Nine9®

Main Catalog III

MCC
Minimum Consumable Cutting Indicator
5%

1994

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

1995

- Small hole fine boring tools launched
- OEM/ODM service
- Standardized boring tools range

1999

"Indexable Power Drill" launched

2001

"NC Spot Drill-CT" launched

2002

"Quick Change High Speed Boring Tools" launched

2003

"NC Spot Drill-PR" launched

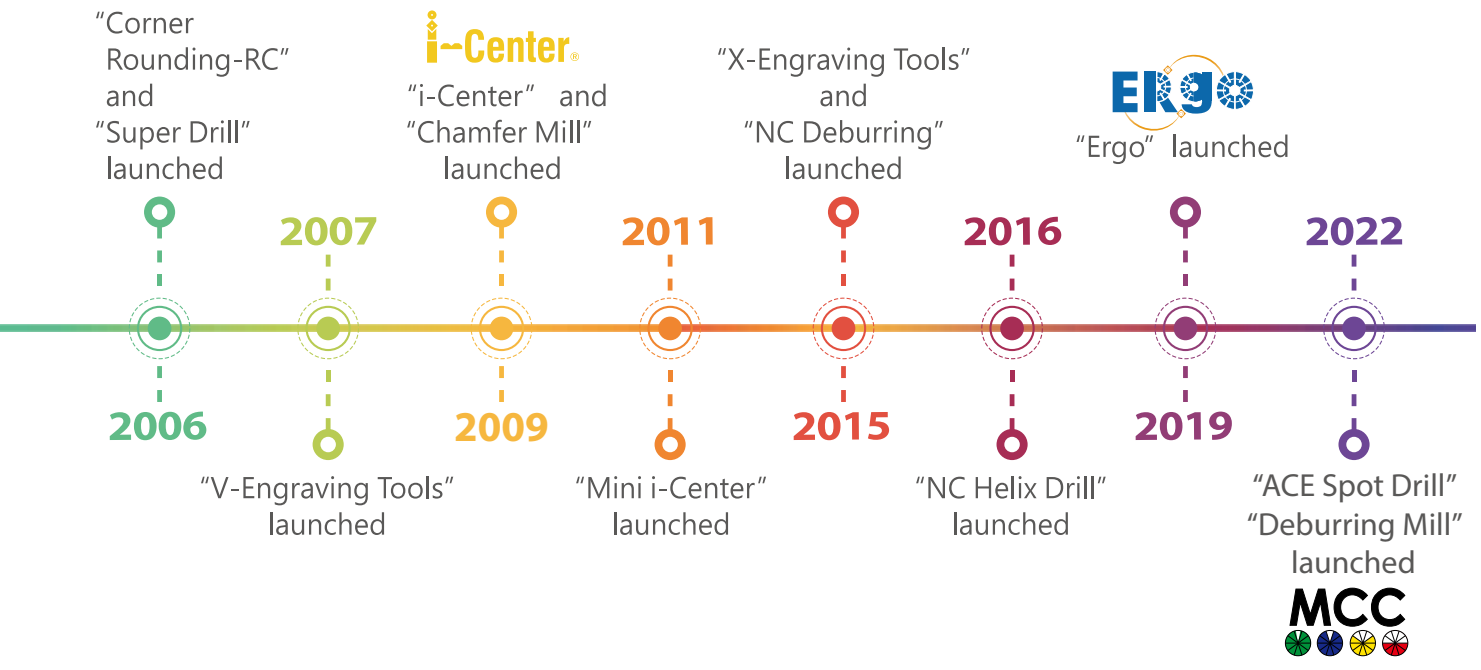
2004

"Power Mill" launched

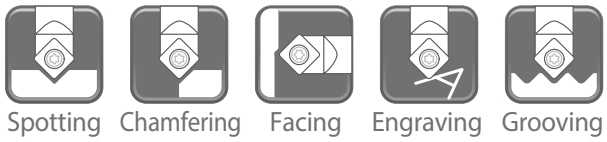
Productivity, Creativity & Infinity

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 drills , super power drills , boring tools , engraving tools , i-Center , NC helix drills , chamfer mill.
Those established Nine9 as a market leader and innovator in the cutting tool field.

Product Milestone >>



NC Spot Drill | 60° ~ 145°



One tool will perform multiple applications

- NC Spot Drill with indexable carbide insert.
- High efficiency! Long tool life! Cost saving!
- Ideal for CNC lathes, CNC turning centers & machining centers.
- Increase cutting speed with coated carbide inserts.

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 »

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.

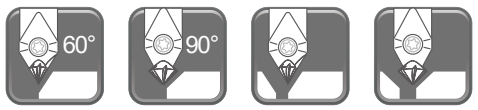
Micro Spotting / Engraving

30° / 45° / 60° / 90°/ 120°/ 142°

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.

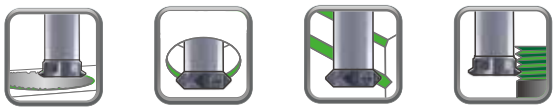
NC Deburring | 60° /90°



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.

Deburring Mill | 60°/ 90°



Front and back deburring, 60° also for threading.

- Each insert has 6 cutting flutes.
- Provide higher feed rate, optimized performance, and reduce cycle time.
- Minimum deburring bore from ø3.8mm to ø10mm.
- Special insert geometry and clamping system provide high precision and accurate position.

Chamfer Mill | 45°

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.

Ergo System | ER11 / ER16 / ER20

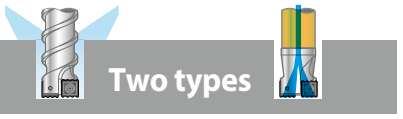
ERgo Monoblock System

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 four 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 10mm.

- 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 10mm. 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

DC Slim Chuck

- Extension adapter
- DC-E collet

Extenstion Bar

- Steel & solid carbide type

ACE Spot Drill | 60° / 90° / 120°

Accuracy! Coolant! Efficiency!

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

Minimum Consumable Cutting

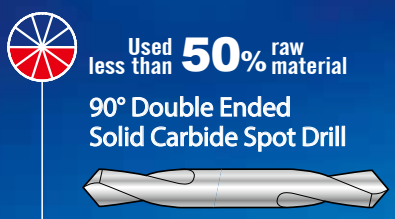
Nine9 insert only takes <5% carbide raw material compared to a whole solid carbide tool and still can achieve good performance.

- Can be used nearly 20 times
- Reduces the raw materials
- Reduces carbon emissions

Minimum Consumable Cutting, used < 5%
MCC
Responsible Consumption and Production

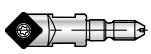
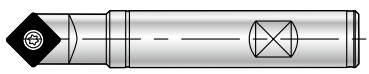
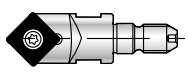
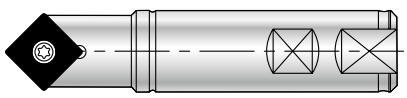
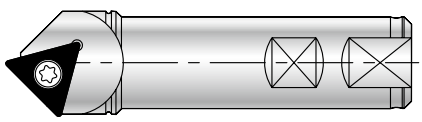
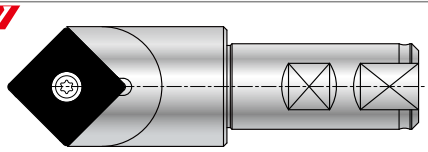
MCC
Minimum Consumable Cutting Indicator
5%

Indicator Example

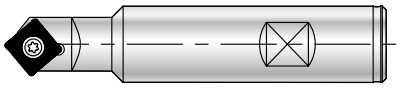
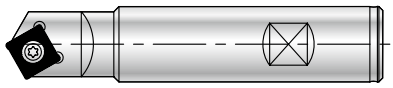
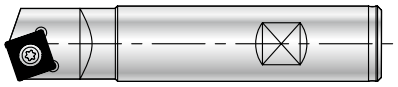
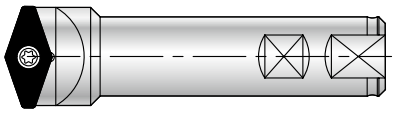
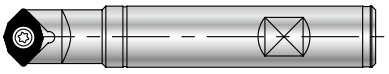


Contents >>

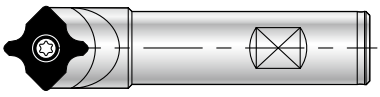
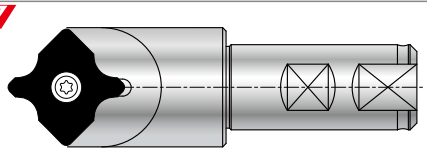
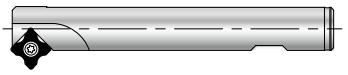
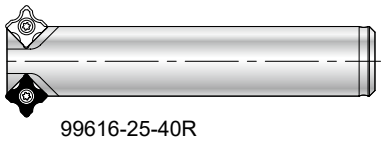
1 SERIES NC Spot Drill

Angle	Holder	Insert	D min.	D max.	Material
60°	 99616-09V	 V9MT0802	1	9	P M K N S
	 99616-13V	 V9MT12T3	2	13	P M K N S
82°	 99619-V082-3/8	 V0820802	2	9	P M K N S
	 99619-V082-5/8	 V08212T3	2	14	P M K N S
90°	 99616-06-6	 N9MT05T1	1	6	P M K N S
	 99616-08-8	 N9MT0602	1	8	P M K N S
	 99616-10...  99616-10-M5	 N9MT0802	2	10	P M K N S
	 99616-14...  99616-14-M8	 N9MT11T3	3	14	P M K N H S
	 99616-14-22	 N9MT1704	3	22	P M K N S
	 99616-25-CT28	 N9MT2204	4	25	P K
	NEW  99616-32...	 N9MT2506	5	32	P K H

1 SERIES NC Spot Drill 1-14

Angle	Holder	Insert	D min.	D max.	Material
100°	 99616-20-100	N9MT11T3	3	16	P M K N S
120°	 99616-20-120		3	17	P M K N S
142°	 99616-20-142..		3	18.5	P M K N S
	 99619-V142...	V1421604	2	32	P M K N S
145° + 90°	 99616-10 / 14 / 22 ...	WSP / M4~M16	3.3	20	P K H

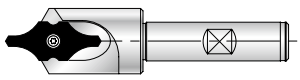
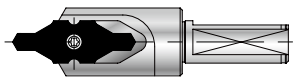
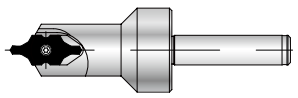
1 SERIES Corner Rounding 1-32

