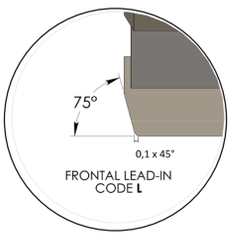
Lead-in 45° for standard speed

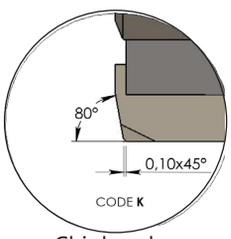


Lead-in 45° for high speed



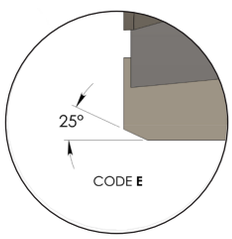


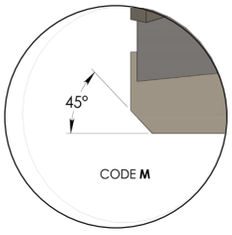




Chipbreaker

LEAD-IN FOR HELICAL FLUTES

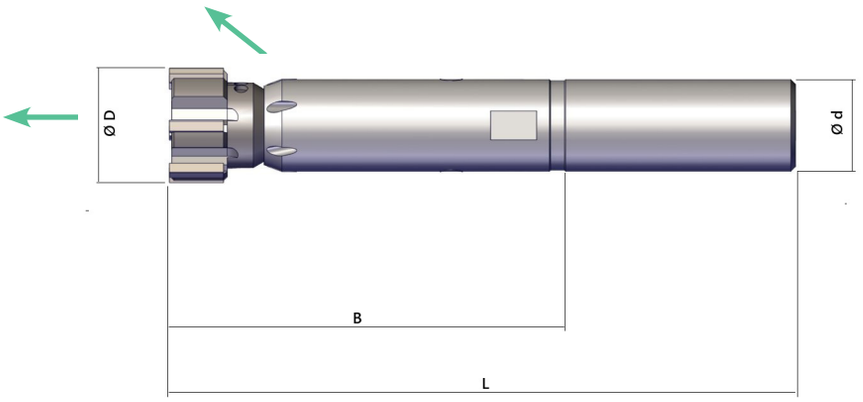


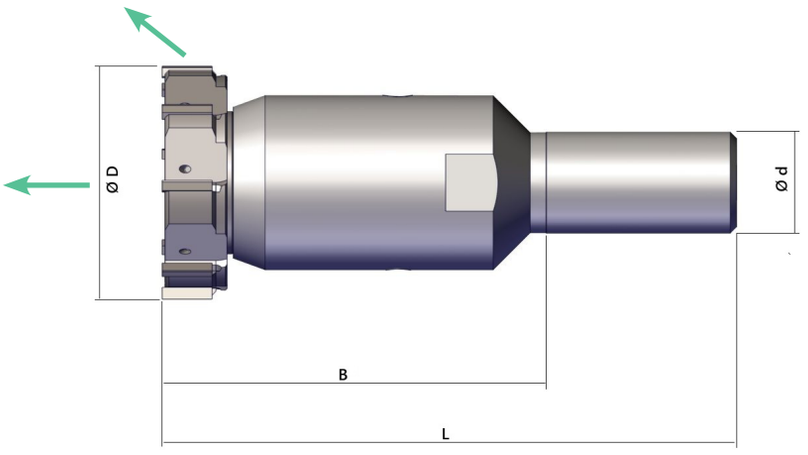


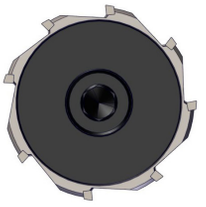
Head Mandrel 7000-MC

- Cylindrical Shank
- Short series
- Radial & axial tool coolant

Note:
- All mandrels are provided with radial through tool coolant
- For through hole reaming - order adjustment screw to suit through holes
- For blind hole reaming - order adjustment screw to suit blind holes. The drilled screw allows central through tool coolant



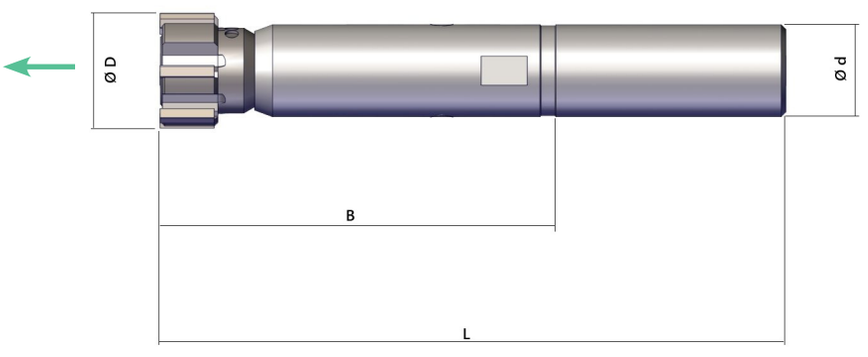




Head Mandrel 7001-MC

- Cylindrical Shank
- Short series
- Axial tool coolant

Note:
Mandrel 7001 fits only the locking screw for blind holes

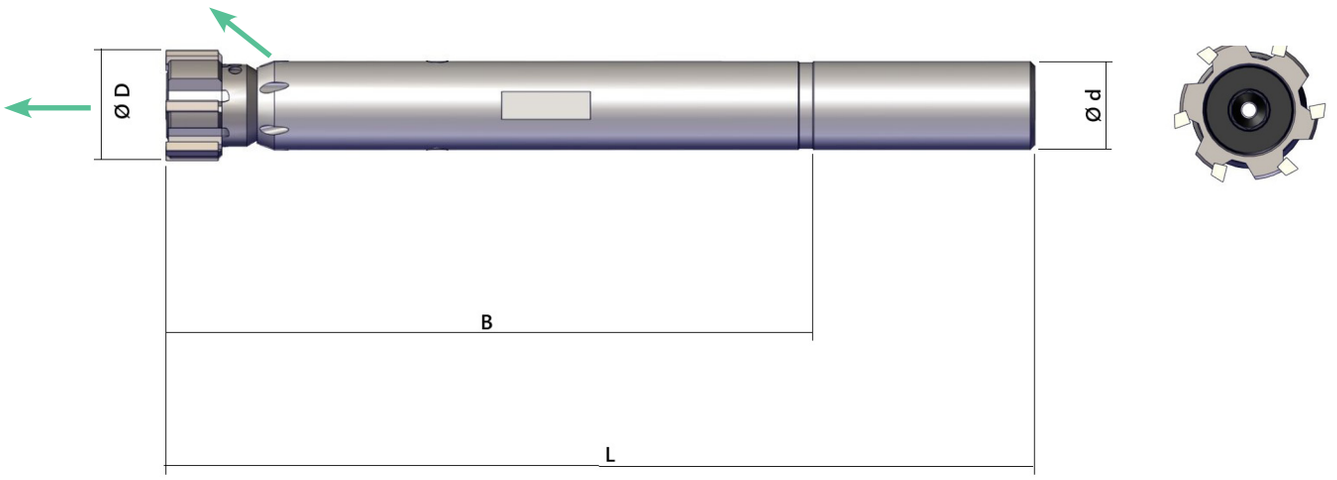


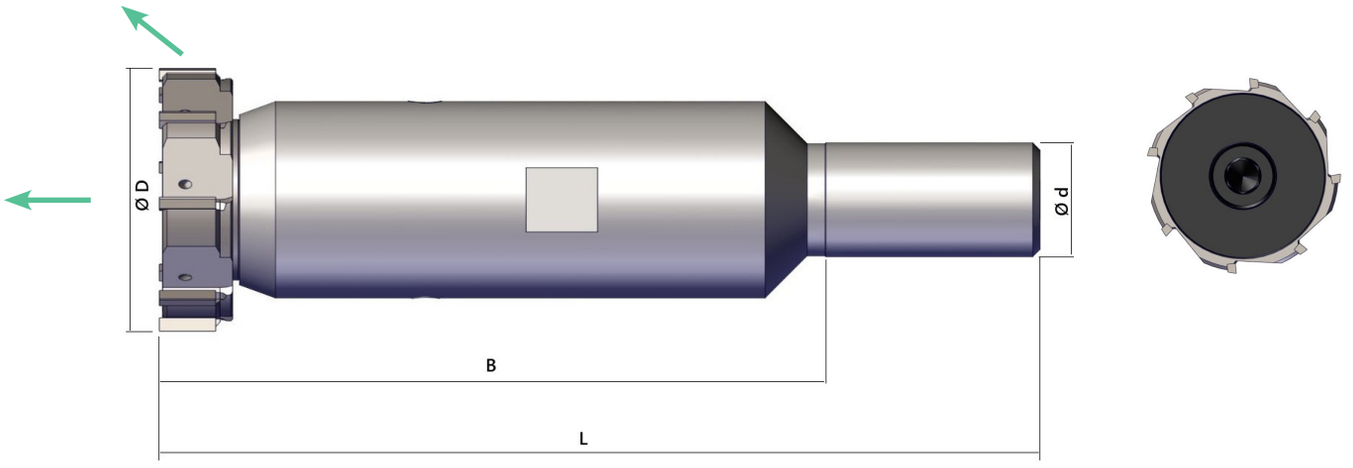
MANDREL CODE WITHOUT HEAD & SCREW	Ø D mm	B mm	L mm	Ø d^{h6} mm	LOCKING SCREW FIXED HEADS		WRENCH FIXED HEADS	LOCKING SCREW EXPANDING HEADS		WRENCH EXPANDING HEADS	NUMBER OF TEETH
					THROUGH HOLES	BLIND HOLES		THROUGH HOLES	BLIND HOLES		
7000-MC-001 7001-MC-001	11,80÷12,60 12,61÷13,60 13,61÷14,60	50	95	12	7000-VI-001	7001-VI-001	hex 2,5	7000-VI-012 7000-VI-013 7000-VI-014	7001-VI-012 7001-VI-013 7001-VI-014	hex 3,5	6 6 6
7000-MC-002 7001-MC-002	14,61÷15,60 15,61÷16,60 16,61÷17,60	65	113	16	7000-VI-002	7001-VI-002	hex 3	7000-VI-015 7000-VI-016 7000-VI-017	7001-VI-015 7001-VI-016 7001-VI-017	hex 4	6 6 6
7000-MC-003 7001-MC-003	17,61÷18,60 18,61÷19,60 19,61÷20,60 20,61÷21,60	75	125	20	7000-VI-003	7001-VI-003	hex 4	7000-VI-018 7000-VI-019 7000-VI-020 7000-VI-021	7001-VI-018 7001-VI-019 7001-VI-020 7001-VI-021	hex 5	6 6 6 6
7000-MC-004 7001-MC-004	21,61÷22,60 22,61÷23,60 23,61÷24,60 24,61÷25,60 25,61÷26,60	85	135	20	7000-VI-004	7001-VI-004	hex 5	7000-VI-022 7000-VI-023 7000-VI-024 7000-VI-025 7000-VI-026	7001-VI-022 7001-VI-023 7001-VI-024 7001-VI-025 7001-VI-026	hex 6	6 6 6 6 6
7000-MC-005 7001-MC-005	26,61÷27,60 27,61÷28,60 28,61÷29,60 29,61÷30,60 30,61÷31,60 31,61÷32,60	105	161	25	7000-VI-005	7001-VI-005	hex 6	7000-VI-027 7000-VI-028 7000-VI-029 7000-VI-030 7000-VI-031 7000-VI-032	7001-VI-027 7001-VI-028 7001-VI-029 7001-VI-030 7001-VI-031 7001-VI-032	hex 8	6 6 6 6 6 6
7000-MC-006 7001-MC-006	32,61÷33,60 33,61÷34,60 34,61÷35,60 35,61÷36,60 36,61÷37,60 37,61÷38,60 38,61÷39,60 39,61÷40,60	120	180	32	7000-VI-006	7001-VI-006	hex 6	7000-VI-033 7000-VI-034 7000-VI-035 7000-VI-036 7000-VI-037 7000-VI-038 7000-VI-039 7000-VI-040	7001-VI-033 7001-VI-034 7001-VI-035 7001-VI-036 7001-VI-037 7001-VI-038 7001-VI-039 7001-VI-040	hex 10	6 6 6 6 6 6 6 6
7000-MC-007 7001-MC-007	40,61÷41,60 41,61÷42,60 42,61÷43,60 43,61÷44,60 44,61÷45,60	120	180	32	7000-VI-007	7001-VI-007	hex 8	7000-VI-041 7000-VI-042 7000-VI-043 7000-VI-044 7000-VI-045	7001-VI-041 7001-VI-042 7001-VI-043 7001-VI-044 7001-VI-045	hex 12	6 6 6 6 6
7000-MC-075 7001-MC-075	45,61÷46,60 46,61÷47,60 47,61÷48,60 48,61÷49,60 49,61÷50,60	120	180	32	7000-VI-007	7001-VI-007	hex 8	7000-VI-046 7000-VI-047 7000-VI-048 7000-VI-049 7000-VI-050	7001-VI-046 7001-VI-047 7001-VI-048 7001-VI-049 7001-VI-050	hex 12	8 8 8 8 8
7000-MC-008 7001-MC-008	50,61÷51,60 51,61÷52,60 52,61÷53,60 53,61÷54,60 54,61÷55,60 55,61÷56,60 56,61÷57,60 57,61÷58,60 58,61÷59,60 59,61÷60,60	120	180	32	7000-VI-008	7001-VI-008	hex 10	7000-VI-051 7000-VI-052 7000-VI-053 7000-VI-054 7000-VI-055 7000-VI-056 7000-VI-057 7000-VI-058 7000-VI-059 7000-VI-060	7001-VI-051 7001-VI-052 7001-VI-053 7001-VI-054 7001-VI-055 7001-VI-056 7001-VI-057 7001-VI-058 7001-VI-059 7001-VI-060	hex 12	8 8 8 8 8 8 8 8 8 8
7000-MC-009	60,61÷61,60 61,61÷62,60 62,61÷63,60 63,61÷64,60 64,61÷65,60 65,61÷66,60 66,61÷67,60 67,61÷68,60 68,61÷69,60 69,61÷70,60 70,61÷71,60 71,61÷72,60 72,61÷73,60 73,61÷74,60 74,61÷75,60 75,61÷76,60 76,61÷77,60 77,61÷78,60 78,61÷79,60 79,61÷80,60	120	180	32	7000-VI-009	7001-VI-009	hex 12	7000-VA-061 7000-VA-062 7000-VA-063 7000-VA-064 7000-VA-065 7000-VA-066 7000-VA-067 7000-VA-068 7000-VA-069 7000-VA-070 7000-VA-071 7000-VA-072 7000-VA-073 7000-VA-074 7000-VA-075 7000-VA-076 7000-VA-077 7000-VA-078 7000-VA-079 7000-VA-080	7001-VA-061 7001-VA-062 7001-VA-063 7001-VA-064 7001-VA-065 7001-VA-066 7001-VA-067 7001-VA-068 7001-VA-069 7001-VA-070 7001-VA-071 7001-VA-072 7001-VA-073 7001-VA-074 7001-VA-075 7001-VA-076 7001-VA-077 7001-VA-078 7001-VA-079 7001-VA-080	-	8-10-12 8-10-12

Head Mandrel 7000-ML

- Cylindrical Shank
- Long series
- Radial & axial tool coolant

Note:
- All mandrels are provided with radial through tool coolant
- For through hole reaming - order adjustment screw to suit through holes
- For blind hole reaming - order adjustment screw to suit blind holes. The drilled screw allows central through tool coolant

