
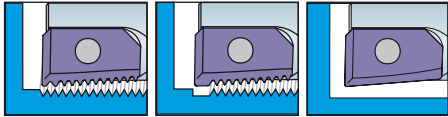

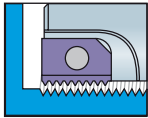


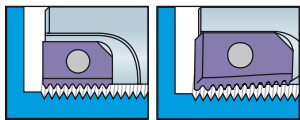
**Circular Thread Milling Tools  
with Inserts**



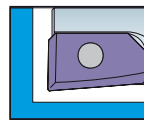
# Table of Contents

Type	Ø min. mm	Thread from	Page
 	12 17 20 25	14 19 22 26 M16 x 1 M20 x 1 M24 x 1 M30 x 1	51 52-53 54 55
 	14,5 15 21 26	18,5 20,0 18,5 30,0 M20 x 1 M24 x 3 M20 x 1,5 M30 x 1,5	57-58 59 60-61 62
<b>Technical Data</b>			Tips about circular and thread milling 62-64 Cutting data table 65 Carbide grades 42

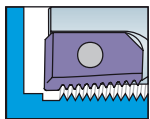
## Symbols



Thread milling



Drill milling (Trio-Cut)



Thread milling with undercut (Trio-Cut)



Type designation



DIN standard



Tool shaft without clamping surface



Thread standard



Tool shaft with Weldon clamping surface



Thread with undercut (Trio-Cut)



Cutter with tightening thread



for right- and left hand internal thread  
for left hand thread modify your NC-program!



Smallest necessary bore-diameter



for right- and left hand external thread  
for left hand thread modify your NC-program!



Internal coolant supply



Full form thread milling



Number of inserts (TrioCut)



Drill milling (Trio-Cut)

## Trio-Cut

### Only 1 Tool for 3 Applications

- Thread Milling with Undercut
- Thread Milling and
- Drill Milling

are possible with the same cutter and the appropriate insert. The advantages are shorter machining times as well as a reduction in tool cost.

**Smooth cutting action** and **reduced cutting forces** guarantees long tool life, improved surface quality, as well as a lower machine load. **A Conical position of insert pocket** guarantees stability of the tool shaft. Further advantages are the **radially back ground thread profile**, extremely high wedge angle, a more stable cutting edge as well as a **positive rake angle** and **coolant through the holder**.

#### ① Thread Milling with Undercut

- Drilling, drill milling, drill and thread milling in a solid material with only one cutting tool without any change of the insert or tool
- Range beginning from M 14 x 1,0
- Available pitches are: 1 / 1,5 / 2 mm
- Length of thread up to 17 mm
- Drilling/milling depth up to 30 mm



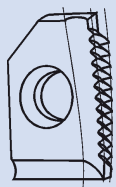
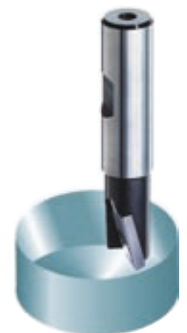
#### ② Thread Milling

- Drilling, drill milling, drill and thread milling in a solid material with only one cutting tool without any change of the insert or tool
- Range beginning from M 14 x 1,0 (Ø theoretical unlimited)
- Available pitches are: 1 / 1,5 / 2 mm
- Length of thread up to 30 mm

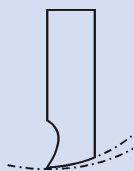


#### ③ Drill Milling

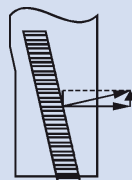
- 3-D machining: Drilling and drill milling in solid material
- Milling of grooves, pockets, offsets
- Drill Ø from 12 mm
- bore depth max. 30 mm



Smooth cutting action by a left helical ground insert



More stability from radial ground clearance angle



Even displacement of cutting forces

## Trio-Cut Circular Thread Milling Tools

Bore Ø mm	Thread	Type	Page
≥ 14 mm	≥ M16 x 1	12	51
≥ 19 mm	≥ M20 x 1	17	52-53
≥ 22 mm	≥ M24 x 1	20	54
≥ 26 mm	≥ M30 x 1	25	55

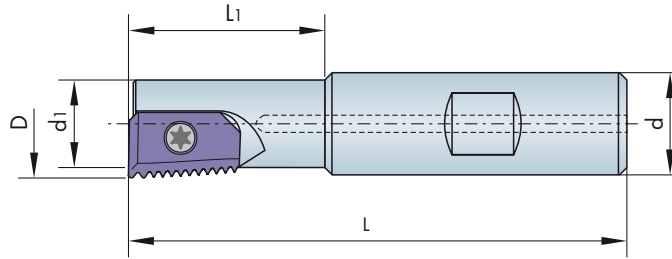
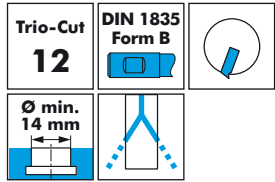
- **3 Applications with only 1 Tool**
- **Thread Milling**
- **Thread Milling with Undercut**
- **Drill Milling**
- **High Efficiency**



**Trio-Cut, Type 12**

**Circular Milling Tools**

- Cutting Data Page 65
- Carbide Grades Page 42
- Inserts see below



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Operation	Shaft	Spare part No.	
									T8 IP Screwdriver	Screw
123620	14	12	16	9,4	74	18	only thread milling	Steel	111656	115567
123621	14	12	16	11,0	74	18	only drill milling	Steel	111656	115567