Angle	Holder	Insert	Radius	Material
RC	 99616-06...	N9MT05T1RC	0.5 / 0.75 / 1.0	P M K N S
	 99616-14...	N9MT11T3RC	1.0 / 1.5 / 2.0 / 2.5 / 3.0	P M K N S
	 99616-22...	N9MT1704RC	4.0 / 5.0 / 6.0	P M K N S
NEW	 99616-32...	N9MT250RC	7.0 / 8.0 / 9.0 / 10.0	P K H
R	 99616-16-25R	N9MT11T3R	1.0 / 1.5 / 2.0 / 2.5 / 3.0	P K
	 99616-16-30R			
	 99616-25-40R			

1 SERIES Large 45° Chamfering — 1-39

Angle	Holder	Insert	Chamfering min.	Chamfering max.	Material
45°	 99616-18...LA	 N9MT11T308LA	6	18	P M K N H
	 99616-28...LA		16	28	

1 SERIES Center Drilling / i-Center — 1-44

Angle	Holder	Inserts	Pilot Dia. min.	Pilot Dia. max.	Material
R		 DIN332 Form R	1.0	10	P M K N
A+B		 DIN332 Form A+B	1.0	10	P M K N
A		 DIN332 Form A	2.0	3.15	P M K N
60°	 IC08 / 10 / 12 / 16 / 20 / 25...	 ANSI 60°	5/64”	3/8”	P M K N

1 SERIES Micro Spotting / Engraving — 1-58

Angle	Holder	Inserts	Bottom Width min.	Bottom Width max.	T max.	Material
30°	 99619-X060...	 X060A...	0.2	0.84	0.6	P M K N H
45°			0.2	1.1	0.8	P M K N H
60°			0.2	1.39	1.0	P M K N H
90°			0.1	2.20	1.0	P M K N H
120°			0.1	2.53	0.7	P M K H
142°			0.1	2.42	0.4	P M K H

1 SERIES Micro Spotting / Engraving 1-64

Angle	Holder	Inserts	Bottom Width min.	Bottom Width max.	T max.	Material
45°	 99619-V045...	 V04506T1W	0.45	2.1	2.0	P M K N
60°	 99619-V060...	 V06006T1W	0.25	2.7	2.0	P M K N H S
60°	 99619-W060...	 W06004S	0.1	1.1	0.6	P M K N
60°	 99616-10...SW	 N9MT0802	0.2	1.1	0.8	P K
90°	 99616-10...SW	 N9MT0802	0.2	2.0	0.9	P K N

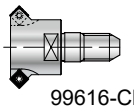
1 SERIES NC Deburring 1-75

Angle	Holder	Inserts	Depth min.	Depth max.	Material
60°	 99619-X060...	 X060A60...	0.1	1.8	P M K N
90°		 X060A90...	0.1	1.5	P M K N

1 SERIES Front and Back Deburring Mill 1-76

Angle	Holder	Inserts	Deburring min.	Deburring max.	Material
60°	 99616-CR...	 R060...	3.8	10.0	P M K N H
90°		 R090...	3.8	10.0	P M K N H

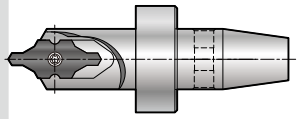
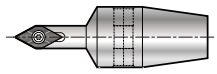
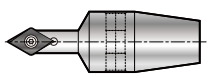
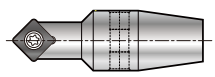
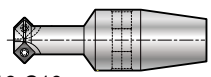
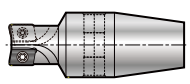
1 SERIES Front and Back Chamfer Mill 1-80

Angle	Holder	Inserts	Chamfering min.	Chamfering max.	Material
45°	 99616-C02, C04, C06	 N9GX04T002	6.8	13.2	P M K N
	 99616-C10 ~ C52	 N9GX...	7	32	P M K N H
	 99616-CM16 ~ CM29	 N9GX...	11	29.5	P M K N H

2 SERIES

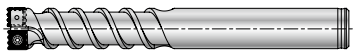
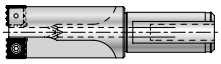
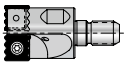
Ergo ER Taper-Shank Cutter

2-86

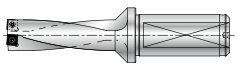
Machining	Angle	Holder	Insert	Pilot Dia. min.	Pilot Dia. max.	Material
i-Center	ER16	 99816-IC10BH	 Form R	1.0	3.15	P M N
			 Form A+B	1.0	3.15	P M N
			 60°, 90°, 120°	2	10	P M N
Engraving / Spotting	ER16	 99816-X060...		D min.	D max.	
			 X060A30...	0.15	0.84	P M K N H
			 X060A45...	0.12	1.1	P M K N H
			 X060A60...	0.10	1.39	P M K N H
			 X060A90...	0.10	2.2	P M K N H
			 X060A120...	0.10	2.53	P M K H
			 X060A142...	0.10	2.42	P M K H
Deburring	ER16		 X060A60T...	Depth min. 0.1	Depth max. 1.8	P M K N
			 X060A90T...	0.5	1.5	P M K N
Multi-Functional Tool	ER16	 99816-V060	 V06006T...	Chamfering min. 0.25	Chamfering max. 2.7	P M K N H S
		 99816...	 N9MT0802	2	10	P M K N S
			 N9MT11T3	3	14	P M K N H S
Chamfer Mill	ER16	 99816-C10	 N9GX04...	7	11	P M K N H
Power Mill	ER11	 99811 / 99816 / 99820	 A9GT0602	Ød		
				Ø10 & Ø12		P M K N H
	ER16			Ø10 ~ Ø32		
	ER20			Ø12 ~ Ø25		

* Special angle is on request.

3 SERIES NC Helix Drill 3-104

Diameter	Holder	Inserts	Max. Drilling Depth	Material
Ø13 ~ Ø50	 99321	 N9MX...	75	P M K N H S
Ø42 ~ Ø65	 99321-025-4265		50	
Ø13 ~ Ø50	 99323		160	

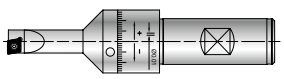
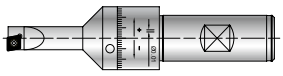
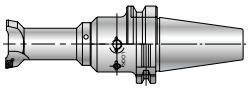
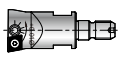
4 SERIES Super Power Drill 5xD~10xD 4-118

Diameter	Holder	Inserts	Diameter	Material
5xD ~ 10xD	 99307...	 Center insert 99307-CD...  Perphery insert 99307-CD...	Ø19 ~ Ø40	P M K N H
3xD & 4xD	 99313... / 99314...	 N9GX...	Ø10 ~ Ø30	P M K H

5 SERIES Power Mill 5-132

Machining	Holder	Inserts	Diameter	Material
Rough milling	 99802-BC..A..	 A9MT/GT/FT	Ø10 ~ Ø25	P M K N
Semi-finishing milling	 99802-BC..C..	 C9MT	Ø10 ~ Ø25	P M H

6 SERIES Boring Tool 6-138

Diameter	Holder	ISO Insert	Boring Depth	Adjusting Range	Material
Ø6.5 ~ Ø25.5	 99101	 G grade	21 ~ 50	±0.5	P M K N H
Ø4.9 ~ Ø25.1	 99121	 G grade	15 ~ 50	±0.1	P M K N H
Ø5 ~ Ø50	 99146	 G grade	10 ~ 70	±0.12	P M K N H
Ø16 ~ Ø50	 99021	 G, F grade	66~140	±0.1	P M K N
Ø14 ~ Ø25	 99043	 G grade	-	±0.1	P M K N

NC Spot Drill >>

NC Spot Drill with indexable carbide insert.

High efficiency! Low cost!

CNC lathes, CNC turning centers and machining centers.

Features

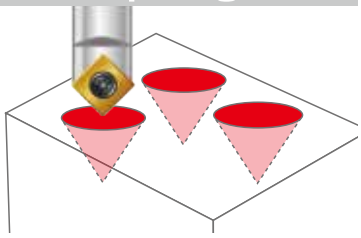
- **Spotting produces better hole position and geometrically uniform holes**
- **Available shank diameter- Ø5, Ø6, Ø8, Ø10, Ø12, Ø16, Ø20, Ø25mm, Ø3/8'', Ø1/2'', Ø5/8'', Ø1/4", Ø3/4'', M5, M6 and M8.**
- **One tool will perform multiple applications**
  - Long tool life.
  - Each insert has 2 or 4 cutting edges.
  - Suitable for spotting, chamfering, grooving and engraving.
  - 60° / 82° / 90° / 100° / 120° / 142° / 145° angle for different applications.
  - Increase cutting speed with coated carbide inserts.

▲Machining Center

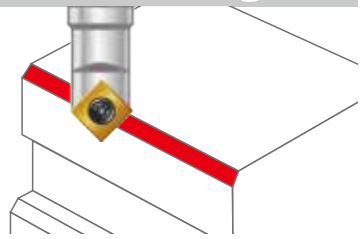
a Engraving
b Spotting
c Chamfering
d Grooving

▼ ALL IN ONE!!