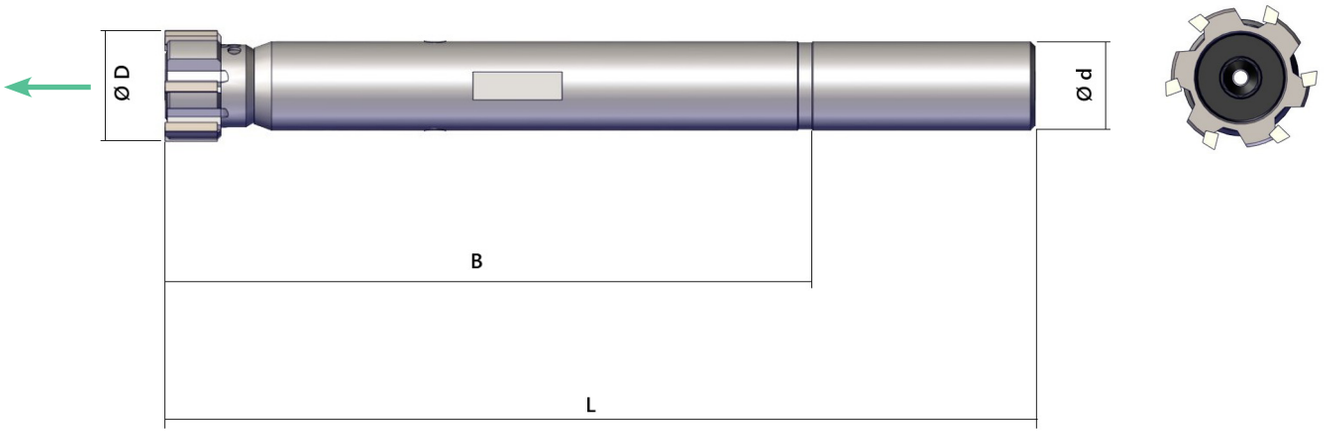




Head Mandrel 7001-ML

- Cylindrical Shank
- Long series
- Axial tool coolant

Note:
Mandrel 7001 fits only the locking screw for blind holes

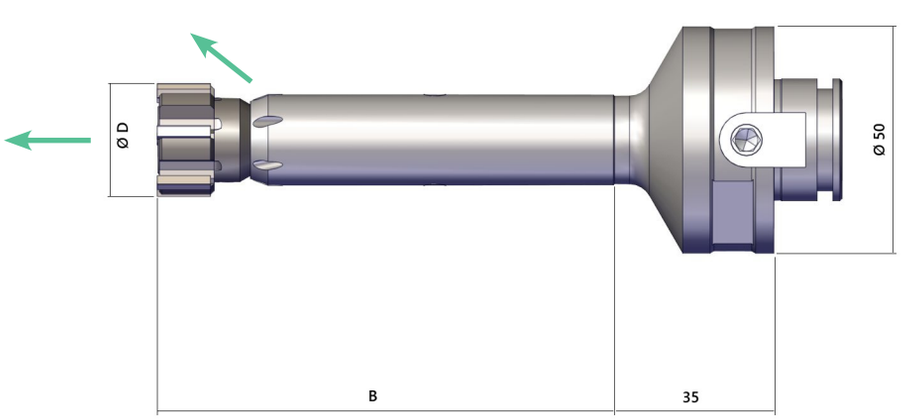


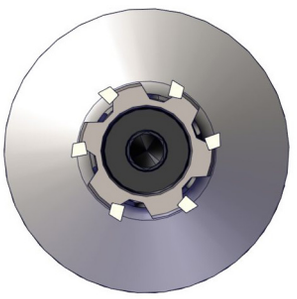
MANDREL CODE WITHOUT HEAD & SCREW	Ø D mm	B mm	L mm	Ø d^{h6} mm	LOCKING SCREW FIXED HEADS		WRENCH FIXED HEADS	LOCKING SCREW EXPANDING HEADS		WRENCH EXPANDING HEADS	NUMBER OF TEETH
					THROUGH HOLES	BLIND HOLES		THROUGH HOLES	BLIND HOLES		
7000-ML-001 7001-ML-001	11,80÷12,60 12,61÷13,60 13,61÷14,60	95	140	12	7000-VI-001	7001-VI-001	hex 2,5	7000-VI-012 7000-VI-013 7000-VI-014	7001-VI-012 7001-VI-013 7001-VI-014	hex 3,5	6 6 6
7000-ML-002 7001-ML-002	14,61÷15,60 15,61÷16,60 16,61÷17,60	105	153	16	7000-VI-002	7001-VI-002	hex 3	7000-VI-015 7000-VI-016 7000-VI-017	7001-VI-015 7001-VI-016 7001-VI-017	hex 4	6 6 6
7000-ML-003 7001-ML-003	17,61÷18,60 18,61÷19,60 19,61÷20,60 20,61÷21,60	125	175	20	7000-VI-003	7001-VI-003	hex 4	7000-VI-018 7000-VI-019 7000-VI-020 7000-VI-021	7001-VI-018 7001-VI-019 7001-VI-020 7001-VI-021	hex 5	6 6 6 6
7000-ML-004 7001-ML-004	21,61÷22,60 22,61÷23,60 23,61÷24,60 24,61÷25,60 25,61÷26,60	145	195	20	7000-VI-004	7001-VI-004	hex 5	7000-VI-022 7000-VI-023 7000-VI-024 7000-VI-025 7000-VI-026	7001-VI-022 7001-VI-023 7001-VI-024 7001-VI-025 7001-VI-026	hex 6	6 6 6 6 6
7000-ML-005 7001-ML-005	26,61÷27,60 27,61÷28,60 28,61÷29,60 29,61÷30,60 30,61÷31,60 31,61÷32,60	165	221	25	7000-VI-005	7001-VI-005	hex 6	7000-VI-027 7000-VI-028 7000-VI-029 7000-VI-030 7000-VI-031 7000-VI-032	7001-VI-027 7001-VI-028 7001-VI-029 7001-VI-030 7001-VI-031 7001-VI-032	hex 8	6 6 6 6 6 6
7000-ML-006 7001-ML-006	32,61÷33,60 33,61÷34,60 34,61÷35,60 35,61÷36,60 36,61÷37,60 37,61÷38,60 38,61÷39,60 39,61÷40,60	185	245	32	7000-VI-006	7001-VI-006	hex 6	7000-VI-033 7000-VI-034 7000-VI-035 7000-VI-036 7000-VI-037 7000-VI-038 7000-VI-039 7000-VI-040	7001-VI-033 7001-VI-034 7001-VI-035 7001-VI-036 7001-VI-037 7001-VI-038 7001-VI-039 7001-VI-040	hex 10	6 6 6 6 6 6 6 6
7000-ML-007 7001-ML-007	40,61÷41,60 41,61÷42,60 42,61÷43,60 43,61÷44,60 44,61÷45,60	185	245	32	7000-VI-007	7001-VI-007	hex 8	7000-VI-041 7000-VI-042 7000-VI-043 7000-VI-044 7000-VI-045	7001-VI-041 7001-VI-042 7001-VI-043 7001-VI-044 7001-VI-045	hex 12	6 6 6 6 6
7000-ML-075 7001-ML-075	45,61÷46,60 46,61÷47,60 47,61÷48,60 48,61÷49,60 49,61÷50,60	185	245	32	7000-VI-007	7001-VI-007	hex 8	7000-VI-046 7000-VI-047 7000-VI-048 7000-VI-049 7000-VI-050	7001-VI-046 7001-VI-047 7001-VI-048 7001-VI-049 7001-VI-050	hex 12	8 8 8 8 8
7000-ML-008 7001-ML-008	50,61÷51,60 51,61÷52,60 52,61÷53,60 53,61÷54,60 54,61÷55,60 55,61÷56,60 56,61÷57,60 57,61÷58,60 58,61÷59,60 59,61÷60,60	185	245	32	7000-VI-008	7001-VI-008	hex 10	7000-VI-051 7000-VI-052 7000-VI-053 7000-VI-054 7000-VI-055 7000-VI-056 7000-VI-057 7000-VI-058 7000-VI-059 7000-VI-060	7001-VI-051 7001-VI-052 7001-VI-053 7001-VI-054 7001-VI-055 7001-VI-056 7001-VI-057 7001-VI-058 7001-VI-059 7001-VI-060	hex 12	8 8 8 8 8 8 8 8 8 8
7000-ML-009	60,61÷61,60 61,61÷62,60 62,61÷63,60 63,61÷64,60 64,61÷65,60 65,61÷66,60 66,61÷67,60 67,61÷68,60 68,61÷69,60 69,61÷70,60 70,61÷71,60 71,61÷72,60 72,61÷73,60 73,61÷74,60 74,61÷75,60 75,61÷76,60 76,61÷77,60 77,61÷78,60 78,61÷79,60 79,61÷80,60	185	245	32	7000-VI-009	7001-VI-009	hex 12	7000-VA-061 7000-VA-062 7000-VA-063 7000-VA-064 7000-VA-065 7000-VA-066 7000-VA-067 7000-VA-068 7000-VA-069 7000-VA-070 7000-VA-071 7000-VA-072 7000-VA-073 7000-VA-074 7000-VA-075 7000-VA-076 7000-VA-077 7000-VA-078 7000-VA-079 7000-VA-080	7001-VA-061 7001-VA-062 7001-VA-063 7001-VA-064 7001-VA-065 7001-VA-066 7001-VA-067 7001-VA-068 7001-VA-069 7001-VA-070 7001-VA-071 7001-VA-072 7001-VA-073 7001-VA-074 7001-VA-075 7001-VA-076 7001-VA-077 7001-VA-078 7001-VA-079 7001-VA-080	-	8-10-12 8-10-12

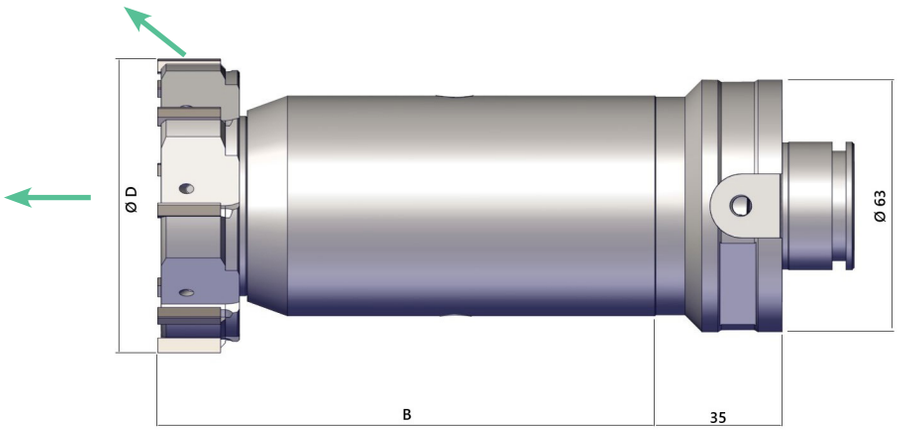
Head Mandrel 7000-MM

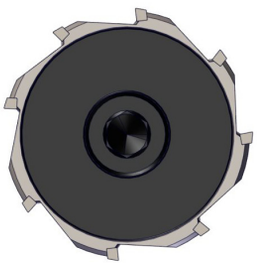
- Modular Shank
- Radial & axial tool coolant

Note:
- All mandrels are provided with radial through tool coolant
- For through hole reaming - order adjustment screw to suit through holes
- For blind hole reaming - order adjustment screw to suit blind holes. The drilled screw allows central through tool coolant





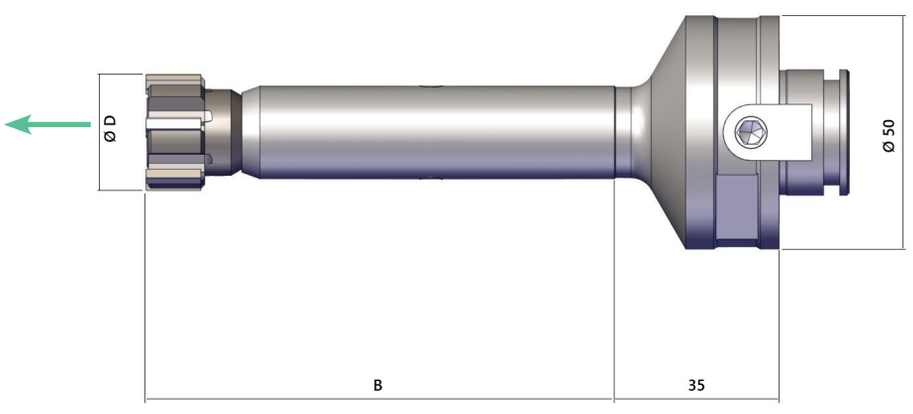


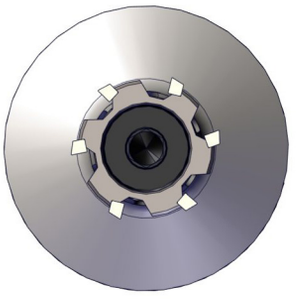


Head Mandrel 7001-MM

- Modular Shank
- Axial tool coolant

Note:
Mandrel 7001 fits only the locking screw for blind holes





MANDREL CODE WITHOUT HEAD & SCREW	Ø D mm	B mm	L mm	LOCKING SCREW FIXED HEADS		WRENCH FIXED HEADS	LOCKING SCREW EXPANDING HEADS		WRENCH EXPANDING HEADS	NUMBER OF TEETH
				THROUGH HOLES	BLIND HOLES		THROUGH HOLES	BLIND HOLES		
7000-MM-001 7001-MM-001	11,80÷12,60 12,61÷13,60 13,61÷14,60	65	-	7000-VI-001	7001-VI-001	hex 2,5	7000-VI-012 7000-VI-013 7000-VI-014	7001-VI-012 7001-VI-013 7001-VI-014	hex 3,5	6 6 6
7000-MM-002 7001-MM-002	14,61÷15,60 15,61÷16,60 16,61÷17,60	80	-	7000-VI-002	7001-VI-002	hex 3	7000-VI-015 7000-VI-016 7000-VI-017	7001-VI-015 7001-VI-016 7001-VI-017	hex 4	6 6 6
7000-MM-003 7001-MM-003	17,61÷18,60 18,61÷19,60 19,61÷20,60 20,61÷21,60	90	-	7000-VI-003	7001-VI-003	hex 4	7000-VI-018 7000-VI-019 7000-VI-020 7000-VI-021	7001-VI-018 7001-VI-019 7001-VI-020 7001-VI-021	hex 5	6 6 6 6
7000-MM-004 7001-MM-004	21,61÷22,60 22,61÷23,60 23,61÷24,60 24,61÷25,60 25,61÷26,60	100	-	7000-VI-004	7001-VI-004	hex 5	7000-VI-022 7000-VI-023 7000-VI-024 7000-VI-025 7000-VI-026	7001-VI-022 7001-VI-023 7001-VI-024 7001-VI-025 7001-VI-026	hex 6	6 6 6 6 6
7000-MM-005 7001-MM-005	26,61÷27,60 27,61÷28,60 28,61÷29,60 29,61÷30,60 30,61÷31,60 31,61÷32,60	110	-	7000-VI-005	7001-VI-005	hex 6	7000-VI-027 7000-VI-028 7000-VI-029 7000-VI-030 7000-VI-031 7000-VI-032	7001-VI-027 7001-VI-028 7001-VI-029 7001-VI-030 7001-VI-031 7001-VI-032	hex 8	6 6 6 6 6 6
7000-MM-006 7001-MM-006	32,61÷33,60 33,61÷34,60 34,61÷35,60 35,61÷36,60 36,61÷37,60 37,61÷38,60 38,61÷39,60 39,61÷40,60	120	-	7000-VI-006	7001-VI-006	hex 6	7000-VI-033 7000-VI-034 7000-VI-035 7000-VI-036 7000-VI-037 7000-VI-038 7000-VI-039 7000-VI-040	7001-VI-033 7001-VI-034 7001-VI-035 7001-VI-036 7001-VI-037 7001-VI-038 7001-VI-039 7001-VI-040	hex 10	6 6 6 6 6 6 6 6
7000-MM-007 7001-MM-007	40,61÷41,60 41,61÷42,60 42,61÷43,60 43,61÷44,60 44,61÷45,60	120	-	7000-VI-007	7001-VI-007	hex 8	7000-VI-041 7000-VI-042 7000-VI-043 7000-VI-044 7000-VI-045	7001-VI-041 7001-VI-042 7001-VI-043 7001-VI-044 7001-VI-045	hex 12	6 6 6 6 6
7000-MM-075 7001-MM-075	45,61÷46,60 46,61÷47,60 47,61÷48,60 48,61÷49,60 49,61÷50,60	120	-	7000-VI-007	7001-VI-007	hex 8	7000-VI-046 7000-VI-047 7000-VI-048 7000-VI-049 7000-VI-050	7001-VI-046 7001-VI-047 7001-VI-048 7001-VI-049 7001-VI-050	hex 12	8 8 8 8 8
7000-MM-008 7001-MM-008	50,61÷51,60 51,61÷52,60 52,61÷53,60 53,61÷54,60 54,61÷55,60 55,61÷56,60 56,61÷57,60 57,61÷58,60 58,61÷59,60 59,61÷60,60	120	-	7000-VI-008	7001-VI-008	hex 10	7000-VI-051 7000-VI-052 7000-VI-053 7000-VI-054 7000-VI-055 7000-VI-056 7000-VI-057 7000-VI-058 7000-VI-059 7000-VI-060	7001-VI-051 7001-VI-052 7001-VI-053 7001-VI-054 7001-VI-055 7001-VI-056 7001-VI-057 7001-VI-058 7001-VI-059 7001-VI-060	hex 12	8 8 8 8 8 8 8 8 8 8
7000-MM-009	60,61÷61,60 61,61÷62,60 62,61÷63,60 63,61÷64,60 64,61÷65,60 65,61÷66,60 66,61÷67,60 67,61÷68,60 68,61÷69,60 69,61÷70,60 70,61÷71,60 71,61÷72,60 72,61÷73,60 73,61÷74,60 74,61÷75,60 75,61÷76,60 76,61÷77,60 77,61÷78,60 78,61÷79,60 79,61÷80,60	120	155	7000-VI-009	7001-VI-009	hex 12	7000-VA-061 7000-VA-062 7000-VA-063 7000-VA-064 7000-VA-065 7000-VA-066 7000-VA-067 7000-VA-068 7000-VA-069 7000-VA-070 7000-VA-071 7000-VA-072 7000-VA-073 7000-VA-074 7000-VA-075 7000-VA-076 7000-VA-077 7000-VA-078 7000-VA-079 7000-VA-080	7001-VA-061 7001-VA-062 7001-VA-063 7001-VA-064 7001-VA-065 7001-VA-066 7001-VA-067 7001-VA-068 7001-VA-069 7001-VA-070 7001-VA-071 7001-VA-072 7001-VA-073 7001-VA-074 7001-VA-075 7001-VA-076 7001-VA-077 7001-VA-078 7001-VA-079 7001-VA-080	-	8-10-12 8-10-12

WORKING PARAMETERS

MATERIAL TO WORK	MATERIAL EXAMPLE	ALLOY COATING SPEED	THROUGH HOLE	INTERRUPTED THROUGH HOLE	BLIND HOLE	INTERRUPTED BLIND HOLE
Unalloyed	ST37 ST52	Cermet Uncoated Speed= 150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Low alloyed	C40 C55	Cermet Uncoated Speed= 140 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Structural steel	41CrMo4 100Cr6	Cermet Uncoated Speed= 100÷130 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Fused Metal	H13 X6CrMo4	Cermet Uncoated Speed= 70÷80 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Austenitics stainless steel	AISI 304 L AISI 316 L	Cermet Uncoated Speed= 50÷60 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
Martensitic stainless steel	AISI 416 AISI 430	Cermet Uncoated Speed= 40÷50 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
ADI cast iron	ADI 800 ADI 1000	Carbide H coated Speed=80÷100 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Spheroidal cast iron	GS 400÷700	Cermet K coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Grey cast iron	GG25 GG30	Carbide H coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Alluminium <3% SI	6061 7075	Carbide Uncoated Speed=30÷60 m/min	E-G lead-in otherwise N-M-A lead-in	M-G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in
Alluminium >7% SI	ALSI 12	PCD Uncoated Speed=100÷1000 m/min	G lead-in	G lead-in	G lead-in otherwise F lead-in	G-F lead-in
Copper	EN2.1182 CW004A	Carbide Uncoated Speed=150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in otherwise N lead-in
Bronze	CuSn12	Carbide D coated Speed=80÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Leaded Brass	CuZn39Pb3	Carbide Uncoated Speed=30÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Brass without lead	CW724R	Carbide D coated Speed=80÷120 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Titanium	Ti-6Al-4V	Carbide Uncoated Speed=10÷20 m/min	T lead-in	T lead-in	F-T lead-in	F-T lead-in
Heat Resistant Alloys	Inconel 718 Hastelloy	Carbide K coated Speed=15÷20 m/min	G lead-in	G lead-in	G-F lead-in	G-F lead-in

STOCK ALLOWANCE

DIAMETER (mm)	STOCK ALLOWANCE ON DIAMETER (mm)
11,80÷21,60	0,15÷0,25
21,61÷39,60	0,20÷0,40
39,61÷45,60	0,30÷0,40
45,61÷80,60	0,35÷0,50

FEED Fz (mm/teeth)

NUMBER OF TEETH	6			8-10-12*	
LEAD IN	Ø 11,80÷21,60	Ø21,61÷39,60	Ø39,61÷45,60	Ø45,61÷60,60	Ø60,61÷80,60
A	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18	Fz=0,07÷0,18
G	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18	Fz=0,07÷0,18
E	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,06÷0,15	Fz=0,08÷0,10	Fz=0,08÷0,10
M	Fz=0,06÷0,17	Fz=0,07÷0,20	Fz=0,08÷0,25	Fz=0,07÷0,18	Fz=0,07÷0,18
N	Fz=0,06÷0,17	Fz=0,07÷0,20	Fz=0,08÷0,25	Fz=0,08÷0,10	Fz=0,08÷0,10
T	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,10÷0,17	Fz=0,04÷0,10	Fz=0,04÷0,10
F	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,10÷0,17	Fz=0,04÷0,10	Fz=0,04÷0,10

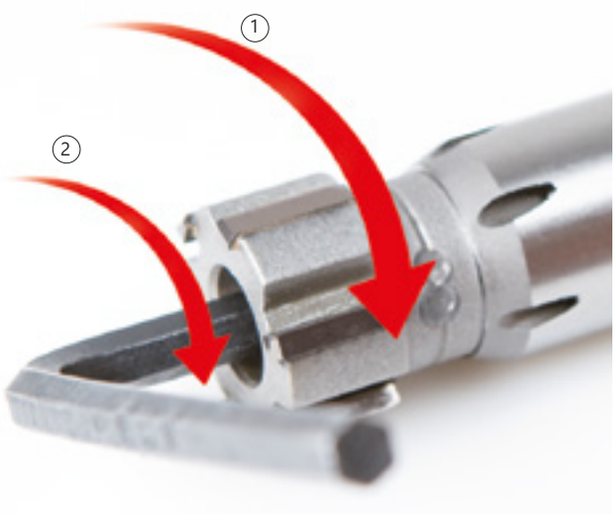
N.B. To work interrupted holes, the feed rate must be reduced by 50%.

* Please specify the number of cutting edges desired in your order by adding the number to the end of the code.
Ex. 7400-SVG-65 H7/10

ASSEMBLY INSTRUCTION - fixed heads

OPERATION 1

Prepare the components by thoroughly cleaning the mating surfaces.
Choose the screw for through holes or blind holes.
Apply the anti-seize paste on the screw thread.
The diameter is made at two-thirds of the required tolerance field.

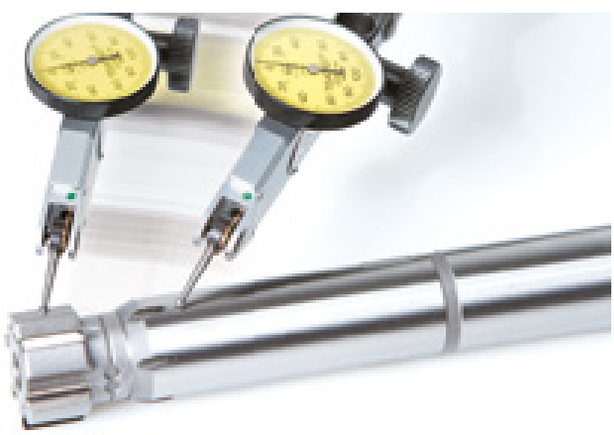


OPERATION 2

1. Insert the head into the spindle, rotate it clockwise by hand to couple it. Put it under tension on the driving key.

2. Close the screw using the tightening values indicated in the table:

RANGE mm	TORQUE Nm
11,80÷14,60	2,5 MAX
14,61÷17,60	3
17,61÷21,60	4
21,61÷26,60	5,5
26,61÷32,60	7
32,61÷40,60	10
40,61÷50,60	14
50,61÷80,60	18



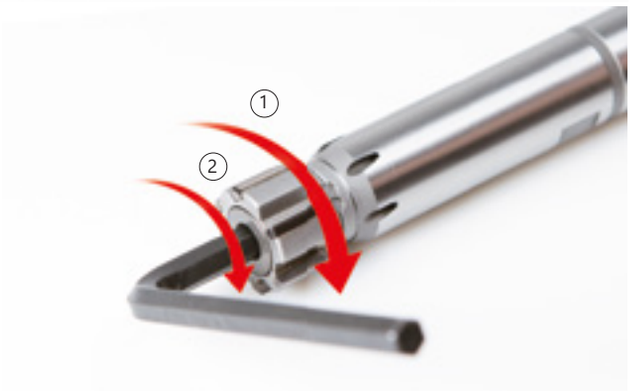
OPERATION 3

Check the concentricity at the end of the spindle on the machine.
The value has to be until 5 µm.

ASSEMBLY INSTRUCTION - expanding heads

OPERATION 1

Prepare the components by thoroughly cleaning the mating surfaces.
Choose the screw for through holes or blind holes.
Apply the anti-seize paste on the screw thread.



OPERATION 2

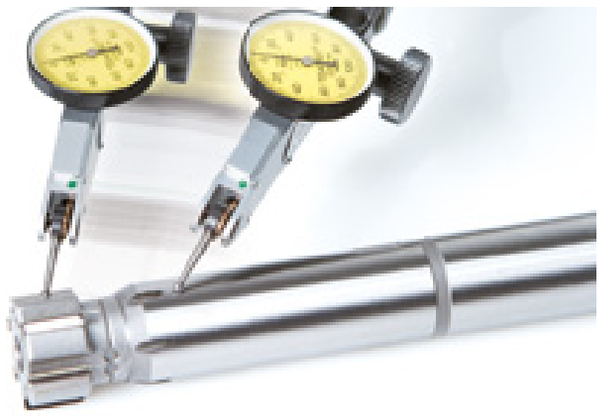
1. Insert the head into the spindle, rotating it clockwise by hand to couple it. Put it under tension on the driving key.

2. Gradually tighten the screw by expanding the head until it reaches the desired diameter.

OPERATION 3

Measure the diameter only on the two opposing cutting edges identified by the punching.

Caution: on Cermet reamers do not touch the cutting edge.



