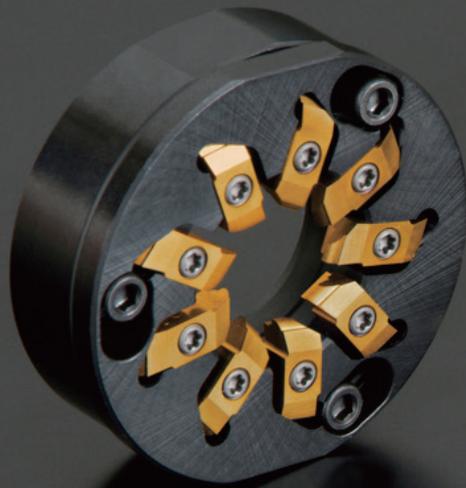


# Thread Whirling **ECO**

High-efficiency threading | For CNC automatic lathe



Expanded lineups of cutter with 3-blade and 6-blade cutter, as well as cutters for left-hand threads, to provide more cost options for a wider range of applications



Single-pass machining is possible,  
and multi-lead threads are also supported.  
Significantly reduces the machining time of threading.

High-efficiency threading I for CNC automatic lathes

# Thread Whirling

- Lineup of 3-blade and 6-blade cutter bodies
- 1-corner insert can be selected.

New

Thread Whirling **ECO**

- Lineup of cutter bodies for left-hand threads

## Performance

In automatic lathes, threading is performed by repeating multiple cutting passes. Therefore, when machining long screws, it is necessary to ensure that the workpiece does not fall off from the guide bush. However, threadwhirling allows for single-pass machining, eliminating the need for subsequent joining process.

In addition, single-pass machining is possible even for multi-lead threads such as double and triple lead screws. This eliminates the need for multiple cutting passes and subsequent joining processes, thus achieving high efficiency threading.

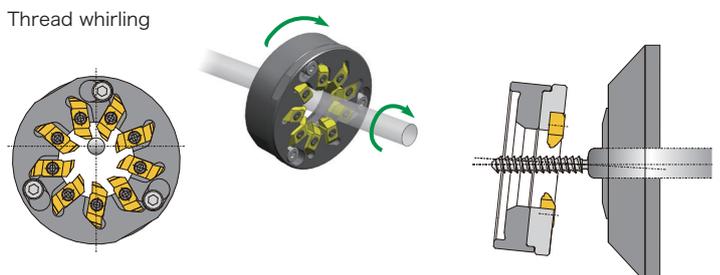
	Double-lead threads	Triple-lead threads
Component	Bone Screw	Worm Screw
Work material	Ti-6Al-4V ELI	brass
Workpiece		
Insert shape		
Major Dia.	φ4.0	φ7.0
Minor Dia.	φ2.4	φ4.7
Lead	3.42mm	4.9mm

When machining multi-lead threads by in a single pass, numerous process requirements must be met. Please contact us to discuss mechanical, Spindle, Insert, tooling specification.

## Machining overview

In thread whirling, the whirling head is tilted to a specific helix angle, and the cutter is rotated at high speed while the bar stock (c axis) is rotated at a low speed. It is possible to machine the outer dimension by adding a wiper to the insert.

Thread whirling



## I Cutter body with selectable number of inserts

The number of inserts can now be selected according to the balance between machining time and cost.