Screw torque 1,1 Nm

**Note:**  
Type 12 milling tools can only be used with type 12 milling inserts!



**Circular Milling Inserts**

		<table border="1"> <thead> <tr> <th>Type</th> <th>Pitch</th> <th>B mm</th> <th>L* mm</th> <th>Teeth</th> <th>Order No. TINAMATIC</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>1,0</td> <td>7,5</td> <td>12,0</td> <td>13</td> <td>142594</td> </tr> <tr> <td>12</td> <td>1,5</td> <td>7,5</td> <td>10,5</td> <td>8</td> <td>142694</td> </tr> </tbody> </table>	Type	Pitch	B mm	L* mm	Teeth	Order No. TINAMATIC	12	1,0	7,5	12,0	13	142594	12	1,5	7,5	10,5	8	142694			
Type	Pitch	B mm	L* mm	Teeth	Order No. TINAMATIC																		
12	1,0	7,5	12,0	13	142594																		
12	1,5	7,5	10,5	8	142694																		
		<table border="1"> <thead> <tr> <th>Type</th> <th>Pitch / "</th> <th>B mm</th> <th>L* mm</th> <th>Teeth</th> <th>Order No. TINAMATIC</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>19</td> <td>7,5</td> <td>9,07</td> <td>9 as of 3/8 only</td> <td>142688</td> </tr> <tr> <td>12</td> <td>14</td> <td>7,5</td> <td>9,07</td> <td>6</td> <td>142632</td> </tr> </tbody> </table>	Type	Pitch / "	B mm	L* mm	Teeth	Order No. TINAMATIC	12	19	7,5	9,07	9 as of 3/8 only	142688	12	14	7,5	9,07	6	142632			
Type	Pitch / "	B mm	L* mm	Teeth	Order No. TINAMATIC																		
12	19	7,5	9,07	9 as of 3/8 only	142688																		
12	14	7,5	9,07	6	142632																		
		<table border="1"> <thead> <tr> <th>Type</th> <th>Pitch / "</th> <th>PG</th> <th>B mm</th> <th>L* mm</th> <th>Teeth</th> <th>Order No. TINAMATIC</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>18</td> <td>9-16</td> <td>7,5</td> <td>11,28</td> <td>9</td> <td>142679</td> </tr> <tr> <td>12</td> <td>16</td> <td>21-48</td> <td>7,5</td> <td>9,52</td> <td>7</td> <td>142664</td> </tr> </tbody> </table>	Type	Pitch / "	PG	B mm	L* mm	Teeth	Order No. TINAMATIC	12	18	9-16	7,5	11,28	9	142679	12	16	21-48	7,5	9,52	7	142664
Type	Pitch / "	PG	B mm	L* mm	Teeth	Order No. TINAMATIC																	
12	18	9-16	7,5	11,28	9	142679																	
12	16	21-48	7,5	9,52	7	142664																	
		<table border="1"> <thead> <tr> <th>Type</th> <th>L mm</th> <th>R mm</th> <th>B mm</th> <th>Milling depth mm</th> <th>Order No. TINAMATIC</th> </tr> </thead> <tbody> <tr> <td>12</td> <td>12</td> <td>0,5</td> <td>7,5</td> <td>8 (Bore Ø 12-14) 18 (Bore Ø 14-20)</td> <td>142702</td> </tr> </tbody> </table>	Type	L mm	R mm	B mm	Milling depth mm	Order No. TINAMATIC	12	12	0,5	7,5	8 (Bore Ø 12-14) 18 (Bore Ø 14-20)	142702									
Type	L mm	R mm	B mm	Milling depth mm	Order No. TINAMATIC																		
12	12	0,5	7,5	8 (Bore Ø 12-14) 18 (Bore Ø 14-20)	142702																		

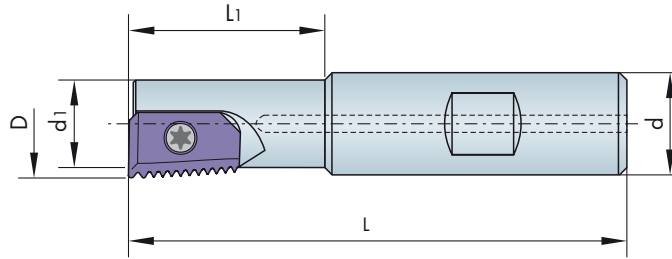
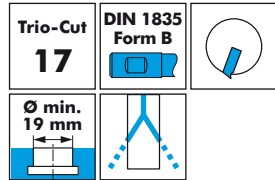
Only for Milling Cutters 123621

\* The length "L" of the Thread Milling Insert is measured when the insert is clamped in the holder.

**Trio-Cut, Type 17**

**Circular Milling Tools**

- Cutting Data Page 65
- Carbide Grades Page 42
- Inserts Page 52-53



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Shaft	Spare part No.	
								T15 IP Screwdriver	Screw
123631	19	17	16	13,7	79	30	Steel	111671	115628
123633	19	17	20	13,7	92	30	Steel	111671	115628

Screw torque 3,8 Nm

**Note:**  
Type 17 milling tools can only be used with type 17 milling inserts!



**Circular Milling Inserts**

		Type	Pitch	B mm	L* mm	Teeth	Order No. TINAMATIC		
		17	1,0	11	16,0	17	142731		
		17	1,5	11	16,5	12	142720		
		17	2,0	11	16,0	9	142651		
		Type	Pitch	B mm	L* mm	Teeth	Order No. TINAMATIC		
		17	1,5	11	16,5	12	142721		
		Type	Pitch	B mm	L* mm	L1* mm	R mm	Teeth	Order No. TINAMATIC
		17	1,0	11	14,0	3,6	0,4	15	142668
		17	1,5	11	13,5	4,1	0,4	10	142650
		17	2,0	11	12,0	3,6	0,4	7	142672
		Type	Pitch / "	B mm	L* mm	Thread	Teeth	Order No. TINAMATIC	
		17	11	11	16,16	all	8	142685	
		17	14	11	16,33	5/8-3/4-7/8"	10	142732	

\* The length "L" and "L1" of the Thread Milling Inserts are measured when the insert is clamped in the holder.

