Nine9®

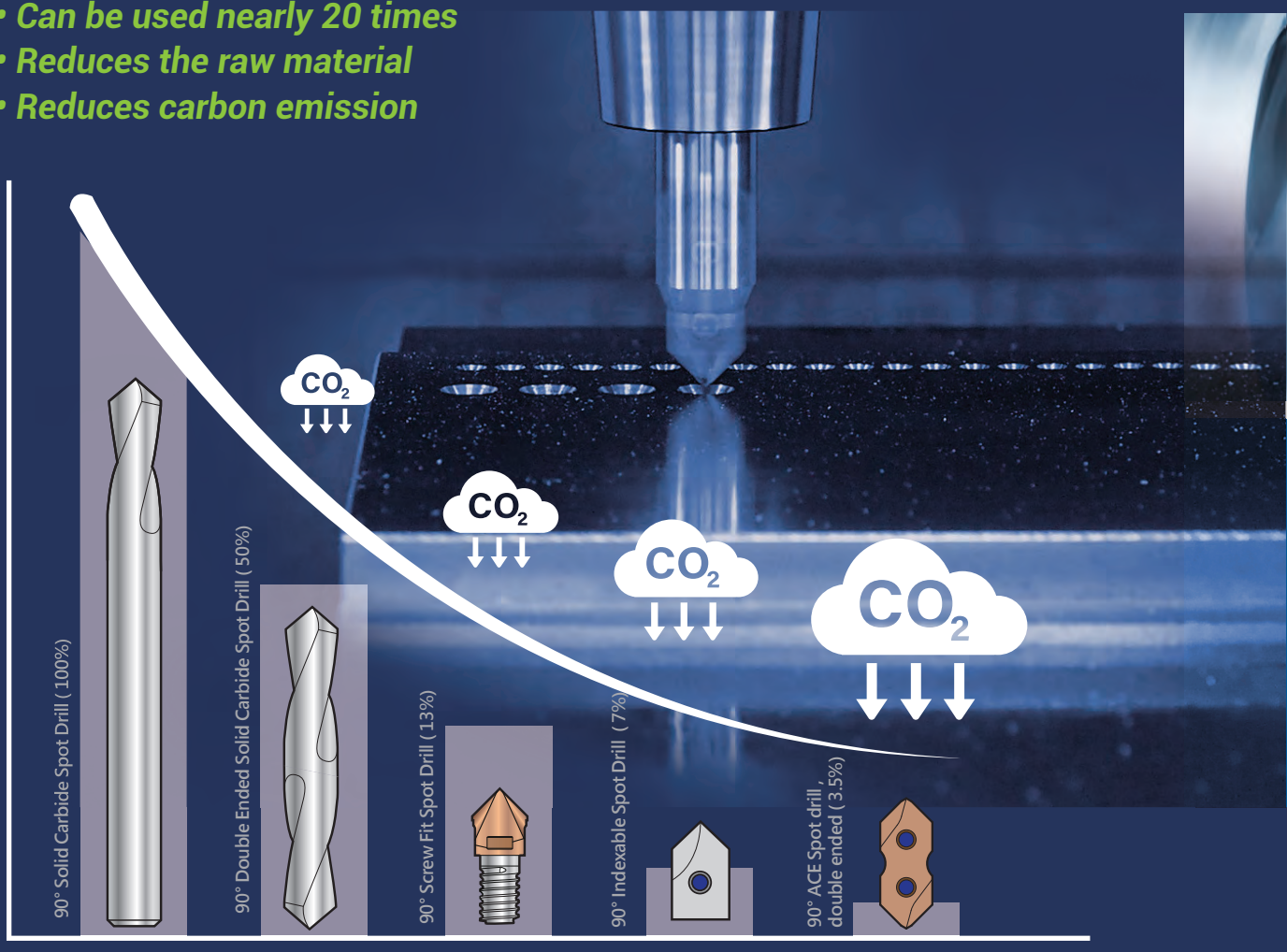
Main Catalog V

MCC
Minimum Consumable Cutting Indicator
5%

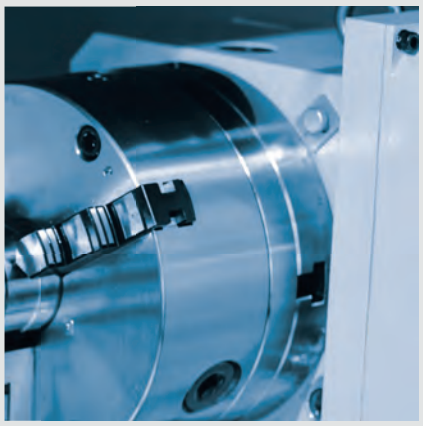
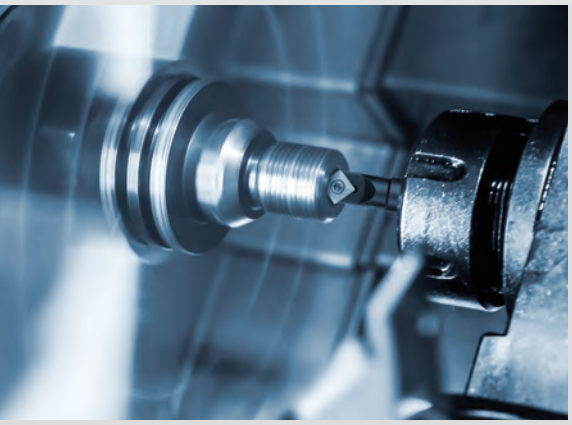
MINIMUM **CONSUMABLE** CUTTING

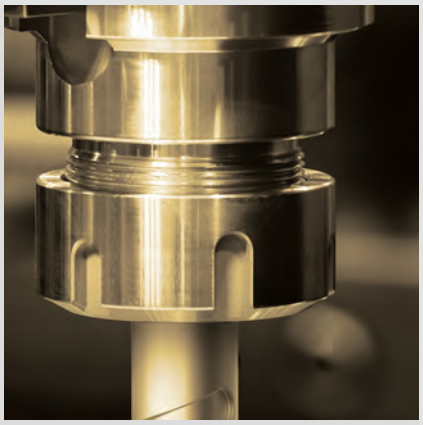
Nine9 insert only takes <5% carbide raw material compared to a whole solid carbide tool and still can achieve good performance.

- ***Can be used nearly 20 times***
- ***Reduces the raw material***
- ***Reduces carbon emission***

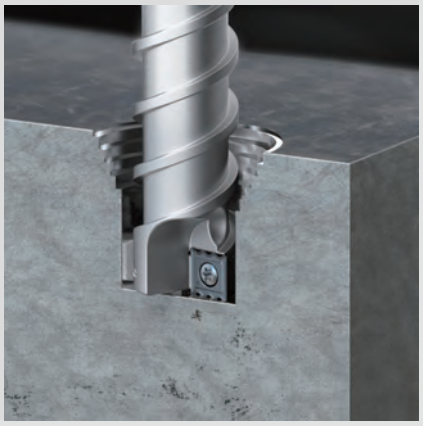


Used	Used	Used	Used	Used
100%	50%	30%	10%	5%
raw material	raw material	raw material	raw material	raw material



PASSION
PERSEVERANCE
DETERMINATION



Nine9 company began in 1994 and with the development of special tools, boring heads and accessories.
The Nine9 logo was commissioned in 1999.
It comes from the Chinese characters meaning “long life and durability” – words which aptly describe all Nine9 tools. 99 is the largest 2 digit number, indicating maximum product endurance.
Nine9 tools whilst being “special” in the industry, are standard in our product range.
NC spot drill , super power drill , boring tool , engraving tool , i-Center ,
NC helix drill , chamfer mill, ACE spot drill and deburring mill.
Those established Nine9 as one of market leader and innovator in the cutting tool field.

INNOVATION PATENTS

We have invested resources in the design & manufacture of indexable cutting tools. Our outstanding R&D team works in close collaboration with our clients to address unique challenges .

PRODUCT MILESTONE

1994 — Nine9 company began in 1994, dedicating on the development of specail tools, boring bars, and accessories.

1995
- Small hole fine boring tools launched
- Standardized boring tools range

2001 — "NC Spot Drill-CT" launched

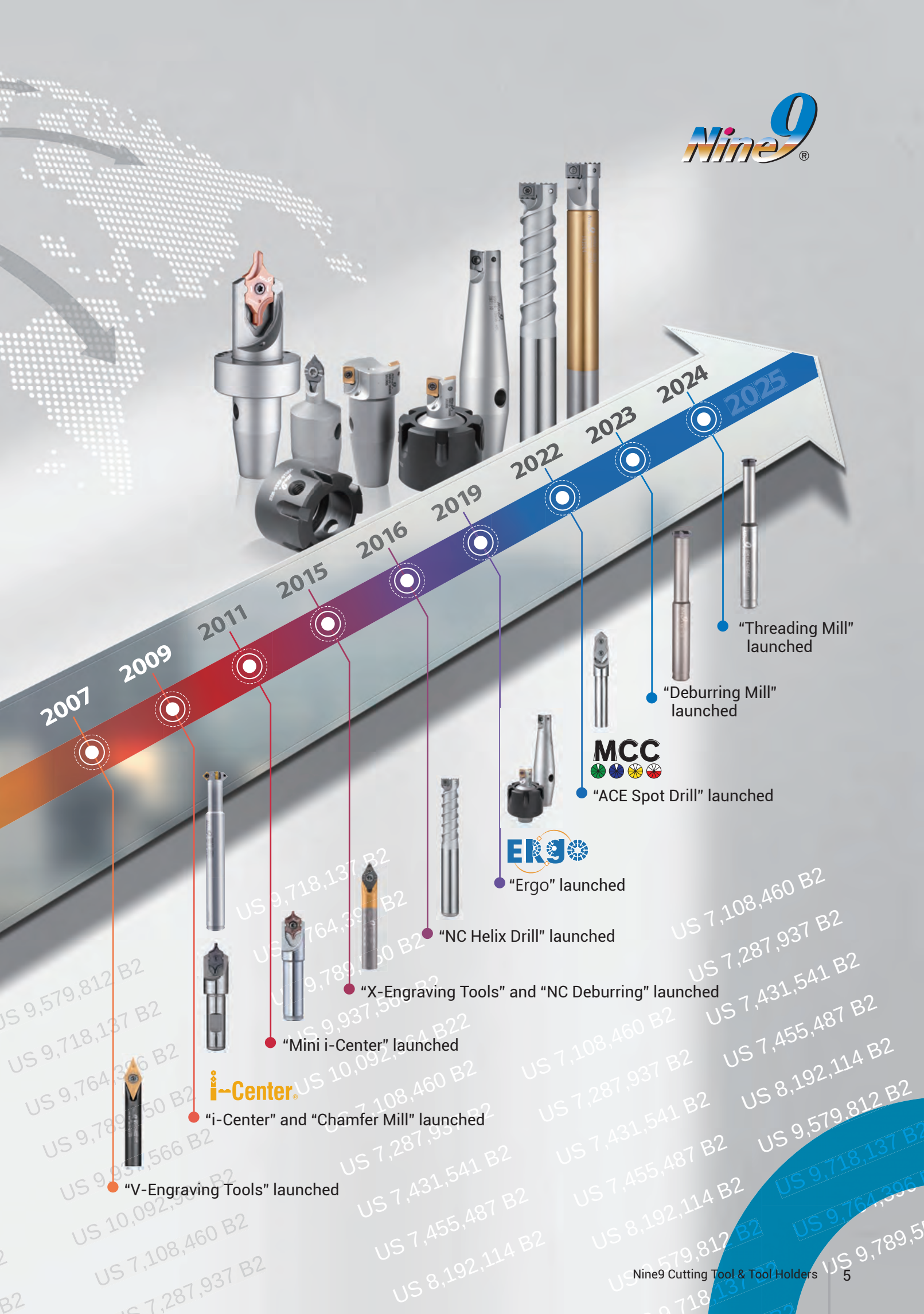
2002 — "Quick Change High Speed Boring Tools" launched

2004 — "Power Mill" launched

2005 — "NC Spot Drill-PR" launched

2006 — "Corner Rounding-RC" and "Super Power Drill" launched

US 7,431,5[illegible] B2
US 7,455,4[illegible]7 B2
US 8,192,114 B2
US 9,579,812 B2
US 9,718,137 B2
US 9,764,396 B2


Nine9
2007
2009
2011
2015
2016
2019
2022
2023
2024
2025
"V-Engraving Tools" launched
"i-Center" and "Chamfer Mill" launched
"Mini i-Center" launched
"X-Engraving Tools" and "NC Deburring" launched
"NC Helix Drill" launched
"Ergo" launched
"ACE Spot Drill" launched
"Deburring Mill" launched
"Threading Mill" launched
i-Center
MCC
ERGO

“Awarded PATENTS”

No Need To Choose
Nine9 Does It All!

US 7,108,460 B2
US 7,287,937 B2
US 7,431,541 B2
US 7,455,487 B2
US 8,192,114 B2
US 9,579,812 B2
US 9,718,137 B2
US 9,764,396 B2
US 9,789,550 B2
US 9,937,566 B2
US 10,092,964 B2
US 11,583,941 B2
US 11,925,990 B2

CREATIVITY

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ACE Spot Drill | 60° / 90° / 120° / 142°

Accuracy! Coolant! Efficiency!

- High rigidity, high performance cutting, ultra-long tool life.
- 4 angles: 60° / 90°/ 120°/ 142°.
- 6 different sizes of insert.
- 2 flutes edged is symmetric, it reduces the lateral force while cutting in Ap.

Micro Spot Drill | 90° / 120° / 142°

0.1 and 0.2mm bottom width

- It produces a consistent surface for micro drill successfully to enter the workpiece especially for round, angled or curved surfaces.
- To improve hole location and tool life of a deep hole drill or micro drill.
- High efficiency! Long tool life! Cost saving!

NC Spot Drill | 60° ~ 145°

One tool will perform multiple applications

- One basic holder supports CT, RC and WSP inserts.
- A wide range of spotting angle including 60°/82°/90°/100°/142°/145°.
- Ideal for CNC lathes, CNC turning centers & machining centers.
- Increase cutting speed with coated carbide inserts. Long tool life.

Corner Rounding | RC0.5 ~ 10.0mm

Various corner radius inserts can fit on same holder

- Inserts are CNC ground for precision radius and location. Long tool life.
- Produces smooth and excellent surface finish on workpiece.
- Combination of corner rounding and 45° chamfering applications on same insert.
- Higher cutting speed and feed rate.

Indexable Center Drill « i-Center »

DIN 332 R | DIN 332 A+B | DIN 332 A | ANSI 60°

Pilot dia.
1~10mm

Long Tool Life! No need tool length resetting

- Excellent repeatability by insert type within 0.02mm in radial direction.
- Shorten set up and center drilling time.
- 0.05mm axial positional accuracy.
- Coolant can be supplied through the center of holder.

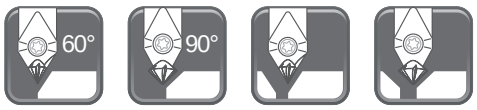
Engraving Tool | 30° / 45° / 60° / 90°

Engraving | Spotting

Different Angle! Burr-Free!

- Multi-side grinding, excellent performance.
- Higher cutting speed and DOC.
- No need to reset tool length.
- Widely used for marking on machine components, medical components, gun components, mold and die, automotive parts, gears, bearings, and luxury goods.

NC Deburring | 60° /90°



Insert has 6 flutes, 6 times higher feed rate

- Ideal for fine hole deburring.
- Smallest chamfer diameter ø0.5mm.
- Achieve high speed and feed rate on CNC machine.
- Retain exceptional positional accuracy of the deburring depth and diameter.

Chamfer Mill | 45°

Chamfering | Face Milling | Back Circular Chamferiing | Countersink

Front and back chamfering. Ultra high speed & feed rate

- Smallest chamfer insert in the world.
- Smallest counter sink diameter ø7mm.
- 4 times faster and up to 10 times higher feed rate than competitors.
- Dual relief angle insert, special edge honning and optimized coated.

MCC Mill | Deburring & Threading

60° & 90° Deburring, 55° & 60° Threading

- Each insert has 6 cutting flutes.
- Provide higher feed rate, optimized performance, and reduce cycle time.
- Minimum deburring bore from ø4.2mm to ø10mm.
- Special insert geometry and clamping system provide high precision and accurate position.

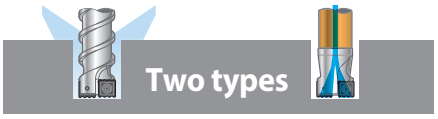
Ergo System | ER11 / ER16 / ER20

ERgo Monoblock System

Integrated ER taper-shank cutter

- Optimize the rigidity.
- Easy and simple assembly.
- Quick change, saving huge machine downtime.
- Excellent repeatability, saving set-up time.
- The ergo system includes milling cutters, spot drills, engraving tools, deburring tools, chamfering tools, center drills and chamfer mill.

NC Helix Drill | Ø13mm~Ø65mm



Ideal for automation production. Excellent swarf removal

- Cuts materials by Helical interpolation.
- Just 6 tools can drill ø13~ø65mm holes.
- Serrated cutting edge minimizes cutting chips.
- Good for drilling on soft and long cutting chip material.
- Circular ramping milling, maximum ramping angle is 20°.

Super Power Drill | 5xD ~ 10xD

5~10xD : Ø19 ~ Ø40mm 12xD is also possible

- The unique design of insert pocket provides the best accuracy and rigidity of center insert.
- The center and peripheral inserts are positioned in order to divide the cutting chips into smaller spiral shape.
- Better surface finish. It can reduce your roughing operation.
- Lateral cutting forces can be absorbed by center insert due to a patented pocket design.

Super Drill | 3xD & 4xD

3xD : Ø10 ~ Ø30mm
4xD : Ø16 ~ Ø30mm

Smallest indexable drill from ø10mm.

- Same insert for outer and inner insert.
- Better surface finish and better diameter accuracy.
- Possible to drill into angled surfaces without pre-drilling.

Power Mill | start from Ø10mm

Indexable milling cutter ø10mm. Higher wear resistance!

- Patented Dual Relief Angle Insert.
- Precision ground insert performs efficient repeatability and excellent accuracy.
- Special geometry design helps the strength of cutting edge in shoulder milling operation.
- Two types of shank - Screw fit type and Cylindrical type.

Boring Tool | Ø5mm~Ø50mm

Easy adjustment! No backlash! G6.3 /10,000 r.p.m.

- Eccentrical mechanism boring bars.
- Adjusting range :±0.1mm
- ø5mm~ø50mm boring bars are interchangeable.
- Good for fine boring operation on milling machines, machining centers and special purpose machines.
- Replace solid carbide reamers.

Accessory

Ergo Tool Length Setter
ER16 Taper

Extenstion Bar
Steel & Solid Carbide Type

DC Slim Chuck
Extension adapter
DC-E Collet

Inserts >> Quick Pick

Products	Grade	Coating	P Steel	M Stainless Steel	K Cast Iron	N Non-Ferrous	H Hardened Steel Up to 50 HRC	S Titanium
ACE Spot Drill	NC2057	AlTiN + TiSiN	●		●		◎	
	NC5254	Helica	○	●		◎		◎
	XP9000	Uncoated		○		●		
Micro Spot Drill	NC2032	TiAlN	●	◎	●			
	NC2035	ALDURA	◎		○		●	
	XP9001	Uncoated		○		●		
NC Spot Drill	NC40	TiN	●	○	◎			
	NC5071	TiAlN + TiN	●	○	●		○	
	NC2071	TiN	●	●	◎	◎		●
	NC9076 / NC9036	DLC		◎		●		◎
	NC10	TiAlN		●	●	◎		
	NC60	Cermet	◎				●	
	NC2033	TiAlN	●		●			
Corner Rounding	NC40 / NC2071	TiN	●	○	●			
	NC9036	DLC		●		●		◎
	NC2033	TiAlN	●		●		◎	
	XP9000	Uncoated		○		●		○
i-Center	NC2057	AlTiN + TiSiN	●	○	●		○	
	NC5074	Helica	●	○	◎			
	NC2033	TiAlN	●	○	●		○	
X060 Engraving	NC2032	TiAlN	●		●			
	NC2035	ALDURA	◎		○		●	
	XP9001	Uncoated		○		●		
V045 / V060 Engraving	NC2032	TiAlN	●	○	●			
	NC2071	TiN	◎	●		◎		
	NC9031	TiN		◎		●		
	NC2035	ALDURA	◎		○		●	
	NC9036	DLC		◎		●		◎

● Best ◎ Suit ○ Possible

Products	Grade	Coating	P Steel	M Stainless Steel	K Cast Iron	N Non-Ferrous	H Hardened Steel Up to 50 HRC	S Titanium
NC Deburring	NC2032	TiAlN	●	○	◎	◎		
	XP9001	Uncoated				●		
Chamfer Mill	NC2032	AlTiN	●	○	●		◎	
	NC9071	TiN	○	●		●		
MCC Mill deburring & threading	NC2032	TiAlN	●	◎	●		◎	○
	XP9000	Uncoated				●		
NC Helix Drill	NC5075	TiAlN + ALDURA	●		●		●	
	NC5072	TiAlN	●	●	◎	◎	○	◎
	NC2032	TiAlN	◎	○	●	◎	◎	○
Super Power Drill / Super Drill	NC2032	AlTiN	●	●				
	NC40	TiN	●	●	◎			◎
	NC2032	AlTiN	●	○	●		◎	●
	NC40	TiN	●	●				
Power Mill-A series shoulder face mills	NC5072	TiAlN	●	◎	●			
	NC2032	TiAlN	●	○	◎			
	NC2033	TiAlN	●	◎	●			
	NC9031	TiN				●		
Power Mill-C series torus radius mills	NC30	AlTiN	●		◎		◎	
	NC2032	AlTiN	●	○	◎			
Boring Tool	NC30	TiAlN	●		◎			
	NC2032	AlTiN	●	○	◎			
	NC2033	TiAlN	●	◎	●			
	NC9036	DLC				●		
	XP9001	Uncoated				●		

Accuracy
Coolant
Efficiency

ACE Spot Drill >>>

Spotting Concept!

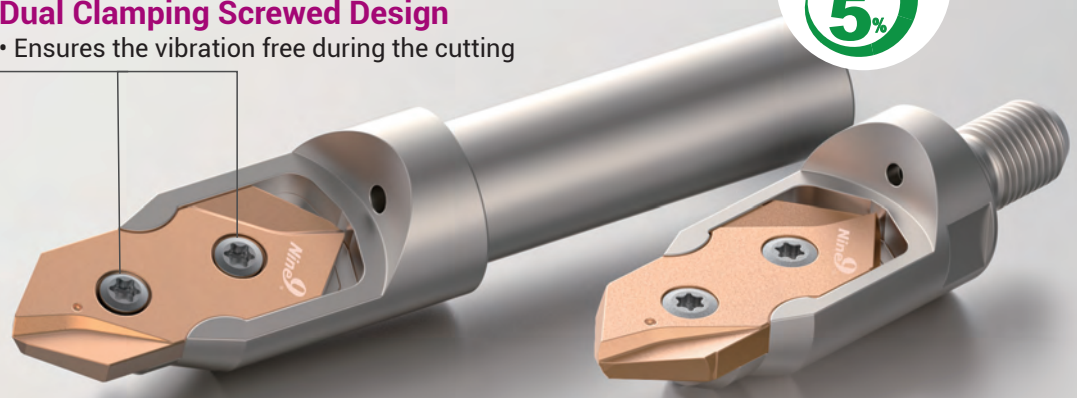
Spotting produces a shallow hole to get better hole position enabling to produce more accurate final product. Ideally, the proper spotting angle should have larger point angle than that of your drill, so the center of a drill shall be the first point to contact workpiece to avoid the drill walked or moved in starting drilling.

P M K N

MCC Minimum Consumable Cutting Indicator 5%

Dual Clamping Screwed Design

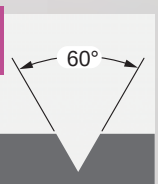
- Ensures the vibration free during the cutting



Features >>>

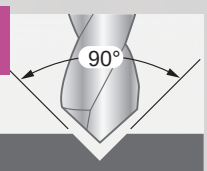
4 Angles : 60° / 90° / 120° / 142°

60°



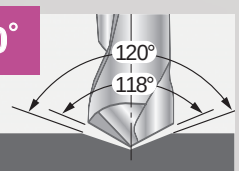
- For 60° point angle drill.

90°



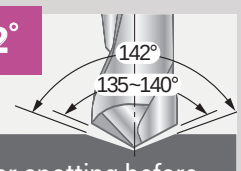
- For 90° point angle drill.

120°



- For spotting before drilling by 118° point angle drill.

142°



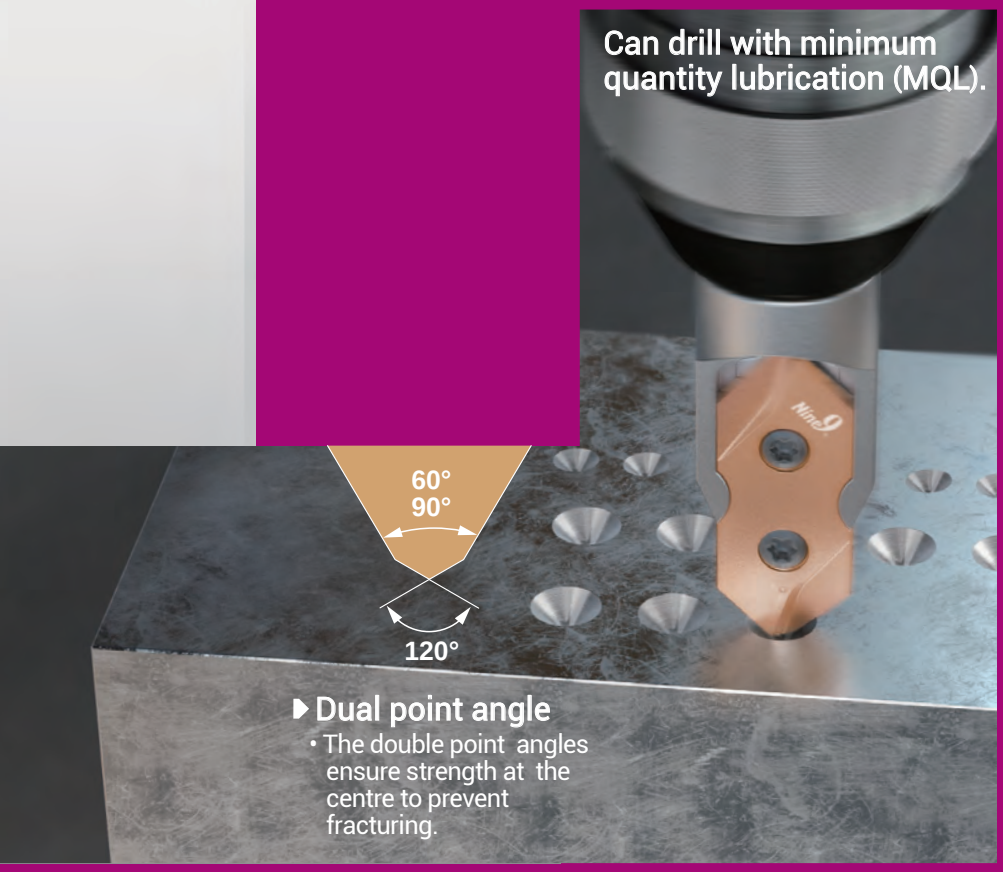
- For spotting before drilling by 135°~140° point angle high performance drill.

Excellent Repeatability. No Need Tool Length Re-setting By Insert Type.

High Rigidity, High Performance Cutting, Ultra-long Tool Life.

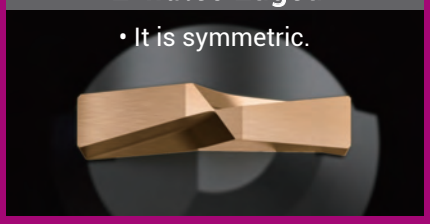
- Symmetric 2-flute edge design reducing the lateral force, it enhances ACE Spot drill rigidity enabling to run high feed rate.
- Double point angle makes the insert tip stronger to prolong service life, which results in lower production cost.

Applications



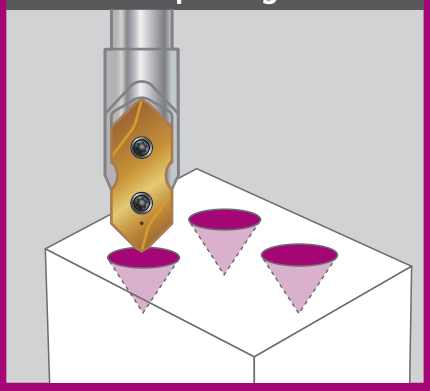
Internal Coolant

2-flutes Edged

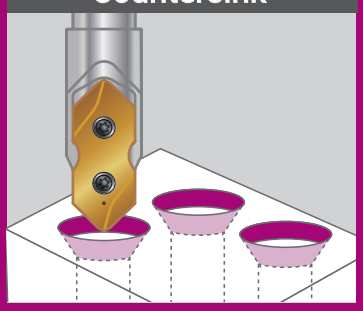


> “Nine9 spotting tool improves hole position, increases drill feed rate, extends tool life, enhances production efficiency, and ensures uniform hole quality.”

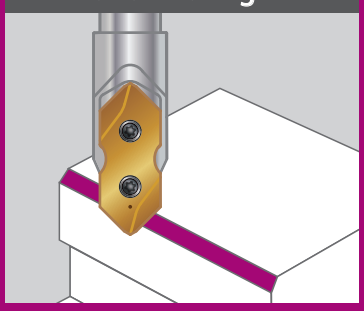
Spotting



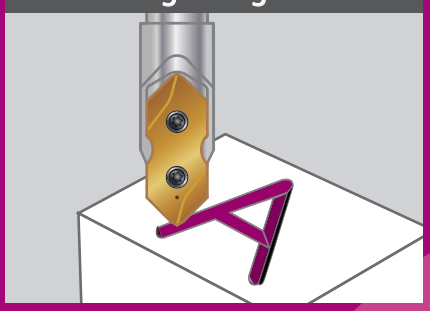
Countersink



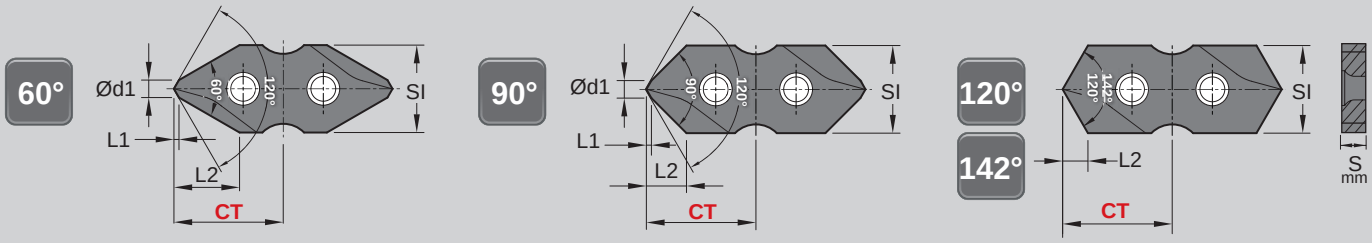
Chamfering



Engraving



Insert of ACE Spot Drill

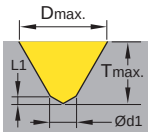


Inserts >>

NC2057: • Universal grade for alloy steel and cast iron.
• Each insert has 2 cutting edges.

NC5254: • For stainless steel.
• Each insert has 2 cutting edges.

XP9000: • High positive geometry and sharp edge produces excellent surface finish.
• For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.
• Each insert has 2 cutting edges.



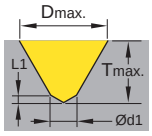
SI	Angle ±0.5	Code	Parts No.		Coating	Grade	Dimensions Ød1	Dimensions L1	Dimensions L2	Dmax.	Tmax.	S	CT ±0.025
06	60°	06A021	S9MT06T1-060	NC2057	AlTiN+TiSiN	P35	1.2	0.35	4.5	5.5	4.1	1.8	7.5
		06A023		NC5254	Helica								
		06A022		XP9000	Uncoated								
	90°	06A031	S9MT06T1-090	NC2057	AlTiN+TiSiN		1.2	0.35	2.75	5.5	2.5		
		06A033		NC5254	Helica								
		06A032		XP9000	Uncoated								
	120°	06A041	S9MT06T1-120	NC2057	AlTiN+TiSiN		-	-	1.73	5.5	1.6		
		06A043		NC5254	Helica								
		06A042		XP9000	Uncoated								
	142°	06A051	S9MT06T1-142	NC2057	AlTiN+TiSiN		-	-	1.03	5.5	0.95		7.0
		06A053		NC5254	Helica								
		06A052		XP9000	Uncoated								
08	60°	06A121	S9MT0802-060	NC2057	AlTiN+TiSiN	P35	1.6	0.46	6.0	7.5	5.6	2.4	10
		06A125		NC5254	Helica								
		06A122		XP9000	Uncoated								
	90°	06A131	S9MT0802-090	NC2057	AlTiN+TiSiN		1.6	0.46	3.6	7.5	3.4		
		06A135		NC5254	Helica								
		06A132		XP9000	Uncoated								
	120°	06A141	S9MT0802-120	NC2057	AlTiN+TiSiN		-	-	2.3	7.5	2.2		
		06A143		NC5254	Helica								
		06A142		XP9000	Uncoated								
	142°	06A151	S9MT0802-142	NC2057	AlTiN+TiSiN		-	-	1.38	7.5	1.29		9
		06A153		NC5254	Helica								
		06A152		XP9000	Uncoated								
10	60°	06A221	S9MT1003-060	NC2057	AlTiN+TiSiN	P35	2	0.58	7.5	9.5	7.1	3.0	12.50
		06A223		NC5254	Helica								
		06A222		XP9000	Uncoated								
	90°	06A231	S9MT1003-090	NC2057	AlTiN+TiSiN		2	0.58	4.6	9.5	4.4		
		06A233		NC5254	Helica								
		06A232		XP9000	Uncoated								
	120°	06A241	S9MT1003-120	NC2057	AlTiN+TiSiN		-	-	2.9	9.5	2.7		
		06A243		NC5254	Helica								
		06A242		XP9000	Uncoated								
	142°	06A251	S9MT1003-142	NC2057	AlTiN+TiSiN		-	-	1.72	9.5	1.64		11.50
		06A253		NC5254	Helica								
		06A252		XP9000	Uncoated								

The quantity of insert per box.:

SI 06	SI 08	SI 10	SI 12	SI 16	SI 20
5 pcs	5 pcs	5 pcs	5 pcs	2 pcs	1 pcs

Insert of ACE Spot Drill

Inserts >>



SI	Angle ±0.5	Code	Parts No.		Coating	Grade	Dimensions Ød1	Dimensions L1	Dimensions L2	Dmax.	Tmax.	S	CT ±0.025
12	60°	06A321	S9MT1203-060	NC2057	AlTiN+TiSiN	P35	2.4	0.69	9.0	11.5	8.6	3.0	15
		06A323		NC5254	Helica								
		06A322		XP9000	Uncoated								
	90°	06A331	S9MT1203-090	NC2057	AlTiN+TiSiN		2.4	0.69	5.5	11.5	5.3		
		06A333		NC5254	Helica								
		06A332		XP9000	Uncoated								
	120°	06A341	S9MT1203-120	NC2057	AlTiN+TiSiN		-	-	3.5	11.5	3.3		
		06A343		NC5254	Helica								
		06A342		XP9000	Uncoated								
	142°	06A351	S9MT1203-142	NC2057	AlTiN+TiSiN		-	-	2.07	11.5	1.98		13.5
		06A353		NC5254	Helica								
		06A352		XP9000	Uncoated								
16	60°	06A421	S9MT1603-060	NC2057	AlTiN+TiSiN	P35	3.2	0.92	12	15.5	11.6	3.18	20
		06A423		NC5254	Helica								
		06A422		XP9000	Uncoated								
	90°	06A431	S9MT1603-090	NC2057	AlTiN+TiSiN		3.2	0.92	7.3	15.5	7.0		
		06A433		NC5254	Helica								
		06A432		XP9000	Uncoated								
	120°	06A441	S9MT1603-120	NC2057	AlTiN+TiSiN		-	-	4.6	15.5	4.4		
		06A443		NC5254	Helica								
		06A442		XP9000	Uncoated								
	142°	06A451	S9MT1603-142	NC2057	AlTiN+TiSiN		-	-	2.76	15.5	2.67		18
		06A453		NC5254	Helica								
		06A452		XP9000	Uncoated								
20	60°	06A521	S9MT2004-060	NC2057	AlTiN+TiSiN	P35	4.0	1.16	15	19.5	14.6	4.76	
		06A523		NC5254	Helica								
		06A522		XP9000	Uncoated								
	90°	06A531	S9MT2004-090	NC2057	AlTiN+TiSiN		4.0	1.16	9.2	19.5	8.9		25
		06A533		NC5254	Helica								
		06A532		XP9000	Uncoated								
	120°	06A541	S9MT2004-120	NC2057	AlTiN+TiSiN		-	-	5.8	19.5	5.6		
		06A543		NC5254	Helica								
		06A542		XP9000	Uncoated								
	142°	06A551	S9MT2004-142	NC2057	AlTiN+TiSiN		-	-	3.44	19.5	3.36		22
		06A553		NC5254	Helica								
		06A552		XP9000	Uncoated								

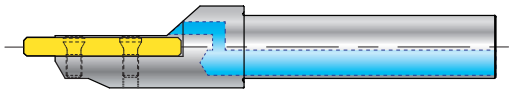
The quantity of insert per box.:

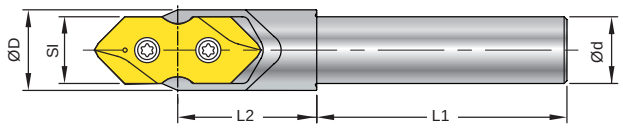
SI 06	SI 08	SI 10	SI 12	SI 16	SI 20
5 pcs	5 pcs	5 pcs	5 pcs	2 pcs	1 pcs

Holders of ACE Spot Drill

Cylindrical Shank >>

- Made of hardened high alloy steel, HRC 53.
- Internal coolant.



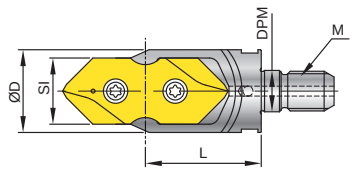


SI	Code	Parts No.	Ød	L1	L2	ØD	Screw	Key
06	6A0001	00-99688-SI06-06	6	27	14	8	*NS-18037 / 0.6Nm	NK-T6
08	6A0101	00-99688-SI08-08	8	36	19	10.5	*NS-20045 / 0.6Nm	NK-T6
10	6A0201	00-99688-SI10-10	10	40	22.5	13	*NS-25060 / 0.9Nm	NK-T7
12	6A0301	00-99688-SI12-12	12	45	25	15.5	NS-30072 / 2.0Nm	NK-T9
16	6A0401	00-99688-SI16-16	16	48	32	21	NS-35080 / 2.5Nm	NK-T15
20	6A0501	00-99688-SI20-20	20	50	35	26	NS-50125 / 5.5Nm	NK-T20

*Torque screwdriver is recommended.

Screw Fit Cutter >>

- Made of hardened high alloy steel, HRC 53.
- Internal coolant.



SI	Code	Parts No.	ØD	L	M	DPM	Screw	Key
06	6A2001	00-99688-SI06-M04	8	14.5	M4xP0.7	4.5	*NS-18037 / 0.6Nm	NK-T6
08	6A2101	00-99688-SI08-M05	10	19	M5xP0.8	5.5	*NS-20045 / 0.6Nm	NK-T6
10	6A2201	00-99688-SI10-M06	12	22	M6xP1.0	6.5	*NS-25060 / 0.9Nm	NK-T7
12	6A2301	00-99688-SI12-M08	16	25	M8xP1.25	8.5	NS-30072 / 2.0Nm	NK-T9
16	6A2401	00-99688-SI16-M10	20	31	M10xP1.5	10.5	NS-35080 / 2.5Nm	NK-T15
20	6A2501	00-99688-SI20-M12	25	35	M12xP1.75	12.5	NS-50125 / 5.5Nm	NK-T20

- Refer to Page 164 for extension bars.

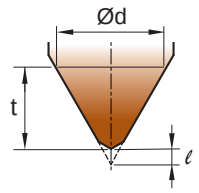
*Torque screwdriver is recommended.

Technical Guide

From spot diameter "d" to get spotting depth "t"

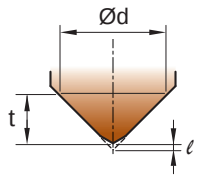
Insert Spec.	S9MT06T1				S9MT0802				S9MT1003				S9MT1203				S9MT1603				S9MT2004			
Angle	60°	90°	120°	142°	60°	90°	120°	142°	60°	90°	120°	142°	60°	90°	120°	142°	60°	90°	120°	142°	60°	90°	120°	142°
Tmax.	4.1	2.5	1.6	0.95	5.6	3.4	2.2	1.29	7.1	4.4	2.7	1.64	8.6	5.3	3.3	1.98	11.6	7.0	4.4	2.67	14.6	8.9	5.6	3.36
ℓ	0.35		0.05	0.04	0.46		0.05	0.04	0.58		0.06	0.05	0.69		0.06	0.05	0.92		0.1	0.15	1.16		0.1	0.15

60°



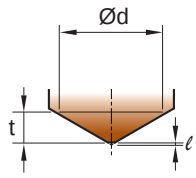
t = Ød x 0.866 - ℓ

90°



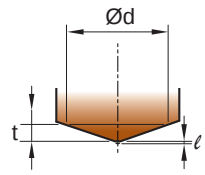
t = Ød x 0.5 - ℓ

120°



t = Ød x 0.289 - ℓ

142°



t = Ød x 0.172 - ℓ

Attention for 60° spotting (S9MTxxx-060) , peck drilling cycle is necessary

Step 1 Get " t " (spotting depth) from above.

Step 2 Calculate T (depth factor): $T = \frac{t}{Tmax.}$

Step 3 According to material, refer to the table and find *Q (each pecking depth).

*Q / T / Material	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
P	0.5		0.45	0.4	0.35	0.3	0.25	0.2	0.15	0.1
M	0.2		0.2	0.2	0.15	0.15	0.15	0.1	0.1	0.1
K	0.5		0.45	0.4	0.35	0.3	0.25	0.2	0.15	0.1
N	1.0		0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.2

Calculate spindle speed and feed rate

Metric

$$S = \frac{Vc \times 1000}{\pi \times d}$$

F = S x f

d = diameter -mm
S = Spindle Speed -r.p.m.
Vc = Cutting Speed -m/min.
f = mm/rev.
F = mm/min.

Inch

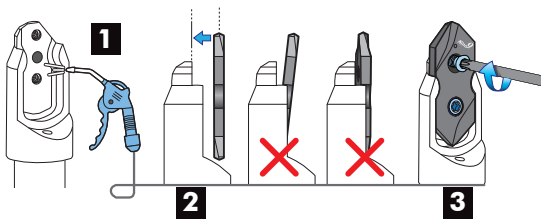
$$S = \frac{(3.82 \times SFM)}{d}$$

SFM = Vc x 3.28

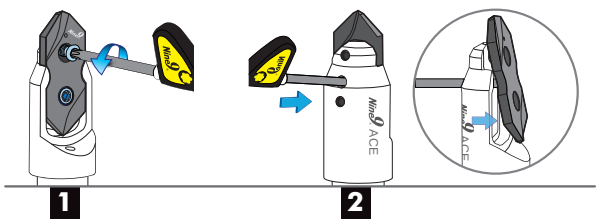
F = r.p.m. x IPR

d = diameter-inch
S = Spindle Speed-r.p.m.
SFM = Surface Speed-ft./min.
f = IPR = inch/rev.
F = inch/min.

Clamping insert



Loosen insert



Cutting Data

SI06- S9MT06T1

• For Spotting

	Workpiece Material	Vc (m/min)	60°		90°	120°	142°	Grade of insert
			*Q (each pecking depth)	f (mm/rev.)				
P	Carbon steel C<0.3%	120 ~ 250	0.1 ~ 0.5mm	0.01 ~ 0.05	0.02 ~ 0.08	0.02 ~ 0.10	0.02 ~ 0.10	NC5254
P	Carbon steel C>0.3%	100 ~ 220						NC2057
P	Low alloy steel C<0.3%	100 ~ 200		0.01 ~ 0.04	0.02 ~ 0.07	0.02 ~ 0.08	0.02 ~ 0.08	NC5254
P	High alloy steel	80 ~ 180		0.01 ~ 0.03	0.02 ~ 0.06	0.02 ~ 0.07	0.02 ~ 0.07	NC2057
M	Stainless steel	30 ~ 80	0.1 ~ 0.2mm	0.01 ~ 0.02	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.03	NC5254
K	Cast Iron	80 ~ 180	0.1 ~ 0.5mm	0.01 ~ 0.05	0.02 ~ 0.08	0.02 ~ 0.10	0.02 ~ 0.10	NC2057
N	Non-ferrous metal	150 ~ 300	0.2 ~ 1.0mm	0.01 ~ 0.06	0.03 ~ 0.10	0.03 ~ 0.12	0.03 ~ 0.12	XP9000

• For Chamfering

	Workpiece Material	Vc (m/min)	f (mm/rev.)				Grade of insert
			60°	90° (Cmax.: 2.0 mm)	120°	142°	
P	Carbon steel C<0.3%	60 ~ 150	0.02 ~ 0.05	0.02 ~ 0.08	0.02 ~ 0.06	0.02 ~ 0.05	NC5254
P	Carbon steel C>0.3%	60 ~ 150	0.04 ~ 0.16	0.04 ~ 0.20	0.04 ~ 0.16	0.04 ~ 0.14	NC2057
P	Low alloy steel C<0.3%	40 ~ 120	0.02 ~ 0.05	0.02 ~ 0.08	0.02 ~ 0.06	0.02 ~ 0.05	NC5254
P	High alloy steel	40 ~ 100	0.04 ~ 0.12	0.04 ~ 0.16	0.04 ~ 0.14	0.04 ~ 0.12	NC2057
M	Stainless steel	30 ~ 80	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.03	NC5254
K	Cast Iron	40 ~ 120	0.04 ~ 0.16	0.04 ~ 0.20	0.04 ~ 0.16	0.04 ~ 0.14	NC2057
N	Non-ferrous metal	90 ~ 200	0.02 ~ 0.16	0.02 ~ 0.20	0.02 ~ 0.16	0.02 ~ 0.14	XP9000

* Feed rate (f) should be gradually reduced while C > 1 mm.
Recommend using the minimum value of feed rate (red color) while Cmax is required.

SI08 - S9MT0802

• For Spotting

	Workpiece Material	Vc (m/min)	60°		90°	120°	142°	Grade of insert
			*Q (each pecking depth)	f (mm/rev.)				
P	Carbon steel C<0.3%	120 ~ 250	0.1 ~ 0.5mm	0.02 ~ 0.08	0.03 ~ 0.10	0.03 ~ 0.12	0.03 ~ 0.12	NC5254
P	Carbon steel C>0.3%	100 ~ 220						NC2057
P	Low alloy steel C<0.3%	100 ~ 200		0.02 ~ 0.07	0.03 ~ 0.08	0.03 ~ 0.10	0.03 ~ 0.10	NC5254
P	High alloy steel	80 ~ 180		0.02 ~ 0.06	0.03 ~ 0.07	0.03 ~ 0.08	0.03 ~ 0.08	NC2057
M	Stainless steel	30 ~ 80	0.1 ~ 0.2mm	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	NC5254
K	Cast Iron	80 ~ 180	0.1 ~ 0.5mm	0.02 ~ 0.08	0.03 ~ 0.10	0.03 ~ 0.12	0.03 ~ 0.12	NC2057
N	Non-ferrous metal	150 ~ 300	0.2 ~ 1.0mm	0.03 ~ 0.10	0.03 ~ 0.12	0.03 ~ 0.15	0.03 ~ 0.15	XP9000

Cutting Data

SI08 - S9MT0802

• For Chamfering

	Workpiece Material	Vc (m/min)	f (mm/rev.) 60°	90° (Cmax.: 2.5 mm)	120°	142°	Grade of insert
P	Carbon steel C<0.3%	60 ~ 150	0.03 ~ 0.06	0.03 ~ 0.10	0.03 ~ 0.08	0.03 ~ 0.08	NC5254
P	Carbon steel C>0.3%	60 ~ 150	0.06 ~ 0.20	0.06 ~ 0.30	0.06 ~ 0.20	0.06 ~ 0.16	NC2057
P	Low alloy steel C<0.3%	40 ~ 120	0.03 ~ 0.06	0.03 ~ 0.10	0.03 ~ 0.08	0.03 ~ 0.08	NC5254
P	High alloy steel	40 ~ 100	0.06 ~ 0.18	0.06 ~ 0.25	0.06 ~ 0.18	0.06 ~ 0.14	NC2057
M	Stainless steel	30 ~ 80	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.03	NC5254
K	Cast Iron	40 ~ 120	0.06 ~ 0.18	0.06 ~ 0.25	0.06 ~ 0.18	0.06 ~ 0.14	NC2057
N	Non-ferrous metal	90 ~ 200	0.03 ~ 0.20	0.03 ~ 0.30	0.03 ~ 0.20	0.03 ~ 0.16	XP9000

* Feed rate (f) should be gradually reduced while C > 1.25 mm.
Recommend using the minimum value of feed rate (red color) while Cmax is required.

SI10 - S9MT1003

• For Spotting

	Workpiece Material	Vc (m/min)	60° *Q (each pecking depth)	60° f (mm/rev.)	90°	120°	142°	Grade of insert
P	Carbon steel C<0.3%	120 ~ 250	0.1 ~ 0.5mm	0.03 ~ 0.08	0.04 ~ 0.15	0.05 ~ 0.20	0.05 ~ 0.20	NC5254
P	Carbon steel C>0.3%	100 ~ 220						NC2057
P	Low alloy steel C<0.3%	100 ~ 200		0.03 ~ 0.07	0.03 ~ 0.12	0.05 ~ 0.15	0.05 ~ 0.15	NC5254
P	High alloy steel	80 ~ 180		0.02 ~ 0.06	0.03 ~ 0.10	0.04 ~ 0.12	0.04 ~ 0.12	NC2057
M	Stainless steel	30 ~ 80	0.1 ~ 0.2mm	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	NC5254
K	Cast Iron	80 ~ 180	0.1 ~ 0.5mm	0.02 ~ 0.08	0.03 ~ 0.12	0.05 ~ 0.15	0.05 ~ 0.15	NC2057
N	Non-ferrous metal	150 ~ 300	0.2 ~ 1.0mm	0.03 ~ 0.10	0.04 ~ 0.20	0.05 ~ 0.25	0.05 ~ 0.25	XP9000

• For Chamfering

	Workpiece Material	Vc (m/min)	f (mm/rev.) 60°	90° (Cmax.: 3.4 mm)	120°	142°	Grade of insert
P	Carbon steel C<0.3%	60 ~ 150	0.04 ~ 0.08	0.04 ~ 0.12	0.04 ~ 0.08	0.04 ~ 0.08	NC5254
P	Carbon steel C>0.3%	60 ~ 150	0.08 ~ 0.30	0.08 ~ 0.40	0.08 ~ 0.30	0.08 ~ 0.30	NC2057
P	Low alloy steel C<0.3%	40 ~ 120	0.04 ~ 0.08	0.04 ~ 0.10	0.04 ~ 0.08	0.04 ~ 0.08	NC5254
P	High alloy steel	40 ~ 100	0.08 ~ 0.25	0.08 ~ 0.30	0.08 ~ 0.25	0.08 ~ 0.25	NC2057
M	Stainless steel	30 ~ 80	0.01 ~ 0.04	0.01 ~ 0.06	0.01 ~ 0.04	0.01 ~ 0.04	NC5254
K	Cast Iron	40 ~ 120	0.08 ~ 0.25	0.08 ~ 0.30	0.08 ~ 0.25	0.08 ~ 0.25	NC2057
N	Non-ferrous metal	90 ~ 200	0.04 ~ 0.30	0.04 ~ 0.40	0.04 ~ 0.30	0.04 ~ 0.30	XP9000

* Feed rate (f) should be gradually reduced while C > 1.7 mm.
Recommend using the minimum value of feed rate (red color) while Cmax is required.

Cutting Data

SI12 - S9MT1203

• For Spotting

	Workpiece Material	Vc (m/min)	60°		90°	120°	142°	Grade of insert
			*Q (each pecking depth)	f (mm/rev.)				
P	Carbon steel C<0.3%	120 ~ 250	0.1 ~ 0.5mm	0.03 ~ 0.08	0.05 ~ 0.20	0.06 ~ 0.25	0.06 ~ 0.25	NC5254
P	Carbon steel C>0.3%	100 ~ 220						NC2057
P	Low alloy steel C<0.3%	100 ~ 200		0.03 ~ 0.07	0.04 ~ 0.15	0.05 ~ 0.20	0.05 ~ 0.20	NC5254
P	High alloy steel	80 ~ 180		0.02 ~ 0.06	0.04 ~ 0.12	0.05 ~ 0.16	0.05 ~ 0.16	NC2057
M	Stainless steel	30 ~ 80	0.1 ~ 0.2mm	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	NC5254
K	Cast Iron	80 ~ 180	0.1 ~ 0.5mm	0.02 ~ 0.08	0.04 ~ 0.15	0.05 ~ 0.20	0.05 ~ 0.20	NC2057
N	Non-ferrous metal	150 ~ 300	0.2 ~ 1.0mm	0.03 ~ 0.10	0.05 ~ 0.22	0.06 ~ 0.25	0.06 ~ 0.25	XP9000

• For Chamfering

	Workpiece Material	Vc (m/min)	f (mm/rev.)				Grade of insert
			60°	90° (Cmax.: 4.0 mm)	120°	142°	
P	Carbon steel C<0.3%	60 ~ 150	0.06 ~ 0.10	0.06 ~ 0.16	0.06 ~ 0.12	0.06 ~ 0.10	NC5254
P	Carbon steel C>0.3%	60 ~ 150	0.10 ~ 0.40	0.10 ~ 0.50	0.10 ~ 0.50	0.10 ~ 0.40	NC2057
P	Low alloy steel C<0.3%	40 ~ 120	0.06 ~ 0.10	0.06 ~ 0.16	0.06 ~ 0.12	0.06 ~ 0.10	NC5254
P	High alloy steel	40 ~ 100	0.10 ~ 0.30	0.10 ~ 0.40	0.10 ~ 0.40	0.10 ~ 0.30	NC2057
M	Stainless steel	30 ~ 80	0.02 ~ 0.06	0.02 ~ 0.08	0.02 ~ 0.08	0.02 ~ 0.06	NC5254
K	Cast Iron	40 ~ 120	0.10 ~ 0.30	0.10 ~ 0.40	0.10 ~ 0.40	0.10 ~ 0.30	NC2057
N	Non-ferrous metal	90 ~ 200	0.06 ~ 0.40	0.06 ~ 0.50	0.06 ~ 0.50	0.06 ~ 0.40	XP9000

* Feed rate (f) should be gradually reduced while C > 2.0 mm.
Recommend using the minimum value of feed rate (red color) while Cmax is required.

SI16 - S9MT1603

• For Spotting

	Workpiece Material	Vc (m/min)	60°		90°	120°	142°	Grade of insert
			*Q (each pecking depth)	f (mm/rev.)				
P	Carbon steel C<0.3%	120 ~ 250	0.1 ~ 0.5mm	0.04 ~ 0.10	0.05 ~ 0.20	0.06 ~ 0.25	0.06 ~ 0.25	NC5254
P	Carbon steel C>0.3%	100 ~ 220						NC2057
P	Low alloy steel C<0.3%	100 ~ 200		0.03 ~ 0.08	0.04 ~ 0.15	0.05 ~ 0.20	0.05 ~ 0.20	NC5254
P	High alloy steel	80 ~ 180		0.02 ~ 0.07	0.04 ~ 0.12	0.05 ~ 0.16	0.05 ~ 0.16	NC2057
M	Stainless steel	30 ~ 80	0.1 ~ 0.2mm	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	NC5254
K	Cast Iron	80 ~ 180	0.1 ~ 0.5mm	0.03 ~ 0.08	0.04 ~ 0.15	0.05 ~ 0.20	0.05 ~ 0.20	NC2057
N	Non-ferrous metal	150 ~ 300	0.2 ~ 1.0mm	0.04 ~ 0.12	0.05 ~ 0.25	0.06 ~ 0.25	0.06 ~ 0.25	XP9000

Cutting Data

SI16 - S9MT1603

• For Chamfering

	Workpiece Material	Vc (m/min)	f (mm/rev.) 60°	90° (Cmax.: 5.5 mm)	120°	142°	Grade of insert
P	Carbon steel C<0.3%	60 ~ 150	0.06 ~ 0.10	0.06 ~ 0.16	0.06 ~ 0.12	0.06 ~ 0.10	NC5254
P	Carbon steel C>0.3%	60 ~ 150	0.10 ~ 0.40	0.10 ~ 0.50	0.10 ~ 0.50	0.10 ~ 0.40	NC2057
P	Low alloy steel C<0.3%	40 ~ 120	0.06 ~ 0.10	0.06 ~ 0.16	0.06 ~ 0.12	0.06 ~ 0.10	NC5254
P	High alloy steel	40 ~ 100	0.10 ~ 0.30	0.10 ~ 0.40	0.10 ~ 0.40	0.10 ~ 0.30	NC2057
M	Stainless steel	30 ~ 80	0.02 ~ 0.06	0.02 ~ 0.08	0.02 ~ 0.08	0.02 ~ 0.06	NC5254
K	Cast Iron	40 ~ 120	0.10 ~ 0.03	0.10 ~ 0.40	0.10 ~ 0.40	0.10 ~ 0.30	NC2057
N	Non-ferrous metal	90 ~ 200	0.06 ~ 0.40	0.06 ~ 0.50	0.06 ~ 0.50	0.06 ~ 0.40	XP9000

* Feed rate (f) should be gradually reduced while C > 2.5 mm.
Recommend using the minimum value of feed rate (red color) while Cmax is required.

SI20 - S9MT2004

• For Spotting

	Workpiece Material	Vc (m/min)	60° *Q (each pecking depth)	60° f (mm/rev.)	90°	120°	142°	Grade of insert
P	Carbon steel C<0.3%	120 ~ 250	0.1 ~ 0.5mm	0.04 ~ 0.10	0.05 ~ 0.25	0.06 ~ 0.30	0.06 ~ 0.30	NC5254
P	Carbon steel C>0.3%	100 ~ 220						NC2057
P	Low alloy steel C<0.3%	100 ~ 200		0.03 ~ 0.08	0.04 ~ 0.20	0.05 ~ 0.25	0.05 ~ 0.25	NC5254
P	High alloy steel	80 ~ 180		0.02 ~ 0.07	0.04 ~ 0.15	0.05 ~ 0.20	0.05 ~ 0.20	NC2057
M	Stainless steel	30 ~ 80	0.1 ~ 0.2mm	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	NC5254
K	Cast Iron	80 ~ 180	0.1 ~ 0.5mm	0.03 ~ 0.08	0.04 ~ 0.20	0.05 ~ 0.25	0.05 ~ 0.25	NC2057
N	Non-ferrous metal	150 ~ 300	0.2 ~ 1.0mm	0.04 ~ 0.12	0.05 ~ 0.30	0.06 ~ 0.30	0.06 ~ 0.30	XP9000

• For Chamfering

	Workpiece Material	Vc (m/min)	f (mm/rev.) 60°	90° (Cmax.: 7.0 mm)	120°	142°	Grade of insert
P	Carbon steel C<0.3%	60 ~ 150	0.06 ~ 0.10	0.06 ~ 0.16	0.06 ~ 0.12	0.06 ~ 0.10	NC5254
P	Carbon steel C>0.3%	60 ~ 150	0.10 ~ 0.40	0.10 ~ 0.50	0.10 ~ 0.50	0.10 ~ 0.40	NC2057
P	Low alloy steel C<0.3%	40 ~ 120	0.06 ~ 0.10	0.06 ~ 0.16	0.06 ~ 0.12	0.06 ~ 0.10	NC5254
P	High alloy steel	40 ~ 100	0.10 ~ 0.30	0.10 ~ 0.40	0.10 ~ 0.40	0.10 ~ 0.30	NC2057
M	Stainless steel	30 ~ 80	0.02 ~ 0.06	0.02 ~ 0.08	0.02 ~ 0.08	0.02 ~ 0.06	NC5254
K	Cast Iron	40 ~ 120	0.10 ~ 0.30	0.10 ~ 0.40	0.10 ~ 0.40	0.10 ~ 0.30	NC2057
N	Non-ferrous metal	90 ~ 200	0.06 ~ 0.40	0.06 ~ 0.50	0.06 ~ 0.50	0.06 ~ 0.40	XP9000

* Feed rate (f) should be gradually reduced while C > 3.0 mm.
Recommend using the minimum value of feed rate (red color) while Cmax is required.