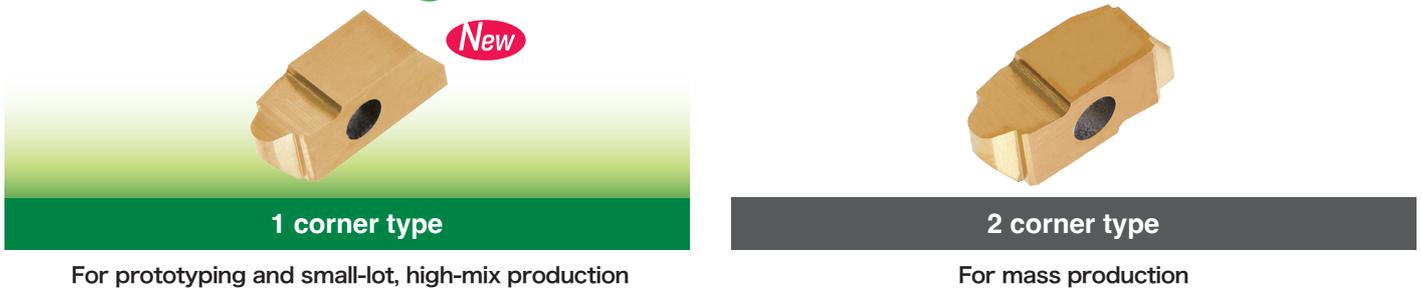
### Thread Whirling **ECO**



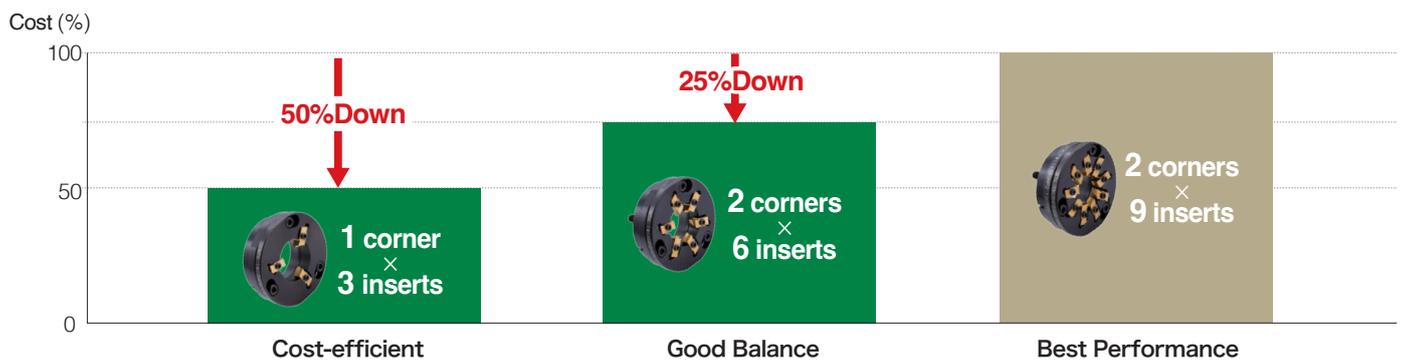
## I Select the number of corners according to your needs

The number of corners can now be selected according to the number of workpieces produced.

### Thread Whirling **ECO**



## I Cost-saving effect



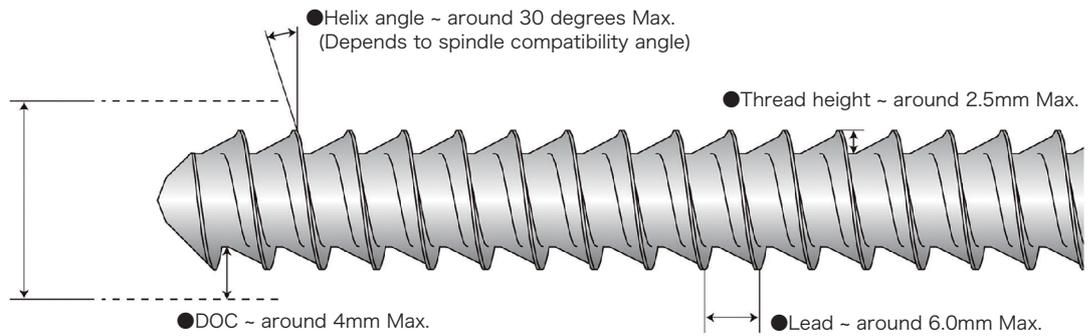
## I Cutter bodies are available for Left/Right-hand screws

A head for left-hand threads has been added to accommodate a wide range of workpieces.