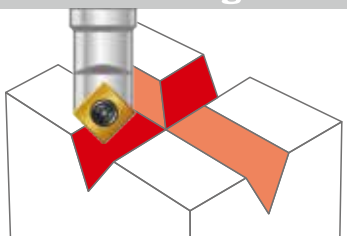
Spotting



Chamfering

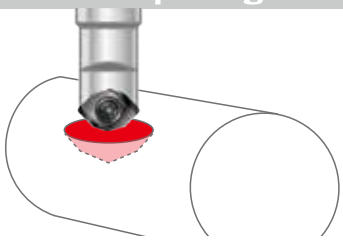


Grooving

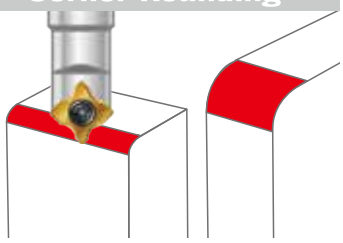


Engraving

W Spotting

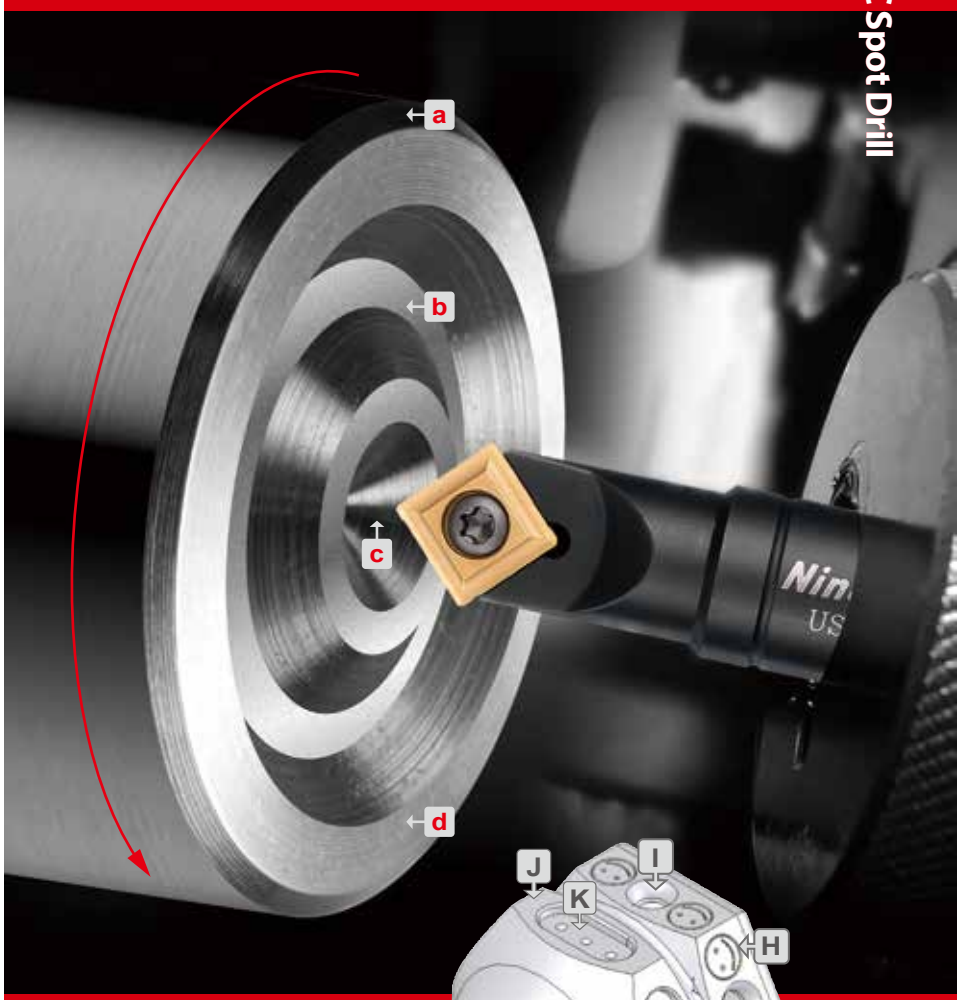


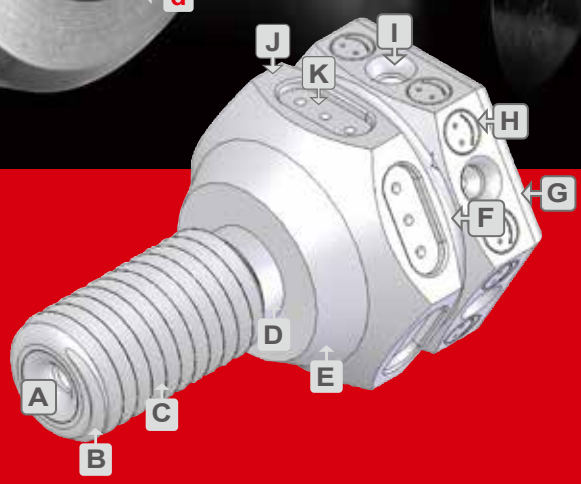
Corner Rounding



▲ CNC Lathes

- a External and internal chamfering
- b Grooving
- c Centering
- d Facing





Multifunctional:

- A I Center Drilling
- C Thread turning
- E Taper turning
- H Engraving
- K Drilling & milling a groove
- B G Corner rounding
- D Grooving
- F V-grooving
- J Face milling

* Some features produced with a special insert

1 No Need To Choose Nine9 Does It All! >>

NC Spot Drill

Cost Saving | Time Saving | Highly Efficient | Long Tool Life

▸ Various inserts can fit on the same tool holder

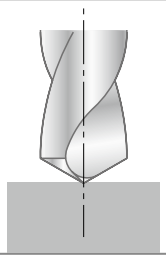
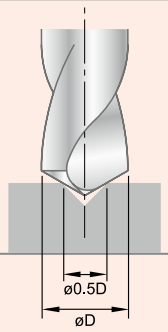
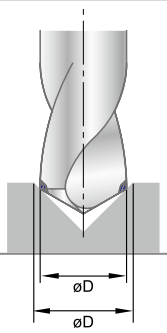
A New Drilling Concept!

0.5xD of spotting

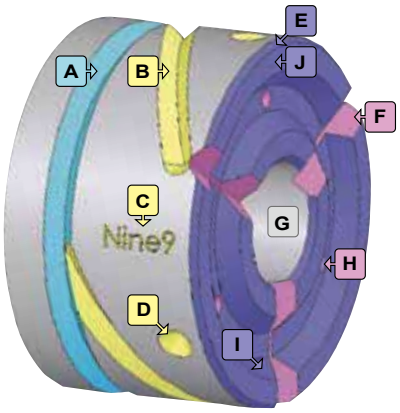
Many drill manufacturers and suppliers state that their drills start drilling on the solid material. You can look forward to the following benefits when using the NC Spot Drill to drill a spot that is half of the drilling diameter.

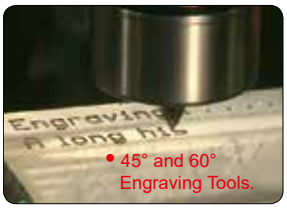
Drill Benefits >>

- **Higher feed rate.**
  Why? Because the drill is guided at the strongest part of cutting edge.
- **Better center position.**
  Why? Because the spotting is done by a single cutting edge which is out of center, and similar to boring operation.
- **Increased tool life.**

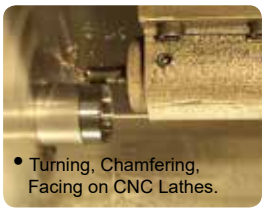
NC Spot Drill	Without Spotting	0.5xD Spotting	Larger Spotting
• Better center position! • Longer tool life!	• Drill has less position accuracy and diameter tolerance.	• Best result! • Higher speed and feed rate. • Better position accuracy and diameter tolerance.	• Longer spotting time! • Guided at the weakest corner of drill. • Shorter tool life
	 Unstable tool life		
✕	○	✕

Various Applications of NC Spot Drill >>

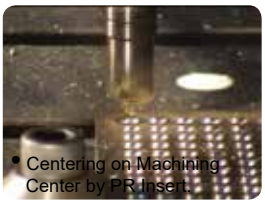
Turning Center	Fig	Applications	Multifunctional Cutting Tool
	A	Grooving	Use on CNC lathes CNC turning centers Machining centers Milling machines SPM machines .....
	B	Helical groove milling	
	C	Engraving	
	D	Spot drilling	
	E	Chamfer turning	
	F	Face groove milling	
	G	Internal turning	
	H	Spot drilling on end surface	
	I	Internal Chamfering	
	J	Face grooving	


• 45° and 60° Engraving Tools.


• Spotting, Grooving, Engraving on Machining Center.


• Turning, Chamfering, Facing on CNC Lathes.


• Cut a Serrated Workpiece.
• Single Pass Each Direction.


• Centering on Machining Center by PR Insert.

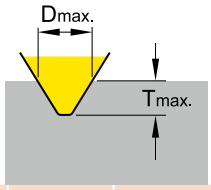

• Contour Chamfering on Machining Center.

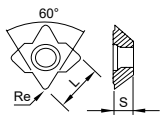
60° N9MT11T3P60

Inserts >>

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

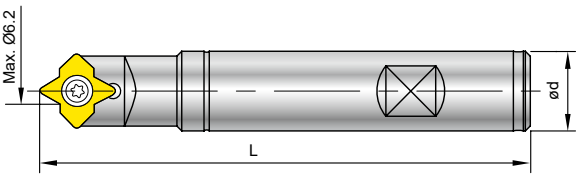
NC40: • Universal grade for all unhardened steel and cast iron.
• Each insert has 2 cutting edges.



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°

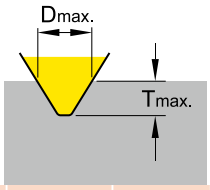
Inserts >>

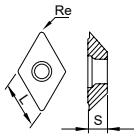
- 60 degree indexable spotting insert, Dmax 13mm.
- Special geometry with supporting edges for using in high speed machining.
- Excellent tool for grooving. Saving machining time!

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.

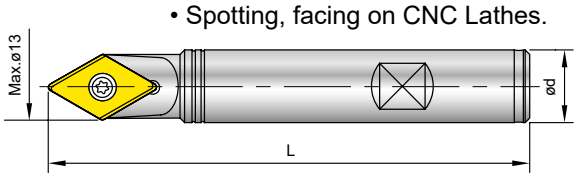
NC9076: • For non-ferrous material such as aluminum, al-alloy, titanium brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



Code	Parts No.		Coating	Grade		Dimensions L	S	Re	Dmax.	Tmax.
NEW 019202	V9MT0802CT	NC5071	TiAlN & TiN	K20F		8	2.38	0.4	9	7.3
019201		NC2071	TiN							
NEW 019203		NC9076	DLC							
NEW 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.



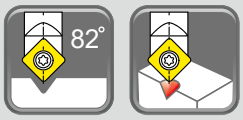
Ø8

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



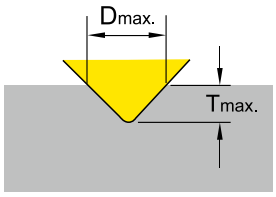
Inserts >>

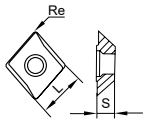
- 82 degree indexable spotting insert, Dmax 14mm (0.551")
- Match the geometry of Amercian standard flat head screw hole.
- Special geometry with supporting edges for high speed machining.

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.