OPERATION 4

Check the concentricity at the end of the spindle on the machine.
The value has to be until 5 µm.

Series 9000

The sintered solution

DIAMETER RANGE: 11,80 ÷ 40,60 mm

SERIES: Short / Long

SHANK: Cylindrical or Composit

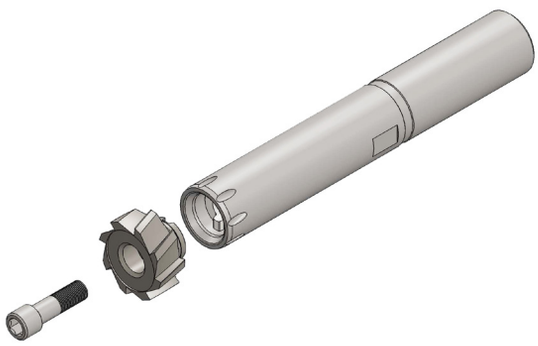
COOLANT: Radial through coolant (through holes)
Axial through coolant (blind holes)

GEOMETRY: Straight flutes / Helical flutes

SUBSTRATE: Carbide / Cermet
Coated or uncoated

BENEFITS:
- Heads are fixed
- Throw away after use
- Straight, left or right hand helical flutes making through or blind holes achievable

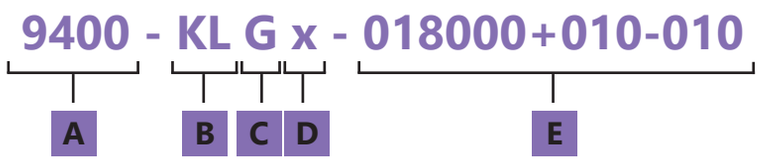
SINTERED SOLUTION TSA System



Advantage of TSA System:

The opportunity to replace the heads directly in the machine, without disassembly the mandrel from the basic shanks, permits a reduction of dead times.

CODE DESCRIPTION



A Series:

9400	Fixed heads with straight flutes
9600	Fixed heads with right hand helical flutes
9700	Fixed heads with left hand helical flutes

B Cutting material and coating:

Code	Description
KL	Carbide cutting edges
KN	Carbide cutting edges - N coated
KC	Carbide cutting edges - C coated
KA	Carbide cutting edges - A coated
KK	Carbide cutting edges - K coated
KH	Carbide cutting edges - H coated
KR	Carbide cutting edges - R coated
KT	Carbide cutting edges - T coated
AV	Cermet cutting edges
AN	Cermet cutting edges - N coated
AC	Cermet cutting edges - C coated
AA	Cermet cutting edges - A coated
AK	Cermet cutting edges - K coated
AH	Cermet cutting edges - H coated
AR	Cermet cutting edges - R coated
AT	Cermet cutting edges - T coated

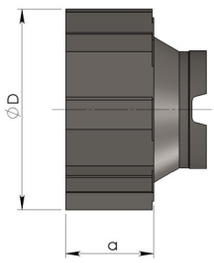
C Lead-in

D Optional request:

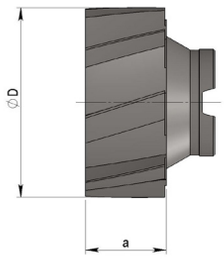
Z= oversized tapering
H= half circular face
K= chipbreaker

E Diameter and tolerance

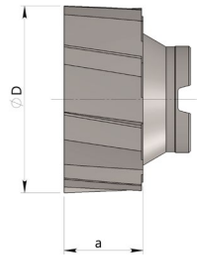
Series 9400
Straight flutes



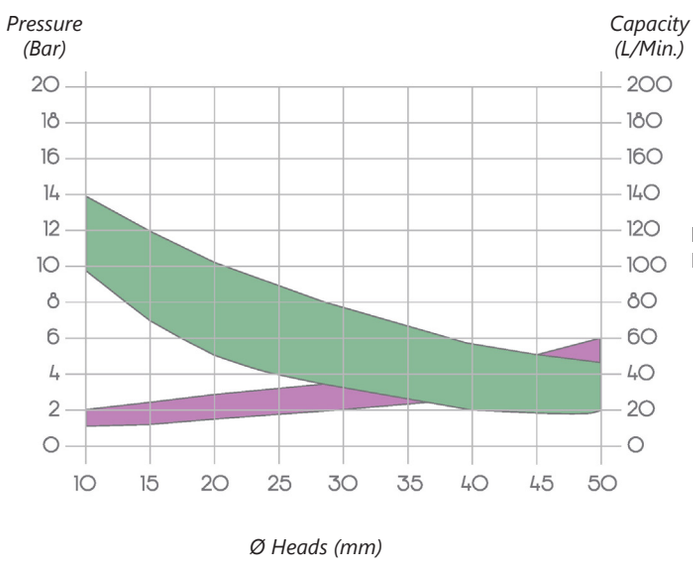
Series 9700
Left hand helical flutes



Series 9600
Right hand helical flutes
(on request)

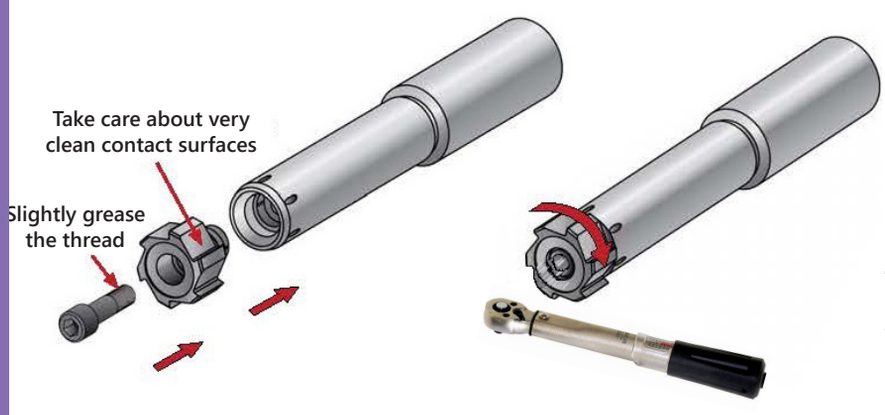


RANGE	a (mm)	number of teeth
11,80÷14,60	10	6
14,61÷17,60	10	6
17,61÷21,60	10	6
21,61÷26,60	10	8
26,61÷32,60	10	8
32,61÷40,60	10	10



Note:
It is important to use a good quality lubricant.

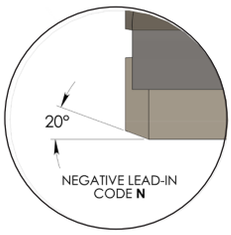
LOCKING SCREW TORQUES		
Range	Nm (Carbide)	Nm (Cermet)
11,80÷14,60	2,5	2,2
14,61÷17,60	3,5	3
17,61÷21,60	4,5	4
21,61÷26,60	6	5
26,61÷32,60	10	9
32,61÷40,60	12	11



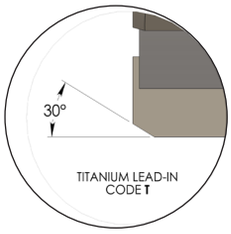
INTUITIVE ASSEMBLY

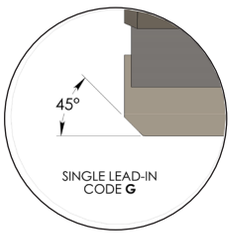
1. Insert manually the head in the slot.
   Forced position allows to make it easy.
2. Turn the head clockwise few degrees to
   make it in contact with mandrel surface.
3. Lock the screw handling a dynamometric key.

LEAD-IN FOR STRAIGHT FLUTES

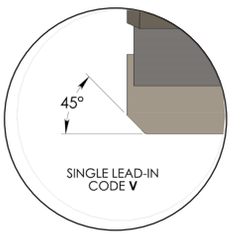


Ideal for through holes

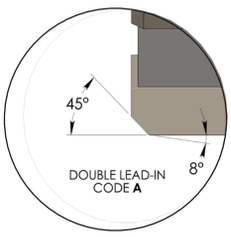


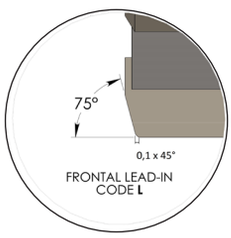


Lead-in 45° for standard speed

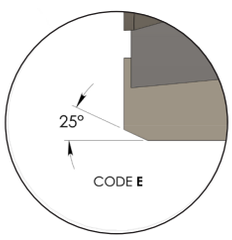


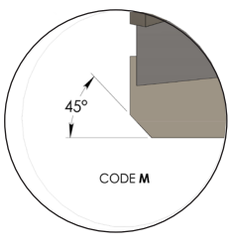
Lead-in 45° for high speed





LEAD-IN FOR HELICAL FLUTES

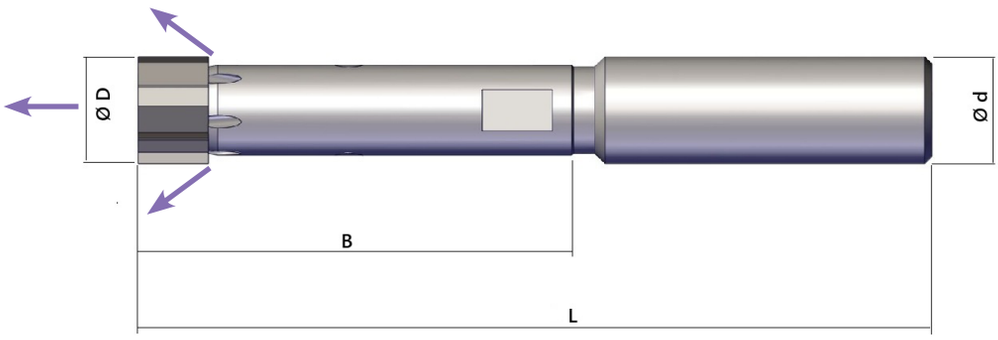


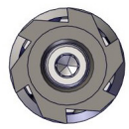


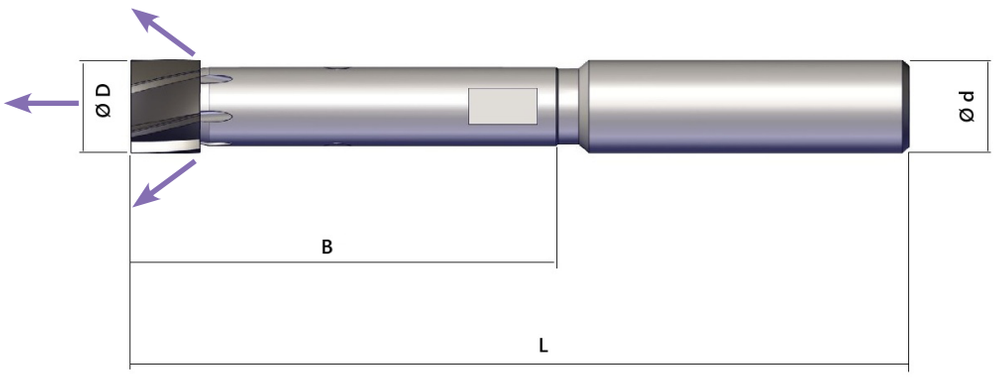
Head Mandrel 9000-MC

- Short Series

Note:
- All mandrels are provided with radial through tool coolant, suitable for working through holes
- To ream blind holes is recommended to order their respective drilled screw that allows only axial coolant flow
- Both types of screw do not protrude the head
- Also the screw for through holes allows to ream counterborings







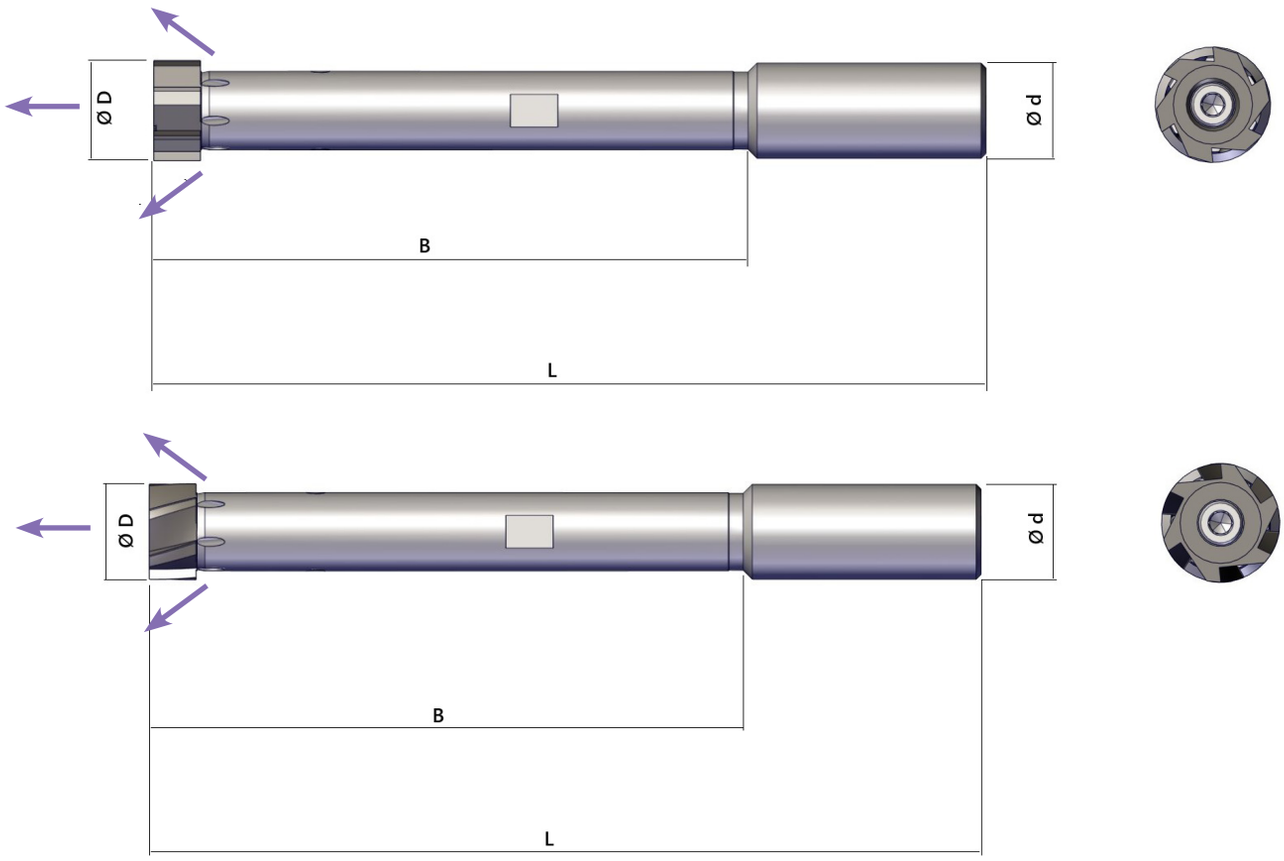
MANDREL CODE	Ø D (mm)	B (mm)	L (mm)	Ø d h6 (mm)	Locking screw through holes	Locking screw blind holes
9000-MC-001	11,80÷14,60	50	95	12	9000-VI-001	9001-VI-001
9000-MC-002	14,61÷17,60	65	113	16	9000-VI-002	9001-VI-002
9000-MC-003	17,61÷21,60	75	125	20	9000-VI-003	9001-VI-003
9000-MC-004	21,61÷26,60	85	135	20	9000-VI-004	9001-VI-004
9000-MC-005	26,61÷32,60	105	161	25	9000-VI-005	9001-VI-005
9000-MC-006	32,61÷36,60	120	180	32	9000-VI-006	9001-VI-006
9000-MC-007	36,61÷40,60	120	180	32	9000-VI-006	9001-VI-006

N.B. Mandrel code is without head and locking screw, they must be ordered separately

Head Mandrel 9000-ML

• Long Series

Note:
- All mandrels are provided with radial through tool coolant, suitable for working through holes
- To ream blind holes is recommended to order their respective drilled screw that allows only axial coolant flow
- Both types of screw do not protrude the head
- Also the screw for through holes allows to ream counterborings



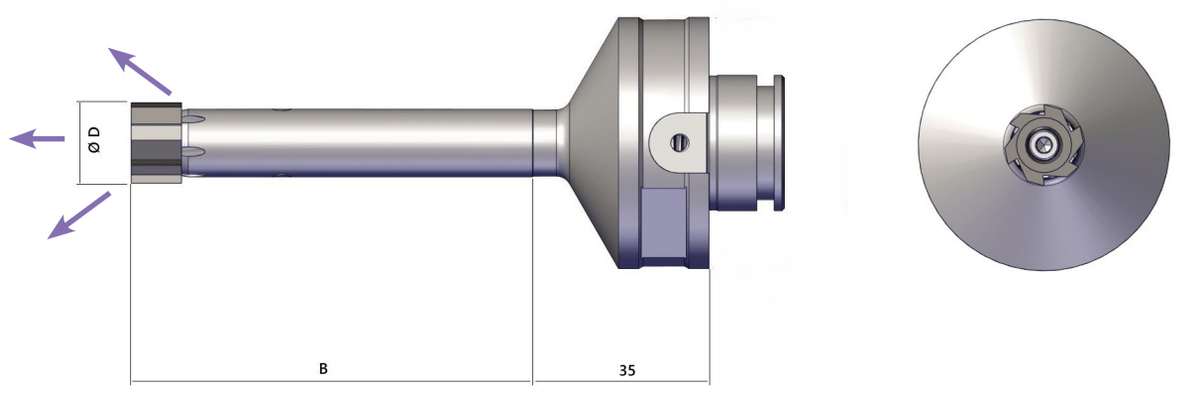
MANDREL CODE	Ø D (mm)	B (mm)	L (mm)	Ø d h6 (mm)	Locking screw through holes	Locking screw blind holes
9000-ML-001	11,80÷14,60	95	140	12	9000-VI-001	9001-VI-001
9000-ML-002	14,61÷17,60	105	153	16	9000-VI-002	9001-VI-002
9000-ML-003	17,61÷21,60	125	175	20	9000-VI-003	9001-VI-003
9000-ML-004	21,61÷26,60	145	195	20	9000-VI-004	9001-VI-004
9000-ML-005	26,61÷32,60	165	221	25	9000-VI-005	9001-VI-005
9000-ML-006	32,61÷36,60	185	245	32	9000-VI-006	9001-VI-006
9000-ML-007	36,61÷40,60	185	245	32	9000-VI-006	9001-VI-006

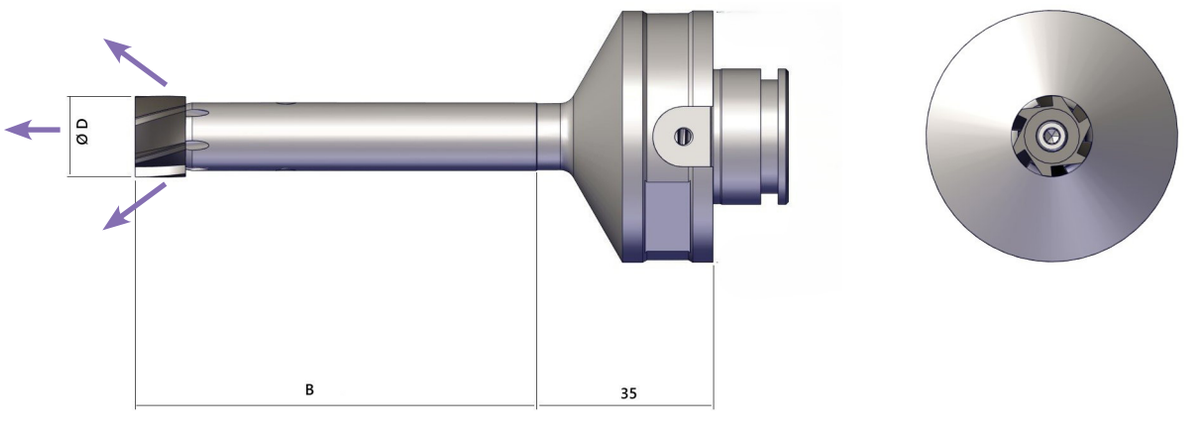
N.B. Mandrel code is without head and locking screw, they must be ordered separately

Head Mandrel 9000-MM

- Short Series
- Modular Shank

Note:
- All mandrels are provided with radial through tool coolant, suitable for working through holes
- To ream blind holes is recommended to order their respective drilled screw that allows only axial coolant flow
- Both types of screw do not protrude the head
- Also the screw for through holes allows to ream counterborings





MANDREL CODE	Ø D (mm)	B (mm)	Locking screw through holes	Locking screw blind holes
9000-MM-001	11,80÷14,60	65	9000-VI-001	9001-VI-001
9000-MM-002	14,61÷17,60	80	9000-VI-002	9001-VI-002
9000-MM-003	17,61÷21,60	100	9000-VI-003	9001-VI-003
9000-MM-004	21,61÷26,60	110	9000-VI-004	9001-VI-004
9000-MM-005	26,61÷32,60	120	9000-VI-005	9001-VI-005
9000-MM-006	32,61÷36,60	120	9000-VI-006	9001-VI-006
9000-MM-007	36,61÷40,60	120	9000-VI-006	9001-VI-006

N.B. Mandrel code is without head and locking screw, they must be ordered separately

ASSEMBLY INSTRUCTION

OPERATION 1

Prepare the components by thoroughly cleaning the mating surfaces.
Choose the screw for through holes or blind holes.
Apply the anti-seize paste on the screw thread.
The diameter is made at two-thirds of the required tolerance field.