## Applicable Thread Geometry (Approximated)

- Lead: 1-3 leads
- Hand: Right & Left
- Bar stock diameter ~ around  $\phi 10$ mm (for cutters with 12mm ID)



The geometries shown above are approximated and could vary by actual applications

## Recommended Cutting Conditions

Conditions / No. of teeth		9	6	3
Main spindle	min-1	10 - 40	10 - 25	5 - 12
Whirling cutter	min-1	1,500 - 4,000		
Feed rate		Same as thread lead = pitch		
Bar stock	mm	$-\phi 10$	$-\phi 10$	$-\phi 10$
Work Material		Ti-6Al-4V EL / SUS316 / 17-4PH / Titanium / Brass etc.		

### Formula for calculating thread whirling process time

$$T(\text{seconds}) = \frac{60 \times \text{Thread length}}{\text{Main spindle rpm} \times \text{Feed rate (Thread Lead)}}$$

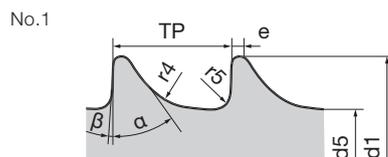
Ex.) Double lead / 50mm length / 2mm lead (2 x 1mm pitch) / 30rpm

$$T(\text{seconds}) = \frac{60 \times 50\text{mm}}{30\text{rpm} \times 2\text{mm lead}} = 50 \text{ second}$$

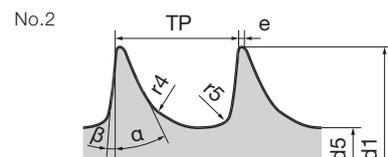
## Standard Thread Whirling Inserts (2 corner type) for Medical ISO Style Threads

### TWC.. series/Inserts Carbide

#### ISO5835 with chipbreaker



ISO5835 HA



ISO5835 HB

P	Steel	★
M	Stainless	★
N	Non-ferrous	★
S	Superalloys	★
H	Hard materials	★

★ : First choice  
☆ : Second choice

Designation	HAND	Coated	ISO	Pitch	d1	d5	e	r4	r5	$\alpha$	$\beta$	Figure
		ZM3										
TW5835-HA1.5-D12	R	●	HA1.5	0.5	1.5	1.1	0.1	0.3	0.1	35	3	1
TW5835-HA2.0-D12	R	●	HA2.0	0.6	2	1.3	0.1	0.4	0.1	35	3	1
TW5835-HA2.7-D12	R	●	HA2.7	1	2.7	1.9	0.1	0.6	0.2	35	3	1
TW5835-HA3.5-D12	R	●	HA3.5	1.25	3.5	2.4	0.1	0.8	0.2	35	3	1
TW5835-HA4.0-D12	R	●	HA4.0	1.5	4	2.9	0.1	0.8	0.2	35	3	1
TW5835-HA4.5-D12	R	●	HA4.5	1.75	4.5	3	0.1	1	0.3	35	3	1
TW5835-HA5.0-D12	R	●	HA5.0	1.75	5	3.5	0.1	1	0.3	35	3	1
TW5835-HB4.0-D12	R	●	HB4.0	1.75	4	1.9	0.1	0.8	0.3	25	5	2
TW5835-HB6.5-D12	R	●	HB6.5	2.75	6.5	3	0.2	1.2	0.8	25	5	2