Micro Spot Drill >>>

90° / 120° / 142°

0.1 & 0.2mm

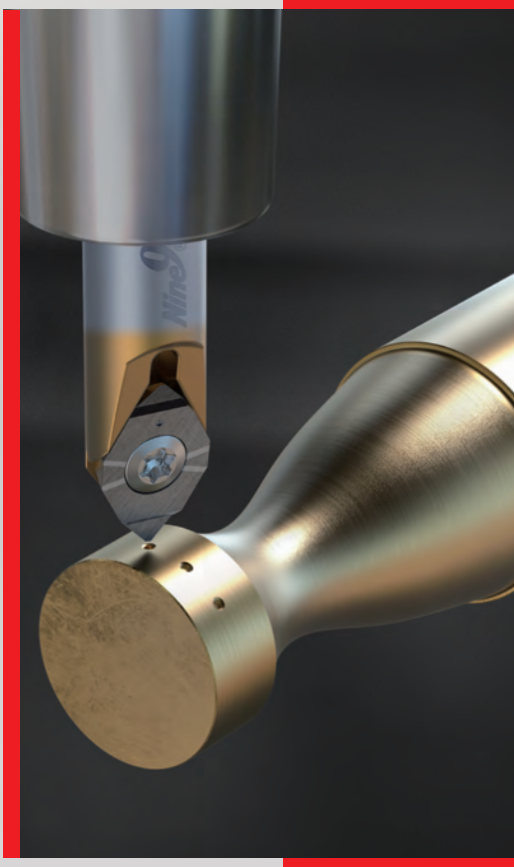
It produces a consistent surface for micro drill successfully to enter the workpiece.

P M K N H

MCC Minimum Consumable Cutting Indicator 5%

One Holder Supports The Entire X060 Series Insert.

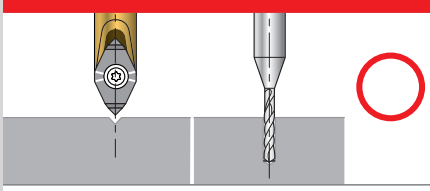
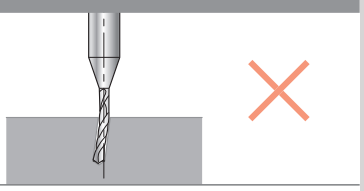
* Most of hole size in Swiss type lathe or small milling machine is between 0.2~1mm.



Features >

Each Insert Has 2 Cutting Edges.

- Micro spot drill geometries are designed to optimize rigidity and accuracy with a point angle to guide micro drill towards the hole's center line.
- Carbide insert can stand very long tool life.
- It produces a consistent surface for micro drill to enter the workpiece especially for round, angled or curved surfaces.

Spotting + Drilling	Without Spotting
	
• Better position accuracy and diameter tolerance.	• Resulted off-center drilling, poor hole quality and reduced tool life.

0.1 and 0.2mm
Micro Spot Drill 90°, 120° & 142°

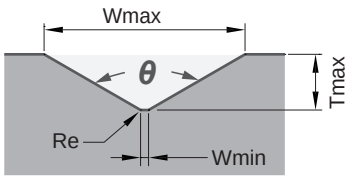
90°
120°
142°

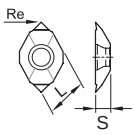
Inserts >>

NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 50.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

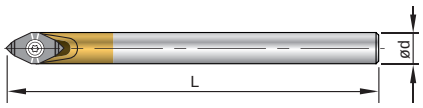


Angle ±0.5	Code	Parts No.		Coating	Grade		Dimensions L	S	Re	Wmin.	Wmax.	Tmax.
90°	01X0082	X060A90W010R	NC2032	TiAlN	K20F		6	2.05	0.02	0.1	1.1	0.5
	01X0221		NC2035	ALDURA								
	01X0220		XP9001	Uncoated								
90°	01X0207	*X060A90W020R	NC2032	TiAlN	K20F				0.04	0.2	2.2	1.0
	01X0208		NC2035	ALDURA								
	01X0209		XP9001	Uncoated								
120°	01X0222	X060A120W010R	NC2032	TiAlN	K20F				0.02	0.1	2.53	0.7
142°	01X0223	X060A142W010R	NC2032	TiAlN	K20F				0.02	0.1	2.42	0.4

* X060A90W020R is also good for engraving.

Holder >>

• One holder supports the entire X060 series of carbide inserts.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.



Code	Parts No.	Shank	Ød	L	Screw	Key
69X001	00-99619-X060-06	Steel	6	40	*NS-22044 0.9Nm	NK-T7
69X002	00-99619-X060-06L	Carbide	6	60		
69X003	00-99619-X060-06LS	Steel	6			
69X004	00-99619-X060-06XL	Carbide	6	100		
69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

Cutting Data >>

Workpiece Material	S (r.p.m)	f (mm/rev.) X060A90W010R	X060A90W020R	X060A120W010R X060A142W010R	Grade of Insert
P Carbon steel	8000 ~ 40000	0.002 ~ 0.012	0.002 ~ 0.015	0.002 ~ 0.015	NC2032
P Alloy steel		0.002 ~ 0.010	0.002 ~ 0.010	0.002 ~ 0.010	NC2032, NC2035
M Stainless steel		0.002 ~ 0.008	0.002 ~ 0.010	0.002 ~ 0.010	NC2032
K Cast Iron		0.002 ~ 0.010	0.002 ~ 0.010	0.002 ~ 0.010	NC2032
N Non-ferrous metal		0.002 ~ 0.015	0.002 ~ 0.020	-	XP9001
H Hardened steel < HRC50		0.002 ~ 0.006	0.002 ~ 0.006	-	NC2035

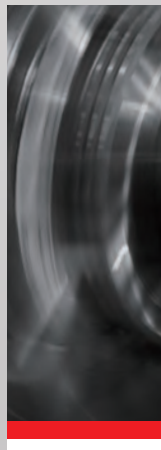
NC Spot Drill >>>

No Need To Choose, Nine9 Does It All!

NC Spot Drill with indexable carbide insert.
High efficiency! Long tool life! Cost saving!

P M K N S H

- **Various Inserts Can Fit On The Same Tool Holder.**
- **One Tool For Various Applications.**



Features >>>

- **Spotting Produces Better Hole Position And Geometrically Uniform Holes.**
- **Available Shank Diameter- Ø5, Ø6, Ø8, Ø10, Ø12, Ø16, Ø20, Ø25mm, Ø3/8", Ø1/2", Ø5/8", Ø1/4", Ø3/4", Ø1", M5, M6 And M8.**
- **60° / 82° / 90° / 100° / 142° / 145° Angle For Different Applications.**
  - Suitable for spotting, chamfering, facing, grooving and engraving.
  - Each insert has 2 or 4 cutting edges.
  - Increase cutting speed with coated carbide inserts.

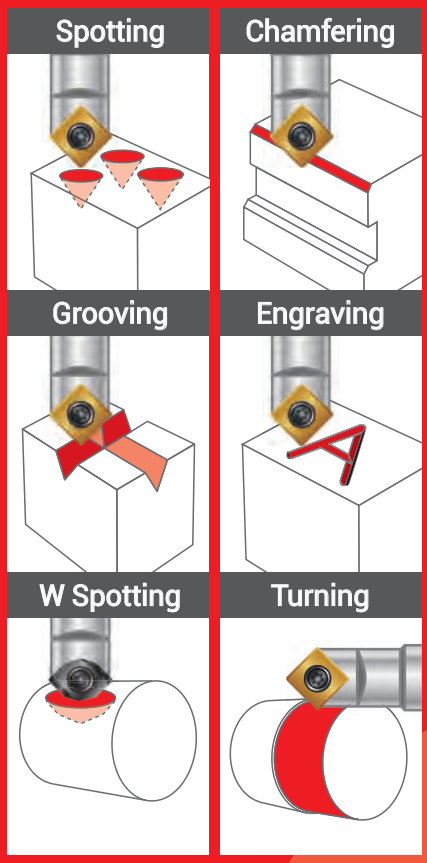
Applications

▼ CNC Lathes

• Contour chamfering on machining center.

◀ Machining Center ▲

"One tool will perform multiple applications.
Suitable for spotting, chamfering, facing, grooving and engraving."

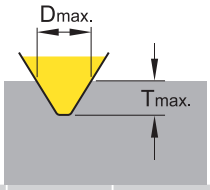


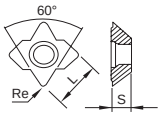
60° N9MT11T3P60

Inserts >>

- Fully ground spotting insert, for 60 degree spotting and engraving.

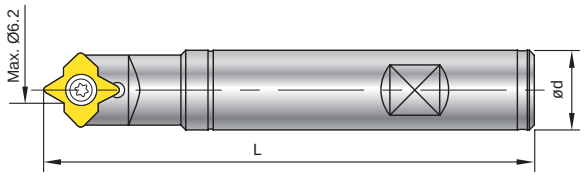
NC40:
- Universal grade for all unhardened steel and cast iron.
- Each insert has 2 cutting edges.



Code	Parts No.	Coating	Grade		Dimensions			Dmax.	Tmax.
					L	S	Re		
014204	N9MT11T3P60-NC40	TiN	P35		11	3.97	0.8	6.2	4

Holder >>

- A single cutting edge design creates higher precision and position when spotting.
- Applications: For spotting, engraving, small grooving on milling machines, machining centers.



Ø16

Code	Parts No.	Ød	L	Screw	Key
604002	00-99616-14-12	12	100	NS-35080 2.5 Nm	NK-T15
604004	00-99616-14	16	100		

V9MT0802 / V9MT12T3

60°

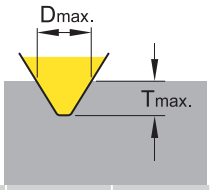
Inserts >>

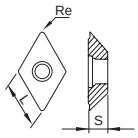
- 60 degree indexable spotting insert, Dmax 13mm.
- Special geometry with supporting edges for using in high speed machining.
- Excellent tool for grooving. Saving machining time!

NC5071: • For high alloy steel and cast iron.
• Each insert has 2 cutting edges.

NC2071: • For carbon steel, low alloy steel, stainless steel, non-ferrous and titanium.
• Each insert has 2 cutting edges.

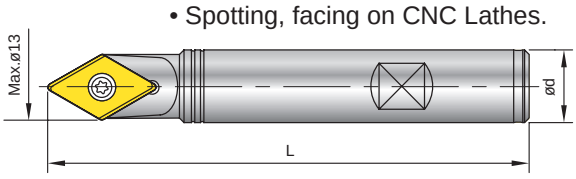
NC9076: • For non-ferrous material such as aluminum, al-alloy, titanium, brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
019202	V9MT0802CT	NC5071	TiAlN & TiN	K20F		8	2.38	0.4	9	7.3
019201		NC2071	TiN							
019203		NC9076	DLC							
015204	V9MT12T3CT	NC5071	TiAlN & TiN	K20F		12.7	3.97	0.8	13	10.3
015201		NC2071	TiN							
015202		NC9076	DLC							

Holder >>

- A single cutting edge creates higher precision and position when spotting.
- Applications: • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
  • Spotting, facing on CNC Lathes.



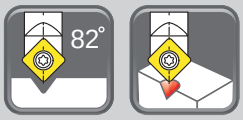
Ø8

Ø16

Code	Parts No.	Ød	L	Insert Type	Screw	Key
609001	00-99616-09V (Cylindrical shank)	8	60	V9MT08	*NS-25045 0.9 Nm	NK-T7
605001	00-99616-13V	16	100	V9MT12	NS-35080 2.5 Nm	NK-T15
615001	00-99616-13V-5/8	5/8”	100			

*Torque screwdriver is recommended.

82° V0820802 / V08212T3



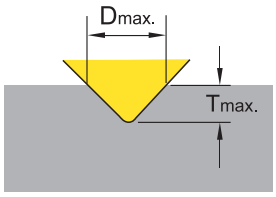
Inserts >>

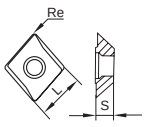
- 82 degree indexable spotting insert, Dmax. 14mm (0.551”).
- Match the geometry of Amercian standard flat head screw hole.
- Special geometry with supporting edges for high speed machining.

NC5071: • For high alloy steel and cast iron.
• Each insert has 2 cutting edges.

NC2071: • For carbon steel, low alloy steel, stainless steel, non-ferrous and titanium.
• Each insert has 2 cutting edges.

NC9076: • For non-ferrous material such as aluminum, al-alloy, titanium, brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



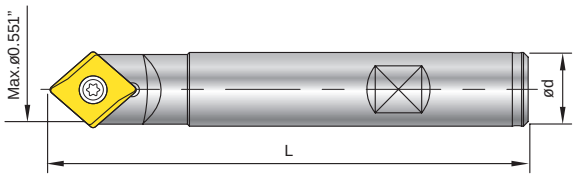
Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
0108203	V0820802	NC5071	TiAlN & TiN	K20F		8	2.38	0.4	9 (0.354”)	4.8 (0.189”)
0108201		NC2071	TiN							
0108202		NC9076	DLC							
0108213	V08212T3	NC5071	TiAlN & TiN	K20F		12.7	3.97	0.8	14 (0.551”)	7.5 (0.295”)
0108211		NC2071	TiN							
0108212		NC9076	DLC							

Holder >>

- Special cutting edge design gives higher precision and position when spotting.
- Applications : • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
  • Spotting, facing on CNC Lathes.

Ø3/8”

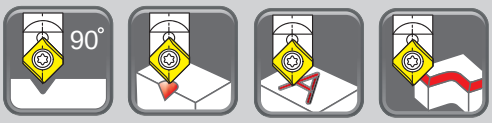
Ø5/8”



Code	Parts No.	Ød	L	Insert Type	Screw	Key
693001	00-99619-V082-3/8	3/8”	90	V0820802	NS-30055 2.0 Nm	NK-T8
693002	00-99619-V082-5/8	5/8”	100	V08212T3	NS-35080 2.5 Nm	NK-T15

N9MT05T1 / N9MT0602

90°



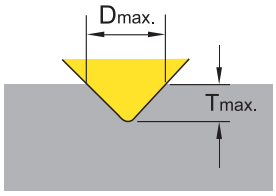
Inserts >>

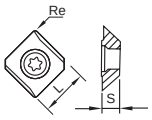
- Mini spotting drill with indexable insert, low cutting power required.
- Especially good for Swiss type automatic lathes and CNC lathes.

NC5071:
- For high alloy steel and cast iron.
- Each insert has 2 cutting edges.

NC2071:
- For carbon steel, low alloy steel, stainless steel, non-ferrous and titanium.
- Geometry with supporting edges to stabilize the cutting condition on low power machine.
- Each insert has 2 cutting edges.

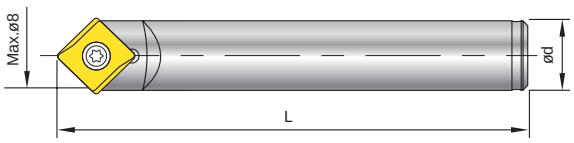
NC9076:
- For non-ferrous material such as aluminum, titanium, brass, copper and stainless steel.
- Produces excellent surface finish on non-ferrous metal.
- Each insert has 2 cutting edges.



Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
011209	N9MT05T1CT	NC5071	TiAlN & TiN	K20F		5	1.8	0.4	5.5	2.43
011201		NC2071	TiN							
011202		NC9076	DLC							
012204	N9MT0602CT	NC5071	TiAlN & TiN	K20F		6.35	2.38	0.4	8	3.8
012201		NC2071	TiN							
012202		NC9076	DLC							

Holder >>

- Smallest indexable spotting drill holder.
- Single cutting edge design gives higher precision when spotting.
- Applications :
  - Spotting, engraving, and chamfering on milling machines, machining centers.
  - Spotting, facing on CNC Lathes.



Code	Parts No.	Ød	L	Insert Type	Screw	Key
601001	00-99616-06-6	6	35	N9MT05	*NS-20036 0.6 Nm	NK-T6
601002	00-99616-06-5	5	35			
601003	00-99616-06-6L	6	60			
602001	00-99616-08-8	8	60	N9MT06	*NS-22044 0.9 Nm	NK-T7

Note:601003 is carbide shank holder.

*Torque screwdriver is recommended.

90° N9MT0802

Inserts >>

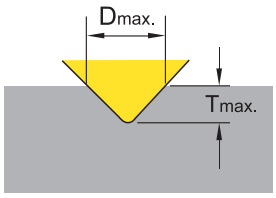
NC40: • General purpose, universal grade for all unhardened steel < HRC 48.
• Each insert has 4 cutting edges.

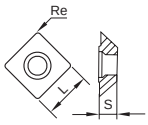
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.

H-NC5071: • For carbon steel C>0.3%, high alloy steel C>0.3% and cast iron.
• Each insert has 2 cutting edges.

H-NC40: • For carbon steel C<0.3%, low alloy steel C<0.3%, stainless steel, non-ferrous and titanium.
• Each insert has 2 cutting edges.

H-NC9076: • High positive geometry and sharp edge.
• For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
013401	N9MT080208CT	NC40	TiN	K20F		8.31	2.38	0.8	10	4.5
013402	N9MT080204CT	NC40	TiN	K20F				0.4		
013403		NC10	TiAlN					0.4		
013206	N9MT0802CT2T	H-NC5071	TiAlN & TiN	K20F				0.8		
013201		H-NC40	TiN							
013202		H-NC9076	DLC							

* H type is with supporting edge.

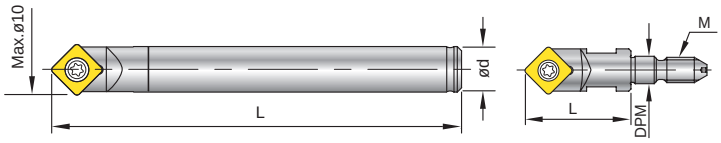
Holder >>

• Single cutting edge design gives higher precision when spotting.
• Applications : • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
• Spotting, facing, turning on CNC Lathes.

M5, M6

00-99616-10 / Ø10, Ø3/8”

00-99616-10-SL10 / Ø10



Code	Parts No.	Ød	L	M	DPM	Screw	Key
603001	00-99616-10	10	90	-	-	NS-30055 2.0 Nm	NK-T8
603003	00-99616-10-SL10 (Weldon shank)	10	90	-	-		
613001	00-99616-3/8	3/8”	90	-	-		
623001	00-99616-10-M5	-	25	M5xP0.8	5.5		
623002	00-99616-10-M6	-	25	M6xP1.0	6.5		

• Refer to Page 164 for extension bars.

N9MT0802

90°

Single Set >>

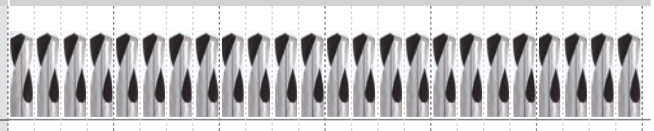
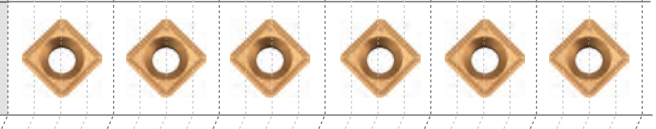
Code	Parts No.	Ød	Total Length	Insert fitted	Dmax.	Tmax.
603101-3401	00-99616-10-02S	10	90	N9MT080208CT-NC40	10	4.5
603101-3403	00-99616-10-02SAL	10	90	N9MT080204CT-NC10	10	4.5

Starter Package >>

- Selected package for starter who wants to try NC Spot Drill.
- Included one insert on tool holder and five inserts in the pocket.
- Total 6 inserts are equal to 24 spot drills.

Code	Parts No.	Ød	Insert included	Content
603201-3401	00-99616-10-ME6	10	N9MT080208CT-NC40	1 tool holder + 6 inserts + 1 key
603201-3403	00-99616-10-ME6AL	10	N9MT080204CT-NC10	
613201-3401	00-99616-10-IN6	3/8”	N9MT080208CT-NC40	
613201-3403	00-99616-10-IN6AL	3/8”	N9MT080204CT-NC10	

Comparison >>

Tool		Benefit analysis
24 spot drills		
6 inserts		

0 4 8 12 16 20 24

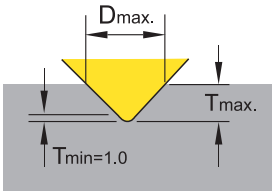
Note: N9MT080201W Engraving , see page 78.

60°-NC40 NC40 NC10

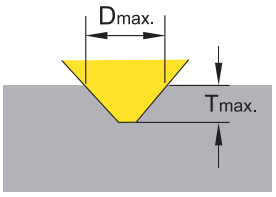
90° N9MT11T3

Inserts >>

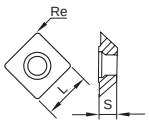
NC40: • Wiper design, universal grade for all unhardened steel.
• Each insert has 4 cutting edges.
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.
NC60: • Wiper design cermet insert, for hardened steel up to HRC 56.
• Each insert has 4 cutting edges.
H-NC5071: • For carbon steel C>0.3%, high alloy steel C>0.3% and cast iron.
• Each insert has 2 cutting edges.
H-NC40: • For carbon steel C<0.3%, low alloy steel C<0.3%, stainless steel, non-ferrous and titanium.
• Each insert has 2 cutting edges.
H-NC9076: • High positive geometry and sharp edge.
• For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



NC40 / Wiper design / NC60



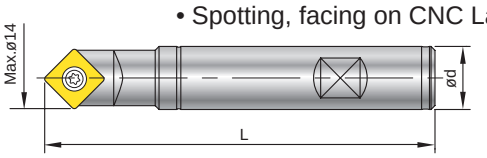
Other grade

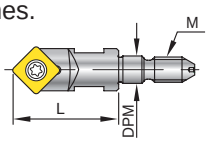
Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
014401	N9MT11T3CT	NC40	TiN	P35		11.11	3.97	0.8	14	7
014402		NC10	TiAlN	K10F				(0.3)		
014403		NC60	CERMET					0.8		
014234	N9MT11T3CT2T	H-NC5071	TiAlN & TiN	K20F				0.8		
014202		H-NC40	TiN	K20F				0.8		
014203		H-NC9076	DLC	K20F				0.8		

* H type is with supporting edge.

Holder >>

• Single cutting edge design gives higher precision when spotting.
• Applications : • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
• Spotting, facing on CNC Lathes.



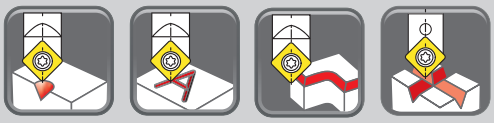


Code	Parts No.	Ød	L	M	DPM	Screw	Key
604002	00-99616-14-12	12	100	-	-	NS-35080 2.5 Nm	NK-T15
604004	00-99616-14	16	100	-	-		
604007	00-99616-14-150L	16	150	-	-		
604009	00-99616-14-220L	20	220	-	-		
614001	00-99616-14-1/2	1/2”	100	-	-		
614002	00-99616-14-5/8	5/8”	100	-	-		
624001	00-99616-14-M8	-	30	M8xP1.25	8.5		

• Refer to Page 164 for extension bars.

N9MT11T3

90°



Single Set >>

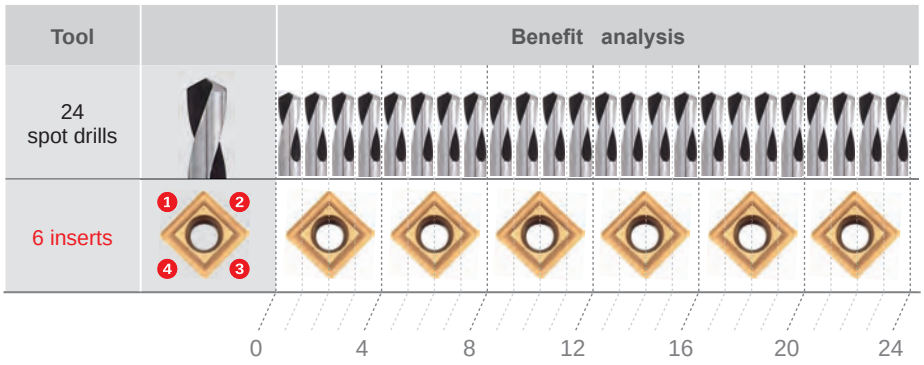
Code	Parts No.	Ød	Total Length	Insert fitted	Dmax.	Tmax.
604104-4401	00-99616-14-02S	16	100	N9MT11T3CT-NC40	14	7
604104-4402	00-99616-14-02SAL			N9MT11T3CT-NC10	14	7
614102-4401	00-99616-14-5/8-02S	5/8”	100	N9MT11T3CT-NC40	0.551”	0.276”
614102-4402	00-99616-14-5/8-02SAL			N9MT11T3CT-NC10	0.551”	0.276”

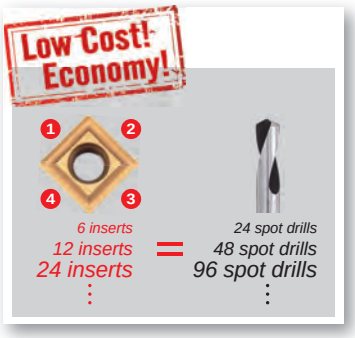
Starter Package >>

- Selected package for starter who wants to try NC Spot Drill.
- Included one insert on tool holder and five inserts in the pocket.
- Total 6 inserts are equal to 24 spot drills.

Code	Parts No.	Ød	Insert included	Content
604204-4401	00-99616-14-ME6	16	N9MT11T3CT-NC40	1 tool holder + 6 inserts + 1 key
604204-4402	00-99616-14-ME6AL		N9MT11T3CT-NC10	
614202-4401	00-99616-14-IN6	5/8”	N9MT11T3CT-NC40	
614202-4402	00-99616-14-IN6AL		N9MT11T3CT-NC10	

Comparison >>

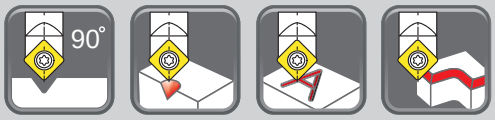




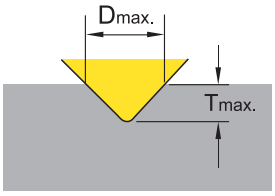
2

NC Spot Drill

90° N9MT1704



Inserts >>

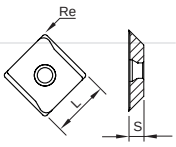


• 90 degree indexable spot drill insert, Dmax. 22mm.

NC5071: • High positive geometry, fully ground cutting edge and relief angle.
• For high alloy steel and cast iron.
• Each insert has 2 cutting edges.

NC9036: • For non-ferrous material such as aluminum, acrylic, brass, copper, titanium and long cutting chip materials.
• High positive geometry and sharp edge produces excellent surface finish.
• Each insert has 2 cutting edges.

NC2071: • For carbon steel, low alloy steel, stainless steel, non-ferrous and titanium.
• Each insert has 2 cutting edges.

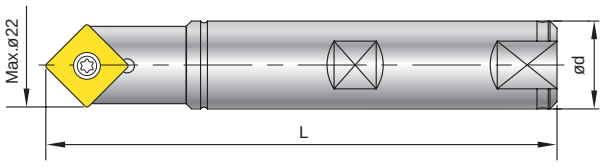
Code	Parts No.		Coating	Grade		Dimensions			Dmax.	Tmax.
						L	S	Re		
016216	N9MT1704CT	NC5071	TiAlN & TiN	K20F		17	4.76	1.2	22	10.4
016211		NC9036	DLC	K20F						
016201		NC2071	TiN	K20F						

Holder >>

• Single cutting edge design gives high precision when spotting.
• Applications : • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
• Spotting, facing on CNC Lathes.

Ø20

Ø25

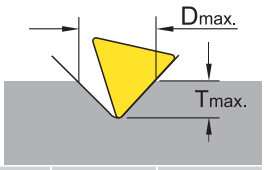


Code	Parts No.	Ød	L	Screw	Key
606001	00-99616-22	20	100	NS-50125 5.5 Nm	NK-T20
606002	00-99616-22-25	25	150		

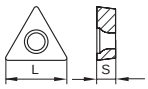
N9MT220408 / N9MT2506

90°

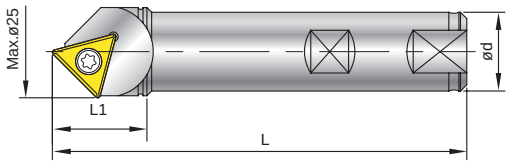
N9MT220408



NC40:
- Universal grade for carbon steel, alloy steel and cast iron.
- Each insert has 3 cutting edges.

Code	Parts No.	Coating	Grade		Dimensions			Dmax.	Tmax.
					L	S	Re		
017301	N9MT220408CT-NC40	TiN	P35		20.83	4.76	---	25	12.2

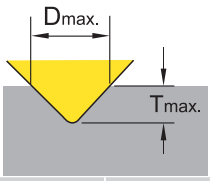
* 5 pcs per box.



Ø25

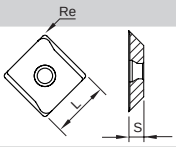
Code	Parts No.	Ød	L	L1	Screw	Key
607001	00-99616-25-CT28	25	120	30	NS-40100 3.5 Nm	NK-T15
617001	00-99616-1-CT28	1”				

N9MT2506 >>

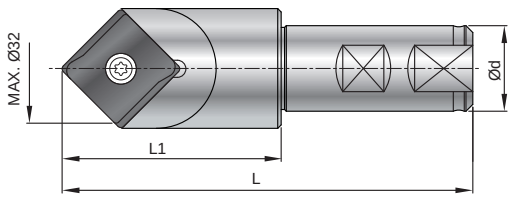


NC2033:
- For carbon steel, alloy steel, high alloy steel, cast iron and hardened steel < HRC 50.
- Each insert has 2 cutting edges.

XP9000:
- High positive geometry and sharp edge produces excellent surface finish.
- For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.
- Each insert has 2 cutting edges.

Code	Parts No.		Coating	Grade		Dimensions			Dmax.	Tmax.
						L	S	Re		
018201	N9MT2506CT	NC2033	TiAlN	K20F		25	6.35	1.2	32	15.4
018202		XP9000	Uncoated							

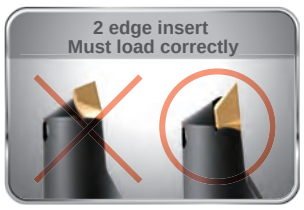
* 2 pcs per box.



Code	Parts No.	Ød	L	L1	Screw	Key
608001	00-99616-32-25	25	120	64	NS-60180 5.5 Nm	NK-UT25
618001	00-99616-32-1	1”				

100° N9MT11T3CT2T-H

Inserts >>

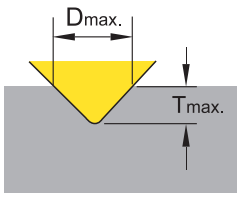


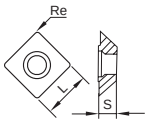
- For aircraft 100° normal rivet hole and screw hole.

H-NC5071:
- For carbon steel C>0.3%, high alloy steel C>0.3% and cast iron.
- Each insert has 2 cutting edges.

H-NC40:
- For carbon steel C<0.3%, low alloy steel C<0.3%, stainless steel, non-ferrous and titanium.
- Each insert has 2 cutting edges.

H-NC9076:
- High positive geometry and sharp edge.
- For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.
- Produces excellent surface finish when chamfering non-ferrous metal.
- Each insert has 2 cutting edges.

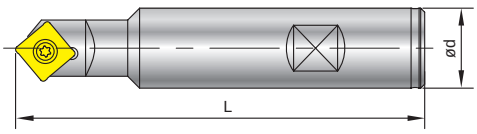


Code	Parts No.		Coating	Grade		Dimensions			Dmax.	Tmax.
						L	S	Re		
014234	N9MT11T3CT2T	H-NC5071	TiAlN & TiN	K20F		11	3.97	0.8	16	6.3
014202		H-NC40	TiN							
014203		H-NC9076	DLC							

* H type is with supporting edge.

Holder >>

- Spotting produces better hole position and geometrically uniform holes.
- Increase tool life of the next drilling operation.



Code	Parts No.	Ød	L	Screw	Key
604011	00-99616-20-100	20	100	NS-35080 2.5 Nm	NK-T15

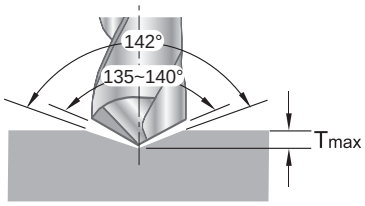
V14208 / V14216

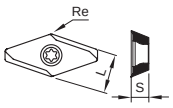
142°

Inserts >>

- For spotting before drilling by 135° - 140° point angle high performance drill.
- 142 degree indexable spotting drills. Dmax. 32mm.

NC2071:
- High positive geometry, fully ground cutting edge and relief angle.
- Universal grade for all unhardened steel and cast iron.
- Each insert has 2 cutting edges.



Code	Parts No.	Coating	Grade		Dimensions			Dmax.	Tmax.
					L	S	Re		
0114201	V1420803-NC2071	TiN	K20F		8	3.18	0.8	16	2.8
0114211	V1421604-NC2071				14	4.76	1.2	32	5.5

The quantity of insert per box.:

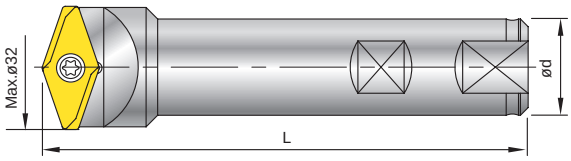
V1420803	V1421604
10	5

Holder >>

- Spotting produces better hole position and geometrically uniform holes.
- Extend your drill life with 142° spotting. Reduce your drilling cost.
- Higher accuracy of positioning and diameter tolerance !

Ø16

Ø25



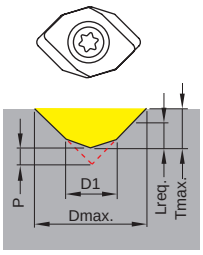
Code	Parts No.	Ød	L	Insert Type	Screw	Key
696001	00-99619-V142-16	16	100	V1420803	NS-30072 2.0 Nm	NK-T9
696002	00-99619-V142-32	25	120	V1421604	NS-50125 5.5 Nm	NK-T20

145°
+
90°

WSP Spotting New Geometry of Spotting Tool

Inserts >>

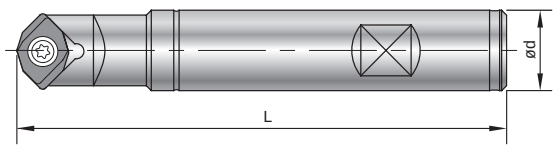
NC2033:
- Fully ground cutting edge and relief angle.
- Universal grade for steel, cast iron and hardened steel < HRC 50.
- Each insert has 2 cutting edges.

Code	Parts No.	Coating	Grade		Thread Size	*D1±0.05	P	Dmax.	Tmax.
013203	N9MT0802M04C-NC2033	TiAlN	K20F		M4x0.7	3.30	1.17	8	2.83
013204	N9MT0802M05C-NC2033				M5x0.8	4.20	1.48		2.52
013205	N9MT0802M06C-NC2033				M6x1.0	5.00	1.76		2.24
014219	N9MT11T3M08C-NC2033	TiAlN	K20F		M8x1.25	6.80	2.39	13	4.11
014220	N9MT11T3M10C-NC2033				M10x1.5	8.50	2.97		3.53
014221	N9MT11T3UNC25-NC2033	TiAlN	K20F		1/4-20 UNC	5.08	1.80	13	4.70
014222	N9MT11T3UNC31-NC2033				5/16-18 UNC	6.53	2.30		4.20
014223	N9MT11T3UNC38-NC2033				3/8-16 UNC	7.94	2.78		3.72
016205	N9MT1704M12C-NC2033	TiAlN	K20F		M12x1.75	10.25	3.59	20	6.61
016206	N9MT1704M14C-NC2033				M14x2.0	12.00	4.19		5.87
016207	N9MT1704M16C-NC2033				M16x2.0	14.00	4.88		5.11

Note: *D1 refer to the Tap Pre-drilling sizes. / Lreq : please see page 52 for details.

Holder >>

- Utilizes standard ***NC Spot Drill*** basic holder.
- Holders and inserts are interchangeable.



Ø10 Ø3/8”

Ø16 Ø5/8”

Ø20 Ø3/4”

Code	Parts No.	Ød	L	Insert Type	Screw	Key
603001	00-99616-10	10	89.08±0.29	N9MT0802	NS-30055 2.0Nm	NK-T8
613001	00-99616-3/8	3/8”				
604004	00-99616-14	16	97.55±0.55	N9MT11T3	NS-35080 2.5Nm	NK-T15
614002	00-99616-14-5/8	5/8”				
606001	00-99616-22	20	96.24±0.64	N9MT1704	NS-50125 5.5Nm	NK-T20
616001	00-99616-22-3/4	3/4"				

WSP Spotting New Geometry of Spotting Tool

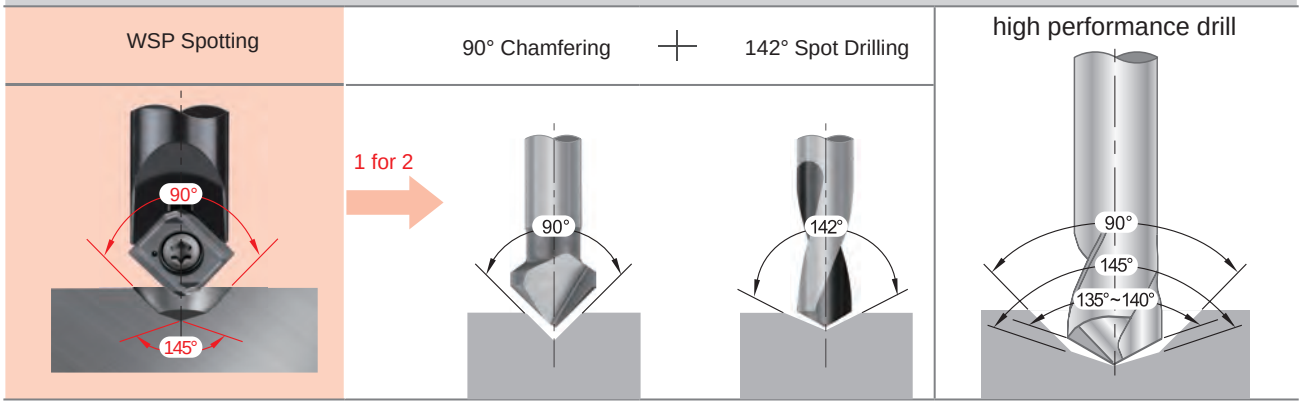
145° + 90°

Combined spotting and chamfering 145° + 90° >>

- Reduces process to one operation. Shorten cycle time.
- Use to spot prior to drilling with high performance drills for higher accuracy of hole position.
- Good support spotting process for round parts.

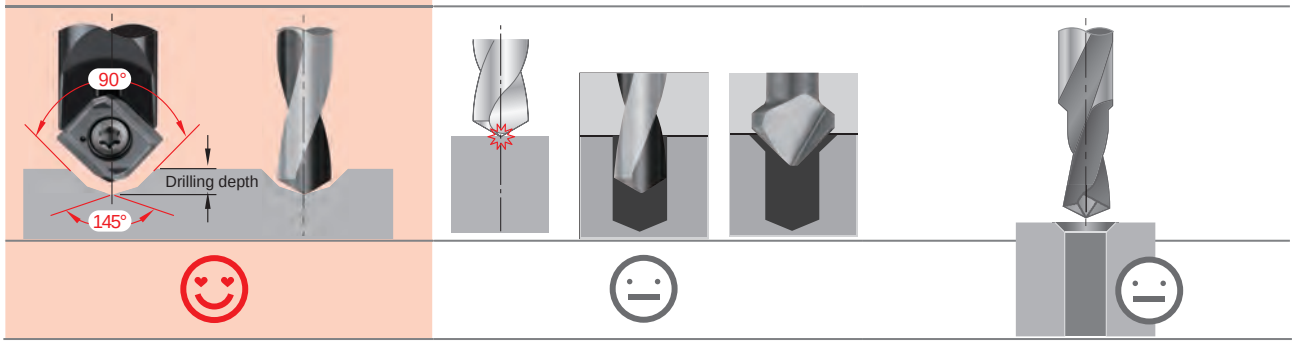
Concept >>

1 process provides 2 applications		
WSP Spotting	90° Chamfering + 142° Spot Drilling	high performance drill



Comparison >>

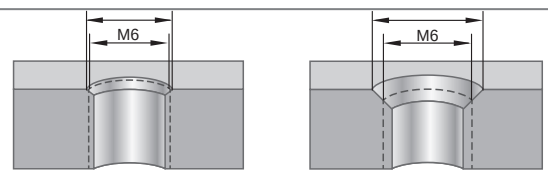
WSP Spotting + Drill	Drill + Spotting	Step Drill
• Shorter drilling time • Guided at the strongest corner of drill • Longer tool life • Good position accuracy	• Longer drilling time • Guided at the weakest corner of drill • Shorter tool life	• Tool cost is high • Shorter tool life • Can't drill directly from solid on round parts. • Bad position accuracy.



Example >>

- The recommended chamfering is 5% of the nominal diameter of the thread, for example 6.3 mm for M6 thread.
- If you need larger chamfer, it can be calculated the required depth of spotting.

Drilled hole for M6	
M6+5% Chamfering	M6+1mm Chamfering



2

NC Spot Drill - WSP

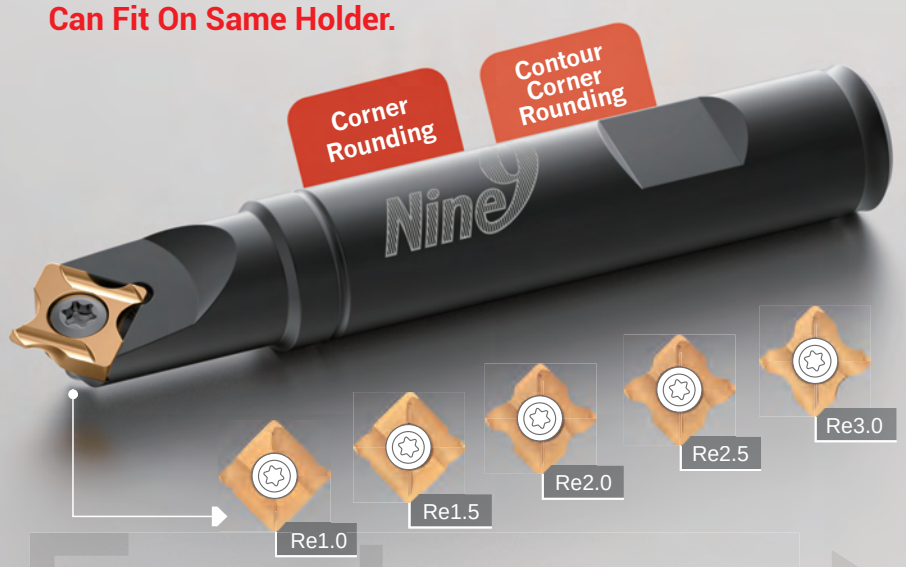
Corner Rounding>>>

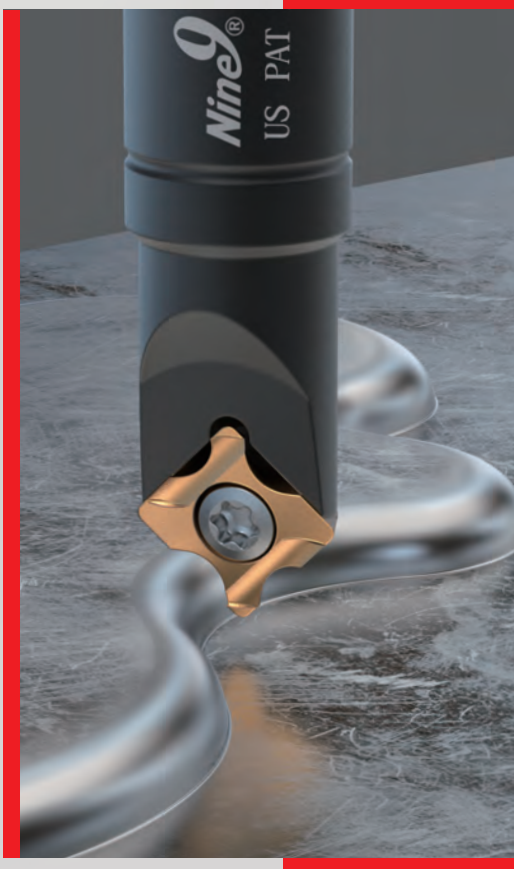
Type of RC / Radius 0.5 ~10mm

Produces smooth and excellent surface finish on workpiece.

P M K N S

Various Corner Radius Inserts Can Fit On Same Holder.





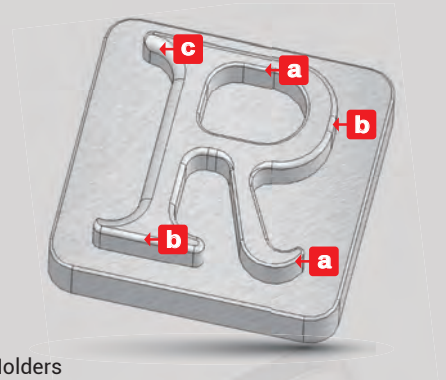
Features >

Each Insert Has 2 Cutting Edges

- Carbide insert can stand very long tool life.
- Combination corner rounding and 45° chamfering application on same insert.
- Higher cutting speed and feed rate.
- Very small X offset, good for contour chamfering.
- Utilizes standard NC Spot Drill holders 99616-06, 99616-14, 99616-22 & 99616-32.

Example

a Radius 0.5
b Radius 1.0
c Radius 2.0



N9MT05T1RC

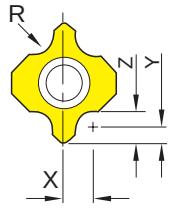
RC0.5 ~ RC1.0

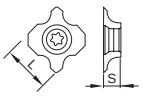
Inserts >>

- Various corner radius inserts can fit on same holder.
- Very small X offset 1.25mm for radius 0.5,
  the small x offset allows for profiling in small corners.

NC2071:
- Universal grade for all unhardened steel and cast iron.
- Inserts are CNC ground for precision radius location.
- Each insert has 2 cutting edges.

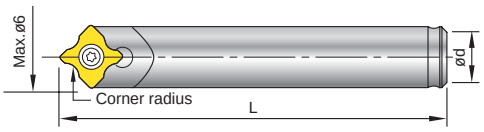
NC9036:
- For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
- High positive geometry and sharp edge produces excellent surface finish.
- Each insert has 2 cutting edges.



Corner Radius ±0.05	Code	Parts No.		Coating	Grade	offset X	offset Y	offset Z		Dimensions L	Dimensions S
0.5	011203	N9MT05T1RC05	NC2071	TiN	K20F	1.25	0.75	1.25		5	1.8
	011206		NC9036	DLC							
0.75	011204	N9MT05T1RC075	NC2071	TiN	K20F	1.50	0.75	1.50			
	011207		NC9036	DLC							
1.0	011205	N9MT05T1RC10	NC2071	TiN	K20F	1.75	0.75	1.75			
	011208		NC9036	DLC							

Holder >>

- For corner rounding using ***NC Spot Drill*** basic holder.



Code	Parts No.	Ød	L	Screw	Key
601001	00-99616-06-6	6	35	*NS-20036 0.6 Nm	NK-T6
601002	00-99616-06-5	5	35		
601003	00-99616-06-6L	6	60		

Note: 601003 is carbide shank holder.

*Torque screwdriver is recommended.

RC N9MT11T3RC

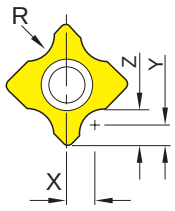
RC1.0 ~ RC3.0

Inserts >>

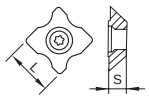
- Combination corner rounding and 45° chamfering application on same insert.
- Each insert has 2 cutting edges.

NC40: • Universal grade for all unhardened steel and cast iron.
• Inserts are CNC ground for precision radius location.

NC9036: • For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
• High positive geometry and sharp edge produces excellent surface finish.



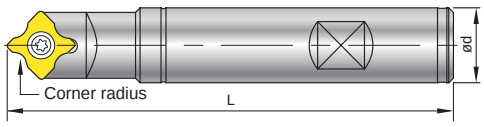
Corner Radius ±0.05	Code	Parts No.		Coating	Grade	offset X	offset Y	offset Z		Dimensions L	Dimensions S
1.0	014209	N9MT11T3RC10	NC40	TiN	K20F	2.75	1.5	2.5		11.11	3.97
	014224		NC9036	DLC							
1.5	014210	N9MT11T3RC15	NC40	TiN	K20F	3.25	1.5	3			
	014225		NC9036	DLC							
2.0	014211	N9MT11T3RC20	NC40	TiN	K20F	3.75	1.5	3.5			
	014226		NC9036	DLC							
2.5	014212	N9MT11T3RC25	NC40	TiN	K20F	4.25	1.5	4			
	014227		NC9036	DLC							
3.0	014213	N9MT11T3RC30	NC40	TiN	K20F	4.75	1.4	4.4			
	014228		NC9036	DLC							
1/64	014214	N9MT11T3RC1/64	NC40	TiN	K20F	0.086”	0.059”	0.0747”		0.437”	0.156”
	014229		NC9036	DLC							
1/32	014215	N9MT11T3RC1/32	NC40	TiN	K20F	0.101”	0.059”	0.090”			
	014230		NC9036	DLC							
1/16	014216	N9MT11T3RC1/16	NC40	TiN	K20F	0.133”	0.059”	0.122”			
	014231		NC9036	DLC							
3/32	014217	N9MT11T3RC3/32	NC40	TiN	K20F	0.164”	0.059”	0.153”			
	014232		NC9036	DLC							
1/8	014218	N9MT11T3RC 1/8	NC40	TiN	K20F	0.199”	0.055”	0.180”			
	014233		NC9036	DLC							



Holder >>

- For corner rounding using ***NC Spot Drill*** basic holder.

Code	Parts No.	Ød	L	Screw/ Key
604002	00-99616-14-12	12	100	NS-35080 2.5 Nm / NK-T15
604004	00-99616-14	16		
614001	00-99616-14-1/2	1/2”	100	
614002	00-99616-14-5/8	5/8”		



Ø12, Ø16

Starter Package >>

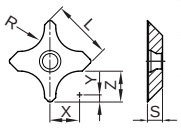
Code	Parts No.	Ød	Insert included	Content
604204-4200	00-99616-14-ME5RC	16	N9MT11T3RC10-NC40 N9MT11T3RC15-NC40 N9MT11T3RC20-NC40 N9MT11T3RC25-NC40 N9MT11T3RC30-NC40	1 tool holder + 5 inserts + 1 key

N9MT1704RC / N9MT2506RC

RC4.0 ~ RC6.0 /
RC7.0 ~ RC10.0

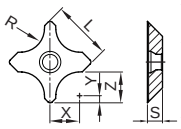
N9MT1704RC >>

NC2071: • Universal grade for all unhardened steel and cast iron.
NC9036: • High positive geometry and sharp edge produces excellent surface finish.
• For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.

Corner Radius(R) ±0.05	Code	Parts No.		Coating	Grade	offset X	offset Y	offset Z		Dimensions L	Dimensions S
4.0	016202	N9MT1704RC40	NC2071	TiN	K20F	6.15	2	6		17	4.76
	016208		NC9036	DLC							
5.0	016203	N9MT1704RC50	NC2071	TiN	K20F	7.1	2	7			
	016209		NC9036	DLC							
6.0	016204	N9MT1704RC60	NC2071	TiN	K20F	8.1	2	8			
	016210		NC9036	DLC							

N9MT2506RC >>

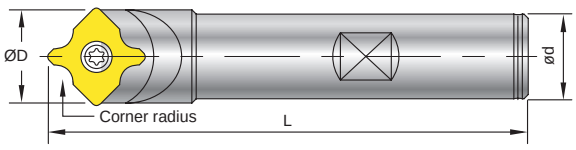
NC2033: • For carbon steel, alloy steel, high alloy steel, cast iron and hardened steel < HRC 50.
XP9000: • High positive geometry and sharp edge produces excellent surface finish.
• For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.

Corner Radius(R) ±0.05	Code	Parts No.		Coating	Grade	offset X	offset Y	offset Z		Dimensions L	Dimensions S
7.0	018203	N9MT2506RC70	NC2033	TiAlN	K20F	9.5	3	10		25	6.35
	018204		XP9000	Uncoated							
8.0	018205	N9MT2506RC80	NC2033	TiAlN	K20F	10.5	3	11			
	018206		XP9000	Uncoated							
9.0	018207	N9MT2506RC90	NC2033	TiAlN	K20F	11.5	3	12			
	018208		XP9000	Uncoated							
10.0	018209	N9MT2506RC100	NC2033	TiAlN	K20F	12.5	3	13			
	018210		XP9000	Uncoated							
5/16	018213	N9MT2506RC5/16	NC2033	TiAlN	K20F	0.411”	0.118”	0.430”			
	018214		XP9000	Uncoated							
3/8	018211	N9MT2506RC3/8	NC2033	TiAlN	K20F	0.474”	0.118”	0.493”			
	018212		XP9000	Uncoated							

* 2 pcs per box.

Holder >>

• For corner rounding using ***NC Spot Drill*** basic holder.



00-99616-22
00-99616-32-XX

00-99616-22-25

Code	Parts No.	Ød	L	ØD	Insert Type	Screw	Key
606001	00-99616-22	20	100	23.25	N9MT1704	NS-50125 5.5 Nm	NK-T20
606002	00-99616-22-25	25	150				
608001	00-99616-32-25	25	120	32.56	N9MT2506	NS-60180 5.5 Nm	NK-UT25
618001	00-99616-32-1	1”	120				

Corner Rounding>>>

Type of R / Radius 1.0~3.0mm

Produces smooth and excellent surface finish on workpiece.

P K

For Front And Back Chamfering (By LA Insert), And Corner Rounding (By R Insert)

Features

Each Insert Has 4 Cutting Edges

- Carbide insert can stand very long tool life.
- R1.0 ~ R3.0 inserts are interchangeable on same holder.
- For front and back chamfering.
- Tool offset can be set after measuring tool length by tool presetter or Z-Zero Setter.
- Inserts are CNC ground for precision radius and location.
- Optimizes the tool performance and reduces the cutting time.

N9MT11T3R

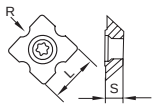
R

R1.0~R3.0

Inserts >>

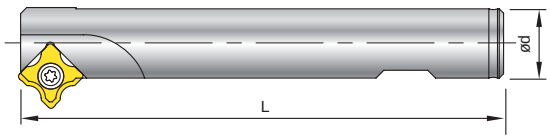
- For front and back corner rounding.
- Various corner radius inserts can fit on same holder.
- Coated carbide inserts for excellent tool life.
- Each insert has 4 cutting edges.

NC2071: • Universal grade for all unhardened steel and cast iron.
• Inserts are CNC ground for precision radius location.

Corner Radius(R) ±0.05	Code	Parts No.	Coating	Grade		Dimensions	
						L	S
1.0	014404	N9MT11T3R10-NC2071	TiN	P35		11.11	3.97
1.5	014405	N9MT11T3R15-NC2071	TiN	P35			
2.0	014406	N9MT11T3R20-NC2071	TiN	P35			
2.5	014407	N9MT11T3R25-NC2071	TiN	P35			
3.0	014408	N9MT11T3R30-NC2071	TiN	P35			

Holder >>

- Center of radius of each tool is dedicated.
- Tool offset can be set after measuring tool length by tool presetter or Z-Zero Setter.

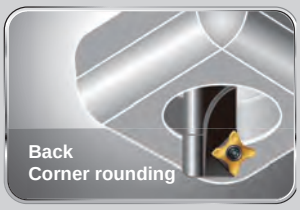


Code	Parts No.	Ød	L	Z	Screw	Key
604015	00-99616-16-25R	16	100	1	NS-35080 2.5 Nm	NK-T15
604019	00-99616-16-30R	16	120	1		
604020	00-99616-25-40R	25	150	4		

More >>

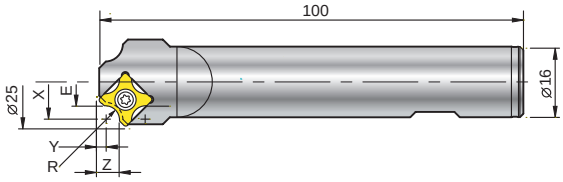
- Also can fit with N9MT11T308LA inserts for front and back chamfering. (Please see page 49)

R N9MT11T3R

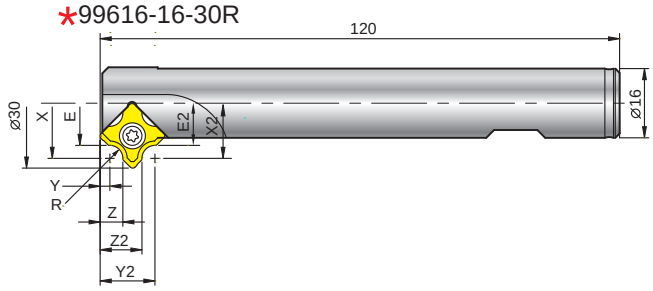


Cutting Position >>

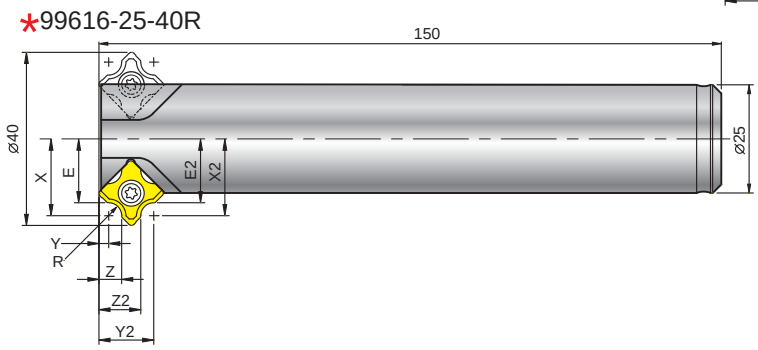
99616-16-25R



*99616-16-30R



*99616-25-40R



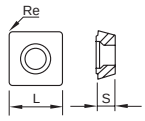
* 99616-16-30R & 99616-25-40R
For front and back corner rounding.
Eliminates 2nd operation or deburring time.

Corner Radius ±0.05	Holder	Front Chamfering				Back Chamfering				Z
		E	X	Y	Z	E2	X2	Y2	Z2	
R1.0	00-99616-16-25R	8.25	9.25	3.25	4.25	----	----	----	----	1
	00-99616-16-30R	10.75	11.75	3.25	4.25	10.75	11.75	11.65	10.65	1
	00-99616-25-40R	15.75	16.75	3.25	4.25	15.75	16.75	11.65	10.65	4
R1.5	00-99616-16-25R	8	9.5	3	4.5	----	----	----	----	1
	00-99616-16-30R	10.5	12	3	4.5	10.5	12	11.9	10.4	1
	00-99616-25-40R	15.5	17	3	4.5	15.5	17	11.9	10.4	4
R2.0	00-99616-16-25R	7.75	9.75	2.75	4.75	----	----	----	----	1
	00-99616-16-30R	10.25	12.25	2.75	4.75	10.25	12.25	12.15	10.15	1
	00-99616-25-40R	15.25	17.25	2.75	4.75	15.25	17.25	12.15	10.15	4
R2.5	00-99616-16-25R	7.5	10	2.5	5	----	----	----	----	1
	00-99616-16-30R	10	12.5	2.5	5	10	12.5	12.4	9.9	1
	00-99616-25-40R	15	17.5	2.5	5	15	17.5	12.4	9.9	4
R3.0	00-99616-16-25R	7.25	10.25	2.25	5.25	----	----	----	----	1
	00-99616-16-30R	9.75	12.75	2.25	5.25	9.75	12.75	12.65	9.65	1
	00-99616-25-40R	14.75	17.75	2.25	5.25	14.75	17.75	12.65	9.65	4

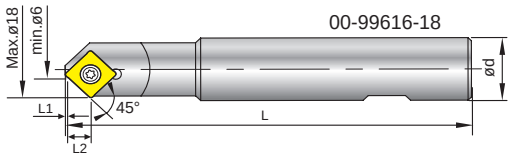
N9MT11T308LA 45° Chamfering Tool

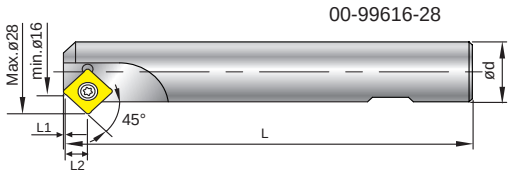
Inserts >>

NC40: • General purpose, universal grade for all unhardened steel.
• Each insert has 4 cutting edges.
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for Al, Al-alloy, non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.
NC60: • Cermet insert, for hardened steel up to HRC 56 .
• Each insert has 4 cutting edges.