**Trio-Cut, Type 17**

**Circular Milling Inserts**



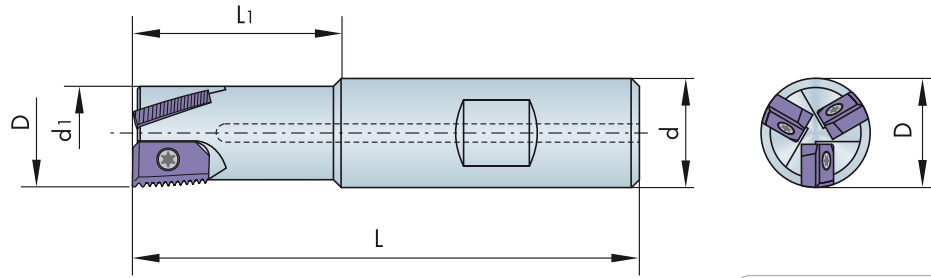
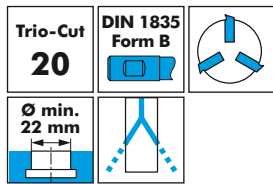
			Type	Pitch / "	B mm	L* mm	Thread	Teeth	Order No. TINAMATIC		
			17	14	11	16,33	G 1/2" profile corrected	10	142652		
			Type	Pitch / "	B mm	L* mm	L1* mm	R mm	Thread	Teeth	Order No. TINAMATIC
			17	11	11	11,54	4,6	0,4	all	6	142725
			17	14	11	12,69	3,5	0,4	5/8-3/4-7/8"	8	142717
			Type	Pitch / "	B mm	L* mm	L1* mm	R mm	Thread	Teeth	Order No. TINAMATIC
			17	14	11	12,69	3,5	0,4	G 1/2" profile corrected	8	142669
			Type	Pitch / "	PG	B mm	L* mm	Teeth	Order No. TINAMATIC		
			17	18	11-16	11	16,92	12	142674		
17	16	21-48	11	15,88	11	142675					
			Type	Pitch / "	PG	B mm	L* mm	L1* mm	R mm	Teeth	Order No. TINAMATIC
			17	18	11-16	11	14,1	3,9	0,4	11	142684
			17	16	21-48	11	12,7	3,7	0,4	9	142714
		Type	L mm	R mm	B mm	Milling depth mm	Order No. TINAMATIC				
		17	17,5	0,4	11	12 (Bore Ø 17-19)	142733				
		17	17,5	0,8	11	30 (Bore Ø 20-32)	142768				
		17	17,5	1,2	11	30 (Bore Ø 20-32)	142710				

\* The length "L" and "L1" of the Thread Milling Inserts are measured when the insert is clamped in the holder.

**Trio-Cut, Type 20**

**Circular Milling Tools**

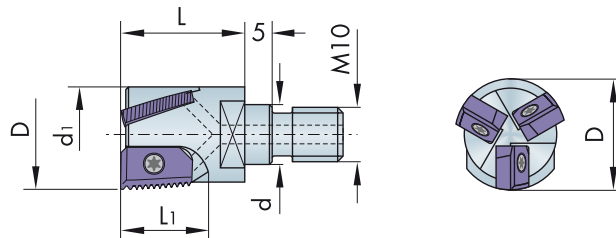
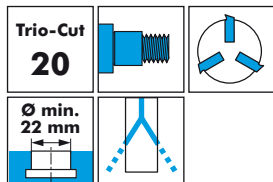
- Cutting Data Page 65
- Carbide Grades Page 42
- Inserts see below



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Shaft
123622	22	20	20	17,5	83	32	Steel

Spare part No.	
<b>T8 IP</b> Screwdriver	Screw
111656	115567
Screw torque 1,1 Nm	

**!** Please adapt cutting data to overhangs length



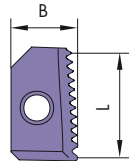
Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Shaft
123623	22	20	10,5	17,5	21	16	Steel

Spare part No.	
<b>T8 IP</b> Screwdriver	Screw
111656	115567
Screw torque 1,1 Nm	

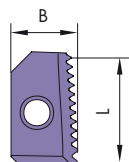
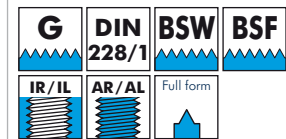


**Note:**  
Type 20 milling tools can only be used with type 20 milling inserts!

**Circular Milling Inserts**

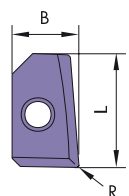


Type	Pitch	B mm	L* mm	Teeth	Order No. TINAMATIC
20	1,0	7,5	12,0	13	142690
20	1,5	7,5	10,5	8	142633



Type	Pitch / "	B mm	L* mm	Thread	Teeth	Order No. TINAMATIC
20	14	7,5	9,07		6	142707
20**	14	7,5	9,07	G 3/4" profile corrected	6	142666

\*\* for internal threads only



Type	L mm	R mm	B mm	Milling depth mm	Order No. TINAMATIC
20	12	0,8	7,5	32 (Bore Ø 26-40)	142683