Must use Thread whirling cutters with 12mm  $\phi$  Dm dimension

● : Line up

# Cutter Lineup

Machine maker	Model	Location	Spindle maker	Spindle model	Helix angle	No.	Cutter body	No. of teeth	φDm (mm)	φDs	P.C.D.	Mount adapter bolt					
CITIZEN	A20	Gang	CITIZEN	BTW-5000	0°-15°	1	TWC3C1040HP1	3	φ12	φ33	φ40	M3 (Provided with spindle)					
	A20(2F)/A20(3F)			BTW-2000	±25°		TWC3C1040HP1-LH	3	φ12								
	A32						TWC6C1040HP1	6	φ12								
							TWC6C1040HP1-LH	6	φ12								
							TWC9C1040HP1	9	φ12								
	C12/16						JARVIS	LTRO170	±15°				2	TWC9C1037P2	9	φ12	φ37
	C20/C32(2M)			CITIZEN	BTW-1000		±25°	1	TWC3C1040HP1				3	φ12	φ33	φ40	M3 (Provided with spindle)
	C32	TWC3C1040HP1-LH	3			φ12											
		TWC6C1040HP1	6			φ12											
	D25	BTW-3100	0°-15°			TWC6C1040HP1-LH			6	φ12							
	D25(1M)			TWC9C1040HP1	9	φ12											
	K16	Attachment	PCM	GSW-101	±15°	1	TWC9C1040HP1-LH	9	φ12	φ33	φ40	M3 (Provided with spindle)					
							TWC9C1040HP1-D16	9	φ16								
	L20	Gang	CITIZEN	BTW-1000	±25°	1	TWC6C1040HP1	6	φ12	φ33	φ40	M3 (Provided with spindle)					
							TWC6C1040HP1-LH	6	φ12								
							TWC9C1040HP1	9	φ12								
	L20/L20E/L20X	Gang	JARVIS	LTRO183	±15°	2	TWC9C1040HP1-LH	9	φ12	φ40	φ32.5	M4 (Provided with spindle)					
							TWC9P1340P2	9	φ12								
	L20/L20X	Gang	PCM	LSW-101-L20	±10°	2	TWC9C0746HP1	9	φ12	φ46	φ35	M3 (Provided with spindle)					
							TWC9C1040HP1-D16	9	φ16								
	L20(7M)	Gang	CITIZEN	BTW-3000 BTW-3100	0°-15°	1	TWC3C1040HP1	3	φ12	φ33	φ40	M3 (Provided with spindle)					
							TWC3C1040HP1-LH	3	φ12								
	L20E(1M)	Gang	CITIZEN	BTW-2000	±25°	1	TWC6C1040HP1	6	φ12	φ33	φ40	M3 (Provided with spindle)					
							TWC6C1040HP1-LH	6	φ12								
	L20E(2M)/L20E(3M)	Gang	CITIZEN	BTW-1000	±25°	1	TWC9C1040HP1	9	φ12	φ33	φ40	M3 (Provided with spindle)					
							TWC9C1040HP1-LH	9	φ12								
	L20X	Gang	CITIZEN	BTW-3000	±15°	1	TWC9C1040HP1-LH	9	φ12	φ33	φ40	M3 (Provided with spindle)					
TWC9C1040HP1-D16							9	φ16									
L32/L32X	Gang	CITIZEN	BTW-1000 BTW-5000	±25°	1	TWC9C0746HP1	9	φ12	φ46	φ35	M3 (Provided with spindle)						
						TWC6C1040HP1	6	φ12									
L32(1M)	Gang	CITIZEN	BTW-3100	±15°	1	TWC3C1040HP1	3	φ12	φ33	φ40	M3 (Provided with spindle)						
						TWC3C1040HP1-LH	3	φ12									
L32(2M)	Gang	CITIZEN	BTW-2000	±25°	1	TWC6C1040HP1	6	φ12	φ33	φ40	M3 (Provided with spindle)						
						TWC6C1040HP1-LH	6	φ12									
L32X	Gang	CITIZEN	BTW-6200 BTW-6000	±25°	1	TWC9C1040HP1	9	φ12	φ33	φ40	M3 (Provided with spindle)						
						TWC9C1040HP1-LH	9	φ12									
M12/M16(2M)	Turret	JARVIS	MSW105	±15°	2	TWC9C1040HP1-D16	9	φ16	φ37	φ30.5	CS0310 (M3)						
M16	Gang	CITIZEN	BTW-5000	±25°	1	TWC9C1037P2	9	φ12	φ33	φ40	M3 (Provided with spindle)						
						TWC3C1040HP1	3	φ12									
M2/16	Turret	JARVIS	LTRO128 LTRO168	±15°	2	TWC6C1040HP1	6	φ12	φ33	φ40	M3 (Provided with spindle)						
						TWC6C1040HP1-LH	6	φ12									

