



Integrated ER taper-shank cutter

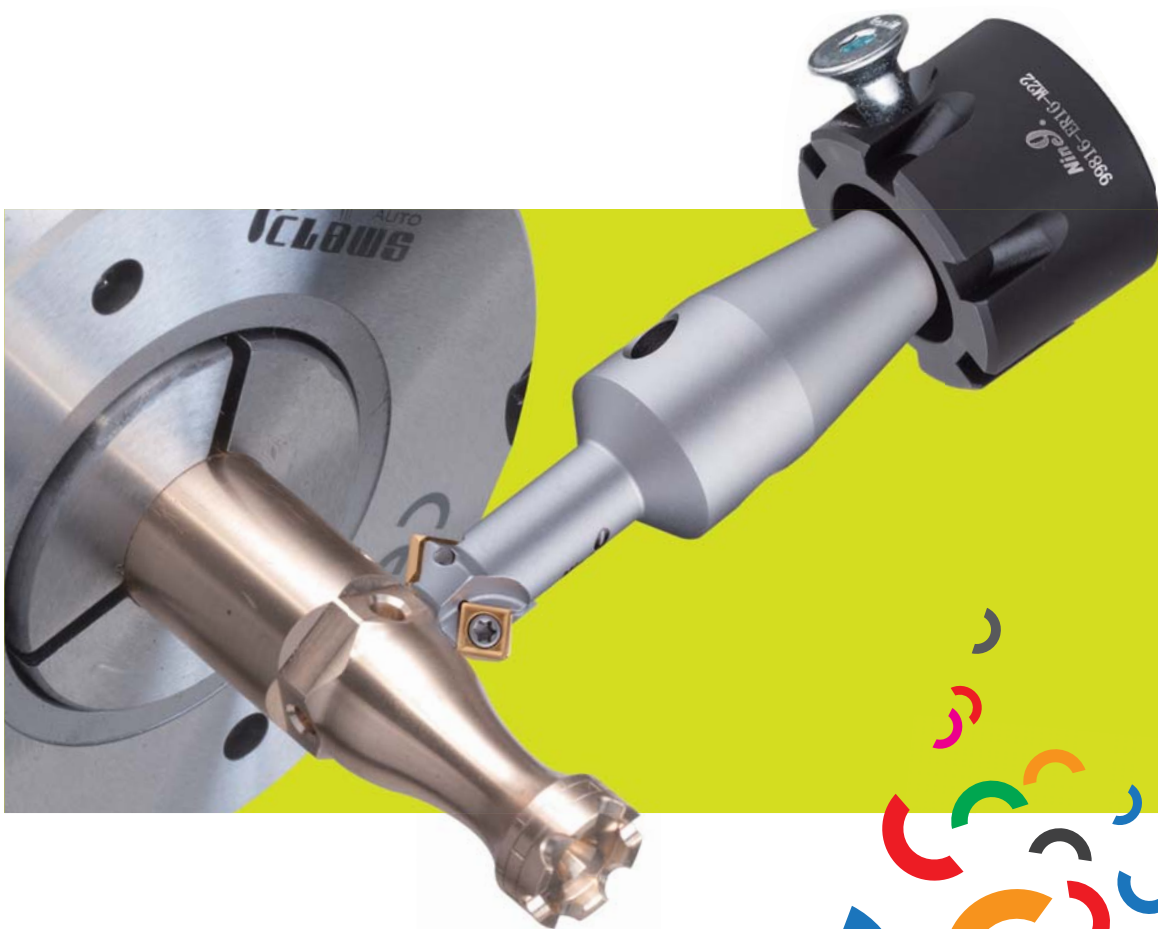
Center Coolant / Pre-balanced

Better rigidity

Quick change

Excellent repeatability

Tool Length maintain

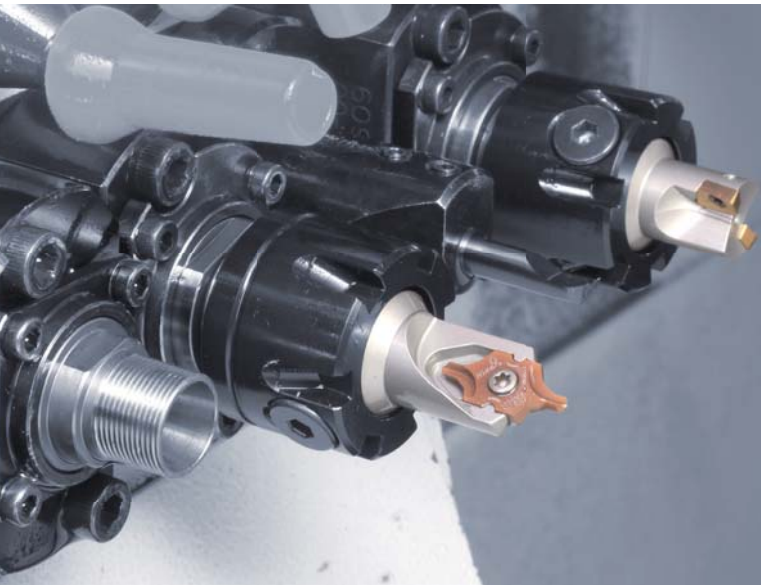


Nine9®

nine9.jic-tools.com.tw

Supplement





ERgo just say "ergo".

The Ergo is a new trademark of Nine9 for ER type indexable cutter. Short tool length and quick change system for adapting on small working area. Ideal solution for BT30, driven tools, tapping and turning center.

Concept:

An integrated ER taper- shank cutter, eliminate assembly tolerance.

A clamping force gained from the 3 parts including

Ergo nut, **high strength Ergo pin** and **ER taper**.

Ergo nut drives the pin to push Ergo holder into ER taper. It is

" A simple way to maximize clamping force "

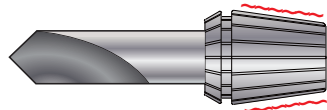


Optimize the rigidity

- An integrated ER taper- shank cutter, eliminate assembly tolerance.
- Coolant can be supplied through the center of the holder.
- Pre-balanced, ready for high speed machining.
- Increase tool life.



Integrated design



Cutting tool
+ Spring collet

Easy and simple assembly

- A simple Ergo cutter has minimal assemble parts, changing tool takes just few seconds.
- Thanks to ER taper, the repeatability of assemble tolerance is $\pm 0.1\text{mm}$ while changing same tool length Ergo holder.