Code	Parts No.		Coating	Grade		Dimensions		
						L	S	Re
014409	N9MT11T308LA	NC40	TiN	P35		11.11	3.97	0.8
014410		NC10	TiAN	K10F				
014411		NC60	Cermet					

Holder >>

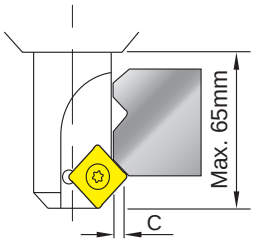




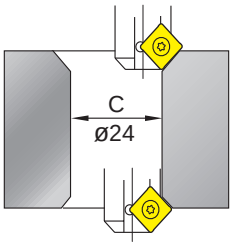
Code	Parts No.	Chamfering	Ød	L	L1	L2	Z	Insert type	Screw / Key
604017	00-99616-18	Ø6-Ø18	20	120	1.15	7.55	1	N9MT11T308LA	NS-35080 2.5 Nm
604018	00-99616-28	Ø16-Ø28	20	120	1.15	7.55	1		NK-T15

Example >>

• 00-99616-28 can be applied for machining back chamfering and side grooving.



For back chamfering
Max. 2mm



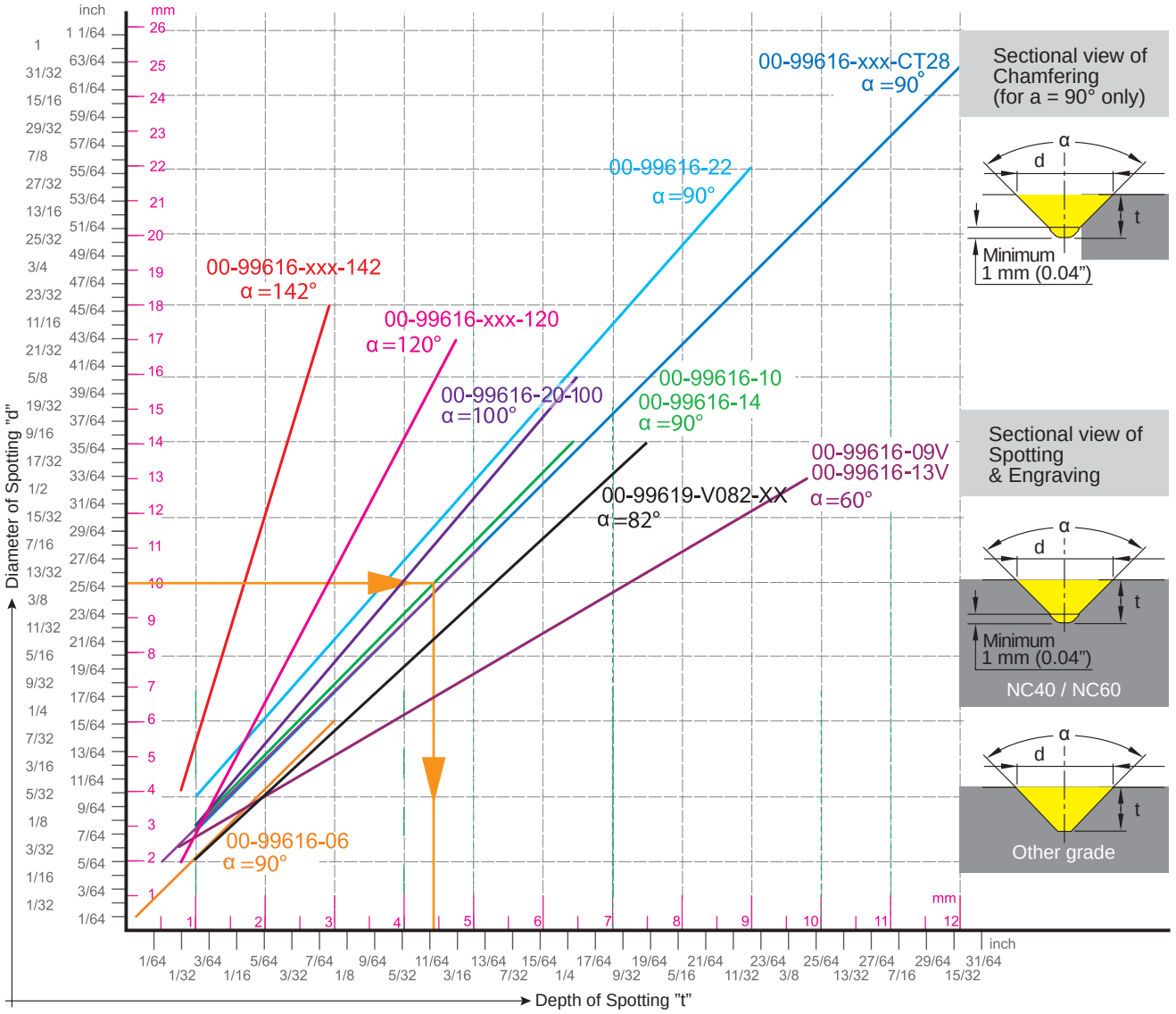
Min.diameter
for shift ø24mm.

More >>

• Also can fit with 99616-XX-25R/30R/40R holders. (Please see page 47)

Cutting Data

Diameter / Depth Chart and Speed / Feed Rate Calculation of NC Spot Drill



Instruction >>

1. From Spot diameter "d" to get drill depth " t ".
2. Point angle "α" is determined by which tool holder you use.
3. From "d" draw a horizontal line to get intersection of the line by point angle "α".
4. From the intersection draw a vertical line to the bottom to have depth of spotting " t ". " t " is the drill depth of the NC program.
5. The sectional view of spotting will depend on the shape of insert, NC40 and other grades of inserts have different sectional view.
6. For chamfering, do not use tip of insert, 1mm(0.04") minimum clearance is required for a smooth surface finish.

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

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

Cutting Data

Determine spindle speed and feed rate:
- Choose spotting depth to decide spotting diameter according to the Diameter/Depth chart on page 50.
- The spindle speed should be calculated by the maximum diameter of spotting, chamfering and grooving.

For Insert V9MT0802CT / N9MT05T1CT / N9MT0602CT

	Workpiece material	Vc (m/min)	f (mm/rev.) Spotting / Grooving	f (mm/rev.) Chamfering	NC2071	NC5071	NC9076
P	Carbon steel C<0.3%	150 ~ 320	0.03 ~ 0.07	0.05 ~ 0.15	●		
P	Carbon steel C>0.3%	100 ~ 250	0.02 ~ 0.06	0.03 ~ 0.12		●	
P	Low alloy steel C<0.3%	100 ~ 250	0.02 ~ 0.06	0.04 ~ 0.12	●		
P	High alloy steel	60 ~ 180	0.02 ~ 0.05	0.03 ~ 0.10		●	
M	Stainless steel	65 ~ 125	0.02 ~ 0.04	0.03 ~ 0.08	●	○	◎
K	Cast Iron	150 ~ 250	0.03 ~ 0.07	0.05 ~ 0.15	◎	●	
N	Non-ferrous metal	150 ~ 320	0.03 ~ 0.07	0.05 ~ 0.15	◎		●
S	Ti, Ti-alloy	40 ~ 80	0.02 ~ 0.06	0.02 ~ 0.06	●		◎
S	Heat resistant alloy	30 ~ 60	-	0.03 ~ 0.07	○	◎	
H	Hardened steel < HRC50	30 ~ 60	0.02 ~ 0.06	0.02 ~ 0.06		○	

* For technical construction reasons, the insert is not located on the center of the holder.

● Best ◎ Suit ○ Possible

For Insert N9MT0802 / N9MT11T3CT

	Workpiece material	Vc (m/min)	f (mm/rev.) Spotting / Grooving	f (mm/rev.) Chamfering	NC40	NC10	NC60	H-NC5071	H-NC40	H-NC9076
P	Carbon Steel C<0.3%	150 ~ 320	0.05 ~ 0.10	0.10 ~ 0.24	●				●	
P	Carbon Steel C>0.3%	100 ~250	0.04 ~ 0.08	0.08 ~ 0.20				●		
P	Low Alloy Steel C<0.3%	100 ~ 250	0.04 ~ 0.08	0.08 ~ 0.20	●		◎		●	
P	High Alloy Steel	60 ~ 180	0.03 ~ 0.07	0.05 ~ 0.15			◎	●		
M	Stainless steel	65 ~ 125	0.03 ~ 0.06	0.08 ~ 0.20	○	●		○	●	◎
K	Cast Iron	150 ~ 250	0.05 ~ 0.10	0.10 ~ 0.25	●	●		●	◎	
N	Non-ferrous metal	150 ~ 320	0.05 ~ 0.10	0.10 ~ 0.25		◎			◎	●
S	Ti, Ti-alloy	40 ~ 80	0.03 ~ 0.08	0.03 ~ 0.08					●	◎
S	Heat resistant alloy	30 ~ 60	-	0.05 ~ 0.10				◎	○	
H	Hardened steel < HRC56	30 ~ 60	0.03 ~ 0.08	0.03 ~ 0.08			●	○		

* For technical construction reasons, the insert is not located on the center of the holder.
* H-NC5071, H-NC40 and H-NC9076 inserts with supporting edges can increase feed rate 50%.

● Best ◎ Suit ○ Possible

Cutting Data

For Insert V9MT12T3CT / V082... / N9MT1704CT / N9MT2204CT / N9MT2506CT / V142...

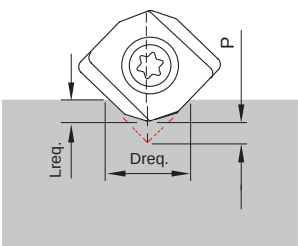
	Workpiece material	Vc (m/min)	f (mm/rev.) Spotting / Grooving	f (mm/rev.) Chamfering	NC2071	NC5071	NC9076 (NC9036)	NC40	NC2033	XP9000
P	Carbon Steel C<0.3%	150 ~ 320	0.05 ~ 0.10	0.10 ~ 0.24	●			●		
P	Carbon Steel C>0.3%	100 ~ 250	0.04 ~ 0.08	0.08 ~ 0.20		●			●	
P	Low Alloy Steel C<0.3%	100 ~ 250	0.04 ~ 0.08	0.08 ~ 0.20	●			●		
P	High Alloy Steel	60 ~ 180	0.03 ~ 0.07	0.05 ~ 0.15		●			●	
M	Stainless steel	65 ~ 125	0.03 ~ 0.06	0.08 ~ 0.20	●	○	◎	○	○	
K	Cast Iron	150 ~ 250	0.05 ~ 0.10	0.10 ~ 0.25	◎	●		◎	●	
N	Non-Ferrous Metal	150 ~ 320	0.05 ~ 0.10	0.10 ~ 0.25	◎		●			●
S	Ti, Ti-alloy	40 ~ 80	0.03 ~ 0.08	0.03 ~ 0.08	●		◎			
S	Heat resistant alloy	30 ~ 60	-	0.05 ~ 0.10	○	◎				
H	Hardened steel < HRC50	30 ~ 60	0.03 ~ 0.08	0.03 ~ 0.08		○			◎	

* For technical construction reasons, the insert is not located on the center of the holder.

● Best ◎ Suit ○ Possible

For Insert N9MT0802M.. / N9MT11T3M.. / N9MT11T3UNC.. N9MT1704M..

WSP spotting	Formula



Lreq. = Dreq. x 0.5 - P

P = distance of theoretical intersection point to tip of insert.

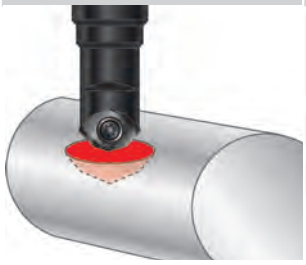
0.5 = fixed factor for calculation

Lreq. = required drilling depth

Dreq. = required diameter

	M4	M5	M6	M8	M10	M12	M14	M16	1/4-20 UNC	5/16-18 UNC	3/8-16 UNC
P =	1.17	1.48	1.76	2.39	2.97	3.59	4.19	4.88	1.80	2.30	2.78

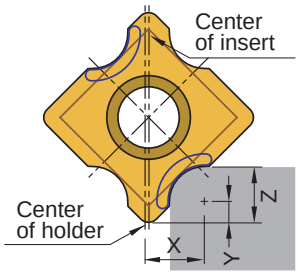
WSP spotting

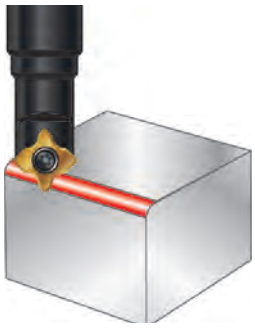


	Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
P	Carbon steel	150 ~ 300	0.05 ~ 0.15	NC2033
P	Alloy steel	120 ~ 250	0.05 ~ 0.10	NC2033
M	Stainless steel	80 ~ 150	0.04 ~ 0.08	NC2033
K	Cast Iron	100 ~ 200	0.05 ~ 0.10	NC2033
H	Hardened steel < HRC50	30 ~ 60	0.03 ~ 0.08	NC2033

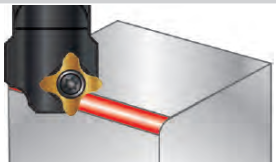
Cutting Data

For Insert N9MT05T1RC / N9MT11T3RC / N9MT1704RC / N9MT2506RC

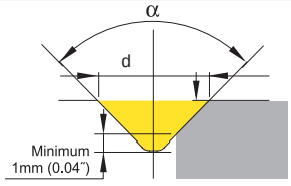
Corner Rounding	Calculate spindle speed	
	$d = 2 \times X$ mm	d = diameter of the tool
		X = tool radius offset
	$S = \frac{Vc \times 1000}{d \times \pi}$ r.p.m.	Vc = Cutting Speed -m/min.
		S = Spindle Speed -r.p.m.
	$F = S \times f$ mm/min.	F = mm/min.
		f = mm/rev.
	Calculate tool length offest on machining center	
	X, Y & Z ref. to insert's spec	X = tool radius offset
		Y = distance to the center of radius.
		Z = distance of cut

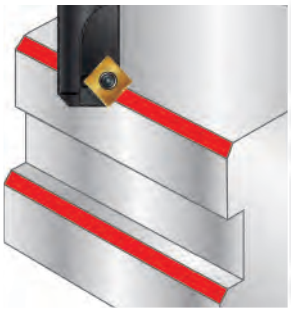
RC Insert		Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	P	Carbon steel	150~320	0.05~0.10	NC40, NC2071, NC2033
	P	Alloy steel	100~250	0.05~0.10	NC40, NC2071, NC2033
	P	High alloy steel	80~150	0.04~0.08	NC40, NC2071, NC2033
	M	Stainless steel	65~125	0.03~0.08	NC9036
	K	Cast Iron	150~250	0.05~0.10	NC40, NC2071, NC2033
	N	Al, Al-alloys(Si<12%)	150~320	0.05~0.10	NC9036, XP9000
	N	Casting Al-alloys(Si>12%)	100~300	0.05~0.10	NC9036, XP9000
	N	Cu, Cu-alloy, casting cu-alloy	150~250	0.05~0.10	NC9036, XP9000
	S	Ti, Ti-alloy	40-80	0.03~0.08	NC9036
	H	Hardened steel < HRC50	30~60	0.03~0.08	NC2033

For N9MT-R Insert >> Corner Rounding (4 cutting edges)

R Insert		Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	P	Carbon steel	150~320	0.05~0.10	NC2071
	P	Alloy steel	100~250	0.04~0.08	NC2071
	P	High alloy steel	60~80	0.03~0.06	NC2071
	K	Cast Iron	150~250	0.05~0.10	NC2071

For LA Insert >> 45° Chamfering

45˚ Chamfering	Formula	
	$S = \frac{Vc \times 1000}{d \times \pi}$ r.p.m.	α = point angle 90°
		d = effective diameter
		Vc = cutting speed-m/min.or ft/min.
	$F = S \times f$ mm/min.	S = Spindle speed
		f = feed per rev.-mm/rev.

45˚ Chamfering		Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	P	Carbon steel	150-320	0.05~0.10	NC40
	P	Alloy steel	100-250	0.04~0.08	NC40
	P	High alloy steel	60-80	0.03~0.06	NC40
	M	Stainless steel	65-125	0.03~0.06	NC10
	K	Cast Iron	150-250	0.05~0.10	NC10, NC40
	N	Al, Al-alloys(Si<12%)	150-320	0.05~0.10	NC10
	N	Casting Al-alloys(Si>12%)	100-300	0.05~0.10	NC10
	N	Cu, Cu-alloy, casting Cu-alloy	150-250	0.05~0.10	NC10
	H	Hardened steel < HRC56	60-80	0.05~0.10	NC60

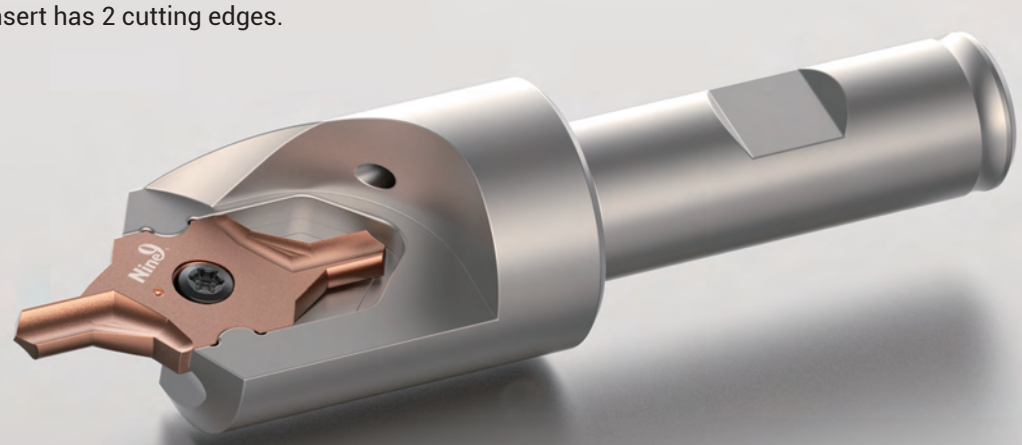
i-Center®

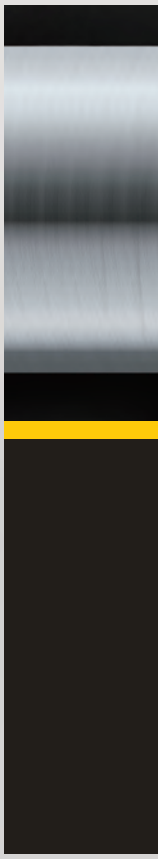
Center Drill >>>

The " i-Center " is a trademark of Nine9,
the developer of the first indexable center drill in the world.(Patented)
Offering an indexable insert system for the 1st time, Nine9's "i-Center " design improves your process performance.

P M K N

- 2 cutting flutes design same as carbide center drill for high performance speed and feed rate.
- Each insert has 2 cutting edges.





Features >>>

High Speed, High Feed Rate

- The special ground insert and rigid holder design facilitate high performance speed and feed rates. For example, drilling alloy steel at 6000 rpm and feed rate of 600 mm/min. (0.1 mm/rev.)

Excellent Repeatability

- The positioning repeatability of the insert is within 0.02 mm (.0008") in radial direction, thus ensuring conformity to any national standards.

Easy Tool Length Setting

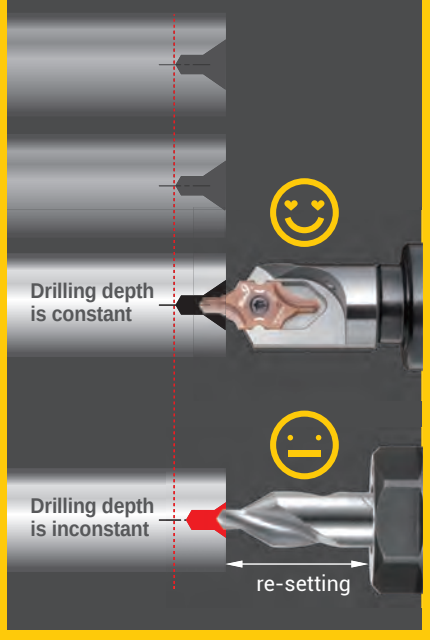
- The axial position accuracy of the insert is 0.05 mm (.002"). It is not necessary to reset the tool length when changing the insert or cutting edge.

Extended Tool Life

- Coolant can be supplied through the center of the holder to increase performance and extend tool life.
- Insert geometry, grades and coating process are specifically engineered for centering applications.

Applications

Excellent repeatability
No need tool length re-setting while changing insert or cutting edge.

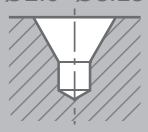


DIN 332 Form R

Ø1.0~Ø10

DIN 332 Form A

Ø2.0~Ø3.15



DIN 332 Form A+B

Ø1.0~Ø10

ANSI 60°

#2.0~#10

> "World's first indexable center drill. Shortens set up and center drilling time. Increases tool life and reduces tooling costs."

• Internal coolant can be supplied to the tip of center drill insert.

NC2057

• P35 grade, AlTiN + TiSiN coating, Universal grade for all kind of steel.
• Double-edged cutting, fully ground insert for improving machining stability. (IC10 inserts)

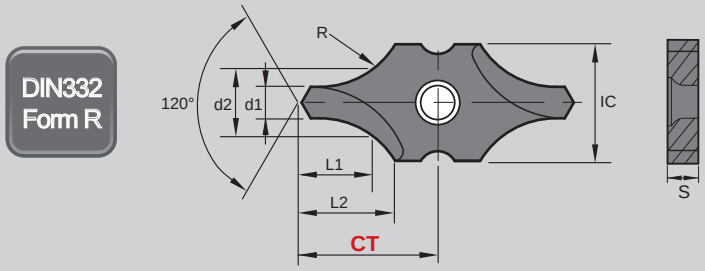
NC5074

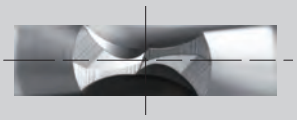
• P40 grade, Helica (AlCrN) coating, design for small diameter center drill (IC08 inserts).

NC2033

• K20F grade, TiAlN coated, for carbon steel, alloy steel, high alloy steel and cast iron.

DIN332 Form R





2 cutting flutes design

2

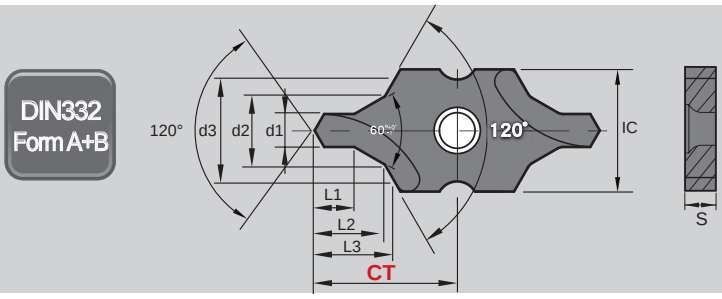
i-Center

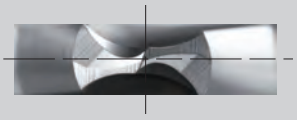
For DIN332 Form R Center Hole >>

IC	Code	Parts No.	Coating	Grade	d1		d2	L1	L2	R	S	CT ±0.025
08	032211	I9MT08T1R0100-NC5074	Helica	P40	1.00	+ 0.14 0	2.12	2.16	4.14	2.8	2.00	7.55
	032212	I9MT08T1R0125-NC5074			1.25		2.65	2.74	4.64	3.5		7.90
	032213	I9MT08T1R0160-NC5074			1.60		3.35	3.45	5.13	4.5		8.40
	032214	I9MT08T1R0200-NC5074			2.00		4.25	4.45	6.08	5.65		9.10
10	031200	I9MT1003R0100-NC2057	AlTiN+ TiSiN	P35	1.00	+ 0.14 0	2.12	2.16	4.72	2.8	3.00	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		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	+ 0.18 0	5.70	6.92	9.50	10.00		
	031207	I9MT1003R0315-NC2057			3.15		6.70	7.21	8.93	9.00		
12	033201	I9MT12T2R0200-NC2033	TiAlN	K20F	2.00	+ 0.14 0	4.25	4.45	6.64	5.65	2.54	11.73
	033202	I9MT12T2R0250-NC2033			2.50		5.3	5.59	8.11	7.15		13.00
	033203	I9MT12T2R0315-NC2033			3.15	+ 0.18 0	6.7	7.21	9.63	9.0		14.00
16	034201	I9MT1603R0400-NC2033			4.00		8.5	9.06	12.23	11.0	3.18	19.40
	034202	I9MT1603R0500-NC2033			5.00		10.6	11.45	14.2	14.0		19.40
20	035201	I9MT2004R0630-NC2033			6.30	+ 0.22 0	13.2	14.63	18.2	18.0	4.76	28.40
	035202	I9MT2004R0800-NC2033			8.00		17.0	18.63	20.44	22.5		28.30
25	036201	I9MT2506R1000-NC2033			10.00		21.2	23.51	25.8	28.0	6.35	34.20

The quantity of insert per box.:	IC 08	IC 10	IC 12	IC 16	IC 20	IC 25
	5	5	5	2	1	1

DIN332 Form A+B





2 cutting flutes design

For DIN332 Form A+B Center Hole >>

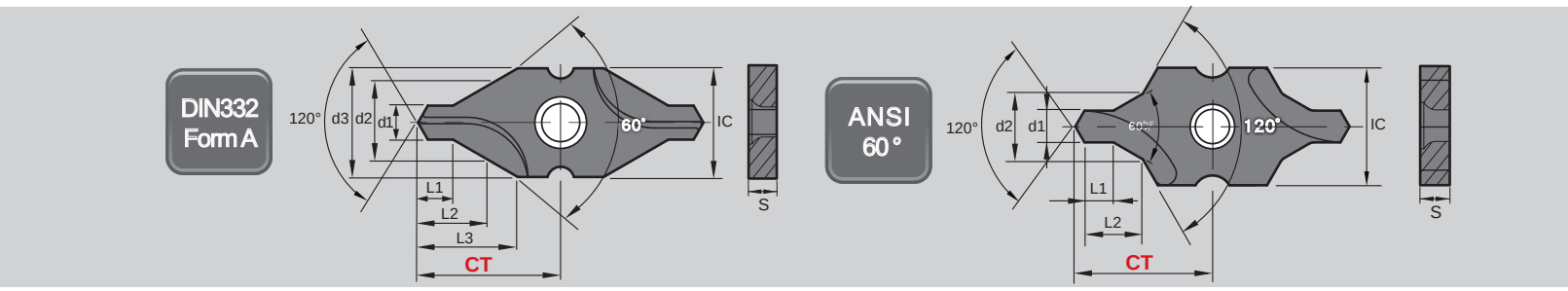
IC	Code	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	S	CT ±0.025
08	032011	I9MT08T1B0100-NC5074	Helica	P40	1.00	+ 0.14 0	2.12	3.15	1.3	2.21	2.51	2.00	7.55
	032012	I9MT08T1B0125-NC5074			1.25		2.65	4.0	1.6	2.75	3.14		7.90
	032013	I9MT08T1B0160-NC5074			1.60		3.35	5.0	2.0	3.46	3.93		8.40
	032014	I9MT08T1B0200-NC5074			2.00		4.25	6.3	2.5	4.39	4.98		9.10
10	031000	I9MT1003B0100-NC2057	AlTiN+ TiSiN	P35	1.00	+ 0.14 0	2.12	3.15	1.3	2.21	2.51	3.00	12.35
	031001	I9MT1003B0125-NC2057			1.25		2.65	4.0	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	5.0	2.0	3.46	3.93		
	031004	I9MT1003B0200-NC2057			2.00		4.25	6.3	2.5	4.39	4.98		
	031005	I9MT1003B0250-NC2057			2.50		5.3	8.0	3.1	5.53	6.28		
	031006	I9MT1003B0300-NC2057			3.00	+ 0.18 0	6.46	9.00	4.1	7.10	7.83		
	031007	I9MT1003B0315-NC2057			3.15		6.7	10.0	3.9	6.90	7.85		
12	033001	I9MT12T2B0200-NC2033	TiAlN	K20F	2.00	+ 0.14 0	4.25	6.3	2.5	4.39	4.98	2.54	11.73
	033002	I9MT12T2B0250-NC2033			2.50		5.3	8.0	3.1	5.53	6.28		13.0
	033003	I9MT12T2B0315-NC2033			3.15	+ 0.18 0	6.7	10.0	3.9	6.90	7.85		14.0
16	034001	I9MT1603B0400-NC2033			4.00		8.5	12.5	5.0	8.9	10.03	3.18	19.4
	034002	I9MT1603B0500-NC2033			5.00		10.6	16.0	6.3	11.15	12.68		19.4
20	035001	I9MT2004B0630-NC2033			6.30	+ 0.22 0	13.2	18.0	8.0	13.98	15.33	4.76	28.4
	035002	I9MT2004B0800-NC2033			8.00		17.0	*20	10.1	17.89	18.73		28.3
25	036001	I9MT2506B1000-NC2033			10.00		21.2	*25	12.8	22.5	23.57	6.35	34.2

* Notice: The d3 size is different from DIN332 center hole.

The quantity of insert per box.:

IC 08	IC 10	IC 12	IC 16	IC 20	IC 25
5	5	5	2	1	1

DIN332 Form A & ANSI 60°



For DIN332 Form A Center Hole >>

The quantity of insert per box.:

IC 08	IC 10	IC 12	IC 16	IC 20	IC 25
5	5	5	2	1	1

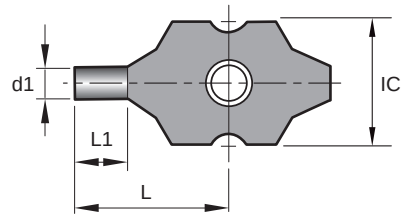
IC	Code	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	S	CT ±0.025
08	032114	I9MT08T1A0200-NC5074	Helica	P40	2.0	+ 0.03 0	4.25	8	2.15	4.10	7.35	2.00	10.5
	032115	I9MT08T1A0250-NC5074			2.5		5.3		2.58	5.00	7.34		
	032116	I9MT08T1A0315-NC5074			3.15	+ 0.03 0	6.7		3.23	6.30	7.43		

For ANSI 60° Center Hole >>

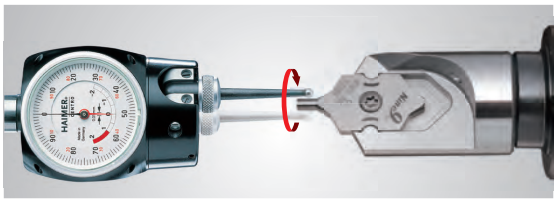
IC	Code	Parts No.	Coating	Grade	Size	d1			d2		L1		L2	S	CT ±0.025
							mm			mm		mm	mm		
12	033101	I9MT12T2A2-NC2033	TiAlN	K20F	#2	5/64	1.98	+0.14 0	3/16	4.76	5/64	1.98	4.4	2.54	12.6
	033102	I9MT12T2A3-NC2033			#3	7/64	2.78		1/4	6.35	7/64	2.78	5.9		13.8
	033103	I9MT12T2A4-NC2033			#4	1/8	3.18	+0.18 0	5/16	7.94	1/8	3.18	7.3		14.25
16	034101	I9MT1603A5-NC2033			#5	3/16	4.76		7/16	11.11	3/16	4.76	10.3	3.18	20.0
20	035101	I9MT2004A6-NC2033			#6	7/32	5.56		1/2	12.7	7/32	5.56	11.8	4.76	27.75
	035102	I9MT2004A7-NC2033			#7	1/4	6.35	+0.22 0	5/8	15.88	1/4	6.35	14.6		28.5
	035103	I9MT2004A8-NC2033			#8	5/16	7.94		3/4	19.05	5/16	7.94	17.6		29.0
25	036101	I9MT2506A10-NC2033			#10	3/8	9.53		0.98"	25.0	3/8	9.53	22.9	6.35	34.9

Measuring Master >>

- Apply on lathe to align the center of work spindle and tool.
- Each insert has just one measuring tip.
- Concentricity: ±0.01mm



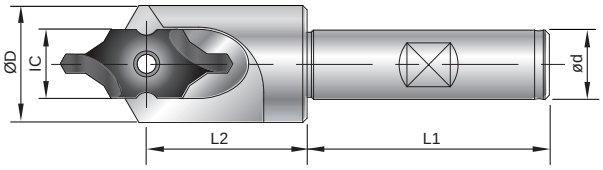
IC	Parts No.	d1	L	L1
08	I9MT08T1-MM	Ø1.9	9.0	3.0
10	I9MT1003-MM	Ø2.9	11.5	5.0
12	I9MT12T2-MM	Ø2.3	13.5	3.5
16	I9MT1603-MM	Ø3.0	19.0	5.0
20	I9MT2004-MM	Ø4.5	26.0	8.0

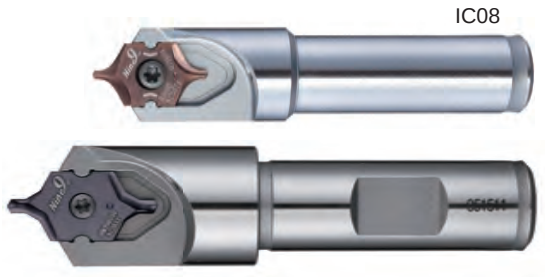


Holders of Indexable Center Drill

Holder >>

- Made of hardened high alloy steel, HRC 53.
- IC08 shank is cylindrical shank.
  Other shanks are weldon shank.



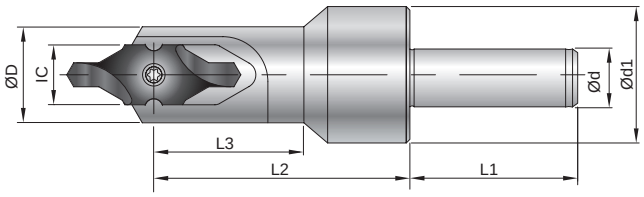


IC	Code	Parts No.	Type	ød	L1	L2	ØD	Screw	Key
08	802002	00-99616-IC08-10F	BC10-IC08F	10	30	18.5	12	*NS-25060 0.9 Nm	NK-T7
	812002	00-99616-IC08-3/8F	BC3/8"-IC08F	3/8"					
10	801002	00-99616-IC10-12F	SB12-IC10F	12	45	24.5	16	*NS-25060 0.9 Nm	NK-T7
12	803002	00-99616-IC12-16F	SB16-IC12F	16	48	30.5	21	NS-30072 2.0 Nm	NK-T9
	813002	00-99616-IC12-5/8F	SB5/8"-IC12F	5/8"					
16	804002	00-99616-IC16-16F	SB16-IC16F	16	48	37	27	NS-35080 2.5 Nm	NK-T15
	814002	00-99616-IC16-5/8F	SB5/8"-IC16F	5/8"					
20	805002	00-99616-IC20-20F	SB20-IC20F	20	50	51	32	NS-50125 5.5 Nm	NK-T20
	815002	00-99616-IC20-3/4F	SB3/4"-IC20F	3/4"					
25	806002	00-99616-IC25-25F	SB25-IC25F	25	56	56	43	NS-50125 5.5 Nm	NK-T20
	816002	00-99616-IC25-1F	SB 1"-IC25F	1"					

*Torque screwdriver is recommended.

Cylindrical Shank with Pre-balanced >>

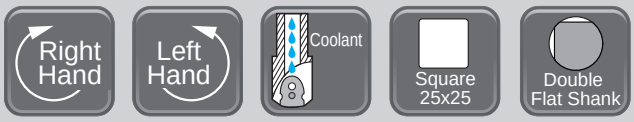
- Pre-balanced holder enhance the stability of centering to get high accurate profile.
- G6.3 / 10,000 r.p.m.



IC	Code	Parts No.	Type	Ød	Ød1	L1	L2	L3	ØD	Screw	Key
08	802003	00-99616-IC08-10B	BC10-IC08B	10	22	30	33.5	19	12	*NS-25060 0.9 Nm	NK-T7
12	803003	00-99616-IC12-12B	BC12-IC12B	12	34	48	51	30	21	NS-30072 2.0 Nm	NK-T9
16	804003	00-99616-IC16-16B	BC16-IC16B	16	39	48	67	37	27	NS-35080 2.5 Nm	NK-T15
20	805003	00-99616-IC20-20B	BC20-IC20B	20	49	50	86	51	32	NS-50125 5.5 Nm	NK-T20
25	806003	00-99616-IC25-25B	BC25-IC25B	25	59	56	99	56	43	NS-50125 5.5 Nm	NK-T20

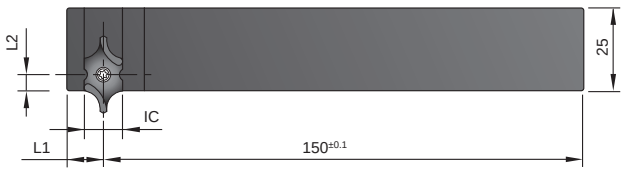
*Torque screwdriver is recommended.

Holders of Indexable Center Drill



Square Shank 25 x 25 Right / Left Hand >>

- For used on lathe, clamp by VDI and BMT holders.
- Made of hardened alloy steel, HRC 40.
- Other sizes are available on request.

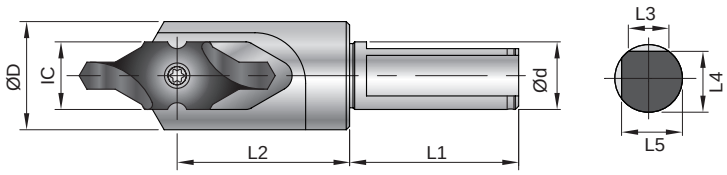


IC	Code	Parts No.	L1	L2	Screw	Key
08	822022	00-99616-IC08-R2525MF	8	3.25	*NS-25060 0.9 Nm	NK-T7
	822012	00-99616-IC08-L2525MF				
12	823022	00-99616-IC12-R2525MF	11	4.9	NS-30072 2.0 Nm	NK-T9
	823012	00-99616-IC12-L2525MF				
16	824022	00-99616-IC16-R2525MF	13	4.9	NS-35080 2.5 Nm	NK-T15
	824012	00-99616-IC16-L2525MF				

*Torque screwdriver is recommended.

Double Flat Shank >> Non-Stock Item

- Used on lathe.
- Double flat shank design for tool holder with side lock flat.
- 180° for insert at top, 90° for insert at front.



IC	Code	Parts No.	Type	Ød	L1	L2	L3	L4	L5	ØD	Screw	Key
08	802004	00-99616-IC08-10S	SL10-IC08S	10	30	18.5	6	9	9	12	*NS-25060 0.9 Nm	NK-T7
12	803004	00-99616-IC12-16S	SL16-IC12S	16	48	30.5	9.33	14.5	14.5	21	NS-30072 2.0 Nm	NK-T9
16	804004	00-99616-IC16-16S	SL16-IC16S	16	48	37	9.33	14.5	14.5	27	NS-35080 2.5 Nm	NK-T15
20	805004	00-99616-IC20-20S	SL20-IC20S	20	50	51	12	18	18	32	NS-50125 5.5 Nm	NK-T20
25	806004	00-99616-IC25-25S	SL25-IC25S	25	56	56	13.57	23	23	43	NS-50125 5.5 Nm	NK-T20

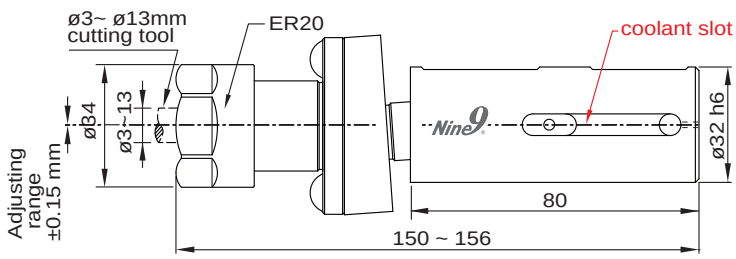
*Torque screwdriver is recommended.

Center Height Adjusting Sleeve

Principle >>

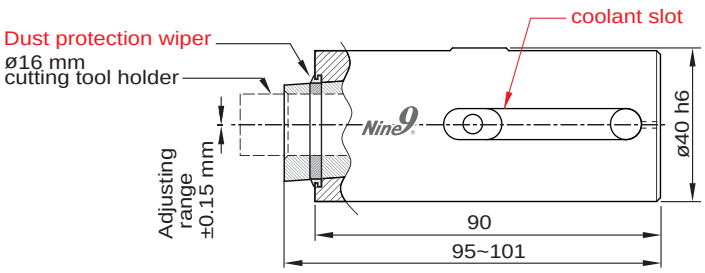
- Designed for adjusting Center Height of center drills, NC spot drills, reamers and taps on the CNC lathes.
- The main body is made from two sleeves. The inner sleeve is to hold and lock the cutting tool.
- Its center is inclined to the outer sleeve. When the inner sleeve is pushed or pulled, the cutting tool's center height is adjusted to lower or higher position.

Parts No.:00-99600-320H >>



Type : SB32-IDER20

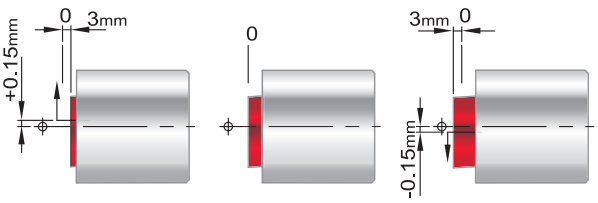
Parts No.:00-99600-400H >>

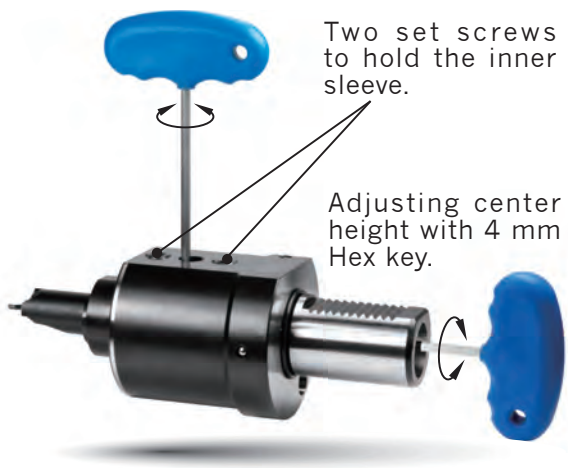


Type : SB40-ID16

Applications >>

- Used when the CNC lathes need to adjust the center height.
- This sleeve can be clamped by VDI 40, VDI 50 E2 tool holders,and other types internal turning tool holders.
- Center height adjusting range: ±0.15 mm(.006").
- Total axial movement is 6mm(.236").

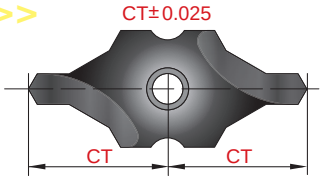




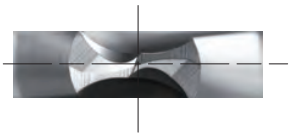
Performance

Profit by making the right choice >>

- High speed and feed rate reduce cutting time.
- The unique design increases tool life and reduces change over time.



▲ 2 cutting edges

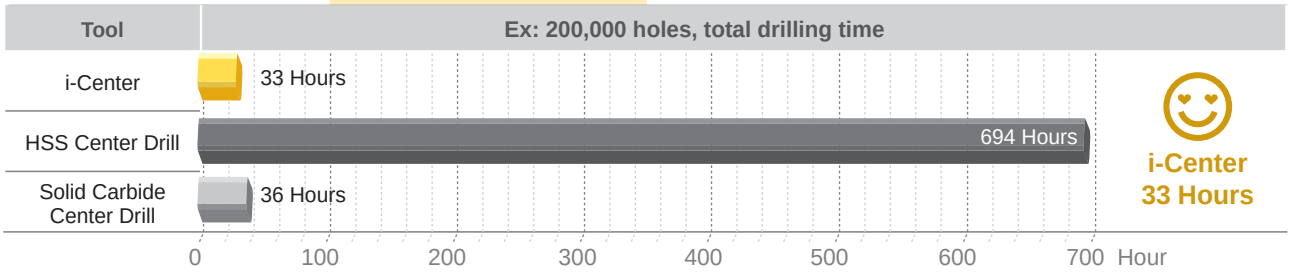


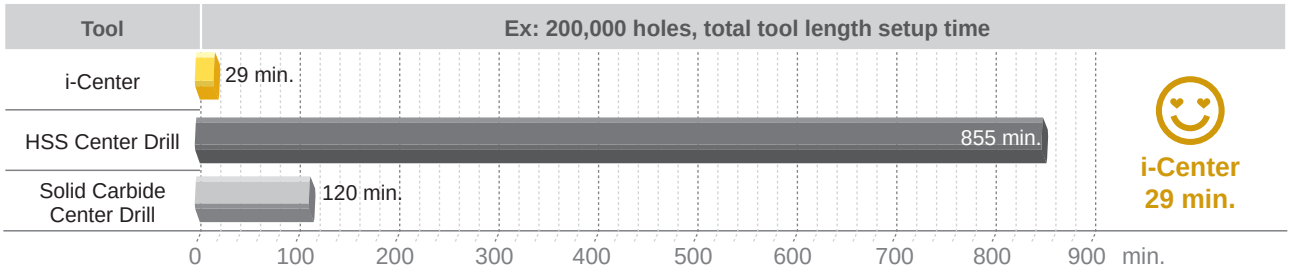
▲ 2 cutting flutes design

Comparison >>

- Workpiece : Low carbon alloy steel, 850 N/mm^2
- Machine: VMC BT40 with internal coolant

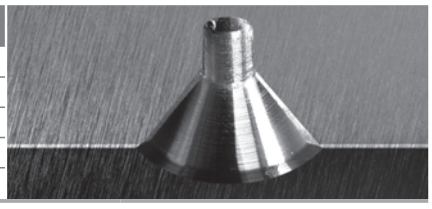
Diameter of tool : Ø3.15 mm Depth of drilling : 7.2 mm				
Comparison		**i-Center**	**HSS Center Drill (TiN Coating)**	**Solid Carbide Center Drill**
Cutting speed	**m/min.**	65	17	65
Spindle speed	**r.p.m.**	6570	1718	6570
Feed rate f =	**mm/rev.**	0.12	0.02	0.1
Feed rate F=	**mm/min.**	788.4	34.4	657
Coolant	**Emulsion**	External / Internal	External	External
Drilling time	**sec.**	0.55	12.5	0.65
Holes of drilling per edge		7000	700	5000





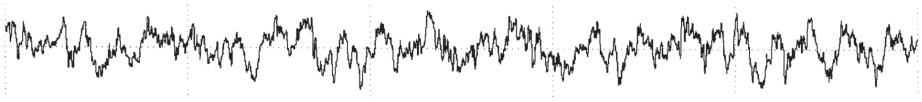
Surface finish >>

i-Center Insert	Material SCM440		
I9MT1603B0500 **NC2033**	**Vc**	60	m/min.
	S	3800	r.p.m.
	f	0.1	mm/rev.
	F	380	mm/min.
	Ap	13.5	mm



```
   Perthometer M1
Object
Name
#
Lt              5.600 mm
Ls Standard       2.5 µm
Lc              0.800 mm
Ra              0.562 µm
Rz               3.26 µm
Rmax             3.61 µm
RPc(0.5,-0.5)     68 /c

R Profile
Lc              0.800 mm
VER              2.50 µm
```



i-Center Enquiry Form

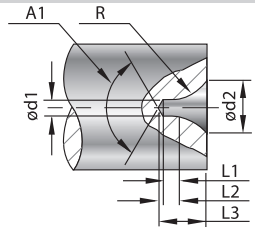
The following information should be checked while discussing with customer.

Machine	
Machine Type	
Spindle Speed	Max. r.p.m.
Power of Spindle motor	☐ KW ☐ HP
Coolant supply	☐ NO ☐ If yes, ☐ External ☐ Internal bar(psi)
Current tool	
Cutting Speed	☐ HSS ☐ Solid Carbide m/min. SFM
Others	
Feed Rate	mm/rev. inch/rev.
Work Piece	
Material code	
Center hole type	☐ R ☐ A ☐ B ☐ C ☐ Other as attached drawing
Other request	☐ Surface roughness ☐ Tolerance(see below)

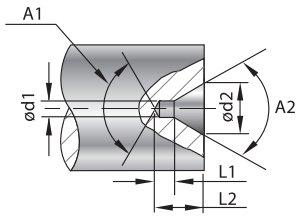
Center hole dimension >>

- Please provide workpiece drawing
- One of following type should be chosen.

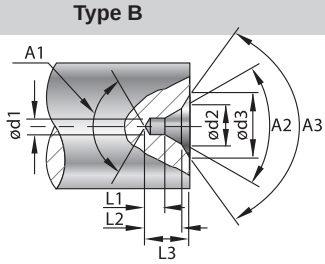
Type R



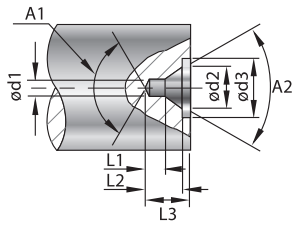
Type A



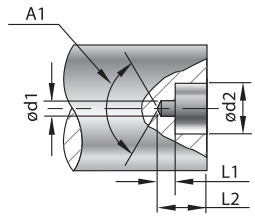
Type B



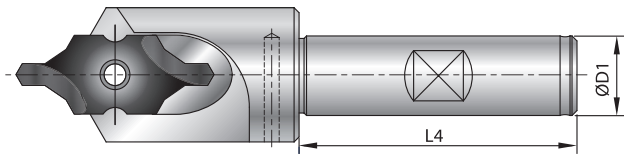
Type C



Other



Special Tool holder shank dimensions >>



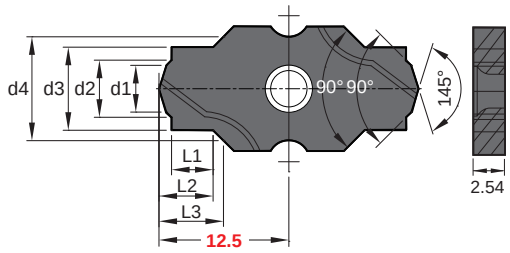
Dimension Table	A1	A2	A3	ød1	ød2	ød3
Dimension						
Tolerance	---	+0° −1°	±1°	±0.05	±0.05	---

Dimension Table	L1	L2	L3	R	øD1	L4
Dimension						
Tolerance	±0.05	±0.05	±0.05	±0.5	h6	---

DIN332 Form D >> Non-Stock Item

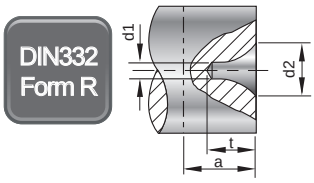
- M3, M4 Counterbore Insert, K20F grade, TiAlN coated.

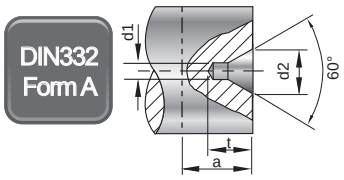
Part No.	d1	d2	d3	d4	L1	L2	L3
I9MT12T2M03-NC2033	3.40	4.40	6.00	8.00	3.00	4.04	5.04
I9MT12T2M04-NC2033	4.50	5.50	8.00	10.0	4.00	5.21	6.21

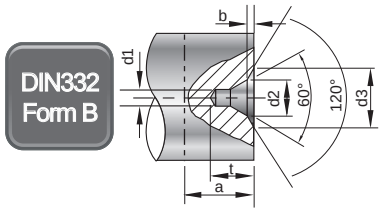


Technical Standard
ISO 2541-1972 / DIN332

60° Center holes >>



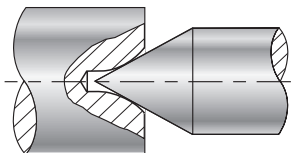
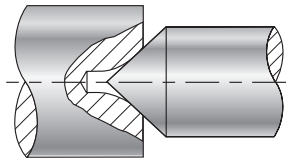
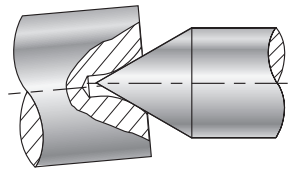




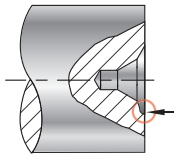
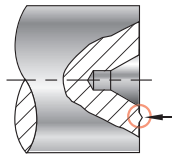
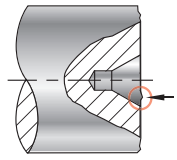
STD	DIN332 Form R ISO 2541-1972			DIN332 Form A ISO 866-1975			DIN332 Form B ISO 2540 1973				
d1	d2	t	a	d2	t	a	d2	b	d3	t	a
1	2.12	1.9	3	2.12	1.9	3	2.12	0.3	3.15	2.2	3.5
1.25	2.65	2.3	4	2.65	2.3	4	2.65	0.4	4	2.7	4.5
1.6	3.35	2.9	5	3.35	2.9	5	3.35	0.5	5	3.4	5.5
2	4.25	3.7	6	4.25	3.7	6	4.25	0.6	6.3	4.3	6.6
2.5	5.3	4.6	7	5.3	4.6	7	5.3	0.8	8	5.4	8.3
3.15	6.7	5.8	9	6.7	5.9	9	6.7	0.9	10	6.8	10
4	8.5	7.4	11	8.5	7.4	11	8.5	1.2	12.5	8.6	12.7
5	10.6	9.2	14	10.6	9.2	14	10.6	1.6	16	10.8	15.6
6.3	13.2	11.4	18	13.2	11.5	18	13.2	1.4	18	12.9	20
8	17	14.7	22	17	14.8	22	17	1.6	22.4	16.4	25
10	21.2	18.3	28	21.2	18.4	28	21.2	2	28	20.4	31

* a: Minimum material will be cut. If the center hole will be removed after turning or grinding. (mm/inch)

Form R center hole apply for >>

60° Center of tail stock	90° Center of tail stock	Center hole and center are misaligned
		

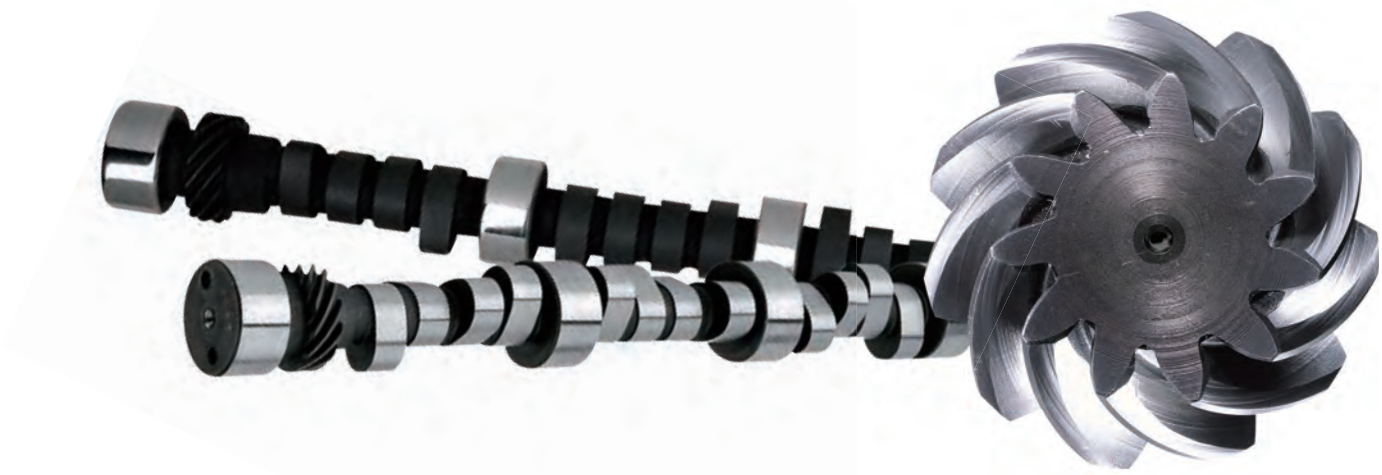
Form B center hole apply for >>

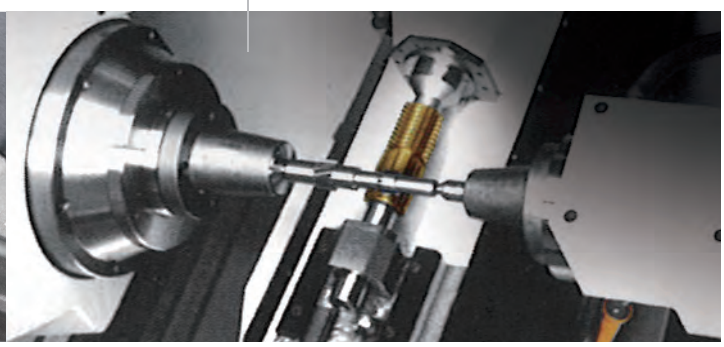
Avoid scar or distortion while transportation	Burr	Rough surface of workpiece
		

i-Center Applications

Tip >>

- Various centering applications and products - shafts of engine, transmission gear, bearings, motors, grinding parts, spindles, gear reducers, cooling fan, universal joints...
- Special forms for other applications also available on request.



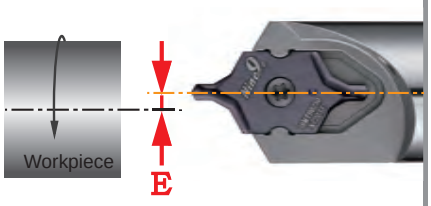


Technical Guide

Before you start, please pay attention the following conditions >>

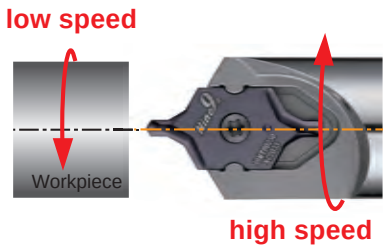
Center misalignment

E must be < 0.02mm.



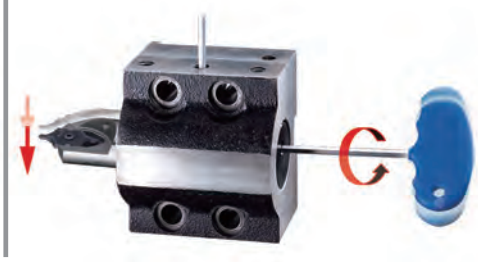
Driving Tool

low speed : high speed
1 : 3



Center height adjusting sleeve

When CNC lathe turret center is misaligned ≥ 0.15mm, please use center height adjusting sleeve. (See page 61)

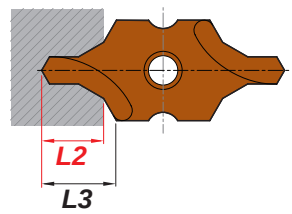


Internal coolant

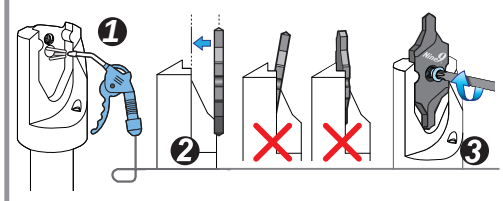
Internal coolant is recommended.

DIN 332 Form A+B

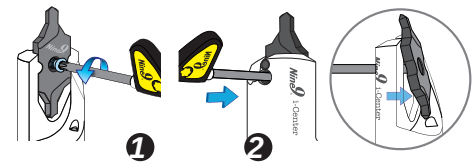
Reduce 30% of Spindle speed and keep same feed rate (mm/rev.) while depth L2 is reached.



Clamping insert



Loosen insert



Metric		Inch	
$S = \frac{Vc \times 1000}{\pi \times d1}$	d1 = diameter -mm	$S = \frac{(3.82 \times SFM)}{d1}$	d1 = diameter-inch
	S = Spindle Speed -r.p.m.		S = Spindle Speed-r.p.m.
	Vc = Cutting Speed -m/min.		SFM = Surface Speed-ft./min. Vc (m/min.) x 3.28
F = S x f	f = mm/rev.	F = IPRxr.p.m	f = IPR = inch/rev.
	F = mm/min.		F = inch/min.