OPERATION 2

1. Insert the head into the spindle, rotating it clockwise by hand to couple it. Put it under tension on the driving key.

2. Tighten the screw using the torque values indicated in the table, use a torque wrench (not shown in the figure).

OPERATION 3

Check the concentricity at the end of the spindle on the machine.
The value has to be until 5 µm.

WORKING PARAMETERS

MATERIAL TO WORK	MATERIAL EXAMPLE	ALLOY COATING SPEED	THROUGH HOLE	INTERRUPTED THROUGH HOLE	BLIND HOLE	INTERRUPTED BLIND HOLE
Unalloyed	ST37 ST52	Cermet Uncoated Speed= 150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Low alloyed	C40 C55	Cermet Uncoated Speed= 140 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Structural steel	41CrMo4 100Cr6	Cermet Uncoated Speed= 100÷130 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Fused Metal	H13 X6CrMo4	Cermet Uncoated Speed= 70÷80 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Austenitics stainless steel	AISI 304 L AISI 316 L	Cermet Uncoated Speed= 50÷60 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
Martensitic stainless steel	AISI 416 AISI 430	Cermet Uncoated Speed= 40÷50 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
ADI cast iron	ADI 800 ADI 1000	Carbide H coated Speed=80÷100 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Spheroidal cast iron	GS 400÷700	Cermet K coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Grey cast iron	GG25 GG30	Carbide H coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Alluminium <3% SI	6061 7075	Carbide Uncoated Speed=30÷60 m/min	E-G lead-in otherwise N-M-A lead-in	M-G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in
Alluminium >7% SI	ALSI 12	PCD Uncoated Speed=100÷1000 m/min	G lead-in	G lead-in	G lead-in otherwise F lead-in	G-F lead-in
Copper	EN2.1182 CW004A	Carbide Uncoated Speed=150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in otherwise N lead-in
Bronze	CuSn12	Carbide D coated Speed=80÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Leaded Brass	CuZn39Pb3	Carbide Uncoated Speed=30÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Brass without lead	CW724R	Carbide D coated Speed=80÷120 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Titanium	Ti-6Al-4V	Carbide Uncoated Speed=10÷20 m/min	T lead-in	T lead-in	F-T lead-in	F-T lead-in
Heat Resistant Alloys	Inconel 718 Hastelloy	Carbide K coated Speed=15÷20 m/min	G lead-in	G lead-in	G-F lead-in	G-F lead-in

STOCK ALLOWANCE

DIAMETER (mm)	STOCK ALLOWANCE ON DIAMETER (mm)
11,80÷17,60	0,10÷0,15
17,61÷21,60	0,10÷0,20
21,61÷32,60	0,10÷0,30
32,61÷40,60	0,10÷0,30

FEED Fz (mm/teeth)

NUMBER OF TEETH	6		8	10
LEAD IN	Ø 11,80÷17,60	Ø17,61÷21,60	Ø21,61÷32,60	Ø32,61÷40,60
A	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18
G	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18
E	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18
M	Fz=0,06÷0,17	Fz=0,07÷0,20	Fz=0,08÷0,25	Fz=0,08÷0,10
N	Fz=0,06÷0,17	Fz=0,07÷0,20	Fz=0,08÷0,25	Fz=0,08÷0,10
T	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,10÷0,17	Fz=0,04÷0,10

N.B. To work interrupted holes, the feed rate must be reduced by 50%.

EXPANDING REAMERS WITH CUTTING RING

DIAMETER RANGE: 17,60 ÷ 32,59 mm - on request
32,60 ÷ 200,59 mm - available

SERIES: Short / Long

COOLANT: Radial through coolant (through holes)
Axial through coolant (blind holes)

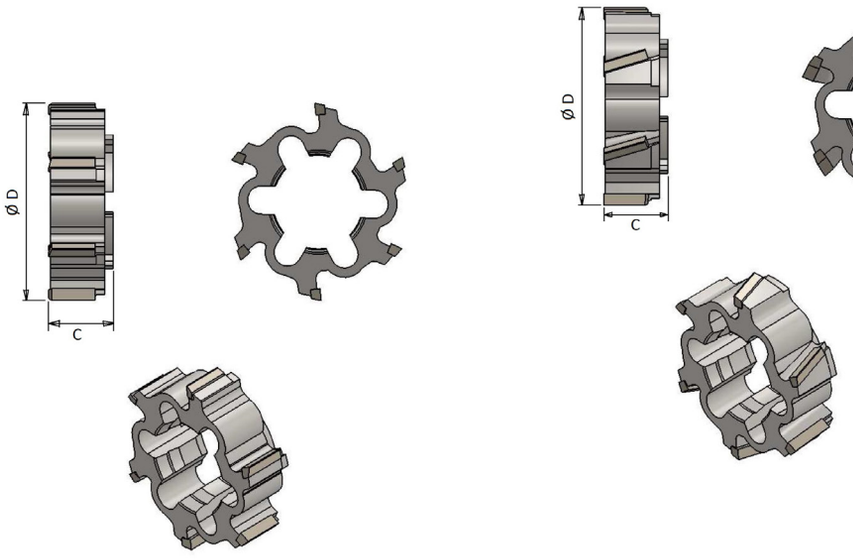
SHANK: Cylindrical or Composit

SUBSTRATE: Carbide / Cermet / PCD - CBN
Coated or uncoated

GEOMETRY: Straight flutes / Helical flutes

BENEFITS:

- ALVAN® cutting rings are modular and compatible with all the listed reamers
- We provide a regrinding ad rebrazing service of the damaged and worn cutting edges
- The cutting edges are arranged asymmetrically to ensure the best roundness of the hole
- Holes with tight tolerances (ISO 5 and ISO 6) can be supplied and the expansion ensures a perfect seal of the reaming diameter
- ALVAN® cutting rings are made 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 functioning and life of the tool



	Straight flutes	Helical flutes	
RANGE mm	C 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	16	6
45,60÷79,59	18,5	18,5	6
79,60÷100,59	18,5	18,5	8
100,60÷110,59	18,5	18,5	10
110,60÷200,59	18,5	18,5	12

on request

CODE DESCRIPTION

2000 - KT x y - 068000+010-010

A **B** **C** **D**

From 2025 codes will change, the part A of the description will become:
- R400 for the straight cutting rings
- R700 for the helical flutes cutting rings

Example:
R400-KNG-060000 N7
R700-SVE-060000 N7

A Cutting material and coating:

Code	Description
2000-KT	Carbide cutting edges K05
2TIN-KT	Carbide cutting edges K05 - N coated
2TIC-KT	Carbide cutting edges K05 - C coated
2TIA-KT	Carbide cutting edges K05 - A coated
2TLK-KT	Carbide cutting edges K05 - K coated
2TLH-KT	Carbide cutting edges K05 - H coated
2TLR-KT	Carbide cutting edges K05 - R coated
2TLT-KT	Carbide cutting edges K05 - T coated
2AVC-ST	Cermet cutting edges P10
2ANC-ST	Cermet cutting edges P10 - N coated
2ACC-ST	Cermet cutting edges P10 - C coated
2AAC-ST	Cermet cutting edges P10 - A coated
2ALK-ST	Cermet cutting edges P10 - K coated
2ALH-ST	Cermet cutting edges P10 - H coated
2ALR-ST	Cermet cutting edges P10 - R coated
2ALT-ST	Cermet cutting edges P10 - T coated

Note:
On request it is possible to supply tools in Carbide K10 and Cermet P20

B Lead-in

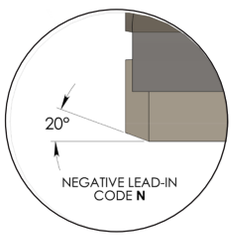
C Optional request:

Z= oversized tapering
H= half circular face
K= chipbreaker

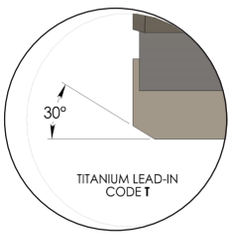
D Diameter and tolerance

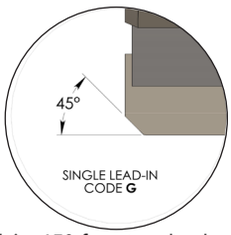
SUMMARY	Series	Page	DIAMETERS mm					Long series	Short series	Axial & radial coolant	Radial coolant
			17,60	20,10	32,10	100,60	200,60				
Expanding reamers with cutting rings	4500	74	√	√	√	√		√			√
	4500A	76	√	√	√	√		√			√
	4505	75	√	√	√	√		√			√
	4505A	77	√	√	√	√		√			√
	4550	70	√	√	√	√			√		√
	4550A	72	√	√	√	√			√		√
	4555	71	√	√	√	√			√		√
	4555A	73	√	√	√	√			√		√
Expanding reamers with cutting rings "Composit Modular System"	4330	78	√	√	√	√			√		√
	4335	79	√	√	√	√			√		√
	4350	80-82	√	√	√	√	√		√		√
	4355	81-83	v	√	√	√	√		√	√	√
	4300	84	√	√	√	√		√			√
	4305	85	√	√	√	√		√			√

LEAD-IN FOR STRAIGHT FLUTES

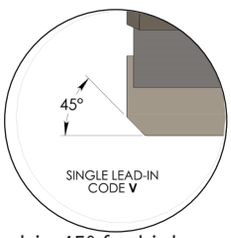


Ideal for through holes

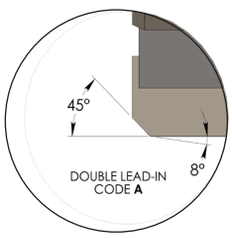


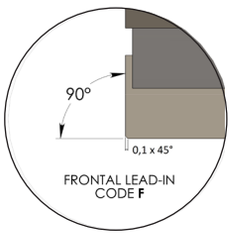


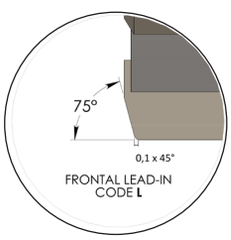
Lead-in 45° for standard speed

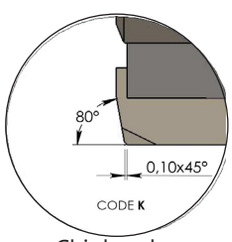


Lead-in 45° for high speed



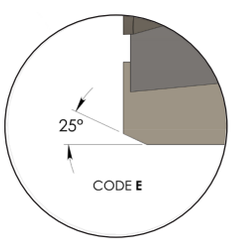


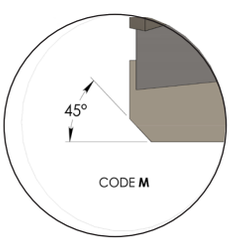




Chipbreaker

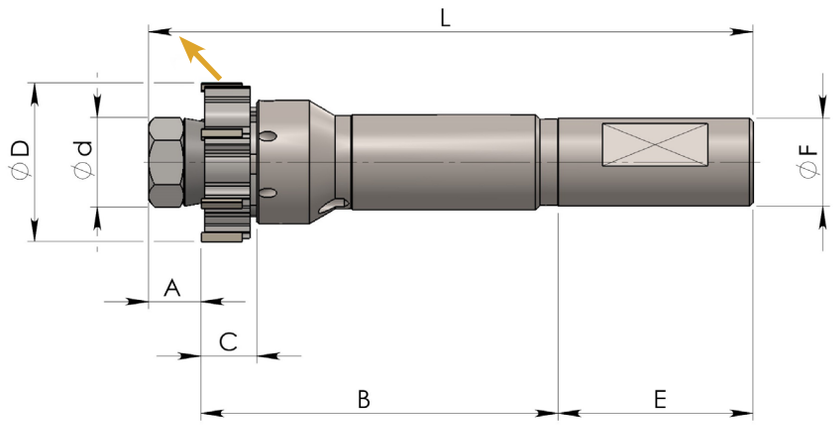
LEAD-IN FOR HELICAL FLUTES





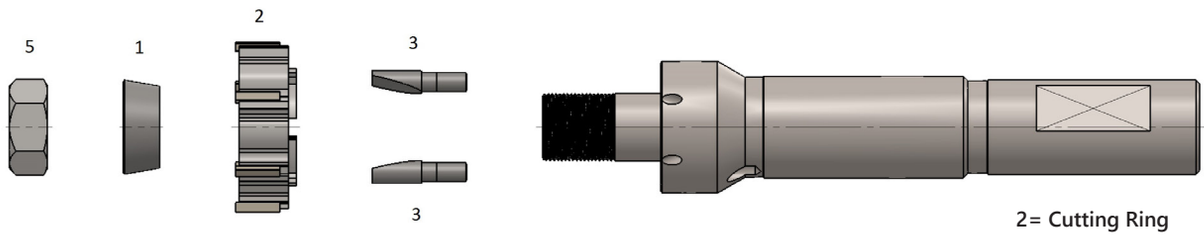
Series 4550

- Short Series
- Cylindrical Shank with flat
- With radial through tool coolant
- For through holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	E mm	ØF^{h7} mm	Number of teeth
17,60÷21,59	12	11	142	81	11	50	20	6
21,60÷25,59	12	11	142	81	12	50	20	6
25,60÷32,59	15,6	11	163	102	14	50	20	6
32,60÷40,59	22	14	172	102	16	56	25	6
40,60÷45,59	25,4	15	173	102	16	56	25	6
45,60÷60,59	30	20,5	185,5	105	18,5	60	32	6
60,60÷79,59	40	24,5	189,5	105	18,5	60	32	6
79,60÷100,59	56	28,5	203,15	105	18,5	70	40	8

SPARE PARTS

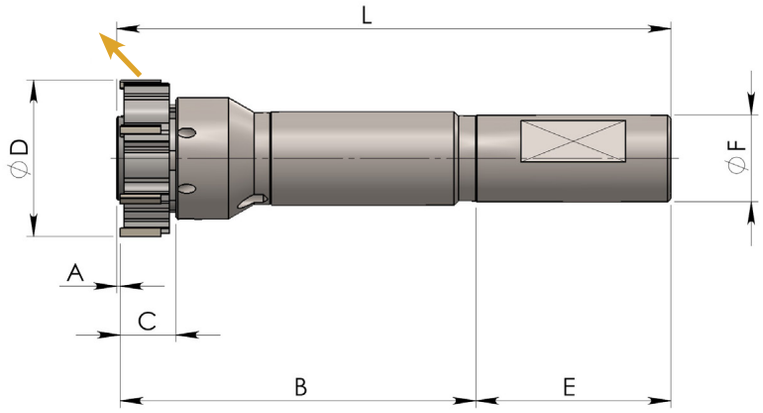


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 5	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4550-MC-010	2010-AC-010	2000-DA-010	hex 10	2000-CO-010	3
21,60÷25,59	4550-MC-020	2010-AC-010	2000-DA-010	hex 10	2000-CO-020	3
25,60÷32,59	4550-MC-030	2010-AC-020	2000-DA-020	hex 13	2000-CO-030	3
32,60÷40,59	4550-MC-040	2010-AC-030	2000-DA-060	hex 19	2000-CO-040	2
40,60÷45,59	4550-MC-050	2010-AC-040	2000-DA-090	hex 22	2000-CO-060	2
45,60÷49,59	4550-MC-060	2010-AC-050	2000-GH-880	hook 30	2000-CO-060	2
49,60÷60,59	4550-MC-070	2010-AC-050	2000-GH-880	hook 30	2000-CO-070	2
60,60÷70,59	4550-MC-080	2010-AC-060	2000-GH-900	hook 40	2000-CO-080	2
70,60÷79,59	4550-MC-090	2010-AC-060	2000-GH-900	hook 40	2000-CO-090	2
79,60÷90,59	4550-MC-100	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2
90,60÷100,59	4550-MC-110	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2

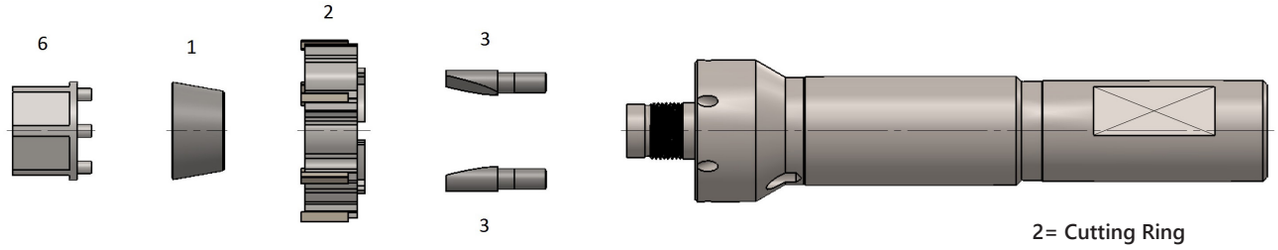
Series 4555

- Short Series
- Cylindrical Shank with flat
- With radial through tool coolant
- For blind holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	E mm	ØF^{h7} mm	Number of teeth
17,60÷21,59	11,2	1	132	81	11	50	20	6
21,60÷25,59	11,2	1	132	81	12	50	20	6
25,60÷32,59	15,1	1	153	102	14	50	20	6
32,60÷40,59	20,3	1	159	102	16	56	25	6
40,60÷45,59	24,1	1	159	102	16	56	25	6
45,60÷60,59	27,9	1,5	166,5	105	18,5	60	32	6
60,60÷79,59	37,1	1,5	166,5	105	18,5	60	32	6
79,60÷100,59	53,1	1,5	176,5	105	18,5	70	40	8

SPARE PARTS

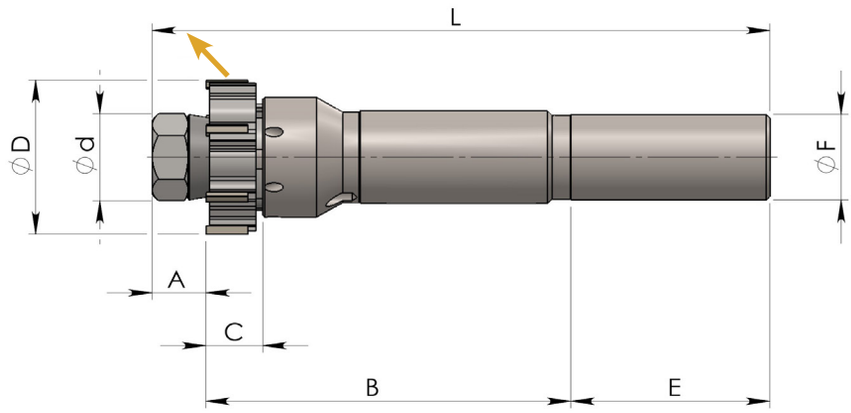


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	CONICAL RING II expansion	CONICAL RING III expansion	KEY 6	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4555-MC-010	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-010	3
21,60÷25,59	4555-MC-020	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-020	3
25,60÷29,59	4555-MC-030	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-030	3
29,60÷32,59	4555-MC-035	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-040	2
32,60÷36,59	4555-MC-040	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-040	2
36,60÷40,59	4555-MC-045	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-050	2
40,60÷45,59	4555-MC-050	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	hex 22	2000-CO-060	2
45,60÷49,59	4555-MC-060	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-060	2
49,60÷55,59	4555-MC-070	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-070	2
55,60÷60,59	4555-MC-075	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-080	2
60,60÷65,59	4555-MC-080	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-080	2
65,60÷70,59	4555-MC-085	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
70,60÷79,59	4555-MC-090	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
79,60÷90,59	4555-MC-100	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2
90,60÷100,59	4555-MC-110	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2

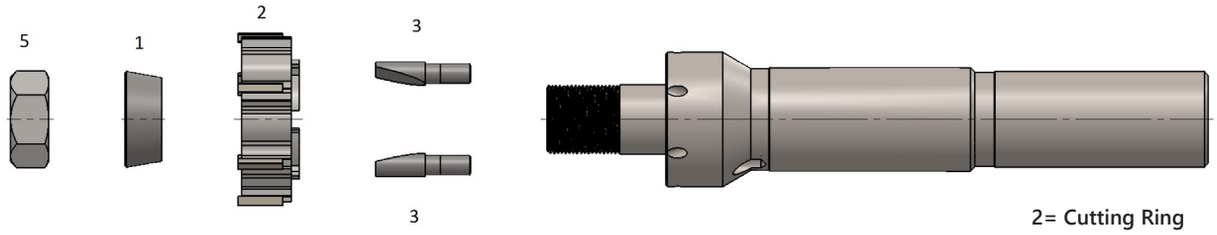
Series 4550A

- Short Series
- Cylindrical Shank without flat
- With radial through tool coolant
- For through holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	E mm	ØF^{h7} mm	Number of teeth
17,60÷21,59	12	11	142	81	11	50	20	6
21,60÷25,59	12	11	142	81	12	50	20	6
25,60÷32,59	15,6	11	163	102	14	50	20	6
32,60÷40,59	22	14	172	102	16	56	25	6
40,60÷45,59	25,4	15	173	102	16	56	25	6
45,60÷60,59	30	20,5	185,5	105	18,5	60	32	6
60,60÷79,59	40	24,5	189,5	105	18,5	60	32	6
79,60÷100,59	56	28,5	203,5	105	18,5	70	40	8