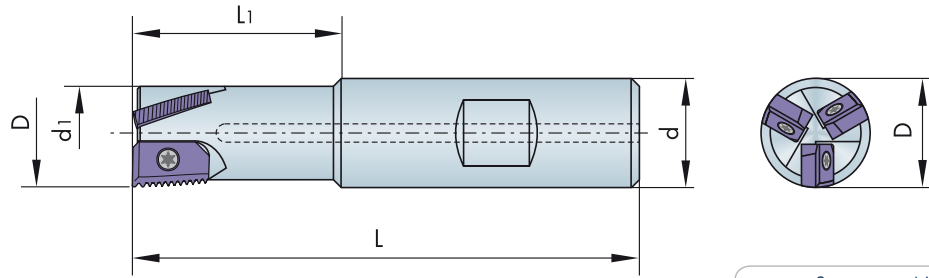
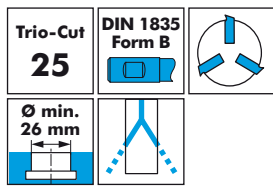
Only for Milling Cutters 123622

\* The length "L" of the Thread Milling Insert is measured when the insert is clamped in the holder.

**Trio-Cut, Type 25**

**Circular Milling Tools**

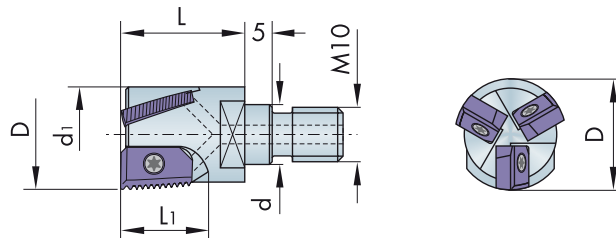
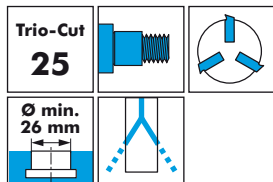
- Cutting Data Page 65
- Carbide Grades Page 42
- Inserts see below



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Shaft
123638	26	25	25	21,7	107,6	50	Steel
123639	26	25	25	21,7	142,6	85	Heavy metal

Spare part No.	
T15 IP Screwdriver	Screw
111671	115628
111671	115628
Screw torque 3,8 Nm	

**!** Please adapt cutting data to overhangs length



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Shaft
166204	26	25	10,5	21,7	30	19	Steel

Spare part No.	
T15 IP Screwdriver	Screw
111671	115628
Screw torque 3,8 Nm	



**Note:**  
Type 25 milling tools can only be used with type 25 milling inserts!

**Circular Milling Inserts**

<b>M</b> DIN 13 IR/IL Full form		Type	Pitch	B mm	L* mm	Teeth	Order No. TINAMATIC
		25	1,0	11	16,0	17	142754
		25	1,5	11	16,5	12	142722
		25	2,0	11	16,0	9	142723
<b>M</b> DIN 13 AR/AL Full form		Type	Pitch	B mm	L* mm	Teeth	Order No. TINAMATIC
		25	1,5	11	16,5	12	142772
<b>G</b> DIN 228/1 BSW BSF IR/IL AR/AL Full form		Type	Pitch / "	B mm	L* mm	Teeth	Order No. TINAMATIC
		25	11	11	16,16	8	142743
		25	14	11	16,33	10	142798
Drill milling		Type	L mm	R mm	B mm	Milling depth mm	Order No. TINAMATIC
		25	17,5	0,8	11	50/85 (Bore Ø 30-50)	142769
		25	17,5	1,2	11	50/85 (Bore Ø 30-50)	142742

Only for Milling Cutters 123620

\* The length "L" of the Thread Milling Insert is measured when the insert is clamped in the holder.

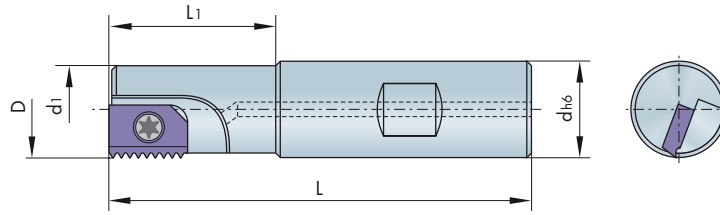
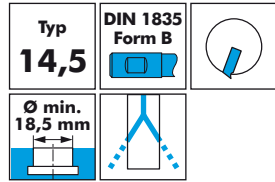
## Circular Thread Milling Tools

Pitch	Thread	Type	Page
≤ 2,5 mm	≥ M20 x 1	14,5	57-58
≤ 3,5 mm	≥ M24 x 3	15	59
≤ 2,0 mm	≥ M20 x 1	21	60-61
≤ 4,0 mm	≥ M30 x 1,5	26	62

**Type 14,5**

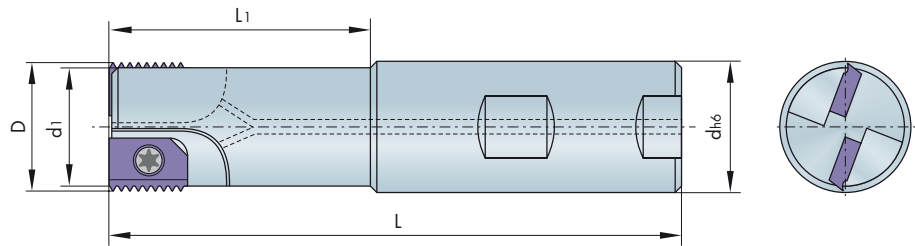
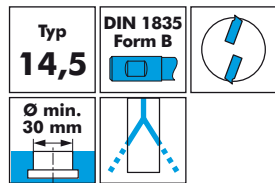
**Circular Thread Milling Tools**