Cutting Data

Ø1~Ø3.15 (A2~A4)

	Workpiece material	Vc (m/min.)	d1 (pilot dia.)	IC08 / IC10		IC12				
				Ø1~1.25	Ø1.6~3.15	Ø2 (A2)	Ø2.5 (A3)	Ø3.15 (A4)		
P	Carbon steel C<0.3%	< 80	S r.p.m.	2000 ~ 10000	1600 ~ 8000	1600 ~ 8000	1400 ~ 7000	1200 ~ 6000	●	○
			f mm/rev.	0.02~0.03~0.05	0.03~0.05~0.06	0.04~0.06~0.08	0.06~0.08~0.10	0.08~0.10~0.12		
P	Carbon steel C>0.3%	< 70	S r.p.m.	2000 ~ 9000	1600~ 7200	1600 ~ 7200	1400 ~ 6300	1200 ~ 5400	●	○
			f mm/rev.	0.02~0.03~0.05	0.03~0.04~0.05	0.03~0.04~0.05	0.06~0.08~0.10	0.08~0.10~0.12		
P	Low alloy steel C<0.3%	< 65	S r.p.m.	2000 ~ 8000	1600 ~ 6400	1600 ~ 6400	1400 ~ 5600	1200 ~ 4800	●	○
			f mm/rev.	0.01~0.02~0.04	0.02~0.03~0.05	0.02~0.03~0.05	0.04~0.06~0.08	0.06~0.08~0.10		
P	High alloy steel	< 60	S r.p.m.	1000 ~ 6000	800 ~ 4800	800 ~ 4800	700 ~ 4200	600 ~ 3600	●	○
			f mm/rev.	0.01 ~ 0.02	0.01~0.02~0.04	0.01~0.02~0.04	0.02~0.04~0.06	0.04~0.06~0.08		
M	Stainless steel	< 20	S r.p.m.	1000 ~ 3000	800 ~ 2400	800 ~ 2400	700 ~ 2100	600 ~ 1800	●	○
			f mm/rev.	0.003 ~ 0.01	0.005 ~ 0.02	0.01 ~ 0.02	0.01~0.02~0.03	0.02~0.03~0.05	≥ 5 bar	
K	Cast Iron	< 70	S r.p.m.	2000 ~ 9000	1600 ~ 7200	1600 ~ 7200	1400 ~ 6300	1200 ~ 5400	Air	
			f mm/rev.	0.01~0.02~0.04	0.02~0.04~0.06	0.02~0.04~0.06	0.04~0.06~0.08	0.06~0.08~0.10		
N	Non-ferrous metal	< 200	S r.p.m.	6000 ~ 20000	4800 ~ 16000	4800 ~ 16000	4200 ~ 14000	3600 ~ 12000	●	○
			f mm/rev.	0.01~0.02~0.03	0.01~0.02~0.04	0.01~0.02~0.04	0.02~0.03~0.05	0.02~0.04~0.06		

● Best ○ Possible

Ø4~Ø10 (A5~A10)

	Workpiece material	Vc m/min.	d1 (pilot dia.)	IC16		IC20		IC25		
				Ø4 (A5)	Ø5 (A6)	Ø6.3 (A7)	Ø8 (A8)	Ø10 (A10)		
P	Carbon steel C<0.3%	< 80	S r.p.m.	1000 ~ 5000	900 ~ 4500	800 ~ 4000	700 ~ 3500	600 ~ 3000	●	○
			f mm/rev.	0.08~0.12~0.14	0.10~0.12~0.16	0.10~0.14~0.16	0.12~0.15~0.18	0.14~0.18~0.20		
P	Carbon steel C>0.3%	< 70	S r.p.m.	1000 ~ 4500	900 ~ 4050	800 ~ 3600	700 ~ 3150	600 ~ 2700	●	○
			f mm/rev.	0.08~0.12~0.14	0.10~0.12~0.16	0.10~0.14~0.16	0.12~0.15~0.18	0.14~0.18~0.20		
P	Low alloy steel C<0.3%	< 65	S r.p.m.	1000 ~ 4000	900 ~ 3600	800 ~ 3200	700 ~ 2800	600 ~ 2400	●	○
			f mm/rev.	0.06~0.08~0.10	0.08~0.10~0.12	0.08~0.12~0.14	0.10~0.14~0.16	0.12~0.16~0.20		
P	High alloy steel	< 60	S r.p.m.	500 ~ 3000	450 ~ 2700	400 ~ 2400	350 ~ 2100	300 ~ 1800	●	○
			f mm/rev.	0.04~0.06~0.08	0.06~0.08~0.10	0.08~0.10~0.12	0.10~0.14~0.16	0.10~0.14~0.16		
M	Stainless steel	< 25	S r.p.m.	500 ~ 1500	450 ~ 1350	400 ~ 1200	350 ~ 1050	300 ~ 900	●	○
			f mm/rev.	0.02~0.04~0.06	0.02~0.04~0.06	0.04~0.06~0.08	0.04~0.06~0.08	0.05~0.07~0.10	≥ 5 bar	
K	Cast Iron	< 70	S r.p.m.	1000 ~ 4500	900 ~ 4050	800 ~ 3600	700 ~ 3150	600 ~ 2700	Air	
			f mm/rev.	0.06~0.08~0.10	0.08~0.10~0.12	0.08~0.12~0.14	0.10~0.14~0.16	0.12~0.16~0.18		
N	Non-ferrous metal	< 200	S r.p.m.	3000 ~ 10000	2700 ~ 9000	2400 ~ 8000	2100 ~ 7000	1800 ~ 6000	●	○
			f mm/rev.	0.02~0.04~0.06	0.04~0.06~0.08	0.04~0.06~0.08	0.06~0.08~0.10	0.06~0.08~0.10		

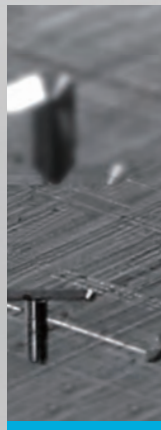
● Best ○ Possible

Engraving Tool >>>

30° / 45° / 60° / 90°

This is a revolutionary new concept of engraving tools with indexable carbide insert.
Provide HIGH QUALITY ENGRAVING in most kinds of material.
Higher speed and feed rate, dramatically reducing your cycle time.

P M K N H S



No Need To Reset After Changing Insert Or Cutting Edge

- 2 Cutting Edges.
- Excellent repeatability!

Features >>>

High Positive Rake Angle

- Very sharp edge for shallow engraving.
- Suitable for all types of materials, such as plastic, non-ferrous metal, aluminum, copper, carbon steel and stainless steel.

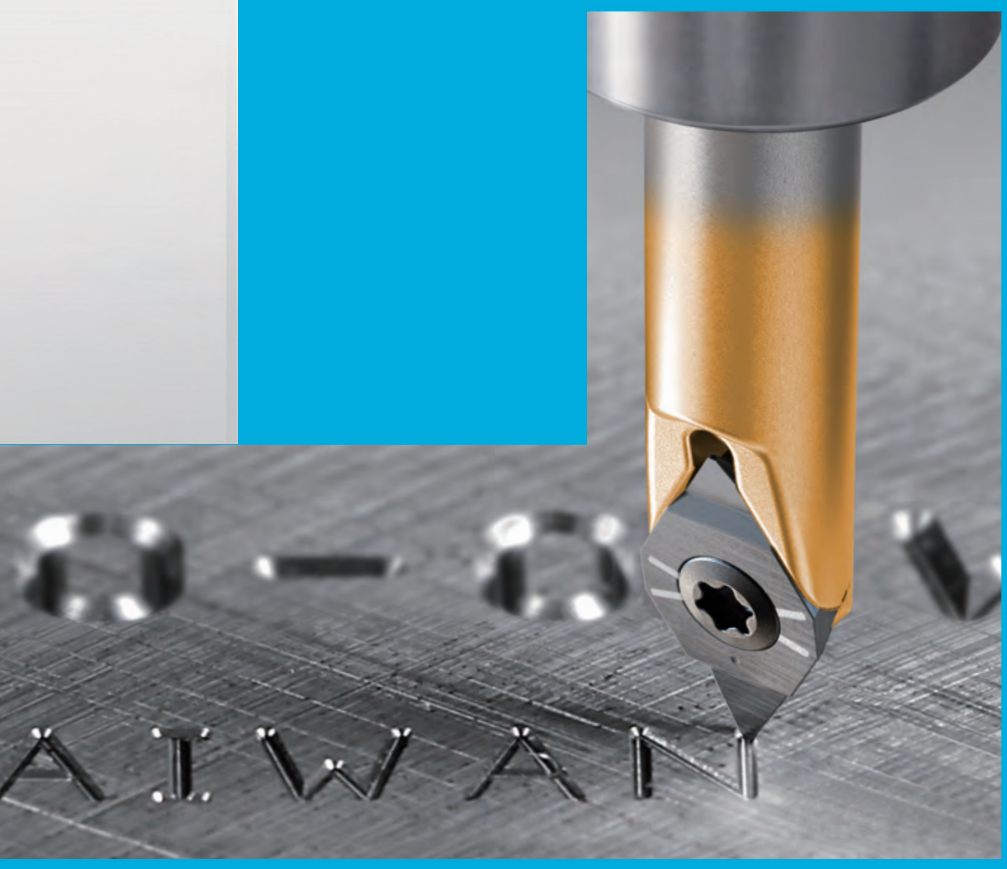
Multi-Side Grinding

- Full peripherally ground insert to ensure efficient repeatability.
- It performs excellently without producing any burrs, especially in copper, aluminum and stainless steel.

High Speed, High Feed Rate

- Designed to run at high speed, up to 40,000 r.p.m.
- Feed rate 0.08mm (0.003") / rev. apply to aluminum; 0.05mm (0.002") / rev. apply to stainless steel.
- Reduces engraving cycle time!

Applications



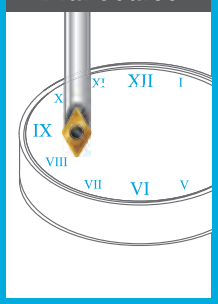
- Serial numbers, product codes, dial scales, signs, logo, graph and almost any character which can be created by the NC programming system.

Ultrasonic welding drum

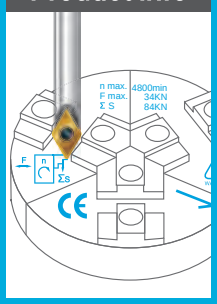
Mold & Die

> "Widely be used for marking on machine components, medical components, gun components, mold and die, automotive parts, gears, bearings and luxury goods."

Dial scales

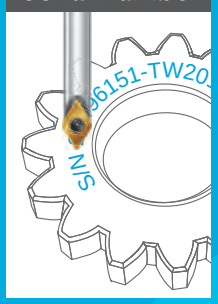


Product info

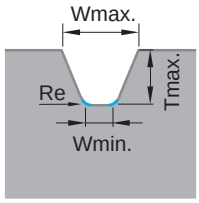
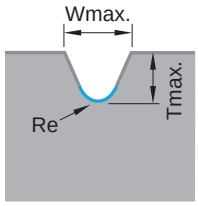
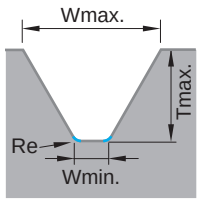
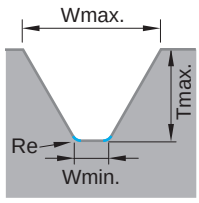
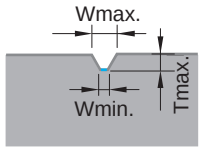
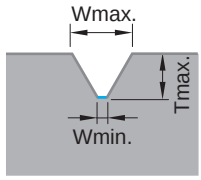


Logo outlines

Serial number



Engraving Tool System

Type	Form	Angle	Insert	Wmin.	Wmax.	Tmax.	Holder
X060 Series	 Radius Angled	30°	X060A30W...	0.2	0.52	0.6	 99619-X060... Ø6, Ø8
		45°	X060A45W...		0.86	0.8	
		60°	X060A60W...		1.36	1.0	
		90°	X060A90W...		2.2	1.0	
	 Radius	30°	X060A30R...	Re: 0.2	0.63	0.6	
		45°	X060A45R...		0.93	0.8	
		60°	X060A60R...		1.39	1.0	
V045 V060 Series	 Radius Angled	45°	V04506T1W	0.45	2.1	2.0	 99619-V045... Ø6, Ø8
				0.65			
	 Radius Angled / Angled	60°	V06006T1W	0.25	1.1	0.8	 99619-V060... Ø4, Ø6, Ø8
				0.45	2.7	2.0	
				0.65	2.7	2.0	
W060 Series	 Angled	60°	W06004S	0.1	0.33	0.2	 99619-W060... Ø4
				0.2	0.66	0.4	
				0.3	0.99	0.6	
N9MT-W Series	 Angled	60°	N9MT080201W -60-NC40	0.2	1.1	0.8	 99616-10...SW Ø10, Ø3/8"
		90°	N9MT080201W	0.2	2.0	0.9	

X060 Engraving Tool 30°

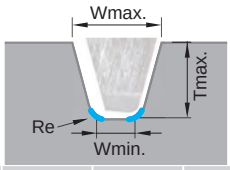
Inserts >>

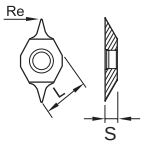
NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 50.

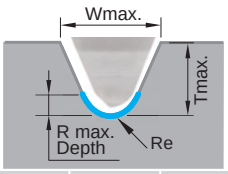
XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

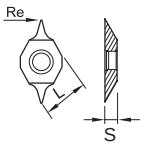
• Radius Angled Form



Angle	Code	Parts No.		Coating	Grade		Dimensions			Wmin.	Wmax.	Tmax.
							L	S	Re			
30°	01X0140	X060A30W020R	NC2032	TiAlN	K20F		6	2.05	0.04	0.20	0.52	0.6
	01X0141		NC2035	ALDURA								
	01X0142		XP9001	Uncoated								

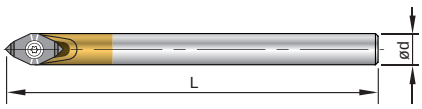
• Radius Form



Angle	Code	Parts No.		Coating	Grade		Dimensions			R max. Depth	Wmax.	Tmax.
							L	S	Re			
30°	01X0119	X060A30R020	NC2032	TiAlN	K20F		6	2.05	0.2	0.15	0.63	0.6
	01X0132		NC2035	ALDURA								
	01X0134		XP9001	Uncoated								

Holder >>

• One holder supports the entire X060 series of carbide inserts.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.



Code	Parts No.	Shank	Ød	L	Screw	Key
69X001	00-99619-X060-06	Steel	6	40	*NS-22044 0.9Nm	NK-T7
69X002	00-99619-X060-06L	Carbide	6	60		
69X003	00-99619-X060-06LS	Steel	6			
69X004	00-99619-X060-06XL	Carbide	6	100		
69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

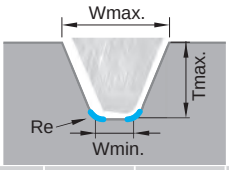
45° X060 Engraving Tool 45°

Inserts >>

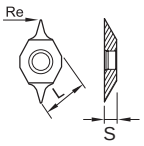
NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

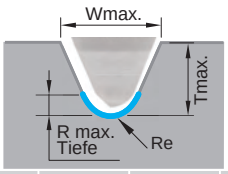
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 50.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

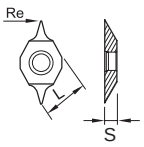


• Radius Angled Form

Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
45°	01X0021	X060A45W020R	NC2032	TiAlN	K20F		6	2.05	0.04	0.20	0.86	0.8
	01X0153		NC2035	ALDURA								
	01X0154		XP9001	Uncoated								



• Radius Form

Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	R max. Depth	Wmax.	Tmax.
45°	01X0013	X060A45R020	NC2032	TiAlN	K20F		6	2.05	0.2	0.12	0.93	0.8
	01X0149		NC2035	ALDURA								
	01X0150		XP9001	Uncoated								

Holder >>

• One holder supports the entire X060 series of carbide inserts.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.

Code	Parts No.	Shank	Ød	L	Screw	Key
69X001	00-99619-X060-06	Steel	6	40	*NS-22044 0.9Nm	NK-T7
69X002	00-99619-X060-06L	Carbide	6	60		
69X003	00-99619-X060-06LS	Steel	6			
69X004	00-99619-X060-06XL	Carbide	6	100		
69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

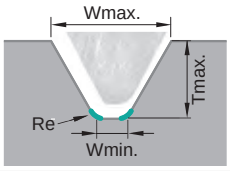
X060 Engraving Tool 60°

Inserts >>

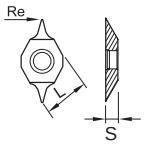
NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

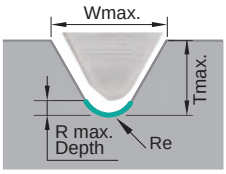
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 50.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

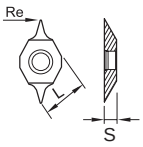


• Radius Angled Form

Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
60°	01X0063	X060A60W020R	NC2032	TiAlN	K20F		6	2.05	0.04	0.20	1.36	1.0
	01X0165		NC2035	ALDURA								
	01X0166		XP9001	Uncoated								

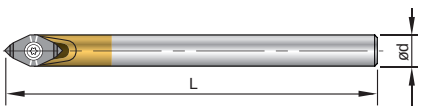


• Radius Form

Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	R max. Depth	Wmax.	Tmax.
60°	01X0117	X060A60R020	NC2032	TiAlN	K20F		6	2.05	0.2	0.10	1.39	1.0
	01X0158		NC2035	ALDURA								
	01X0159		XP9001	Uncoated								

Holder >>

• One holder supports the entire X060 series of carbide inserts.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.



Code	Parts No.	Shank	Ød	L	Screw	Key
69X001	00-99619-X060-06	Steel	6	40	*NS-22044 0.9Nm	NK-T7
69X002	00-99619-X060-06L	Carbide	6	60		
69X003	00-99619-X060-06LS	Steel	6			
69X004	00-99619-X060-06XL	Carbide	6	100		
69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

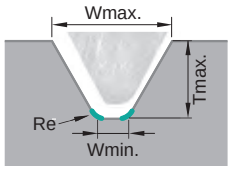
90° X060 Engraving Tool 90°

Inserts >>

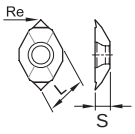
NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 50.

XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic, acrylic.



• Radius Angled Form

Angle	Code	Parts No.		Coating	Grade		Dimensions			Wmin.	Wmax.	Tmax.
							L	S	Re			
90°	01X0207	X060A90W020R	NC2032	TiAlN	K20F		6	2.05	0.04	0.2	2.2	1.0
	01X0208		NC2035	ALDURA								
	01X0209		XP9001	Uncoated								

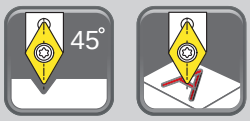
Holder >>

• One holder supports the entire X060 series of carbide inserts.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.

Code	Parts No.	Shank	Ød	L	Screw	Key
69X001	00-99619-X060-06	Steel	6	40	*NS-22044 0.9Nm	NK-T7
69X002	00-99619-X060-06L	Carbide	6	60		
69X003	00-99619-X060-06LS	Steel	6			
69X004	00-99619-X060-06XL	Carbide	6	100		
69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

V045 Engraving Tool 45°

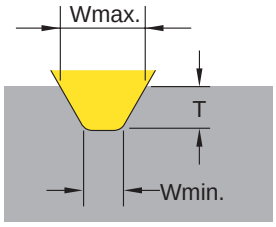


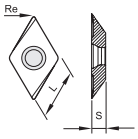
Inserts >>

NC2071: • Strong edge on chip-breaker, best suited for min. DOC 0.2mm.
• Universal grade for all kinds of steel <HRC 30, non-ferrous metal and stainless steel.

NC2032: • Long tool life.
• For all kinds of steel from HRC 30~50, carbon steel, alloy steel, and cast iron.

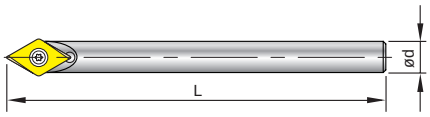
NC9031: • Fully positive ground rake angle, very sharp edge for shallow engraving.
• For non-ferrous metal such as aluminum, brass, copper, titanium, plastic and acrylic.



Angle	Code	Parts No.		Coating	Grade		Dimensions			W		T	
							L	S	Re ±0.05	Wmin.	Wmax.	Tmin.	Tmax.
45°	0104501	V04506T1W06	NC2071	TiN	K20F		6.35	2.0	0.2	0.65	2.1	0.20	2.0
	0104502		NC2032	TiAlN						0.65		0.20	
	0104504		NC9031	TiN						0.45		0.05	

Holder >>

• Carbide shank holders for high speed cutting.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.



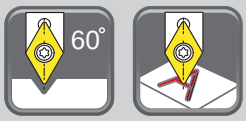
Angle	Code	Parts No.	Shank	Ød	L	Screw	Key
45°	691001	00-99619-V045-06	Steel	6	40	*NS-22044 0.9Nm	NK-T7
	691002	00-99619-V045-06L	Carbide		60		
	691003	00-99619-V045-06XL	Carbide		100		
	691004	00-99619-V045-08	Steel	8	60		

*Torque screwdriver is recommended.

Starter Kit >> V045 & V060

Angle	Code	Parts No.	Shank Ø	Insert included	Content
45°	691201-4501	00-99619-V045-03K-71	Ø6 99619-V045-06	V04506T1W06-NC2071	1 x Holder 1 x T7 Key 3 x inserts
	691201-4502	00-99619-V045-03K-32		V04506T1W06-NC2032	
	691201-4504	00-99619-V045-03K-31		V04506T1W06-NC9031	
60°	692201-6001	00-99619-V060-03K-71	Ø6 99619-V060-06	V06006T1W06-NC2071	
	692201-6002	00-99619-V060-03K-32		V06006T1W06-NC2032	
	692201-6003	00-99619-V060-03K-35		V06006T1W06-NC2035	
	692201-6004	00-99619-V060-03K-31		V06006T1W06-NC9031	

60° V060 Engraving Tool 60°



Inserts >>

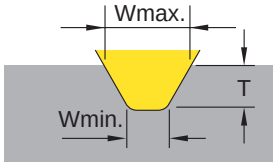
NC2071: • Strong edge on chip-breaker, best suited for min. DOC 0.2mm.
• Universal grade for all kinds of steel <HRC 30, non-ferrous metal and stainless steel.

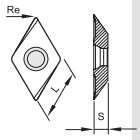
NC2032: • Long tool life.
• For all kinds of steel from HRC 30~50, carbon steel, alloy steel,and cast iron.

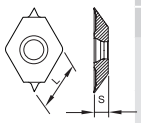
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 56.

NC9031: • Fully positive ground rake angle very sharp edge for shallow engraing.
• For non-ferrous metals such as aluminum, brass, copper, titanium, plastic and acrylic.

NC9036: • DLC coating, very sharp edge produces excellent surface finish.
• For non-ferrous metals such as aluminum, brass, copper, titanium, plastic and acrylic.

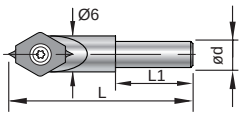


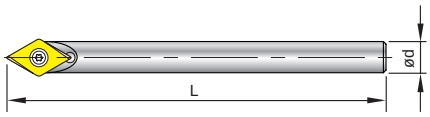
Angle	Code	Parts No.		Coating	Grade		Dimensions			W		T	
							L	S	Re ±0.05	Wmin.	Wmax.	Tmin.	Tmax.
60°	0106001	V06006T1W06	NC2071	TiN	K20F		6.35	2.0	0.2	0.65	2.7	0.20	2.0
	0106002		NC2032	TiAlN						0.65		0.20	
	0106003		NC2035	ALDURA						0.65		0.20	
	0106004		NC9031	TiN						0.45		0.05	

Angle	Code	Parts No.		Coating	Grade		Dimensions			W		T	
							L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
60°	0106006	V06006T1W03	NC2032	TiAlN	K20F		6.35	2.0	---	0.25	1.1	0.05	0.8
	0106007		NC9036	DLC									

Holder >>

• Carbide shank holders for high speed cutting.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.



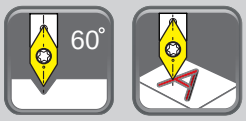


Angle	Code	Parts No.	Shank	Ød	L	L1	Screw	Key
60°	692004	00-99619-V060-04	Steel	4	30	12	*NS-22044 0.9Nm	NK-T7
	692001	00-99619-V060-06	Steel	6	40	---		
	692002	00-99619-V060-06L	Carbide		60	---		
	692003	00-99619-V060-06XL	Carbide		100	---		
	692005	00-99619-V060-08	Steel	8	60	---		

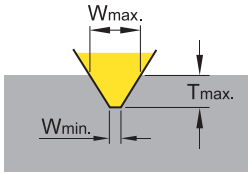
*Torque screwdriver is recommended.

W060 Engraving Tools

60°

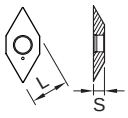


Inserts >>



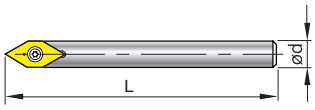
- Limited design, simply for thin or light engraving, used on engraving machine .
- Shank diameter 4mm is same as insert's size. Slim fits!
- Each insert has 2 cutting edges.

NC2032: • Universal grade for all unhardened steel.

Angle	Code	Parts No.	Coating	Grade		Dimensions L	Dimensions S	Wmin.	Wmax.	Tmax.
60°	01W2001	W06004S101-NC2032	TiAlN	K20F		4.5	1.3	0.1	0.33	0.2
	01W2002	W06004S102-NC2032						0.2	0.66	0.4
	01W2003	W06004S103-NC2032						0.3	0.99	0.6

Holder >>

- Made from steel.



Angle	Code	Parts No.	Ød	L	Screw	Key
60°	69W001	00-99619-W060-04	4	40	*NS-18037 0.6Nm	NK-T6

*Torque screwdriver is recommended.

Cutting Data >>

S101	Workpiece Meterial	S (r.p.m)	f (mm/rev.)	Depth of cut (mm) 1st	2nd	3rd	~	Finishing	Grade of Insert
Tmax.: 0.2mm	P Carbon steel	8000 ~ 40000	0.002 ~ 0.015	0.1	0.05	0.03	0.02	0.02	NC2032
	P Alloy steel	8000 ~ 40000	0.002 ~ 0.010	0.08	0.03	0.03	0.02	0.02	
	M Stainless steel	8000 ~ 40000	0.002 ~ 0.010	0.08	0.03	0.03	0.02	0.02	
	K Cast Iron	8000 ~ 40000	0.002 ~ 0.010	0.1	0.05	0.03	0.02	0.02	
	N Non-ferrous metal	8000 ~ 40000	0.002 ~ 0.020	0.1	0.05	0.03	0.02	0.02	

S102	Workpiece Meterial	S (r.p.m)	f (mm/rev.)	Depth of cut (mm) 1st	2nd	3rd	4th	~	Finishing	Grade of Insert
Tmax.: 0.4mm	P Carbon steel	8000 ~ 40000	0.002 ~ 0.015	0.15	0.1	0.05	0.03	0.03	0.02	NC2032
	P Alloy steel	8000 ~ 40000	0.002 ~ 0.010	0.12	0.08	0.05	0.03	0.03	0.02	
	M Stainless steel	8000 ~ 40000	0.002 ~ 0.010	0.12	0.05	0.05	0.03	0.03	0.02	
	K Cast Iron	8000 ~ 40000	0.002 ~ 0.010	0.15	0.1	0.05	0.03	0.03	0.02	
	N Non-ferrous metal	8000 ~ 40000	0.002 ~ 0.020	0.2	0.1	0.1	0.05	0.03	0.02	

S103	Workpiece Meterial	S (r.p.m)	f (mm/rev.)	Depth of cut (mm) 1st	2nd	3rd	4th	~	Finishing	Grade of Insert
Tmax.: 0.6mm	P Carbon steel	8000 ~ 40000	0.002 ~ 0.015	0.2	0.1	0.05	0.05	0.03	0.02	NC2032
	P Alloy steel	8000 ~ 40000	0.002 ~ 0.010	0.15	0.1	0.05	0.03	0.03	0.02	
	M Stainless steel	8000 ~ 40000	0.002 ~ 0.010	0.15	0.05	0.05	0.03	0.03	0.02	
	K Cast Iron	8000 ~ 40000	0.002 ~ 0.010	0.2	0.1	0.05	0.05	0.03	0.02	
	N Non-ferrous metal	8000 ~ 40000	0.002 ~ 0.020	0.3	0.1	0.1	0.05	0.03	0.02	

N9MT080201W Engraving Tool 60° / 90°

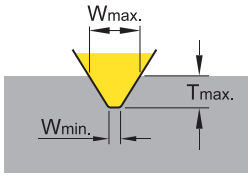
Inserts >>

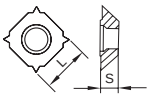
- No need to reset tool length after changing insert or cutting edge.
- The inserts can be used for small diameter spotting.
- Each insert has 4 cutting edges.

60-NC40: • Very positive angle for 60° engraving for all kind of unhardened steel and cast iron.

NC40: • Universal grade for all unhardened steel.

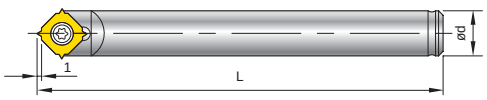
NC10: • Universal grade for non-ferrous metal and cast iron.



Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Wmin.	Wmax.	Tmax.
60°	013404	N9MT080201W	60-NC40	TiN	K20F		8	2.38	0.2	1.1	0.8
90°	013405		NC40	TiN	K20F				0.2	2.0	0.9
	013406		NC10	TiAlN	K20F				0.2	2.0	0.9

Holder >>

- For SW engraving using NC Spot Drill basic holder.



Ø10

Code	Parts No.	Ød	L	Screw	Key
603001	00-99616-10	10	90	NS-30055 2.0 Nm	NK-T8
613001	00-99616-3/8	3/8”	90		

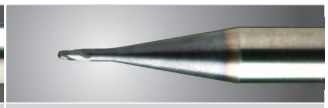
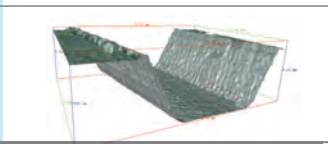
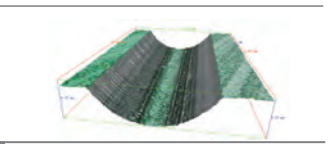
Cutting Data >>

(Tmax.: 0.8 mm)

Workpiece Meterial	S (r.p.m)	f (mm/rev.)	Depth of cut (mm) 1st	2nd	3rd	Finishing	Grade of Insert
P Alloy steel	5000 ~ 20000	0.008 ~ 0.02	0.3	0.2	0.2	0.05	60-NC40,NC40
K Cast iron	5000 ~ 20000	0.008 ~ 0.02	0.3	0.2	0.2	0.05	60-NC40, NC10
N Non-ferrous metal	5000 ~ 20000	0.008 ~ 0.02	0.3	0.2	0.2	0.05	NC10

Performance

Comparison >>

Tool / Cutting data			
	00-99619-V060-06 V06006T1W06-NC2071	Engraving tool	Ball nose end mill Radius 0.4 mm
Workpiece material	Tool steel SKD 61 (JIS G 4404), Hardness: HRB92~93 (HB 200)		
Spindle speed r.p.m.	10000	10000	10000
Feed rate mm/min.	100	100	300
Cutting depth Ap	0.2 mm	0.2 mm	0.05 mm, 4 times to cut to 0.2 mm
Roughness of bottom Ra	0.36 μm	0.83 μm	0.46 μm
Change and resetting	No need	Need	Need
Tool life	Long	Short	Short
Measured result by Alicona IFM system			

Tool / Cutting data	00-99619-V060-06 V06006T1W06-NC2071	00-99619-V060-06 V06006T1W06-NC2071	00-99619-V060-06 V06006T1W06-NC2035
Workpiece material	P SKD 51	M SS	H SKD 61 (50HRC)
Spindle speed r.p.m.	10000	10000	10000
Feed rate mm/min.	300	300	100
Cutting depth Ap	0.1 mm	0.35 mm	0.2 mm
Change and resetting	No need	No need	No need
Tool life	24 min.(1440 sec.)	7.2 meters	3.5 meters

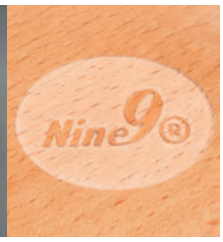
Application >>

Components

Luxury goods

Mold & Die

Product

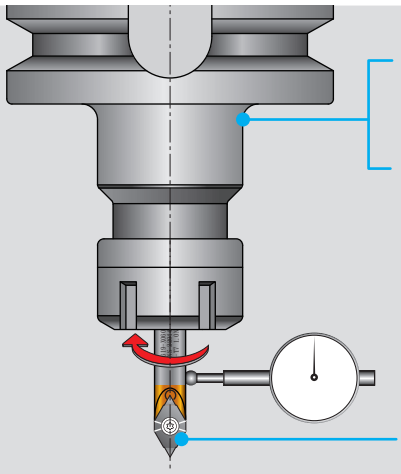


3

Engraving Tool

Technical guide

Before you start, please pay attention the following conditions



1 Recommended of tool holders
High precision spring collet chucks, shrink fit chucks, hydraulic chuck.

2 Pre-balance the tool holder
minimum **G6.3/10,000 r.p.m.** is necessary.

3 The downward feed rate of the Z-axis
should be **reduced to 50%** of the table feed rate.

4 Tool shank runout:
below 0.01 mm.

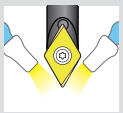
5 Torque screwdriver is recommended

6 Cutting fluid and cooling condition

Emusion / Oil

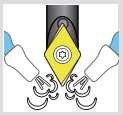
- **P** Steel
- **M** Stainless Steel
- **S** Titanium
- **H** Hardened Steel

Oil



- **N** Non-Ferrous

Air



- **K** Cast Iron

Clamping the engraving insert

• Place and hold the insert in the insert pocket against the positioning side.

• Step-1

Place the insert in the insert pocket.

• Step-2

Push insert against insert pocket and insert the screw.

• Step-3

Tighten the insert screw.

Tip >>

The Nine9 X060 Engraving Tool delivers precision with a fine 0.2mm bottom width and multiple angle options (30°, 45°, 60°, 90°). Its sharp, high-positive rake edge ensures clean, shallow engraving, while excellent repeatability eliminates the need for tool length resetting! A single holder supports the entire X060 insert series, making it a versatile choice for engraving plastic, aluminum, copper, non-ferrous metals, carbon steel, cast iron, hardened steel (HRC50) and stainless steel.

Use the V045 and V060 style engravers in materials that tend to push burrs such as stainless steels and high temp. alloys. These inserts have a 0.2mm(0.008”) radius with a very sharp cutting edge and cut very freely. Character widths start around 0.45mm(0.017”).
This tool best replaces ball nose endmills. This tool is considered to be first choice for all but fine engraving width below 0.25mm.

Cutting Data >> X060 Engraving

▶ X060A30W020R / X060A30R020

(Tmax. : 0.6mm)

Workpiece Material		S (r.p.m)	f (mm/rev.) Radius Angled	f (mm/rev.) Radius	Depth of cut (mm) 1st	2nd	3rd	4th	5th ~	Finishing	Grade of Insert
P	Carbon steel	8000 ~ 40000	0.001 ~ 0.010	0.002 ~ 0.015	0.15	0.1	0.05	0.05	0.05	0.02	NC2032
P	Alloy steel		0.001 ~ 0.006	0.002 ~ 0.010	0.15	0.1	0.05	0.05	0.03	0.02	NC2032, NC2035
M	Stainless steel		0.001 ~ 0.006	0.002 ~ 0.010	0.1	0.05	0.05	0.03	0.03	0.02	NC2032
K	Cast Iron		0.001 ~ 0.006	0.002 ~ 0.010	0.15	0.1	0.05	0.05	0.03	0.02	NC2032
N	Non-ferrous metal		0.001 ~ 0.012	0.002 ~ 0.020	0.2	0.1	0.1	0.05	0.05	0.02	XP9001
H	Hardened steel < HRC50		0.001 ~ 0.005	0.002 ~ 0.006	0.1	0.05	0.03	0.03	0.02	0.01	NC2035

▶ X060A45W020R / X060A45R020

(Tmax. : 0.8mm)

Workpiece Material		S (r.p.m)	f (mm/rev.) Radius Angled	f (mm/rev.) Radius	Depth of cut (mm) 1st	2nd	3rd	4th	5th ~	Finishing	Grade of Insert
P	Carbon steel	8000 ~ 40000	0.002 ~ 0.012	0.002 ~ 0.015	0.25	0.15	0.1	0.05	0.05	0.03	NC2032
P	Alloy steel		0.002 ~ 0.010	0.002 ~ 0.010	0.2	0.1	0.05	0.05	0.05	0.03	NC2032, NC2035
M	Stainless steel		0.002 ~ 0.008	0.002 ~ 0.010	0.2	0.1	0.05	0.05	0.05	0.03	NC2032
K	Cast Iron		0.002 ~ 0.010	0.002 ~ 0.010	0.2	0.1	0.1	0.05	0.05	0.03	NC2032
N	Non-ferrous metal		0.002 ~ 0.015	0.002 ~ 0.020	0.3	0.2	0.1	0.1	0.05	0.03	XP9001
H	Hardened steel < HRC50		0.002 ~ 0.006	0.002 ~ 0.006	0.15	0.1	0.05	0.05	0.03	0.02	NC2035

▶ X060A60W020R / X060A60R020

(Tmax. : 1.0mm)

Workpiece Material		S (r.p.m)	f (mm/rev.) Radius Angled	f (mm/rev.) Radius	Depth of cut (mm) 1st	2nd	3rd	4th	5th ~	Finishing	Grade of Insert
P	Carbon steel	8000 ~ 40000	0.002 ~ 0.012	0.002 ~ 0.015	0.3	0.2	0.1	0.1	0.05	0.03	NC2032
P	Alloy steel		0.002 ~ 0.010	0.002 ~ 0.010	0.3	0.1	0.1	0.05	0.05	0.03	NC2032, NC2035
M	Stainless steel		0.002 ~ 0.008	0.002 ~ 0.010	0.2	0.1	0.1	0.05	0.05	0.03	NC2032
K	Cast Iron		0.002 ~ 0.010	0.002 ~ 0.010	0.3	0.1	0.1	0.05	0.05	0.03	NC2032
N	Non-ferrous metal		0.002 ~ 0.015	0.002 ~ 0.020	0.3	0.2	0.1	0.1	0.05	0.03	XP9001
H	Hardened steel < HRC50		0.002 ~ 0.006	0.002 ~ 0.006	0.2	0.1	0.05	0.05	0.03	0.02	NC2035

▶ X060A90W020R

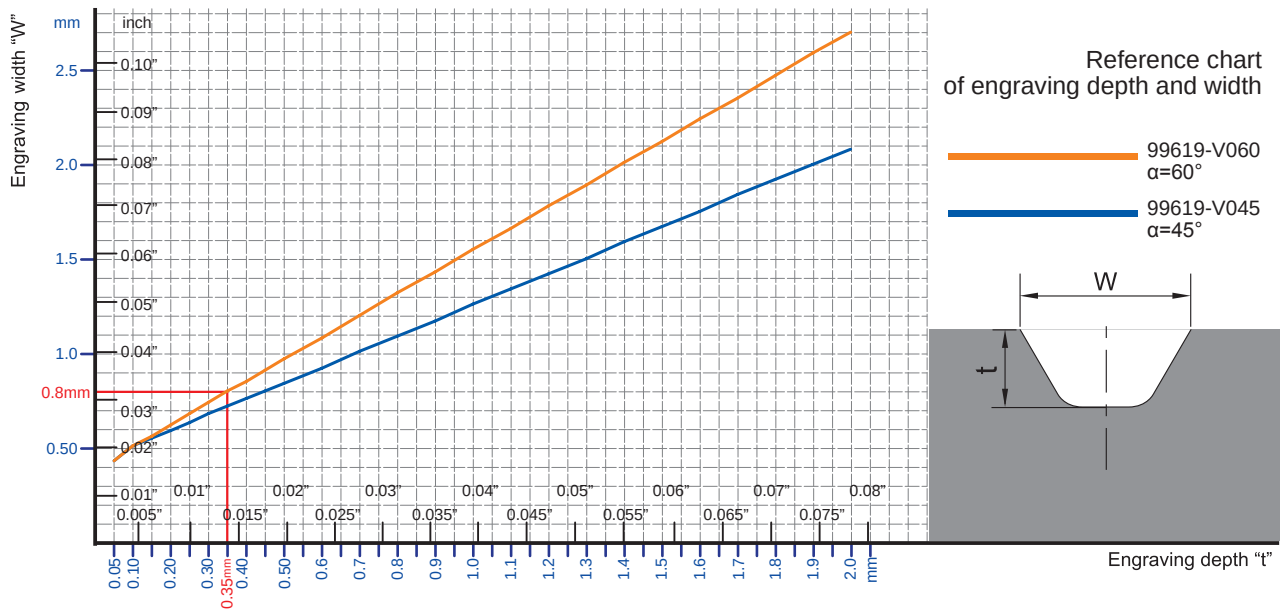
(Tmax. : 1.0mm)

Workpiece Material		S (r.p.m)	f (mm/rev.)	Depth of cut (mm) 1st	2nd	3rd	4th	5th ~	Finishing	Grade of Insert
P	Carbon steel	8000 ~ 40000	0.002 ~ 0.015	0.3	0.2	0.1	0.1	0.05	0.03	NC2032
P	Alloy steel		0.002 ~ 0.010	0.3	0.1	0.1	0.05	0.05	0.03	NC2032, NC2035
M	Stainless steel		0.002 ~ 0.010	0.2	0.1	0.1	0.05	0.05	0.03	NC2032
K	Cast Iron		0.002 ~ 0.010	0.3	0.1	0.1	0.05	0.05	0.03	NC2032
N	Non-ferrous metal		0.002 ~ 0.020	0.4	0.3	0.2	0.1	0.05	0.03	XP9001
H	Hardened steel < HRC50		0.002 ~ 0.006	0.2	0.1	0.05	0.05	0.03	0.02	NC2035

Cutting Data >> V045/V060 Engraving

- To use the engraving chart, select your engraving width (w) on the vertical axis. Select your engraving insert angle (45° or 60°), and follow the horizontal line from the (w) axis to the intersection with the insert angle.
- Follow the vertical line from this intersection point to the engraving depth (t) axis to determine the engraving depth.

▶ V045/V060 T1W06

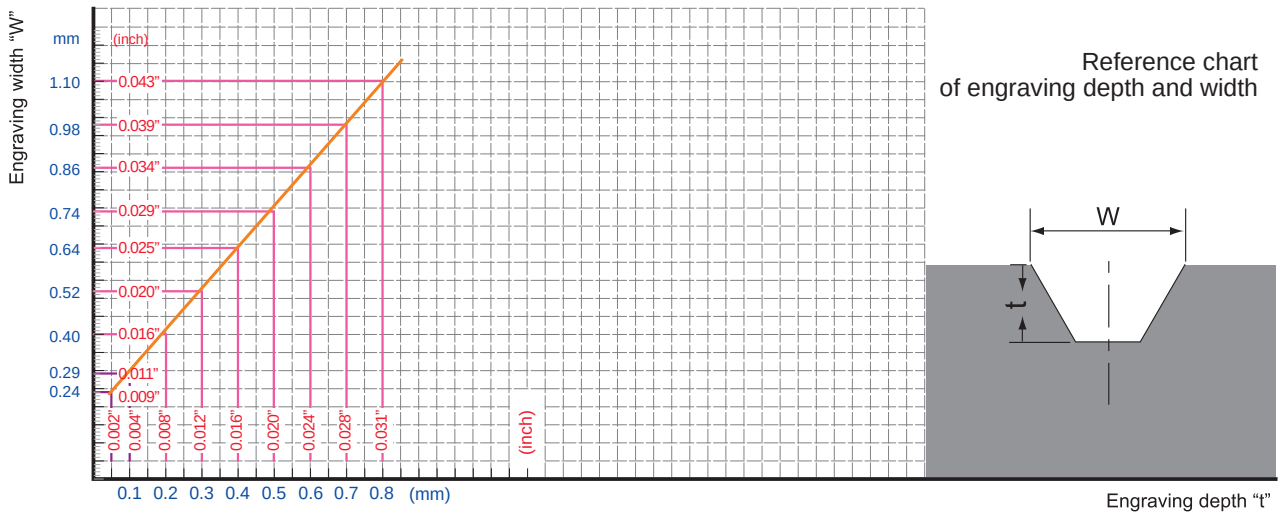


	Work Material	S (r.p.m)	f (mm/rev.)	Grade of Insert
P	Carbon steel	5000~40000	0.008~0.05	NC2071,NC2032
P	Alloy steel	5000~40000	0.008~0.03	NC2032,NC2071
M	Stainless steel	5000~40000	0.008~0.05	NC2071,NC9031
K	Cast Iron	5000~40000	0.008~0.03	NC2032
N	Non-ferrous metal	5000~40000	0.008~0.08	NC2071,NC9031
H	Hardened steel < HRC56	6000~35000	0.003~0.01	NC2035

(Tmax. : 2.0mm)

	Ap / Material	1st	2nd	3rd	4th	5th	6th	~	Fine finishing
P	Carbon steel	0.8	0.6	0.3	0.2	0.1	~	~	0.05
P	Alloy steel	0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.05
M	Stainless steel	0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.05
K	Cast Iron	0.8	0.6	0.3	0.2	0.1	~	~	0.05
N	Non-ferrous metal	1.0	0.8	0.2	~	~	~	~	0.05
H	Hardened steel < HRC56	0.2	0.2	0.15	0.15	0.1	0.1	0.1	0.05

▶ V060 T1W03



	Workpiece Meterial	S (r.p.m)	f (mm/rev.)	Grade of Insert
P	Carbon steel	8000 ~ 40000	0.005 ~ 0.015	NC2032
P	Alloy steel	6000 ~ 35000	0.005 ~ 0.010	NC2032
M	Stainless steel	8000 ~ 35000	0.003 ~ 0.010	NC9036
K	Cast Iron	6000 ~ 35000	0.005 ~ 0.015	NC2032
N	Non-ferrous metal	8000 ~ 40000	0.005 ~ 0.015	NC9036
S	Ti, Ti-alloy	6000 ~ 15000	0.003 ~ 0.010	NC9036

(Tmax. : 0.8mm)

	Material \ Ap	1st	2nd	3rd	4th	5th	~	Fine finishing
P	Carbon steel	0.3	0.2	0.1	0.1	0.05	0.05	0.03
P	Alloy steel	0.3	0.1	0.1	0.05	0.05	0.05	0.03
M	Stainless steel	0.2	0.1	0.1	0.1	0.05	0.05	0.03
K	Cast Iron	0.2	0.1	0.1	0.1	0.05	0.05	0.03
N	Non-ferrous metal	0.2	0.1	0.1	0.1	0.05	0.05	0.03
S	Ti, Ti-alloy	0.2	0.1	0.1	0.1	0.05	0.05	0.03

NC Deburring >>>

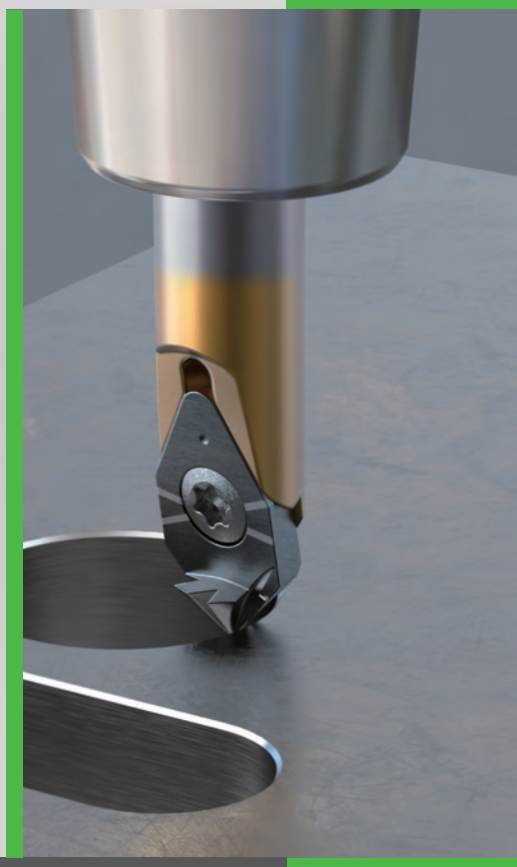
60° & 90°

Ideal for fine hole deburring.

P M K N

Indexable Type, High Precision Ground Carbide Insert.

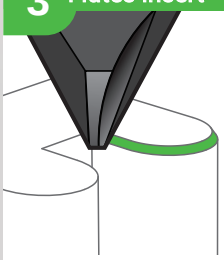
- Achieve high speed and high feed deburring and chamfering on CNC machine.
- Retain exceptional positional accuracy of the deburring depth and diameter.



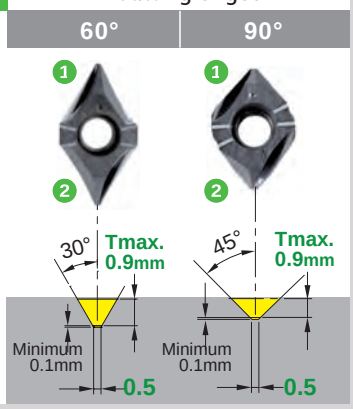
Features >

X060A..T3

3 Flutes insert — 2 cutting edges

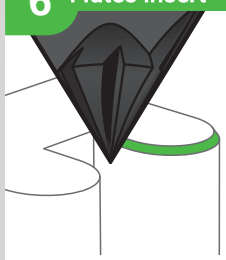


- Good for interior angles < 90°.
- The chip removing space is bigger.

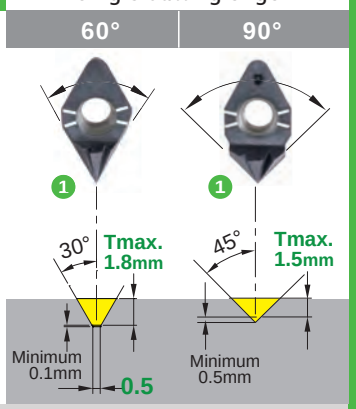


X060A..T6

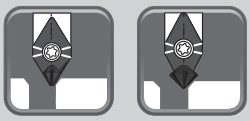
6 Flutes insert — single cutting edge



- Good for simple contours.
- Fast deburring, Time saving!



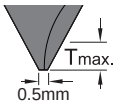
NC Deburring 60°& 90°

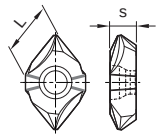
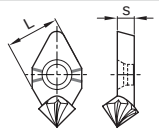


Inserts >>

NC2032: • For all kinds of steel < HRC 40, carbon steel, alloy steel, cast iron, aluminum and non-ferrous metal.

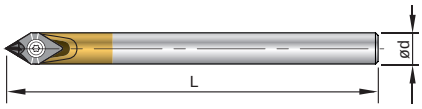
XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic and acrylic.



Angle	Code	Part No.	Coating	Grade	Flutes		Dimensions L	Dimensions S	Tmin.	Tmax.
60°	01X611	X060A60T3-NC2032	TiAlN	K20F	3		6	2.8	0.1	0.9
	01X612	X060A60T3-XP9001	Uncoated							
90°	01X911	X060A90T3-NC2032	TiAlN							
	01X912	X060A90T3-XP9001	Uncoated							
60°	01X601	X060A60T6-NC2032	TiAlN	K20F	6		6	2.0	0.1	1.8
90°	01X901	X060A90T6-NC2032							0.5	1.5

Holder >>

• Using same tool holder of X060 engraving tool.



Code	Parts No.	Shank	Ød	L	Screw	Key
69X001	00-99619-X060-06	Steel	6	40	*NS-22044 0.9Nm	NK-T7
69X002	00-99619-X060-06L	Carbide	6	60		
69X003	00-99619-X060-06LS	Steel	6			
69X004	00-99619-X060-06XL	Carbide	6	100		
69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

Starter Kit >>

• Different content can be customized.

Code	Parts No.	Carbide Shank Ø	Angle	Insert included	Content
69X202-X601	00-99619-X060-DB60-02K-32	6 (99619-X060-06L)	60°	X060A60T6-NC2032	1 x Holder 1 x T7 Key 2 x inserts
69X202-X901	00-99619-X060-DB90-02K-32		90°	X060A90T6-NC2032	

Cutting Data >>

	Workpiece Material	S (r.p.m.)	Feed Rate (mm / tooth)	Grade of Insert
P	Carbon steel	8000~40000	0.005-0.05	NC2032
P	Alloy steel	6000~35000	0.005-0.04	
M	Stainless steel	6000~25000	0.005-0.03	
K	Cast Iron	6000~35000	0.005-0.03	
N	Non-ferrous metal	8000~40000	0.005-0.05	XP9001

Chamfer Mill >>>

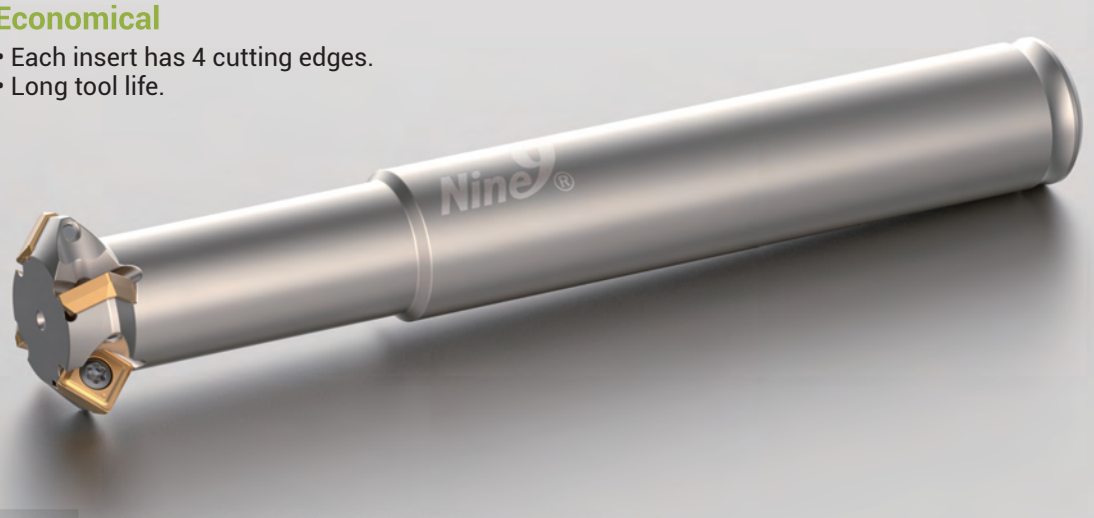
45° Front And Back Chamfering!

Nine9 chamfer mill
is designed for chamfering and countersinking with indexable inserts.
The insert is a specifically designed for high speed machining ; the multiple flutes provide for increased feed rate, optimizing performance and reducing cutting time.

P M K N H

Economical

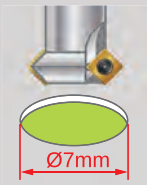
- Each insert has 4 cutting edges.
- Long tool life.



Features >>>

Excellent Repeatability

- Smallest Indexable counter sink, diameter Ø7 mm.
- The insert is dual-relief angle, specially edge honning and optimized coated for high cutting speed.
- Optimized the number of teeth on the holder to achieve higher feed rate.

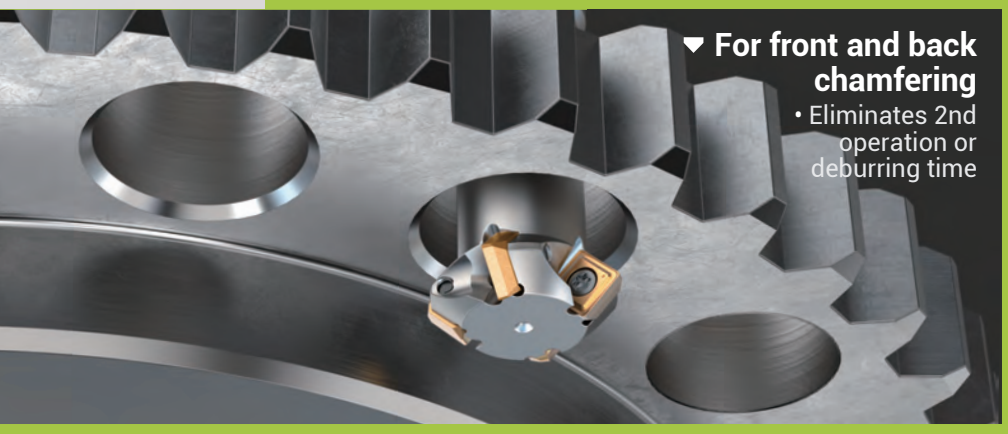


Applications

- For front and back chamfering.
- 90° counter sink and 45° chamfering.
- For counter sink, circular chamfering, contour chamfering and face milling.

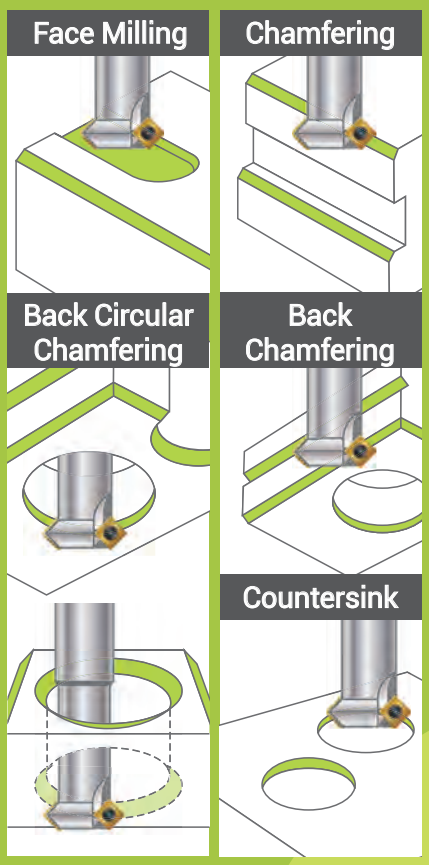
Eliminate 2nd Operation Or Deburring Time.

Applications



"
- Ultra high speed and feed rate.
- 4 times faster in cutting speed and up to 10 times higher in feed rate.

"



Indexable Chamfer Mill

Features >>

- Benefiting from the specially ground dual-relief insert and optimized coating, higher feed rate and cutting speed can be achieved on chamfering operation.
- Each insert has 4 cutting edges, reducing insert cost.
- Fine edge honning cutting edge, good chip breaking condition and long tool life.

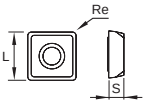
Inserts >>

NC2032:
- AlTiN coating, very long tool life.
- For carbon steel, alloy steel, cast iron and hardened steel up to HRC 50.
- Each insert has 4 cutting edges.

NC9071:
- TiN coating, very sharp cutting edge produces excellent surface finish
- For non ferrous metal, aluminum, aluminum-alloy, brass, copper and stainless steel.
- Each insert has 4 cutting edges.

NC2032

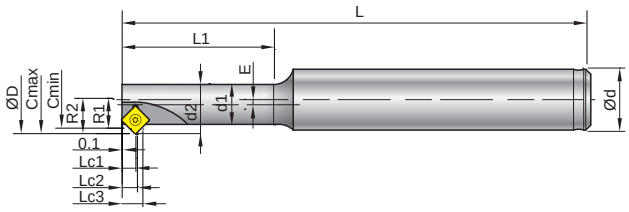
NC9071

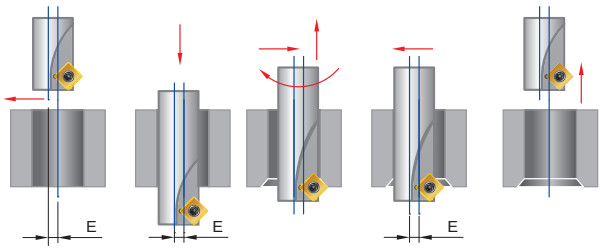
Code	Parts No.		Coating	Grade		Dimensions L ±0.05	S	Re	Screw	Key
021401	N9GX04T002	NC2032	AlTiN	K20F		4.0	1.8	0.2	*NS-18037 0.6Nm	NK-T6
021402		NC9071	TiN							
023401	N9GX060204	NC2032	AlTiN			6.35	2.38	0.4	*NS-22055 0.9Nm	NK-T7
023402		NC9071	TiN							
025401	N9GX090308	NC2032	AlTiN			9.52	3.18	0.8	NS-30072 2.0Nm	NK-T9
025402		NC9071	TiN							

*Torque screwdriver is recommended.

Holder >>

- Made of hot working steel and hardened.
- Elliptical necked bar to optimize the tool strength.
- Shank is ground to h6 tolerance.