SPARE PARTS

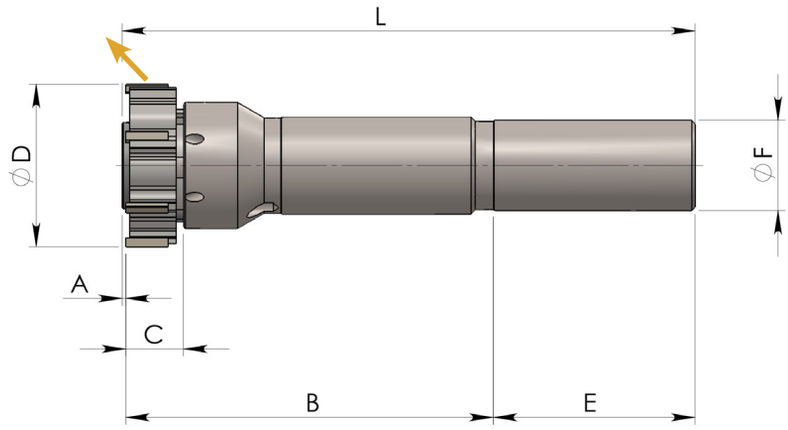


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 5	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4550A-MC-010	2010-AC-010	2000-DA-010	hex 10	2000-CO-010	3
21,60÷25,59	4550A-MC-020	2010-AC-010	2000-DA-010	hex 10	2000-CO-020	3
25,60÷32,59	4550A-MC-030	2010-AC-020	2000-DA-020	hex 13	2000-CO-030	3
32,60÷40,59	4550A-MC-040	2010-AC-030	2000-DA-060	hex 19	2000-CO-040	2
40,60÷45,59	4550A-MC-050	2010-AC-040	2000-DA-090	hex 22	2000-CO-060	2
45,60÷49,59	4550A-MC-060	2010-AC-050	2000-GH-880	hook 30	2000-CO-060	2
49,60÷60,59	4550A-MC-070	2010-AC-050	2000-GH-880	hook 30	2000-CO-070	2
60,60÷70,59	4550A-MC-080	2010-AC-060	2000-GH-900	hook 40	2000-CO-080	2
70,60÷79,59	4550A-MC-090	2010-AC-060	2000-GH-900	hook 40	2000-CO-090	2
79,60÷90,59	4550A-MC-100	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2
90,60÷100,59	4550A-MC-110	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2

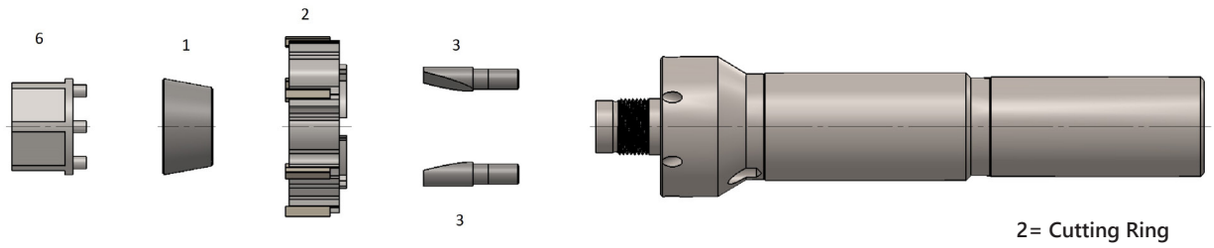
Series 4555A

- Short Series
- Cylindrical Shank without flat
- With radial through tool coolant
- For blind holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	E mm	ØF^{h7} mm	Number of teeth
17,60÷21,59	11,2	1	132	81	11	50	20	6
21,60÷25,59	11,2	1	132	81	12	50	20	6
25,60÷32,59	15,1	1	153	102	14	50	20	6
32,60÷40,59	20,3	1	159	102	16	56	25	6
40,60÷45,59	24,1	1	159	102	16	56	25	6
45,60÷60,59	27,9	1,5	166,5	105	18,5	60	32	6
60,60÷79,59	37,1	1,5	166,5	105	18,5	60	32	6
79,60÷100,59	53,1	1,5	176,5	105	18,5	70	40	8

SPARE PARTS

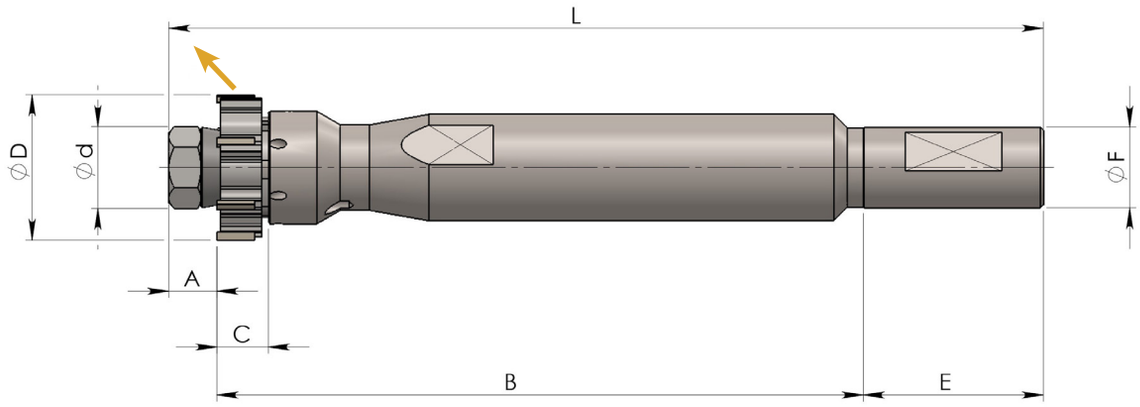


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	CONICAL RING II expansion	CONICAL RING III expansion	KEY 6	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4555A-MC-010	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-010	3
21,60÷25,59	4555A-MC-020	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-020	3
25,60÷29,59	4555A-MC-030	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-030	3
29,60÷32,59	4555A-MC-035	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-040	2
32,60÷36,59	4555A-MC-040	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-040	2
36,60÷40,59	4555A-MC-045	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-050	2
40,60÷45,59	4555A-MC-050	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	hex 22	2000-CO-060	2
45,60÷49,59	4555A-MC-060	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-060	2
49,60÷55,59	4555A-MC-070	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-070	2
55,60÷60,59	4555A-MC-075	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-080	2
60,60÷65,59	4555A-MC-080	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-080	2
65,60÷70,59	4555A-MC-085	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
70,60÷79,59	4555A-MC-090	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
79,60÷90,59	4555A-MC-100	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2
90,60÷100,59	4555A-MC-110	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2

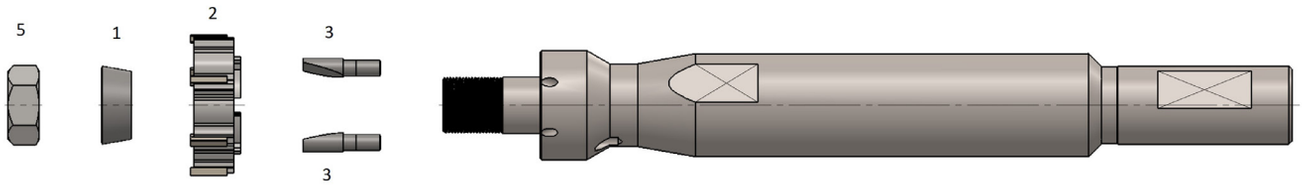
Series 4500

- Long Series
- Cylindrical Shank with flat
- With radial through tool coolant
- For through holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	E mm	ØF^{h7} mm	Number of teeth
17,60÷21,59	12	11	182	121	11	50	20	6
21,60÷25,59	12	11	182	121	12	50	20	6
25,60÷32,59	15,6	11	214	153	14	50	20	6
32,60÷40,59	22	14	249	179	16	56	25	6
40,60÷45,59	25,4	15	272	201	16	56	25	6
45,60÷60,59	30	20,5	294,5	214	18,5	60	32	6
60,60÷79,59	40	24,5	321,5	237	18,5	60	32	6
79,60÷100,59	56	28,5	343,5	245	18,5	70	40	8

SPARE PARTS

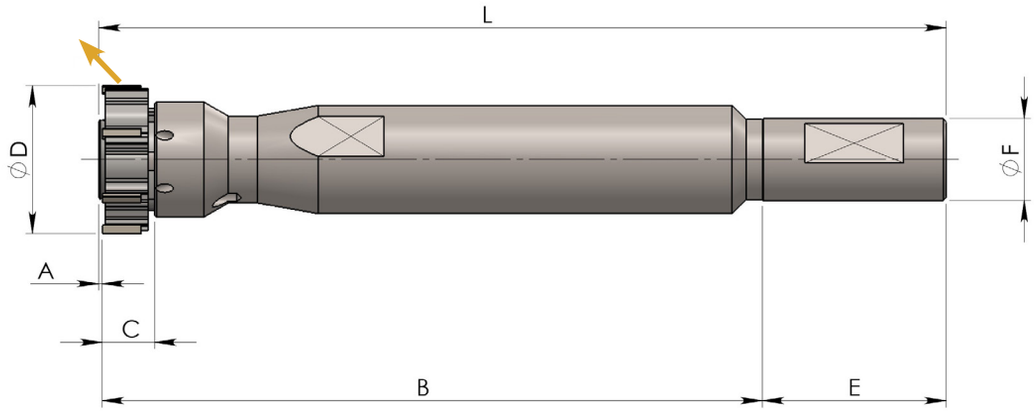


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 5	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4500-MC-010	2010-AC-010	2000-DA-010	hex 10	2000-CO-010	3
21,60÷25,59	4500-MC-020	2010-AC-010	2000-DA-010	hex 10	2000-CO-020	3
25,60÷32,59	4500-MC-030	2010-AC-020	2000-DA-020	hex 13	2000-CO-030	3
32,60÷40,59	4500-MC-040	2010-AC-030	2000-DA-060	hex 19	2000-CO-040	2
40,60÷45,59	4500-MC-050	2010-AC-040	2000-DA-090	hex 22	2000-CO-060	2
45,60÷49,59	4500-MC-060	2010-AC-050	2000-GH-880	hook 30	2000-CO-060	2
49,60÷60,59	4500-MC-070	2010-AC-050	2000-GH-880	hook 30	2000-CO-070	2
60,60÷70,59	4500-MC-080	2010-AC-060	2000-GH-900	hook 40	2000-CO-080	2
70,60÷79,59	4500-MC-090	2010-AC-060	2000-GH-900	hook 40	2000-CO-090	2
79,60÷90,59	4500-MC-100	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2
90,60÷100,59	4500-MC-110	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2

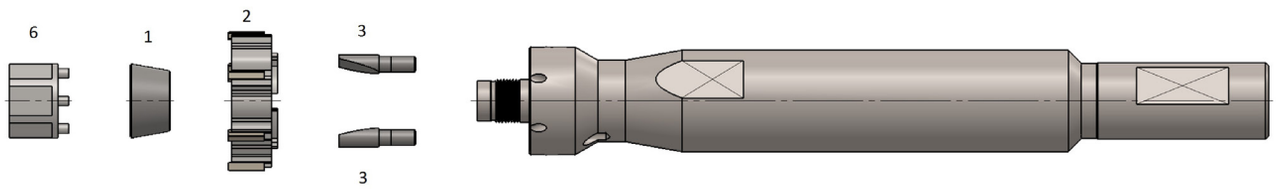
Series 4505

- Long Series
- Cylindrical Shank with flat
- With radial through tool coolant
- For blind holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	E mm	ØF^{h7} mm	Number of teeth
17,60÷21,59	11,2	1	172	121	11	50	20	6
21,60÷25,59	11,2	1	172	121	12	50	20	6
25,60÷32,59	15,1	1	204	153	14	50	20	6
32,60÷40,59	20,3	1	236	179	16	56	25	6
40,60÷45,59	24,1	1	258	201	16	56	25	6
45,60÷60,59	27,9	1,5	275,5	214	18,5	60	32	6
60,60÷79,59	37,1	1,5	298,5	237	18,5	60	32	6
79,60÷100,59	53,1	1,5	316,5	245	18,5	70	40	8

SPARE PARTS

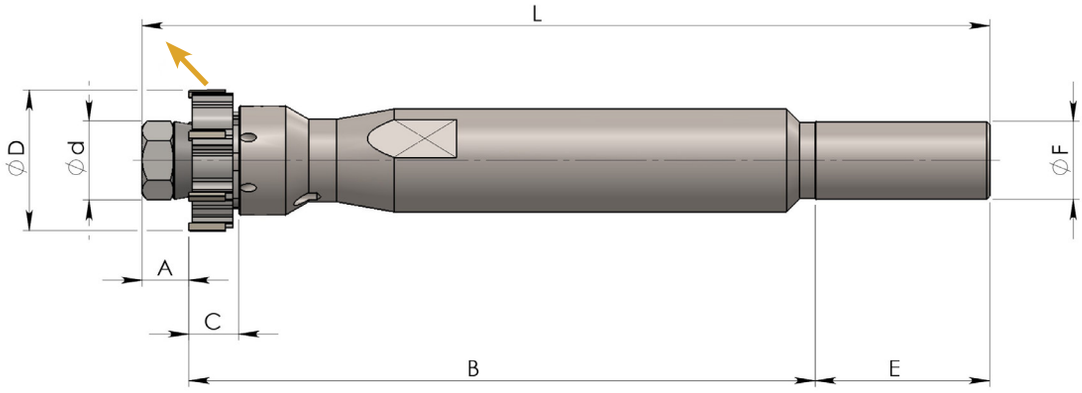


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	CONICAL RING II expansion	CONICAL RING III expansion	KEY 6	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4505-MC-010	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-010	3
21,60÷25,59	4505-MC-020	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-020	3
25,60÷29,59	4505-MC-030	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-030	3
29,60÷32,59	4505-MC-035	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-040	2
32,60÷36,59	4505-MC-040	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-040	2
36,60÷40,59	4505-MC-045	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-050	2
40,60÷45,59	4505-MC-050	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	hex 22	2000-CO-060	2
45,60÷49,59	4505-MC-060	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-060	2
49,60÷55,59	4505-MC-070	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-070	2
55,60÷60,59	4505-MC-075	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-080	2
60,60÷65,59	4505-MC-080	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-080	2
65,60÷70,59	4505-MC-085	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
70,60÷79,59	4505-MC-090	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
79,60÷90,59	4505-MC-100	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2
90,60÷100,59	4505-MC-110	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2

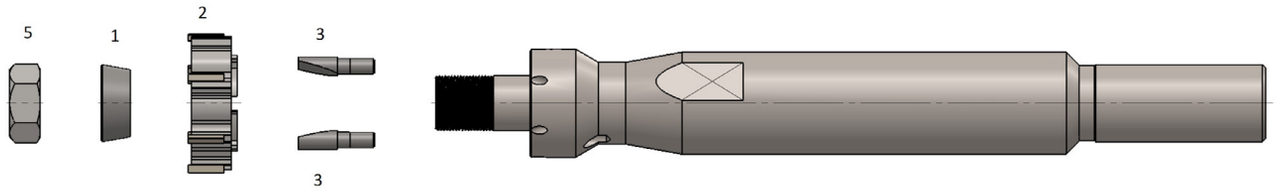
Series 4500A

- Long Series
- Cylindrical Shank without flat
- With radial through tool coolant
- For through holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	E mm	ØF^{h7} mm	Number of teeth
17,60÷21,59	12	11	182	121	11	50	20	6
21,60÷25,59	12	11	182	121	12	50	20	6
25,60÷32,59	15,6	11	214	153	14	50	20	6
32,60÷40,59	22	14	249	179	16	56	25	6
40,60÷45,59	25,4	15	272	201	16	56	25	6
45,60÷60,59	30	20,5	294,5	214	18,5	60	32	6
60,60÷79,59	40	24,5	321,5	237	18,5	60	32	6
79,60÷100,59	56	28,5	343,5	245	18,5	70	40	8

SPARE PARTS

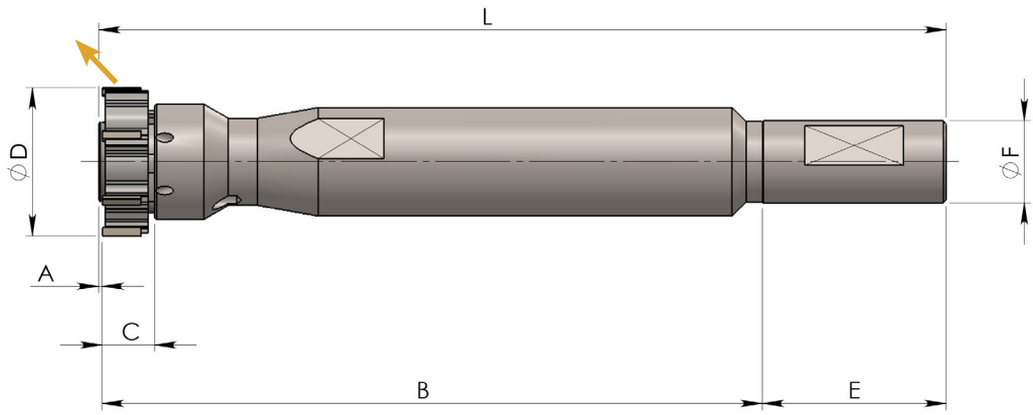


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 5	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4500A-MC-010	2010-AC-010	2000-DA-010	hex 10	2000-CO-010	3
21,60÷25,59	4500A-MC-020	2010-AC-010	2000-DA-010	hex 10	2000-CO-020	3
25,60÷32,59	4500A-MC-030	2010-AC-020	2000-DA-020	hex 13	2000-CO-030	3
32,60÷40,59	4500A-MC-040	2010-AC-030	2000-DA-060	hex 19	2000-CO-040	2
40,60÷45,59	4500A-MC-050	2010-AC-040	2000-DA-090	hex 22	2000-CO-060	2
45,60÷49,59	4500A-MC-060	2010-AC-050	2000-GH-880	hook 30	2000-CO-060	2
49,60÷60,59	4500A-MC-070	2010-AC-050	2000-GH-880	hook 30	2000-CO-070	2
60,60÷70,59	4500A-MC-080	2010-AC-060	2000-GH-900	hook 40	2000-CO-080	2
70,60÷79,59	4500A-MC-090	2010-AC-060	2000-GH-900	hook 40	2000-CO-090	2
79,60÷90,59	4500A-MC-100	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2
90,60÷100,59	4500A-MC-110	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2

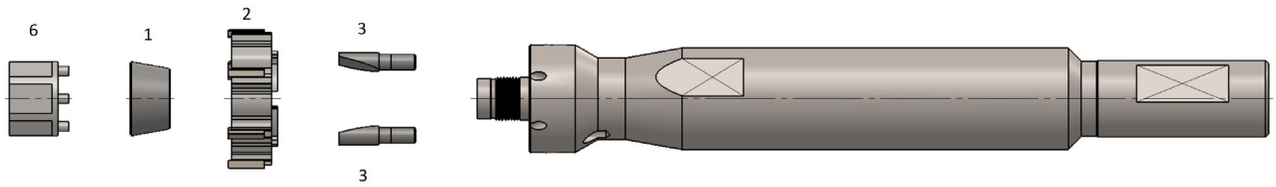
Series 4505A

- Long Series
- Cylindrical Shank without flat
- With radial through tool coolant
- For blind holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	E mm	ØF^{h7} mm	Number of teeth
17,60÷21,59	11,2	1	172	121	11	50	20	6
21,60÷25,59	11,2	1	172	121	12	50	20	6
25,60÷32,59	15,1	1	204	153	14	50	20	6
32,60÷40,59	20,3	1	236	179	16	56	25	6
40,60÷45,59	24,1	1	258	201	16	56	25	6
45,60÷60,59	27,9	1,5	275,5	214	18,5	60	32	6
60,60÷79,59	37,1	1,5	298,5	237	18,5	60	32	6
79,60÷100,59	53,1	1,5	316,5	245	18,5	70	40	8

SPARE PARTS

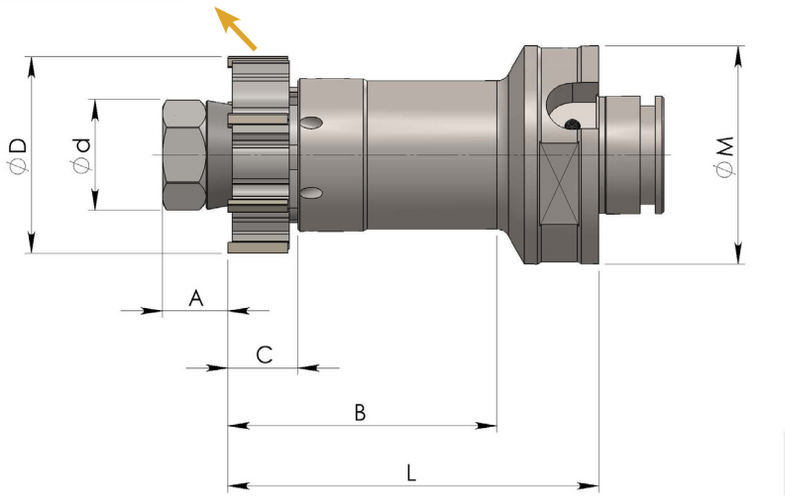


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	CONICAL RING II expansion	CONICAL RING III expansion	KEY 6	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4505A-MC-010	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-010	3
21,60÷25,59	4505A-MC-020	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-020	3
25,60÷29,59	4505A-MC-030	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-030	3
29,60÷32,59	4505A-MC-035	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-040	2
32,60÷36,59	4505A-MC-040	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-040	2
36,60÷40,59	4505A-MC-045	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-050	2
40,60÷45,59	4505A-MC-050	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	hex 22	2000-CO-060	2
45,60÷49,59	4505A-MC-060	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-060	2
49,60÷55,59	4505A-MC-070	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-070	2
55,60÷60,59	4505A-MC-075	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-080	2
60,60÷65,59	4505A-MC-080	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-080	2
65,60÷70,59	4505A-MC-085	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
70,60÷79,59	4505A-MC-090	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
79,60÷90,59	4505A-MC-100	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2
90,60÷100,59	4505A-MC-110	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2