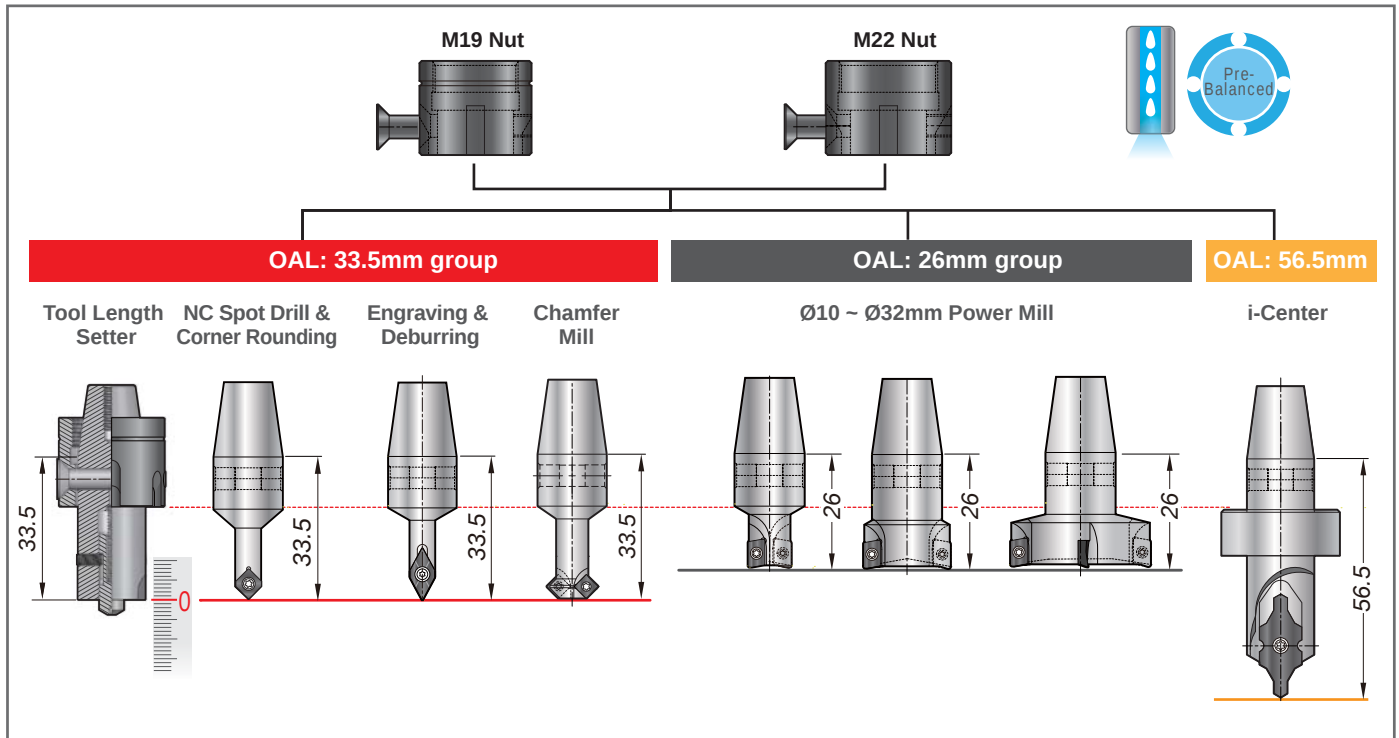
Ergo cutter



Solid carbide cutter

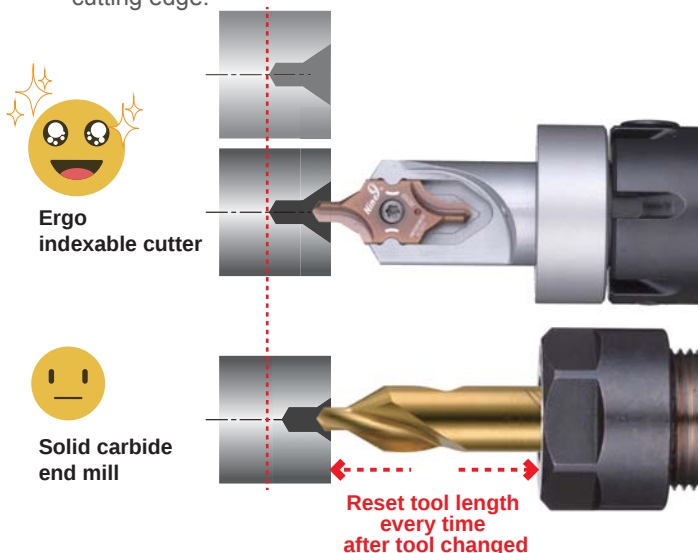
Quick change, saving huge machine downtime.

- The simplest way to get tools on the machine.
- 3 fixed tool length groups of Ergo system.
- No need to reset tool length while changing tools in the same group.



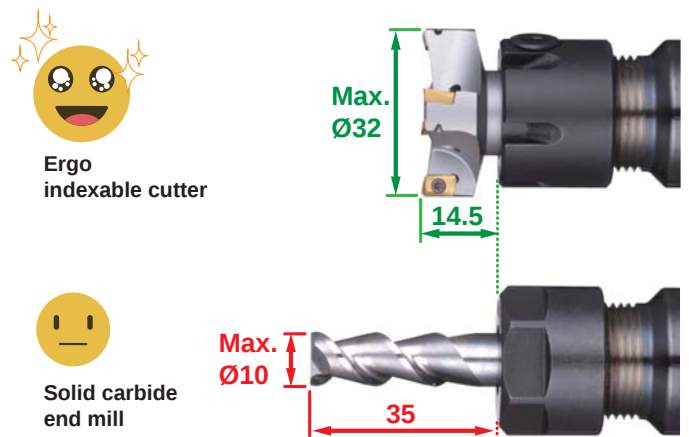
Excellent repeatability, saving set-up time.

- Indexable insert provides the greatest benefit of saving tool changing time and tool length setting time.
- The drilling depth is constant after change the insert or cutting edge.



Dimension is not limited by the ER16 collet clamping range

- Ergo ER16 covers milling cutter range from 10 to 32mm.
- More efficiency and the possibilities to machine bigger parts.
- The shorter tool length, the better run-out accuracy.



P. 6

NC Spot Drill / Corner Rounding

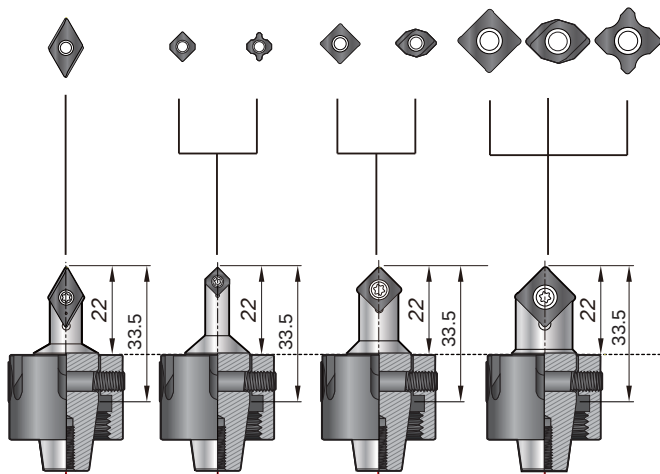
G6.3 10,000 r.p.m.

One tool will perform multiple applications



V9MT0802 N9MT05T1 N9MT0802 N9MT11T3

60° 90° RC 0.5~1.0 90° 145°
+ 90° 90° 145°
+ 90° RC 1.0~3.0



99816-09V 99816-606 99816-610 99816-614

P. 8

Engraving Tool / Deburring Tool

G4.0 20,000 r.p.m.

Engraving
30°, 45° & 60°

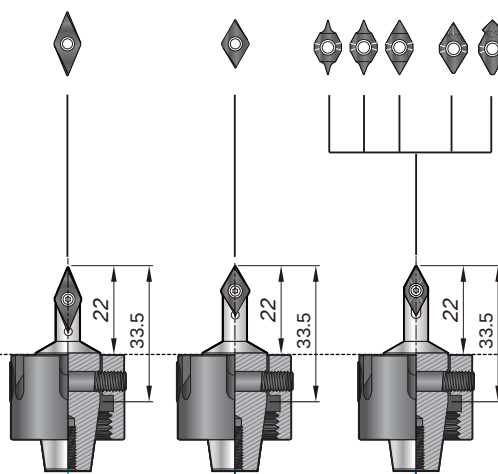


Deburring
60° & 90°



V045 V060 X060 X060

Engraving 45° Engraving 60° Engraving 30° / 45° / 60° Deburring 60° / 90°



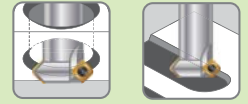
99816-V045 99816-V060 99816-X060 99816-X060

P.10

Chamfer Mill

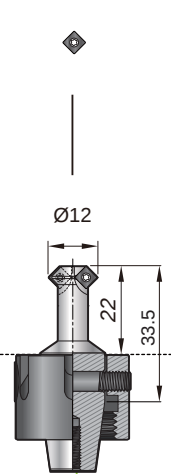
G6.3 10,000 r.p.m.