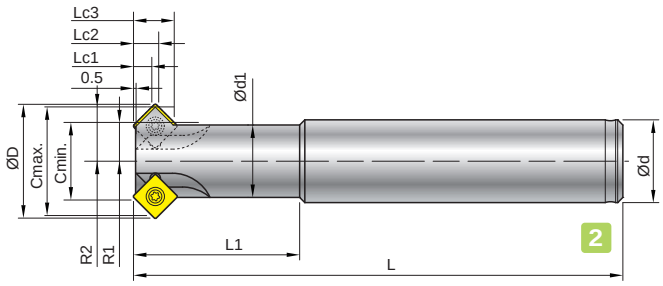


Code	Parts No.	Type	Cmin ø	Cmax ø	ød	ød1	ød2	øD	R1	R2	L	L1	Lc1	Lc2	Lc3	E	⌖z	insert Screw / Key
701003	00-99616-C02	BC10-C02-80	6.8	8.8	10	5.25	6.5	9	3.4	4.4	80	20	2.56	2.93	3.93	1.25	1	N9GX04T002
701004	00-99616-C04	BC12-C04-100	8.5	10.8	12	6.45	8	11.1	4.25	5.4	100	25	2.51	2.98	4.13	1.55	1	*NS-18037 0.6Nm NK-T6
701005	00-99616-C06	BC12-C06-100	10.26	13.2	12	7.88	9.75	13.5	5.13	6.6	100	30	2.51	2.98	4.45	1.88	1	

*Torque screwdriver is recommended.

Holder >>

- Made from tool steel.
- Shank is ground to h6 tolerance.



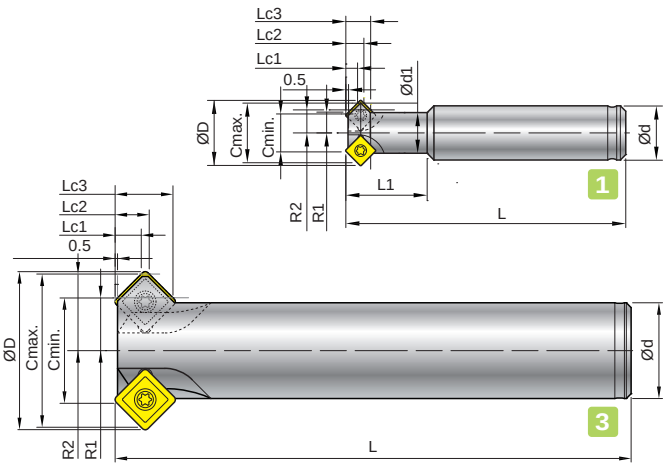
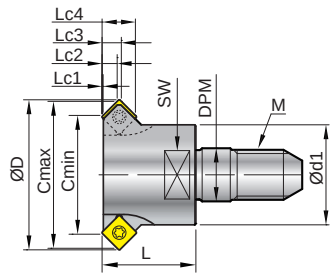


Fig	Code	Parts No.	Type	Cmin ø	Cmax ø	ød	ød1	øD	R1	R2	L	L1	Lc1	Lc2	Lc3	⌖z	insert Screw / Key
1	701001	00-99616-C10	BC10-C07-60	7	11	10	7.5	12	3.5	5.5	60	15	2.6	2.9	4.6	2	N9GX04 *NS-18037 0.6Nm NK-T6
	701002	00-99616-C20	BC12-C11-100	11	16	12	9.6	16.15	5.5	8.0	100	25	2.6	2.9	5.0	4	
2	703001	00-99616-C30	BC16-C15-120	15	21	16	14	22	7.5	10.5	120	40	3.5	4.9	7.9	4	N9GX06 *NS-22055 0.9Nm NK-T7
	703002	00-99616-C40	BC20-C19-130	19	25	20	18	26	9.5	12.5	130	50	3.5	4.9	7.9	4	
3	705001	00-99616-C50	BC20-C22-130	22	32	20	--	33	11	16	130	--	5.5	7.1	12.1	4	N9GX090 NS-30072 2.0Nm NK-T9
2	705002	00-99616-C52	BC25-C22-180	22	32	25	20	33	11	16	180	80	5.5	7.1	12.1	4	

*Torque screwdriver is recommended.

Screw Fit Cutter >>

- Quick and easy to change system and provides chamfering flexibility.
- Capable of extended overhangs by almost any kind of the screw-fit tool holder or extension bar in the market.



Code	Parts No.	Type	Cmin ø	Cmax ø	øD	M	SW	ød1	DPM	L	Lc1	Lc2	Lc3	Lc4	⌖z	insert Screw / Key
721101	00-99616-CM16-M05	M05-CM16	11	16	16.15	M5	8	10	5.5	15	0.09	2.59	2.9	5.4	3	N9GX04 *NS-18037 0.6Nm / NK-T6
721201	00-99616-CM20-M06	M06-CM20	15	20	20.15	M6	11	12	6.5	16	0.09	2.59	2.9	5.4	4	
723301	00-99616-CM23-M08	M08-CM23	19	23.5	24	M8	14	16	8.5	19	0.16	2.41	3.08	5.33	4	
723401	00-99616-CM29-M10	M10-CM29	23	29	30	M10	18	20	10.5	17	0.54	3.54	4.87	7.87	4	N9GX06 *NS-22055 0.9Nm / NK-T7

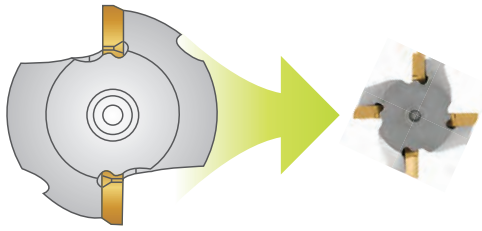
* Refer to page 164 for extension bars.

*Torque screwdriver is recommended.

Starter Kit >>

Fig	Code	Parts No.	Insert included	Holder included	Content
1	701201-1401	00-99616-C1020-32	N9GX04T002-NC2032	00-99616-C10 + 00-99616-C20	2 x holders + 10 inserts + 1 key
	701201-1402	00-99616-C1020-71	N9GX04T002-NC9071		
2	703201-3401	00-99616-C3040-32	N9GX060204-NC2032	00-99616-C30 + 00-99616-C40	
	703201-3402	00-99616-C3040-71	N9GX060204-NC9071		
3	705201-5401	00-99616-C5052-32	N9GX090308-NC2032	00-99616-C50 + 00-99616-C52	
	705201-5402	00-99616-C5052-71	N9GX090308-NC9071		

Performance

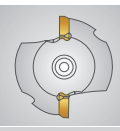


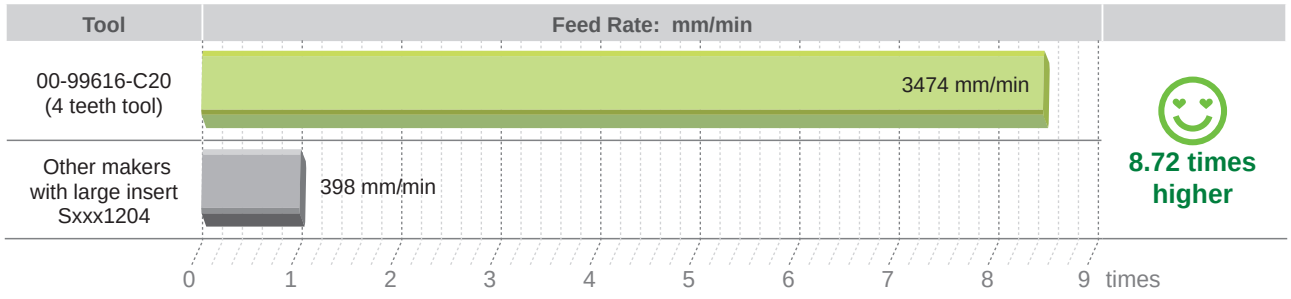
Feed Rate =
Feed per Tooth x Spindle Speed x **No. of Flute** mm/min.

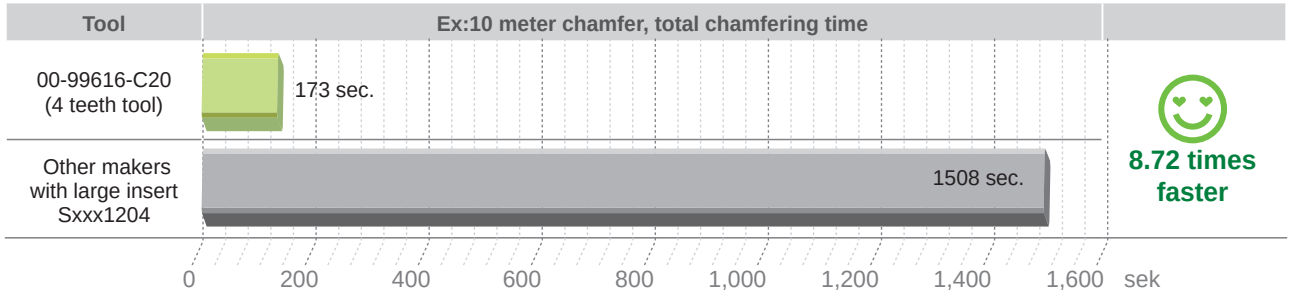
UP **Spindle Speed** = $\frac{\text{Cutting Speed x 1000}}{\pi \text{ x Cmin.}}$

Comparison >>

• Chamfer tool with larger insert(Sxxx1204) and Nine9 N9GX04 insert.

Tool			
Cutting data		**Nine 9 Chamfer mills**	**Other makers with Large insert**
Chamfering		1 mm	1 mm
Feed rate	**mm/rev.**	0.1	0.1
Dia. of cutter	**mm**	11	32
Teeth of cutter		**4**	2
Cutting Speed Vc	**m/min.**	300	200
Spindle Speed	**r.p.m.**	**8685**	1990
Feed rate	**mm/min**	**3474**	398





Cutting Data

99616-C02, C04, C06 Cutting Data >>

Workpiece Material			Cutting Speed VC (m/min.)	Feed Rate (mm / tooth)	Grade of Insert
	Material Group	Sample Code (JIS)		N9GX04T002 Max. Chamfering 1.5mm	
P	Carbon steel C<0.3%	SS400	60-80-120	0.02 ~ 0.07	NC9071
P	Carbon steel C>0.3%	S50C, P5	60-80-120	0.02 ~ 0.07	NC2032
P	Low alloy steel C<0.3%	SCM420	60-80-120	0.01 ~ 0.04	NC9071
P	High alloy steel	SKD11	60-80-120	0.02 ~ 0.07	NC2032
M	Stainless steel	SUS304	30-60-100	0.01 ~ 0.04	NC9071
K	Cast Iron	FC25	60-80-120	0.02 ~ 0.06	NC2032
N	Non-ferrous metal	A6061	80-100-150	0.03 ~ 0.10	NC9071

99616-C10~C52 Cutting Data >>

Workpiece Material			Cutting Speed VC (m/min.)	Feed Rate (mm / tooth)			Grade of Insert
	Material Group	Sample Code (JIS)		N9GX04T002 Max. Chamfering 1.5mm	N9GX060204 Max. Chamering 2.5mm	N9GX090308 Max. Chamfering 4mm	
P	Carbon steel C<0.3%	SS400	150-250-350	0.06~0.12	0.10~0.25	0.10~0.25	NC9071
P	Carbon steel C>0.3%	S50C,P5	200-300-400	0.06~0.10	0.10~0.20	0.10~0.25	NC2032
P	Low alloy steel C<0.3%	SCM420	180-240-260	0.06~0.10	0.10~0.20	0.10~0.20	NC9071
P	High alloy steel	SKD11	120-150-200	0.06~0.10	0.10~0.15	0.10~0.15	NC2032
M	Stainless steel	SUS304	120-150-180	0.06~0.10	0.06~0.15	0.10~0.20	NC9071
K	Cast Iron	FC25	120-150-180	0.06~0.10	0.10~0.15	0.10~0.20	NC2032
N	Non-ferrous metal	A6061	200-400-600	0.06~0.15	0.10~0.25	0.10~0.25	NC9071
H	Hardened steel < HRC50	SKD61	80-90-100	0.06~0.10	0.06~0.12	0.10~0.15	NC2032

MCC Mill >>>

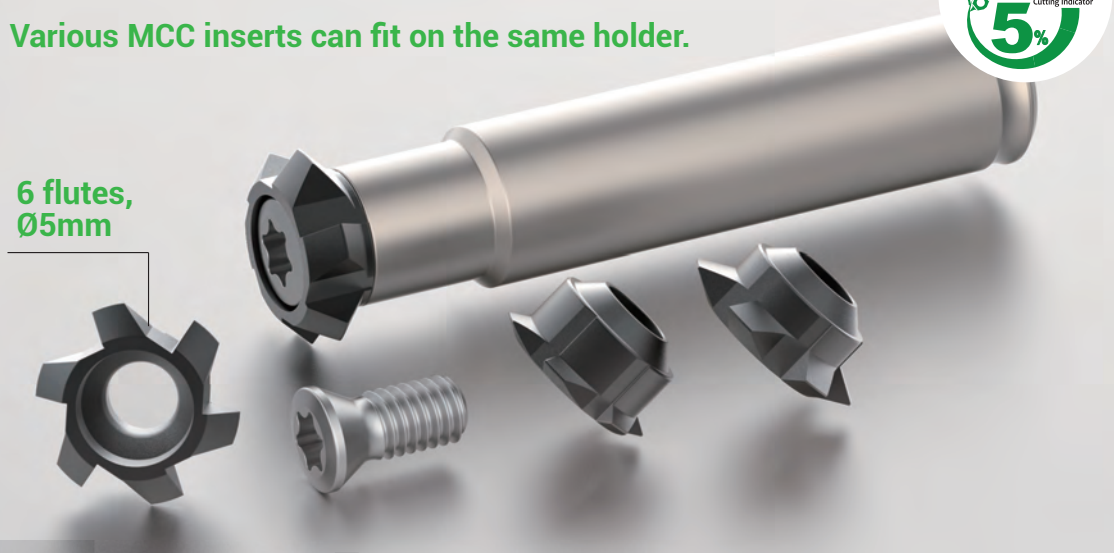
60° & 90° Deburring, 55° & 60° Threading

P M K N H

Optimum 6 flutes design, the smallest insert dia. is 5mm.

- Min. deburring bore from Ø4.2 ~ Ø10mm.
- The smallest insert Ø5.0 can do M6xP0.75 internal threading and deburring.

Various MCC inserts can fit on the same holder.



Features >>>

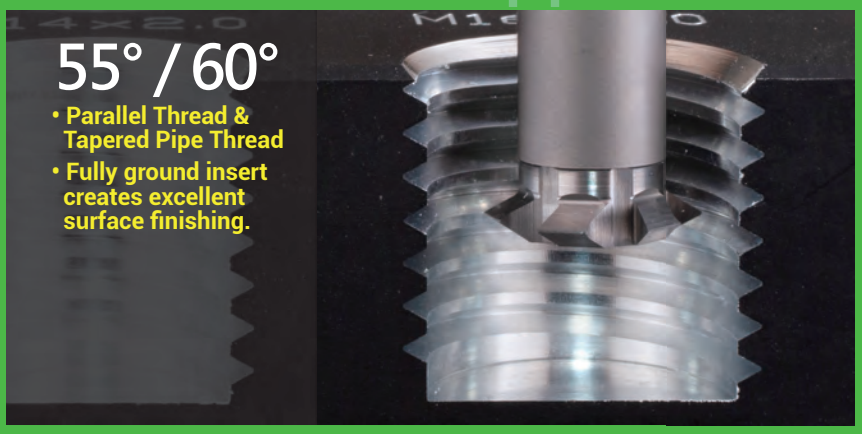
Deburring Mill 60° & 90°

- Front & back deburring in one operation, grooving is also possible.
- Each insert has 6 flutes.
- Thanks for special insert geometry and Nine9 clamping system to provide high precision and accurate position.

Threading Mill 55° / 60°

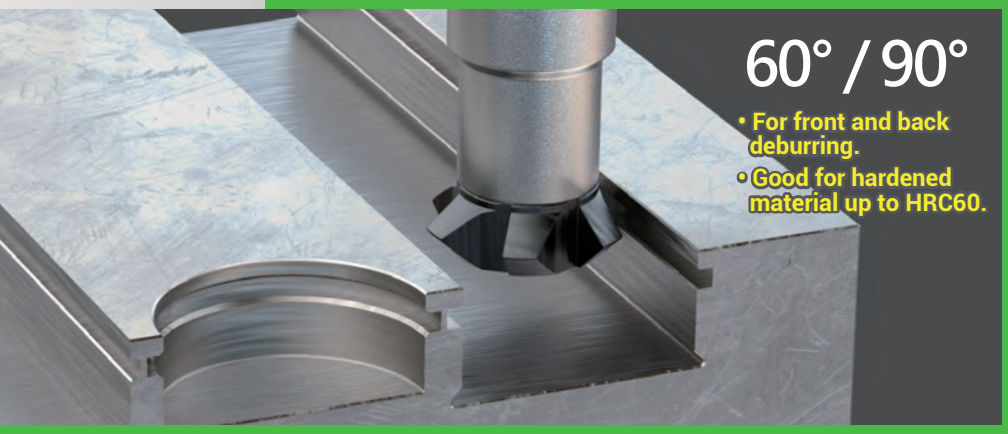
- The smallest insert Ø5.0 can do M6xP0.75 internal threading and deburring.
- For external different threading pitch can be done by NC programing.
  For example: Ø10.0mm insert can do external, threading pitch from P1.0 to P1.75mm, save your tool inventory.
- Each insert has 6 flutes.
- Thanks for special insert geometry and Nine9 clamping system to provide high precision and accurate position.

Applications



55° / 60°

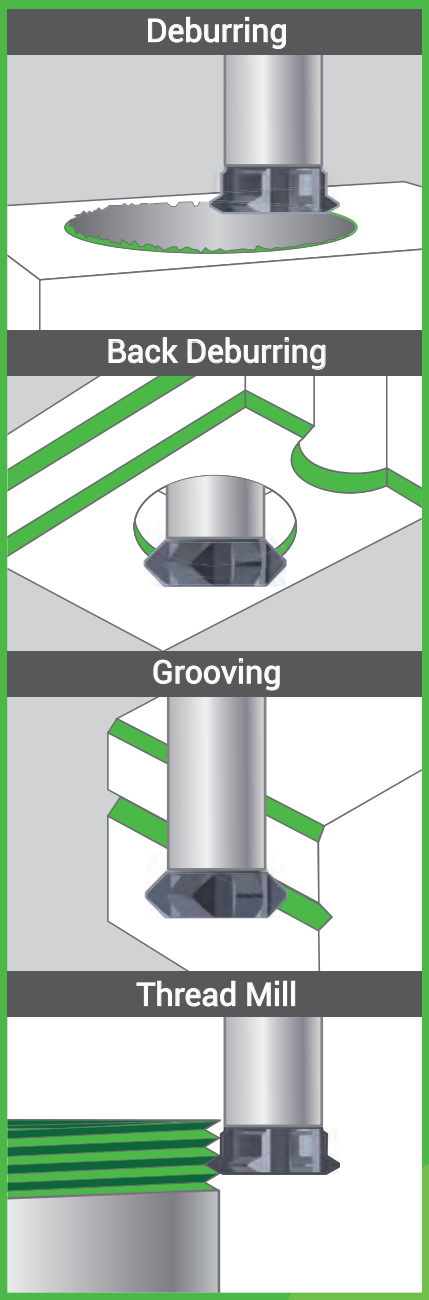
- Parallel Thread & Tapered Pipe Thread
- Fully ground insert creates excellent surface finishing.



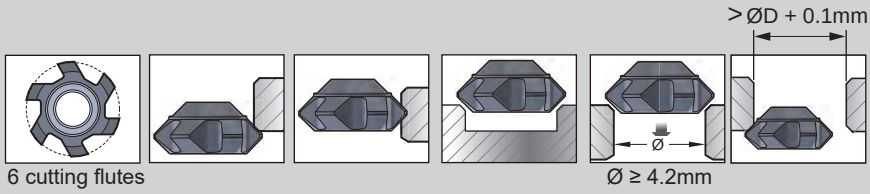
60° / 90°

- For front and back deburring.
- Good for hardened material up to HRC60.

"
- Specialized on narrow space below 10mm by indexable inserts.
- 6 cutting flutes, higher feed rate, good for hardened steel up to HRC60.
"



MCC Mill- Deburring



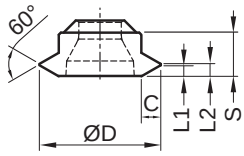
Inserts >>

NC2032: • TiAlN coating provides longer tool life.
• For all kinds of steel < HRC60, carbon steel, alloy steel and cast iron.

XP9000: • High positive and sharp edge produces excellent surface finish.
• For non-ferrous material such as aluminum, brass, copper and soft material.

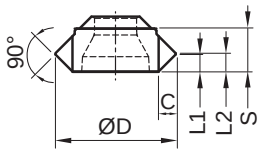
60° deburring

• For front and back deburring.
• Also for threading application.

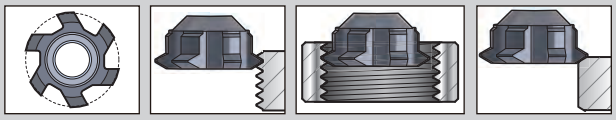
Holder Size	Code	Parts No.	Coating	Grade		ØD ±0.025	L1	L2	S ±0.025	C	0.1C min. hole	0.1C max. hole
CR05	01R2103	R06005-05010-32	TiAlN	K20F		5.0	0.35	0.45	2.0.	0.40	4.2	4.8
	01R2104	R06005-05010-00	Uncoated									
CR07	01R2301	R06007-06810-32	TiAlN	K20F		6.8	0.40	0.50	2.35	0.50	5.6	6.6
	01R2302	R06007-06810-00	Uncoated									
CR10	01R2601	R06010-08510-32	TiAlN	K20F		8.5	0.49	0.59	3.60	0.65	7.2	8.3
	01R2602	R06010-08510-00	Uncoated									
	01R2603	R06010-10010-32	TiAlN			10.0	0.90	1.00	3.60	1.20	7.6	9.8
	01R2604	R06010-10010-00	Uncoated									

90° deburring

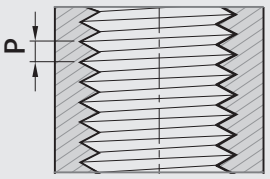
• Front and back deburring in one operation.

Holder Size	Code	Parts No.	Coating	Grade		ØD ±0.025	L1	L2	S ±0.025	C	0.1C min. hole	0.1C max. hole
CR05	01R4101	R09005-05060-32	TiAlN	K20F		5.0	0.60	1.20	2.00	0.4	4.2	4.8
	01R4102	R09005-05060-00	Uncoated									
CR07	01R4301	R09007-07020-32	TiAlN	K20F		7.0	1.00	1.20	2.35	0.7	5.6	6.8
	01R4302	R09007-07020-00	Uncoated									
CR10	01R4601	R09010-10010-32	TiAlN	K20F		10.0	1.45	1.55	3.60	1.2	7.6	9.8
	01R4602	R09010-10010-00	Uncoated									

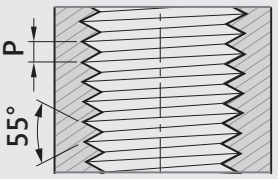
MCC Mill- Threading



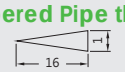
6 cutting flutes



55° Parallel Pipe thread
60° Parallel thread



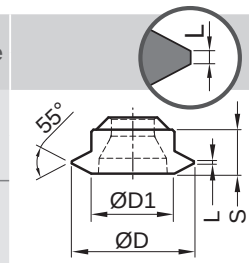
55° Tapered Pipe thread



Inserts >>

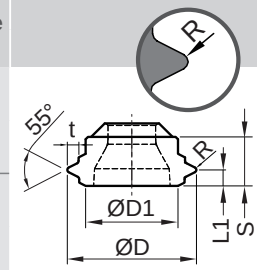
NC2032: • TiAlN coating provides longer tool life.
• For all kinds of steel < HRC50, carbon steel, alloy steel and cast iron.
XP9000: • High positive and sharp edge produces excellent surface finish.
• For non-ferrous material such as aluminum, brass, copper and soft material.

55° Parallel Pipe Thread: Ideal for milling parallel threads such as ISO/JIS-G, PF, Rp, PS; BSPP.

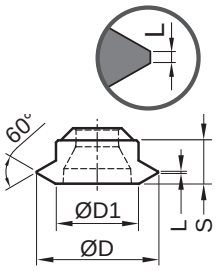
Holder Size	Code	Parts No.	Coating	Grade		ØD ±0.025	ØD1	L	S ±0.025	Pitch range TPI
CR07	01R1301	R05507-06512-32	TiAlN	K20F		6.56	5.32	0.12	2.35	28
	01R1302	R05507-06512-00	Uncoated							
CR10	01R1601	R05510-10018-32	TiAlN	K20F		10.0	6.92	0.18	3.60	19 ~ 14
	01R1602	R05510-10018-00	Uncoated							

55° Tapered Pipe Thread: Perfect for milling tapered threads like ISO/JIS-R, PT, Rc; BSPT.

• Mill a tapered thread directly into a drilled hole without the need to pre-mill the taper.

Holder Size	Code	Parts No.	Coating	Grade		ØD ±0.025	ØD1	t	R	L1	S ±0.025	Pitch range TPI
CR10	01R1603	R05510-09516-32	TiAlN	K20F		9.50	6.8	0.85	0.18	1.18	3.6	19
	01R1604	R05510-09516-00	Uncoated									
	01R1605	R05510-10025-32	TiAlN	K20F		10.0	6.8	1.16	0.25	1.42	3.6	14
	01R1606	R05510-10025-00	Uncoated									

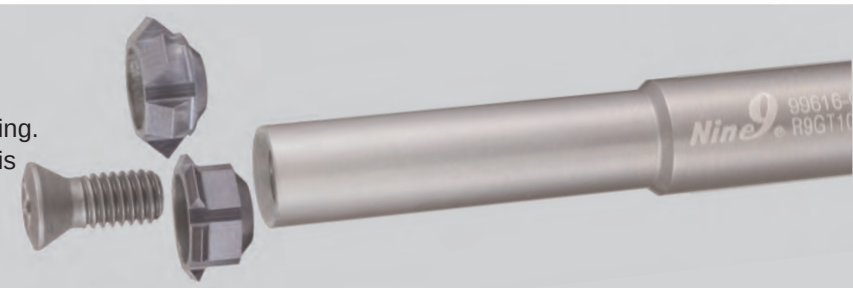
60° Parallel Thread

Holder Size	Code	Parts No.	Coating	Grade		ØD ±0.025	ØD1	L	S ±0.025	Screw Size	Pitch range	mm	TPI
CR05	01R2101	R06005-05006-32	TiAlN	K20F		5.0	3.9	0.06	2.0	M6	Internal	0.6 ~ 0.75	32 ~ 28
	01R2102	R06005-05006-00	Uncoated								External	0.5 ~ 0.7	48 ~ 36
	01R2103	R06005-05010-32	TiAlN			5.0	3.9	0.10	2.0	M6	Internal	0.8 ~ 1.0	28 ~ 24
	01R2104	R06005-05010-00	Uncoated								External	0.6 ~ 0.8	40 ~ 32
CR07	01R2301	R06007-06810-32	TiAlN	K20F		6.8	5.5	0.10	2.35	M8	Internal	0.8 ~ 1.25	28 ~ 20
	01R2302	R06007-06810-00	Uncoated								External	0.7 ~ 1.0	36 ~ 28
CR10	01R2601	R06010-08510-32	TiAlN	K20F		8.5	6.9	0.10	3.60	M10	Internal	1.0 ~ 1.5	24 ~ 18
	01R2602	R06010-08510-00	Uncoated								External	0.7 ~ 1.0	36 ~ 24
	01R2603	R06010-10010-32	TiAlN			10.0	6.9	0.10	3.60	M12 M14 M16	Internal	1.0 ~ 2.0	24 ~ 13
	01R2604	R06010-10010-00	Uncoated								External	1.0 ~ 1.75	24 ~ 14

MCC Mill

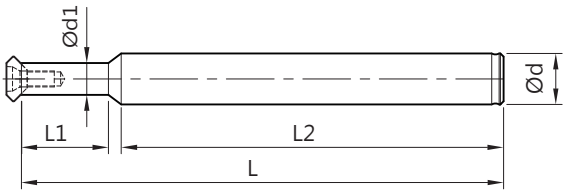
Feature >>

- Patented clamping system for accurate positioning.
- Dual-contact insert pocket, exchange accuracy is guaranteed.



Holder >>

- Various OAL holders for your choice.
- Carbide shank holders good for fine finish.



Holder Size	Code	Parts No.	Type	Shank	Ød	Ød1	L1	L2	L	Screw / Key
CR05	70R104	00-99626-CR05-06-039	BC06-CR05-039	Steel	6	3.5	4	33	39	*NS-20045 0.6Nm / NK-T6
	70R105	00-99626-CR05-06-045	BC06-CR05-045		6	3.5	10	33	45	
	70R103	00-99626-CR05-08-076	BC08-CR05-076		8	3.5	10	60	74	
	70R101	00-99626-CR05-05-043	BC05-CR05-043		5	3.5	16	24	41	
	70R106	00-99626-CR05-06-051	BC06-CR05-051		6	3.5	16	33	51	
	70R107	00-99626-CR05-06-051W	BC06-CR05-051W	Carbide	6	3.5	16	33	51	
CR07	70R304	00-99626-CR07-06-041	BC06-CR07-041	Steel	6	5.0	6	33	41	*NS-25060 0.9Nm / NK-T7
	70R303	00-99626-CR07-08-078	BC08-CR07-078		8	5.0	13	60	75	
	70R305	00-99626-CR07-06-049	BC06-CR07-049		6	5.0	14	33	49	
	70R301	00-99626-CR07-06-052	BC06-CR07-052		6	5.0	21	27	49	
	70R306	00-99626-CR07-06-057	BC06-CR07-057		6	5.0	22	33	57	
	70R307	00-99626-CR07-06-057W	BC06-CR07-057W	Carbide	6	5.0	22	33	57	
CR10	70R604	00-99626-CR10-08-049	BC08-CR10-049	Steel	8	6.8	7	40	49	NS-35080 2.5Nm / NK-T15
	70R603	00-99626-CR10-08-082	BC08-CR10-082		8	6.8	16	60	78	
	70R605	00-99626-CR10-08-059	BC08-CR10-059		8	6.8	17	40	59	
	70R606	00-99626-CR10-08-069	BC08-CR10-069		8	6.8	27	40	69	
	70R607	00-99626-CR10-08-084W	BC08-CR10-084W	Carbide	8	6.8	27	55	84	

*Torque screwdriver is recommended.

Single Set >>

- Included one holder and one insert is available on request.

Example:

Parts No.	Insert included				Holder included		Content
	Type / grade	ØD ±0.025	C	S ±0.025	Shank	L	
00-99626-R106-4101	R09005-05060-32	5.0	0.4	2.00	00-99626-CR05-06-051	51	1 tool holder + 1 inserts + 1 key
00-99626-R306-4301	R09007-07020-32	7.0	0.7	2.35	00-99626-CR07-06-057	57	
00-99626-R606-4601	R09010-10010-32	10.0	1.2	3.60	00-99626-CR10-08-069	69	

Cutting Data

60° & 90° deburring mill >>

	Workpiece material	Vc (m/min)	Feed rate (mm / tooth)	Grade of insert
P	Carbon steel	80 ~ 250	0.005 ~ 0.12	NC2032
P	Alloy steel	60 ~ 200	0.005 ~ 0.10	NC2032
M	Stainless steel	40 ~ 120	0.005 ~ 0.10	NC2032
K	Cast iron	60 ~ 180	0.005 ~ 0.10	NC2032
N	Non-ferrous metal	100 ~ 500	0.005 ~ 0.15	XP9000
H	Hardened steel < HRC60	30 ~ 80	0.005 ~ 0.05	NC2032

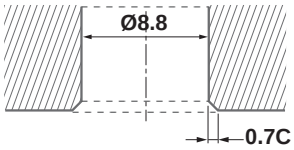
55° & 60° thread milling >>

- Friendly reminding: Upward and outward thread milling is recommended for all threads, except 55° PT threading.

	Workpiece material	Vc (m/min)	Feed rate (mm / tooth)	Grade of insert
P	Carbon steel	40 ~ 120	0.002 ~ 0.013	NC2032
P	Alloy steel	30 ~ 90	0.002 ~ 0.01	NC2032
M	Stainless steel	30 ~ 80	0.002 ~ 0.01	NC2032
K	Cast iron	40 ~ 100	0.002 ~ 0.01	NC2032
N	Non-ferrous metal	60 ~ 200	0.002 ~ 0.013	XP9000
H	Hardened steel < HRC50	20 ~ 60	0.002 ~ 0.008	NC2032

Performance >>

Work Task: C0.7 back chamfering
Material: Stainless Steel
Machine: MECTRON MTS-C420

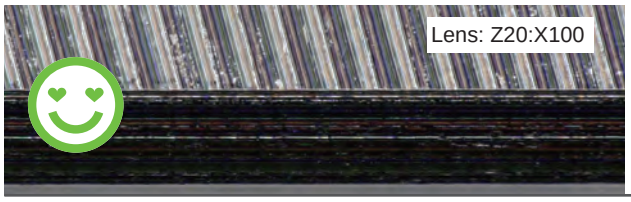


Tool		MCC Deburring Mill Holder: 00-99626-CR07-049 Insert: R09007-07020-32	Carbide chamfering cutter
Deburring		0.7 mm	0.7 mm
Dia. of cutter	mm	7	8
Teeth of cutter		6	3
Spindle Speed	r.p.m.	2500	2500
Feed rate	mm/min	300	150
RESULT			
Tool life		*720* workpiece (8 times higher)	90 workpiece

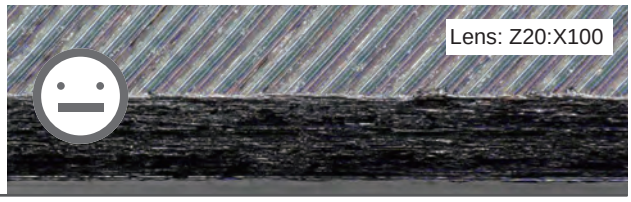
Comparison of Surface Quality >>

Material	Deburring	Vc (m/min)	S (r.p.m.)	f (mm/tooth)	F (mm/min)
SCM415	C0.3	188.5	6000	0.03	1080

Tool: Nine9 MCC Mill
Holder: 00-99626-CR10-08-082 / Insert: R09010-10010-32



Tool: Other brand chamfering cutter

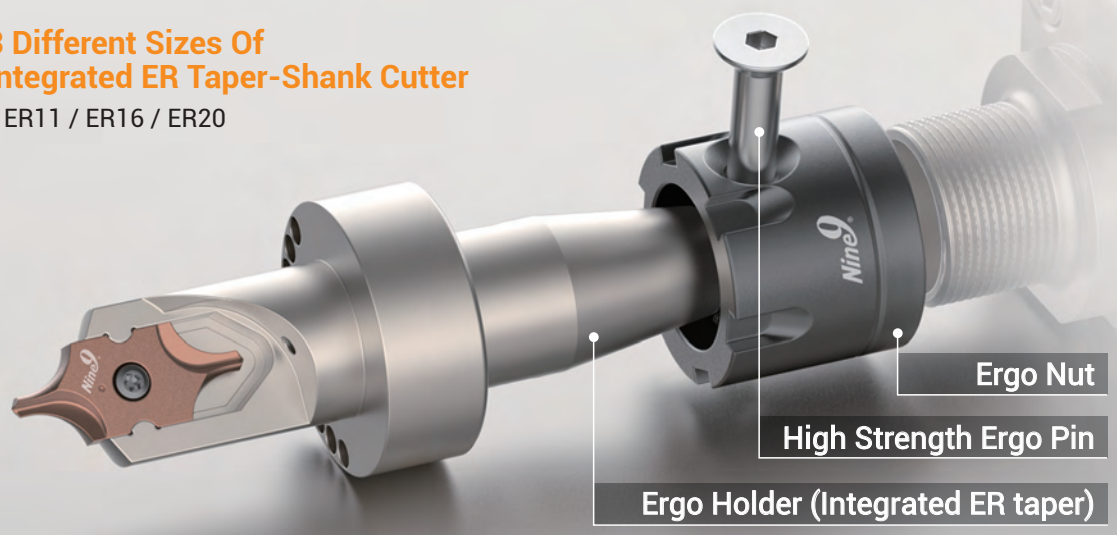


ER Indexable Cutter >>>

ERgo just say “ergo”.
The Ergo is a new trademark of Nine9 for ER type indexable cutter.
Better rigidity, quick change, excellent repeatability, tool length maintain, and pre-balanced.

P M N

▶ **3 Different Sizes Of Integrated ER Taper-Shank Cutter**
- ER11 / ER16 / ER20



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.**

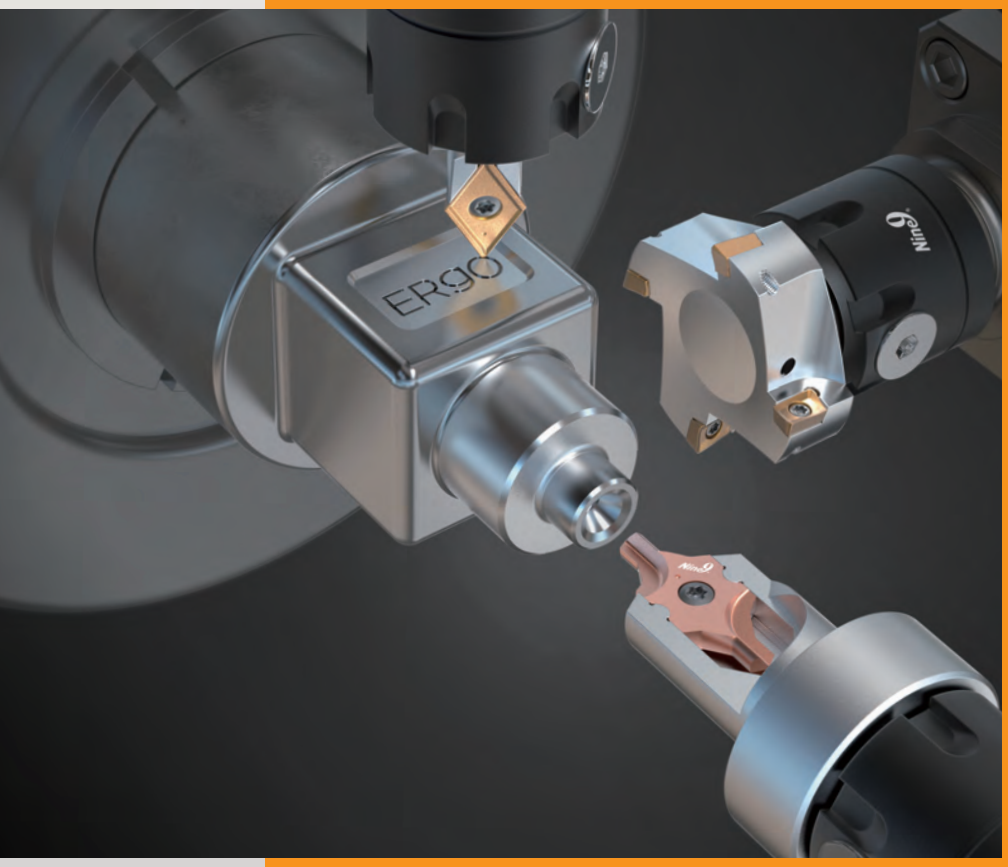
▶ **Ergo Nut Drives The Pin To Push Ergo Holder Into ER Taper. It Is “ A simple way to maximize clamping force ”**
- Short tool length and quick change system for adapting on small working area.
- Ideal solution for BT30, driven tools, tapping and turning center.
- Increase tool life.
- Easy and simple assembly.

▶ **Ergo Provide Customized Tooling Service.**

Applications

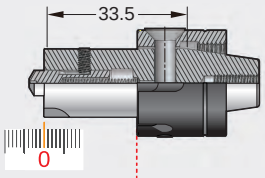
Quick Change, Saving Huge Machine Downtime.

- 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.

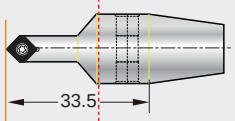


OAL: 33.5mm Group

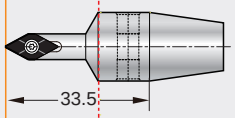
Tool Length Setter



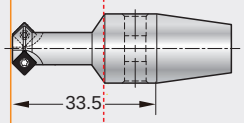
Multi-Functional Tool



Engraving & Deburring

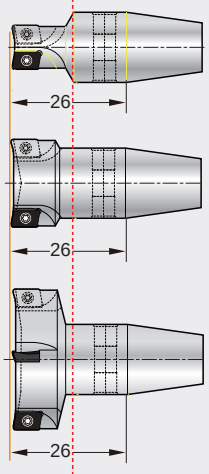


Chamfer Mill



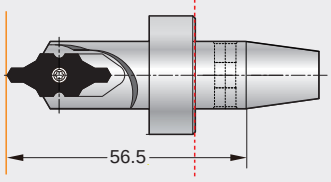
OAL: 26mm Group

Power Mill Ø10 ~ Ø32mm

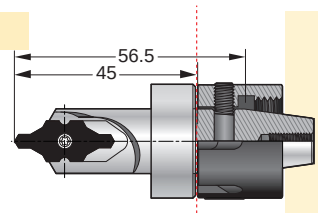
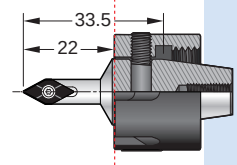
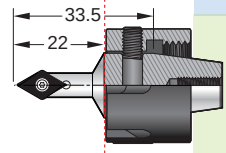
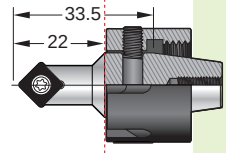
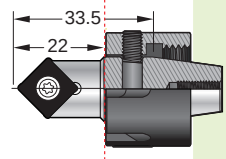
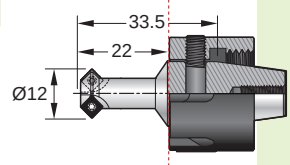
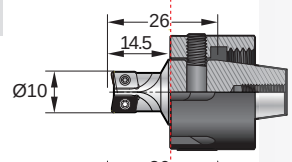
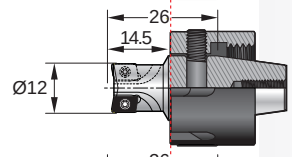
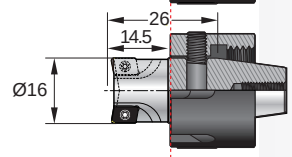
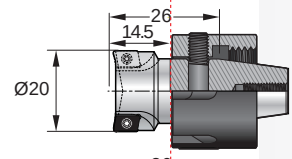
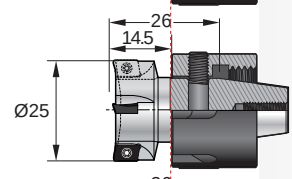
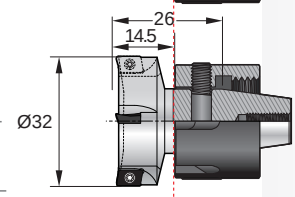


OAL: 56.5mm

i-Center



> "The Ergo system includes milling cutter, spot drills, engraving tools, deburring tools, chamfering tools, and center drills."

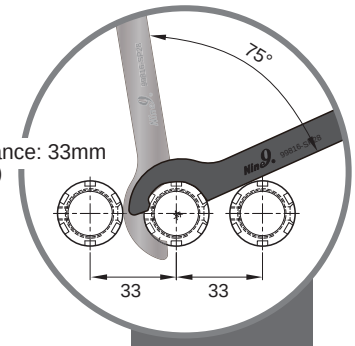
ER16	**i-Center** Internal coolant G6.3 10,000 r.p.m.	Centering DIN 332 R DIN 332 A+B Spotting & Csink 60°, 90° & 120°	**I9MT1003** R / A+B Ø1.0~Ø3.15 60° 90° 120°	
ER16	**X060** G4.0 20,000 r.p.m.	Spotting/Engraving 30° ~ 142° Deburring 60° & 90°	**X060** 30° 45° 60° 90° 120° 142° 60° 90°	
ER16	**Multi-Functional Tool** G6.3 10,000 r.p.m.	Spotting Chamfering	**V060** 60°	
			N9MT0802 90°	
			N9MT11T3 90°	
ER16	**Chamfer Mill** G6.3 10,000 r.p.m.	Front & Back Chamfering Face Milling	**N9GX04T002** 45°	
ER11 ER16 ER20	**Power Mill** G6.3 10,000 r.p.m.	Ø10 ~ Ø32 Smaller, sharper and more effective teeth.	**A9GT0602** Re 0.1 Re 0.2 & Re 0.5	     

6

Ergo

99816-IC10BH	OAL = 56.5 mm
99816-X060	OAL = 33.5 mm
99816-V060	
99816-610	
99816-614	
99816-C10	
99816-10A06	OAL = 26 mm
99816-12A06	
99816-16A06	
99816-20A06	
99816-25A06	
99816-32A06	

Ergo Monoblock System



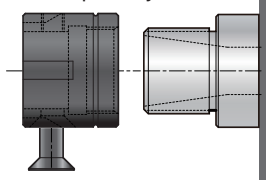
Center distance: 33mm
(ER16 M19)

ER 11

ER 16

ER 20

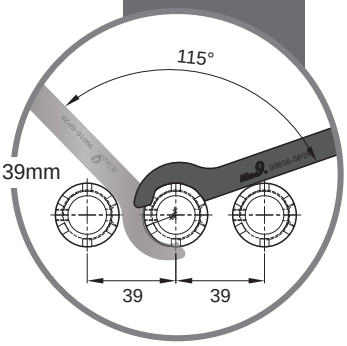
Pin & Nut
are sold separately.



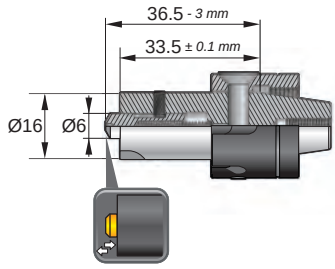
Pre-Balanced

99811 99816 99820

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



Center distance: 39mm
(ER16 M22)



Spring Pin

Ergo Setter TP

99816-TP

refer to Page 163

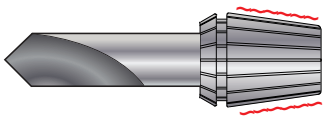
6

Ergo

Ergo's Features

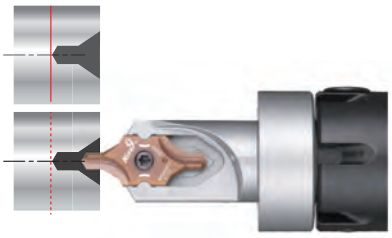
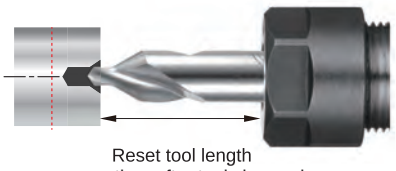
Optimize the rigidity >>

- An integrated ER taper- shank cutter, eliminate assembly tolerance.
- Pre-balanced, ready for high speed machining. Increase tool life.

Ergo Integrated design	Cutting tool + Spring collet
	
• Improve tool concentricity • Increase rigidity	• When tightening ER nut, be cautious of uneven tightening situation. • Chips, rust, or collet deform.

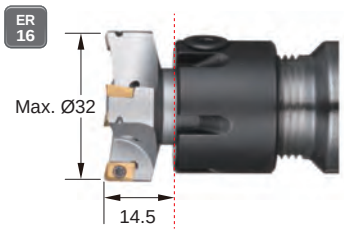
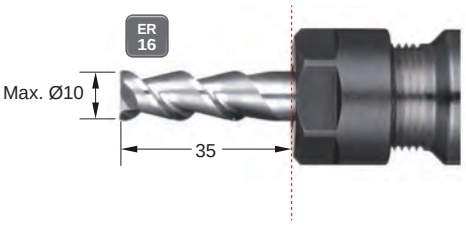
Excellent repeatability, saving set-up time >>

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

Ergo indexable cutter	Solid carbide center drill
	
	Reset tool length every time after tool changed

Dimension is not limited by the ER16 collet clamping range >>

- Cover milling cutter range from Ø10 to Ø32mm.
- More efficiency and the possibilities to cut bigger parts.
- The shorter tool length, the better run-out accuracy.

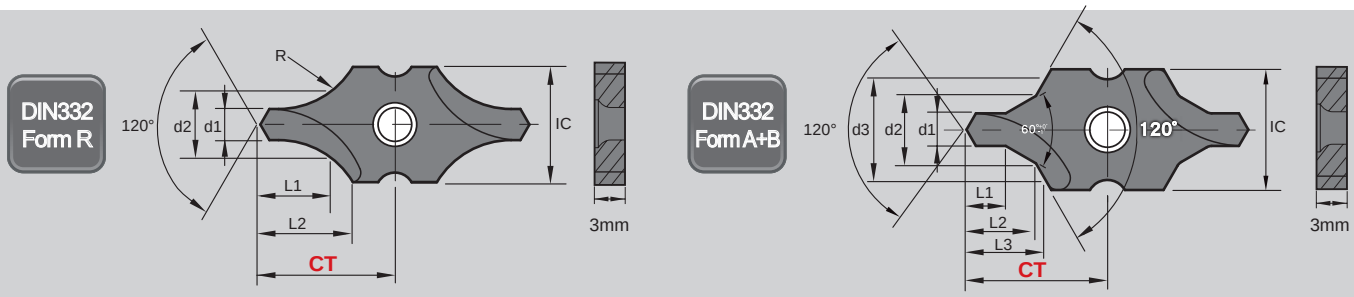
Ergo indexable cutter	Solid carbide end mill
	

Easy and simple assembly >>

- A simple Ergo cutter has minimal assemble parts, saving 50% your time.
- Thanks to ER taper, the repeatability of assemble tolerance is ±0.1mm while changing same tool length of Ergo holder.

Ergo cutter	Solid carbide cutter

i-Center Indexable Center Drill



For DIN332 Form R Center Hole >>

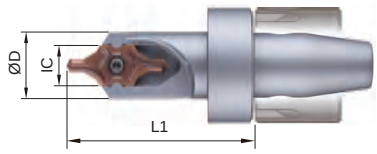
IC	Code	Parts No.	Coating	Grade	d1		d2	L1	L2	R	CT ±0.025
10	031200	I9MT1003R0100-NC2057	AlTiN+ TiSiN	P35	1.00	+ 0.14 0	2.12	2.16	4.72	2.8	12.35
	031201	I9MT1003R0125-NC2057			1.25		2.65	2.74	5.22	3.5	
	031202	I9MT1003R0150-NC2057			1.50		3.60	3.67	6.14	5.0	
	031203	I9MT1003R0160-NC2057			1.60		3.35	3.45	5.32	4.5	
	031204	I9MT1003R0200-NC2057			2.00		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	+ 0.18 0	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	AlTiN+ TiSiN	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		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	+ 0.18 0	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	

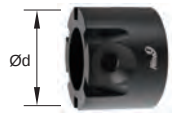
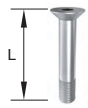
Basic Holder >>

• G6.3 / 10,000 r.p.m. • With internal coolant.

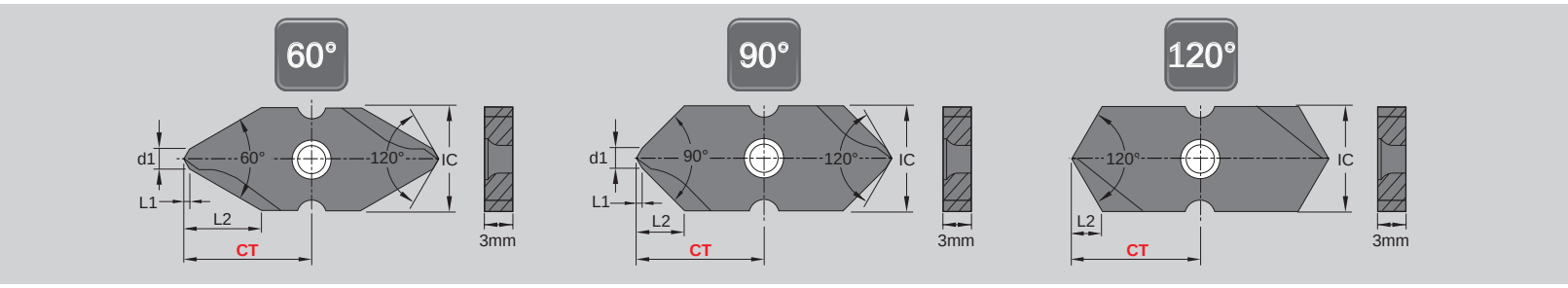
IC	Code	Parts No.	Basic Holder	L1	øD	Screw	Key
10	16-801003	00-99816-IC10BH		45	16	*NS-25060/ 0.9Nm	NK-T7

*Torque screwdriver is recommended.

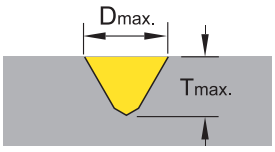
Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
* Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	00-99816-M19S	00-99816-M19	25	M19xP1.0	30 Nm	NS-50025	25	5 Nm	NK-LW3	00-99816-SP28
	00-99816-M22S	00-99816-M22	28	M22xP1.5	30 Nm	NS-50028	28	5 Nm		

i-Center Spotting & Countersink



Insert >>

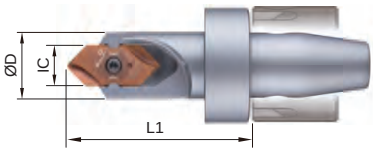


- Double-edged cutting, fully ground insert for improving machining stability.
- NC2057: Universal grade for all kind of steel.
- Each insert has 2 cutting edges.

IC	Angle	Code	Parts No.	Coating	Grade	Dimensions			Dmax.	Tmax.	CT ±0.025
						d1	L1	L2			
10	60°	031401	I9MT1003CT060-NC2057	AlTiN+ TiSiN	P35	2	0.58	7.5	10	7.5	12.35
	90°	031402	I9MT1003CT090-NC2057					4.6	10	4.6	
	120°	031403	I9MT1003CT120-NC2057			-	-	2.9	10	2.9	

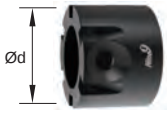
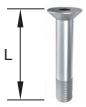
Basic Holder >>

- G6.3 / 10,000 r.p.m.
- With internal coolant.

IC	Code	Parts No.	Basic Holder	L1	øD	Screw	Key
10	16-801003	00-99816-IC10BH		45	16	*NS-25060 / 0.9Nm	NK-T7

*Torque screwdriver is recommended.

Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
* Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	00-99816-M19S	00-99816-M19	25	M19xP1.0	30 Nm	NS-50025	25	5 Nm	NK-LW3	00-99816-SP28
	00-99816-M22S	00-99816-M22	28	M22xP1.5	30 Nm	NS-50028	28	5 Nm		

i-Center 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.

Indexable Center Drill >>

Workpiece Material		Vc (m/min.)		d1 (Pilot Diameter)									
				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 ~ 9000	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	< 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	● ≥ 5 bar	○
			f mm/rev.	0.003 ~ 0.01	0.005 ~ 0.015	0.005 ~ 0.02	0.005 ~ 0.02	0.01 ~ 0.025	0.01 ~ 0.03	0.01 ~ 0.01	0.02 ~ 0.05		
N	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

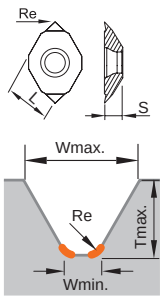
Spotting & Countersink >>

Workpiece Material		Spotting				Countersink	
		Vc (m/min)	f (mm/rev.)			Vc (m/min)	f (mm/rev.)
			60°	90°	120°		
P	Carbon steel C<0.3%	120 ~ 250	0.04 ~ 0.20	0.15 ~ 0.25	0.10 ~ 0.30	120 ~ 250	0.20 ~ 0.50
	Carbon steel C>0.3%	100 ~ 220	0.04 ~ 0.20	0.10 ~ 0.05	0.10 ~ 0.30	100 ~ 220	0.20 ~ 0.40
	Low alloy steel C<0.3%	100 ~ 200	0.03 ~ 0.16	0.08 ~ 0.20	0.10 ~ 0.25	100 ~ 200	0.15 ~ 0.40
	High alloy steel	80 ~ 180	0.03 ~ 0.12	0.08 ~ 0.20	0.10 ~ 0.25	80 ~ 180	0.10 ~ 0.30
M	Stainless steel	60 ~ 120	0.02 ~ 0.10	0.06 ~ 0.12	0.08 ~ 0.15	60 ~ 120	0.08 ~ 0.30
N	Non-ferrous metal	150 ~ 300	0.04 ~ 0.20	0.10 ~ 0.25	0.10 ~ 0.30	150 ~ 300	0.20 ~ 0.50

X060 Micro Spotting & Engraving

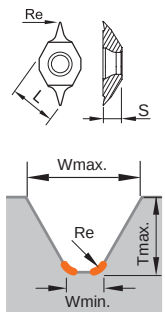
Micro Spotting >>

• Radius Angled Form

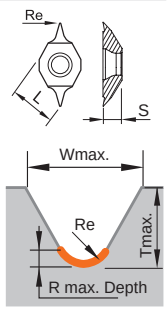
Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
90°	01X0082	X060A90W010R	NC2032	TiAlN	K20F		6	2.05	0.02	0.10	1.10	0.5
	01X0220		XP9001	Uncoated								
120°	01X0222	X060A120W010R	NC2032	TiAlN	K20F					0.10	2.53	0.7
142	01X0223	X060A142W010R	NC2032	TiAlN	K20F					0.10	2.42	0.4

Engraving >>

• Radius Angled Form

Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
30°	01X0140	X060A30W020R	NC2032	TiAlN	K20F		6	2.05	0.04	0.20	0.52	0.6
	01X0142		XP9001	Uncoated								
45°	01X0021	X060A45W020R	NC2032	TiAlN	K20F					0.20	0.86	0.8
	01X0154		XP9001	Uncoated								
60°	01X0063	X060A60W020R	NC2032	TiAlN	K20F					0.20	1.36	1.0
	01X0166		XP9001	Uncoated								
90°	01X0207	X060A90W020R	NC2032	TiAlN	K20F					0.20	2.20	1.0
	01X0209		XP9001	Uncoated								

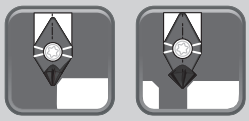
• Radius Form

Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	R max. Depth	Wmax.	Tmax.
30°	01X0119	X060A30R020	NC2032	TiAlN	K20F		6	2.05	0.2	0.15	0.63	0.6
	01X0134		XP9001	Uncoated								
45°	01X0013	X060A45R020	NC2032	TiAlN	K20F					0.12	0.93	0.8
	01X0150		XP9001	Uncoated								
60°	01X0117	X060A60R020	NC2032	TiAlN	K20F					0.10	1.39	1.0
	01X0159		XP9001	Uncoated								

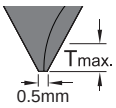
More & Cutting Data >>

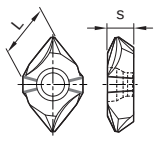
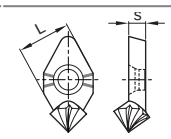
• For more micro spotting insert & cutting data, please refer to page 25.
For more engraving insert & cutting data, please refer from page 81.

X060 Deburring



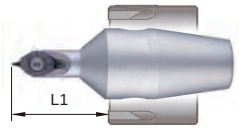
Deburring >>



Angle	Code	Part No.	Coating	Grade	Flutes		Dimensions L	Dimensions S	Tmin.	Tmax.
60°	01X611	X060A60T3-NC2032	TiAlN	K20F	3		6	2.8	0.1	0.9
	01X612	X060A60T3-XP9001	Uncoated							
90°	01X911	X060A90T3-NC2032	TiAlN							
	01X912	X060A90T3-XP9001	Uncoated							
60°	01X601	X060A60T6-NC2032	TiAlN	K20F	6		6	2.0	0.1	1.8
90°	01X901	X060A90T6-NC2032							0.5	1.5

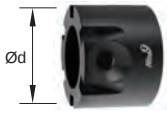
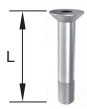
Basic Holder >>

- For entire X060 engraving, spotting and deburring inserts.
- G4.0 / 20,000 r.p.m.

Code	Parts No.	Basic Holder	L1	Screw	Key
16-69X004	00-99816-X060		22	*NS-22044 0.9Nm	NK-T7

*Torque screwdriver is recommended.