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- Carbide Grades Page 42
- Inserts Page 58



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Type	Shaft	Spare part No.	
									T15 IP Screwdriver	Screw
123540	18,5	16	16	12,7	78	30	short	Steel	111671	107571
123541	18,5	16	16	12,7	98	50	long	Heavy metal	111671	107571
123542	23,0	20	20	16,8	110	60	short	Steel	111671	115628

Screw torque 3,8 Nm



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Type	Shaft	Spare part No.	
									T15 IP Screwdriver	Screw
123546	30	25	25	21,5	106	48,2	short	Steel	111671	107552
123547	30	25	25	21,5	150	92,2	long	Heavy metal	111671	107552

Screw torque 3,8 Nm

Type 14,5

Circular Thread Milling Inserts

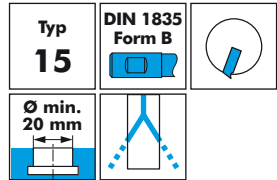
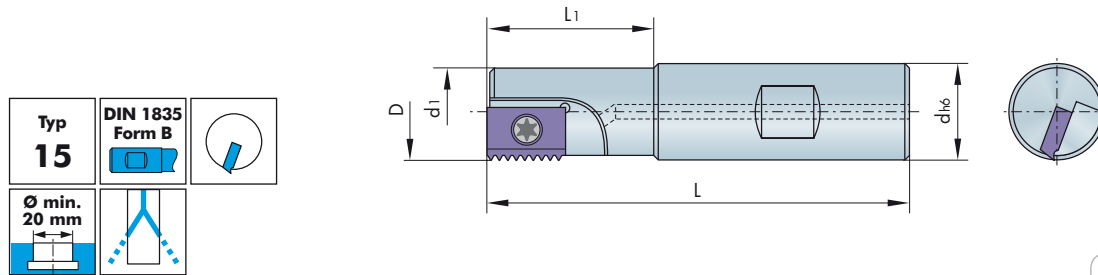


				Type	Pitch	B mm	L mm	S mm	Thread	Teeth	Order No.			
											K10	TINAMATIC		
				14,5	0,5	10	13,50	3,18		28		142026	142117	
				14,5	0,75	10	13,50	3,18		19		142083	142048	
				14,5	1,0	10	13,00	3,18		14		142096	142037	
				14,5	1,25	10	12,50	3,18		11		142057	142067	
				14,5	1,5	10	12,00	3,18		9		142058	142053	
				14,5	1,75	10	12,25	3,18		8		142106	142080	
				14,5	2,0	10	12,00	3,18		7		142135	142136	
				14,5	2,5	10	10,00	3,18		5		142137	142129	
				14,5	2,5	10	10,00	3,18	M20x2,5	5		142108	142069	
				profile corrected										
				Type	Pitch	B mm	L mm	S mm	Teeth	Order No.				
										K10	TINAMATIC			
				14,5	1,0	10	13	3,18		14		142163	142177	
				14,5	1,5	10	12	3,18		9		142115	142186	
				14,5	2,0	10	12	3,18		7		142196	142167	
				Type	Pitch / "	B mm	L mm	S mm	Teeth	Order No.				
										K10	TINAMATIC			
				14,5	24	10	12,70	3,18		13		142214	142218	
				14,5	20	10	12,70	3,18		11		142173	142213	
				14,5	19	10	12,03	3,18		10		142248	142234	
				14,5	18	10	11,28	3,18		9		142247	142145	
				14,5	16	10	11,11	3,18		8		142212	142152	
				14,5	14	10	12,70	3,18		8		142144	142203	
				14,5	12	10	10,58	3,18		6		142123	142181	
				14,5	11	10	11,54	3,18		6		142226	142159	
								Type	Pitch / "	B mm	L mm	S mm	Teeth	Order No.
										K10	TINAMATIC			
				14,5	40	10	13,33	3,18		22		142224	142124	
				14,5	32	10	12,70	3,18		17		142250	142286	
				14,5	28	10	12,70	3,18		15		142249	142223	
				14,5	24	10	12,70	3,18		13		142155	142273	
				14,5	20	10	12,70	3,18		11		142266	142285	
				14,5	18	10	12,69	3,18		10		142184	142216	
				14,5	16	10	12,70	3,18		9		142253	142147	
				14,5	14	10	10,88	3,18		7		142272	142221	
				14,5	12	10	10,58	3,18		6		142192	142243	
				14,5	11	10	11,55	3,18		6		142148	142237	
				Type	Pitch / "	PG	B mm	L mm	S mm	Teeth	Order No.			
											K10	TINAMATIC		
				14,5	18	11-16	10	12,69	3,18		10		142300	142263
				14,5	16	21-48	10	11,11	3,18		8		142274	142257

**Type 15**

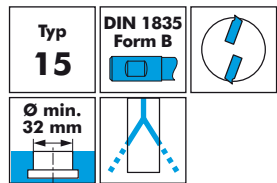
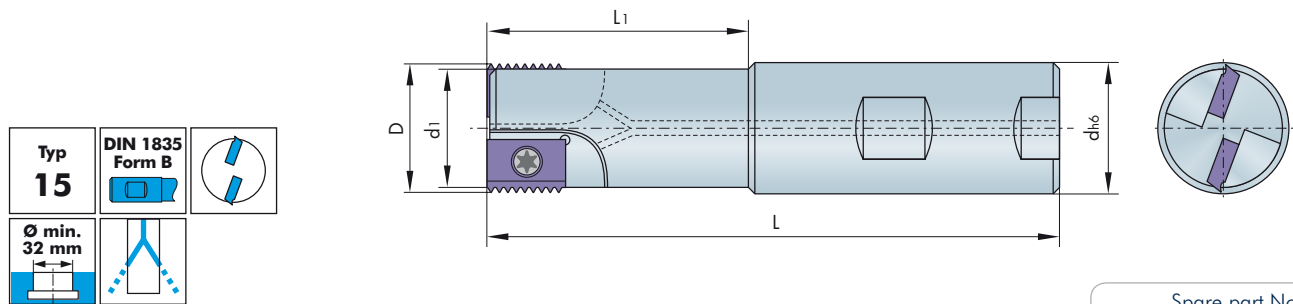
**Circular Thread Milling Tools**