Front & Back
Chamfering Face
Milling



N9GX04T002

45°



99816-C10

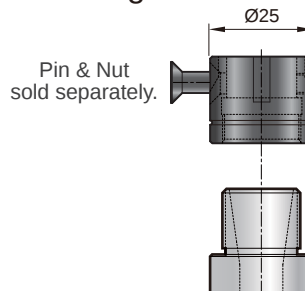
OAL= 33.5mm



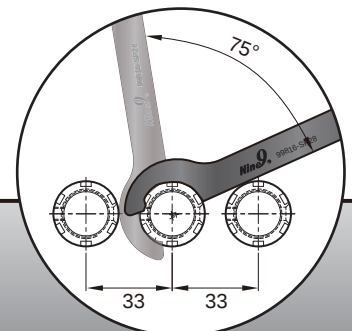
99816 System

Ergo system can apply on live spindle tool of turning centers and swiss type automatic lathes such as Star, Citizen, Tugami, Doosan, Tornos, INDEX, EMAG...and so on. And also good for tapping and machining centers.

Ergo ER16 Mini Nut



Center distance:
33mm



P.11

Power Mill

Center Coolant / G6.3 10,000 r.p.m.

Smaller, sharper and more effective teeth.

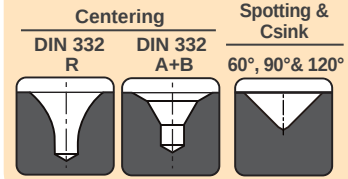


A9GT0602

New

P.12

i-Center

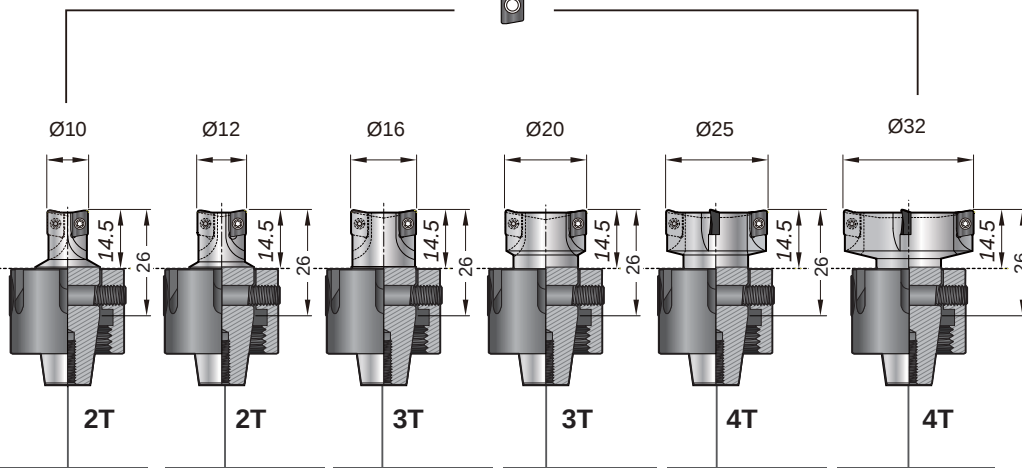
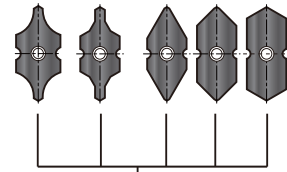
Center Coolant
G6.3 10,000 r.p.m.

Boring Tool

On Request

I9MT1003

New

Re 0.1
&
Re 0.5R, A+B
Ø1.0 ~ Ø3.15 60° 90° 120°

99816-10A06

99816-12A06

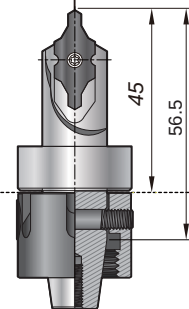
99816-16A06

99816-20A06

99816-25A06

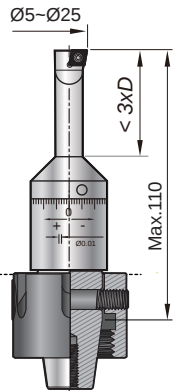
99816-32A06

OAL= 26mm



99816-IC10BH

OAL= 56.5mm

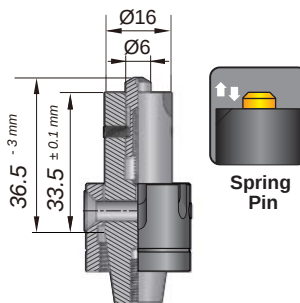


On Request

OAL= 75~110mm

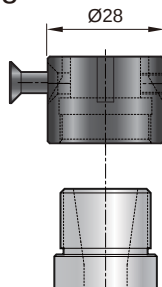
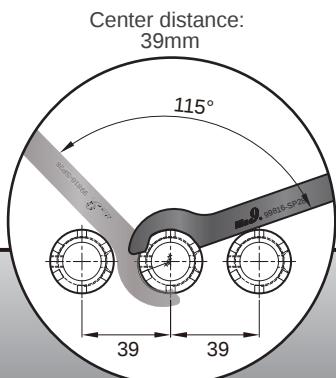
P.15

Ergo Setter TP



99816-TP

Ergo ER16 Nut

Pin & Nut
sold separately.Assembled
Parts

Insert



Holder

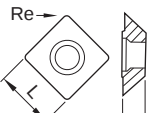
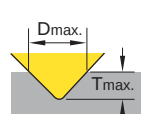
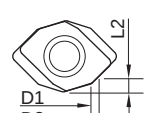
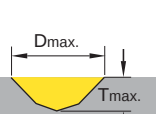
Nut
&
PinErgo
Sets
(See P. 17)

Nine9 Ergo

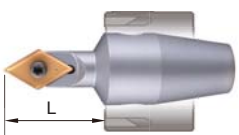
5

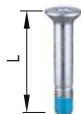


Insert

							Grade	P	M	N	
							NC5071	●	◎	◎	
 							NC5071 NC9076		●	●	
 							NC40 NC10	●			
							NC2033		●	◎	
							NC2033	●	●		
Angle	Code	Parts No.	Coating	Grade		L	S	Re	Dmax.	Tmax.	
60°	019201	V9MT0802CT-NC5071	TiN	K20F		8	2.38	0.4	9	7.3	
90°	011201	N9MT05T1CT-NC5071	TiN	K20F		5	1.8	0.4	6	2.8	
	011202	N9MT05T1CT-NC9076	DLC	K20F							
90°	013401	N9MT080208CT-NC40	TiN	K20F		8.31	2.38	0.8	10	4.5	
	013402	N9MT080204CT-NC40	TiN	K20F		8.31	2.38	0.4			
	013403	N9MT080204CT-NC10	TiAlN	K20F							
90°	014401	N9MT11T3CT-NC40	TiN	P35		11.11	3.97	0.8	14	7	
	014402	N9MT11T3CT-NC10	TiAlN	K10F		11.11	3.97	0.3			
Angle	Code	Parts No.	Coating	Grade		Thread Size	D1 ±0.05	D2	L2	Dmax.	Tmax.
90° + 145°	013203	N9MT0802M04C-NC2033	TiAlN	K20F		M4x0.7	3.30	4.20	0.93	8	2.83
	013204	N9MT0802M05C-NC2033				M5x0.8	4.20	5.25	1.14		2.52
	013205	N9MT0802M06C-NC2033				M6x1.0	5.00	6.30	1.39		2.24
90° + 145°	014219	N9MT11T3M08C-NC2033	TiAlN	K20F		M8x1.25	6.80	8.40	1.81	13	4.11
	014220	N9MT11T3M10C-NC2033				M10x1.5	8.50	10.50	2.28		3.53
	014221	N9MT11T3UNC25-NC2033	TiAlN	K20F		1/4-20 UNC	5.08	6.70	1.55	13	4.70
	014222	N9MT11T3UNC31-NC2033				5/16-18 UNC	6.53	8.40	1.90		4.20
	014223	N9MT11T3UNC38-NC2033				3/8-16 UNC	7.94	10.00	2.22		3.72