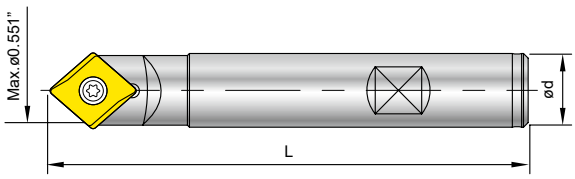
Code	Parts No.		Coating	Grade		Dimensions L	S	Re	Dmax.	Tmax.
NEW 0108203	V0820802	NC5071	TiAlN & TiN	K20F		8	2.38	0.4	9 (0.354")	4.8 (0.189")
0108201		NC2071	TiN							
0108202		NC9076	DLC							
NEW 0108213	V08212T3	NC5071	TiAlN & TiN	K20F		12.7	3.97	0.8	14 (0.551")	7.5 (0.295")
0108211		NC2071	TiN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

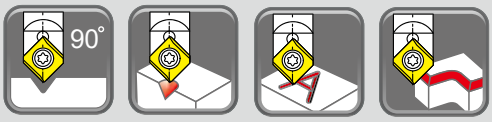
Ø5/8"



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°



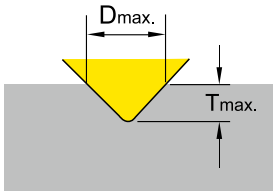
Inserts >>

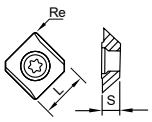
- Mini spotting drill with indexable insert, low cutting power required.
- Especially good for Swiss type automatic lathes and CNC lathes.

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.

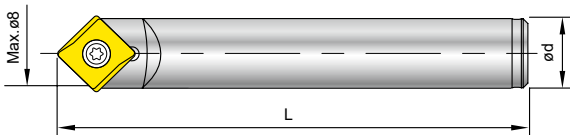
NC9076:
- For non-ferrous material such as aluminum, titanium, brass, copper and stainless steel.
- Produces excellent surface finish on non-ferrous metal.
- Each insert has 2 cutting edges.



Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
NEW 011209	N9MT05T1CT	NC5071	TiAlN & TiN	K20F		5	1.8	0.4	6	2.8
011201		NC2071	TiN							
011202		NC9076	DLC							
NEW 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 >>

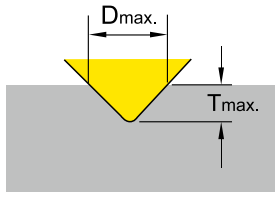
NC40: • General purpose, universal grade for all unhardened steel.
• Each insert has 4 cutting edges.

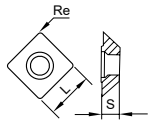
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.

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		
NEW 013206	N9MT0802CT2T	H-NC5071	TiAlN & TiN	K20F				0.8		
013201		H-NC40	TiN							
013202		H-NC9076	DLC							

* H type is with supporting edge.

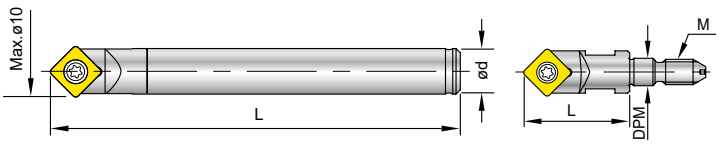
Holder >>

• 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		

N9MT0802

90°

Single Set >>

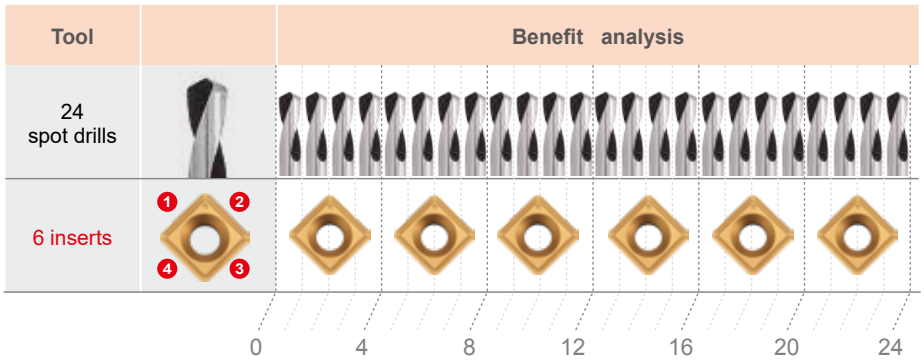
Code	Parts No.	Ød	Total Length	Insert fitted	Dmax.	Tmax.
603101-3401	00-99616-10-02S	10	90	N9MT080208CT-NC40	10	4.5
603101-3403	00-99616-10-02SAL	10	90	N9MT080204CT-NC10	10	4.5

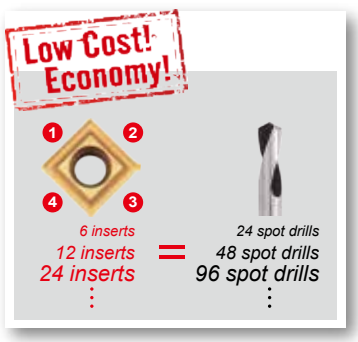
Starter Package >>

- 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 >>





Note: N9MT080201W Engraving , see page 1-67.

90° N9MT11T3

Inserts >>

NC40: • Wiper design, universal grade for all unhardened steel.
• Each insert has 4 cutting edges.

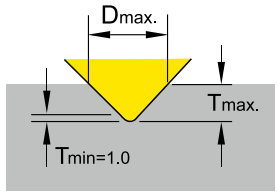
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.

NC60: • Wiper design cermet insert, for hardened steel up to 56 HRC.
• Each insert has 4 cutting edges.

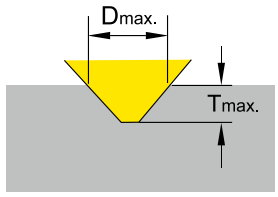
H-NC5071: • For carbon steel C>0.3%, high alloy steel C>0.3% and cast iron.
• Each insert has 2 cutting edges.

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.

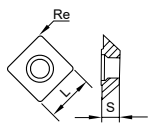
H-NC9076: • High positive geometry and sharp edge.
• For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



NC40 / Wiper design / NC60



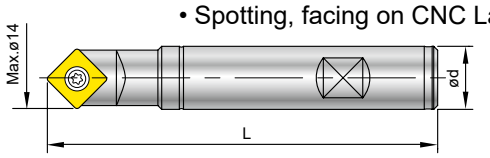
Other grade

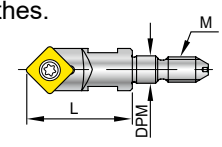
Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
014401	N9MT11T3CT	NC40	TiN	P35		11.11	3.97	0.8	14	7
014402		NC10	TiAlN	K10F				(0.3)		
014403		NC60	CERMET					0.8		
NEW 014234	N9MT11T3CT2T	H-NC5071	TiAlN & TiN	K20F				0.8		
014202		H-NC40	TiN	K20F				0.8		
014203		H-NC9076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

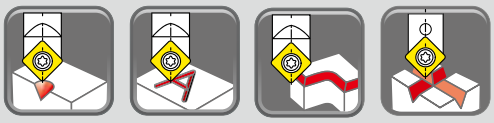




Code	Parts No.	Ød	L	M	DPM	Screw	Key
604002	00-99616-14-12	12	100	-	-	NS-35080 2.5 Nm	NK-T15
604004	00-99616-14	16	100	-	-		
604007	00-99616-14-150L	16	150	-	-		
604009	00-99616-14-220L	20	220	-	-		
614001	00-99616-14-1/2	1/2”	100	-	-		
614002	00-99616-14-5/8	5/8”	100	-	-		
624001	00-99616-14-M8	-	30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

N9MT11T3

90°



Single Set >>

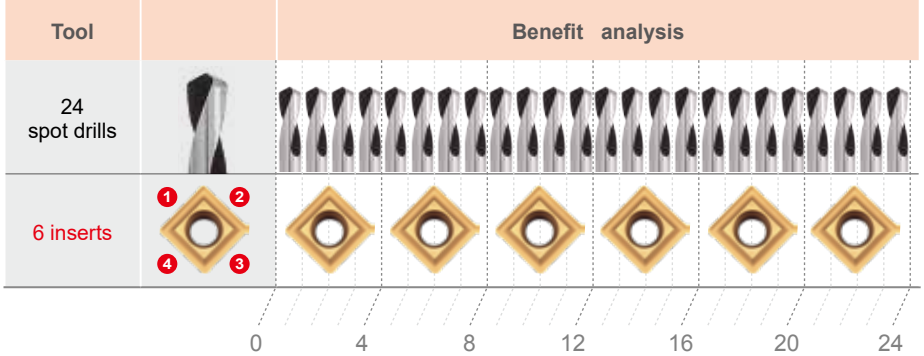
Code	Parts No.	Ød	Total Length	Insert fitted	Dmax.	Tmax.
604104-4401	00-99616-14-02S	16	100	N9MT11T3CT-NC40	14	7
604104-4402	00-99616-14-02SAL			N9MT11T3CT-NC10	14	7
614102-4401	00-99616-14-5/8-02S	5/8”	100	N9MT11T3CT-NC40	0.551”	0.276”
614102-4402	00-99616-14-5/8-02SAL			N9MT11T3CT-NC10	0.551”	0.276”

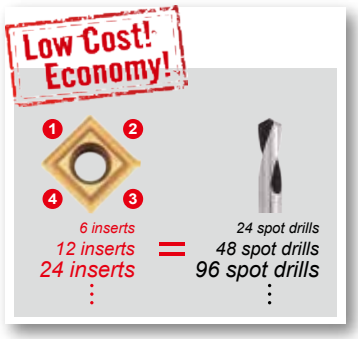
Starter Package >>

- 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.

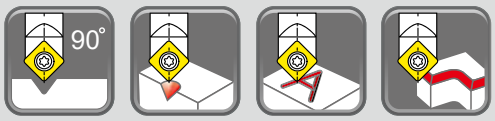
Code	Parts No.	Ød	Insert included	Content
604204-4401	00-99616-14-ME6	16	N9MT11T3CT-NC40	1 tool holder + 6 inserts + 1 key
604204-4402	00-99616-14-ME6AL		N9MT11T3CT-NC10	
614202-4401	00-99616-14-IN6	5/8”	N9MT11T3CT-NC40	
614202-4402	00-99616-14-IN6AL		N9MT11T3CT-NC10	

Comparison >>



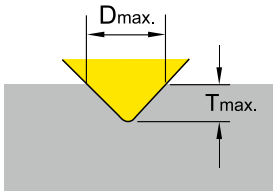


90° N9MT1704



Inserts >>

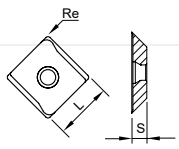
• 90 degree indexable spot drill insert, Dmax 22mm.



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.