- Cutting Data Page 65
- Carbide Grades Page 42
- Inserts see below



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Type	Shaft	Spare part No.	
									T15 IP Screwdriver	Screw
123550	20	18	16	12,7	79	30	short	Steel	111671	107571
123551	26	22	20	16,8	110	60	short	Steel	111671	107571

Screw torque 3,8 Nm



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Type	Shaft	Spare part No.	
									T15 IP Screwdriver	Screw
123555	32	27	25	21,5	106	48,2	short	Steel	111671	107552

Screw torque 3,8 Nm

**Circular Thread Milling Inserts**

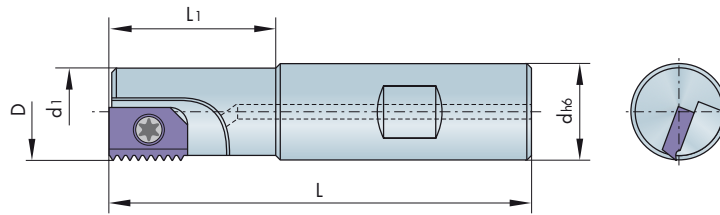
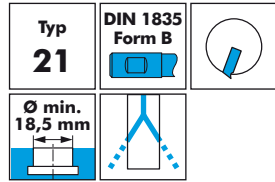


Type	Pitch	B mm	L mm	S mm	Teeth	Order No.	
						K10	TINAMATIC
15	3,0	10,5	12,0	3,18	5		142269
15	3,5	10,5	10,5	3,18	4		142231

**Type 21**

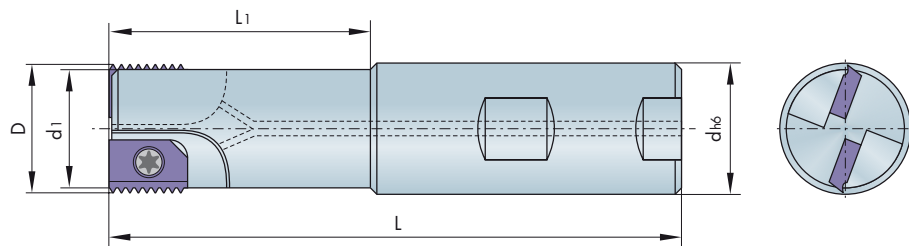
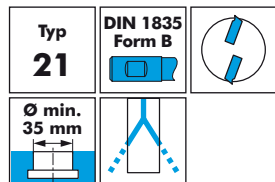
**Circular Thread Milling Tools**

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- Carbide Grades Page 42
- Inserts Page 61



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Type	Shaft	Spare part No.	
									T15 IP Screwdriver	Screw
123557	18,5	16	20	12,7	85	31,3	short	Steel	111671	107571
123560	22,0	18	20	15,0	85	31,3	short	Steel	111671	107571
123558	26,0	22	25	18,7	92	32,8	short	Steel	111671	107571
123559	26,0	22	25	18,7	122	62,8	long	Heavy metal	111671	107552

Screw torque 3,8 Nm



Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Type	Shaft	Spare part No.	
									T15 IP Screwdriver	Screw
123564	35	28	32	24,7	102	38,3	short	Steel	111671	107552
123566	35	28	32	24,5	142	78,3	long	Heavy metal	111671	107552

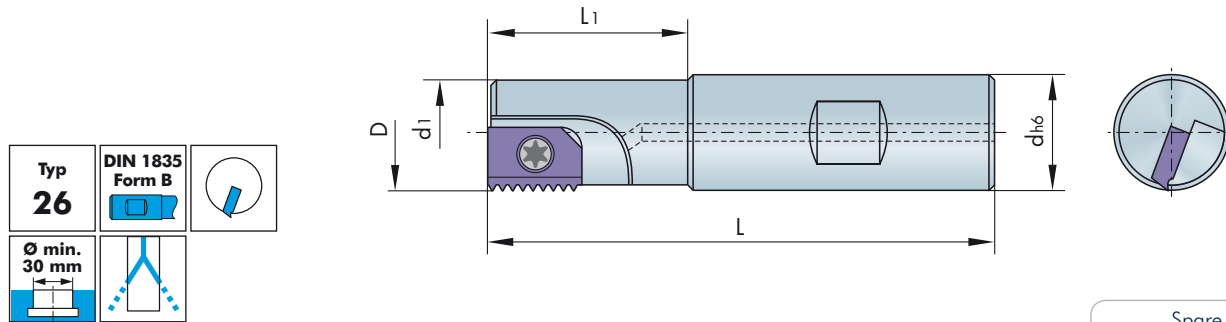
Screw torque 3,8 Nm



**Type 26**

**Circular Thread Milling Tools**

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- Carbide Grades Page 42
- Inserts see below



Typ **26**

DIN 1835 Form B

Ø min. 30 mm

Order No.	Bore Ø min.	D mm	dh6 mm	d1 mm	L mm	L1 mm	Type	Shaft
123569	30	25	25	20	107	48,5	short	Steel

Spare part No.