Basic Holder & Accessory

Code	Parts No.	Basic Holder	Insert Type	L	Screw	Key
16-609002	00-99816-09V		V9MT0802...	22	NS-25045 0.9Nm	NK-T7
16-601004	00-99816-606		N9MT05T1...		NS-20036 0.6 Nm	NK-T6
16-603004	00-99816-610		N9MT0802...		NS-30055 2.0 Nm	NK-T8
16-604010	00-99816-614		N9MT11T3...		NS-35080 2.5 Nm	NK-T15

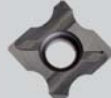
Set of Ergo Nut		Ergo Nut			High Strength Ergo Pin			L-Key		25~28mm Ergo Spanner	
 * Nut, pin & L-key are included.											
Code	Parts No.	Code	Parts No.	Ød	Code	Parts No.	L	Code	Parts No.	Code	Parts No.
NN-M19S	00-99816-M19S	NN-M19	00-99816-M19	25	NS-50025	00-NS-50025	25	NK-LW3	00-NK-LW3	NK-SP28	00-99816-SP28
NN-M22S	00-99816-M22S	NN-M22	00-99816-M22	28	NS-50028	00-NS-50028	28				

● Best © Suit



NC9036

N9MT05T1RC...

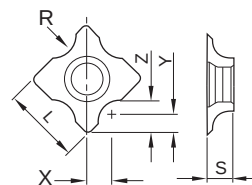


NC9036

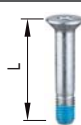
N9MT11T3BC

Grade	P	M	N
NC2071	●	◎	◎
NC9036		●	●

Technical drawing of a mechanical part showing a cross-section. The part has a central circular hole. Dimensions are indicated: R is the radius of the outer profile, L is the total width, Y is the distance from the center to the top edge, and Z is the distance from the center to the bottom edge. A section line $S-S$ is shown on the right side of the part.



* Nut, pin & L-key are included.



V045 / V060 Engraving Tool



Insert

						● Best ◎ Suit ○ Possible			
						Grade	P	M	N
45°						NC2071	◎	●	◎
						NC2032	●	○	
						NC9031		◎	●
60°						NC2071			
						NC2032			
						NC9031			

Angle	Code	Parts No.	Coating	Grade		L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
45°	0104501	NC2071	TiN	K20F		6.35	2.0	0.2	0.65		0.20	
	0104502	V04506T1W06 NC2032	TiAlN						0.65	2.1	0.20	2.0
	0104504	NC9031	TiN						0.45		0.05	
60°	0106001	NC2071	TiN	K20F		6.35	2.0	0.2	0.65		0.20	
	0106002	V06006T1W06 NC2032	TiAlN						0.65	2.7	0.20	2.0
	0106004	NC9031	TiN						0.45		0.05	

Basic Holder & Accessory

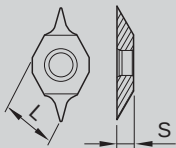
Angle	Code	Parts No.	Basic Holder	Insert Type	L	Screw	Key
45°	16-691004	00-99816-V045		V0450...	22	 NS-22044 0.9Nm	 NK-T7
60°	16-692005	00-99816-V060		V060...			

Set of Ergo Nut		Ergo Nut			High Strength Ergo Pin			L-Key		25-28mm Ergo Spanner	
 * Nut, pin & L-key are included.											
Code	Parts No.	Code	Parts No.	Ød	Code	Parts No.	L	Code	Parts No.	Code	Parts No.
NN-M19S	00-99816-M19S	NN-M19	00-99816-M19	25	NS-50025	00-NS-50025	25	NK-LW3	00-NK-LW3	NK-SP28	00-99816-SP28
NN-M22S	00-99816-M22S	NN-M22	00-99816-M22	28	NS-50028	00-NS-50028	28				

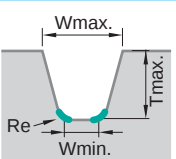
X060 Engraving Tool & Deburring Tool



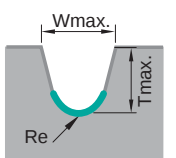
Engraving Insert

 NC2032	 XP9001		Grade	P	M	N
			NC2032	●	●	
			XP9001			●

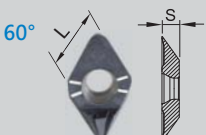
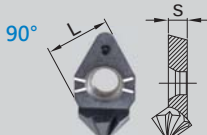
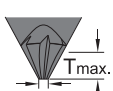
• Radius angled form

Angle	Code	Parts No.	Coating	Grade		L	S	Re	Wmin.	Wmax.	Tmax.
30°	01X0140	X060A30W020R	NC2032	TiAlN		6	2.05	0.04	0.20	0.74	0.6
	01X0142		XP9001	Polished							
45°	01X0021	X060A45W020R	NC2032	TiAlN		6	2.05	0.04	0.20	1.03	0.8
	01X0154		XP9001	Polished							
60°	01X0063	X060A60W020R	NC2032	TiAlN		6	2.05	0.04	0.20	1.36	1.0
	01X0166		XP9001	Polished							

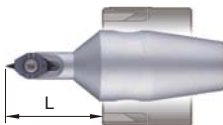
• Radius form

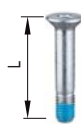
Angle	Code	Parts No.	Coating	Grade		L	S	Re	R max. Depth	Wmax.	Tmax.
30°	01X0119	X060A30R020	NC2032	TiAlN		6	2.05	0.2	0.15	0.84	0.6
	01X0134		XP9001	Polished							
45°	01X0013	X060A45R020	NC2032	TiAlN		6	2.05	0.2	0.12	1.1	0.8
	01X0150		XP9001	Polished							
60°	01X0117	X060A60R020	NC2032	TiAlN		6	2.05	0.2	0.10	1.39	1.0
	01X0159		XP9001	Polished							

Deburring Insert

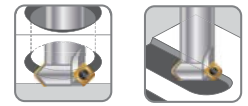
 					<table><tr><th>Grade</th><th>P</th><th>M</th><th>N</th></tr><tr><td>NC2032</td><td>●</td><td>○</td><td>●</td></tr></table>					Grade	P	M	N	NC2032	●	○	●
Grade	P	M	N														
NC2032	●	○	●														
Angle	Code	Parts No.	Coating	Grade			L	S	Tmin.	Tmax.							
60°	01X601	X060A60T6-NC2032	TiAlN	K20F	60°		6	2.0	0.1	1.9							
90°	01X901	X060A90T6-NC2032			90°						6	2.0	0.5	2.0			

Basic Holder & Accessory

Code	Parts No.	Basic Holder	L	Screw	Key
16-69X004	00-99816-X060		22	 NS-22044 0.9Nm	 NK-T7

Set of Ergo Nut		Ergo Nut	High Strength Ergo Pin	L-Key	25-28mm Ergo Spanner
 * Nut, pin & L-key are included.					
Code	Parts No.	Code	Parts No.	Code	Parts No.
NN-M19S	00-99816-M19S	NN-M19	00-99816-M19	NS-50025	00-NS-50025
NN-M22S	00-99816-M22S	NN-M22	00-99816-M22	NS-50028	00-NS-50028
				NK-LW3	00-NK-LW3
				NK-SP28	00-99816-SP28

45° Chamfer Mill



Insert

- The smallest insert in the world.
- Each insert has 4 cutting edges.

