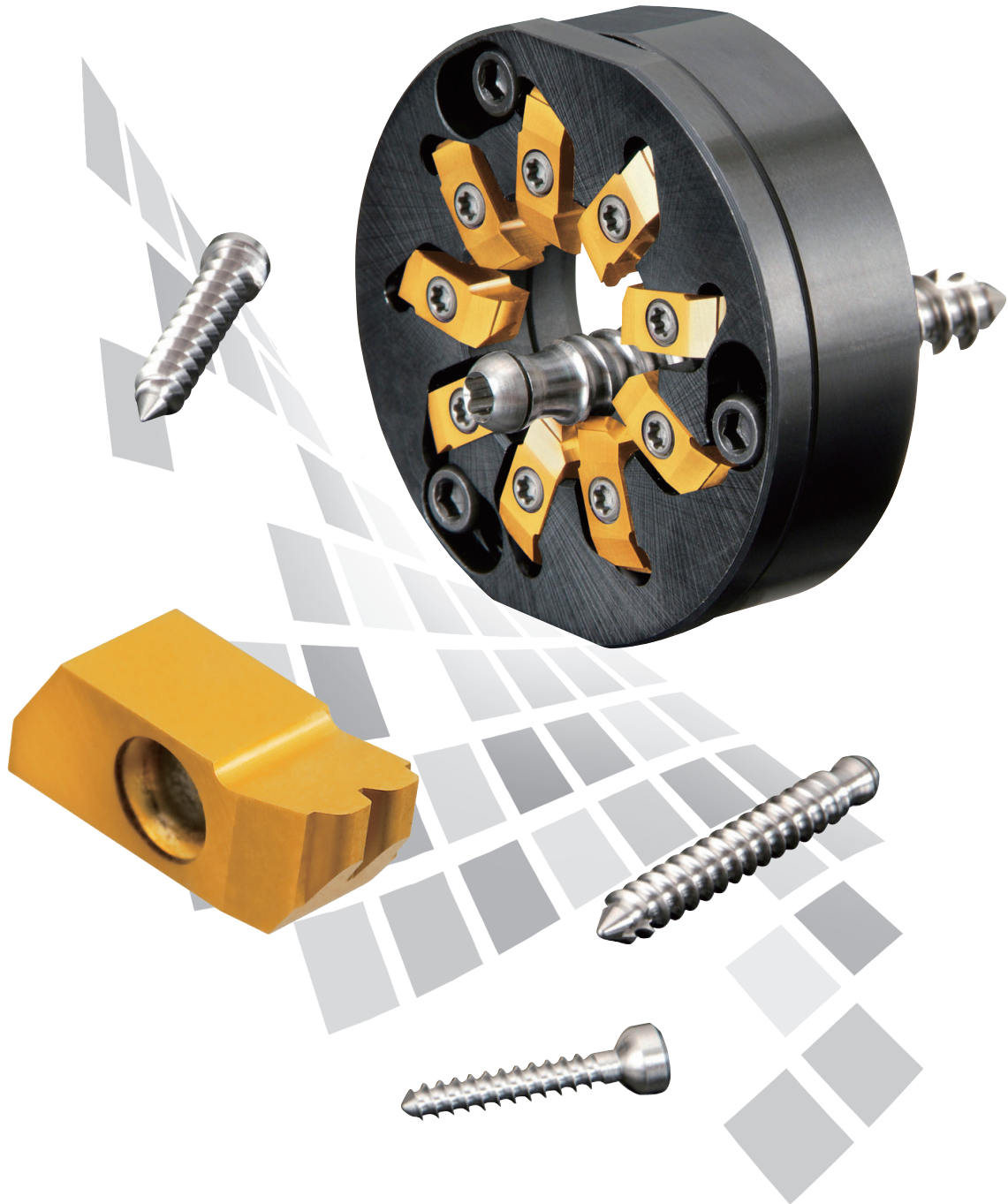
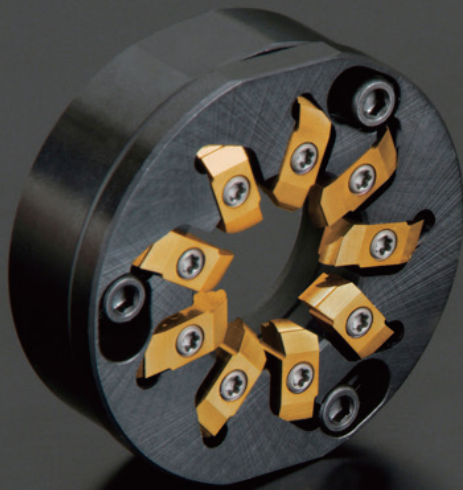


Thread Whirling

High-efficiency threading | For CNC automatic lathe



High productivity for precision screw manufacturing, like implant screws and bone screws.
Extensive experience in machining worm screws, which are known to be difficult to cut.