Machine maker	Model	Location	Spindle maker	Spindle model	Helix angle	No.	Cutter body	No. of teeth	φDm (mm)	φDs	P.C.D.	Mount adapter bolt										
	M2/16III	Turret	CITIZEN	MSW105	±15°	2	TWC9C1037P2	9	φ12	φ37	φ30.5	CS0310 (M3)										
	M20	Gang		BTW-2000	±25°	1	TWC3C1040HP1	3	φ12	φ33	φ40	M3 (Provided with spindle)										
				TWC3C1040HP1-LH	3		φ12															
			TWC6C1040HP1	6	φ12																	
	M20/16	Turret	PCM	NSW-101	±10°	2	TWC9P1340P2	9	φ12	φ40	φ32.5	M4 (Provided with spindle)										
							TWC9J1040P2					9	φ12	H-M4 × 12								
							TWC9C1037P2							φ37	φ30.5	CS0310 (M3)						
	M20/32	Gang	JARVIS	LTRO183	±15°	2	TWC9P1340P2	9	φ12	φ40	φ32.5	M4 (Provided with spindle)										
	M20/32III	Turret	CITIZEN	KSW110									TWC9C1037P2	φ37	φ30.5	CS0310 (M3)						
	M20/M32		Gang	PCM	KSW-101	±10°	2	TWC9P1340P2	9	φ12	φ40	φ32.5	M4 (Provided with spindle)									
	M20/M32(3M)	KSW110			±15°	TWC9C1037P2		φ37						φ30.5	CS0310 (M3)							
	M20/M32(4M)	Gang	CITIZEN	BTW-4000	±15°	1	TWC9C0746HP1	9	φ12	φ46	φ35	M3 (Provided with spindle)										
													M32	BTW-2000	±25°	1	TWC3C1040HP1	3	φ12	φ33	φ40	M3 (Provided with spindle)
																	TWC3C1040HP1-LH	3	φ12			
													M32(5M)	BTW-6000	±25°	1	TWC6C1040HP1	6	φ12	φ33	φ40	M3 (Provided with spindle)
TWC6C1040HP1-LH	6	φ12																				
M32(5M)	BTW-2000	±25°	1	TWC9C1040HP1	9	φ12	φ33	φ40	M3 (Provided with spindle)													
				TWC9C1040HP1-LH	9	φ12																
M32(5M)	BTW-2000	±25°	1	TWC9C1040HP1-D16	9	φ16	φ33	φ40	M3 (Provided with spindle)													
				TWC9C1040HP1-LH	9	φ16																
STAR	SL-10	Attachment	STAR	10159	±20°	1	TWC4S1433HP1	4	φ8	φ38	φ27	CS0310 (M3)										
	SW-12			68172	-20°-0°																	
	SW-20												54178	±10°								
	ECAS-12/20	Turret		59172	±20°																	
	ECAS-20T			58171	±10°																	
	ECAS-32T	Attachment		0M171	-20°-0°																	
	SB-20R			68172																		
	SB-20/23RII				10172	±20°																
	SR-20J/20RIII	Attachment		0M171	-20°-0°																	
	20RIV/32JII			19121	±20° (MAX φ8)																	
	SR-38	Swivel type unit		19122	±25° (MAX φ6)																	
	SD-26			0M171	-20°-0°																	
	(Common to all types)																					
	SD-26 type S	Turret		19121	±20° (MAX φ8)																	
	SP-20			Attachment	19122	±25° (MAX φ6)																
	ST-20				0M171	-20°-0°																
	ST-38			59172	±20°																	
	SV-12			43156	±20°																	
	SV-20			45172	±10°																	
	SV-20R			42173	±10°																	
	SV-32			59172	±20°																	
	SV-38R			43172	±10°																	