● Best ◎ Suit ○ Possible

		Grade					
					P	M	N
					●	○	
					○	●	●

Code	Parts No.	Coating	Grade	Insert	Dimensions		
					L	S	Re
021401	N9GX04T002	NC2032	AlTiN		4.0	1.8	0.2
021402		NC9071	TiN				



Basic Holder & Accessory

Code	Parts No.	Basic Holder	L	No. of teeth	Screw	Key
16-701003	00-99816-C10		22	2	 NS-18037 0.6Nm	 NK-T6

Set of Ergo Nut		Ergo Nut			High Strength Pin			L-Key		25~28mm Ergo Spanner	
 * Nut, pin & L-key are included.											
Code	Parts No.	Code	Parts No.	Ød	Code	Parts No.	L	Code	Parts No.	Code	Parts No.
NN-M19S	00-99816-M19S	NN-M19	00-99816-M19	25	NS-50025	00-NS-50025	25	NK-LW3	00-NK-LW3	NK-SP28	00-99816-SP28
NN-M22S	00-99816-M22S	NN-M22	00-99816-M22	28	NS-50028	00-NS-50028	28				



Cutting Data

Workpiece material		Grade of insert	Cutting Speed Vc m/min.	Feed rate mm / tooth
Material Group	Sample Code (JIS)			Max. Chamfering 1.5mm
P	Carbon steel C<0.3%	NC2032	150-250-350	0.06~0.12
	Carbon steel C>0.3%		200-300-400	0.06~0.10
	Low alloy steel C<0.3%		180-240-260	0.06~0.10
	High alloy steel C>0.3%		120-150-200	0.06~0.10
M	Stainless steel	NC9071	120-150-180	0.06~0.10
N	Al, and non-ferrous metal	NC9071	200-400-600	0.06~0.15



Insert

- Small radius Re0.1 can reduce cutting resistance in general.
- NC2033 for steel, NC9031 for stainless steel, aluminum and copper cutting.

● Best ◎ Suit ○ Possible

					Grade	P	M	N
					NC2033	●	●	
					NC9031	◎	◎	●

Code	Parts No.	Coating	Grade	Insert	Re	Ap	L	W	S
05A122	A9GT0602 01H	NC2033	TiAlN		0.1	5	6.5	4	2.45
05A123		NC9031	TiN						
05A102	A9GT0602 05H	NC2033	TiAlN		0.5	5	6.5	4	2.45
05A103		NC9031	TiN						



Basic Holder & Accessory

- Customized cutter is on request. Please refer to P18.

Code	Parts No.	Basic Holder	ØD	L	No. of teeth	α°	Screw	Key
16-51A100	00-99816-10A06		10	14.5	2	5	NS-18037 / 0.6Nm	NK-T6
16-51A122	00-99816-12A06		12		2	4		
16-51A130	00-99816-16A06		16		3	2		
16-51A140	00-99816-20A06		20		3	2		
16-51A150	00-99816-25A06		25		4	1.3		
16-51A160	00-99816-32A06		32		4	1		

Set of Ergo Nut		Ergo Nut			High Strength Ergo Pin			L-Key		25~28mm Ergo Spanner	
 * Nut, pin & L-key are included.											
Code	Parts No.	Code	Parts No.	Ød	Code	Parts No.	L	Code	Parts No.	Code	Parts No.
NN-M19S	00-99816-M19S	NN-M19	00-99816-M19	25	NS-50025	00-NS-50025	25	NK-LW3	00-NK-LW3	NK-SP28	00-99816-SP28
NN-M22S	00-99816-M22S	NN-M22	00-99816-M22	28	NS-50028	00-NS-50028	28				



Cutting Data

Work Material		Grade	Vc (m/min)	fz (mm/tooth)	 Ap(mm) Ae(mm)	 Ap(mm) Ae(mm)
P	Carbon Steel	NC2033	80 ~ 150	0.03 ~ 0.07	1.5	3
	Low-alloy Steel C ≤ 0.3%					
	High-alloy Steel C > 0.3%	NC2033	60 ~ 120	0.02 ~ 0.06	1.0	1
M	Stainless Steel	NC2033	60 ~ 120	0.01 ~ 0.05	0.5	2.0
N	Al, and non-ferrous metal (Cu)	NC9031	200 ~ 500	0.02 ~ 0.07	2.0	4.0

New Insert

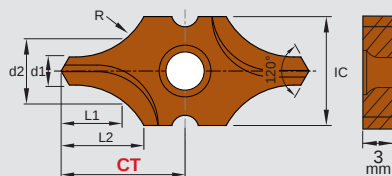
- Double-edged cutting, fully ground insert for improving machining stability.
- NC2057: Universal grade for all kind of steel.



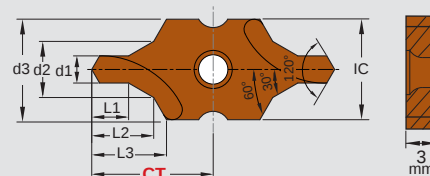
◀ 2 Cutting flutes design
No offset



DIN332
Form R



DIN332
Form A+B



• For DIN332 Form R Center Hole

IC	Code	Parts No.	Coating	Grade	d1		d2	L1	L2	R	CT ±0.025
10	031200	I9MT1003R0100- NC2057	AL(L)	P35	1.00	+0.14 0	2.12	2.16	4.72	2.8	12.35
	031201	I9MT1003R0125- NC2057			1.25		2.65	2.74	5.22	3.5	
	031202	I9MT1003R0150- NC2057			1.50		3.60	3.67	6.14	5.0	
	031203	I9MT1003R0160- NC2057			1.60		3.35	3.45	5.32	4.5	
	031204	I9MT1003R0200- NC2057			2.00	+0.18 0	4.25	4.45	6.50	5.65	
	031205	I9MT1003R0250- NC2057			2.50		5.30	5.59	7.66	7.15	
	031206	I9MT1003R0300- NC2057			3.00		5.70	6.92	9.50	10.00	
	031207	I9MT1003R0315- NC2057			3.15		6.70	7.21	8.93	9.00	

• For DIN332 Form A+B Center Hole

IC	Code	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	CT ±0.025
10	031000	I9MT1003B0100- NC2057	AL(L)	P35	1.00	+0.14 0	2.12	3.15	1.3	2.21	2.51	12.35
	031001	I9MT1003B0125- NC2057			1.25		2.65	4.00	1.6	2.75	3.14	
	031002	I9MT1003B0150- NC2057			1.50		3.18	4.50	2.0	3.45	3.84	
	031003	I9MT1003B0160- NC2057			1.60		3.35	5.00	2.0	3.46	3.93	
	031004	I9MT1003B0200- NC2057			2.00	+0.18 0	4.25	6.30	2.5	4.39	4.98	
	031005	I9MT1003B0250- NC2057			2.50		5.30	8.00	3.1	5.53	6.28	
	031006	I9MT1003B0300- NC2057			3.00		6.46	9.00	4.1	7.10	7.83	
	031007	I9MT1003B0315- NC2057			3.15		6.70	10.0	3.9	6.90	7.85	



Basic Holder & Accessory

IC	Code	Parts No.	Basic Holder	ØD	L	Screw	Key
10	16-801003	00-99816-IC10BH	With center coolant	16	45	NS-25060 / 0.9Nm	NK-T7

Set of Ergo Nut

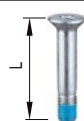


* Nut, pin & L-key are included.

Ergo Nut



High Strength Ergo Pin



L-Key



25~28mm Ergo Spanner



Code	Parts No.	Code	Parts No.	Ød	Code	Parts No.	L	Code	Parts No.	Code	Parts No.
NN-M19S	00-99816-M19S	NN-M19	00-99816-M19	25	NS-50025	00-NS-50025	25	NK-LW3	00-NK-LW3	NK-SP28	00-99816-SP28
NN-M22S	00-99816-M22S	NN-M22	00-99816-M22	28	NS-50028	00-NS-50028	28				

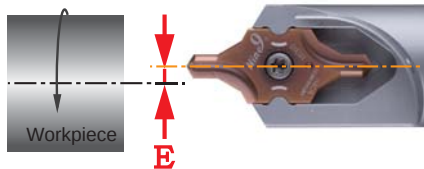


Before you start, please pay attention the following conditions



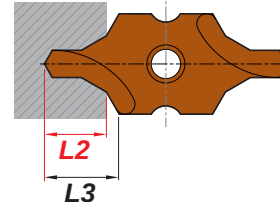
Center misalignment

E must be < 0.02mm.