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





High-efficiency threading I for CNC automatic lathes

Thread whirling

| Performance

In automatic lathes, threading is performed by repeating multiple cutting passes. Therefore, when machining long screws, it is necessary to ensure that workpiece not to fall off from the guide bush. However, thread whirling 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, eliminating the need for multiple cutting passes and subsequent joining process, thus achieving high-efficiency threading.

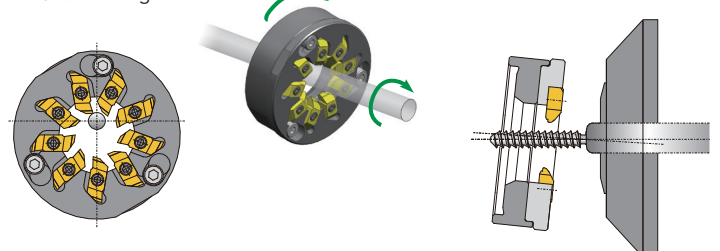
	Double-lead threads	Triple-lead threads
Component name	Bone Screws	Worm Screws
Work material	Ti-6Al-4V ELI	brass
Workpiece		
Insert shape		
Major Dia.	$\phi 4.0$	$\phi 7.0$
Minor Dia.	$\phi 2.4$	$\phi 4.7$
Lead	3.42mm	4.9mm

When machining multi-lead threads by 1 pass, many process requirements. Please contact to discuss about mechanical spec., Spindle spec., Insert spec., tooling spec.,.

| Machining overview

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

Thread whirling



NTK's unique easy-to-detach system

NTK's whirling toolholder can be attached and detached without removing mounting screws



① Loosen the Mounting Screws

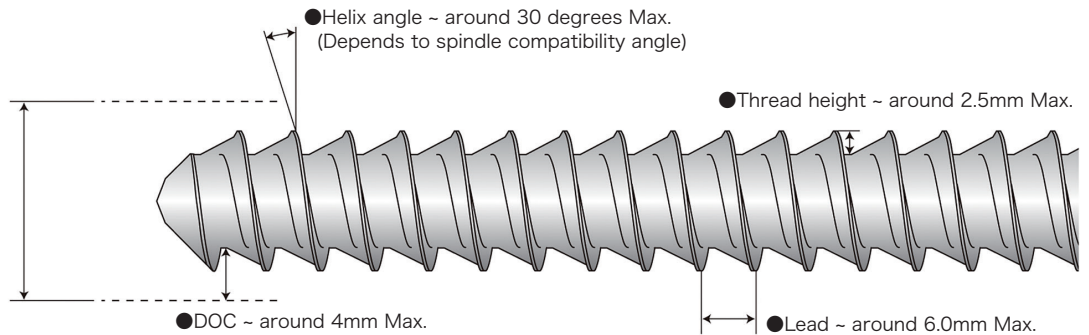
② Rotate toolholder 10 degrees

③ Detach the toolholder without removing the Mounting Screws

Applicable Thread Geometry (Approximated)

● Lead: 1-3 leads

● 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	4	Faster RPM reduces machining time
Main spindle	min-1	10-40	10-25	7-15	
Whirling cutter	min-1	1500-4000			
Feed Rate		pitch			
Material diameter	mm	$-\phi 10$	$-\phi 10$	$-\phi 8$	
Work Material		Ti-6Al-4V EL / SUS316 / 17-4PH / Titanium / Brass			

Formula for calculating thread whirling process time

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

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

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

Practical examples

Single-lead Bone Screw					
Work Material	SUS316	Major Dia.	φ3.5	NTK Thread Whirling 9-Blade Specification	2,600 pcs
Material Diameter	φ8.0	Minor Dia.	φ2.5		
Spindle Speed	23rpm	Number of Threads	1		
Cutter Speed	2,000rpm	Lead Angle	7.5°	Competitor Thread Whirling 6 Blade Specification	1,000 pcs
Pitch/Feed	1.2mm/rev	Thread Direction	Right-hand thread		

Tool life
2.6 times
longer!

Double-lead Bone Screw					
Work Material	Titanium alloys	Major Dia.	φ4.0	NTK Thread Whirling 9-Blade Specification	26 sec
Material Diameter	φ9.5	Minor Dia.	φ0.5		
Spindle Speed	15rpm	Number of Threads	2		
Cutter Speed	3,500rpm	Lead Angle	28.5°	Competitor Chasing Processing	170 sec
Pitch/Feed	5.5mm/rev	Thread Direction	Right-hand thread		

6x productivity!

Triple-lead Worm Gear					
Work Material	Brass	Major Dia.	φ7.0	NTK Thread Whirling 9-Blade Specification	Once out of shape
Material Diameter	φ8.0	Minor Dia.	φ4.7		
Spindle Speed	20rpm	Number of Threads	3		
Cutter Speed	3,500rpm	Lead Angle	14.6°	Competitor Thread Whirling	Shape forming by 3 times
Pitch/Feed	4.8mm/rev	Thread Direction	Left-hand thread		

Shape
forming by
1 time!



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