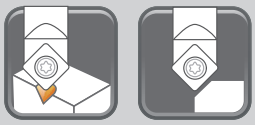
Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
* Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	00-99816-M19S	00-99816-M19	25	M19xP1.0	30 Nm	NS-50025	25	5 Nm	NK-LW3	00-99816-SP28
	00-99816-M22S	00-99816-M22	28	M22xP1.5	30 Nm	NS-50028	28	5 Nm		

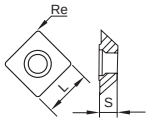
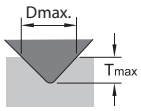
Cutting Data >>

- For Deburring, please refer to page 85.

Multi-Functional Tool Spotting & Chamfering

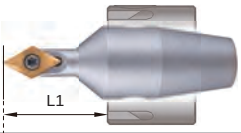


Inserts >>

Angle	Code	Parts No.	Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
60°	0106001	V06006T1W06-NC2071	TiN	K20F		6.35	2.0	0.2	2.7	2.0
	0106002	V06006T1W06-NC2032	TiAlN							
	0106004	V06006T1W06-NC9031	TiN							
90°	013401	N9MT080208CT-NC40	TiN	K20F		8.31	2.38	0.8	10	4.5
	013402	N9MT080204CT-NC40	TiN					0.4	10	4.5
	013403	N9MT080204CT-NC10	TiAlN							
90°	014401	N9MT11T3CT-NC40	TiN	P35		11.11	3.97	0.8	14	7
	014402	N9MT11T3CT-NC10	TiAlN	K10F				0.3		

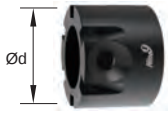
Basic Holder >>

• G6.3 / 10,000 r.p.m.

Code	Parts No.	Basic Holder	Insert Type	L1	Screw	Key
16-692005	00-99816-V060		V060...	22	*NS-22044 0.9Nm	NK-T7
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

*Torque screwdriver is recommended.

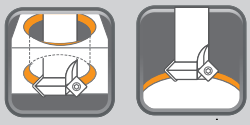
Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
* Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	00-99816-M19S	00-99816-M19	25	M19xP1.0	30 Nm	NS-50025	25	5 Nm	NK-LW3	00-99816-SP28
	00-99816-M22S	00-99816-M22	28	M22xP1.5	30 Nm	NS-50028	28	5 Nm		

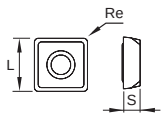
Cutting Data >>

please refer to page 82 for 60° insert, page 51 for 90° insert.

45° Chamfer Mill

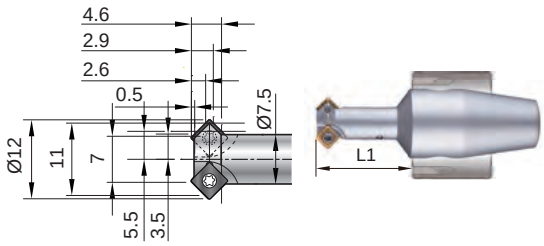


Inserts >>

Code	Parts No.		Coating	Grade		Dimensions		
						L	S	Re
021401	N9GX04T002	NC2032	AlTiN	K20F		4.0	1.8	0.2
021402		NC9071	TiN					

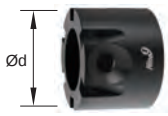
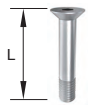
Basic Holder >>

- For front and back chamfering.
- G6.3 / 10,000 r.p.m.

Code	Parts No.	Basic Holder	L1	No. of teeth	Screw	Key
16-701003	00-99816-C10		22	2	*NS-18037 0.6Nm	NK-T6

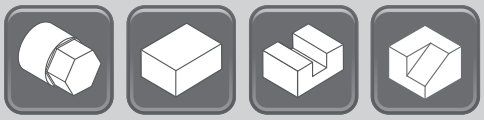
*Torque screwdriver is recommended.

Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
* Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	00-99816-M19S	00-99816-M19	25	M19xP1.0	30 Nm	NS-50025	25	5 Nm	NK-LW3	00-99816-SP28
	00-99816-M22S	00-99816-M22	28	M22xP1.5	30 Nm	NS-50028	28	5 Nm		

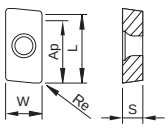
Cutting Data >> please refer to page 91.

Power Mill



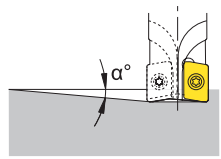
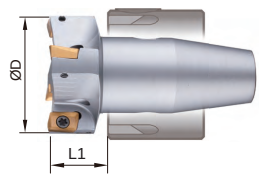
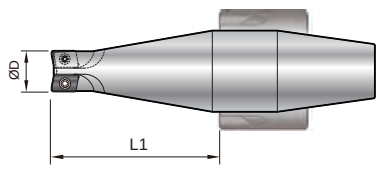
Inserts >>

- U type insert is fully ground for reducing the cutting resistance during the cutting, best choice for long shank cutter.
- H type with high positive rake angle, shape edge.

Code	Parts No.		Coating	Grade	Insert	Dimensions				
						Re	Ap	L	W	S
05A122	A9GT060201H	NC2033	TiAIN	K20F		0.1	5	6.5	4	2.45
05A123		NC9031	TiN							
05A132	A9GT060202H	NC2033	TiAIN	K20F		0.2				
05A133		NC9031	TiN							
05A102	A9GT060205H	NC2033	TiAIN	K20F		0.5				
05A103		NC9031	TiN							
05A142	A9GT060201U	NC2032	TiAIN	K20F		0.1				
05A143	A9GT060202U	NC2032	TiAIN	K20F		0.2				
05A144	A9GT060205U	NC2032	TiAIN	K20F		0.5				

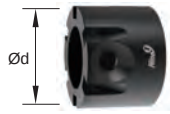
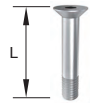
Basic Holder >>

- G6.3 / 10,000 r.p.m.
- Customized cutter is available on request. Please refer to page 5-107.

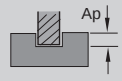
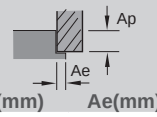
ER Taper	Code	Parts No.	ØD	Basic Holder	L1	No. of teeth	α°	Screw / Key
ER11	11-51A100	00-99811-10A06	10	 	14	2	5	*NS-18037 0.6Nm / NK-T6
	11-51A122	00-99811-12A06	12			2	4	
ER16 (with internal coolant)	16-51A100	00-99816-10A06	10		14.5	2	5	
	16-51A122	00-99816-12A06	12			2	4	
	16-51A130	00-99816-16A06	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	
ER20	20-51A122	00-99820-12A06	12		26	2	4	
	20-51A130	00-99820-16A06	16			3	2	
	20-51A140	00-99820-20A06	20			3	2	
	20-51A150	00-99820-25A06	25			4	1.3	
ER16	16-51A101	00-99816-10A06-32L	10		32	2	5	
	16-51A102	00-99816-10A06-40L	10		40	2	5	
ER20	20-51A101	00-99820-10A06-40L	10			2	5	
	20-51A124	00-99820-12A06-40L	12			2	4	

*Torque screwdriver is recommended.

Accessories - Set & Spare >>

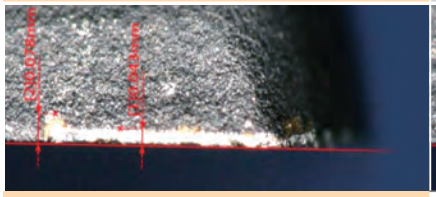
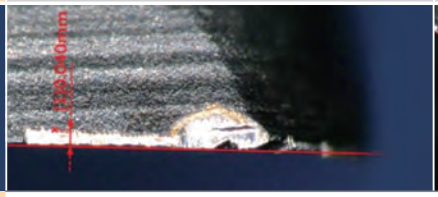
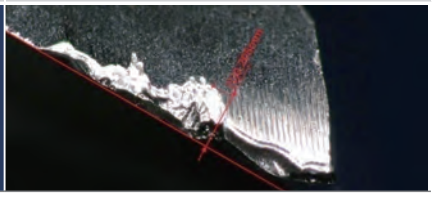
Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
* Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER11	00-99811-M13S	00-99811-M13	19	M13xP0.75	12 Nm	NS-40019	19	3 Nm	NK-LW25	00-99811-SP20
ER16	00-99816-M19S	00-99816-M19	25	M19xP1.0	30 Nm	NS-50025	25	5 Nm	NK-LW3	00-99816-SP28
	00-99816-M22S	00-99816-M22	28	M22xP1.5	30 Nm	NS-50028	28	5 Nm		
ER20	00-99820-M24S	00-99820-M24	34	M24xP1.0	45 Nm	NS-60033	33	6 Nm	NK-LW4	00-99820-SP36
	00-99820-M25S	00-99820-M25	34	M25xP1.5	45 Nm	NS-60033	33	6 Nm		

Cutting Data >>

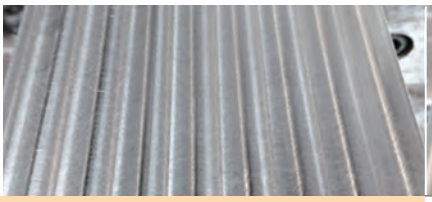
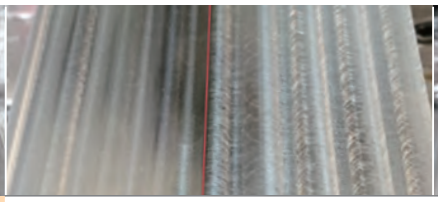
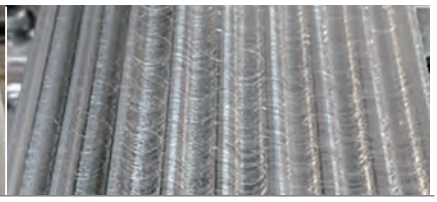
Workpiece Material		Vc (m/min)	fz (mm/tooth)	 Ap(mm)	 Ap(mm)	Ae(mm)	Grade of insert
P	Carbon steel	80 ~ 150	0.03 ~ 0.07	1.5	3	1	NC2033 NC2032
P	Low alloy steel C < 0.3%						
P	High alloy steel	60 ~ 120	0.02 ~ 0.06	1.0	2.5	1	NC2033 NC2032
M	Stainless steel	60 ~ 120	0.01 ~ 0.05	0.5	2.0	1	NC9031 NC2033
N	Non-ferrous metal	200 ~ 500	0.02 ~ 0.07	2.0	4.0	2	NC9031 NC2032

Performance >>

• Result - Surface Quality

Ergo power mill Ø10	Indexable milling cutter Ø10	Carbide end mill Ø10
		
VB=0.04 mm No chipping	VB=0.04 mm Partial chipping	VB=0.20 mm Extensive chipping

• Measure VB value (tool wearing) and chipping condition

		
Surface finishing is fine	About 50% surface finishing is rough	About 80% surface finishing is rough

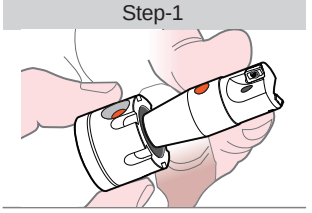
6

Ergo

Assembly Steps

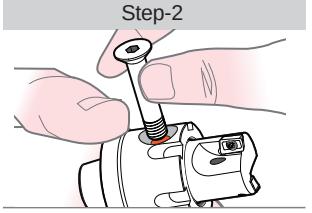
Make sure all parts are clean while re-assembly or change tool

Step-1



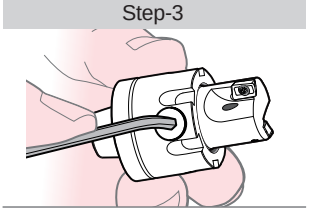
Place Ergo holder into Ergo nut and align to screw hole.

Step-2



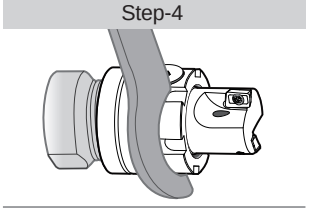
Put Ergo pin into screw hole.

Step-3



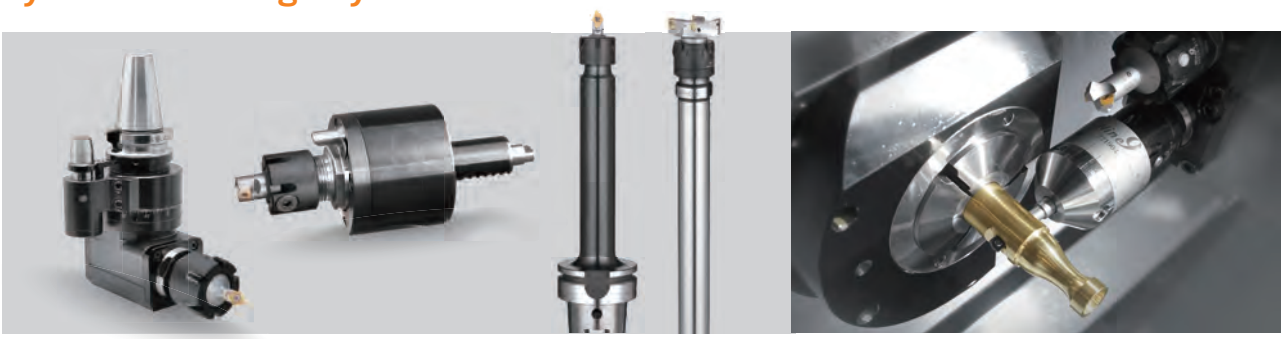
Lock Ergo pin screw.

Step-4



Tighten into ER holder or driven tool spindle.

As long as it complies with ER11, 16, 20 and ER25 standard, you can use Ergo system. >>

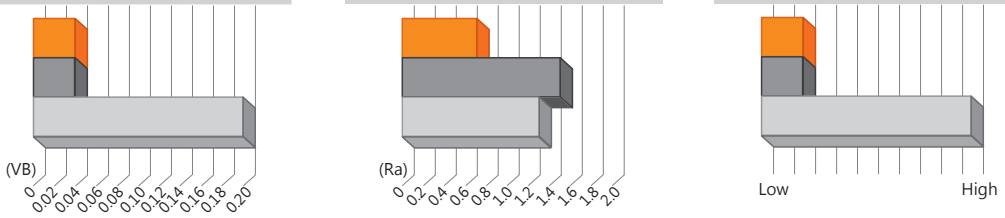


- Quick change and ultrashort over all tool length.
- Apply on any kinds of driven tools and collet chucks.

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

Tool	Tool Wear	Surface Roughness	Cutting Noise
Ergo Power Mill			
Indexable cutter			
Carbide end mill			



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)	i-Center	161-801003	00-99816-IC10BH-M19S	Ergo Holder x1 Ergo ER16 Mini Nut x1 High Strength Ergo pin x1 3mm L key x1 Insert Key x1 * The insert is not included.
	X060 - Micro Spotting, Engraving & Deburring	161-69X004	00-99816-X060-M19S	
	Multi-Functional Tool - Spotting & Chamfering	161-692005	00-99816-V060-M19S	
		161-603004	00-99816-610-M19S	
		161-604010	00-99816-614-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	
	Tool Length Setter	161-TP0001	00-99816-TP-M19S	
With ER16 Nut (M22 x 1.5 P)	i-Center	162-801003	00-99816-IC10BH-M22S	Ergo Holder x1 Ergo ER16 Nut x1 High Strength Ergo pin x1 3mm L key x1 Insert Key x1 * The insert is not included.
	X060 - Micro Spotting, Engraving & Deburring	162-69X004	00-99816-X060-M22S	
	Multi-Functional Tool - Spotting & Chamfering	162-692005	00-99816-V060-M22S	
		162-603004	00-99816-610-M22S	
		162-604010	00-99816-614-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	
	Tool Length Setter	162-TP0001	00-99816-TP-M22S	

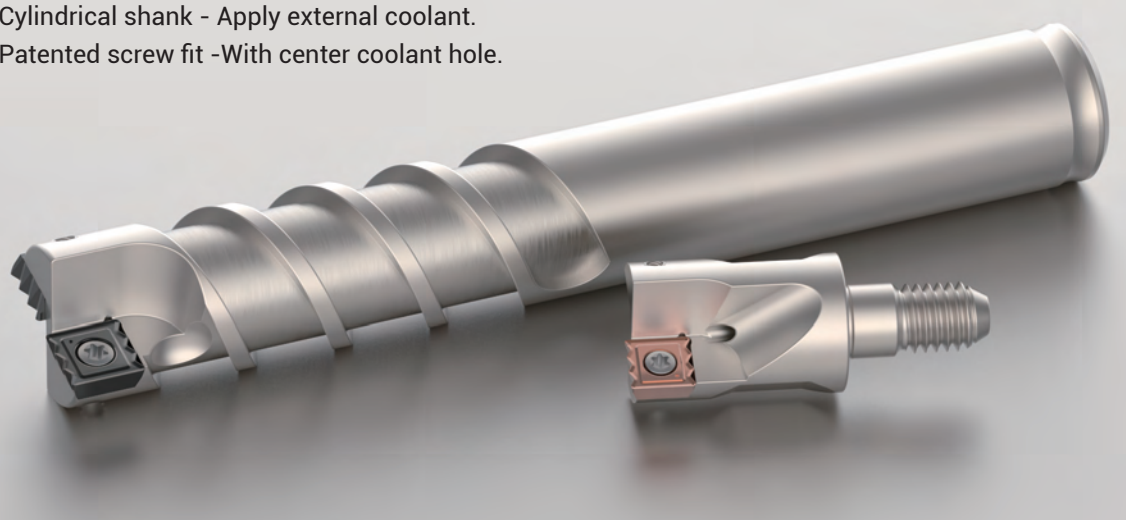
NC Helix Drill >>>

The Expert Of Swarfs Control

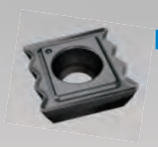
P M K N S H

Two Types Of Shank, Drilling Depth Up To 8xDc

- Cylindrical shank - Apply external coolant.
- Patented screw fit -With center coolant hole.



Features >>>



Serrated Cutting Edge.

- One insert is able to cut different materials.
- Special insert geometry is able to cut different materials and eliminate swarf and vibration problems while drilling difficult material or deeper holes. Excellent swarfs control for providing safe and smooth chip removal for modern automation.
- 2 cutting edges insert

Only Six Tools For Making Ø13~Ø65mm Holes From Solid.

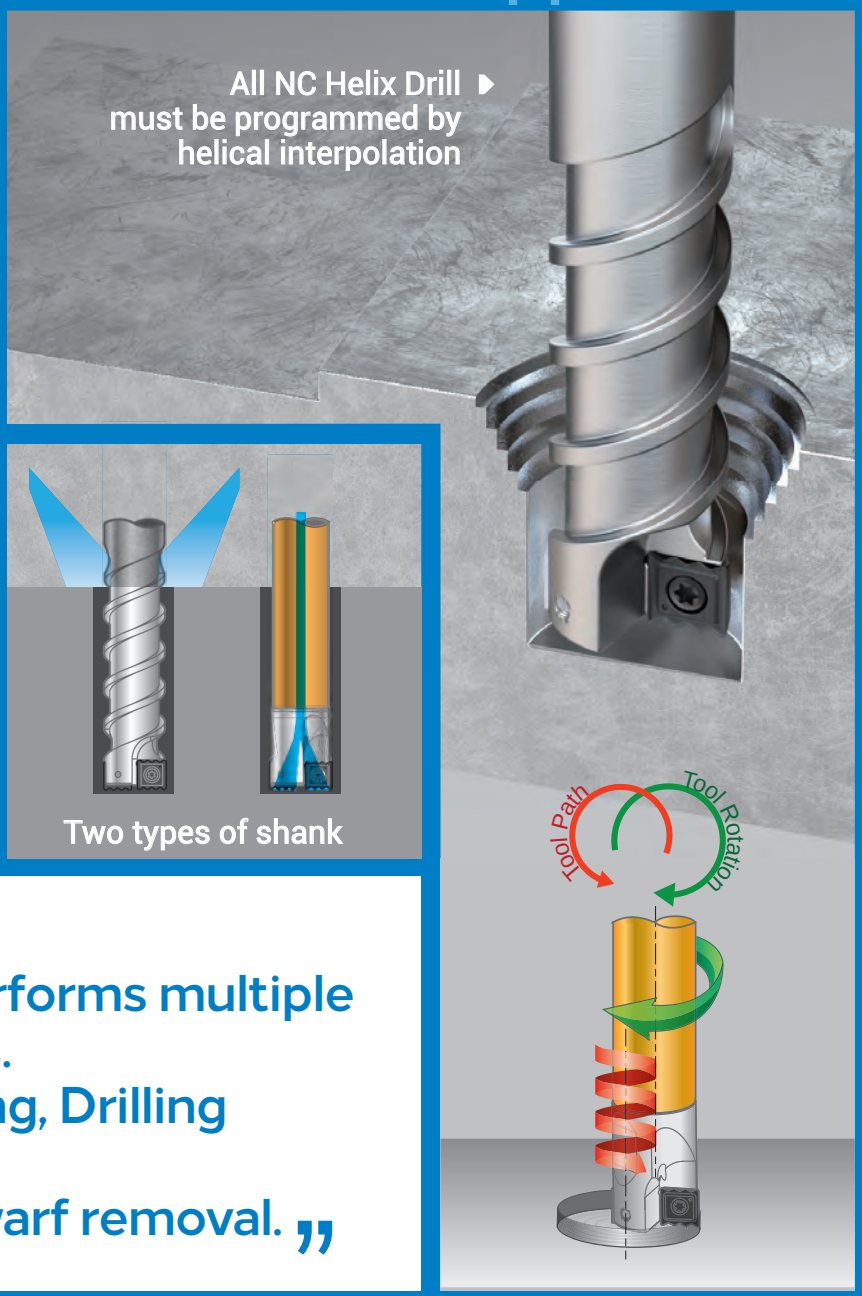
- Saving your tool inventory and cost!
- No need to peck drill or dwell in operation even machine without internal coolant.

20° Ramping Angle, Either Linear Or Circular Ramping.

- Cuts material by helical interpolation, maximum ramping angle is 20°.

Low Spindle Power Is Required, Easy To Cut, Not Only A Drill, But An End Mill Too.

Applications



All NC Helix Drill must be programmed by helical interpolation

Two types of shank

"
- One tool performs multiple applications.
- Rough Milling, Drilling & Slotting.
- Excellent swarf removal. "

Short & small chips

NC Helix Drill Features

Reduce your tool inventory >> Low Cost! Economy!

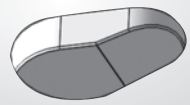
- Each holder can machine different diameters and hole depths, saving your tool inventory and cost!
- No need to peck drill or dwell in operation even machine without internal coolant.

Reduce Inventory	Large Inventory

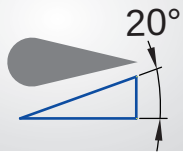
Lower spindle power consumption >> Easy to cut!

- Thanks to the small cutting load of the serrated cutting edge and helical interpolation lower power consumption. Work quicker, smarter and achieve better results.
- Circular ramping milling, maximum ramping angle is 20°.
- For example: tool HD27 machining Ø50 mm hole, 9 mm pitch for aluminum, 6 mm pitch for carbon steel.

Circular milling

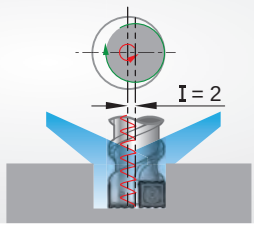
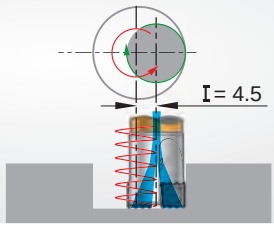


Ramping Angle



Just six tools for drilling Ø13~ Ø 65 mm or larger >>

Example

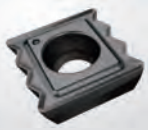
Hole Ø15 / Tool Ø11	Hole Ø20 / Tool Ø11
	

- Cuts by helical interpolation.
- Each holder can machine different diameters and hole depths.
- Enlarger hole is adaptable by using 99323 internal coolant cutter.

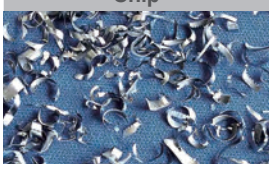
Special insert geometry >> exceptional swarfs control.

- Serrated cutting edge makes the chips short and small, and easier to evacuate.
- Eliminate swarf and vibration problems while drilling difficult material or deeper holes.
- Excellent swarfs control for providing safe and rational chip removal for modern automation.

Insert



Chip



Functions in variable conditions >>
It's so easy!

Circular Milling	Half Hole	Concave Surfaces	Angled Surfaces	Stack Drilling

Cross Holes	Round Workpiece Offset Drilling	Cone Workpiece Offset Drilling	Half hole on radius

Roughness Measuring >>

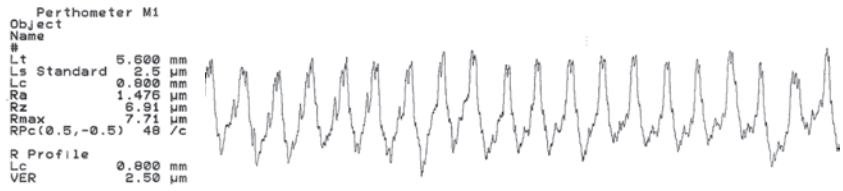
- Making a flatness at bottom just by NC program, easy and smart!

Workpiece Application

Flatness

Make " One more turn" after reached the depth.
Ex :
⋮

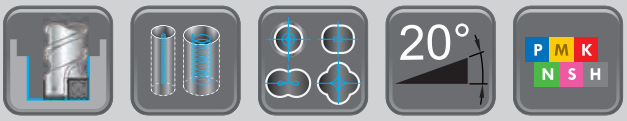
G03 I-1.5 Z-30 P5
G03 I-1.5 <make one more turn >
G01 X0 Y0 < afterward, let tool back to center of hole >

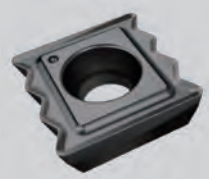


One tool performs multiple applications >>

Not only a drill, but an end mill tool. Small path radius to cut hole, step hole, various shape of cavity on different material.
Less inventory of different sizes of drills and indexable end mills.
Replace your end mill by NC Helix Drill. Make the impossible become possible!

NC Helix Drill



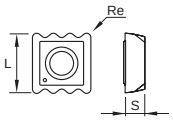


Inserts >>

NC5075 : • Good for steel with heat treatment up to HRC 50.
• Reduce heat and tool wear.
• Long tool life.

NC5072 : • P40, TiAlN coating. General purpose, suitable for almost all kind of steel, stainless steel and Titanium.
• Recommended while clamping devices is unstable or deep hole drilling or apply on low power machines.

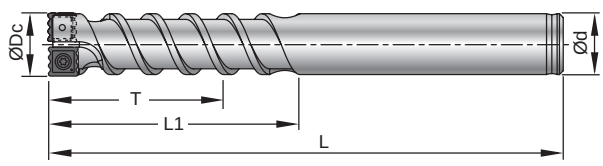
NC2032 : • K20F, TiAlN coating.
• Design for high performance cutting, special good for cast iron and hardened material <HRC 50.

Code	Parts No.		Grade	Coating		Dimensions			Screw	Key
						L	S	Re		
041041	01-N9MX04T002	NC5075	TiAlN+ALDURA	P40		4.75	1.8	0.2	*NS-18037 0.6Nm	NK-T6
041021		NC5072	TiAlN	P40						
041001		NC2032		K20F						
042041	01-N9MX05T103	NC5075	TiAlN+ALDURA	P40		5.75	2.0	0.3	*NS-20045 0.6Nm	NK-T6
042021		NC5072	TiAlN	P40						
042001		NC2032		K20F						
043041	01-N9MX070204	NC5075	TiAlN+ALDURA	P40		7.5	2.4	0.4	*NS-25045 0.9Nm	NK-T7
043021		NC5072	TiAlN	P40						
043001		NC2032		K20F						
044041	01-N9MX100306	NC5075	TiAlN+ALDURA	P40		10.0	3.18	0.6	NS-30072 2.0Nm	NK-T9
044021		NC5072	TiAlN	P40						
044001		NC2032		K20F						
045041	01-N9MX12T308	NC5075	TiAlN+ALDURA	P40		12.5	3.97	0.8	NS-35080 2.5Nm	NK-T15
045021		NC5072	TiAlN	P40						
045001		NC2032		K20F						

*Torque screwdriver is recommended.

Cylindrical Shank >>

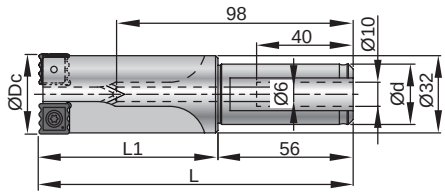
• Made from hardened high alloy steel HRC 48.
• Unique helical groove design generates chip-removing coolant stream.
• Designed for CNC machine with external coolant.



Code	Parts No.	Type	Capable of drill dia. mm		ØDc	T	L1	L	Ød	Insert type	Max. ramping angle
			Dmin.	Dmax.							
401001	00-99321-010-1320	BC10-HD11-1320	**13**	**20**	11	30	40	80	10	N9MX04T002	20°
402001	00-99321-012-1525	BC12-HD13-1525	**15**	**25**	13	36	50	100	12	N9MX05T103	20°
403001	00-99321-016-2030	BC16-HD17-2030	**20**	**30**	17	50	60	110	16	N9MX070204	20°
404001	00-99321-020-2540	BC20-HD22-2540	**25**	**40**	22	60	70	125	20	N9MX100306	20°
405001	00-99321-025-3050	BC25-HD27-3050	**30**	**50**	27	75	85	165	25	N9MX12T308	20°

Side Lock Shank >>

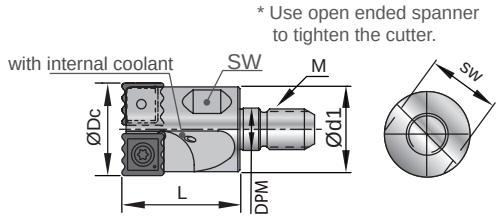
- Made from hardened high alloy steel HRC 48.
- With internal coolant
- Special size is available on request.



Code	Parts No.	Type	Capable of drill dia. mm		ØDc	L	L1	Ød	Max. Depth	Insert type	Max. ramping angle
			Dmin.	Dmax.							
405002	00-99321-025-4265	SL25-HD33-4265	**42**	**65**	33	130	74	25	50	N9MX12T308	9°

Screw Fit Cutter >>

- Made from hardened high alloy steel HRC 42.
- With internal coolant.
- Standard screw-fit body adapts to almost any kinds of the screw-fit tool holder or extension bar in the market.
- Possible to apply for enlarge hole.



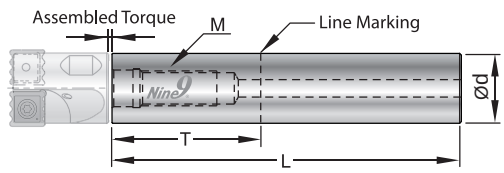
Code	Part No.	Type	Capable of drill dia. mm		ØDc	L	M	DPM	Ød1	SW	Insert type	Max. ramping angle
			Dmin.	Dmax.								
421001	00-99323-010-1320	M05-HD11-1320	**13**	**20**	11	20	M5	5.5	10	8	N9MX04T002	20°
422001	00-99323-012-1525	M06-HD13-1525	**15**	**25**	13	25	M6	6.5	12	10	N9MX05T103	20°
423001	00-99323-016-2030	M08-HD17-2030	**20**	**30**	17	25	M8	8.5	16	14	N9MX070204	20°
424001	00-99323-020-2540	M10-HD22-2540	**25**	**40**	22	30	M10	10.5	20	18	N9MX100306	20°
425001	00-99323-025-3050	M12-HD27-3050	**30**	**50**	27	35	M12	12.5	25	23	N9MX12T308	20°

* Special size is available by request.

Extension Bar

Steel Type >>

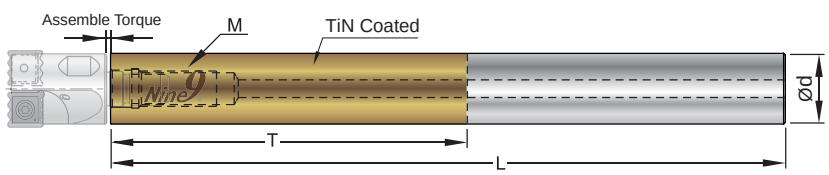
- T is the maximum overhang length.
- With internal coolant hole.



Code	Parts No.	Type	Ød	T	L	M	Assembled Torque
970100	00-99801-10S	BC10-075M05S	10	25	75	M5xP0.8	6.5 Nm
970122	00-99801-12S	BC12-075M06S	12	25	75	M6xP1.0	11.0 Nm
970161	00-99801-16S	BC16-090M08S	16	35	90	M8xP1.25	25.0 Nm
970202	00-99801-20S	BC20-100M10S	20	40	100	M10xP1.5	50.0 Nm
970253	00-99801-25S	BC25-120M12S	25	50	120	M12xP1.75	60.0 Nm

Solid Carbide Type >>

- T is the maximum overhang length.
- With internal coolant hole.

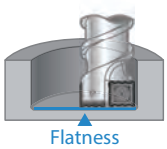


Code	Parts No.	Type	Ød	T	L	M	Assembled Torque
980102	00-99801-10W	BC10-100M05W	10	50	100	M5xP0.8	6.5Nm
980122	00-99801-12W	BC12-100M06W	12	60	100	M6xP1.0	11.0Nm
980143	00-99801-14W	BC14-120M08W	14	70	120	M8xP1.25	25.0Nm
980164	00-99801-16W	BC16-150M08W	16	80	150	M8xP1.25	25.0Nm
980184	00-99801-18W	BC18-150M10W	18	90	150	M10xP1.5	50.0Nm
980205	00-99801-20W	BC20-200M10W	20	100	200	M10xP1.5	50.0Nm
980255	00-99801-25W	BC25-200M12W	25	125	200	M12xP1.75	60.0Nm

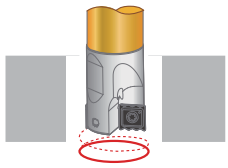
Technical Guide

Programming conditions

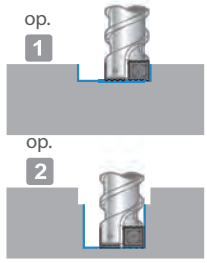
Blind Hole*



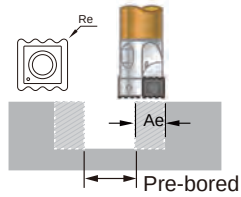
Through Hole*



Step Hole



Pre-bored work piece



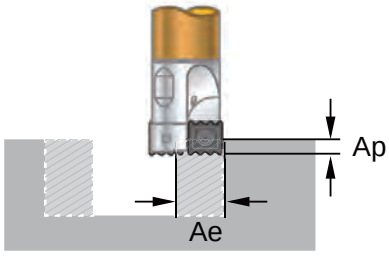
External coolant Min. 5 bar

Internal coolant Min. 10 bar

*50% feedrate reduced at the bottom or last circlar of cutting.

For enlarge hole

Minimum and Maximum Ae for programming a pre-bored hole

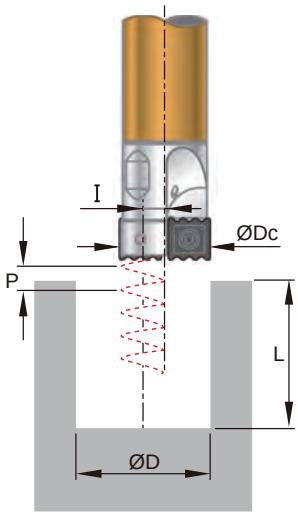


Max. Ae = Dc- (Rex2)
Min. Ae = 1/3 insert length (L)
Max. ap < 3/4 of insert length

Insert type	Re	Min. Ae	Max. Ae	Max. Ap
N9MX04T002	0.2	1.6	10.6	3.5
N9MX05T103	0.3	2.0	12.4	4.3
N9MX070204	0.4	2.5	16.2	5.6
N9MX100306	0.6	3.3	20.8	7.5
N9MX12T308	0.8	4.2	25.4	9
N9MX12T308*	0.8	4.2	31.4*	9

(* for 99321-025-4265)

NC Helix Drill



Cutting Parameters (S & F)

$$S = \frac{Vc \times 1000}{Dc \times \pi} \text{ r.p.m.}$$

$$F = S \times fz \times Z \quad \text{mm/min.}$$

$$d = D - Dc \text{ mm}$$

$$I = \frac{(D-Dc)}{2} \text{ mm}$$

Cutting time (T)

$$T = \frac{\pi \times d \times L \times 60}{F \times P} \text{ sec.}$$

Chip removal Volume rate (Q)

$$Q = \frac{\pi \times D^2 \times L \times 60}{4 \times 1000 \times T} \text{ cm}^3\text{/min.}$$

Formula

Dc	=	Dia. of drill	mm
D	=	Dia. of hole	mm
L	=	Depth of drilling	mm
Vc	=	Cutting speed	m/min.
S	=	Spindle speed	r.p.m.
I	=	Circular radius	mm
fz	=	Feed rate	mm/tooth
F	=	Table feed rate	mm/min.
d	=	Circular diameter (D-Dc)	mm
P	=	Pitch of helical interpolation	mm
T	=	Cutting time	sec.
Q	=	Chip removal volume rate	cm^3 / min.
Z	=	Insert tooth	

Spindle power

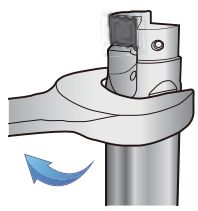
The Feed rate(Fc) may be adjusted by the power factor(PF) of below:

Fc= FxPF (mm/min.)

Spindle Type	BT-30 Small power			BT-40 Medium power			BT-50 Big power		
Spindle Power (KW)	< 5	7	10	12	16	20	22	25	> 30
Power Factor (PF)	0.8	0.85	0.9	0.95	1	1.05	1.1	1.15	1.2
Pitch (P)	Lower pitch			Medium pitch			Large pitch		

Remarks:
Fc: Adjusted Feed rate for real cutting
Pitch(P) can be selected according to spindle power.

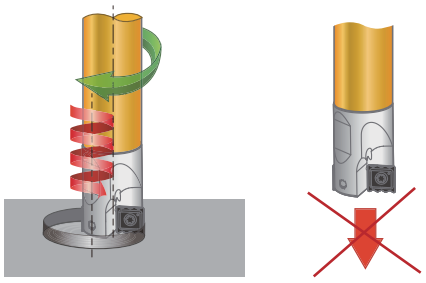
99323 screw fit cutter assembly



To ensure a secure fit, use a spanner to tighten the cutter until there is no gaps visible.

Part No.	Assembled Torque
99323-010-1320	6.5 Nm
99323-012-1525	11.0 Nm
99323-016-2030	25.0 Nm
99323-020-2540	50.0 Nm
99323-025-3050	60.0 Nm

Apply only helical interpolation or ramping down feed only!

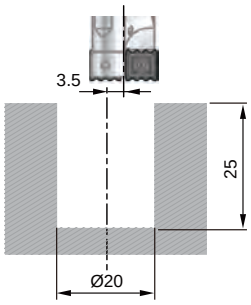


Step 1: Choose Cutting speed(Vc), feed rate(f) and Pitch(P) on the cutting data tables (page 122~124).
The feed rate and Pitch can be adjusted depend on the spindle power, please see page 120.
Step 2: Decide circular radius I (I= (D-Dc)/2)
For enlarge hole, decided Ae as page 120.
Step 3: Programming helical interpolation program according to CNC controller.
Step 4: Make the first hole and measure diameter as D', if D' is too small, please adjust "I" as I'=I+(D-D')/2 and try again, this value I' is possible to be adjusted to get correct D.

This sample program is written for general condition of the CNC controller. The NC program can be generated by most of the CAD/CAM system.

Example

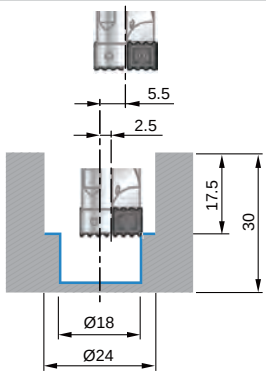
1 Programming a blind hole



Material	N AL6061T6
Holder	00-99321-012-1525
Insert	01-N9MX05T103-NC5072
Dc	ø13 mm
Vc	306 m/min.
f	0.065 mm/tooth
P	3 mm
I	(20-13)/2 = 3.5 mm

```
G00 G90 X3.5 Y0.
S7500 M03
G43 H01 Z30. M08
Z5.
G01 Z2. F500.
G03 I-3.5 Z-1. F975
G03 I-3.5 Z-4.
G03 I-3.5 Z-7.
G03 I-3.5 Z-10.
G03 I-3.5 Z-13.
G03 I-3.5 Z-16.
G03 I-3.5 Z-19.
G03 I-3.5 Z-22.
G03 I-3.5 Z-25.
G03 I-3.5 F500.
G01 X0. Y0.
G00 G90 Z5. M09
G00 G90 Z30. M05
G28 G91 Z0.
```

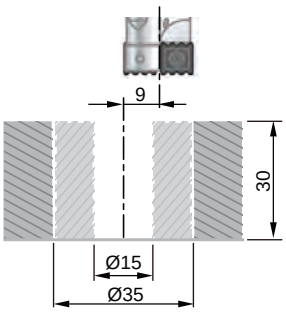
2 Programming a step hole



Material	P SCM440
Tool holder	00-99323-012-1525
Insert	01-N9MX05T103-NC5072
Dc	ø13 mm
Vc	100 m/min.
For D1	ø24 mm
f1	0.07 mm/tooth
I1	(24-13)/2 = 5.5 mm
P1	2.4 mm
For D2	ø18 mm
f2	0.05 mm/tooth
I2	(18-13)/2 = 2.5 mm
P2	1.5 mm

```
G00 G90 X5.5 Y0.
S2450 M03
G43 H02 Z10. M08
G01 Z1.7 F200.
Z5.
G03 I-5.5 Z-0.7 F343.
G03 I-5.5 Z-3.1
G03 I-5.5 Z-5.5
G03 I-5.5 Z-7.9
G03 I-5.5 Z-10.3
G03 I-5.5 Z-12.7
G03 I-5.5 Z-15.1
G03 I-5.5 Z-17.5
G03 I-5.5 F200.
G01 X2.5 Y0.
G03 I-2.5 Z-19. F245.
G03 I-2.5 Z-20.5
G03 I-2.5 Z-22.
G03 I-2.5 Z-23.5
G03 I-2.5 Z-25.
G03 I-2.5 Z-26.5
G03 I-2.5 Z-28.
G03 I-2.5 Z29.5
G03 I-2.5 Z31.
G03 I-2.5 F150.
G01 X0. Y0.
G00 G90 Z5. M09
G00 G90 Z30. M05
G28 G91 Z0.
```

3 Programming a pre-bore hole



Material	K FCD400
Tool holder	00-99321-016-2030
Insert	01-N9MX070204-NC5072
Prebore	15 mm
Dc	17 mm
Vc	90 m/min.
Pre-bored	ø15 mm
D	ø35 mm
f	0.1 mm/tooth
I	(35-17)/2 = 9.0 mm
P	4.0 mm

```
G00 G90 X9. Y0.
S1685 M03
G43 H03 Z30. M08
Z5.
G01 Z2. F200.
G03 I-9. Z-4. F337.
G03 I-9. Z-8.
G03 I-9. Z-12.
G03 I-9. Z-16.
G03 I-9. Z-20.
G03 I-9. Z-24.
G03 I-9. Z-28.
G03 I-9. Z-32.
G03 I-9. F200.
G01 X0. Y0.
G00 G90 Z5. M09
G00 G90 Z30. M05
G28 G91 Z0.
```

Cutting Data

Pitch Suggestion Table			
Spindle Power	< 12 KW	12-20 KW	> 20 KW
Pitch Pick Up	Lower Pitch	Medium Pitch	Higher Pitch

00-99321-010-1320 / 00-99323-010-1320 >>

	Workpiece material	Vc m/min.		Ø13				Ø16				Ø20				Grade of insert
		99321	99323	fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			
P	Carbon steel C<0.3%	120	200	0.025	0.60	0.80	1.00	0.055	0.90	1.20	1.50	0.08	1.20	1.60	2.00	NC2032
P	Carbon steel C>0.3%	100	150	0.025	0.60	0.75	0.90	0.05	0.80	1.10	1.35	0.07	1.00	1.40	1.80	NC5075
P	Low alloy steel C<0.3%	70	120	0.02	0.50	0.65	0.80	0.05	0.70	0.95	1.20	0.06	1.00	1.30	1.60	NC5072
P	High alloy steel	60	90	0.02	0.50	0.65	0.80	0.05	0.70	0.95	1.20	0.06	1.00	1.30	1.60	NC5075
M	Stainless steel	60	90	0.02	0.50	0.65	0.80	0.05	0.70	0.95	1.20	0.06	1.00	1.30	1.60	NC5072
K	Cast Iron	70	120	0.025	0.60	0.80	1.00	0.055	0.90	1.20	1.50	0.08	1.20	1.60	2.00	NC2032
N	Al, Al-alloys	350	500	0.025	0.90	1.20	1.50	0.055	1.30	1.80	2.25	0.08	1.80	2.40	3.00	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	200	400	0.025	0.70	0.95	1.20	0.055	1.00	1.40	1.80	0.08	1.40	1.90	2.40	NC2032
S	Heat resistant alloy	20	30	0.01	0.50	0.65	0.80	0.015	0.70	0.95	1.20	0.03	0.90	1.30	1.60	NC5075
S	Ti, Ti-alloy	40	60	0.01	0.50	0.65	0.80	0.015	0.70	0.95	1.20	0.03	0.90	1.30	1.60	NC5072
H	Hardened steel < HRC50	60	90	0.02	0.50	0.65	0.80	0.05	0.70	0.95	1.20	0.06	1.00	1.30	1.60	NC5075

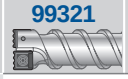
00-99321-012-1525 / 00-99323-012-1525 >>

	Workpiece material	Vc m/min.		Ø15				Ø20				Ø25				Grade of insert
		99321	99323	fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			
P	Carbon steel C<0.3%	120	200	0.035	1.20	1.60	2.00	0.065	1.50	2.00	2.50	0.09	1.80	2.40	3.00	NC2032
P	Carbon steel C>0.3%	100	150	0.03	1.10	1.50	1.80	0.06	1.30	1.78	2.25	0.08	1.60	2.15	2.70	NC5075
P	Low alloy steel C<0.3%	70	120	0.025	1.00	1.30	1.60	0.05	1.20	1.60	2.00	0.07	1.40	1.90	2.40	NC5072
P	High alloy steel	60	90	0.025	1.00	1.30	1.60	0.05	1.20	1.60	2.00	0.07	1.40	1.90	2.40	NC5075
M	Stainless steel	60	90	0.025	1.00	1.30	1.60	0.05	1.20	1.60	2.00	0.07	1.40	1.90	2.40	NC5072
K	Cast Iron	70	120	0.035	1.20	1.60	2.00	0.065	1.30	1.90	2.50	0.09	1.80	2.40	3.00	NC2032
N	Al, Al-alloys	350	500	0.035	1.80	2.00	2.20	0.065	2.20	2.98	3.75	0.09	2.70	3.60	4.30	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	200	400	0.035	1.40	1.90	2.20	0.065	1.80	2.40	3.00	0.09	2.10	2.85	3.60	NC2032
S	Heat resistant alloy	20	30	0.0125	1.00	1.30	1.60	0.0225	1.20	1.60	2.00	0.03	1.40	1.90	2.40	NC5075
S	Ti, Ti-alloy	40	60	0.0125	1.00	1.30	1.60	0.0225	1.20	1.60	2.00	0.03	1.40	1.90	2.40	NC5072
H	Hardened steel < HRC50	60	90	0.025	1.00	1.30	1.60	0.05	1.20	1.60	2.00	0.07	1.40	1.90	2.40	NC5075

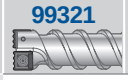
Cutting Data

Pitch Suggestion Table			
Spindle Power	< 12 KW	12-20 KW	> 20 KW
Pitch Pick Up	Lower Pitch	Medium Pitch	Higher Pitch

00-99321-016-2030 / 00-99323-016-2030 >>

	Workpiece material	Vc m/min.		Ø20				Ø25				Ø30				Grade of insert
		99321 	99323	fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			
P	Carbon steel C<0.3%	120	200	0.04	1.80	2.40	3.00	0.08	2.10	2.80	3.50	0.105	2.40	3.20	4.00	NC2032
P	Carbon steel C>0.3%	100	150	0.035	1.60	2.15	2.70	0.07	1.90	2.55	3.20	0.09	2.10	2.85	3.60	NC5075
P	Low alloy steel C<0.3%	70	120	0.03	1.40	1.90	2.40	0.065	1.60	2.20	2.80	0.08	1.90	2.55	3.20	NC5072
P	High alloy steel	60	90	0.03	1.40	1.90	2.40	0.065	1.60	2.20	2.80	0.08	1.90	2.55	3.20	NC5075
M	Stainless steel	60	90	0.03	1.40	1.90	2.40	0.065	1.60	2.20	2.80	0.08	1.90	2.55	3.20	NC5072
K	Cast Iron	70	120	0.04	1.80	2.40	3.00	0.08	2.10	2.80	3.50	0.105	2.40	3.20	4.00	NC2032
N	Al, Al-alloys	350	500	0.04	2.70	3.00	3.40	0.08	3.10	4.05	5.00	0.105	3.60	4.80	5.60	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	200	400	0.04	2.10	2.85	3.40	0.08	2.50	3.35	4.20	0.105	2.80	3.80	4.80	NC2032
S	Heat resistant alloy	20	30	0.015	1.40	1.90	2.40	0.03	1.60	2.20	2.80	0.04	1.90	2.55	3.20	NC5075
S	Ti, Ti-alloy	40	60	0.015	1.40	1.90	2.40	0.03	1.60	2.20	2.80	0.04	1.90	2.55	3.20	NC5072
H	Hardened steel < HRC50	60	90	0.03	1.40	1.90	2.40	0.065	1.60	2.20	2.80	0.08	1.90	2.55	3.20	NC5075

00-99321-020-2540 / 00-99323-020-2540 >>

	Workpiece material	Vc m/min.		Ø25				Ø32				Ø40				Grade of insert
		99321 	99323	fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			
P	Carbon steel C<0.3%	120	200	0.05	1.80	2.40	3.00	0.095	2.40	3.20	4.00	0.12	3.00	4.00	5.00	NC2032
P	Carbon steel C>0.3%	100	150	0.04	1.60	2.15	2.70	0.08	2.20	2.90	3.60	0.11	2.70	3.60	4.50	NC5075
P	Low alloy steel C<0.3%	70	120	0.035	1.40	1.90	2.40	0.07	1.90	2.55	3.20	0.095	2.40	3.20	4.00	NC5072
P	High alloy steel	60	90	0.035	1.40	1.90	2.40	0.07	1.90	2.55	3.20	0.095	2.40	3.20	4.00	NC5075
M	Stainless steel	60	90	0.035	1.40	1.90	2.40	0.07	1.90	2.55	3.20	0.095	2.40	3.20	4.00	NC5072
K	Cast Iron	70	120	0.05	1.80	2.40	3.00	0.095	2.40	3.20	4.00	0.12	3.00	4.00	5.00	NC2032
N	Al, Al-alloys	350	500	0.05	2.70	3.00	3.40	0.095	3.60	4.80	6.00	0.12	4.50	6.00	7.50	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	200	400	0.05	2.10	2.85	3.40	0.095	2.90	3.85	4.80	0.12	3.60	4.80	6.00	NC2032
S	Heat resistant alloy	20	30	0.02	1.40	1.90	2.40	0.035	1.90	2.55	3.20	0.045	2.40	3.20	4.00	NC5075
S	Ti, Ti-alloy	40	60	0.02	1.40	1.90	2.40	0.035	1.90	2.55	3.20	0.045	2.40	3.20	4.00	NC5072
H	Hardened steel < HRC50	60	90	0.035	1.40	1.90	2.40	0.07	1.90	2.55	3.20	0.095	2.40	3.20	4.00	NC5075

Cutting Data

Pitch Suggestion Table			
Spindle Power	< 12 KW	12-20 KW	> 20 KW
Pitch Pick Up	Lower Pitch	Medium Pitch	Higher Pitch

00-99321-025-3050 / 00-99323-025-3050 >>

	Workpiece material	Vc m/min.		Ø30				Ø40				Ø50				Grade of insert
		99321	99323	fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			
P	Carbon steel C<0.3%	120	200	0.055	2.40	3.00	3.40	0.12	3.00	4.00	5.00	0.135	3.60	4.80	6.00	NC2032
P	Carbon steel C>0.3%	100	150	0.05	2.20	2.90	3.40	0.10	2.70	3.60	4.50	0.12	3.20	4.30	5.40	NC5075
P	Low alloy steel C<0.3%	70	120	0.04	1.90	2.55	3.20	0.09	2.40	3.20	4.00	0.11	2.90	3.85	4.80	NC5072
P	High alloy steel	60	90	0.04	1.90	2.55	3.20	0.09	2.40	3.20	4.00	0.11	2.90	3.85	4.80	NC5075
M	Stainless steel	60	90	0.04	1.90	2.55	3.20	0.09	2.40	3.20	4.00	0.11	2.90	3.85	4.80	NC5072
K	Cast Iron	70	120	0.055	2.40	3.00	3.40	0.115	3.00	4.00	5.00	0.135	3.60	4.80	6.00	NC2032
N	Al, Al-alloys	350	500	0.055	2.50	3.00	3.40	0.115	4.50	6.00	7.50	0.135	5.40	7.20	9.00	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	200	400	0.055	2.50	3.00	3.40	0.115	3.60	4.80	6.00	0.135	4.30	5.75	7.20	NC2032
S	Heat resistant alloy	20	30	0.02	1.90	2.55	3.20	0.045	2.40	3.20	4.00	0.055	2.90	3.85	4.80	NC5075
S	Ti, Ti-alloy	40	60	0.02	1.90	2.55	3.20	0.045	2.40	3.20	4.00	0.055	2.90	3.85	4.80	NC5072
H	Hardened steel < HRC50	60	90	0.04	1.90	2.55	3.20	0.09	2.40	3.20	4.00	0.11	2.90	3.85	4.80	NC5075

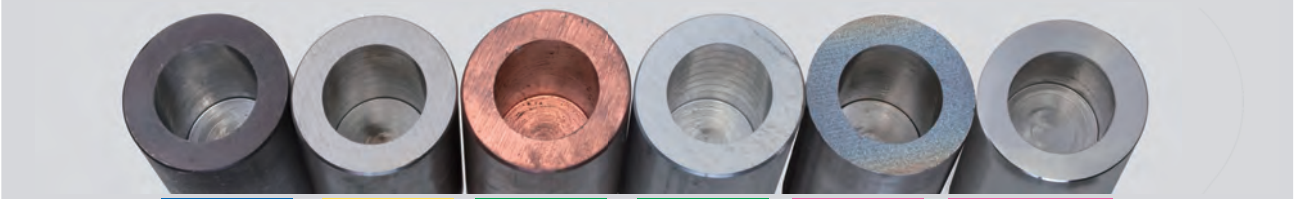
00-99321-025-4265 >>

	Workpiece material	Vc m/min.	Ø42				Ø55				Ø65				Grade of insert
		99321	fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			
P	Carbon steel C<0.3%	200	0.08	3.00	3.60	4.40	0.12	3.30	4.40	5.50	0.135	3.60	4.80	6.00	NC2032
P	Carbon steel C>0.3%	150	0.075	2.70	3.60	4.40	0.11	3.00	4.00	5.00	0.12	3.20	4.30	5.40	NC5075
P	Low alloy steel C<0.3%	120	0.065	2.40	3.20	4.00	0.095	2.60	3.50	4.40	0.11	2.90	3.85	4.80	NC5072
P	High alloy steel	90	0.065	2.40	3.20	4.00	0.095	2.60	3.50	4.40	0.11	2.90	3.85	4.80	NC5075
M	Stainless steel	90	0.065	2.40	3.20	4.00	0.095	2.60	3.50	4.40	0.11	2.90	3.85	4.80	NC5072
K	Cast Iron	120	0.08	3.00	3.60	4.40	0.12	3.30	4.40	5.50	0.135	3.60	4.80	6.00	NC2032
N	Al, Al-alloys	500	0.08	4.00	4.20	4.40	0.12	4.90	6.55	8.20	0.135	5.40	7.20	9.00	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	400	0.08	3.60	4.00	4.40	0.12	4.00	5.30	6.60	0.135	4.30	5.75	7.20	NC2032
S	Heat resistant alloy	30	0.03	2.40	3.20	4.00	0.045	2.60	3.50	4.40	0.055	2.90	3.85	4.80	NC5075
S	Ti, Ti-alloy	60	0.03	2.40	3.20	4.00	0.045	2.60	3.50	4.40	0.055	2.90	3.85	4.80	NC5072
H	Hardened steel < HRC50	90	0.065	2.40	3.20	4.00	0.095	2.60	3.50	4.40	0.11	2.90	3.85	4.80	NC5075

Application Example

Special insert geometry is able to cut different materials>>

- Serrated cutting edge makes the chips short and small, and easier to evacuate.
- Recommended for almost all material types, good for drilling material that generates long, soft chips.



BT40, 22.5KW | Hole size: Ø25 x 50L mm | Tool: 00-99321-016-2030

Material: SAE8620

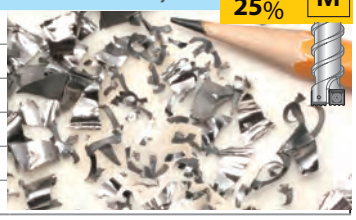
Load 25% P

Vc	=	120	m/min.
S	=	2250	r.p.m.
fz	=	0.08	mm/tooth
F	=	360	mm/min
P	=	5.6	mm
T	=	40	sec.

Material: SUS304 (Stainless steel 304)

Load 25% M

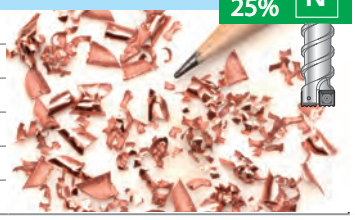
Vc	=	80	m/min.
S	=	1500	r.p.m.
fz	=	0.04	mm/tooth
F	=	120	mm/min
P	=	5.6	mm
T	=	118	sec.



Material: C1100

Load 25% N

Vc	=	200	m/min.
S	=	3750	r.p.m.
fz	=	0.08	mm/tooth
F	=	600	mm/min
P	=	5.6	mm
T	=	23	sec.



Material: AL6061T6

Load 20% N

Vc	=	345	m/min.
S	=	6500	r.p.m.
fz	=	0.10	mm/tooth
F	=	1300	mm/min
P	=	5.6	mm
T	=	11	sec.

Material: TiAl6V4

Load 24% S

Vc	=	80	m/min.
S	=	1500	r.p.m.
fz	=	0.04	mm/tooth
F	=	120	mm/min
P	=	5.6	mm
T	=	118	sec.

Material: Inconel 718 (Drill with internal coolant)

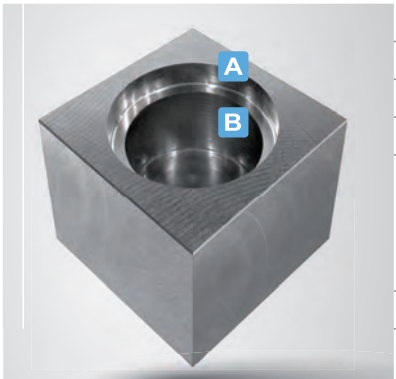
Load 24% S

Vc	=	40	m/min.
S	=	750	r.p.m.
fz	=	0.15	mm/tooth
F	=	225	mm/min
P	=	2.0	mm
T	=	177	sec.