DIN 332 Form A+B

Reduce 30% of Spindle speed and keep same feed rate (mm/rev.) while depth L2 is reached.



Cutting Data

- ▶ Internal coolant is recommended.
- ▶ Middle value of feed rate is recommended for starting.
- ▶ Using your “d1” value and cutting speed Vc from the data sheet, calculate spindle speed “S”(r.p.m).
- ▶ “F” feed rate per minute F = S x f = IPR x r.p.m.

Workpiece Material		Vc (m/min.)		d1									
				Ø1	Ø1.25	Ø1.50	Ø1.60	Ø2.0	Ø2.50	Ø3.0	Ø3.15		
P	Carbon steel C<0.3%	< 80	S r.p.m.	2000 ~ 10000	2000 ~ 10000	1800 ~ 9000	1600 ~ 8000	1600 ~ 8000	1400 ~ 7000	1300 ~ 6500	1200 ~ 6000		
			f mm/rev.	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.05	0.02 ~ 0.05	0.02 ~ 0.06	0.03 ~ 0.1	0.03 ~ 0.11	0.03 ~ 0.12		
	Carbon steel C>0.3%	< 70	S r.p.m.	2000 ~ 9000	2000 ~ 9000	1800 ~ 8000	1600 ~ 7200	1600 ~ 7200	1400 ~ 6300	1300 ~ 6000	1200 ~ 5400		
			f mm/rev.	0.01~ 0.04	0.01 ~ 0.04	0.01 ~ 0.05	0.02 ~ 0.05	0.02 ~ 0.06	0.03 ~ 0.1	0.03 ~ 0.11	0.03 ~ 0.12		
	Low alloy steel C<0.3%	< 65	S r.p.m.	2000 ~ 8000	2000 ~ 8000	1800 ~ 7000	1600 ~ 6400	1600 ~ 6400	1400 ~ 5600	1300 ~ 5200	1200 ~ 4800		
			f mm/rev.	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.05	0.02 ~ 0.08	0.02 ~ 0.10	0.03 ~ 0.1		
	High alloy steel C>0.3%	< 60	S r.p.m.	1000 ~ 6000	1000 ~ 6000	900 ~ 5500	800 ~ 4800	800 ~ 4800	700 ~ 4200	600 ~ 4000	600 ~ 3600		
			f mm/rev.	0.01 ~ 0.02	0.01 ~ 0.02	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.04	0.02 ~ 0.06	0.02 ~ 0.08	0.03 ~ 0.08		
M	Stainless steel	< 20	S r.p.m.	1000 ~ 3000	1000 ~ 3000	900 ~ 2700	800 ~ 2400	800 ~ 2400	700 ~ 2100	600 ~ 2000	600 ~ 1800		
			f mm/rev.	0.03 ~ 0.01	0.005 ~ 0.015	0.005 ~ 0.02	0.005 ~ 0.02	0.01 ~ 0.025	0.01 ~ 0.03	0.01 ~ 0.04	0.02 ~ 0.05	≥ 5 bar	
N	Al, and non-ferrous metal	< 200	S r.p.m.	6000 ~ 20000	6000 ~ 20000	5000 ~ 18000	4800 ~ 16000	4800 ~ 16000	4200 ~ 14000	4000 ~ 13000	3600 ~ 12000		
			f mm/rev.	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	0.02 ~ 0.05	0.02 ~ 0.05	0.02 ~ 0.06		

● Best ○ Possible

Metric

$S = \frac{V_c \times 1000}{\pi \times d1}$	d1 = diameter -mm
	S = Spindle Speed -r.p.m.
	Vc = Cutting Speed -m/min.
	f = mm/rev.
F = S x f	F = mm/min.

Inch

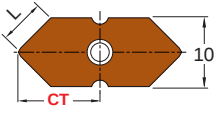
$S = \frac{(3.82 \times \text{SFM})}{d1}$	d1 = diameter-inch
	S = Spindle Speed-r.p.m.
	SFM = Surface Speed-ft./min. Vc (m/min.) x 3.28
	f = IPR = inch/rev.
F = IPR x r.p.m	F = inch/min.

New Insert

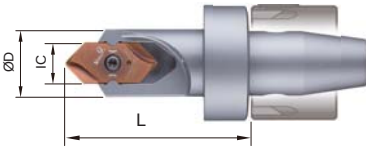
- Double-edged cutting, fully ground insert for improving machining stability.
- NC2057: Universal grade for all kind of steel.



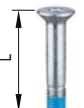
◀ 2 Cutting flutes design
No offset

Angle	Code	Parts No.	Coating	Grade	Insert	L	S	Dmax.	Tmax.	CT ±0.025
60°	031401	I9MT1003CT060- NC2057	AL(L)	P35		8	3	10	7.5	12.35
90°	031402	I9MT1003CT090- NC2057				5.6	3	10	4.6	
120°	031403	I9MT1003CT120- NC2057				5.7	3	10	2.9	

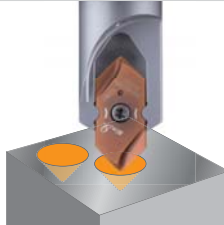
Basic Holder & Accessory

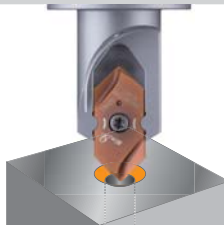
IC	Code	Parts No.	Basic Holder	ØD	L	Screw	Key
10	16-801003	00-99816-IC10BH		16	45	NS-25060 / 0.9Nm	NK-T7

With center coolant

Set of Ergo Nut		Ergo Nut			High Strength Ergo Pin			L-Key		25–28mm Ergo Spanner	
 * Nut, pin & L-key are included.											
Code	Parts No.	Code	Parts No.	Ød	Code	Parts No.	L	Code	Parts No.	Code	Parts No.
NN-M19S	00-99816-M19S	NN-M19	00-99816-M19	25	NS-50025	00-NS-50025	25	NK-LW3	00-NK-LW3	NK-SP28	00-99816-SP28
NN-M22S	00-99816-M22S	NN-M22	00-99816-M22	28	NS-50028	00-NS-50028	28				

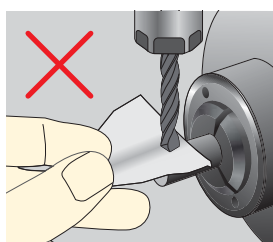
Cutting Data

Spotting	Workpiece Material	Vc (m/min.)	f (mm/rev.)		
			60°	90°	120°
	P Carbon steel C<0.3%	120 ~ 250	0.08 ~ 0.20	0.15 ~ 0.25	0.10 ~ 0.30
	P Carbon steel C>0.3%	100 ~ 220	0.08 ~ 0.20	0.10 ~ 0.05	0.10 ~ 0.30
	P Low alloy steel C<0.3%	100 ~ 200	0.06 ~ 0.16	0.08 ~ 0.20	0.10 ~ 0.25
	P High alloy steel C>0.3%	80 ~ 180	0.06 ~ 0.12	0.08 ~ 0.20	0.10 ~ 0.25
M	M Stainless steel	60 ~ 120	0.04 ~ 0.10	0.06 ~ 0.12	0.08 ~ 0.15
	N Al, and non-ferrous metal	150 ~ 300	0.08 ~ 0.20	0.10 ~ 0.25	0.10 ~ 0.30

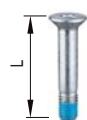
Countersink	Workpiece Material	Vc (m/min.)	f (mm/rev.)		
			60°	90°	120°
	P Carbon steel C<0.3%	120 ~ 250	0.20 ~ 0.50		
	P Carbon steel C>0.3%	100 ~ 220	0.20 ~ 0.40		
	P Low alloy steel C<0.3%	100 ~ 200	0.15 ~ 0.40		
	P High alloy steel C>0.3%	80 ~ 180	0.10 ~ 0.30		
M	M Stainless steel	60 ~ 120	0.08 ~ 0.30		
	N Al, and non-ferrous metal	150 ~ 300	0.20 ~ 0.50		

Setter & Accessory

- Ergo setter is an easy tool length recorder while setting the tool length on swiss type automatic lathe and CNC turning centers.
- Reduce machine downtime, prevent insert and workpiece from damage.