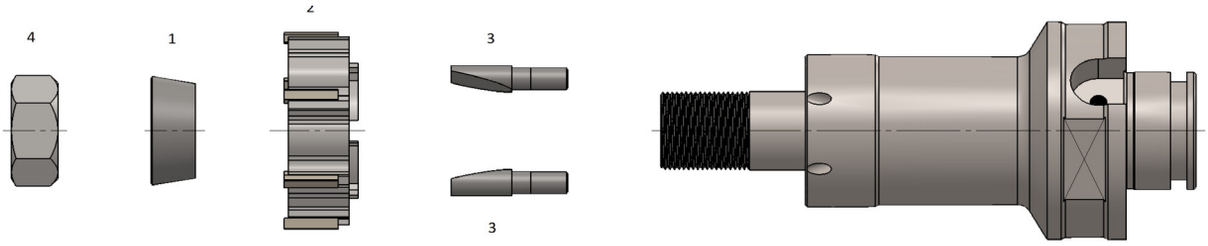
Series 4330

- Short Series
- Modular Shank
- With radial through tool coolant
- For through holes



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

SPARE PARTS

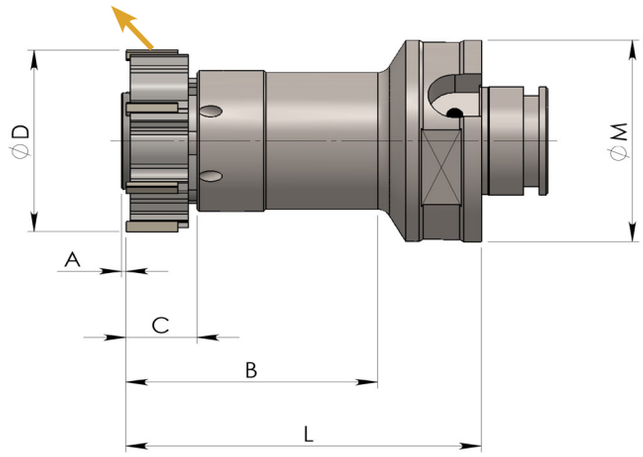


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 4	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4330-MC-010	2010-AC-010	2000-DA-010	hex 10	2000-CO-010	3
21,60÷25,59	4330-MC-020	2010-AC-010	2000-DA-010	hex 10	2000-CO-020	3
25,60÷32,59	4330-MC-030	2010-AC-020	2000-DA-020	hex 13	2000-CO-030	3
32,60÷40,59	4330-MC-040	2010-AC-030	2000-DA-060	hex 19	2000-CO-040	2
40,60÷45,59	4330-MC-050	2010-AC-040	2000-DA-090	hex 22	2000-CO-060	2
45,60÷49,59	4330-MC-060	2010-AC-050	2000-GH-880	hook 30	2000-CO-060	2
49,60÷60,59	4330-MC-070	2010-AC-050	2000-GH-880	hook 30	2000-CO-070	2
60,60÷70,59	4330-MC-080	2010-AC-060	2000-GH-900	hook 40	2000-CO-080	2
70,60÷79,59	4330-MC-090	2010-AC-060	2000-GH-900	hook 40	2000-CO-090	2
79,60÷90,59	4330-MC-100	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2
90,60÷100,59	4330-MC-110	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2

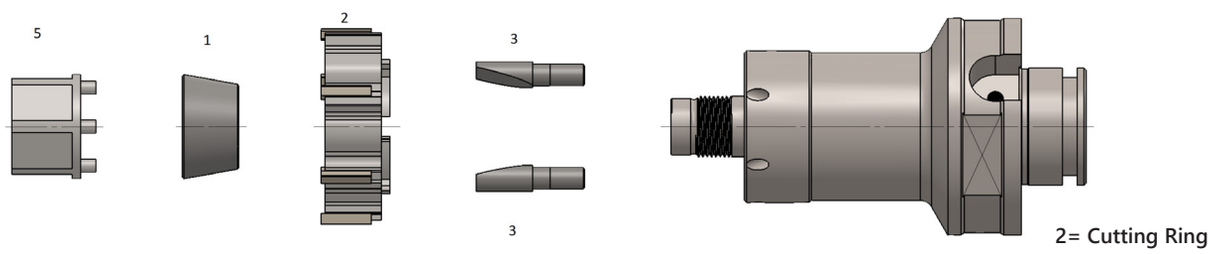
Series 4335

- Short Series
- Modular Shank
- With radial through tool coolant
- For blind holes



RANGE mm	Ød mm	A mm	L mm	B mm	C mm	ØM mm	Number of teeth
17,60÷21,59	11,2	1	75	55	11	50	6
21,60÷25,59	11,2	1	75	55	12	50	6
25,60÷32,59	15,1	1	80	60	14	50	6
32,60÷40,59	20,3	1	80	60	16	50	6
40,60÷45,59	24,1	1	80	60	16	50	6
45,60÷60,59	27,9	1,5	80	60	18,5	50	6
60,60÷79,59	37,1	1,5	90	65	18,5	63	6
79,60÷100,59	53,1	1,5	90	65	18,5	63	8

SPARE PARTS

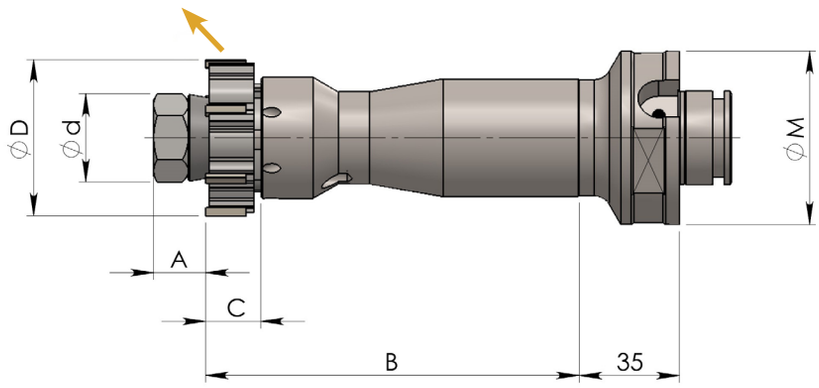


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	CONICAL RING II expansion	CONICAL RING III expansion	KEY 5	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4335-MC-010	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-010	3
21,60÷25,59	4335-MC-020	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-020	3
25,60÷29,59	4335-MC-030	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-030	3
29,60÷32,59	4335-MC-035	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-040	2
32,60÷36,59	4335-MC-040	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-040	2
36,60÷40,59	4335-MC-045	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-050	2
40,60÷45,59	4335-MC-050	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	hex 22	2000-CO-060	2
45,60÷49,59	4335-MC-060	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-060	2
49,60÷55,59	4335-MC-070	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-070	2
55,60÷60,59	4335-MC-075	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-080	2
60,60÷65,59	4335-MC-080	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-080	2
65,60÷70,59	4335-MC-085	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
70,60÷79,59	4335-MC-090	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
79,60÷90,59	4335-MC-100	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2
90,60÷100,59	4335-MC-110	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2

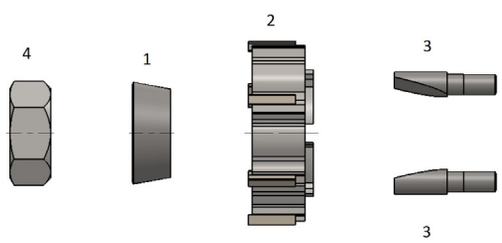
Series 4350

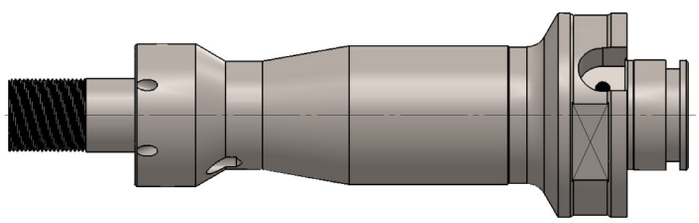
- Standard Series
- Modular Shank
- With radial through tool coolant
- For through holes



RANGE mm	Ød mm	A mm	B mm	C mm	ØM mm	Number of teeth
17,60÷21,59	12	11	81	11	50	6
21,60÷25,59	12	11	81	12	50	6
25,60÷32,59	15,6	11	102	14	50	6
32,60÷40,59	22	14	102	16	50	6
40,60÷45,59	25,4	15	102	16	50	6
45,60÷60,59	30	20,5	105	18,5	50	6
60,60÷79,59	40	24,5	105	18,5	63	6
79,60÷100,59	56	28,5	105	18,5	63	8

SPARE PARTS



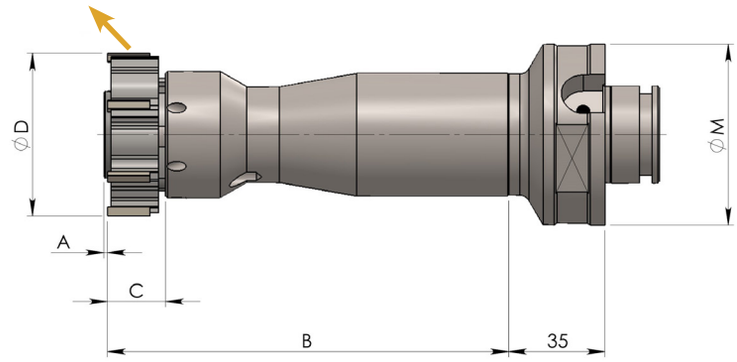


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 4	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4350-MC-010	2010-AC-010	2000-DA-010	hex 10	2000-CO-010	3
21,60÷25,59	4350-MC-020	2010-AC-010	2000-DA-010	hex 10	2000-CO-020	3
25,60÷32,59	4350-MC-030	2010-AC-020	2000-DA-020	hex 13	2000-CO-030	3
32,60÷40,59	4350-MC-040	2010-AC-030	2000-DA-060	hex 19	2000-CO-040	2
40,60÷45,59	4350-MC-050	2010-AC-040	2000-DA-090	hex 22	2000-CO-060	2
45,60÷49,59	4350-MC-060	2010-AC-050	2000-GH-880	hook 30	2000-CO-060	2
49,60÷60,59	4350-MC-070	2010-AC-050	2000-GH-880	hook 30	2000-CO-070	2
60,60÷70,59	4350-MC-080	2010-AC-060	2000-GH-900	hook 40	2000-CO-080	2
70,60÷79,59	4350-MC-090	2010-AC-060	2000-GH-900	hook 40	2000-CO-090	2
79,60÷90,59	4350-MC-100	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2
90,60÷100,59	4350-MC-110	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2

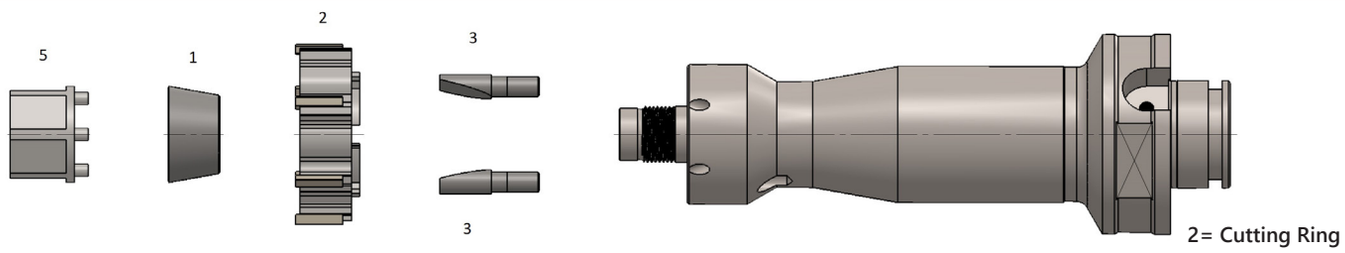
Series 4355

- Standard Series
- Modular Shank
- With radial through tool coolant
- For blind holes



RANGE mm	Ød mm	A mm	B mm	C mm	ØM mm	Number of teeth
17,60÷21,59	11,2	1	81	11	50	6
21,60÷25,59	11,2	1	81	12	50	6
25,60÷32,59	15,1	1	102	14	50	6
32,60÷40,59	20,3	1	102	16	50	6
40,60÷45,59	24,1	1	102	16	50	6
45,60÷60,59	27,9	1,5	105	18,5	50	6
60,60÷79,59	37,1	1,5	105	18,5	63	6
79,60÷100,59	53,1	1,5	105	18,5	63	8

SPARE PARTS

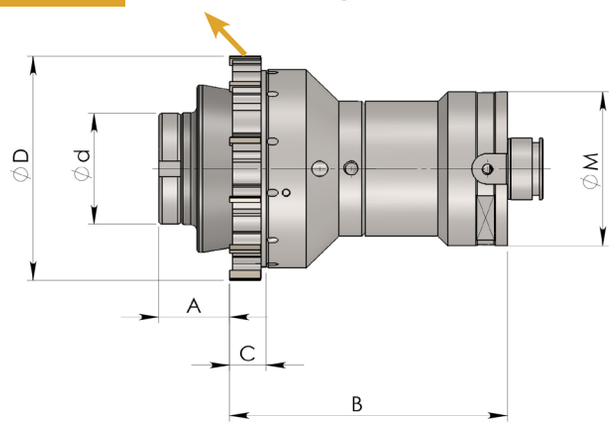


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	CONICAL RING II expansion	CONICAL RING III expansion	KEY 5	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4355-MC-010	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-010	3
21,60÷25,59	4355-MC-020	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-020	3
25,60÷29,59	4355-MC-030	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-030	3
29,60÷32,59	4355-MC-035	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-040	2
32,60÷36,59	4355-MC-040	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-040	2
36,60÷40,59	4355-MC-045	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-050	2
40,60÷45,59	4355-MC-050	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	hex 22	2000-CO-060	2
45,60÷49,59	4355-MC-060	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-060	2
49,60÷55,59	4355-MC-070	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-070	2
55,60÷60,59	4355-MC-075	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-080	2
60,60÷65,59	4355-MC-080	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-080	2
65,60÷70,59	4355-MC-085	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
70,60÷79,59	4355-MC-090	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
79,60÷90,59	4355-MC-100	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2
90,60÷100,59	4355-MC-110	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2

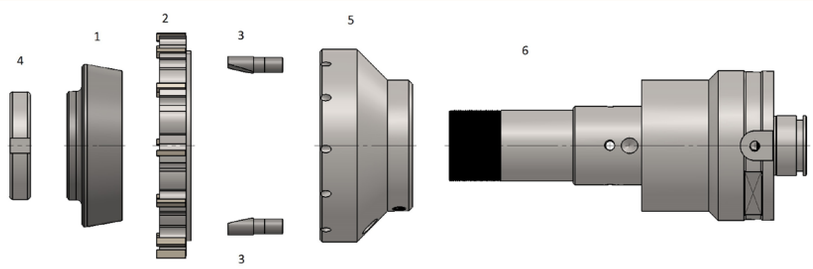
Series 4350

- Standard Series for big diameters
- Modular Shank
- With radial through tool coolant
- For through holes



RANGE mm	Ød mm	A mm	B mm	C mm	ØM mm	Number of teeth
100,60÷110,59	73,8	35,5	140	18,5	80	10
110,60÷115,59	80,8	35,5	140	18,5	80	12
115,60÷125,59	86,8	35,5	140	18,5	80	12
125,60÷139,59	90,8	35,5	140	18,5	80	12
139,60÷145,59	102,8	35,5	140	18,5	80	12
145,60÷155,59	107,8	35,5	140	18,5	80	12
155,60÷165,59	107,8	48,5	140	18,5	80	12
165,60÷175,59	117,8	48,5	140	18,5	80	12
175,60÷185,59	127,8	48,5	140	18,5	80	12
185,60÷195,59	137,8	48,5	140	18,5	80	12
195,60÷200,59	145,8	48,5	140	18,5	80	12

SPARE PARTS

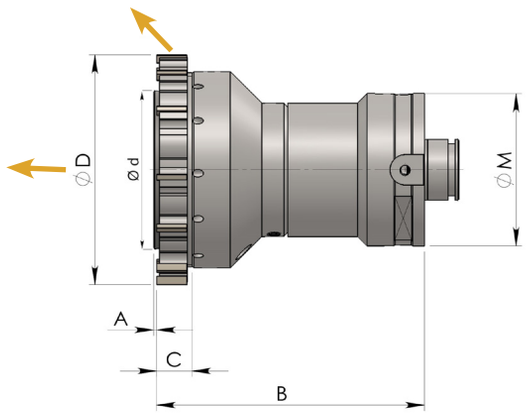


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 4	WRENCH	FLANGE 5	MANDREL 6	DRIVE PIN 3	NUMBER OF DRIVE PIN
100,60÷110,59	4350-MC-120	2060-BU-010	2000-GH-095	hook 58	4355-FL-035	4350-MA-120	2000-CO-090	2
110,60÷115,59	4350-MC-130	2060-BU-020	2000-GH-095	hook 58	4355-FL-045	4350-MA-120	2000-CO-090	2
115,60÷120,59	4350-MC-140	2060-BU-030	2000-GH-095	hook 58	4355-FL-055	4350-MA-120	2000-CO-090	2
120,60÷125,59	4350-MC-150	2060-BU-030	2000-GH-095	hook 58	4355-FL-065	4350-MA-120	2000-CO-090	2
125,60÷132,59	4350-MC-160	2060-BU-040	2000-GH-095	hook 58	4355-FL-075	4350-MA-120	2000-CO-100	2
132,60÷139,59	4350-MC-170	2060-BU-040	2000-GH-095	hook 58	4355-FL-085	4350-MA-120	2000-CO-100	2
139,60÷145,59	4350-MC-180	2060-BU-050	2000-GH-095	hook 58	4355-FL-095	4350-MA-120	2000-CO-100	2
145,60÷155,59	4350-MC-190	2060-BU-060	2000-GH-095	hook 58	4355-FL-105	4350-MA-120	2000-CO-110	2
155,60÷165,59	4350-MC-200	2060-BU-070	2000-GH-120	hook 90	4355-FL-115	4350-MA-200	2000-CO-110	2
165,60÷175,59	4350-MC-210	2060-BU-080	2000-GH-120	hook 90	4355-FL-125	4350-MA-200	2000-CO-110	2
175,60÷185,59	4350-MC-220	2060-BU-090	2000-GH-120	hook 90	4355-FL-135	4350-MA-200	2000-CO-120	2
185,60÷195,59	4350-MC-230	2060-BU-100	2000-GH-120	hook 90	4355-FL-145	4350-MA-200	2000-CO-120	2
195,60÷200,59	4350-MC-240	2060-BU-110	2000-GH-120	hook 90	4355-FL-155	4350-MA-200	2000-CO-120	2

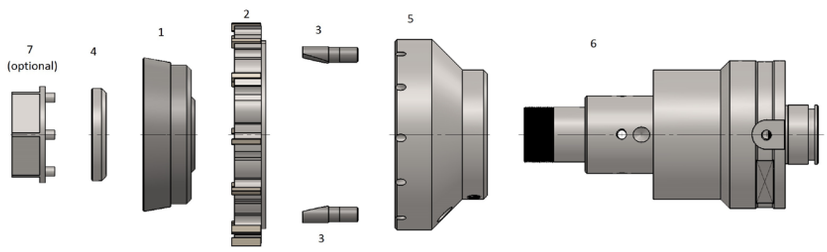
Series 4355

- Standard Series for big diameters
- Modular Shank
- With radial and central through tool coolant
- For blind holes



RANGE mm	Ød mm	A mm	B mm	C mm	ØM mm	Number of teeth
100,60÷110,59	70,3	1,5	140	18,5	80	10
110,60÷115,59	76,3	1,5	140	18,5	80	12
115,60÷125,59	83,3	1,5	140	18,5	80	12
125,60÷139,59	87,3	1,5	140	18,5	80	12
139,60÷145,59	99,3	1,5	140	18,5	80	12
145,60÷155,59	104,3	1,5	140	18,5	80	12
155,60÷165,59	104,3	1,5	140	18,5	80	12
165,60÷175,59	114,3	1,5	140	18,5	80	12
175,60÷185,59	124,3	1,5	140	18,5	80	12
185,60÷195,59	134,3	1,5	140	18,5	80	12
195,60÷200,59	142,3	1,5	140	18,5	80	12