T15 IP	
Screwdriver	Screw
111671	107559

Screw torque 3,8 Nm

**Circular Thread Milling Inserts**



M		DIN 13	IR/IL	Full form	Type	Pitch	B mm	L mm	S mm	Teeth	Order No.	
											K10	TINAMATIC
												142417
												142452
												142489
												142445
												142449

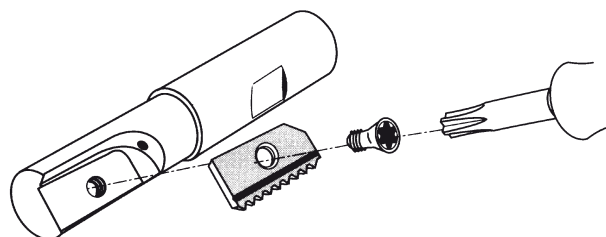
  

G		DIN 228/1	BSW	BSF	Type	Pitch / "	B mm	L mm	S mm	Teeth	Order No.	
											K10	TINAMATIC
												142450

**Assembling Instructions**

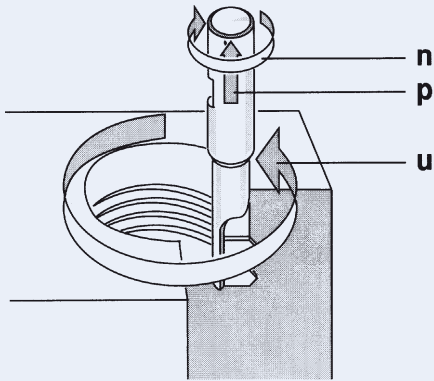
**Changing Thread Milling Inserts**

Put in the insert firmly into insert pocket. Hold the insert in position while clamping.

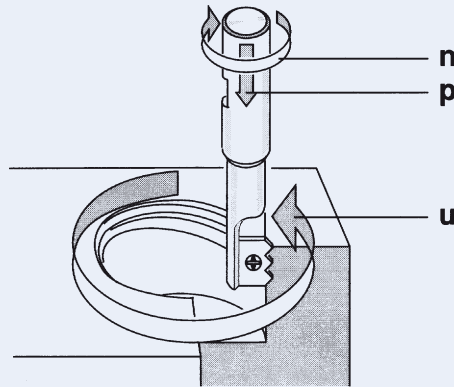


## Information about Circular Thread Milling

### Internal Thread

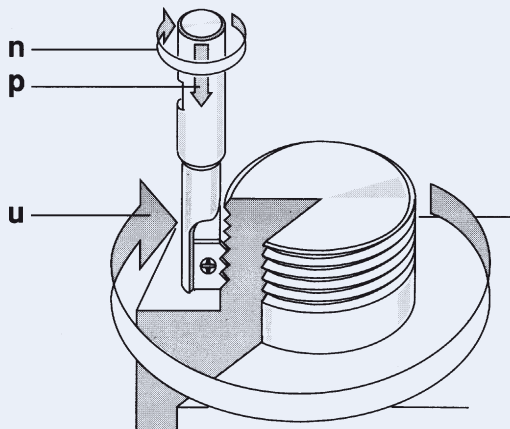


**Right-hand Thread (climb milling)**  
Left-hand Thread (up-cut milling)

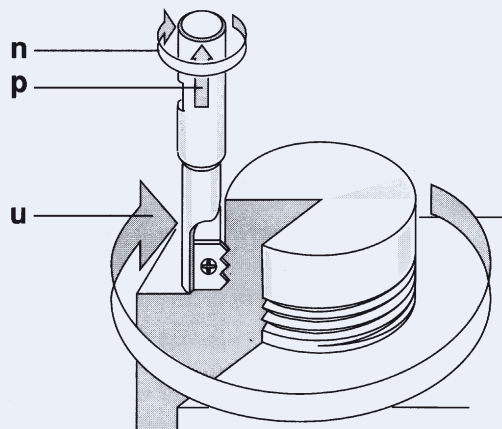


**Left-hand Thread (climb milling)**  
Right-hand Thread (up-cut milling)

### External Thread



**Right-hand Thread (climb milling)**  
Left-hand Thread (up-cut milling)



**Left-hand Thread (climb milling)**  
Right-hand Thread (up-cut milling)

**n** = rotation direction to the right  
**p** = feed direction axial (1 revol. per pitch)  
**u** = feed direction radial

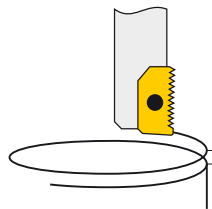
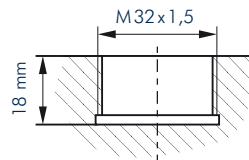
Always try to use climb milling process. If the thread is longer than insert length, cut in two steps. If you plunge in with a circle, please watch your axial feed (depending on pitch).

# Cutting Data Reference Values for Trio-Cut

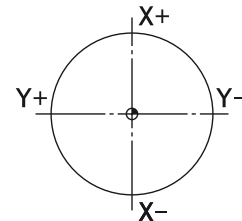
Material to be machined	Cutting speed Vc (m/min.)	Feed per tooth fz* mm			
		Drill milling		Thread milling	
		mm	inch	mm	inch
Steel ≤ 700 N/mm <sup>2</sup>	120-200	0,20-0,40	0,008-0,016	0,13-0,25	0,005-0,010
Alloyed Steel	100-180	0,15-0,30	0,006-0,012	0,10-0,20	0,004-0,008
Cast Iron	100-170	0,20-0,40	0,008-0,016	0,20-0,30	0,008-0,012
Nonferrous	200-350	0,20-0,40	0,008-0,016	0,15-0,28	0,006-0,011

## TRIO-Cut Programming Example

Cycle time 57 sec.  
Material 1045




I and J incremental from the starting point.