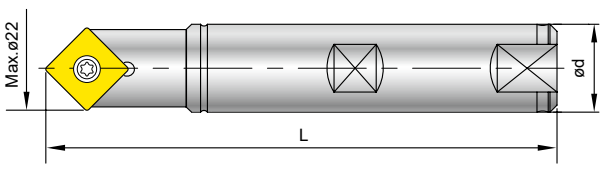
Code	Parts No.		Coating	Grade		Dimensions			Dmax.	Tmax.
						L	S	Re		
NEW 016216	N9MT1704CT	NC5071	TiAlN & TiN	K20F		17	4.76	1.2	22	10.4
NEW 016211		NC9036	DLC	K20F						
016201		NC2071	TiN	K20F						

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.

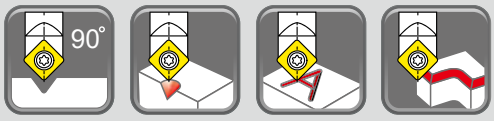
Ø20

Ø25

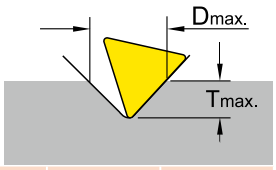


Code	Parts No.	Ød	L	Screw	Key
606001	00-99616-22	20	100	NS-50125 5.5 Nm	NK-T20
606002	00-99616-22-25	25	150		

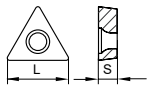
N9MT220408 / N9MT2506 NEW

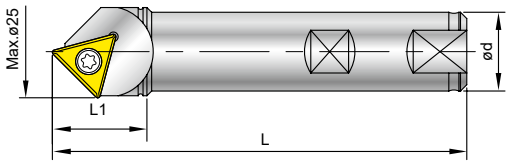


N9MT220408



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



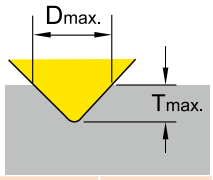
Ø25

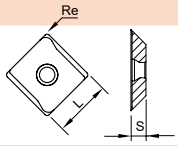
Code	Parts No.	Ød	L	L1	Screw	Key
607001	00-99616-25-CT28	25	120	30	NS-40100 3.5 Nm	NK-T15
617001	00-99616-1-CT28	1”				

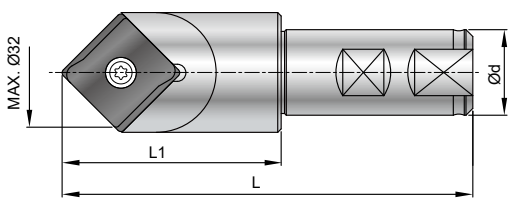
N9MT2506 >> NEW

NC2033: • For carbon steel, alloy steel, high alloy steel, cast iron and hardened steel < 50 HRC.
• 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.

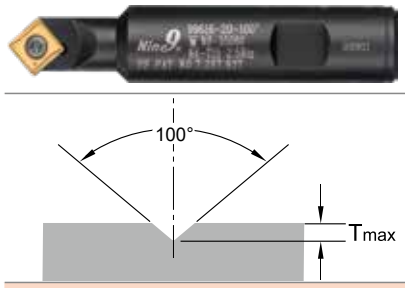
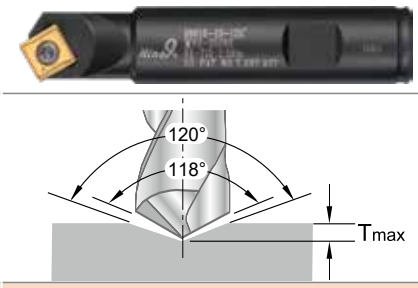
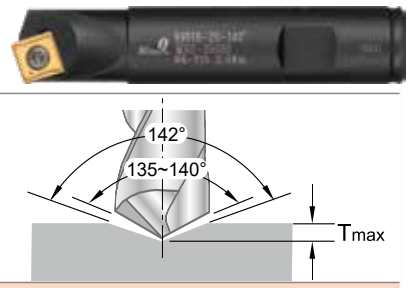


Code	Parts No.		Coating	Grade		Dimensions			Dmax.	Tmax.
						L	S	Re		
018201	N9MT2506CT	NC2033	TiAlN	K20F		25	6.35	1.2	32	15.4
018202		XP9000	-							



Code	Parts No.	Ød	L	L1	Screw	Key
608001	00-99616-32-25	25	120	64	NS-60180 5.5 Nm	NK-T25
618001	00-99616-32-1	1”				

100°
120°
142° N9MT11T3CT2T-H

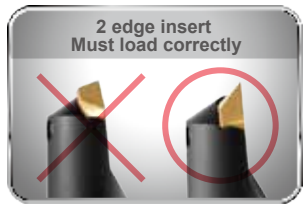
100°	120°	142°
		
• For aircraft 100° normal rivet hole and screw hole.	• For spotting before drilling by 118° point angle drill. • 60° chamfering.	• For spotting before drilling by 135°~140° point angle high performance drill.

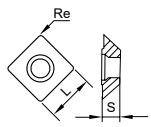
Inserts >>

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.

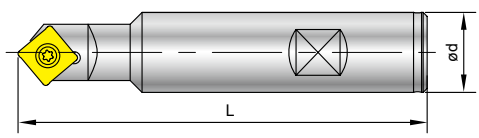


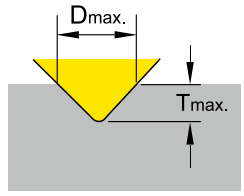
Code	Parts No.		Coating	Grade		Dimensions		
						L	S	Re
NEW 014234	N9MT11T3CT2T	H-NC5071	TiAlN & TiN	K20F		11	3.97	0.8
014202		H-NC40	TiN					
014203		H-NC9076	DLC					

* H type is with supporting edge.

Holder >>

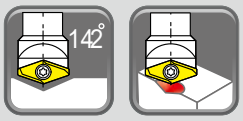
• Indexable insert spotting drill holders for 100°/120°/142° spotting.
• Spotting produces better hole position and geometrically uniform holes.
• Increase tool life of the next drilling operation.



Code	Parts No.	Angle	Ød	L	Screw / Key	Dmax.	Tmax.	
604011	00-99616-20-100	100°	20	100	NS-35080 2.5 Nm NK-T15	16	6.3	
604013	00-99616-20-120	120°	20	100		17	4.76	
614003	00-99616-3/4-120	120°	3/4”	100		0.669”	0.187”	
604014	00-99616-20-142	142°	20	100		18.5	3.16	
614004	00-99616-3/4-142	142°	3/4”	100		0.728”	0.124”	

V14208 / V14216

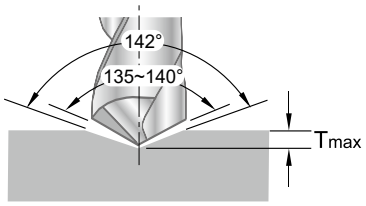
142°

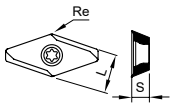


Inserts >>

- 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.



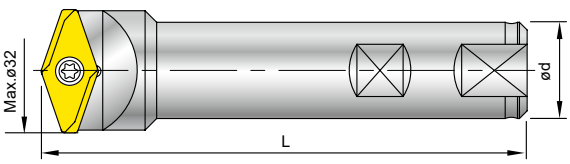
Code	Parts No.	Coating	Grade		Dimensions			Dmax.	Tmax.
					L	S	Re		
0114201	V1420803-NC2071	TiN	K20F		8	2.38	0.8	16	2.8
0114211	V1421604-NC2071				14	4.76	1.2	32	5.5

Holder >>

- Using spotting first may increase higher speed and feed rate of the after drills.
- Extend your drill life with 142° spotting. Reduce your drilling cost.
- Higher accuracy of positioning and diameter tolerance !

Ø16

Ø25

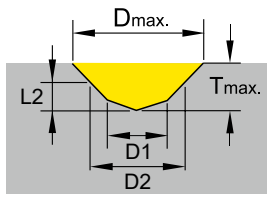


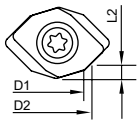
Code	Parts No.	Ød	L	Insert Type	Screw	Key
696001	00-99619-V142-16	16	100	V1420803	NS-30072 2.0 Nm	NK-T9
696002	00-99619-V142-32	25	120	V1421604	NS-50125 5.5 Nm	NK-T20

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 < 50 HRC.
- Each insert has 2 cutting edges.

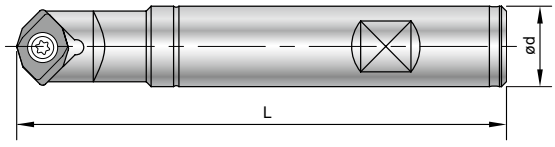


Code	Parts No.	Coating	Grade		Thread Size	*D1±0.05	D2	L2	Dmax.	Tmax.
013203	N9MT0802M04C-NC2033	TiAlN	K20F		M4x0.7	3.30	4.20	0.93	8	2.83
013204	N9MT0802M05C-NC2033				M5x0.8	4.20	5.25	1.14		2.52
013205	N9MT0802M06C-NC2033				M6x1.0	5.00	6.30	1.39		2.24
014219	N9MT11T3M08C-NC2033	TiAlN	K20F		M8x1.25	6.80	8.40	1.81	13	4.11
014220	N9MT11T3M10C-NC2033				M10x1.5	8.50	10.50	2.28		3.53
014221	N9MT11T3UNC25-NC2033	TiAlN	K20F		1/4-20 UNC	5.08	6.70	1.55	13	4.70
014222	N9MT11T3UNC31-NC2033				5/16-18 UNC	6.53	8.40	1.90		4.20
014223	N9MT11T3UNC38-NC2033				3/8-16 UNC	7.94	10.00	2.22		3.72
016205	N9MT1704M12C-NC2033	TiAlN	K20F		M12x1.75	10.25	12.60	2.91	20	6.61
016206	N9MT1704M14C-NC2033				M14x2.0	12.00	14.70	3.22		5.87
016207	N9MT1704M16C-NC2033				M16x2.0	14.00	16.80	3.51		5.11

Note: * D1 refer to the Tap Pre-drilling sizes. D2 : Thread size x 5%. L2 : Depth of D2., see page 1-31 for example.