SPARE PARTS

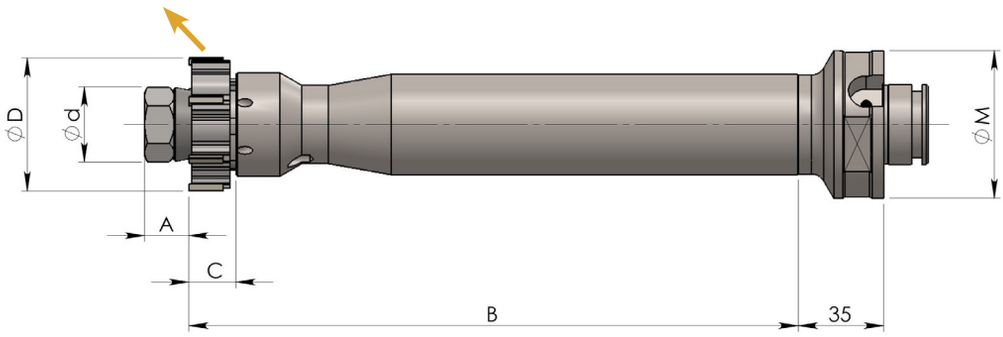


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 4	WRENCH	FLANGE 5	MANDREL 6	KEY (optional) 7	DRIVE PIN 3	NUMBER OF DRIVE PIN
100,60÷110,59	4355-MC-120	4001-AC-116	4001-GH-035	hex 46	4355-FL-035	4355-MA-120	4001-CH-135	2000-CO-090	2
110,60÷115,59	4355-MC-130	4001-AC-126	4001-GH-035	hex 46	4355-FL-045	4355-MA-120	4001-CH-135	2000-CO-090	2
115,60÷120,59	4355-MC-140	4001-AC-136	4001-GH-035	hex 46	4355-FL-055	4355-MA-120	4001-CH-135	2000-CO-090	2
120,60÷125,59	4355-MC-150	4001-AC-136	4001-GH-035	hex 46	4355-FL-065	4355-MA-120	4001-CH-135	2000-CO-090	2
125,60÷132,59	4355-MC-160	4001-AC-146	4001-GH-035	hex 46	4355-FL-075	4355-MA-120	4001-CH-135	2000-CO-100	2
132,60÷139,59	4355-MC-170	4001-AC-146	4001-GH-035	hex 46	4355-FL-085	4355-MA-120	4001-CH-135	2000-CO-100	2
139,60÷145,59	4355-MC-180	4001-AC-156	4001-GH-035	hex 46	4355-FL-095	4355-MA-120	4001-CH-135	2000-CO-100	2
145,60÷155,59	4355-MC-190	4001-AC-166	4001-GH-035	hex 46	4355-FL-105	4355-MA-120	4001-CH-135	2000-CO-110	2
155,60÷165,59	4355-MC-200	4001-AC-176	4001-GH-115	hex 46	4355-FL-115	4355-MA-200	4001-CH-115	2000-CO-110	2
165,60÷175,59	4355-MC-210	4001-AC-186	4001-GH-115	hex 46	4355-FL-125	4355-MA-200	4001-CH-115	2000-CO-110	2
175,60÷185,59	4355-MC-220	4001-AC-196	4001-GH-115	hex 46	4355-FL-135	4355-MA-200	4001-CH-115	2000-CO-120	2
185,60÷195,59	4355-MC-230	4001-AC-117	4001-GH-115	hex 46	4355-FL-145	4355-MA-200	4001-CH-115	2000-CO-120	2
195,60÷200,59	4355-MC-240	4001-AC-127	4001-GH-115	hex 46	4355-FL-155	4355-MA-200	4001-CH-115	2000-CO-120	2

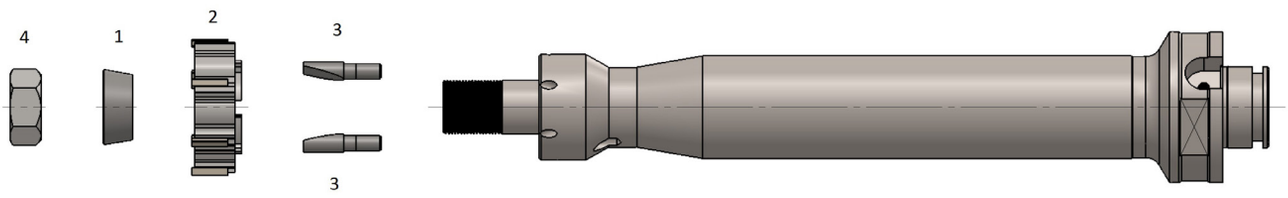
Series 4300

- Long Series
- Modular Shank
- With radial through tool coolant
- For through holes



RANGE mm	Ød mm	A mm	B mm	C mm	ØM mm	Number of teeth
17,60÷21,59	12	11	121	11	50	6
21,60÷25,59	12	11	121	12	50	6
25,60÷32,59	15,6	11	153	14	50	6
32,60÷40,59	22	14	179	16	50	6
40,60÷45,59	25,4	15	201	16	50	6
45,60÷60,59	30	20,5	214	18,5	50	6
60,60÷79,59	40	24,5	237	18,5	63	6
79,60÷100,59	56	28,5	245	18,5	63	8

SPARE PARTS

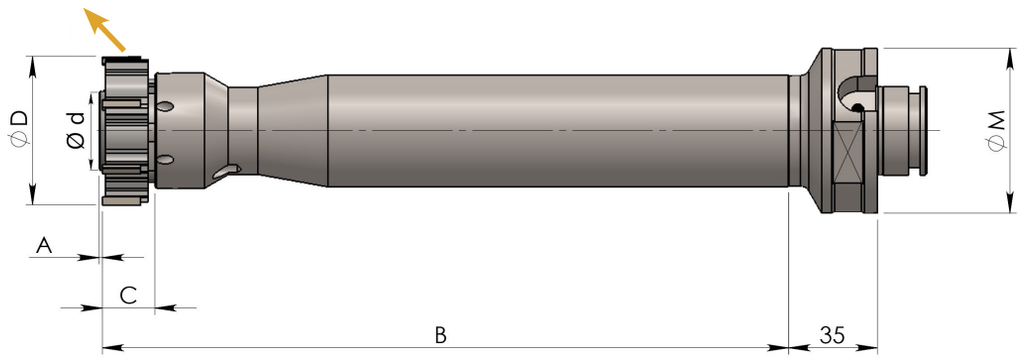


2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	RING NUT OR NUT 4	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4300-MC-010	2010-AC-010	2000-DA-010	hex 10	2000-CO-010	3
21,60÷25,59	4300-MC-020	2010-AC-010	2000-DA-010	hex 10	2000-CO-020	3
25,60÷32,59	4300-MC-030	2010-AC-020	2000-DA-020	hex 13	2000-CO-030	3
32,60÷40,59	4300-MC-040	2010-AC-030	2000-DA-060	hex 19	2000-CO-040	2
40,60÷45,59	4300-MC-050	2010-AC-040	2000-DA-090	hex 22	2000-CO-060	2
45,60÷49,59	4300-MC-060	2010-AC-050	2000-GH-880	hook 30	2000-CO-060	2
49,60÷60,59	4300-MC-070	2010-AC-050	2000-GH-880	hook 30	2000-CO-070	2
60,60÷70,59	4300-MC-080	2010-AC-060	2000-GH-900	hook 40	2000-CO-080	2
70,60÷79,59	4300-MC-090	2010-AC-060	2000-GH-900	hook 40	2000-CO-090	2
79,60÷90,59	4300-MC-100	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2
90,60÷100,59	4300-MC-110	2010-AC-070	2000-GH-920	hook 56	2000-CO-090	2

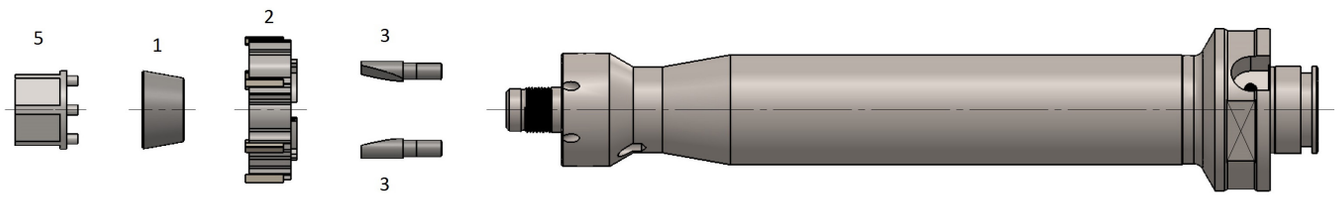
Series 4305

- Long Series
- Modular Shank
- With radial through tool coolant
- For blind holes



RANGE mm	Ød mm	A mm	B mm	C mm	ØM mm	Number of teeth
17,60÷21,59	11,2	1	121	11	50	6
21,60÷25,59	11,2	1	121	12	50	6
25,60÷32,59	15,1	1	153	14	50	6
32,60÷40,59	20,3	1	179	16	50	6
40,60÷45,59	24,1	1	201	16	50	6
45,60÷60,59	27,9	1,5	214	18,5	50	6
60,60÷79,59	37,1	1,5	237	18,5	63	6
79,60÷100,59	53,1	1,5	245	18,5	63	8

SPARE PARTS



2= Cutting Ring

RANGE mm	COMPLETE MANDREL WITHOUT CUTTING RING	CONICAL RING 1	CONICAL RING II expansion	CONICAL RING III expansion	KEY 5	WRENCH	DRIVE PIN 3	NUMBER OF DRIVE PIN
17,60÷21,59	4305-MC-010	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-010	3
21,60÷25,59	4305-MC-020	4001-AC-115	4001-AC-215	-	4001-CH-015	hex 10	2000-CO-020	3
25,60÷29,59	4305-MC-030	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-030	3
29,60÷32,59	4305-MC-035	4001-AC-125	4001-AC-225	4001-AC-325	4001-CH-025	hex 13	2000-CO-040	2
32,60÷36,59	4305-MC-040	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-040	2
36,60÷40,59	4305-MC-045	4001-AC-135	4001-AC-235	4001-AC-335	4001-CH-035	hex 18	2000-CO-050	2
40,60÷45,59	4305-MC-050	4001-AC-145	4001-AC-245	4001-AC-345	4001-CH-045	hex 22	2000-CO-060	2
45,60÷49,59	4305-MC-060	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-060	2
49,60÷55,59	4305-MC-070	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-070	2
55,60÷60,59	4305-MC-075	4001-AC-155	4001-AC-255	4001-AC-355	4001-CH-055	hex 26	2000-CO-080	2
60,60÷65,59	4305-MC-080	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-080	2
65,60÷70,59	4305-MC-085	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
70,60÷79,59	4305-MC-090	4001-AC-165	4001-AC-265	4001-AC-365	4001-CH-065	hex 34	2000-CO-090	2
79,60÷90,59	4305-MC-100	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2
90,60÷100,59	4305-MC-110	4001-AC-185	4001-AC-285	4001-AC-385	4001-CH-085	hex 46	2000-CO-090	2

WORKING PARAMETERS

MATERIAL TO WORK	MATERIAL EXAMPLE	ALLOY COATING SPEED	THROUGH HOLE	INTERRUPTED THROUGH HOLE	BLIND HOLE	INTERRUPTED BLIND HOLE
Unalloyed	ST37 ST52	Cermet Uncoated Speed= 150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Low alloyed	C40 C55	Cermet Uncoated Speed= 140 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Structural steel	41CrMo4 100Cr6	Cermet Uncoated Speed= 100÷130 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Fused Metal	H13 X6CrMo4	Cermet Uncoated Speed= 70÷80 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G lead-in otherwise F lead-in
Austenitics stainless steel	AISI 304 L AISI 316 L	Cermet Uncoated Speed= 50÷60 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
Martensitic stainless steel	AISI 416 AISI 430	Cermet Uncoated Speed= 40÷50 m/min	E-H-Z lead-in	M-H-Z lead-in	G-H-Z lead-in	G-H-Z lead-in
ADI cast iron	ADI 800 ADI 1000	Carbide H coated Speed=80÷100 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Spheroidal cast iron	GS 400÷700	Cermet K coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Grey cast iron	GG25 GG30	Carbide H coated Speed=90÷150 m/min	M-V lead-in otherwise G-N lead-in	M-V lead-in otherwise G lead-in	G-F lead-in otherwise V lead-in	G-F lead-in otherwise V lead-in
Alluminium <3% SI	6061 7075	Carbide Uncoated Speed=30÷60 m/min	E-G lead-in otherwise N-M-A lead-in	M-G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in
Alluminium >7% SI	ALSI 12	PCD Uncoated Speed=100÷1000 m/min	G lead-in	G lead-in	G lead-in otherwise F lead-in	G-F lead-in
Copper	EN2.1182 CW004A	Carbide Uncoated Speed=150 m/min	E lead-in otherwise N-G-A lead-in	M lead-in otherwise G lead-in	G-F lead-in otherwise A lead-in	G-F lead-in otherwise N lead-in
Bronze	CuSn12	Carbide D coated Speed=80÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Leaded Brass	CuZn39Pb3	Carbide Uncoated Speed=30÷100 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Brass without lead	CW724R	Carbide D coated Speed=80÷120 m/min	E-G lead-in otherwise N-M lead-in	M-G lead-in	G-F lead-in	G-F lead-in
Titanium	Ti-6Al-4V	Carbide Uncoated Speed=10÷20 m/min	T lead-in	T lead-in	F-T lead-in	F-T lead-in
Heat Resistant Alloys	Inconel 718 Hastelloy	Carbide K coated Speed=15÷20 m/min	G lead-in	G lead-in	G-F lead-in	G-F lead-in

STOCK ALLOWANCE

DIAMETER (mm)	STOCK ALLOWANCE ON DIAMETER (mm)
32,61÷79,59	0,10÷0,15
79,60÷100,59	0,10÷0,20
100,60÷110,59	0,10÷0,30
110,59÷200,00	0,10÷0,30

FEED Fz (mm/teeth)

NUMBER OF TEETH	6	8	10	12
LEAD IN	Ø 32,60÷79,59	Ø 79,60÷100,59	Ø 100,60÷110,59	Ø 110,60÷200,00
A	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,13	Fz=0,07÷0,18
G	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18
E	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,09÷0,22	Fz=0,10÷0,27
M	Fz=0,06÷0,15	Fz=0,09÷0,20	Fz=0,06÷0,15	Fz=0,07÷0,18
N	Fz=0,06÷0,15	Fz=0,09÷0,20	Fz=0,09÷0,22	Fz=0,10÷0,27
T	Fz=0,04÷0,10	Fz=0,05÷0,13	Fz=0,10÷0,17	Fz=0,10÷0,17
F	Fz=0,04÷0,10	Fz=0,06÷0,13	Fz=0,06÷0,15	Fz=0,07÷0,18

N.B. To work interrupted holes, the feed rate must be reduced by 50%.

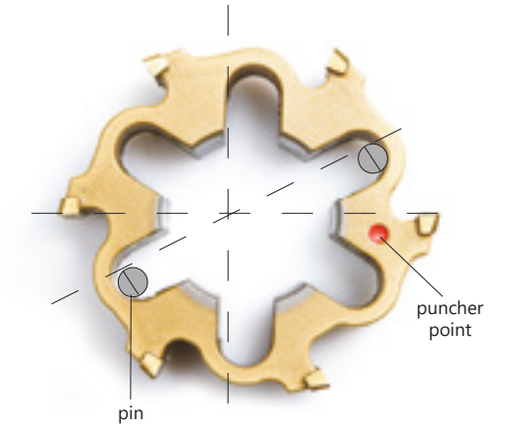
ASSEMBLY INSTRUCTION - expanding reamer for through holes

OPERATION 1

Prepare the components by thoroughly cleaning the mating surfaces.
Apply the anti-seize paste on the thread and expansion cone.

OPERATION 2

Match the punching on the crown (1) with the one on the mandrel (2). This operation will ensure that the cooling holes will be aligned with the cutting edges and that the driving pins will be correctly positioned (3).
If there is no punching on the spindle, remember that the driving pin must be positioned in the slot in front of the crown tooth with the punching



OPERATION 3

Rotate the crown slightly clockwise by hand until the side of the slot comes into contact with the pin.

OPERATION 4

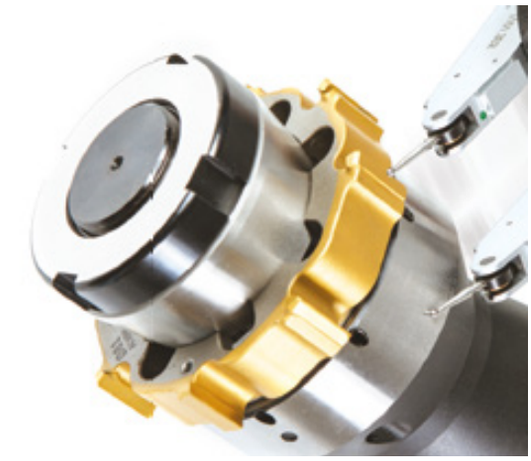
Gradually close the ring-nut by expanding the cutting ring until reaching the required size.

Attention: the thread is left-handed, rotate counterclockwise.

OPERATION 5

Measure the diameter only on the two opposing cutting edges identified by the punching.

Attention: on Cermet reamers do not touch the cutting edge.



OPERATION 6

Check the concentricity at the end of the spindle on the machine.
The value has to be until 5 µm.

ASSEMBLY INSTRUCTION - expanding reamer for blind holes

OPERATION 1

Prepare the components by thoroughly cleaning the mating surfaces.
Apply the anti-seize paste on the thread and expansion cone.
The hexagonal key is supplied with the mandrel.

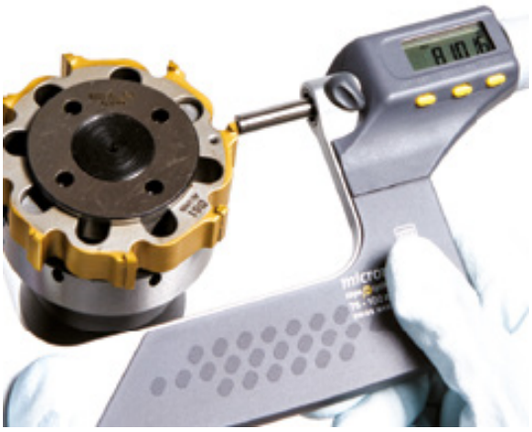
OPERATION 2

Match the punching on the crown (1) with that on the mandrel (2). This will ensure that the cooling holes are aligned with the cutting edges and that the driving pins are correctly positioned (3).
If there is no punching on the spindle, keep in mind that the driving pin must be positioned in the slot in front of the crown tooth with the punching

OPERATION 3

Use the hex key and gradually tighten until the required size is reached.

Attention: the thread is left-handed, rotate counterclockwise.



OPERATION 4

Measure the diameter only on the two opposing cutting edges identified by the punching.

Attention: on Cermet reamers do not touch the cutting edge.

OPERATION 5

Turn the key slightly clockwise to bring the side of the key into contact with the pin.

OPERATION 6

Check the concentricity at the end of the spindle on the machine.
The value has to be until 5 µm.