N1	G..							Selection of the level
N2	G..							Zero offset to the hole center
N10	S3000	T..						Technology data
N20	G0	X0	Y0	Z1	M13			1 mm over workpiece, hole center
N30	G43	X-15.15						up to the outline
N40	G41							Cutting edge radius adjustment, left of the outline
N50	G3	X-15.15	Y0	Z-1	I15.15	J0	F1500	Circular drill-milling, infeed 2 mm
N60	G3	X-15.15	Y0	Z-3	I15.15	J0		Circular drill-milling, infeed 2 mm
N70	G3	X-15.15	Y0	Z-5	I15.15	J0		Circular drill-milling, infeed 2 mm
N80	G3	X-15.15	Y0	Z-7	I15.15	J0		Circular drill-milling, infeed 2 mm
N90	G3	X-15.15	Y0	Z-9	I15.15	J0		Circular drill-milling, infeed 2 mm
N100	G3	X-15.15	Y0	Z-11	I15.15	J0		Circular drill-milling, infeed 2 mm
N110	G3	X-15.15	Y0	Z-13	I15.15	J0		Circular drill-milling, infeed 2 mm
N120	G3	X-15.15	Y0	Z-15	I15.15	J0		Circular drill-milling, infeed 2 mm
N130	G3	X-15.15	Y0	Z-17	I15.15	J0		Circular drill-milling, infeed 2 mm
N140	G3	X-15.15	Y0	Z-18	I15.15	J0		Circular drill-milling, infeed 1 mm
N150	G3	X-15.15	Y0	Z-18	I15.15	J0		Circular face milling
N160	G1	X-15.15	Y-0.85					to the starting point of the inward circular arc
N170	G3	X0	Y-16	Z-17.625	I15.15	J0	F600	Inward circular arc with pitch in Z
N180	G3	X0	Y-16	Z-16.125	I0	J16		Thread milling
N190	G3	X15.15	Y0	Z-15.75	I0	J15.5		Outward circular arc
N200	G40							Deselection of the cutting edge radius adjustment
N210	G0	X0	Y0					to hole center
N220	G0	Z1						Outfeed to 1 mm over workpiece
N230	M30							End of program

# Cutting Data Reference Values for Circular Thread Milling

Material to be machined	Strength N/mm <sup>2</sup>	Cutting Speed V <sub>c</sub> (m/min.)	Feed per tooth fz* mm
			
General construction steels	< 500	250	0,05 - 0,12
	500 - 800	180	0,05 - 0,12
Free cutting steels	< 850	180	0,05 - 0,12
	850 - 1000	120	0,05 - 0,12
Unalloyed heat-treatable steels	< 700	250	0,05 - 0,12
	700 - 850	180	0,05 - 0,12
	850 - 1000	120	0,05 - 0,12
Alloyed heat-treatable steels	850 - 1000	180	0,05 - 0,12
	1000 - 1200	100	0,05 - 0,12
Unalloyed cementation steels	< 750	120	0,05 - 0,12
Alloyed cementation steels	< 1000	120	0,05 - 0,12
	> 1000	100	0,05 - 0,12
Nitriding steels	< 1000	120	0,05 - 0,12
Cast Steel	> 1000	100	0,05 - 0,12
Tool steels	< 850	180	0,05 - 0,12
	850 - 1100	120	0,05 - 0,12
	1100 - 1400	100	0,05 - 0,12
Rapid steels	830 - 1200	120	0,05 - 0,12
Nonwearing construction steels	< 1350	120	0,05 - 0,12
	< 1850	100	0,05 - 0,12
Spring steels	< 1500	80	0,05 - 0,08
Stainless steel, sulphured	< 700	250	0,05 - 0,12
Stainless steel, austenitic	< 700	180	0,05 - 0,12
Stainless steel, martensitic	< 1100	120	0,05 - 0,12
Hardened steels	48 - 55 HRC	100	0,05 - 0,10
	55 - 60 HRC	100	0,05 - 0,08
Cast Iron	60 - 67 HRC	100	0,05 - 0,08
Cast iron (GG)	< 180 HB	180	0,05 - 0,12
	> 180 HB	120	0,05 - 0,12
Cast iron (GGG, GT)	> 180 HB	120	0,05 - 0,12
	> 260 HB	100	0,05 - 0,12
Aluminium, aluminium alloys	< 530	400	0,05 - 0,25
Aluminium cast alloys <10% Si	< 600	300	0,05 - 0,25
	> 10% Si	250	0,05 - 0,25
Magnesium, magnesium alloys	< 280	400	0,05 - 0,25
Copper, low alloyed	< 400	500	0,05 - 0,25
Cooper Alloys	< 850	120	0,05 - 0,12
Brass, short-chipping	< 600	400	0,05 - 0,25
Brass, long-chipping	< 600	400	0,05 - 0,25
Bronze, short-chipping	< 600	400	0,05 - 0,25
	650 - 850	400	0,05 - 0,25
Bronze, long-chipping	< 850	300	0,05 - 0,25
	850 - 1200	500	0,05 - 0,25
Graphite	-	500	
Thermosetting- and Thermoplastics	-	500	
GFK and CFK	-	400	
Titanium, titanium alloys	< 850	80	0,01 - 0,05
	850 - 1200	60	0,01 - 0,05
Special alloys	< 1200	120	0,05 - 0,12

\* The indicated feed values apply only with circular bringing in loop. During linear bringing in movement the feed motion amounts to max. 30%