Holder >>

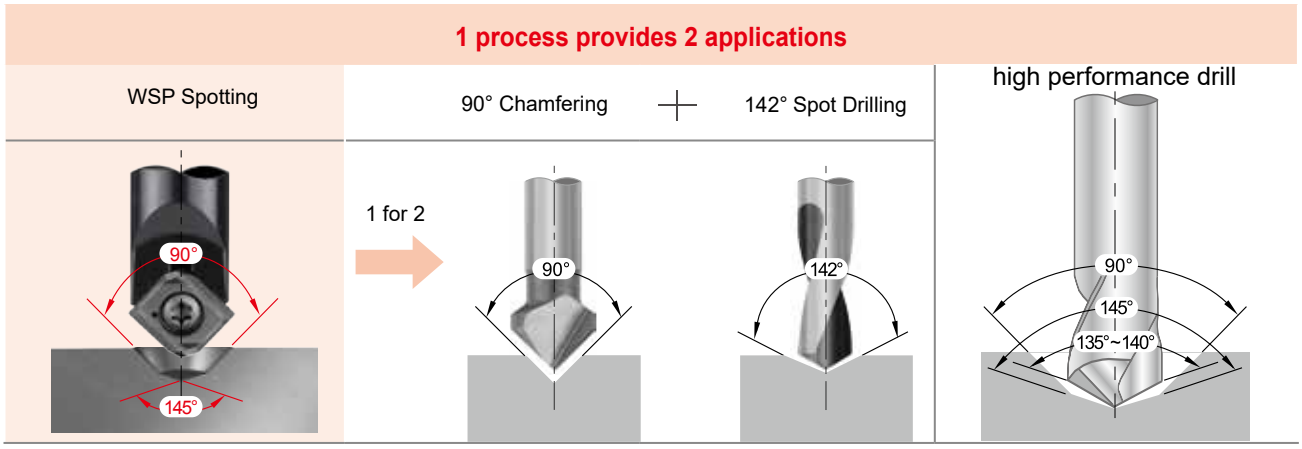
- Utilizes standard ***NC Spot Drill*** holders.
- Holders and inserts are interchangeable.



Code	Parts No.	Ød	L	Insert Type	Thread Size	Screw	Key
603001	00-99616-10	10	89.08±0.29	N9MT0802	M4~M6	NS-30055 2.0Nm	NK-T8
613001	00-99616-3/8	3/8”					
604004	00-99616-14	16	97.55±0.55	N9MT11T3	M8~M10	NS-35080 2.5Nm	NK-T15
614002	00-99616-14-5/8	5/8”			1/4~3/8 UNC		
606001	00-99616-22	20	96.24±0.64	N9MT1704	M12~M16	NS-50125 5.5Nm	NK-T20
616001	00-99616-22-3/4	3/4"					

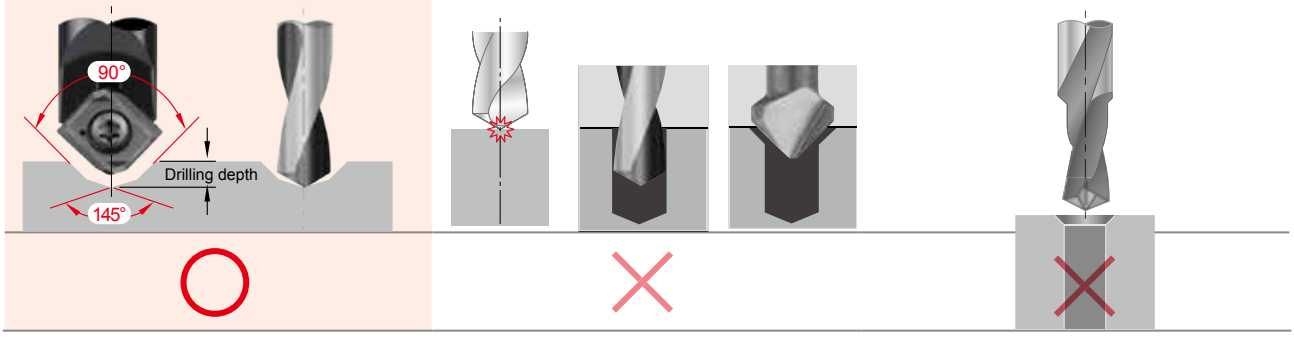
Combined spotting and chamfering 145° + 90° >>

- 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.



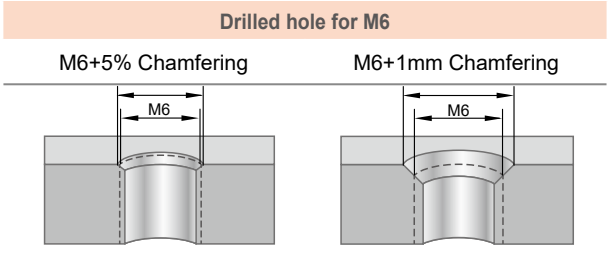
Comparison >>

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.



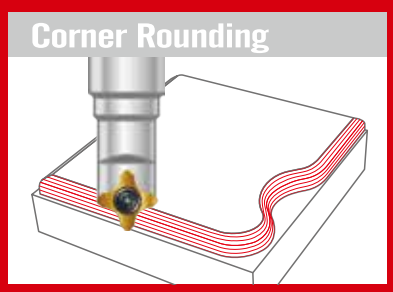
Corner Rounding >> Type of RC

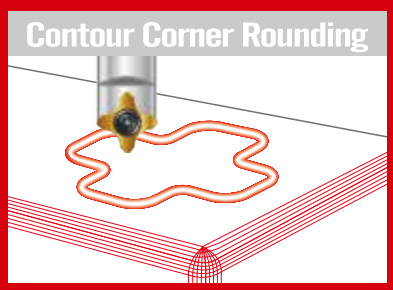
Various corner radius inserts can fit on same holder
Carbide insert can stand very long tool life
Produces smooth and excellent surface finish on workpiece.

Features

RC

- Each insert has 2 cutting edges.
- 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.





◀ Applications

a Radius 0.5
b Radius 1.0
c Radius 2.0

N9MT05T1RC

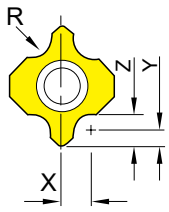
RC0.5 ~ RC1.0
All are interchangeable
on same holder

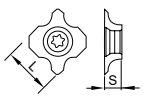
Inserts >>

- 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.

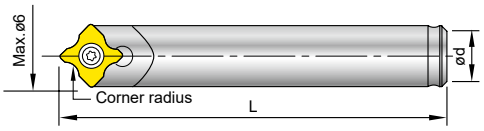
NC9036:
- For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
- High positive geometry and sharp edge produces excellent surface finish.
- Each insert has 2 cutting edges.



Insert Radius	Code	Parts No.		Coating	Grade	offset				Dimensions	
						X	Y	Z		L	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*** shank.



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

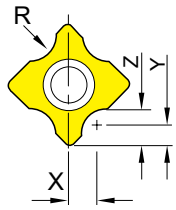
RC1.0 ~ RC3.0
All are interchangeable
on same holder

Inserts >>

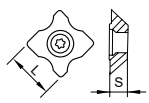
- Combination corner rounding and 45° chamfering application on same insert.
- Each insert has 2 cutting edges.

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.



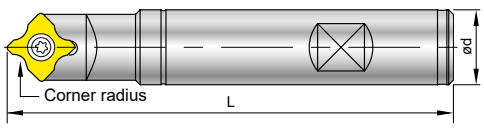
Insert Radius	Code	Parts No.		Coating	Grade	offset				Dimensions	
						X	Y	Z		L	S
1.0	014209	N9MT11T3RC10	NC40	TiN	K20F	2.75	1.5	2.5		11.11	3.97
	014224		NC9036	DLC							
1.5	014210	N9MT11T3RC15	NC40	TiN	K20F	3.25	1.5	3			
	014225		NC9036	DLC							
2.0	014211	N9MT11T3RC20	NC40	TiN	K20F	3.75	1.5	3.5			
	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*** shank.

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 >>

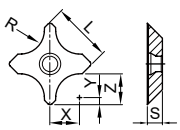
Code	Parts No.	Ød		Content
604204-4200	00-99616-14-ME5RC	16	N9MT11T3RC10-NC40 N9MT11T3RC15-NC40 N9MT11T3RC20-NC40 N9MT11T3RC25-NC40 N9MT11T3RC30-NC40	1 tool holder + 5 inserts + 1 key

N9MT1704RC / N9MT2506RC NEW

RC4.0 ~ RC6.0 /
RC7.0 ~ RC10.0
All are interchangeable
on same holder

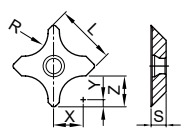
N9MT1704RC >>

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)	Code	Parts No.		Coating	Grade	offset				Dimensions	
						X	Y	Z		L	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							

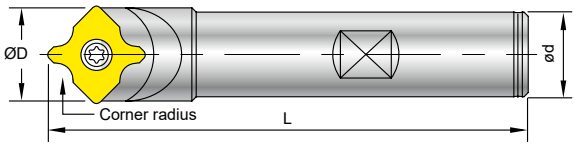
N9MT2506RC >> NEW

NC2033: • For carbon steel, alloy steel, high alloy steel, cast iron and hardened steel < 50 HRC.
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)	Code	Parts No.		Coating	Grade	offset				Dimensions	
						X	Y	Z		L	S
7.0	018203	N9MT2506RC70	NC2033	TiAlN	K20F	9.5	3	10		25	6.35
	018204		XP9000	-							
8.0	018205	N9MT2506RC80	NC2033	TiAlN	K20F	10.5	3	11			
	018206		XP9000	-							
9.0	018207	N9MT2506RC90	NC2033	TiAlN	K20F	11.5	3	12			
	018208		XP9000	-							
10.0	018209	N9MT2506RC100	NC2033	TiAlN	K20F	12.5	3	13			
	018210		XP9000	-							
5/16	018213	N9MT2506RC5/16	NC2033	TiAlN	K20F	0.411”	0.118”	0.430”			
	018214		XP9000	-							
3/18	018211	N9MT2506RC3/8	NC2033	TiAlN	K20F	0.474”	0.118”	0.493”			
	018212		XP9000	-							

Holder >>

• For corner rounding using ***NC Spot Drill*** shank.



00-99616-32-XX

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	23.25			
NEW 608001	00-99616-32-25	25	120	32.56	N9MT2506	NS-60180 5.5 Nm	NK-T25
NEW 618001	00-99616-32-1	1”	120	32.56			

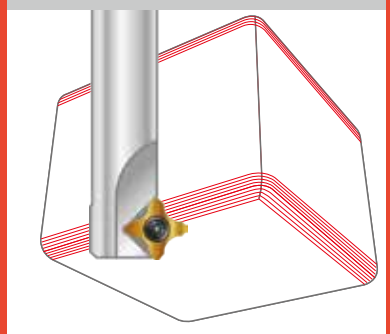
Corner Rounding >> Type of R

Various corner radius inserts can fit on same holder
Carbide insert can stand very long tool life
Produces smooth and excellent surface finish on workpiece.