Code	Parts No.	Illustration	L-Key
16-TP0001	00-99816-TP		NK-LW15 (2 Nm) 

Set of Ergo Nut		Ergo Nut			High Strength Ergo Pin			L-Key		25~28mm Ergo Spanner	
 * Nut, pin & L-key are included.											
Code	Parts No.	Code	Parts No.	Ød	Code	Parts No.	L	Code	Parts No.	Code	Parts No.
NN-M19S	00-99816-M19S	NN-M19	00-99816-M19	25	NS-50025	00-NS-50025	25	NK-LW3	00-NK-LW3	NK-SP28	00-99816-SP28
NN-M22S	00-99816-M22S	NN-M22	00-99816-M22	28	NS-50028	00-NS-50028	28				

Setting process

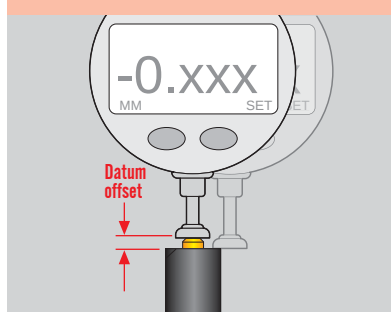
* Mind the cutting depth of Engraving! *If cutting depth is less than 0.1mm*, You must reset tool length when change new insert or cutting edge.

1. Set Temporary Position



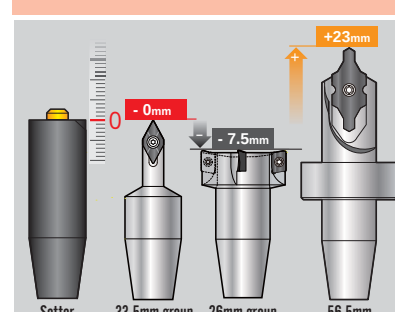
- 1: Move the setter tip to touch the center-top of workpiece.
- 2: Press spring pin 1~2 mm down.
- 3: Tighten screw to fix spring pin, and get a temporary length of setter.
- 4: Input the temporary length value to the CNC controller.

2. Get The Datum Position



- 1: The offline measures the datum offset of setter by height gauge.
- 2: Input datum offset to CNC controller.

3. Input Tool Length Offset



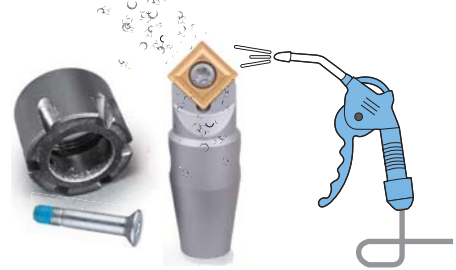
- 1: Choose an Ergo tool to install, and input the offset value to CNC controller directly.

Assembly Steps

Ergo parts:



To keep the machining performance, please make sure all parts are clean while re-assembly or change tool.



- Place Ergo holder and Ergo pin into Ergo nut.



- Lock Ergo pin screw. (Tighten Torque 5Nm)



- Tighten Ergo tool on ER16 holder / driven tool base. Then lock Ergo nut. (Tighten Torque 30Nm)



As long as it complies with ER16 standard, you can use Ergo system.

- Quick change and ultrashort over all tool length.
- Apply on any kind of driven tools and collet chucks.



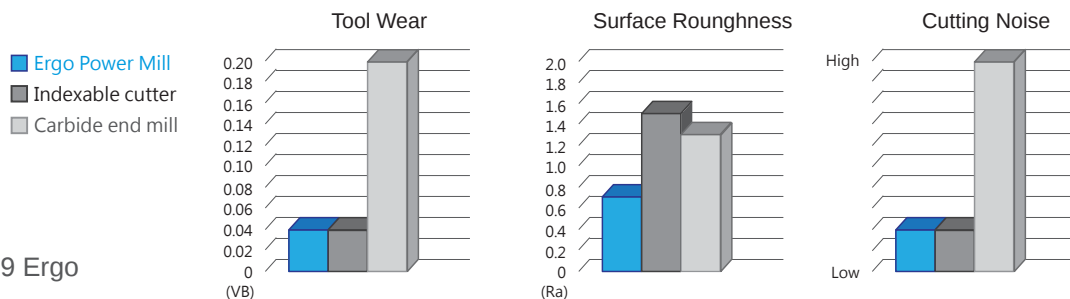
Performance

Material	Testing length	Tool Overhang	Machine: HAAS VM-3, BT40 / 22.5KW					
			Vc (m/min.)	S (r.p.m.)	f (mm/z)	F (mm/min.)	Ap (mm)	Ae (mm)
S50C (Carbon Steel)	2000 mm	172 mm (by ER collet chuck)	80	2500	0.03	150	1.0	6.0



Using Ergo system, you can believe :

- **Better rigidity** resulted a good surface finish quality and surface roughness.
- **Reliable machining** resulted a better run-out accuracy, eliminate vibration, cutting noise and chatter.
- **Longer tool life** is guaranteed.



Ergo Sets ~ *For your first ordering.* ~

• The insert is not included.

Nut	Series	Code	Parts No.	Contents
With ER16 Mini Nut (M19 x 1.0 P)	NC Spot Drills & Corner Rounding	161-609002	00-99816-09V-M19S	Ergo Holder x 1 Ergo ER16 Mini Nut x 1 High Strength Ergo pin x 1 3mm L key x 1 Insert Key x 1  * The insert is not included.
		161-601004	00-99816-606-M19S	
		161-603004	00-99816-610-M19S	
		161-604010	00-99816-614-M19S	
	Engraving Tools & Deburring Tools	161-691004	00-99816-V045-M19S	
		161-692005	00-99816-V060-M19S	
		161-69X004	00-99816-X060-M19S	
	Chamfer Mills	161-701003	00-99816-C10-M19S	
	Power Mills	161-51A100	00-99816-10A06-M19S	
		161-51A122	00-99816-12A06-M19S	
		161-51A130	00-99816-16A06-M19S	
		161-51A140	00-99816-20A06-M19S	
		161-51A150	00-99816-25A06-M19S	
		161-51A160	00-99816-32A06-M19S	
	i-Center	161-801003	00-99816-IC10BH-M19S	
	Tool Length Setter	161-TP0001	00-99816-TP-M19S	
With ER16 Nut (M22 x 1.5 P)	NC Spot Drills & Corner Rounding	162-609002	00-99816-09V-M22S	Ergo Holder x 1 Ergo ER16 Nut x 1 High Strength Ergo pin x 1 3mm L key x 1 Insert Key x 1  * The insert is not included.
		162-601004	00-99816-606-M22S	
		162-603004	00-99816-610-M22S	
		162-604010	00-99816-614-M22S	
	Engraving Tools & Deburring Tools	162-691004	00-99816-V045-M22S	
		162-692005	00-99816-V060-M22S	
		162-69X004	00-99816-X060-M22S	
	Chamfer Mills	162-701003	00-99816-C10-M22S	
	Power Mills	162-51A100	00-99816-10A06-M22S	
		162-51A122	00-99816-12A06-M22S	
		162-51A130	00-99816-16A06-M22S	
		162-51A140	00-99816-20A06-M22S	
		162-51A150	00-99816-25A06-M22S	
		162-51A160	00-99816-32A06-M22S	
	i-Center	162-801003	00-99816-IC10BH-M22S	
	Tool Length Setter	162-TP0001	00-99816-TP-M22S	

Power Mill

Inquiry Form

Company: _____

The following information should be checked while discussing with customer.