Suggested insert grades for best result >>

Diameter (mm)		25		
Depth (mm)		50		
Tool (Dc=17mm)		00-99321-016-2030 (external coolant)		
Material		P Carbon Steel	M Stainless Steel	H Tool Steel
	DIN	C45E	X5CrNi18-10	X40CrMoV5 1
	SAE	1045	304	H13
	JIS	S45C	SUS304	SKD61 (HRC50°)
Insert Grade		**NC5072** (P40, TiAlN)	**NC5072** (P40, TiAlN)	**NC2032** (K20F, TiAlN)
No. of Edges		2	2	2
Vc = (m/min.)		120	60	80
S = r.p.m.		2250	1120	1500
fz = (mm/tooth)		0.1	0.065	0.05
F = (mm/min.)		450	146	150
Pitch = (mm)		5.6	3	3
Machine Load = % (BT40, 22.5KW)		35%	20%	20%
Tool Life (hole)		150	108	18
Chip Removal Volume (cm³/min.)		52.66	8.55	8.77

To produce step hole Ø53.5 & Ø45 by one tool >>

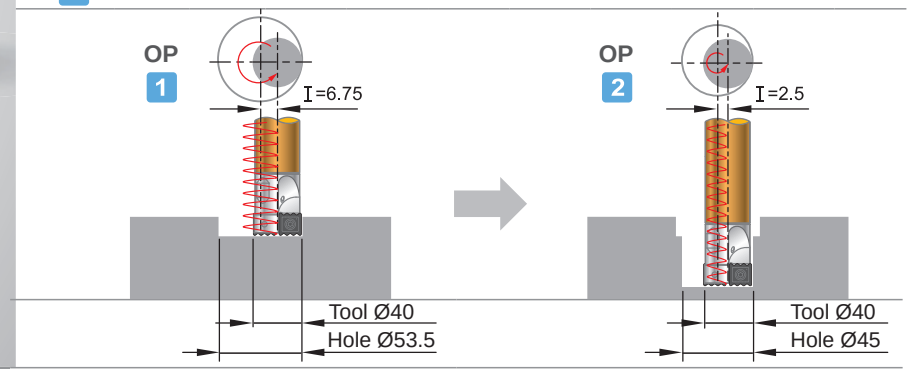


Application

- Hydraulic port for plug-in valve cylinders, counterbore for bolt, and more!

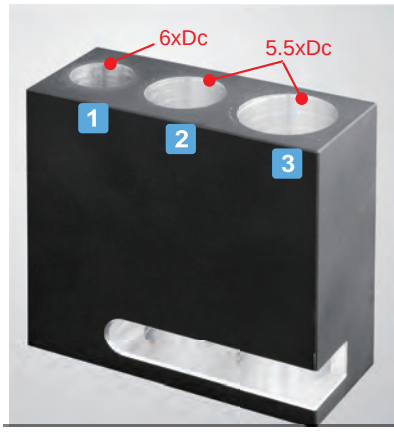
Material	S50C (JIS). High carbon steel
Tool	99323-LS32-HD40 (Non-standard size)
Insert	N9MX12T308-NC2032
Machine	BT40, 22.5 KW
Coolant	Internal

Hole	Dc mm	D mm	L mm	Vc m/min.	S r.p.m.	fz mm/tooth	F mm/min.	l mm	P mm	T sec.
A	Ø40	Ø53.5	10	300	2400	0.08	380	6.75	5.0	13.3
B		Ø45.0	32	300	2400	0.08	380	2.5	2.0	39.48



▶ Just one "NC Helix Drill" can machine different diameters and hole depths.

Just one tool to drill different diameters and hole depth, possible up to 6xDc >>



Material	AL6061T6
Tool	00-99323-016-2030
Insert	N9MX070204-NC5072
Machine	HAAS VM-3, BT40, 22.5KW
Coolant	Internal coolant

Fig.	Dc mm	D mm	l mm	L mm	Vc m/min.	S r.p.m.	fz mm/tooth	fcut mm/tooth	F mm/min.	P mm	α deg
1	Ø17	20	1.5	100	500	9360	0.04	0.058	1090	3	17.67
2		25	4	95	500	9360	0.08	0.103	1930	4.5	10.16
3		30	6.5	95	500	9360	0.105	0.131	2450	5.6	7.81

One tool performs multiple patterns >>

Material	AL6061T6
Tool	00-99323-016-2030 M08-HD17-2030
Insert	N9MX070204-NC5072
Machine	HAAS VM-3, BT40, 22.5KW
Coolant	Internal

Fig.	Dc mm	Vc m/min.	S r.p.m.	fz mm/tooth	F mm/min.	P mm	T sec.
1	Ø17	200	3800	0.075	570	4	67
2		200	3800	0.075	570	4	95
3		200	3800	0.075	570	4	80

Widening a deep hole (6xD) in stainless steel by NC Helix Drill. Predrilled 15mm enlarge to 29mm. >>

Ø15mm hole Ø29mm hole

Material	Stainless steel
Tool	00-99323-016-2030 with 0-398016-150M08 Extension Bar
Insert	N9MX070204-NC5072
Machine	VMC m/c.
Coolant	Internal coolant

Dc mm	D mm	L mm	S r.p.m.	fz mm/tooth	F mm/min.	P mm
Ø17	Ø29	105	1685	0.05	168	1.5

Low spindle power is not a problem! BT30 machine, Ø30 hole diameter, 3.3xDc drill depth >>

The main purpose of this example is to improve machining efficiency.

Maximum drilling capacity of the 5.5 kw spindle is Ø16 mm

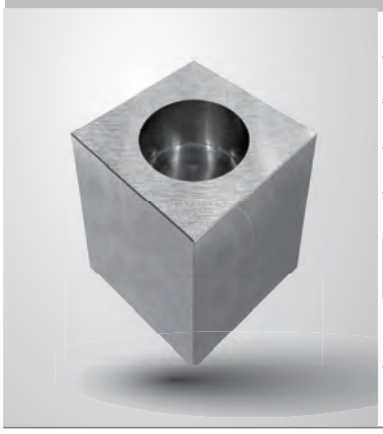
Material	S50C (JIS), High carbon steel
Tool	00-99321-020-2540 / BC20-HD22-2540
Insert	N9MX100306-NC2032
Machine	***BT30, 5.5 KW***
Coolant	External coolant

Dc mm	D mm	L mm	Vc m/min.	S r.p.m.	fz mm/tooth	fcut mm/tooth	F mm/min.	l mm	P mm	T sec.
Ø22	Ø30	60	200	* 2893	0.12	0.1	600	4	2.8	62

* 3000 r.p.m. is used.

NC Helix Drill reduces the spindle load and increases spindle life. >>

Maximum drilling capacity of the 18 kw spindle is Ø50 mm



Material	SS400 Low carbon steel
Tool	00-99323-025-3050
Insert	N9MX12T308-NC5072
Machine	Toshiba MPE-2140, CAT-50, 25HP / 18KW
Coolant	Internal coolant

Dc mm	D mm	L mm	Vc m/min.	S r.p.m.	fz mm/tooth	fcut mm/tooth	F mm/min.	l mm	P mm	T sec.
Ø27	Ø50	80	119	1400	0.15	0.165	420	11.5	3	275

15% Spindle load only!

Super Power Drill >>>

Deep Hole Drilling Up To 12xD!

5xD & 10xD Ø19mm ~ Ø40mm

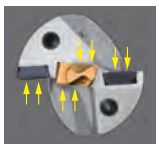
- It is no doubt that deep hole drilling by indexable drill is always a challenge of the drill makers.
- Nine9 "Super Power Drill", featuring by patented indexable center pilot insert design, which is the first time in the world, helping to achieve the cost-effective and good performance.
- Customed deep hole drills on request. Max. diameter 50mm ; Max drilling depth (T) 450mm.

P M K H

Features >>>

Indexable Drills With Carbide Center Pilot Insert

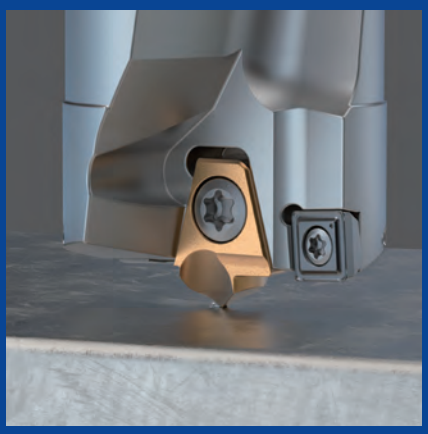
- Better surface finish.
- Better straightness.
- Better roundness.

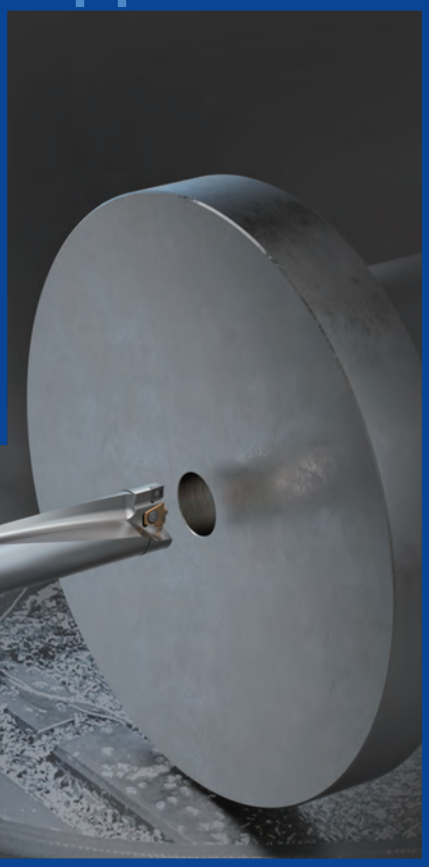


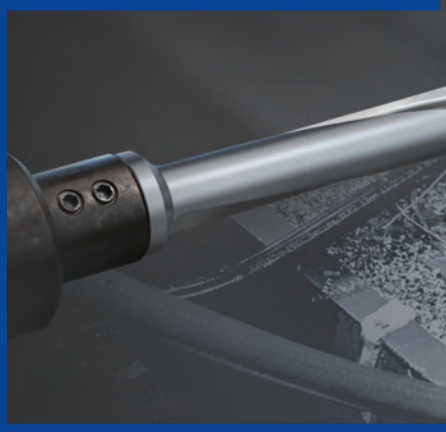
Patented Pocket Design

- Lateral cutting forces can be absorbed by center insert due to a patented pocket design.
- The unique design of insert pocket provides the best accuracy and rigidity of center insert.
- The center and peripheral inserts are positioned in order to divide the cutting chips into smaller spiral shape.
- It designed for optimum chip breaking and good edge preparation for longer tool life.

Applications



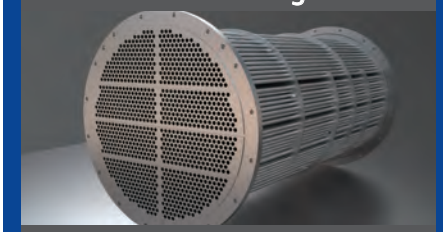




Performance

“
- With patented center pilot insert which aids accurate and steady deep hole drilling.
- Better finished surface, potentially reducing boring time. ”

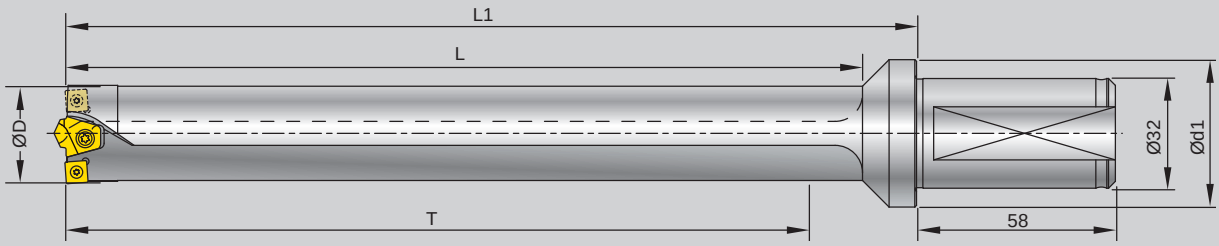
Heat-Exchanger



Semi-Finished Product

Continuous Track

Holder 19mm~40mm



Parts No.	ØD ±0.2mm (±0.0079")	T	L	L1	Ød1	Insert / Screw / Key	
						Center	Periphery
00-99307-19100	19 (0.748")	100	119	134	39	99307-CD6 x 1 pc. NS-35080 2.5Nm NK-T15	N9GX04T002 x 1 pc. *NS-18037 / 0.6Nm NK-T6
00-99307-19150		150	169	184			
00-99307-19200		200	219	239			
00-99307-20100	20 (0.787")	100	120	134	39		N9GX05T103 x 1 pc. *NS-20045 / 0.6Nm NK-T6
00-99307-20150		150	170	184			
00-99307-20200		200	220	239			
00-99307-21100	21 (0.827")	100	120	134	39		
00-99307-21150		150	170	184			
00-99307-21200		200	220	239			
00-99307-22100	22 (0.866")	100	125	139	39		N9GX060204 x 1 pc. *NS-22062 / 0.9Nm NK-T7
00-99307-22150		150	175	189			
00-99307-22200		200	225	239			
00-99307-23100	23 (0.905")	100	125	139	39		
00-99307-23150		150	175	189			
00-99307-23200		200	225	239			
00-99307-24100	24 (0.945")	100	126	139	39		
00-99307-24150		150	176	189			
00-99307-24200		200	226	239			
00-99307-24250		250	276	289			
00-99307-25100	25 (0.984")	100	126	139	39		
00-99307-25150		150	176	189			
00-99307-25200		200	226	239			
00-99307-25250		250	276	289			
00-99307-26150	26 (1.024")	150	176	189	39		
00-99307-26200		200	226	239			
00-99307-26250		250	276	289			
00-99307-27150	27 (1.630")	150	181	198	43	99307-CD8 x 1 pc. NS-35120 2.5Nm NK-T15	N9GX060204 x 2 pcs. *NS-22062 / 0.9Nm NK-T7
00-99307-27200		200	231	248			
00-99307-27250		250	281	298			
00-99307-28150	28 (1.102")	150	181	198	43		
00-99307-28200		200	231	248			
00-99307-28250		250	281	298			
00-99307-29150	29 (1.142")	150	182	198	43		
00-99307-29200		200	232	248			
00-99307-29250		250	282	298			
00-99307-29300		300	332	348			

*Torque screwdriver is recommended.

Parts No.	ØD ±0.2mm (±0.0079")	T	L	L1	Ød1	Insert / Screw / Key	
						Center	Periphery
00-99307-30150	30 (1.181″)	150	182	198	43	99307-CD8 x 1 pc. NS-35120 2.5Nm NK-T15	N9GX060204 x 2 pcs. *NS-22055 / 0.9Nm NK-T7
00-99307-30200		200	232	248			
00-99307-30250		250	282	298			
00-99307-30300		300	332	348			
00-99307-31150	31 (1.220″)	150	188	198	43		
00-99307-31200		200	238	248			
00-99307-31250		250	288	298			
00-99307-31300		300	338	348			
00-99307-32150	32 (1.260″)	150	188	203	43		
00-99307-32200		200	238	253			
00-99307-32250		250	288	303			
00-99307-32300		300	338	353			
00-99307-33150	33 (1.300″)	150	189	203	43		
00-99307-33200		200	239	253			
00-99307-33250		250	289	303			
00-99307-33300		300	339	353			
00-99307-34150	34 (1.339″)	150	189	203	43		
00-99307-34200		200	239	253			
00-99307-34250		250	289	303			
00-99307-34300		300	339	353			
00-99307-34350		350	389	403			
00-99307-35200	35 (1.378″)	200	245	258	43		N9GX090308 x 2 pcs. NS-30072 / 2.0Nm NK-T9
00-99307-35250		250	295	308			
00-99307-35300		300	345	358			
00-99307-35350		350	395	408			
00-99307-36200	36 (1.417″)	200	245	258	43		
00-99307-36250		250	295	308			
00-99307-36300		300	345	358			
00-99307-36350		350	395	408			
00-99307-37200	37 (1.457″)	200	246	258	43		
00-99307-37250		250	296	308			
00-99307-37300		300	346	358			
00-99307-37350		350	396	408			
00-99307-38200	38 (1.496″)	200	246	258	43		
00-99307-38250		250	296	308			
00-99307-38300		300	346	358			
00-99307-38350		350	396	408			
00-99307-39200	39 (1.535″)	200	247	258	43		
00-99307-39250		250	297	308			
00-99307-39300		300	346	358			
00-99307-39350		350	397	408			
00-99307-40200	40 (1.575″)	200	247	258	43		
00-99307-40250		250	297	308			
00-99307-40300		300	347	358			
00-99307-40350		350	397	408			

Insert

Featuring by patented indexable center pilot insert design

- High precision fully ground and edge honing to increase tool life and surface finish.
- Special geometry design delivers the benefits of the center drill in guiding position and eliminates the defects caused by the chip flow from the gap between the center drill and insert.

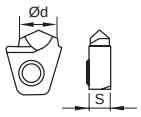
Center Pilot Insert >>

NC2032 : • K20F grade, AlTiN coated, fully ground, honed cutting edge.
• For carbon steel & alloy steel C<0.3% and stainless steel.

NC40 : • P35 grade, TiN coated, fully ground, honed cutting edge.
• For carbon steel & alloy steel C>0.3% and stainless steel.

NC2032

NC40

Parts No.		Coating	Grade		Dimensions Ød	Dimensions S	Screw	Key
99307-CD6	NC2032	AlTiN	K20F		6	4	NS-35080 2.5Nm	NK-T15
	NC40	TiN	P35					
99307-CD8	NC2032	AlTiN	K20F		8	6	NS-35120 2.5Nm	NK-T15
	NC40	TiN	P35					

Periphery Insert >>

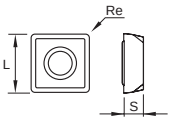
- Fully ground carbide insert
- Each insert has 4 cutting edges.
- Patented Dual-relief angle insert are designed for optimum chip breaking and good edge preparation for longer tool life.

NC2032

NC40

NC2032: • K20F grade, AlTiN coated, honed cutting edge for carbon steel, alloy steel, casting iron, stainless steel and hardened steel up to HRC 50.

NC40: • P35 grade, tougher insert with special chip breaker, TiN coated, for low carbon steel and stainless steel.
• Only available for insert N9GX06020431 and N9GX09030831.

Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions re	Screw	Key
N9GX04T002	NC2032	AlTiN	K20F		4.07	1.8	0.2	*NS-18037 0.6Nm	NK-T6
N9GX05T103	NC2032	AlTiN	K20F		5.07	2.0	0.3	*NS-20045 0.6Nm	
N9GX060204	NC2032	AlTiN	K20F		6.35	2.38	0.4	*NS-22062 0.9Nm	NK-T7
N9GX06020431	NC40	TiN	P35		6.35	2.38	0.4		
N9GX090308	NC2032	AlTiN	K20F		9.52	3.18	0.8	NS-30072 2.0Nm	NK-T9
N9GX09030831	NC40	TiN	P35		9.52	3.18	0.8		

*Torque screwdriver is recommended.

Performance

NC Spot Drill + Super Power Drill Apply on Stationary Machine Tool >>

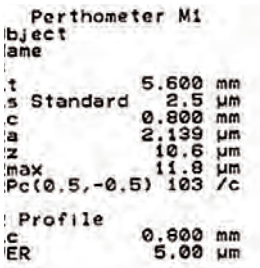
To get better position accuracy and diameter tolerance first, and make sure the size of the spot according to following.

Step 1	Tool: 99616-14-12-02S to make a spot.		**Pilot Insert**	**99307-CD6**	**99307-CD8**
			Spotting Diameter	ø5 mm	ø7 mm
			Spotting Depth	2.8 mm	3.8 mm
Step 2	Tool: 99307-20200 to make a 10xD deep hole.		Then the spot hole will guide the pilot insert at the beginning and stablized the drill to get the perfect drilling operation.		

Result	Cutting Speed	Feed rate	Surface
Without spotting	Vc= 80 m/min.	f = 0.1 mm/rev.	
With spotting	Vc= 120 m/min. ↑	f = 0.1 mm/rev.	Finished surface is better and accurate. 50% Up Efficient

Good surface finish >>

Center Pilot Insert	Material: Carbon steel (S45C)		
99307-CD8-NC40 N9GX060204-NC2032	**Vc**	80	m/min.
	S	880	r.p.m.
	f	0.10	mm/rev.
	F	88.0	mm/min.
	Ra	2.139	μm
	Rmax	11.8	μm



Technical Guide

Machining Power Requirement for Drilling

Material Classifiction for Calculation

There are an extremely wide range of materials and different machining operations in the metal cutting industry. We follow the ISO material group and color to make brief information for calculation of the required power for super power drill, the main effective parameter is “specified cutting force”, please use following table and formula.

	Material Group	Material Type and description	Hardness (HB)	Strength (N/mm^2)	Specified cutting force Kc (N/mm^2)
P	1.10	Carbon steel C<0.3%, free cutting steels	~125	500-850	1900
	1.20	Carbon steel C>0.3%	~150	850-1000	2100
	1.30	Low alloy steel C<0.3%	180	Up to 750	2100
	1.40	Low alloy steel C>0.3%	200	750-1200	2600
	1.50	High alloy steel	200	800-1200	2600
	1.60	Tool steel, harder steels for toughening. Martensitic stainless steels.	<230	850-1100	2200
	1.70	Casting steel			2900
M	2.10	Free cutting Stainless steel Austenitic stainless steels	200	490-700	2300
	2.20	Difficult Stainless steel Austenitic stainless steels and duplex	175	650-850	2450
K	3.10	Grey casting Iron	180	250-350	1100
	3.20	Malleable casting iron	230	Up to 600	1200
	3.30	Nodular casting iron	250	Up to 800	1800
N	4.10	Al- alloys(Si<12%)	60	230-310	500
	4.20	Al-alloys(Si>12%)	75	150-200	750
	4.30	Non-ferrous materials, Zirconium, Magnesium, Copper alloys, etc.	100	150-200	800
	4.40	Carbon and graphite composites, plastics, wood, rubbers, etc.	—	—	—
S	5.10	Nickel-based heat-resistant alloys	250		3500
	5.20	Cobalt-based heat resistant alloys	350		4150
	5.30	Iron-based heat resistant alloys	250		3050
H	6.10	Tool steels and hardened steels	55HRC		4500
	6.20	Hardened cast iron	—	—	—

Formulas for Calculation

feed force(KN) Ff

$$Ff = \frac{ap \times f \times Kc}{2000}$$

Drilling torque (Md) torque=(Nm)

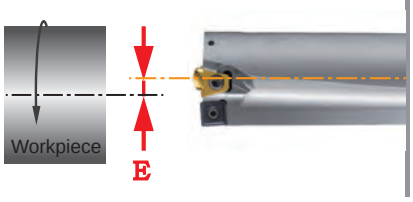
$$Md = \frac{f \times \pi \times D^2 \times Kc}{4000} \text{ Nm}$$

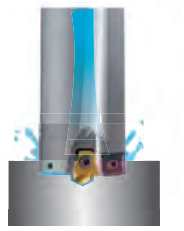
f =	feed rate	mm/rev.
Vc =	cutting speed	m/min.
D =	drill diameter	mm
Kc =	specified cutting force	N/mm^2

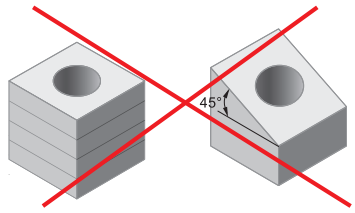
Technical Guide

▶ Please pay attention to following conditions before you start.

Center misalignment	Internal coolant	Application of drilling
E must be < 0.05mm.	High volume is recommended. Minimum coolant pressure is 10 bar. (150 psi)	Not apply for stack drilling and angled surface drilling.







- Recommand to make a spot hole first by spot drill. See page 133 for detail.
- The cutting speed relates to the periphery inserts, The feed rate depends on the load of the center pilot insert.
- The best condition will create short cutting chips. The feed rate can be applied ± 25% of the recommended value depended on the shape of the cutting chips.
- Be careful to monitor the spindle power consumption !
  When the spindle load is 15% higher than starting power consumption, please change the periphery insert to next new cutting edge and change a new center pilot insert.
- Increase 20% of the cutting speed and the feed rate for horizontal spindle machine.

Cutting Data

	Work piece material	T= Length/ Dia.	Vc (m/min.)	f (mm/rev.)				Grade of Insert	
				N9GX04T002	N9GX05T103	N9GX060204	N9GX090308		
				Dia.19	Dia.20-21	Dia.22-34	Dia.35-40	Center	Periphery
P	Carbon steel C<0.3% Ex.:S25C, SS41	T<7D	80~150	0.03~0.07	0.04~0.08	0.06~0.10	0.08~0.12	NC2032	NC2032
		T>7D	60~120	0.03~0.07	0.04~0.08	0.06~0.10	0.08~0.12		
		T<7D	80~130	—	—	0.06~0.10	0.08~0.12	NC40	NC40
		T>7D	60~100	—	—	0.06~0.10	0.08~0.12		
	Carbon steel C>0.3% Ex.:S50C, P5	T<7D	80~150	0.04~0.08	0.04~0.10	0.06~0.12	0.08~0.15	NC40	NC2032
		T>7D	60~120	0.04~0.08	0.04~0.10	0.06~0.12	0.08~0.15		
	Low alloy stee C<0.3% Ex.:SCM415	T<7D	60~150	0.04~0.08	0.04~0.10	0.06~0.10	0.08~0.12	NC2032	NC2032
		T>7D	40~120	0.04~0.08	0.04~0.10	0.06~0.10	0.08~0.12		
	Low alloy steel C>0.3% Ex.:SCM440	T<7D	60~150	0.04~0.08	0.04~0.10	0.06~0.12	0.08~0.15	NC40	NC2032
		T>7D	40~120	0.04~0.08	0.04~0.10	0.06~0.12	0.08~0.15		
	High alloy steel Ex.:SKD11	T<7D	60~120	0.03~0.07	0.04~0.08	0.06~0.10	0.08~0.12	NC40	NC2032
		T>7D	40~100	0.03~0.07	0.04~0.08	0.06~0.10	0.08~0.12		
M	Stainless steel Ex.:SUS304	T<7D	60~120	0.03~0.06	0.04~0.07	0.05~0.08	0.06~0.10	NC2032	NC2032
		T>7D	40~100	0.03~0.06	0.04~0.07	0.05~0.08	0.06~0.10		
		T<7D	60~120	—	—	0.05~0.08	0.06~0.10	NC40	NC40
		T>7D	40~100	—	—	0.05~0.08	0.06~0.10		
K	Cast Iron Ex.:FC25	T<7D	60~120	0.04~0.08	0.04~0.10	0.06~0.10	0.08~0.12	NC40	NC2032
		T>7D	40~100	0.04~0.08	0.04~0.10	0.06~0.10	0.08~0.12		
N	Non-ferrous metal Ex.:A6061	—	—	—	—	—	—	—	—
		—	—	—	—	—	—	—	—
H	Hardened steel < HRC50 Ex.:SKD61	T<7D	50~80	0.03~0.06	0.04~0.07	0.05~0.08	0.06~0.10	NC40	NC2032
		T>7D	40~60	0.03~0.06	0.04~0.07	0.05~0.08	0.06~0.10		

Super Drill >>>

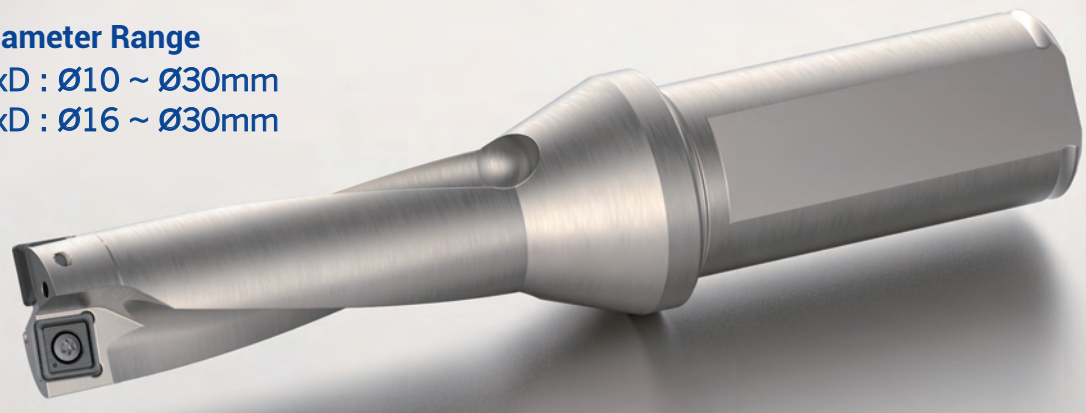
3xD & 4xD

Ø10mm ~ Ø30mm

P M K H

Diameter Range

3xD : Ø10 ~ Ø30mm
4xD : Ø16 ~ Ø30mm



Features >>>

Smaller Cutting Chip

- The center and peripheral inserts are positioned in order to divide the cutting chips into smaller spiral shape.
  It helps the cutting chip to be removed faster and easier.
- Designed for high productivity, high speed cutting.
- With internal coolant.

Better Surface Finish And Better Diameter Accuracy

- Special insert positioning to balance the cutting forces, better surface finish and diameter accuracy are achievable.

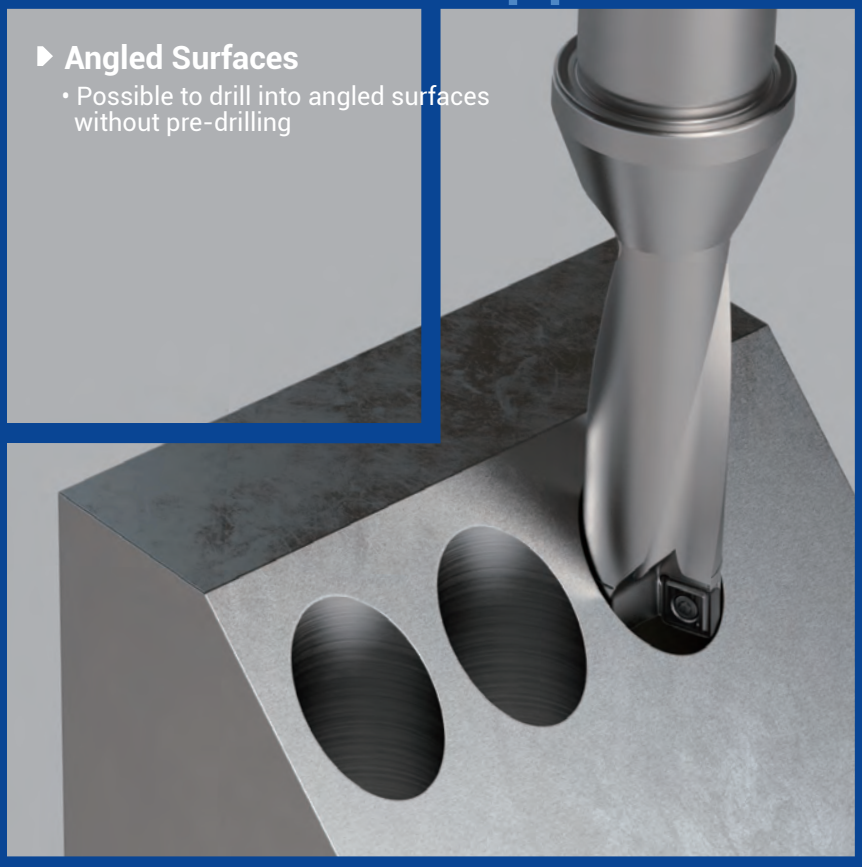
4 Cutting Edges Insert, AlTiN Coated

- Chip breaker of SD insert provides excellent chip control property due to its engineered design.
- Easy and simple change of cutting edge without inconvenience.

Applications

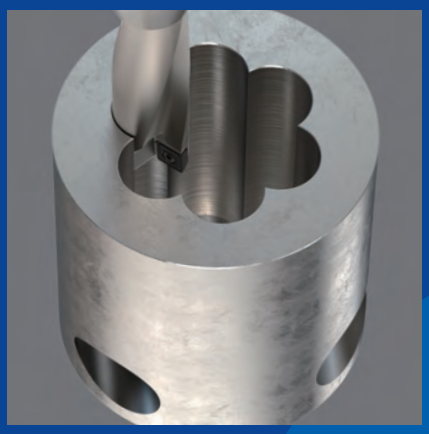
Angled Surfaces

- Possible to drill into angled surfaces without pre-drilling

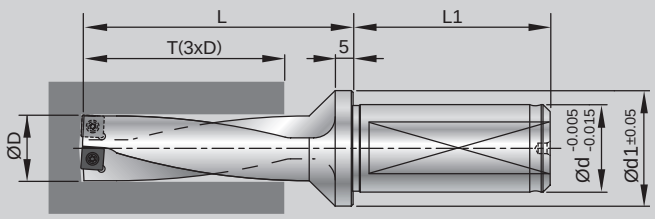


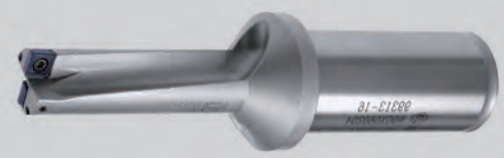
"
- Smallest indexable drill from 10mm.
- 4 cutting edges per insert.
- Same insert for outer and inner insert.

"



Holder 3xD 10mm~30mm

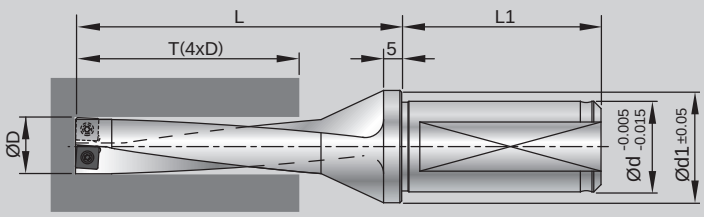




Parts No.	ØD	T	L	L1	Ød	Ød1	Insert Screw / Key	Radial Adjustment (For Lathe)	D max
00-99313-10	10.0	30.0	49	49	20	27	N9GX04T002 *NS-18037 / 0.6Nm NK-T6	0.25	10.5
00-99313-10.3	10.3	30.9	52					0.25	10.8
00-99313-10.5	10.5	31.5	52					0.25	11.0
00-99313-11	11.0	33.0	52					0.20	11.4
00-99313-11.5	11.5	34.5	55					0.20	11.9
00-99313-12	12.0	36.0	55					0.15	12.3
00-99313-12.5	12.5	37.5	58					0.15	12.8
00-99313-13	13.0	39.0	58	49	20	27	N9GX05T103 *NS-20045 / 0.6Nm NK-T6	0.30	13.6
00-99313-13.5	13.5	40.5	61					0.30	14.1
00-99313-14	14.0	42.0	61					0.25	14.5
00-99313-14.5	14.5	43.5	64					0.25	15.0
00-99313-15	15.0	45.0	64					0.20	15.4
00-99313-15.5	15.5	46.5	67					0.20	15.9
00-99313-16	16.0	48.0	74	55	25	31	N9GX060204 *NS-22055 / 0.9Nm NK-T7	0.40	16.8
00-99313-16.5	16.5	49.5	76					0.40	17.3
00-99313-17	17.0	51.0	76					0.35	17.7
00-99313-17.5	17.5	52.5	78					0.35	18.2
00-99313-18	18.0	54.0	78					0.30	18.6
00-99313-18.5	18.5	55.5	80					0.30	19.1
00-99313-19	19.0	57.0	80					0.25	19.5
00-99313-19.5	19.5	58.5	85					0.25	20.0
00-99313-20	20.0	60.0	85	55	25	31	N9GX070304 *NS-25060 / 0.9Nm NK-T7	0.50	21.0
00-99313-20.5	20.5	61.5	87					0.50	21.5
00-99313-21	21.0	63.0	87					0.45	21.9
00-99313-21.5	21.5	64.5	88					0.45	22.4
00-99313-22	22.0	66.0	88					0.40	22.8
00-99313-22.5	22.5	67.5	90					0.40	23.3
00-99313-23	23.0	69.0	90					0.35	23.7
00-99313-23.5	23.5	70.5	92					0.35	24.2
00-99313-24	24.0	72.0	92					0.30	24.6
00-99313-25	25.0	75.0	114	58	32	43	N9GX090308 NS-30072 / 2.0Nm NK-T9	0.50	26.0
00-99313-26	26.0	78.0	115					0.50	27.0
00-99313-27	27.0	81.0	117					0.40	27.8
00-99313-28	28.0	84.0	126					0.40	28.8
00-99313-29	29.0	87.0	127					0.30	29.6
00-99313-30	30.0	90.0	130					0.30	30.6

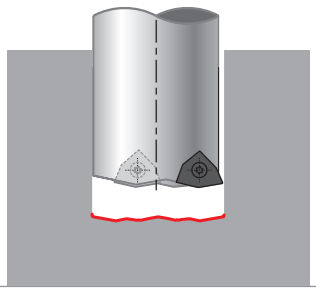
*Torque screwdriver is recommended.

Holder 4xD 16mm~30mm



Parts No.	ØD	T	L	L1	Ød	Ød1	Insert Screw / Key	Radial Adjustment (For Lathe)	D max
00-99314-16	16	64	90	55	25	31	N9GX060204 *NS-22055 0.9Nm NK-T7	0.40	16.8
00-99314-17	17	68	93					0.35	17.7
00-99314-18	18	72	96					0.30	18.6
00-99314-19	19	76	99					0.25	19.5
00-99314-20	20	80	105	55	25	31	N9GX070304 *NS-25060 0.9Nm NK-T7	0.50	21.0
00-99314-21	21	84	108					0.45	21.9
00-99314-22	22	88	110					0.40	22.8
00-99314-23	23	92	113					0.35	23.7
00-99314-24	24	96	116					0.30	24.6
00-99314-25	25	100	139	58	32	43	N9GX090308 NS-30072 2.0Nm NK-T9	0.50	26.0
00-99314-26	26	104	141					0.50	27.0
00-99314-27	27	108	144					0.40	27.8
00-99314-28	28	112	154					0.40	28.8
00-99314-29	29	116	156					0.30	29.6
00-99314-30	30	120	160					0.30	30.6

*Torque screwdriver is recommended.

Nine9 SD	Other makers
	

8

Super Drill

Insert

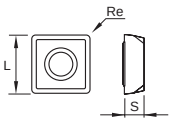
Features >>

- Fully ground dual-relief insert, for improved surface finish and higher feed rate.
- Primary relief angle is to increase the toughness of the insert, secondary relief angle is to strengthen the axial feed rate.

Inserts >>

NC2032

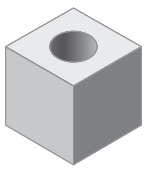
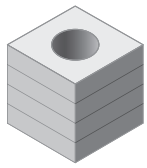
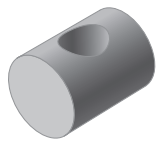
NC2032: • K20F grade, AlTiN coated, for carbon steel, alloy steel, casting iron, stainless steel and hardened steel up to HRC 50.

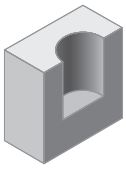
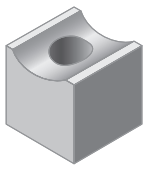
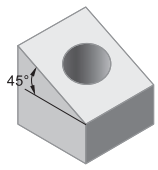
Parts No.		Coating	Grade		Dimensions			Screw	Key
					L	S	Re		
N9GX04T002	NC2032	AlTiN	K20F		4.07	1.8	0.2	*NS-18037 0.6Nm	NK-T6
N9GX05T103	NC2032	AlTiN	K20F		5.07	2.0	0.3	*NS-20045 0.6Nm	NK-T6
N9GX060204	NC2032	AlTiN	K20F		6.35	2.38	0.4	*NS-22055 0.9Nm	NK-T7
N9GX070304	NC2032	AlTiN	K20F		7.94	3.18	0.4	*NS-25060 0.9Nm	NK-T7
N9GX090308	NC2032	AlTiN	K20F		9.52	3.18	0.8	NS-30072 2.0Nm	NK-T9

*Torque screwdriver is recommended.

Functions in various conditions >>

Material classifiction for calculation of cutting speed &feed rate

Application	* Regular Surface	Cross Holes	Stack Drilling	Round Work Piece Offset Drilling
Work Piece Shape				
Cutting Speed Vc (m/min.)	100%	80%	80%~70%	80%~60%
Feed Rate (mm/rev.)	100%	80%	80%~70%	80%~60%

Application	Plunge Drilling	Concave Surfaces	Angled Surfaces	Cone Work Piece Offset Drilling
Work Piece Shape				
Cutting Speed Vc (m/min.)	80%	80%	80%~70%	80%~70%
Feed Rate (mm/rev.)	80%	80%	80%~70%	80%~70%

* SPD, SD both are suitable.

Cutting Data

	Work piece material	T= Length/ Dia.	Vc (m/min.)	f (mm/rev.) N9GX 04T002 Dia. 10~12.5	N9GX 05T103 Dia. 13~15.5	N9GX 060204 Dia. 16~19.5	N9GX 070304 Dia. 20~24	N9GX 090308 Dia. 25~30	Grade of Insert
P	Carbon steel C<0.3% Ex.:S25C, SS41	T=3D	80~250	0.03~0.06	0.04~0.08	0.06~0.10	0.06~0.10	0.08~0.12	NC2032
		T=4D	60~180	—	—	0.06~0.10	0.06~0.10	0.08~0.12	
	Carbon steel C>0.3% Ex.:S50C, P5	T=3D	80~300	0.04~0.08	0.06~0.10	0.06~0.12	0.08~0.12	0.08~0.15	NC2032
		T=4D	60~150	—	—	0.06~0.12	0.08~0.12	0.08~0.15	
	Low alloy steel C<0.3% Ex.:SCM415	T=3D	80~250	0.04~0.08	0.04~0.08	0.06~0.10	0.06~0.10	0.08~0.12	NC2032
		T=4D	60~150	—	—	0.06~0.10	0.06~0.10	0.08~0.12	
	Low alloy steel C>0.3% Ex.:SCM440	T=3D	80~250	0.04~0.08	0.04~0.10	0.06~0.12	0.06~0.12	0.08~0.15	NC2032
		T=4D	60~150	—	—	0.06~0.12	0.06~0.12	0.08~0.15	
	High alloy steel Ex.:SKD11	T=3D	60~150	0.03~0.06	0.04~0.08	0.06~0.10	0.06~0.10	0.08~0.12	NC2032
		T=4D	50~100	—	—	0.06~0.10	0.06~0.10	0.08~0.12	
M	Stainless steel Ex.:SUS304	T=3D	60~150	0.03~0.06	0.04~0.08	0.04~0.10	0.06~0.10	0.06~0.12	NC2032
		T=4D	50~100	—	—	0.04~0.10	0.06~0.10	0.06~0.12	
K	Cast Iron Ex.:FC25	T=3D	80~120	0.04~0.08	0.06~0.08	0.06~0.08	0.06~0.10	0.08~0.12	NC2032
		T=4D	60~100	—	—	0.06~0.08	0.06~0.10	0.08~0.12	
H	Hardened steel < HRC50 Ex.:SKD61	T=3D	60~100	0.03~0.06	0.04~0.08	0.05~0.08	0.06~0.08	0.06~0.10	NC2032
		T=4D	40~80	—	—	0.05~0.08	0.06~0.08	0.06~0.10	

*** The maximum misalignment of the drill center is +0.2 mm/-0.5 mm on the CNC lathe.**

Metric

$$S = \frac{Vc \times 1000}{\pi \times d}$$

$$F = S \times f$$

d =	diameter -mm
S =	Spindle Speed -r.p.m.
Vc =	Cutting Speed -m/min.
f =	mm/rev.
F =	mm/min.

Inch

$$S = \frac{(3.82 \times SFM)}{d}$$

$$SFM = Vc\ (m/min.) \times 3.28$$

$$F = f \times S$$

d =	diameter-inch
S =	Spindle Speed-r.p.m.
SFM =	Surface Speed-ft./min.
f = IPR =	inch/rev.
F =	IPM=RPM x f / 25.4

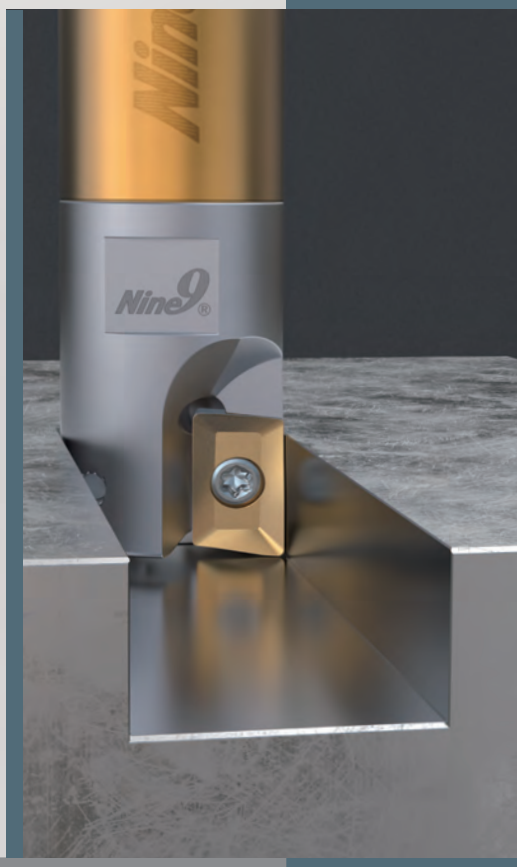
Power Mill >>>

Indexable Milling Cutter 10mm

Patented dual relief angle insert!

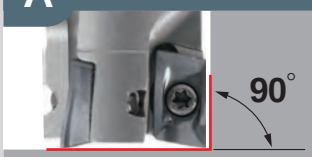
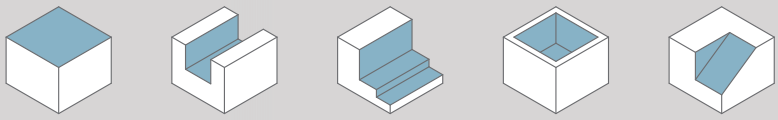
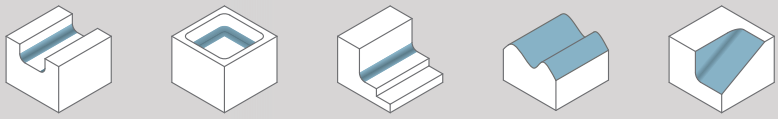
P K

- Higher Feed Rate.
- Higher Wearing Resistance!
- Fast Chip Removal!



Features >

Applications

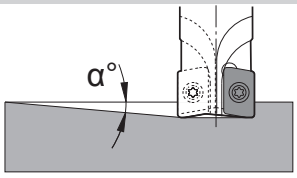
A Series		Shoulder Face Mills Dia. range: Ø10 ~ Ø25mm 
C Series	R	Torus Radius Mills Dia. range: Ø10 ~ Ø26mm 

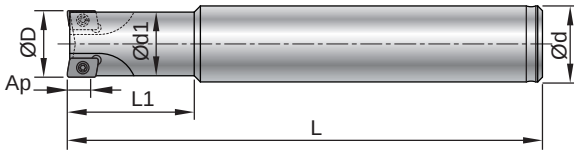
A Series Shoulder Face Mills

Features

- Strong insert with high positive geometry and helical cutting edges.
- Shoulder mill with good cutting performance and cutting edge strength. which produce perfect 90° shoulders.

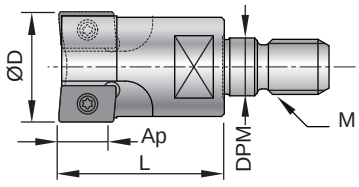
Cylindrical Shank >>





Part No.	Type	ØD	Ød h6	Ød1	α°	L1	L	⌖ Z	Ap	Insert type
00-99802-BC10-10A06	BC10-10A06-100	**10**	10	9.8	5.0	40	100	2	5	A9...0602...
00-99802-BC12-10A06	BC12-10A06-80	**10**	12	9.8	5.0	20	80	2		
00-99802-BC12-11A06	BC12-11A06-80	**11**	12	10.8	4.5	22	80	2		
00-99802-BC12-12A06	BC12-12A06-80	**12**	12	11.4	4.0	24	80	2		
00-99802-BC16-13A06	BC16-13A06-100	**13**	16	12.4	3.5	26	100	2		
00-99802-BC16-14A06	BC16-14A06-100	**14**	16	13.4	3.0	28	100	2		
00-99802-BC16-15A06	BC16-15A06-100	**15**	16	14.4	2.5	30	100	3		
00-99802-BC16-16A06	BC16-16A06-100	**16**	16	15.4	2.0	32	100	3		
00-99802-BC16-16A10	BC16-16A10-100	**16**	16	14.5	2.5	32	100	2	9	A9...1035...
00-99802-BC20-20A10	BC20-20A10-120	**20**	20	18.5	2.0	40	120	3		
00-99802-BC25-25A10	BC25-25A10-150	**25**	25	23.5	1.3	50	150	3		

Screw-Fit Type >>



Part No.	Type	ØD	α°	L	M	DPM	⌖ Z	Ap	Insert type
00-99805-M05-10A06	M05-10A06	**10**	5.0	13	M5xP0.8	5.5	2	5	A9...0602...
00-99805-M05-11A06	M05-11A06	**11**	4.5	13	M5xP0.8	5.5	2		
00-99805-M06-12A06	M06-12A06	**12**	4.0	13	M6xP1.0	6.5	2		
00-99805-M06-13A06	M06-13A06	**13**	3.5	13	M6xP1.0	6.5	2		
00-99805-M08-14A06	M08-14A06	**14**	3.0	13	M8xP1.25	8.5	2		
00-99805-M08-15A06	M08-15A06	**15**	2.5	15	M8xP1.25	8.5	3		
00-99805-M08-16A06	M08-16A06	**16**	2.0	15	M8xP1.25	8.5	3		
00-99805-M08-17A06	M08-17A06	**17**	1.5	15	M8xP1.25	8.5	3		
00-99802-M08-16A10	M08-16A10	**16**	2.5	25	M8xP1.25	8.5	2	9	A9...1035...
00-99802-M10-20A10	M10-20A10	**20**	2.0	30	M10xP1.5	10.5	3		
00-99802-M12-25A10-3T	M12-25A10-3T	**25**	1.3	35	M12xP1.75	12.5	3		
00-99805-M12-25A10	M12-25A10	**25**	1.3	20	M12xP1.75	12.5	3		

* Refer to page 164 for extension bars.

A Series Shoulder Face Mills

NC5072

U-NC2032

H-NC2033

H-NC9031

Insert

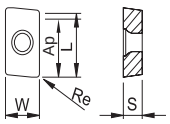
- U type insert is fully ground for reducing the cutting resistance during the cutting, best choice for long shank cutter.
- H type with high positive rake angle, shape edge.

NC5072 :
- High rigidity, special edge honing, resistance of impact during milling operation.
- Special chip breaker design for high removal rate.
- P40 tougher grade for smooth cutting, good for all kinds of steel.

U-NC2032 :
- High rigidity, special edge honing, resistance of impact during milling operation.
- For all kinds of steel from < 50 HRC, carbon steel, alloy steel, cast iron, aluminum and non-ferrous metal.

H-NC2033 :
- Sharp cutting edge and high positive rake angle, good for finishing milling and surface roughness.
- Re 0.5 and Re1.0 for your option.
- Sutiable for all kinds of steel.

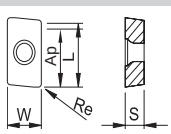
H-NC9031 :
- Sharp cutting edge and high positive rake angle, low friction coefficient for non-ferrous metal.
- Good for Al, Al-alloy, Copper, Copper alloy and Non-Ferrous metal.

Insert Size	Parts No.		Coating	Grade		Dimensions					Screw / Key
						L	W	S	Re	Ap	
06	A9MT060205	NC5072	TiAlN	P40		6.5	4	2.45	0.5	5	*NS-18037 0.6Nm / NK-T6
	A9GT060201U	NC2032	TiAlN	K20F					0.1		
	A9GT060202U	NC2032	TiAlN	K20F					0.2		
	A9GT060205U	NC2032	TiAlN	K20F					0.5		
	A9GT060201H	NC2033	TiAlN	K20F					0.1		
		NC9031	TiN	K20F							
	A9GT060202H	NC2033	TiAlN	K20F					0.2		
		NC9031	TiN	K20F							
	A9GT060205H	NC2033	TiAlN	K20F					0.5		
		NC9031	TiN	K20F							
	A9GT060210H	NC2033	TiAlN	K20F					1.0		

*Torque screwdriver is recommended.

NC2032 :
- High rigidity, special edge honing, resistance of impact during milling operation.
- Special chip breaker design for high removal rate.
- Good for hard cutting carbon steel and alloy steel.

H-NC9031 :
- Sharp cutting edge and high positive rake angle, low friction coefficient for non-ferrous metal.
- Good for Al, Al-alloy, Copper, Copper alloy and Non-Ferrous metal.

Insert Size	Parts No.		Coating	Grade		Dimensions					Screw / Key
						L	W	S	Re	Ap	
10	A9MT1035	NC2032	TiAlN	K20F		10	6.6	3.5	0.4	9	*NS-25060 0.9Nm NK-T7
	A9GT103505H	NC9031	TiN	K20F					0.5		

*Torque screwdriver is recommended.

Cutting Data

- Reduce the feed rate 30% from the below table for slotting operation.
- Ramping angle should be under α°. (Please refer to holder specifications)

Insert Size: 6.5mm (Holder Ø10~Ø17mm) >>

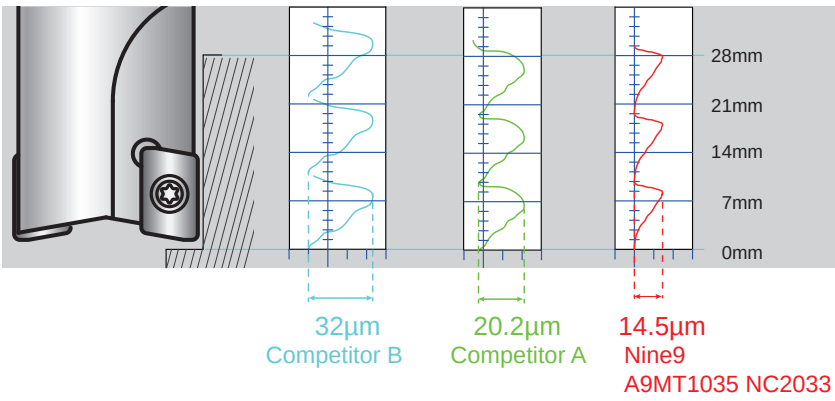
	Work Material	Sample Code (JIS)	Vc (m/min)	fz (mm/tooth)	Ap(mm)	Ap(mm)	Ae(mm)	Grade of Insert
P	Carbon Steel	P5	80~150	0.03~0.07	1.5	4	1.5	NC5072
								NC2033
P	Low alloy steel	SCM440	80~150	0.03~0.07	1.5	4	1	NC5072
								NC2033
P	High alloy steel	SKD11	60~120	0.03~0.07	1	2.5	1	NC5072
								NC2033
M	Stainless steel	SUS304	60~120	0.01~0.05	0.5	2	1	NC5072
								NC2033
K	Cast Iron	FC25	60~120	0.03~0.07	1	2.5	1	NC5072
								NC2033
K	Malleable Cast Iron		100~150	0.03~0.07	1.5	4	1.5	NC5072
								NC2033
N	Non-ferrous metal	A6061	200~500	0.03~0.07	2	4	2	NC9031

Insert Size: 10mm (Holder Ø16~Ø25mm) >>

	Work Material	Sample Code (JIS)	Vc (m/min)	fz (mm/tooth)	Ap(mm)	Ap(mm)	Ae(mm)	Grade of Insert
P	Carbon Steel	P5	150~250	0.08~0.15	3	8	3	NC2032
P	Low alloy steel	SCM440	150~250	0.08~0.15	3	8	2	NC2032
P	High alloy steel	SKD11	120~200	0.08~0.15	2	4	2	NC2032
M	Stainless Steel	SUS304	80~120	0.04~0.08	1	4	2	NC2032
K	Cast Iron	FC25	120~200	0.08~0.12	2	5	2	NC2032
K	Malleable Cast Iron		100~150	0.06~0.10	3	8	3	NC2032
N	Non-ferrous metal	A6061	200~500	0.03~0.07	5	8	3	NC9031

Surface Roughness Comparison

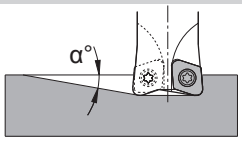
- Nine9 A series shoulder face mill insert receive a better result of surface finish.



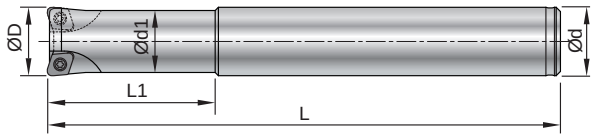
C Series Torus Radius Mills

Features

- Good for corner finishing.
- Series C is developed for replacement of the other milling cutters with ramp feed.

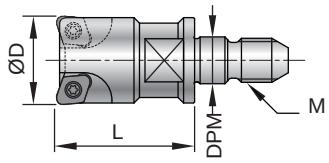


Cylindrical Shank >>



Part No.	Type	ØD	Ød h6	Ød1	α°	L1	L	⌖ Z	Insert type
00-99802-BC12-12C5	BC12-12C5	**12**	12	10.5	8.0	30	100	2	C9MT05T105 C9MT05T110H
00-99802-BC16-16C5	BC16-16C5	**16**	16	14.5	5.5	40	120	3	
00-99802-BC20-20C5	BC20-20C5	**20**	20	18	4.0	50	130	3	
00-99802-BC25-25C5	BC25-25C5	**25**	25	23	3.0	60	150	4	

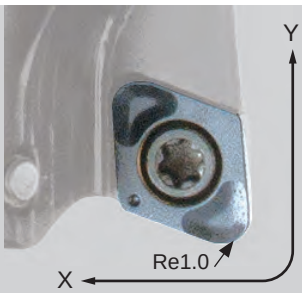
Screw-Fit Type >>



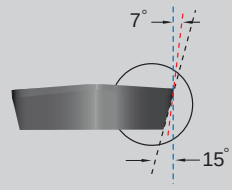
Part No.	Type	ØD	α°	L	M	DPM	⌖ Z	Insert type
00-99802-M05-10C4	M05-10C4	**10**	8	15	M5xP0.8	5.5	2	C9MT040105 C9MT040110
00-99802-M05-11C4	M05-11C4	**11**	6	15	M5xP0.8	5.5		
00-99802-M06-12C5	M06-12C5	**12**	8	25	M6xP1.0	6.5	2	C9MT05T105 C9MT05T110H
00-99802-M06-13C5	M06-13C5	**13**	7.5	25	M6xP1.0	6.5		
00-99802-M08-16C5	M08-16C5	**16**	5.5	25	M8xP1.25	8.5	3	
00-99802-M08-17C5	M08-17C5	**17**	5	25	M8xP1.25	8.5		
00-99802-M10-20C5	M10-20C5	**20**	4	30	M10xP1.5	10.5		
00-99802-M10-21C5	M10-21C5	**21**	3.5	30	M10xP1.5	10.5		
00-99802-M12-25C5	M12-25C5	**25**	3	35	M12xP1.75	12.5	4	
00-99802-M12-26C5	M12-26C5	**26**	2.5	35	M12xP1.75	12.5		
00-99805-M05-11C5	M05-11C5	**11**	10	13	M5xP0.8	5.5	2	C9MT05T105 C9MT05T110H
00-99805-M06-12C5	M06-12C5	**12**	8	13	M6xP1.0	6.5		
00-99805-M06-13C5	M06-13C5	**13**	7.5	13	M6xP1.0	6.5		
00-99805-M08-16C5	M08-16C5	**16**	5.5	15	M8xP1.25	8.5	3	
00-99805-M08-17C5	M08-17C5	**17**	5	15	M8xP1.25	8.5		
00-99805-M10-20C5	M10-20C5	**20**	4	15	M10xP1.5	10.5		
00-99805-M10-21C5	M10-21C5	**21**	3.5	15	M10xP1.5	10.5		
00-99805-M12-25C5	M12-25C5	**25**	3	20	M12xP1.75	12.5	4	
00-99805-M12-26C5	M12-26C5	**26**	2.5	20	M12xP1.75	12.5		

* Refer to page 164 for extension bars.

C Series Torus Radius Mills



Dual Relief Angle Insert



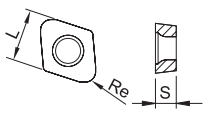
Higher feed rate!
Higher wearing resistance!

Insert

- Submicron carbide inserts are fully ground.
- Special design milling cutter and ground insert for semi-finishing 3D surface milling for mold industry.

NC30 : • Flat cutting edge design, universal type for all kind of materials.

NC2032 : • High positive angle, special chip breaker design, higher wearing resistance.
• Good for hardened material.

Parts No.	Coating	Grade		Dimensions			Screw	Key
				L	S	Re		
C9MT040105-NC30	AlTiN	K10F		4	1.59	0.5	*NS-18037 0.6Nm	NK-T6
C9MT040110-NC30	AlTiN	K10F		4	1.59	1.0		
C9MT05T105-NC30	AlTiN	K10F		5	2.0	0.5	*NS-20045 0.6Nm	NK-T6
C9MT05T110H-NC2032	AlTiN	K20F		5	2.0	1.0		

*Torque screwdriver is recommended.

Cutting Data

- Recommand Ae below 2.5mm.