Features

- Each insert has 4 cutting edges.
- 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.**

Front & Back Corner Rounding



R1.0 R1.5 R2.0 R2.5 R3.0

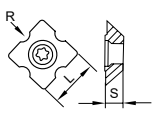
N9MT11T3R

R1.0~R3.0
All are interchangeable
on same holder

Inserts >>

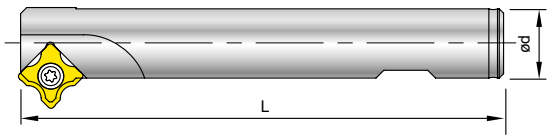
- For front and back corner rounding.
- Various corner radius inserts can fit on same holder.
- Coated carbide inserts for excellent tool life.
- Each insert has 4 cutting edges.

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

Corner radius(R)	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		

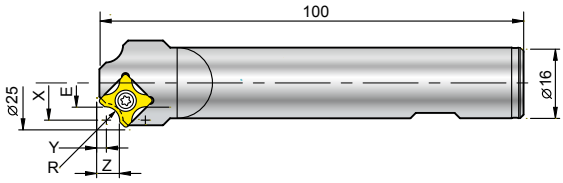
More >>

- Also can fit with N9MT11T308LA inserts for front and back chamfering. (Please see page 1-39)

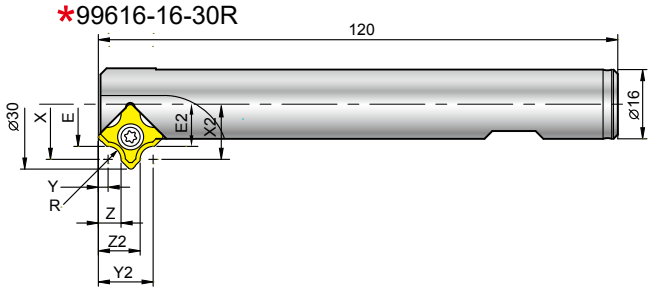
R N9MT11T3R

Cutting Position >>

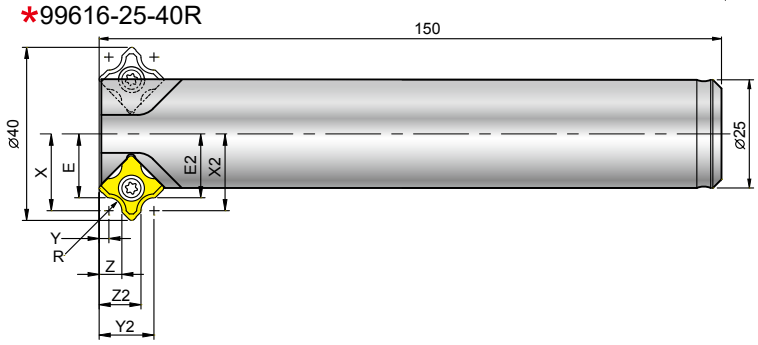
99616-16-25R



*99616-16-30R



*99616-25-40R



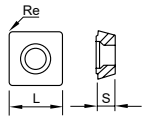
99616-16-30R & 99616-25-40R
*For front and back corner rounding.
*Eliminates 2nd operation or deburring time.

Insert Radius	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

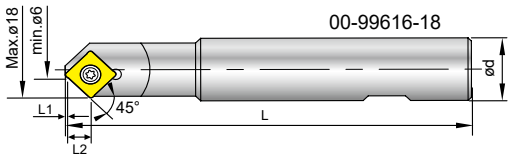
Inserts >>

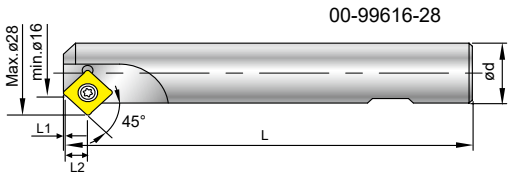
NC40: • General purpose, universal grade for all unhardened steel.
• Each insert has 4 cutting edges.
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for Al, Al-alloy, non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.
NC60: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

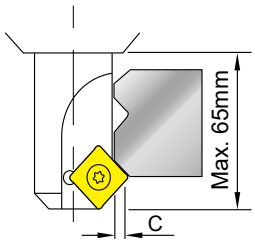
• 00-99616-28 can be applied for machining back chamfering and side grooving.



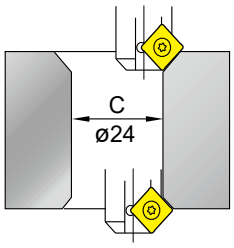


Code	Parts No.	Chamfering	Ød	L	L1	L2	Z	Insert type	Screw / Key
604017	00-99616-18	Ø6-Ø18	20	120	1.15	7.55	1	N9MT11T308LA	NS-35080 2.5 Nm
604018	00-99616-28	Ø16-Ø28	20	120	1.15	7.55	1		NK-T15

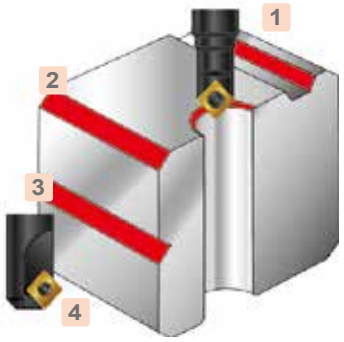
Example >>



For back chamfering
Max. 2mm



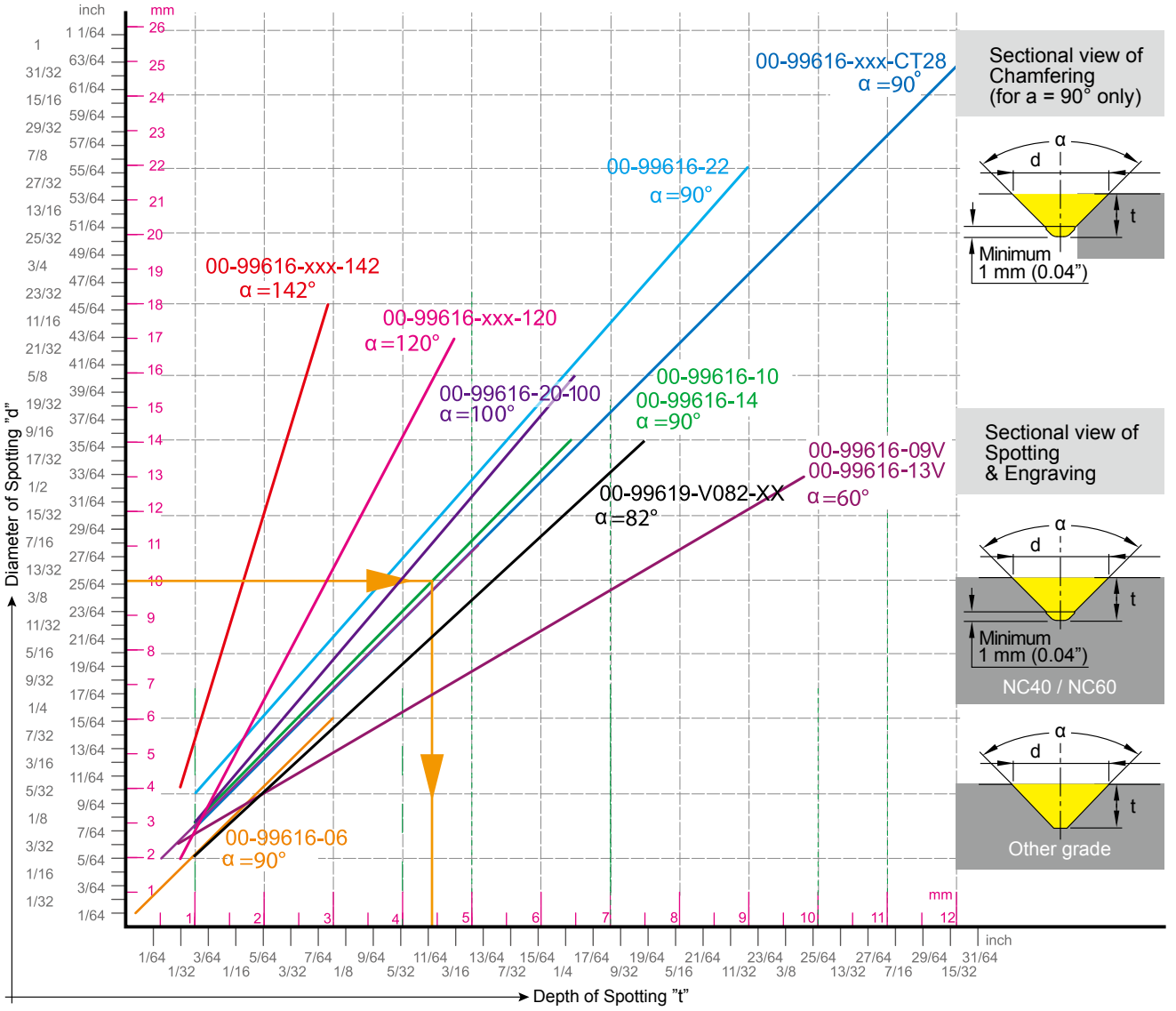
Min.diameter
for shift ø24mm.



Action	
1	External and internal chamfering
2	Side chamfering
3	Side grooving
4	Back chamfering

Cutting Data

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



Instruction of Use >>

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.

Calculate spindle speed and feed rate >>

1. Using your "d" value and cutting speed Vc from the data sheet, calculate spindle speed "S"(RPM).
2. " F" feed rate per minute F = f x S = RPM x IPR

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

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

$$F = f \times S$$

d =	diameter-inch
S =	Spindle Speed-r.p.m.
SFM =	Surface Speed-ft./min. Vc (m/min.) x 3.28
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 1-40.
- 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 C>0.3%	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 (Al, Cu)	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	Ni-alloy	30 ~ 60	-	0.03 ~ 0.07	○	◎	
H	Hardened steel HRC 40°~56°	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.
* Inserts with supporting edges can increase feed rate 50%.

● 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 C>0.3%	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 (Al, Cu)	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	Ni-alloy	30 ~ 60	-	0.05 ~ 0.10				◎	○	
H	Hardened steel HRC 40°~56°	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.
* Inserts with supporting edges can increase feed rate 50%.