Machine

Spindle Speed	Max.	r.p.m.
Power of Spindle motor	☐ KW	☐ HP
Coolant supply	☐ NO ☐ If yes, ☐ External ☐ Internal	

Current tool

Cutting Speed	m/min.	SFM
Feed Rate	mm/rev.	inch/rev.

ER Taper-shank dimensions:

(* MOQ: 2 pcs / Lead Time: 10 ~ 12 Weeks.)

Cutter Dia.: (ØDc) (Ø10 ~ Ø32)

L1 :
(See chart for Max.)

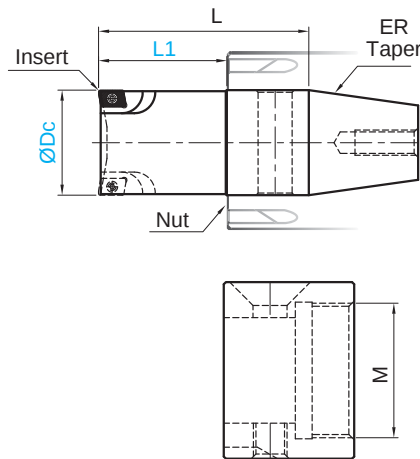
Center Coolant: ☐ Yes ☐ No

ER Nut :

- ☐ N9ER16-M19
☐ N9ER16-M22
☐ N9ER20-M25
☐ N9ER25-M32

Current Insert: (Please provide sample.)

Insert Brand: ISO Code:



• Specifications

ØDc	L1 Max.	L Max.	ER Taper
10 ~ 32	22	34	ER16
	26.5	40	ER20
	30.5	50	ER25

Nut	M
ER16	M19 x P1.0
ER16	M22 x P1.5
ER20	M25 x P1.5
ER25	M32 x P1.5

Boring Tool

Inquiry Form

Company: _____

The following information should be checked while discussing with customer.

Machine

Spindle Speed	Max.	r.p.m.
Power of Spindle motor	☐ KW	☐ HP
Coolant supply	☐ NO ☐ If yes, ☐ External ☐ Internal	

Current tool

Cutting Speed	m/min.	SFM
Feed Rate	mm/rev.	inch/rev.

ER Taper-shank dimensions:

(* MOQ: 2 pcs / Lead Time: 10 ~ 12 Weeks.)

Boring Dia.: (ØDc) (Ø5 ~ Ø25)

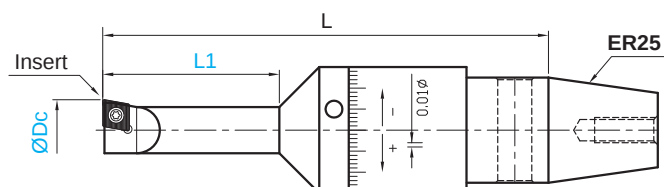
L1 : (Max.50mm and 3xDc)

Center Coolant: ☐ Yes ☐ No

ER Nut : N9ER25-M32

Current Insert: (Please provide sample.)

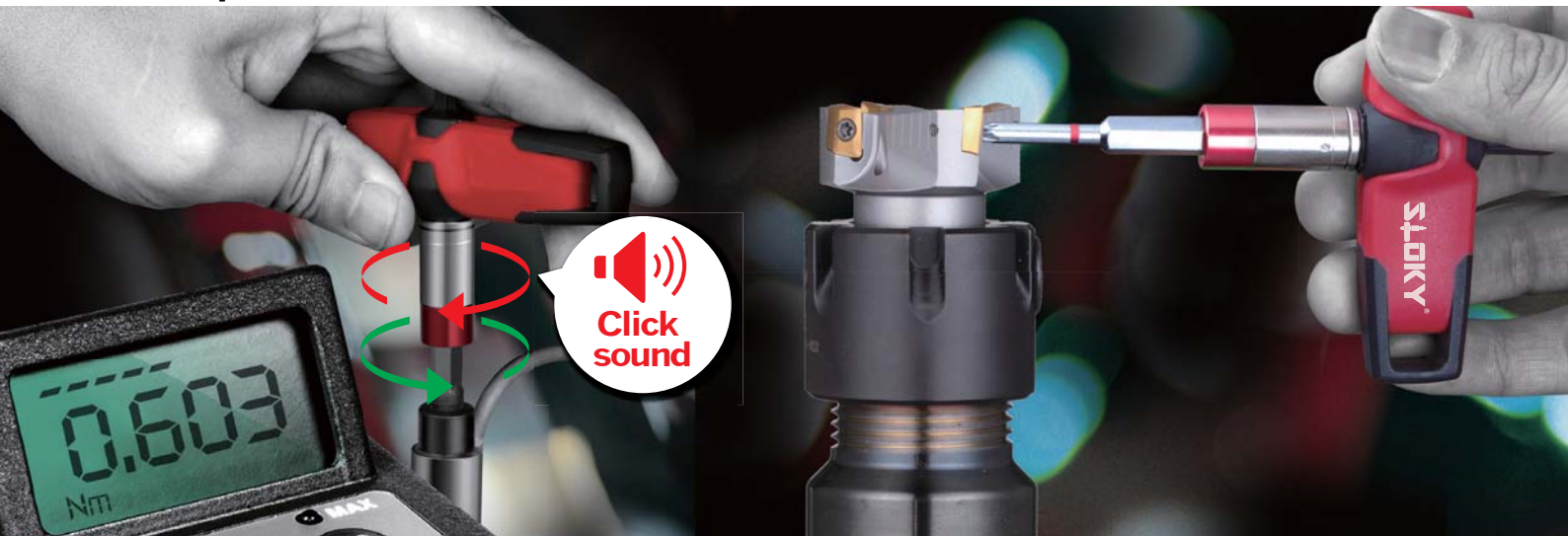
Insert Brand: ISO Code:



• Specifications

ØDc	L1 Max.	L Max.	ER Taper
5 ~ 25	50	110	ER25

Torque Screwdriver



► Why Torque Control is important?

- Increase tool life of insert screw.
- Optimize performance of milling cutters after locking with identical torque on all inserts.
- Avoid damage of screw, resulted couldn't take insert out from the cutter.
- Deliver right tightening force to precise parts, no more over-tightening.
- Enhance the function of both tightened parts and connected parts.

► 0.6~5.0Nm torque screwdriver with 25mm+50mm high precision bit.

Parts No.	Contents						N.W.	Packaging Illustration	
	Handle	Adapter			Bit				
		Nm	KgfcM	In-lb	Size	25mm+50mm			
0-TPK01-TX06-0.6	TPK-H01		0.6	6.1	5.3	TX6	2 pcs + 2 pcs	130g	
0-TPK01-TX07-0.9			0.9	9.2	8.0	TX7			
0-TPK01-TX08-2.0			2.0	20.4	17.7	TX8			
0-TPK01-TX15-3.0			3.0	30.6	26.6	TX15			
0-TPK03-H030-5.0	TPK-H03		5.0	51.0	44.3	H3	Bit 50mm 4 pcs	200g	

Note: Other sizes are available, please feel free to contact us.

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NC Spot Drill &
Corner Rounding

Engraving Tool
& Deburring Tool

Chamfer
Mill

Power
Mill

i-Center



Nine9 Ergo
indexable cutter system



Nine9 standard
indexable cutter system



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Agent