	SX-38 type A			43156	±20°																	
	SX-38 type B			Attachment	12174	±20°																
					68172		-20°-0°															
SX-38 type B	Attachment		12174	±20°																		
			68172		-20°-0°																	
SX-38 type B	Attachment		12174	±20°																		
		68172	-20°-0°																			
SX-38 type B	Attachment	12174	±20°																			
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SX-38 type B	Attachment	12174	±20°																			
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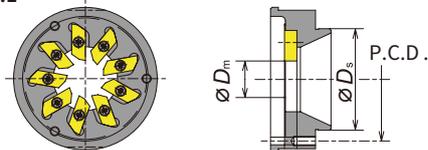
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Machine maker	Model	Location	Spindle maker	Spindle model	Helix angle	No.	Cutter body	No. of teeth	φDm (mm)	φDs	P.C.D.	Mount adapter bolt	
TSUGAMI	BH20/BH38	Turret	TSUGAMI	3263-Y481	±10°	2	TWC3TS2252P2	3	φ12	φ52	φ42	CS0515 (M5)	
	B038T			3263-Y2481			TWC3TS2252P2-LH	3					
				TWC6TS2252P2			6						
									TWC6TS2252P2-LH	6			
									TWC9TS2252P2	9			
									TWC9TS2252P2-LH	9			
	BS20	Attachment		3214-Y1371	0°-10° 0°-20° 0°-25° 0°-30°	3	TWC9TS20550P2	9	φ16	φ50	φ40		
	SS20/SS26/SS32			3268-Y451			TWC3TS2244HP1	3	φ12	φ52	φ44	φ38	CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0520 (M5) CS0515 (M5)
	B0265/B0266-II						TWC3TS2244HP1-LH	3					
	B0325/B0326-II						TWC6TS2244HP1	6					
	B0265/B0266(V)-III						TWC6TS2244HP1-LH	6					
	B0325/B0326(V)-III						TWC9TS2244HP1	9					
	BW329Z/B0385386(L)-III						TWC9TS2244HP1-LH	9					
	S205/S206						TWC9TS1944HP1	9					
	S205/S206-II						TWC9TS1644HP1	9					
B0123/124/126-II	TWC9TS1044HP1		9										
B0-V/B0-VR													
B0203/204/205205-III/206-II													
SS20/SS26/SS32	3268-Y271		0°-15° 0°-20°	3			TWC9TS1952P2BK	9	φ12	φ52	φ38	CS0515 (M5)	
				TWC9TS1652P2BK			9						
SS207/SS267/SS327	B-axis	Using B-axis	0°-15°	4			TWC4TS3010HP1	4	φ7	φ10	For single-corner inserts only		
SS267/SS327-III	Attachment	3293-Y3031		3	TWC9TS1944HP1	9	φ12	φ52	φ44	CS0520 (M5)			
TORNOS	DECO 10/10a	Attachment	TORNOS	224-1900	±15°	3	TWC6TO11542HP1	6	φ12	φ42	φ32	CS0410 (M4)	
	Evo DECO 10/10			242-1900									
	DECO 13a/13e			226-1900									
	Evo DECO 16/10			243-1900	±15°	2	TWC9TO10540P2	9	φ12	φ40	φ31	CS0410 (M4)	
	Swiss ST26			246-1900									
	DECO 20a			223-1900									
	DECO 26a			225-1900	±25°	2	TWC9TO12050P2-D18	9	φ18	φ50	φ40	CS0410 (M4)	
	Sigma 20			234-2750									
Sigma 32	236-2750												
HASEGAWA	JS-1W	-	HASEGAWA	-	0°-20°	2	TWC9HA22594P2	9	φ16	φ94	φ76	CS0620 (M6)	
Various Machines	-	-	WTO	42BJ	-22°	1	TWC9WT42BJ20D12RH	9	φ12	-	-	-	
	-	-		54BJ	30°	1	TWC9WT54BJ30D12RH	9	φ12	-	-	-	
	-	-			30°	1	TWC9WT54BJ25D22RH	9	φ22	-	-	-	