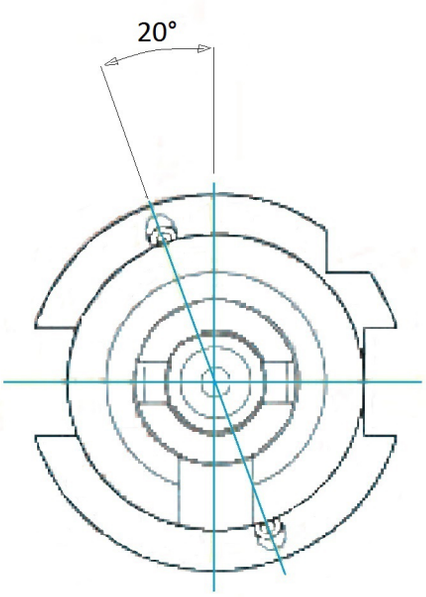
MODULAR SYSTEM

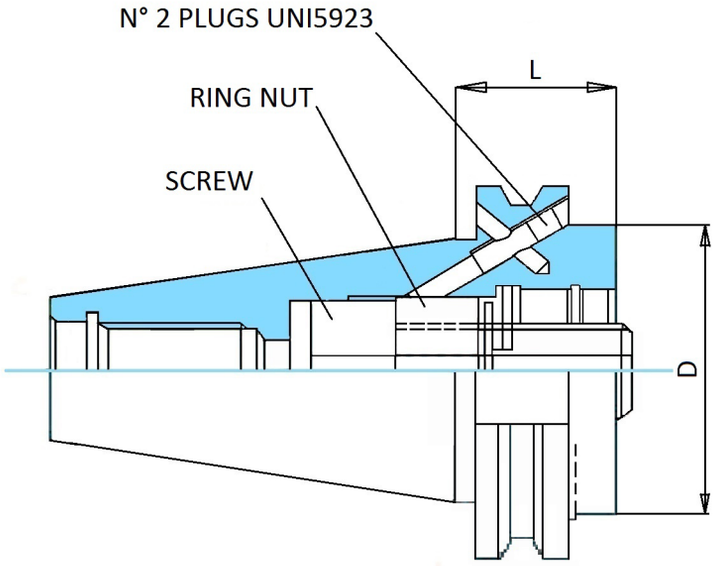
NOTE:

- Large range of shanks for different machine types
- Higly adjustable for improved concentricity
- All shanks are available with through coolant

COURTESY OF

BASIC SHANKS DIN 69871/1 B+A(1)

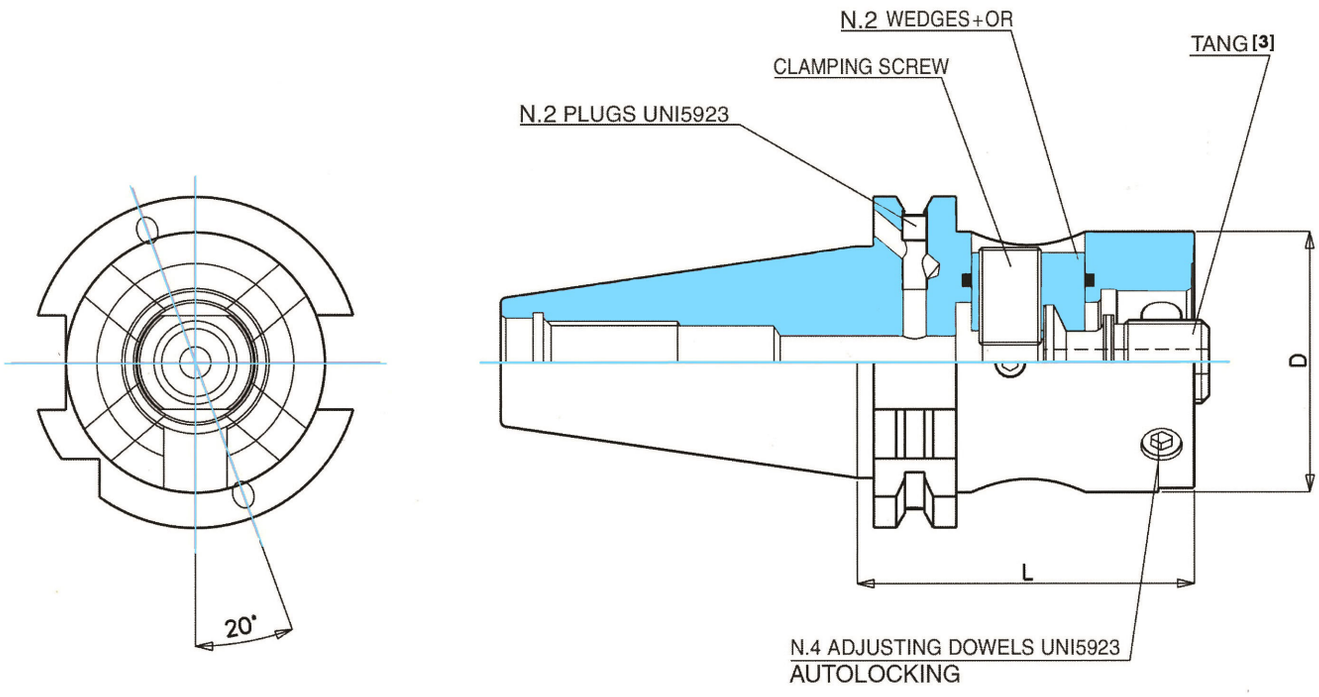




ORDER CODE	ISO	MODULAR REDUCER D	L	STANDARD EQUIPMENT			ACCESSORIES	
				screw	ring nut	plugs	modular screw key	modular ring nut key
02B.40.50.27	40	50	27	TAB2808	TAB2809	M5x5TG	hex 10	ATR8851
02B.40.63.50	40	63	50	TAB9038	TAB2793	M5x5TG	hex 12	ATR8851
02B.40.80.50	40	80	50	TAB9038	TAB2793	M5x5TG	hex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

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

BASIC SHANKS DIN 69871/1 B+A(1) MODULAR WITH LATERAL CLAMPING(2) AND RADIAL ADJUSTMENT



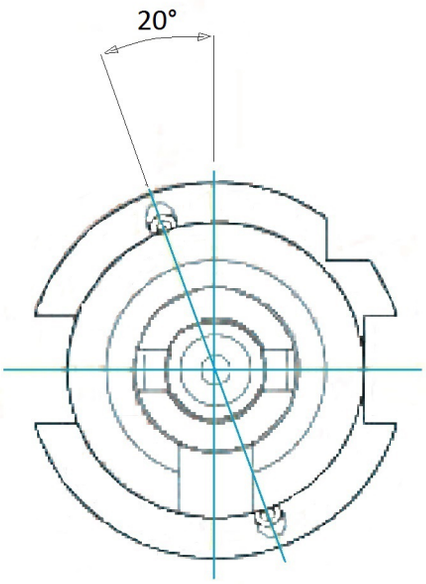
ORDER CODE	ISO	MODULAR REDUCER D	L	STANDARD EQUIPMENT					ACCESSORIES	
				wedges+OR	clamping screw	adjusting dowels	plugs	TANG(3)	clampig screw key	tang key
02B.40.50L.65	40	50	65	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hex 6	fixed 18
02B.40.63L.85	40	63	85	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	hex 6	fixed 24
02B.45.50L.70	45	50	70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hex 6	fixed 18
02B.45.63L.70	45	63	70	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	hex 6	fixed 24
02B.50.50L.70	50	50	70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hex 6	fixed 18
02B.50.63L.70	50	63	70	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG	ATT14104	hex 6	fixed 24
02B.50.80L.70	50	80	70	ATR18775.2.3	ATR18775.1	M8x1x20G	M5x5TG	ATT14104	hex 6	fixed 24

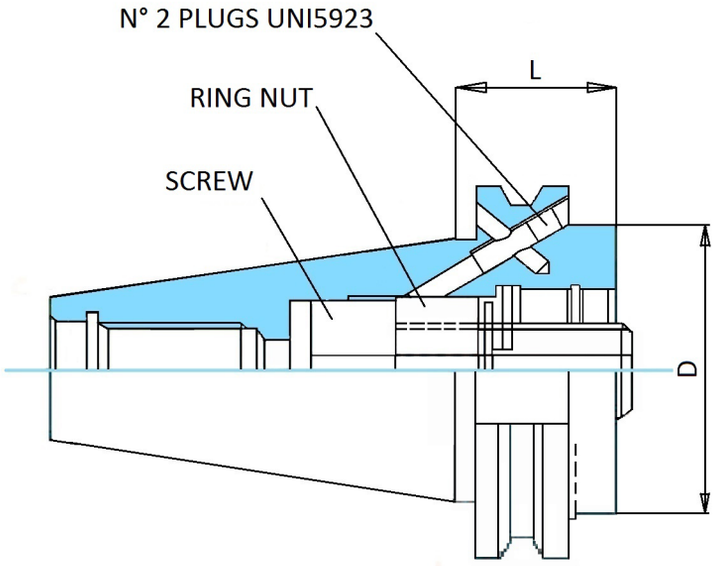
(1) Basic shanks can be converted into DIN 69871/A coolant by screwing the two plugs clockwise to the end of their stroke

(2) The modular system has lateral clamping which enables an efficient quick release of the tools. Light torque exerted on the clamping screw transmits high axial forces which provides 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

BASIC SHANKS
JMTBA MAS-403 BT B+BT(1)

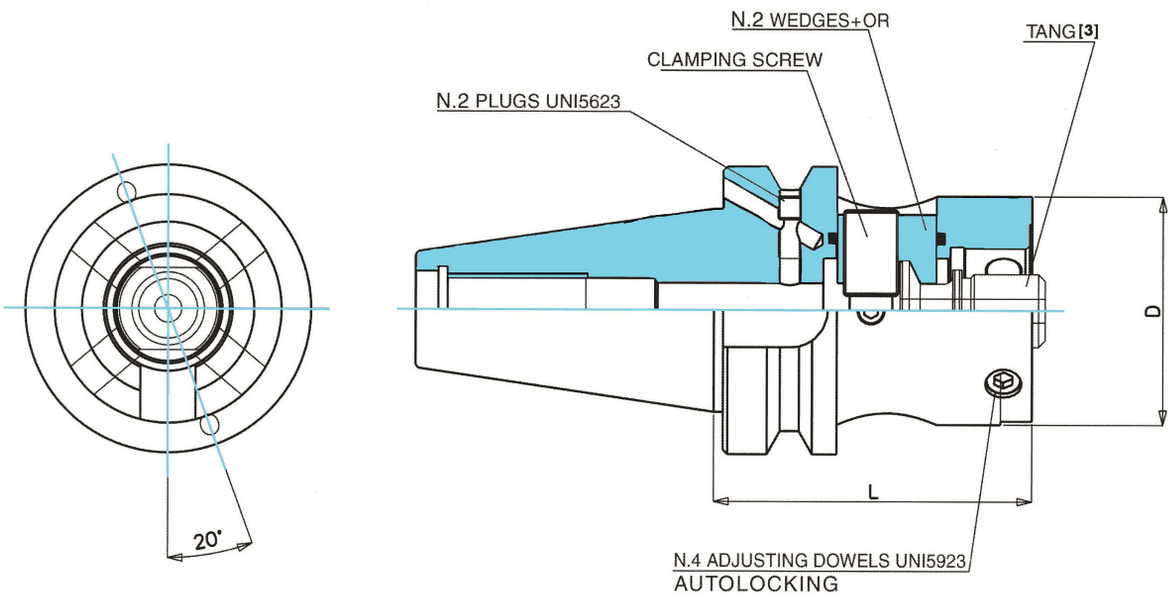




ORDER CODE	BT	MODULAR REDUCER D	L	STANDARD EQUIPMENT			ACCESSORIES	
				screw	ring nut	plugs	modular screw key	modular ring nut key
BTB.40.50.50	40	50	50	TAB2808	TAB2809	M5x5TG	hex 10	ATR8851
BTB.40.63.50	40	63	50	TAB9038	TAB2793	M5x5TG	hex 12	ATR8851
BTB.50.50.50	50	50	50	TAB2808	TAB2809	M5x5TG	hex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

BASIC SHANKS JMTBA MAS-403 BT B+BT(1) MODULAR WITH LATERAL CLAMPING(2) AND RADIAL ADJUSTMENT



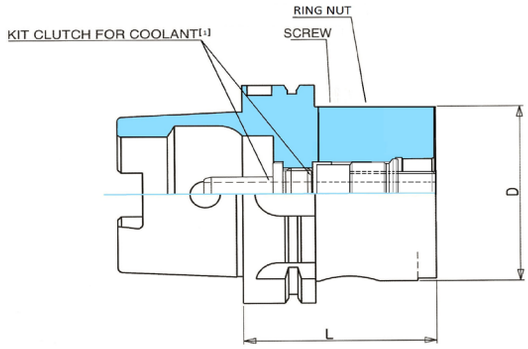
ORDER CODE	BT	MODULAR REDUCER D	L	STANDARD EQUIPMENT					ACCESSORIES	
				wedges+OR	clamping screw	adjusting dowels	plugs	TANG(3)	clampig screw key	tang key
BTB.40.50L.70	40	50	70	ATR14102.2.3	ATR14102.1	M8x1x10G	M5x5TG	ATT14103	hex 6	fixed 18
BTB.40.63L.80	40	63	80	ATR14108.2.3	ATR14108.1	M8x1x14G	M5x5TG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

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

(2) The modular system has lateral clamping which enables an efficient quick release of the tools. Light torque exerted on the clamping screw transmits high axial forces which provides 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

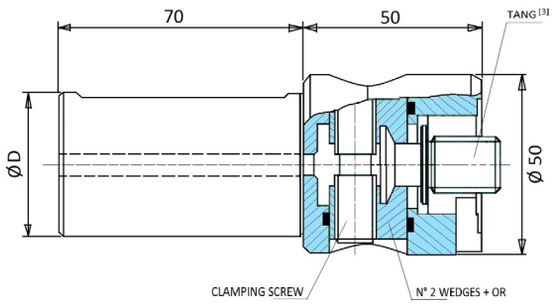
BASIC SHANKS
HSK-A DIN 69893/1



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(1)
HSK-A.63.50.75	63	53	75	TAB2808	TAB2809	hex 10	ATR8851	ATR23856	ATT23728
HSK-A.63.63.85	63	63	85	TAB2795	TAB2793	hex 14	ATR8851	ATR23856	ATT23728
HSK-A.100.50.80	100	50	80	TAB2808	TAB2809	hex 10	ATR8851	ATR23856	ATT23656
HSK-A.100.63.90	100	63	90	TAB2795	TAB2793	hex 14	ATR8851	ATR23856	ATT23656
HSK-A.100.80.90	100	80	90	TAB2795	TAB2793	hex 14	ATR8851	ATR23856	ATT23656

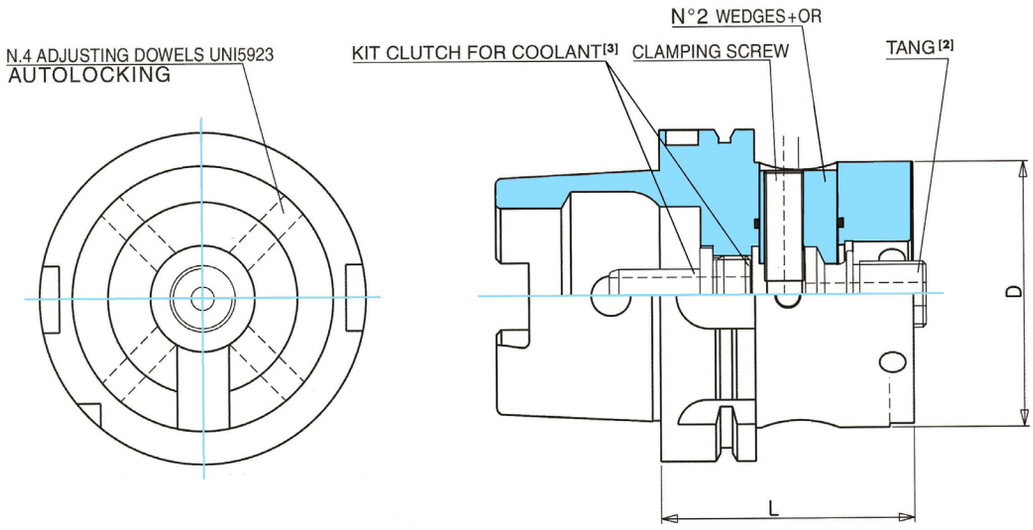
(1) Coolant clutch kits are supplied separately on request

ADJUSTING CYLINDRICAL BASIC SHANKS



ORDER CODE	D	STANDARD EQUIPMENT				ACCESSORIES	
		wedges+OR	clamping screw	adjusting dowels	TANG(3)	clampig screw key	tang key
CIL.25.50.50	25	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	hex 6	fixed 18
CIL.32.50.50	32	ATR14108.2.3	ATR14102.1	M8x1x10G	ATT14103	hex 6	fixed 18
CIL.40.50.50	40	ATR14102.2.3	ATR14102.1	M8x1x10G	ATT14103	hex 6	fixed 18

BASIC SHANKS HSK-A DIN 69893/1 MODULAR WITH LATERAL CLAMPING(1) AND RADIAL ADJUSTMENT



Max radial adjustment: +/- 0,2 mm on Ø

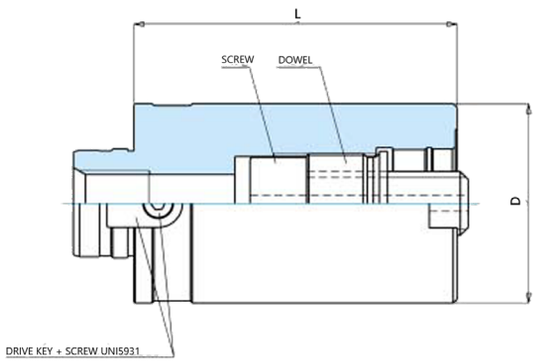
ORDER CODE	HSK	MODULAR REDUCER D	L	STANDARD EQUIPMENT			ACCESSORIES			
				wedges+OR	clamping screw	adjusting dowels	clamping screw key	tang key(2)	key kit clutch for coolant	kit clutch for coolant(3)
HSK-A.63.50L.70	63	50	70	ATR14102.2.3	ATR14102.1	M8x1x10G	hex 6	fixed 18 ATT14103	ATR23856	ATT23728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

(1) The modular system has lateral clamping which enables an efficient quick release of the tools. Light torque exerted on the clamping screw transmits high axial forces which provides stiffness and extreme acurancy 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.

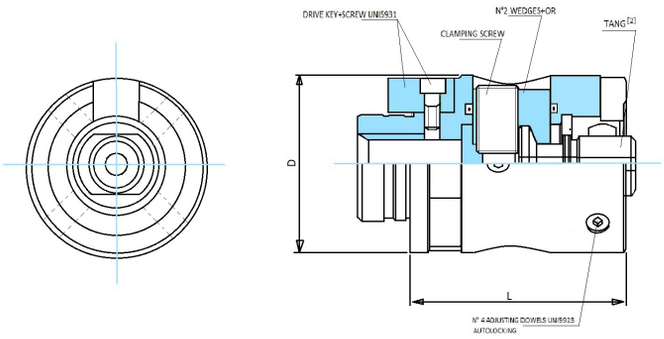
MODULAR EXTENSION



ORDER CODE	MODULAR SHANK D	L	STANDARD EQUIPMENT				ACCESSORIES	
			screw	ring nut	drive key	dowel	ring nut key	adjusting dowel key
10.50R.50.60	50	60	TAB2808	TAB2809	TAB3924	M4x8V	ATR8851	hex 10
10.50R.50.100	50	100	TAB2808	TAB2809	TAB3924	M4x8V	ATR8851	hex 10
10.63R.63.80	63	80	TAB2795	TAB2793	TAB3923.1	M6x12V	ATR8851	hex 14
10.63R.63.120	63	120	TAB2795	TAB2793	TAB3923.1	M6x12V	ATR8851	hex 14
10.80R.80.80	80	80	TAB2795	TAB2793	TAB3923.2	M6x16V	ATR8851	hex 14
10.80R.80.120	80	120	TAB2795	TAB2793	TAB3923.2	M6x16V	ATR8851	hex 14
10.80R.80.160	80	160	TAB2795	TAB2793	TAB3923.2	M6x16V	ATR8851	hex 14

N.B. To use with adjustable basic shanks.

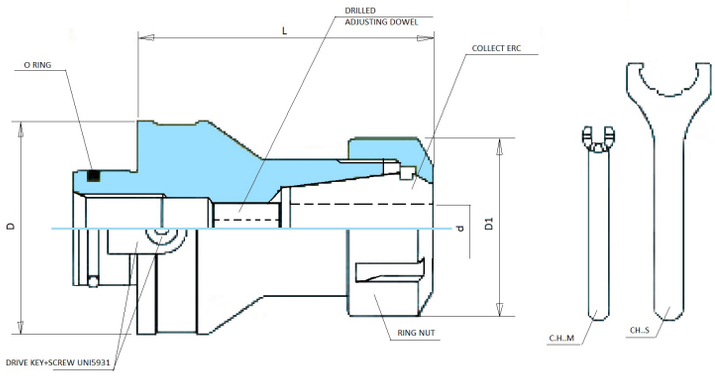
MODULAR EXTENSION "LATERAL CLAMPING" AND "RADIAL ADJUSTABLE"



ORDER CODE	MODULAR SHANK D	L	STANDARD EQUIPMENT					ACCESSORIES	
			wedges+OR	clamping screw	drive key	dowels	adjusting dowel	ring nut key	adjusting dowel key
10.50.50L.60	50	60	ATR14102.2.3	ATR14102.1	TAB3924	M4x8V	M8x1x10G	ATR8851	hex 10
10.63.63L.80	63	80	ATR14108.2.3	ATR14108.1	TAB3923.1	M6x12V	M8x1x14G	ATR8851	hex 14
10.80.80L.80	80	80	ATR18775.2.3	ATR18775.1	TAB3923.2	M6x16V	M8x1x10G	ATR8851	hex 14

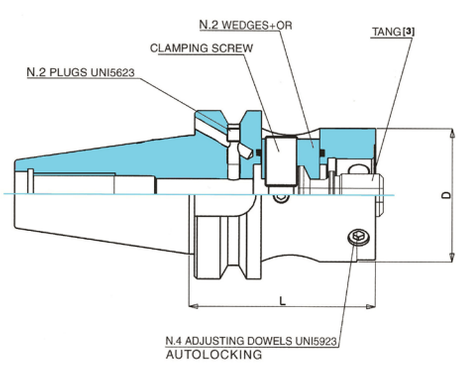
N.B. To use with fixed basic shanks.

COLLECT CHUCK ADAPTORS
ERC DIN 6499-B
FOR SHANK WITH RADIAL ADJUSTMENT



ORDER CODE	MODULAR SHANK D	COLLECT REDUCER	d	D1	L	STANDARD EQUIPMENT					ACCESSORIES	
						screw	ring nut	drive key	dowel	0 ring	ring nut key	adjusting dowel key
30.50R.25.70	50	ERC25	0,5÷16	42	70	M4x8V	G25S	TAB3924	M12x16GF	130	CH25S	hex 6
30.50R.32.70	50	ERC32	1÷20	50	70	M4x8V	G32S	TAB3924	M16x15x18GF	130	CH32S	hex 8
30.63R.32.90	63	ERC32	1÷20	50	90	M6x12V	G32S	TAB3923.1	M12x16GF	1400	CH32S	hex 6
30.63R.40.90	63	ERC40	2÷30	63	90	M6x12V	G40S	TAB3923.1	M20x2x20GF	1400	CH40S	hex 10
30.80R.32.90	80	ERC32	1÷20	50	90	M6x16V	G32S	TAB3923.2	M12x16GF	1400	CH32S	hex 6
30.80R.40.90	80	ERC40	2÷30	63	90	M6x16V	G40S	TAB3923.2	M20x2x20GF	1400	CH40S	hex 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

N.B. 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 radical direction
-Correct eccentricity with the 4 adjusting dowels by bringing them into contact with the tang
-Tighten the clamping screw to lock the tang
-Check again 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

NOTE

Other products literature

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