	Work Material	Sample Code (JIS)	Vc (m/min)	fz (mm/tooth)	Ap(mm)	Grade of Insert
P	Carbon Steel	P5	150~300	0.2~0.5	0.2~0.5	NC30
						NC2032
P	Alloy Steel	SCM440	120~250	0.2~0.5	0.2~0.5	NC30
						NC2032
M	Stanless Steel	SUS304	120~200	0.2~0.4	0.2~0.4	NC30
						NC2032
H	Hardened steel < HRC52	SKD61	100~150	0.1~0.3	0.1~0.3	NC2032

NineBore >>>

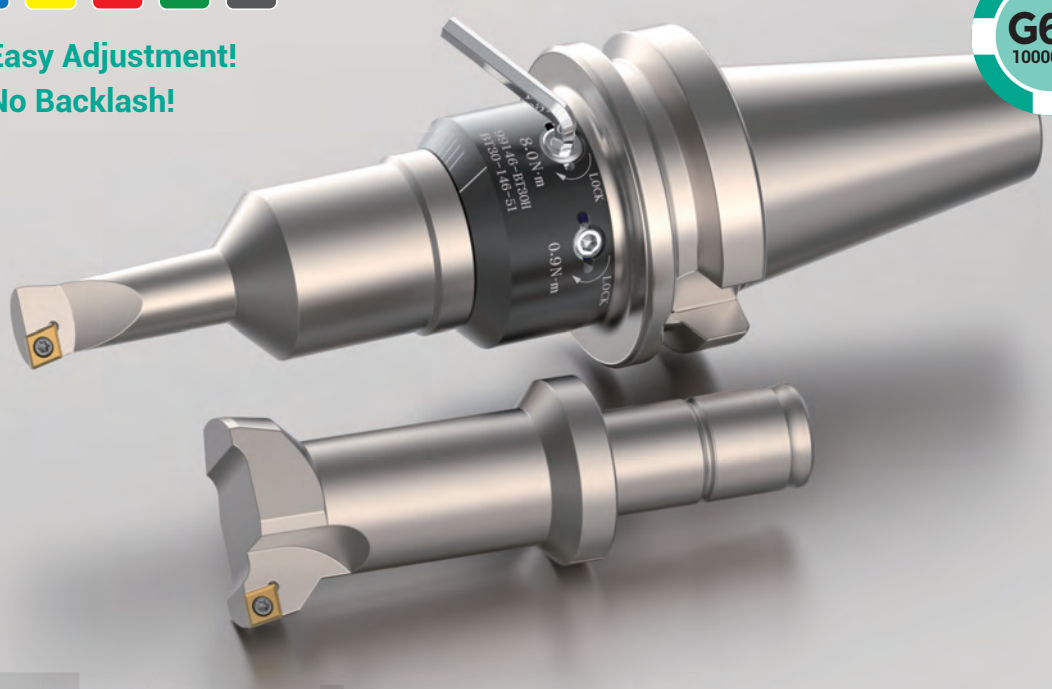
Cycle Time
Roughness
Position Accuracy
True Roundness

Nine9 offers a range of eccentrically mechanism boring tools which designed to provide stability, accuracy, and productivity in boring operations.
These tools are commonly used in industries such as automotive, aerospace, mold and die, and general machining.
99146 can complete rough and finish boring in one operation.

P M K N H

- Easy Adjustment!
- No Backlash!

G6.3
10000rpm



Features >>>

Easy Handling

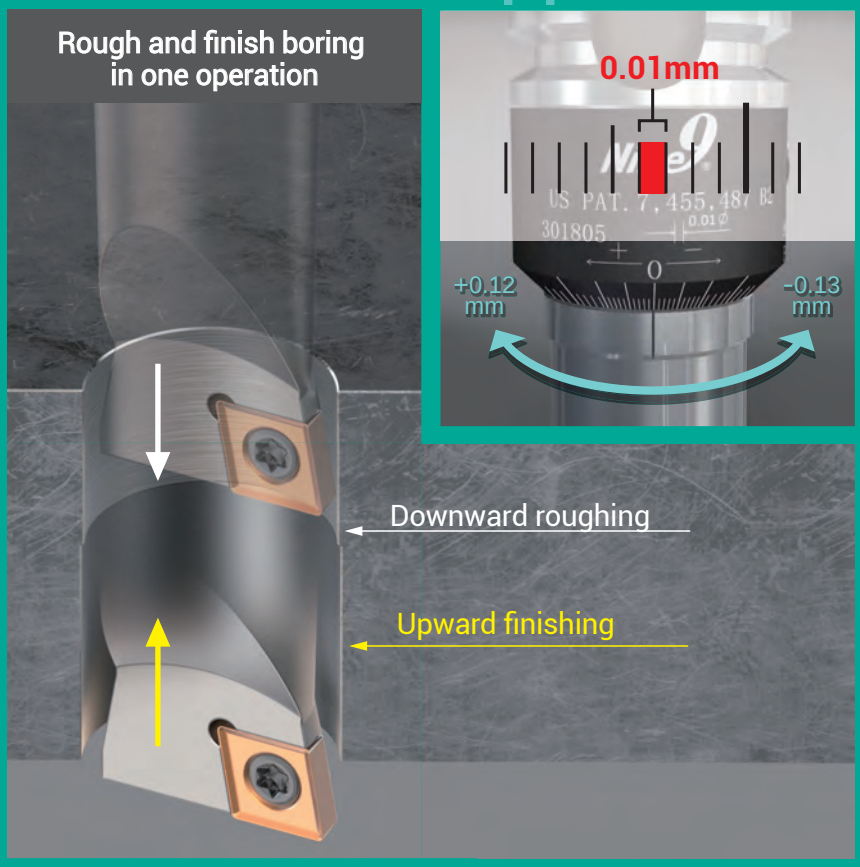
- Change the boring bar in just one minute.
- Dimensions are easy to read. They are indicated on the tools and are easily adjusted on a tool presetter or in machining center.
- Adjusting range :±0.1mm

High Speed.

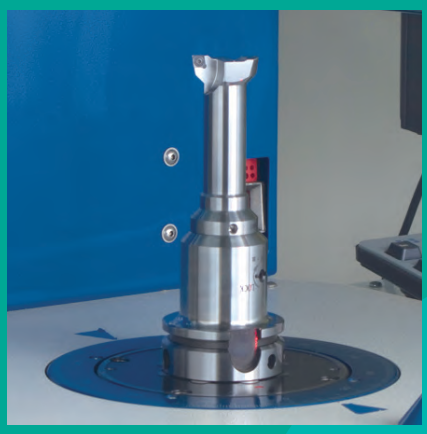
- Good for fine boring operation on milling machines, machining centers and special purpose machines.
- Replace solid carbide reamers.

99146 Series Is Ideal For Casting Aluminum With Uncertain Pre-Hole Dimensions And Deviations In Hole Spacing.

Applications



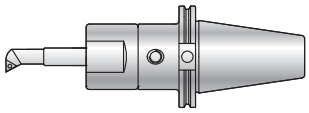
> “Ø5~Ø50mm boring bars are interchangeable, balanced grade is G6.3 10000 r.p.m., all sizes are guaranteed.”



NineBore Features

Precisely pre-balanced the basic holder and the boring bar >>

• Balanced grade is maintained while adjusting boring dimension or change to different diameter boring bars.

NineBore design	Other Boring Tool
	
• Pre-balanced	• Without pre-balanced

Application >>

• Ideal as small hole boring tool with excellent accuracy.
• For fine boring operation on milling machines, machining centres and special purpose machines.

High Speed >>

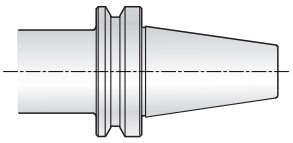
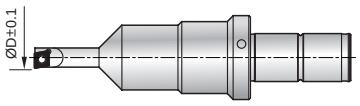
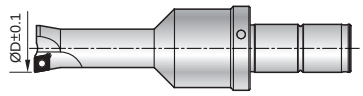
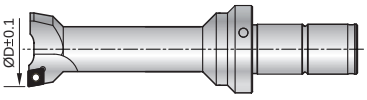
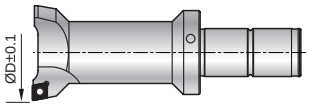
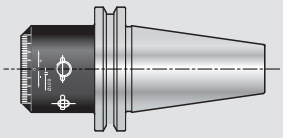
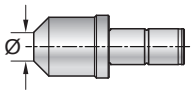
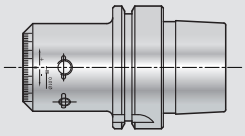
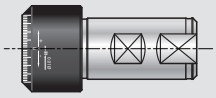
• Boring bar design ensures accurate high speed boring.
Balanced grade is G6.3 10000 r.p.m., all sizes are guaranteed.
• Combination bore / chamfer / facing / multi-task tools can be ordered on request.

Economic >>

• Low cost micro adjustable boring heads.
• It can replace end mill and brazed tool bits.
• This simple boring tool has minimal components. In minutes, the boring bar can be changed and the boring dimension set on the tool presetter.

Work Task HoleØ : 10mm (H7 Tolerance) Hole Distance : 20mm		
Tool	NineBore 99146	Other Boring Tool
Workpiece material	N AL6061T6	
CNC Code	G85	G76
Spindle speed r.p.m.	10000 r.p.m.	2500 r.p.m.
Feed rate f = mm/rev.	0.07 mm/rev.	0.07 mm/rev.
Feed rate F= mm/min.	700 mm/min.	175mm/min.
	RESULT	
Drilling time sec.	4s 75	10s 44
Hole 1 Ø mm	Ø10.006 mm	Ø10.003 mm
Hole 2 Ø mm	Ø10.005 mm	Ø9.990 mm
Hole Distance mm	Ø20.00 mm	Ø19.98 mm
Comparison		

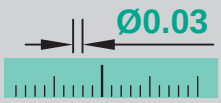
NineBore System

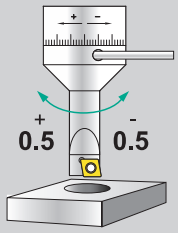
Series	Adjustment range	ØD range	Insert	Boring Bars	Head Shank
99101 Each Division 0.03 mm/div	±0.5mm	Ø 6.5 mm ~ 25.5 mm	CCGT030102 CCGT040102 CCGH060204	 00-99101-07...25	Side lock holders Hydraulic chucks Spring collet chucks 
99121 Each Division 0.01 mm/div.	±0.1mm	Ø 4.9 mm ~ 25.1 mm		 00-99121-05...25	
G6.3 10000 r.p.m **99146** Each Division 0.01 mm/div.	+0.12mm ~ -0.13mm	Ø 4.87 mm ~ 50.12 mm	CCGT030102 CCGT040102 CCGH060204	 Ø5 ~ Ø10 mm 00-99146-xxS  Ø11 ~ Ø25 mm 00-99146-xxS  Ø26 ~ Ø39 mm 00-99146-xxA  Ø40 ~ Ø50 mm 00-99146-xxA	 00-99146-BT30H 00-99146-BT40H 00-99146-BT50H 00-99146-CAT40H
4~6XD **99151** Each Division 0.01 mm/div.	+0.12mm ~ -0.13mm	Ø 4.87 mm ~ 20.12 mm	CCGT030102 CCGT040102 CCGH060204	Ø6 Ø4.87 ~ Ø6.87 mm Ø8 Ø6.87 ~ Ø8.87 mm Ø10 Ø8.87 ~ Ø11.12 mm Adapter  00-99151A-06...15.5 Ø11 Ø11.87 ~ Ø14.12 mm Ø15.5 Ø14.87 ~ Ø20.12 mm	 00-99146-HSK63AH  00-99146-SB32H

NineBore Boring Tool

10

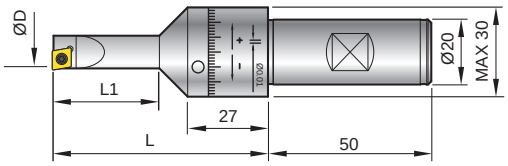
99101 EMB Boring Bars 0.03 mm/div.





Boring Bars >>

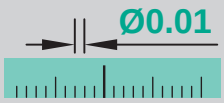
- Adjusted to required diameter by eccentric mechanism
- H type with internal coolant can be ordered on request from Dia. 7mm. Ordering example: 00-99101-07H.
- Other sizes are available on request.

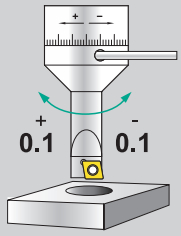


Part No.	Type		ØD	L1	L	Insert	Screw / Key
00-99101-07	SB20-0721-03	Adjustment range:±0.5mm Each Division 0.03mm	6.5-7.5	21	60	CC...040102	*NS-20036 0.6Nm / NK-T6
00-99101-08	SB20-0824-03		7.5-8.5	24	63		
00-99101-09	SB20-0927-03		8.5-9.5	27	65	CC...0602...	*NS-25045 0.9Nm / NK-T7
00-99101-10	SB20-1030-03		9.5-10.5	30	68		
00-99101-11	SB20-1133-03		10.5-11.5	33	70		
00-99101-12	SB20-1236-03		11.5-12.5	36	73		
00-99101-13	SB20-1339-03		12.5-13.5	39	75		
00-99101-14	SB20-1442-03		13.5-14.5	42	78		
00-99101-15	SB20-1545-03		14.5-15.5	45	80		
00-99101-16	SB20-1648-03		15.5-16.5	48	83	CC...0602...	*NS-25060 0.9Nm / NK-T7
00-99101-17	SB20-1751-03		16.5-17.5	51	85		
00-99101-18	SB20-1850-03		17.5-18.5	50	82		
00-99101-19	SB20-1950-03		18.5-19.5	50	82		
00-99101-20	SB20-2050-03		19.5-20.5	50	82		
00-99101-21	SB20-2150-03		20.5-21.5	50	82		
00-99101-22	SB20-2250-03		21.5-22.5	50	82		
00-99101-23	SB20-2350-03		22.5-23.5	50	82		
00-99101-24	SB20-2450-03		23.5-24.5	50	82		
00-99101-25	SB20-2550-03		24.5-25.5	50	82		

*Torque screwdriver is recommended.

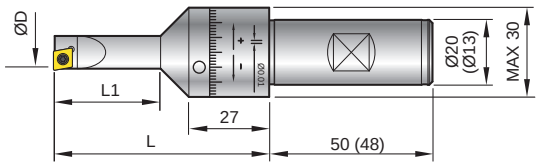
99121 EMB Boring Bars 0.01 mm/div.





Boring Bars >>

- Adjusted to required diameter by eccentric mechanism
- H type with internal coolant can be ordered on request from Dia. 7mm. Ordering example: 00-99121-07H.
- Other sizes are available on request.



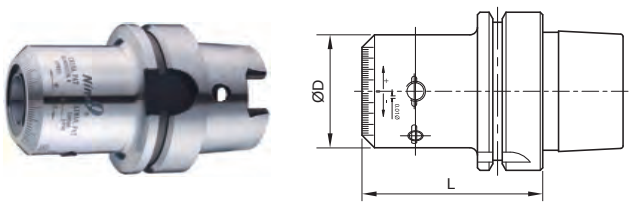
Part No.	Type		ØD	L1	L	Insert	Screw / Key
00-99121-05	SB20-0515-01	Adjustment range:±0.1mm Each Division 0.01mm	4.9-5.1	15	54	CC...030102	*NS-16030 0.4Nm / NK-T6
00-99121-06	SB20-0618-01		5.9-6.1	18	57		
00-99121-07	SB20-0721-01		6.9-7.1	21	60	CC...040102	*NS-20036 0.6Nm / NK-T6
00-99121-08	SB20-0824-01		7.9-8.1	24	63		
00-99121-09	SB20-0927-01		8.9-9.1	27	65	CC...0602...	*NS-25045 0.9Nm / NK-T7
00-99121-10	SB20-1030-01		9.9-10.1	30	68		
00-99121-11	SB20-1133-01		10.9-11.1	33	70		
00-99121-12	SB20-1236-01		11.9-12.1	36	73		
00-99121-13	SB20-1339-01		12.9-13.1	39	75		
00-99121-14	SB20-1442-01		13.9-14.1	42	78		
00-99121-15	SB20-1545-01		14.9-15.1	45	80		
00-99121-16	SB20-1648-01		15.9-16.1	48	83	CC...0602...	*NS-25060 0.9Nm / NK-T7
00-99121-17	SB20-1751-01		16.9-17.1	51	85		
00-99121-18	SB20-1850-01		17.9-18.1	50	82		
00-99121-19	SB20-1950-01		18.9-19.1	50	82		
00-99121-20	SB20-2050-01		19.9-20.1	50	82		
00-99121-21	SB20-2150-01		20.9-21.1	50	82		
00-99121-22	SB20-2250-01		21.9-22.1	50	82		
00-99121-23	SB20-2350-01		22.9-23.1	50	82		
00-99121-24	SB20-2450-01		23.9-24.1	50	82		
00-99121-25	SB20-2550-01		24.9-25.1	50	82		

*Torque screwdriver is recommended.

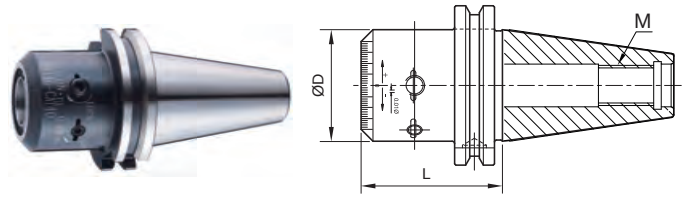
99146 Quick Change High Speed EMB Boring Bar

Boring Head Shank >>

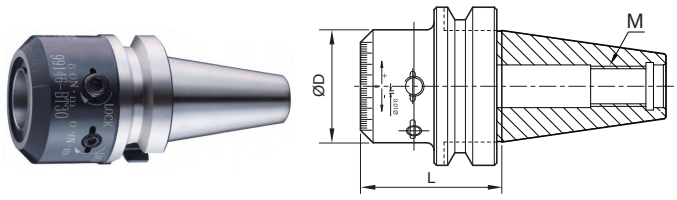
- HSK63



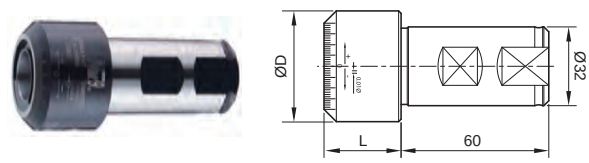
- CAT40



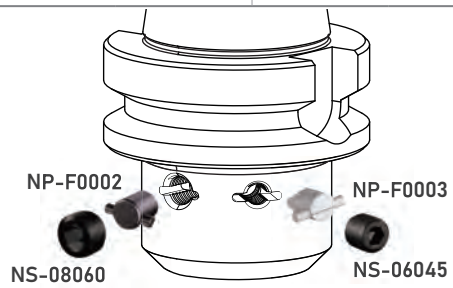
- BT



- SB32

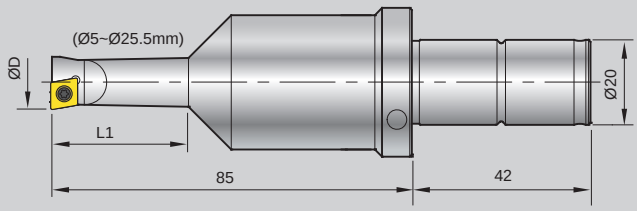


Part No.	Type	ØD	L	M	M8 Screw		M6 Screw	
					Spring Fingers	Locking Screw	Spring Fingers	Pre-load Screw
00-99146-HSK63AH	HSK63A-146-72	45	72.0	-	NP-F0002	NS-08060 8.0 Nm	NP-F0003	NS-06045 0.9 Nm
00-99146-CAT40H	CAT40-146-56	45	56.3	5/8”-11				
00-99146-BT30H	BT30-146-51	45	51.3	M12xP1.75				
00-99146-BT40H	BT40-146-56	45	56.3	M16xP2.0				
00-99146-BT50H	BT50-146-77	45	77.3	M24xP3.0				
00-99146-SB32H	SB32-146-31	45	31.3	-				



99146 Quick Change High Speed EMB Boring Bar

Boring Bar Ø5~Ø25 >>



- Alloy Steel Shank. Boring Depth : L1, 2~3xD
- H type with internal coolant can be ordered on request from Dia. 10mm.
  Ordering example: 00-99146-1000SH.
- Other sizes are available on request.

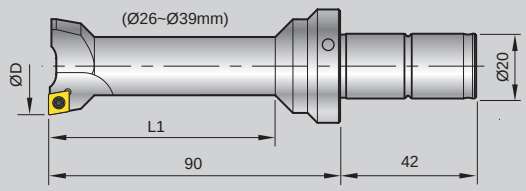
Part No.	Type	ØD	L1	Insert Screw / Key
00-99146-0500S	C20-0500-10L	4.87~5.12	10.00	CC...030102 *NS-16030 0.4Nm / NK-T6
00-99146-0600S	C20-0600-12L	5.87~6.12	12.00	
00-99146-0700S	C20-0700-14L	6.87~7.12	14.00	CC...040102 *NS-20036, 0.6Nm / NK-T6
00-99146-0800S	C20-0800-16L	7.87~8.12	16.00	
00-99146-0900S	C20-0900-18L	8.87~9.12	18.00	CC...0602... *NS-25045 0.9Nm NK-T7
00-99146-1000S	C20-1000-25L	9.87~10.12	25.00	
00-99146-1025S	C20-1025-25L	10.12~10.37		
00-99146-1050S	C20-1050-26L	10.37~10.62	26.25	
00-99146-1075S	C20-1075-26L	10.62~10.87		
00-99146-1100S	C20-1100-27L	10.87~11.12	27.50	
00-99146-1125S	C20-1125-27L	11.12~11.37		
00-99146-1150S	C20-1150-28L	11.37~11.62	28.75	
00-99146-1175S	C20-1175-28L	11.62~11.87		
00-99146-1200S	C20-1200-30L	11.87~12.12	30.00	
00-99146-1225S	C20-1225-30L	12.12~12.37		
00-99146-1250S	C20-1250-31L	12.37~12.62	31.25	
00-99146-1275S	C20-1275-31L	12.62~12.87		
00-99146-1300S	C20-1300-32L	12.87~13.12	32.50	
00-99146-1325S	C20-1325-32L	13.12~13.37		
00-99146-1350S	C20-1350-33L	13.37~13.62	33.75	
00-99146-1375S	C20-1375-33L	13.62~13.87		
00-99146-1400S	C20-1400-35L	13.87~14.12	35.00	
00-99146-1425S	C20-1425-35L	14.12~14.37		
00-99146-1450S	C20-1450-36L	14.37~14.62	36.25	
00-99146-1475S	C20-1475-36L	14.62~14.87		
00-99146-1500S	C20-1500-37L	14.87~15.12	37.50	
00-99146-1525S	C20-1525-37L	15.12~15.37		
00-99146-1550S	C20-1550-38L	15.37~15.62	38.75	
00-99146-1575S	C20-1575-38L	15.62~15.87		
00-99146-1600S	C20-1600-40L	15.87~16.12	40.00	CC...0602... *NS-25060 0.9Nm NK-T7
00-99146-1625S	C20-1625-40L	16.12~16.37		
00-99146-1650S	C20-1650-41L	16.37~16.62	41.25	
00-99146-1675S	C20-1675-41L	16.62~16.87		
00-99146-1700S	C20-1700-42L	16.87~17.12	42.50	

Part No.	Type	ØD	L1	Insert Screw / Key
00-99146-1725S	C20-1725-42L	17.12~17.37	42.50	CC...0602... *NS-25060 0.9Nm NK-T7
00-99146-1750S	C20-1750-43L	17.37~17.62	43.75	
00-99146-1775S	C20-1775-43L	17.62~17.87		
00-99146-1800S	C20-1800-45L	17.87~18.12	45.00	
00-99146-1825S	C20-1825-45L	18.12~18.37		
00-99146-1850S	C20-1850-46L	18.37~18.62	46.25	
00-99146-1875S	C20-1875-46L	18.62~18.87		
00-99146-1900S	C20-1900-47L	18.87~19.12	47.50	
00-99146-1925S	C20-1925-47L	19.12~19.37		
00-99146-1950S	C20-1950-48L	19.37~19.62	48.75	
00-99146-1975S	C20-1975-48L	19.62~19.87		
00-99146-2000S	C20-2000-50L	19.87~20.12	50.00	
00-99146-2025S	C20-2025-50L	20.12~20.37		
00-99146-2050S	C20-2050-50L	20.37~20.62		
00-99146-2075S	C20-2075-50L	20.62~20.87		
00-99146-2100S	C20-2100-50L	20.87~21.12		
00-99146-2125S	C20-2125-50L	21.12~21.37		
00-99146-2150S	C20-2150-50L	21.37~21.62		
00-99146-2175S	C20-2175-50L	21.62~21.87		
00-99146-2200S	C20-2200-50L	21.87~22.12		
00-99146-2225S	C20-2225-50L	22.12~22.37		
00-99146-2250S	C20-2250-50L	22.37~22.62		
00-99146-2275S	C20-2275-50L	22.62~22.87		
00-99146-2300S	C20-2300-50L	22.87~23.12		
00-99146-2325S	C20-2325-50L	23.12~23.37		
00-99146-2350S	C20-2350-50L	23.37~23.62		
00-99146-2375S	C20-2375-50L	23.62~23.87		
00-99146-2400S	C20-2400-50L	23.87~24.12		
00-99146-2425S	C20-2425-50L	24.12~24.37		
00-99146-2450S	C20-2450-50L	24.37~24.62		
00-99146-2475S	C20-2475-50L	24.62~24.87		
00-99146-2500S	C20-2500-50L	24.87~25.12		
00-99146-2525S	C20-2525-50L	25.12~25.37		
00-99146-2550S	C20-2550-50L	25.37~25.62		

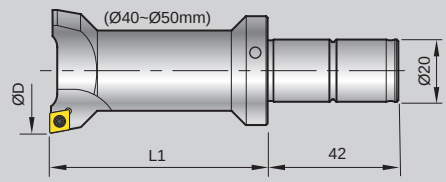
*Torque screwdriver is recommended.

99146 Quick Change High Speed EMB Boring Bar

Boring Bar Ø26~Ø39 >>



Boring Bar Ø40~Ø50 >>



- Alloy Steel Shank. Boring Depth : L1, 2~3xD
- H type with internal coolant can be ordered on request from Dia. 10mm.
  Ordering example: 00-99146-36AH.
- Other sizes are available on request.

Part No.	Type	ØD	L1	Insert Screw / Key
00-99146-26A	C20-2600-50L	25.87~26.12	50	CC...0602... *NS-25060 0.9Nm NK-T7
00-99146-27A	C20-2700-50L	26.87~27.12		
00-99146-28A	C20-2800-50L	27.87~28.12		
00-99146-29A	C20-2900-50L	28.87~29.12		
00-99146-30A	C20-3000-50L	29.87~30.12		
00-99146-31A	C20-3100-70L	30.87~31.12	70	
00-99146-32A	C20-3200-70L	31.87~32.12		
00-99146-33A	C20-3300-70L	32.87~33.12		
00-99146-34A	C20-3400-70L	33.87~34.12		
00-99146-35A	C20-3500-70L	34.87~35.12		
00-99146-36A	C20-3600-70L	35.87~36.12		
00-99146-37A	C20-3700-70L	36.87~37.12		
00-99146-38A	C20-3800-70L	37.87~38.12		
00-99146-39A	C20-3900-70L	38.87~39.12		

Part No.	Type	ØD	L1	Insert Screw / Key
00-99146-40A	C20-4000-70L	39.87-40.12	70	CC...0602... *NS-25060 0.9Nm NK-T7
00-99146-41A	C20-4100-70L	40.87-41.12		
00-99146-42A	C20-4200-70L	41.87-42.12		
00-99146-43A	C20-4300-70L	42.87-43.12		
00-99146-44A	C20-4400-70L	43.87-44.12		
00-99146-45A	C20-4500-70L	44.87-45.12		
00-99146-46A	C20-4600-70L	45.87-46.12		
00-99146-47A	C20-4700-70L	46.87-47.12		
00-99146-48A	C20-4800-70L	47.87-48.12		
00-99146-49A	C20-4900-70L	48.87-49.12		
00-99146-50A	C20-5000-70L	49.87-50.12		

*Torque screwdriver is recommended.

High Speed Boring Bar Kit >>

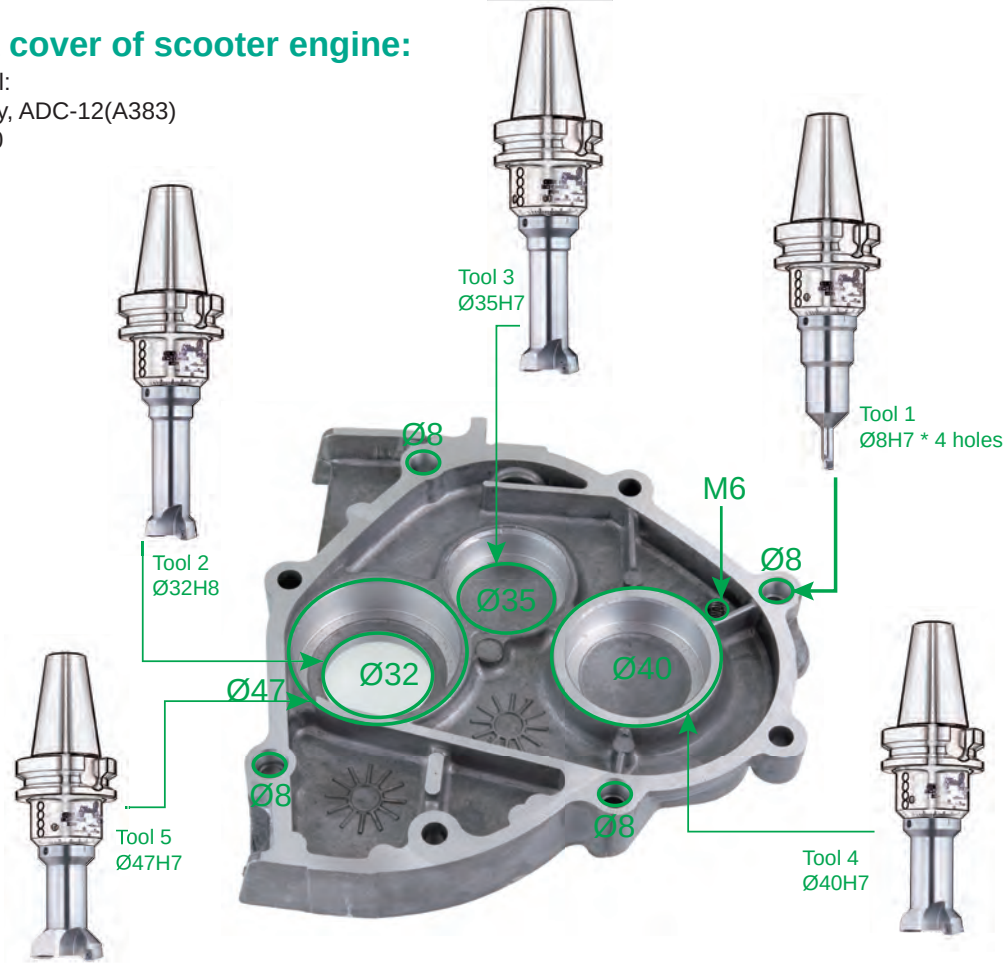
Part No.	Contents	
00-99146-SB32H-05SET	SB32-146-31 Weldon Shank	Boring head shank: 1pc Boring bar: any 5 pcs from Ø5~Ø50 Key: 3~5 pcs Plastic box: 1pc
00-99146-BT30-05SET	BT30H Boring head shank	
00-99146-BT40-05SET	BT40H Boring head shank	
00-99146-BT50-05SET	BT50H Boring head shank	
00-99146-CAT40-05SET	CAT40H Boring head shank	
00-99146-HSK63A-05SET	HSK63A Boring head shank	

(Insert is not included, please order seperately)
- Note: BT50 boring head shank is packed in a separate box.

Application Example

Machining a cover of scooter engine:

Workpiece material:
Die casting, Al-alloy, ADC-12(A383)
Spindle Size: BT40

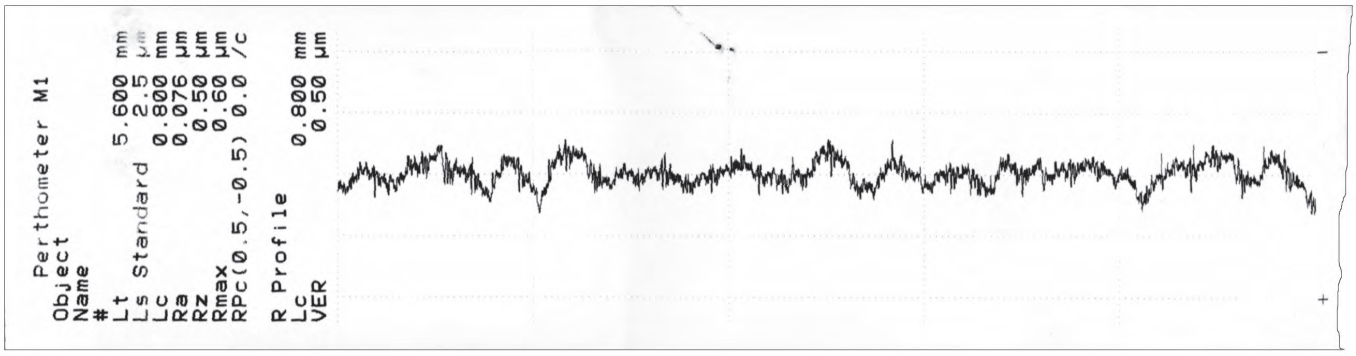


TOOL LIST by Nine9 Boring Bar 99146-series :

No.	Boring Bar	Grade of insert	Dia. mm	Depth	r.p.m.	F = mm/min.	Machining time
1	00-99146-08A	CCGT040102 NC30	Ø8H7	8 mm	8000	400	1.2 sec.
2	00-99146-32A	CCFT060204HP NC9031	Ø32H8	8 mm	2985	209	2.3 sec.
3	00-99146-35A		Ø35H7	12 mm	2730	191	3.8 sec.
4	00-99146-40A		Ø40H7	15 mm	2400	168	5.4 sec.
5	00-99146-47A		Ø47H7	15 mm	2030	142	6.4 sec.

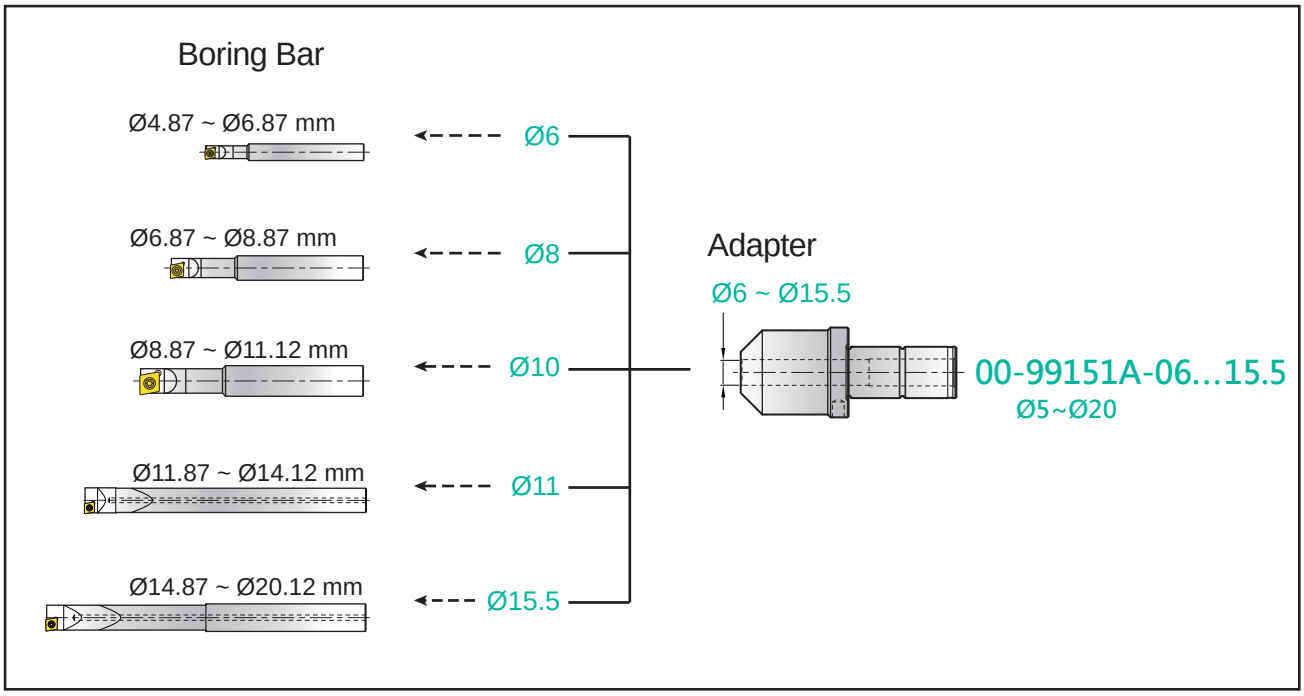
Example >>

	Material	Vc m/min.	f mm/rev.	Roughness			Tool holder	Insert
				Ra	Rz	Rmax		
	Al alloy, 6061	150	0.2	0.076μm	0.50μm	0.6μm	99146-BT40-26A	CCGH0602U NC9036



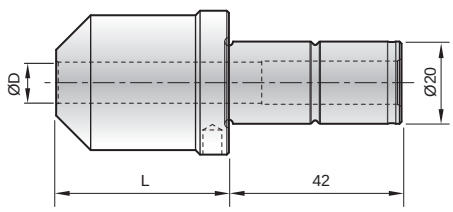
99151 Deep hole boring 4~6XD

99151 System >>



Adapter >>

- Economical solution of small dia. boring bar.

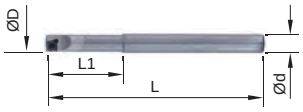
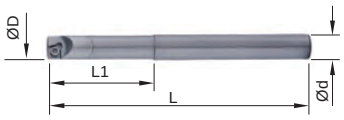
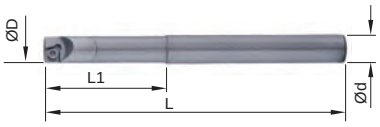
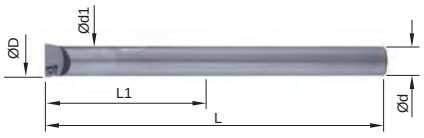
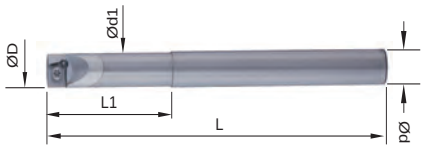
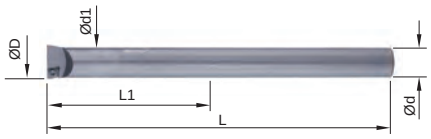


Part No.	Type	ØD	L
00-99151A-06	C20-ID06	6	52
00-99151A-08	C20-ID08	8	49
00-99151A-10	C20-ID10	10	42
00-99151A-11	C20-ID11	11	21.5
00-99151A-15.5	C20-ID15.5	15.5	21.5

99151 Deep hole boring 4~6XD

Boring Bar Ø5~Ø20 >>

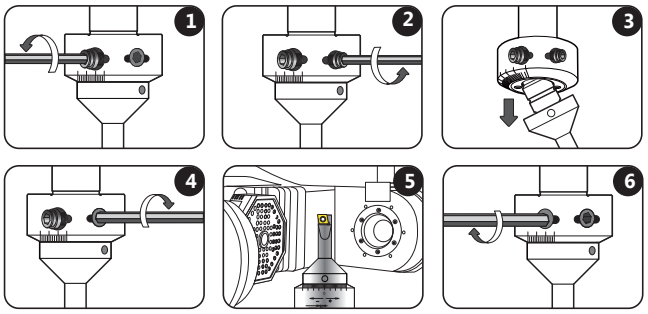
- Solid Carbide Shank
- Boring Depth : L1, 4~6xD

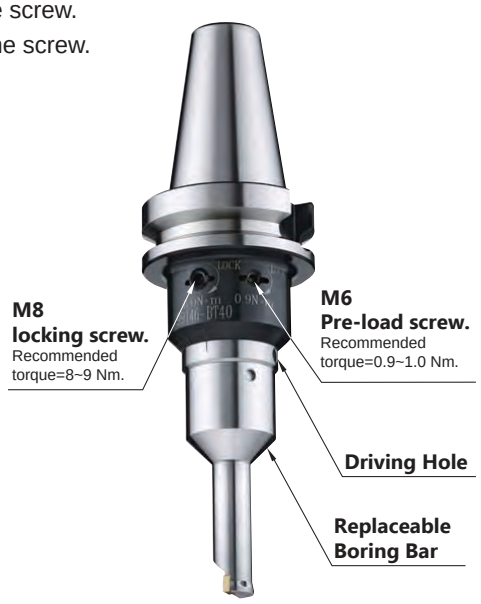
Part No.	Type	ØD	Ød	Ød1	L1	L	Insert Screw / Key	Fig.
00-99151-0500W	C06-0500-20L	4.87~5.12	6	-	20	70	CCGT030102 *NS-16030 / 0.4Nm NK-T6	
00-99151-0525W	C06-0525-20L	5.12~5.37		-				
00-99151-0550W	C06-0550-22L	5.37~5.62		-	22			
00-99151-0575W	C06-0575-22L	5.62~5.87		-				
00-99151-0600W	C06-0600-24L	5.87~6.12		-	24			
00-99151-0625W	C06-0625-24L	6.12~6.37		-				
00-99151-0650W	C06-0650-26L	6.37~6.62		-	26			
00-99151-0675W	C06-0675-26L	6.62~6.87		-				
00-99151-0700W	C08-0700-28L	6.87~7.12	8	-	28	85	CCGT040102 *NS-20036 / 0.6Nm NK-T6	
00-99151-0725W	C08-0725-28L	7.12~7.37		-				
00-99151-0750W	C08-0750-30L	7.37~7.62		-	30			
00-99151-0775W	C08-0775-30L	7.62~7.87		-				
00-99151-0800W	C08-0800-32L	7.87~8.12		-	32			
00-99151-0825W	C08-0825-32L	8.12~8.37		-				
00-99151-0850W	C08-0850-34L	8.37~8.62		-	34			
00-99151-0875W	C08-0875-34L	8.62~8.87		-				
00-99151-0900W	C10-0900-36L	8.87~9.12	10	-	36	110	CC...0602... *NS-25045 / 0.9Nm NK-T7	
00-99151-0925W	C10-0925-36L	9.12~9.37		-				
00-99151-0950W	C10-0950-38L	9.37~9.62		-	38			
00-99151-0975W	C10-0975-38L	9.62~9.87		-				
00-99151-1000W	C10-1000-40L	9.87~10.12		-	40			
00-99151-1025W	C10-1025-40L	10.12~10.37		-				
00-99151-1050W	C10-1050-42L	10.37~10.62		-	42			
00-99151-1075W	C10-1075-42L	10.62~10.87		-				
00-99151-1100W	C10-1100-44L	10.87~11.12		-	44			
00-99151-1200WS	C11-1200-120L	11.87~12.12	11	11	70	120	CC...0602... *NS-25045 / 0.9Nm NK-T7	
00-99151-1300WS	C11-1300-120L	12.87~13.12		-				
00-99151-1400WS	C11-1400-120L	13.87~14.12		-				
00-99151-1500W	C15.5-1500-180L	14.87~15.12	15.5	14	90	180		
00-99151-1600W	C15.5-1600-180L	15.87~16.12	15.5	15	90	180	CC...0602... *NS-25060 / 0.9Nm NK-T7	
00-99151-1700W	C15.5-1700-180L	16.87~17.12		-	100			
00-99151-1800W	C15.5-1800-180L	17.87~18.12		-				
00-99151-1900W	C15.5-1900-180L	18.87~19.12		-				
00-99151-2000W	C15.5-2000-180L	19.87~20.12		-				

*Torque screwdriver is recommended.

Procedures For Assembly

1. Use 4 mm allen-key to loosen locking screw M8, take care not to remove the screw.
2. Use 3 mm allen-key to loosen pre-load screw M6, take care not to remove the screw.
3. Remove the original boring bar and insert the new boring bar.
4. Tighten the M6 pre-load screw. Recomended torque = 0.9 ~ 1.0Nm.
5. Measure the boring diameter of the boring bar using tool presetter and adjust it to the required diameter.
6. Tighten the M8 locking screw. Recomended torque = 8 ~ 9Nm.





Procedures For Adjustment

On Tool Presetter

1. Loosen M8 locking screw.
2. Set the boring bar at the neutral position. (Step 1)
3. Measure the boring diameter using the tool presetter and compare with the required diameter. (Step 2)
4. If boring diameter is too big or too small, please put an allen-key into the adjusting driving hole.
   Turn to " + " to increase and turn to " - " to reduce boring diameter. (Step 3 and 4)
5. Tighten M8 locking screw.

(Step 1)

(Step 2)

(Step 3)

(Step 4)

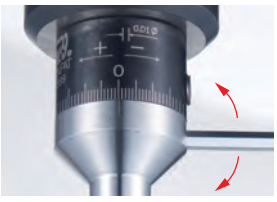
To Increase Diameter

To Reduce Diameter

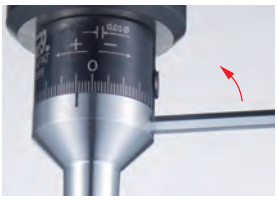
On Milling Machine and Machining Centers

1. Set the boring bar at the neutral position. (Step 1)
2. Tighten M8 locking screw.
3. Test cut on work piece, about 3-5mm deepth on the machine.
4. Measuring boring diameter of workpiece and compare with required diameter.
5. If boring diameter is too big or too small, loosen M8 locking screw, please put an allen-key into the adjusting driving hole.
   Turn to " + " to increase and turn to " - " to reduce boring diameter. (Step 2 and 3)
6. Tighten M8 locking screw. (Step 4)

(Step 1)

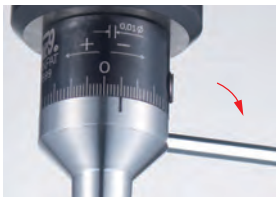


(Step 2)

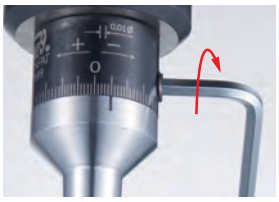


To Increase Diameter

(Step 3)



(Step 4)

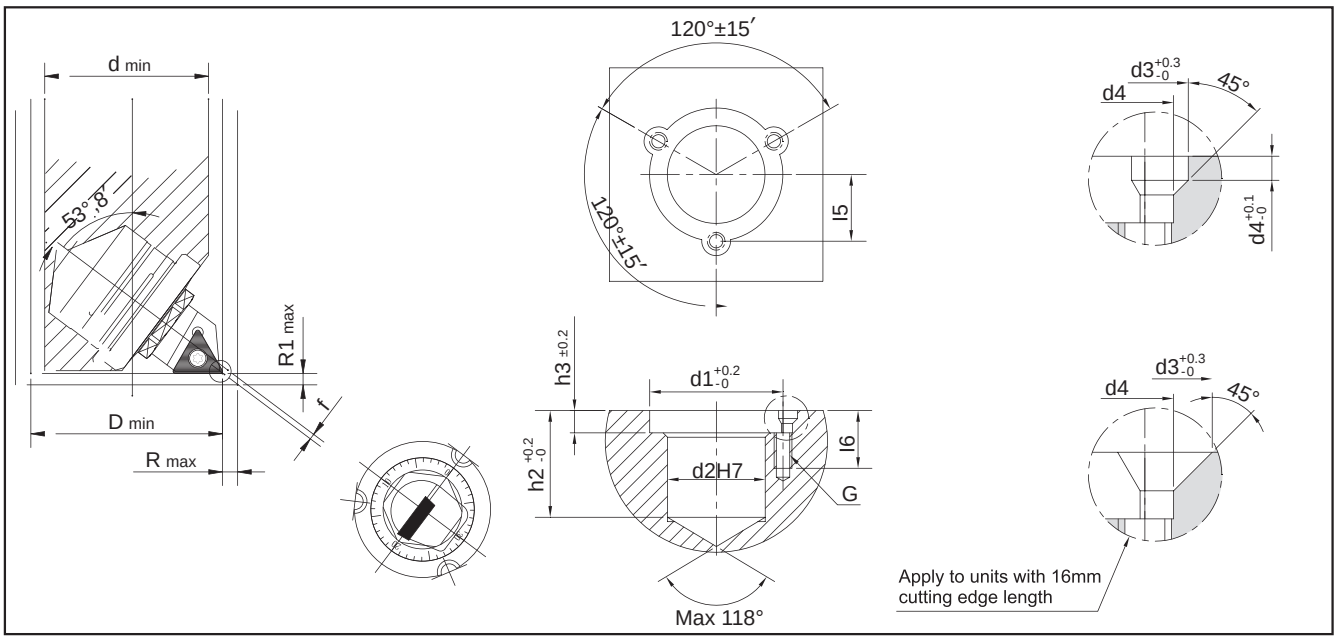


To Reduce Diameter

Micro Adjustable Fine Boring Unit

Angular mounting 90°

- Insert to be used:
  CCMT, CCMW, CCGH, CCGT, CCGX,
  TCMT, TCMW, TCGT, TCGX
- Maximum range can be checked by end of spanner.



Parts No.			Insert Radius	Dimensions / mm					Mounting Dimensions / mm									
				dmin	Dmin	Rmin	R1max	f	h2	h3	h4	d1	d2	d3	d4	G	l6	l5
3106		06	0.2	22	25.7	2	1.5	0.40	11.5	2.8	1.6	19	16	4.6	3.2	M3	10	9.65 ±0.02
			0.4		25.4			0.40										
			0.8		24.8			0.45										
3209	09		0.2	28.5	33.4	2.8	2.1	0.95	15.5	4	1.6	25	20	4.6	3.2	M3	10	12.5 ±0.02
			0.4		33.1			1.0										
			0.8		32.5			1.1										
3311	11		0.2	38	42.9	4.8	3.6	1.15	24	5	1.8	30	22	6.5	4.3	M4	15	15.4 ±0.02
			0.4		42.6			1.2										
			0.8		42.0			1.3										
3416	16		0.2	55	60.6	8	6	1.3	33	6.3	-	46	32	11.9	5.4	M5	20	23 ±0.02
			0.4		60.0			1.4										
			1.2		59.4			1.5										

Spare parts for setting and clamping

Item			Spanner	Mounting Screw	Insert Screw	Mounting Screw Key	Insert Screw Key	Mounting Screw Key
3106		06	3106-SP	NS-30072	NS-25060	NK-T9	NK-T7	-
3209	09		3209-SP	NS-30072	191.958	NK-T9	NK-T7	-
3311	11		3311-SP	CS4011	NS-25060	NK-T15	NK-T7	-
3416	16		3416-SP	3416H	NS-35080	-	NK-T15	3146-J

Boring Tool Precisely Ground Inserts

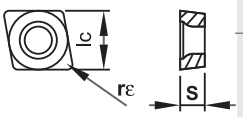
NC30 : • Universal grade for casting iron, carbon steel, alloy steel, stainless steel.

NC2032 : • For high speed cutting of casting iron.

NC2033 : • Good for carbon steel, alloy steel, stainless steel.

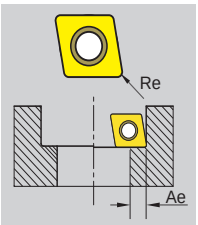
NC9036 : • long tool life.
• Good for Al, Al-alloy, Copper and non-ferrous metal.

XP9001 : • Super finishing insert with special specified cutting width 0.15mm radius for high feed rate.
• Good for Al, Al-alloy and non-ferrous metal.

Parts No.		Coating	Grade		Dimensions			Screw	Key
					Ic	S	Re		
CCGT030102	NC30	TiAlN	K20F		3.5	1.4	0.2	*NS-16030 0.4Nm	NK-T6
	NC9036	DLC							
CCGT040102	NC30	TiAlN	K20F		4.3	1.8	0.2	*NS-20036 0.6Nm	NK-T6
	NC9036	DLC							
CCGH0602U	XP9001	Uncoated	K20F				-		
CCFT060204	NC2033	TiAlN	K20F		6.35	2.38	0.4	*NS-25045 0.9Nm	NK-T7
	NC9036	DLC							
CCFW060204	NC2032	AlTiN	K20F				0.4		

*Torque screwdriver is recommended.

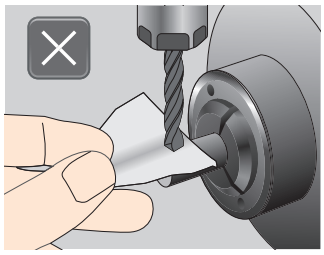
Cutting Data

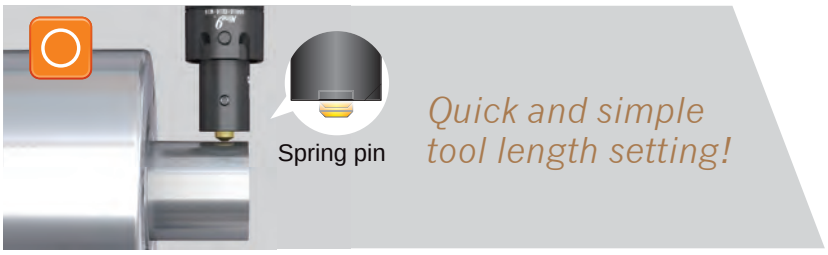


Spindle speed $S = \frac{Vc \times 1000}{\pi \times D}$ r.p.m. Feed rate: f x S mm/min.

	Workpiece Meterial	Cutting conditions or surface finishes	Cutting Speed Vc(m/min.)	feed rate f (mm/rev.)	Re0.2	Re0.4	Grade of Insert	
					Ae (mm)			
P	Carbon Steel	Regular cutting	120-150-200	0.05-0.07-0.10	0.05	0.1	NC2033	
		Interrupted cutting	100-120-140	0.04-0.05-0.08	0.05	0.1	NC30	
	Alloy Steel	Regular cutting	100-120-140	0.05-0.07-0.10	0.05	0.1	NC2033	
		Interrupted cutting	80-100-120	0.04-0.05-0.08	0.05	0.1	NC30	
M	Stainless steel	Regular cutting	80-100-120	0.05-0.07-0.10	0.05	0.1	NC2033	
		Interrupted cutting	70-80-100	0.05-0.07-0.10	0.05	0.1	NC30	
K	Cast Iron	Regular cutting	80-100-120	0.05-0.07-0.10	0.05	0.1	NC2032	NC30
N	Non-ferrous metal	Regular cutting	150-200-300	0.05-0.07-0.10	0.05	0.1	NC9036	
		Super mirror finish	150-200-300	0.15-0.20-0.25	0.15		XP9001	
H	Hardened Steel <HRC 50	Regular cutting	80-100-120	0.04-0.06-0.08	0.05	0.1	NC30	

Accessories



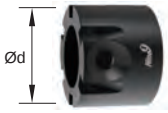
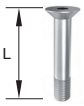


Ergo tool length setter TP >>

- 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	Focusing edge (For Tool Presetter)	NK-LW15 (2 Nm)

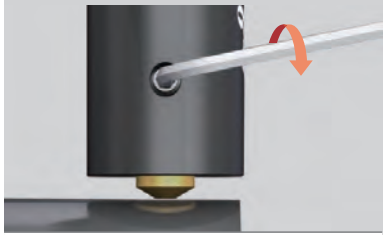
Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
* Nut, pin & L-key are included.		 Ød				 L				
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	00-99816-M19S	00-99816-M19	25	M19xP1.0	30 Nm	NS-50025	25	5 Nm	NK-LW3	00-99816-SP28
	00-99816-M22S	00-99816-M22	28	M22xP1.5	30 Nm	NS-50028	28	5 Nm		

Setting process >>

- Step-1

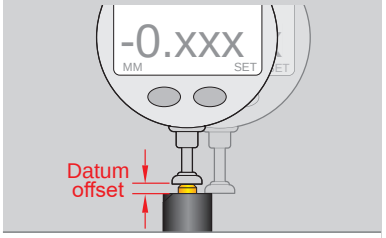
Set Temporary Position



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

- Step-2

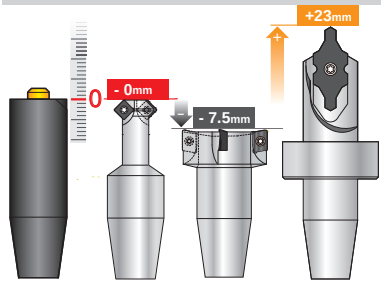
Get The Datum Position



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

- Step-3

Input Tool Length Offset



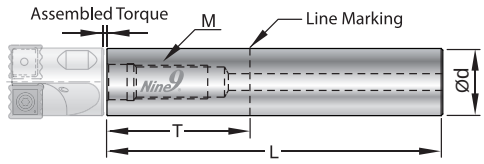
3-1: Choose an Ergo tool to install, and input the offset value to CNC controller directly.

Extension Bar

For ACE Spot Drill, NC Spot Drill, Chamfer Mill, NC Helix Drill, Power Mill.

Steel Type >>

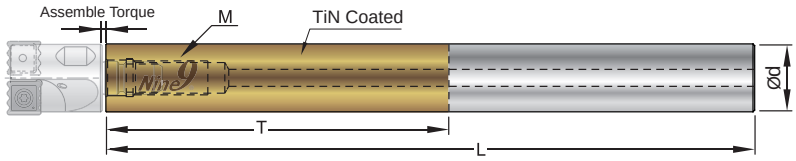
- T is the maximum overhang length.
- With internal coolant hole.



Part No.	Type	Ød	T	L	M	Assemble Torque
00-99801-10S	BC10-075M05S	10	25	75	M5xP0.8	6.5 Nm
00-99801-12S	BC12-075M06S	12	25	75	M6xP1.0	11.0 Nm
00-99801-14S	BC14-090M08S	14	30	90	M8xP1.25	25.0 Nm
00-99801-16S	BC16-090M08S	16	35	90	M8xP1.25	25.0 Nm
00-99801-18S	BC18-100M10S	18	40	100	M10xP1.5	50.0 Nm
00-99801-20S	BC20-100M10S	20	40	100	M10xP1.5	50.0 Nm
00-99801-25S	BC25-120M12S	25	50	120	M12xP1.75	60.0 Nm

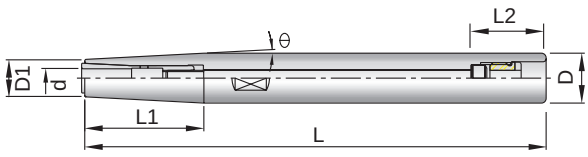
Solid Carbide Type >>

- T is the maximum overhang length.
- With internal coolant hole.



Part No.	Type	Ød	T	L	M	Assemble Torque
00-99801-08W	BC08-075M04W	8	25	75	M4xP0.7	3.5 Nm
00-99801-10W	BC10-100M05W	10	50	100	M5xP0.8	6.5 Nm
00-99801-12W	BC12-100M06W	12	60	100	M6xP1.0	11.0 Nm
00-99801-14W	BC14-120M08W	14	70	120	M8xP1.25	25.0 Nm
00-99801-16W	BC16-150M08W	16	80	150	M8xP1.25	25.0 Nm
00-99801-18W	BC18-150M10W	18	90	150	M10xP1.5	50.0 Nm
00-99801-20W	BC20-200M10W	20	100	200	M10xP1.5	50.0 Nm
00-99801-25W	BC25-200M12W	25	125	200	M12xP1.75	60.0 Nm

DC Slim Chuck



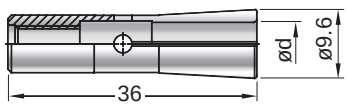
Parts No.	Type of Holder	d	L	L1	L2	D	D1	θ	Collet	Back Screw	Stop Screw	Hexagon Key	Stop Nut
0-329090-212	ST12-DC6-120	2~6	120	40	-	12	14	--	DC6	M5 * L95	--	0-301940~642	TP-M12
-222	ST16-DC6-150	2~6	150	38	24	16	14	3°		M5 * L100	OP-M10		--
-232	ST20-DC6-200	2~6	200	70	74	20	14	3°		M5 * L100	OP-M10		--
-242	ST25-DC6-250	2~6	250	115	124	25	14	3°		M5 * L100	OP-M10	0-301940~643	--

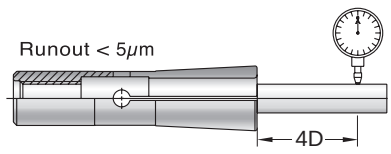
* Stop nut is applied when clamping and unclamping tools.

DC-6E Collet >>

- The design of DC-E collets is emphasized on increasing the clamping force of end mills.

Parts No.	Size(mm)
0-300090-203	3.0
0-300090-204	4.0
0-300090-206	6.0





Notes

No Need To Choose
Nine9 Does It All

Always Better
JIMMORE
International Corp.

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