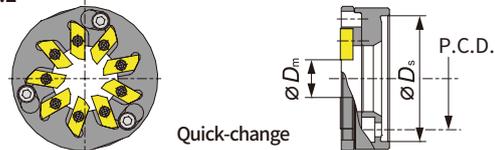
※Screws for insert-thickness 4.0/6.5mm are supplied with the cutter body. Use screws for the thickness of the insert you are using.

Number of inserts and product appearance vary by part number.

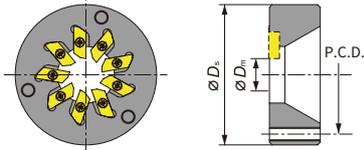
No.1



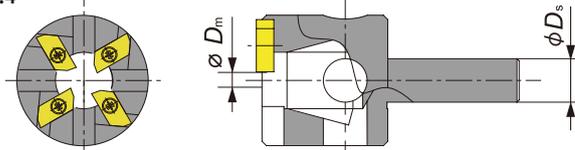
No.2



No.3



No.4



Guideline: Raw material diameter up to φ6, machinable up to length 18mm (Contact for further information)

### Spare Insert Holder (Cartridge)

Designation	No. of teeth	φDm (mm)
TWC6HP2	6	12
TWC9HP2	9	12
TWC9HP2-D16	9	12

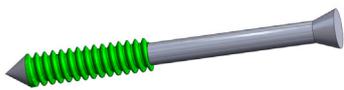
### Spare Parts

Description		Designation
Insert Screw	for insert thickness: 4mm	FS117-2.2×6.0
	for insert thickness: 6.5mm	FS124-2.2×7.9
Wrench		T-07
Cutter body Mounting Bolt		CS0309-TW

※Cannot be used for TWC9TS20550P2, TWC9TO12050P2-D18 and TWC9HA22594P2

Note: Insert holder comes with insert screws and wrench Insert holder mounting screw is not included

## Practical examples

Single-lead Bone Screw						
Work Material	Titanium alloys	Major Dia.	φ3.6	 <div style="position: absolute; top: 10px; right: 10px; border: 1px solid black; border-radius: 50%; padding: 5px; color: white; font-weight: bold;">                     Total cost for machining parts 50% reduce!                 </div>		
Material Diameter	φ4.0	Minor Dia.	φ2.4			
Spindle Speed	15rpm	Number of Threads	1			
Cutter Speed	4,000rpm	Edge per insert	1			
Pitch/Feed	1.25mm	Thread Direction	Right-hand thread			
				<b>Thread Whirling ECO</b>	50%	Cost ratio / workpiece ( % )
				<b>Competitor Thread Whirling</b>	100%	

The **Thread Whirling ECO** allows for more economical performance. In this case, by reducing the number of teeth from 9 to 3 and the number of insert corners from 2 to 1, total machining costs can be reduced by 48% while maintaining the same tool life.

Double-lead Bone Screw						
Work Material	Titanium alloys	Major Dia.	φ4.0	 <div style="position: absolute; top: 10px; right: 10px; border: 1px solid black; border-radius: 50%; padding: 5px; color: white; font-weight: bold;">                     Cycle time 85% reduce!                 </div>		
Material Diameter	φ9.5	Minor Dia.	φ0.5			
Spindle Speed	15rpm	Number of Threads	2			
Cutter Speed	3,500rpm	Edge per insert	2			
Pitch/Feed	5.5mm	Thread Direction	Right-hand thread			
				<b>NTK Thread Whirling 9-Blade Specification</b>	26 sec	
				<b>Competitor Chasing Processing</b>	170 sec	

Single-lead Bone Screw						
Work Material	SUS316	Major Dia.	φ3.5	 <div style="position: absolute; top: 10px; right: 10px; border: 1px solid black; border-radius: 50%; padding: 5px; color: white; font-weight: bold;">                     Tool life 2.6 times longer!                 </div>		
Material Diameter	φ8.0	Minor Dia.	φ2.5			
Spindle Speed	23rpm	Number of Threads	1			
Cutter Speed	2,000rpm	Edge per insert	2			
Pitch/Feed	1.2mm	Thread Direction	Right-hand thread			
				<b>NTK Thread Whirling 9-Blade Specification</b>	2,600 pcs	
				<b>Competitor Thread Whirling 6 Blade Specification</b>	1,000 pcs	



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