● Best ◎ Suit ○ Possible

Cutting Data

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

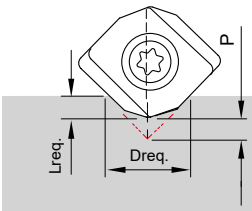
	Workpiece material	Vc (m/min)	f (mm/rev.) Spotting / Grooving	f (mm/rev.) Chamfering	NC2071	NC5071	NC9076 (NC9036)	NC40	NC2033	XP9000
P	Carbon Steel C<0.3%	150 ~ 320	0.05 ~ 0.10	0.10 ~ 0.24	●			●		
P	Carbon Steel C>0.3%	100 ~ 250	0.04 ~ 0.08	0.08 ~ 0.20		●			●	
P	Low Alloy Steel C<0.3%	100 ~ 250	0.04 ~ 0.08	0.08 ~ 0.20	●			●		
P	High Alloy Steel C>0.3%	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 (Al, Cu)	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	Ni-alloy	30 ~ 60	-	0.05 ~ 0.10	○	◎				
H	Hardened steel HRC 40°~56°	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.
* Inserts with supporting edges can increase feed rate 50%.

● Best ◎ Suit ○ Possible

WSP Spotting >> 145°+90° W Spotting

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

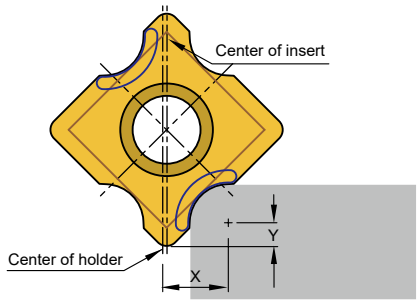
	M4	M5	M6	M8	M10	M12	M14	M16	1/4-20 UNC	5/16-18 UNC	3/8-16 UNC
P =	1.17	1.48	1.76	2.39	2.97	3.59	4.19	4.88	1.80	2.30	2.78

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	Casting iron	100 ~ 200	0.05 ~ 0.10	NC2033
	H	Hardened steel up 50 HRC	30 ~ 60	0.03 ~ 0.08	NC2033

Cutting Data

For Insert N9MT05T1RC / N9MT11T3RC / N9MT1704RC / N9MT2506RC

Corner Rounding



(X, Y ref. to insert's spec)

Calculate spindle speed

$d = 2 \times X$ mm

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

$F = S \times f$ mm/min.

d =	diameter of the tool
X =	tool radius offset
Vc =	Cutting Speed -m/min.
S =	Spindle Speed -r.p.m.
F =	mm/min.
f =	mm/rev.

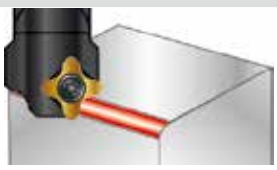
Calculate tool length offest on machining center

$TL = TL' - Y$,
$H = X$

X =	tool radius offset
Y =	distance to the center of radius.
TL' =	tool length
TL =	tool length offset.
H =	tool radius offset

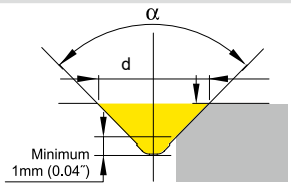
RC Insert		Work Material	Vc (m/min)	f (mm/rev.)	Grade of Insert
	P	Carbon steel	150~320	0.05~0.10	NC40, NC2071, NC2033
	P	Alloy steel	100~250	0.05~0.10	NC40, NC2071, NC2033
	P	High alloy steel	80~150	0.04~0.08	NC40, NC2071, NC2033
	M	Stainless steel	65~125	0.05~0.10	NC9036
	K	Casting iron	150~250	0.05~0.10	NC40, NC2071, NC2033
	N	Aluminum, Al-alloy Si < 12%	150~320	0.05~0.10	NC9036, XP9000
	N	Al-alloy Si >12%	100~300	0.05~0.10	NC9036, XP9000
	N	Cu	200~250	0.05~0.10	NC9036, XP9000
	N	Brass and Bronze	150~250	0.05~0.10	NC9036, XP9000
	S	Ti, Ti-alloy	40-80	0.03~0.08	NC9036

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	Casting iron	150~250	0.05~0.10	NC2071

LA Insert >> 45° Chamfering

45° Chamfering

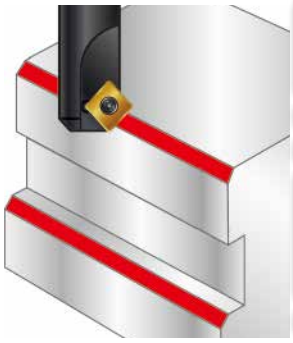


Formula

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

$F = S \times f$ mm/min.

α =	point angle 90°
d =	effective diameter
Vc =	cutting speed-m/min.or ft/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	Casting iron	150-250	0.05~0.10	NC10, NC40
	N	Aluminum, Al-alloy Si < 12%	150-320	0.05~0.10	NC10
	N	Al-alloy Si >12%	100-300	0.05~0.10	NC10
	N	Cu	200-250	0.05~0.10	NC10
	N	Brass and Bronze	150-250	0.05~0.10	NC10
	H	Hardened steel 40~56 HRC	60-80	0.05~0.10	NC60

Center Drill >> i-Center®

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.

Features

World’s first indexable center drill
Shortens set up and center drilling time
Increases tool life and reduces tooling costs

High Speed, High Feed Rate

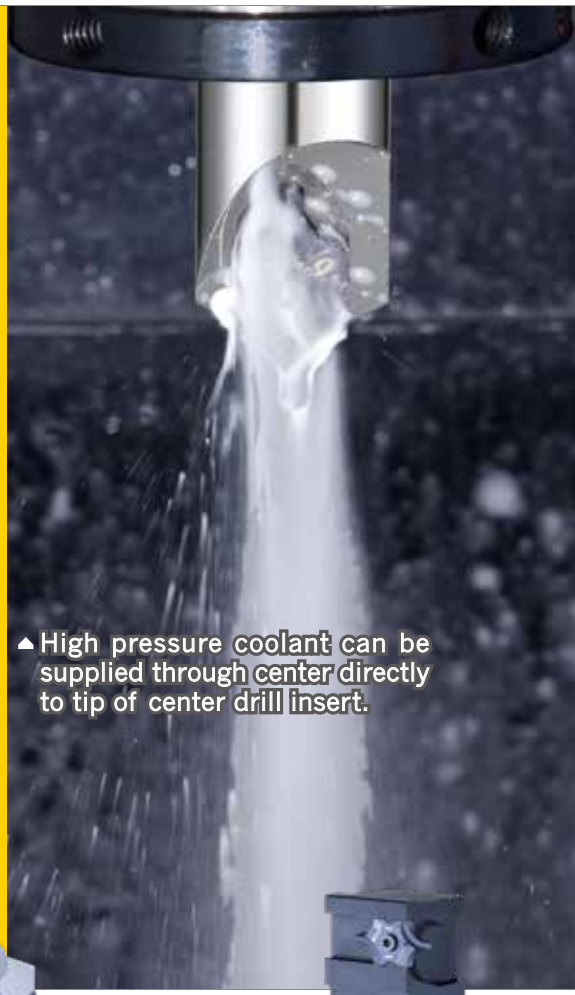
- The special ground insert and rigid holder design facilitate high performance speed and feed rates. For example, drilling alloy steel at 6000 rpm and feed rate of 600 mm/min. (0.1 mm/rev.)

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.



▲High pressure coolant can be supplied through center directly to tip of center drill insert.

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.

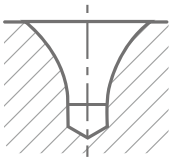
NC2057 (IC10)

NC5074 (IC08)

NC2033

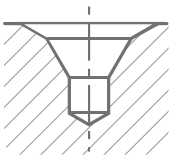
DIN 332 Form R

Ø1.0~Ø10



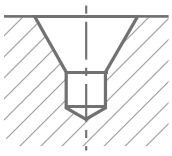
DIN 332 Form A + B

Ø1.0~Ø10



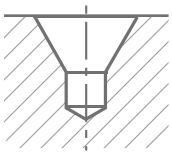
DIN 332 Form A

Ø2.0~Ø3.15



ANSI 60°

#2.0~#10



NEW NC2057:
- P35 grade, AL(L) coating, Universal grade for all kind of steel.
- Double-edged cutting, fully ground insert for improving machining stability. (IC10 inserts)

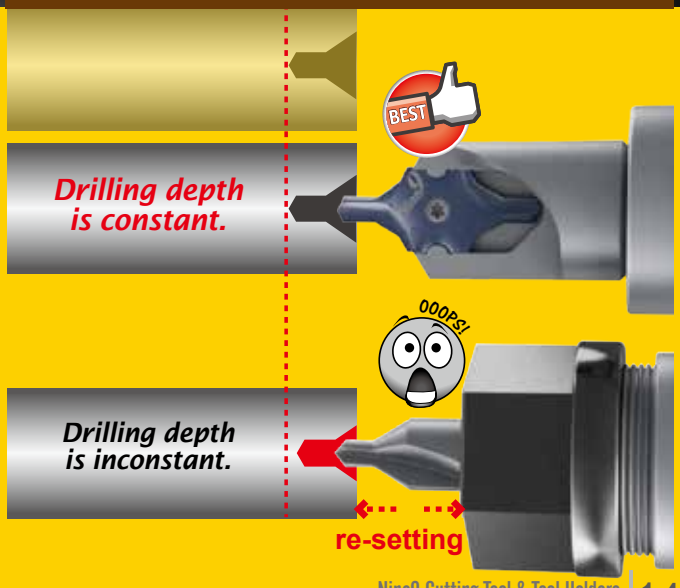
NC5074:
- P40 grade, Helica (AlCrN) coating, design for small diameter center drill (IC08 inserts).

NC2033:
- K20F grade, TiAlN coated, for carbon steel, alloy steel, high alloy steel and cast iron.

Inserts:

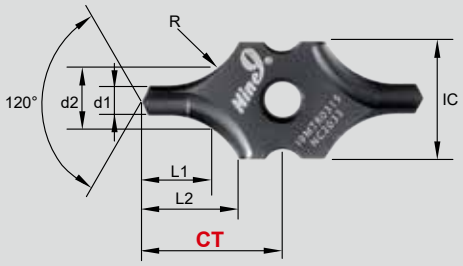
- 2 cutting flutes design same as carbide center drill for high performance speed and feed rate.
- Each insert has 2 cutting edges.

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



DIN332 Form R

DIN332 Form R



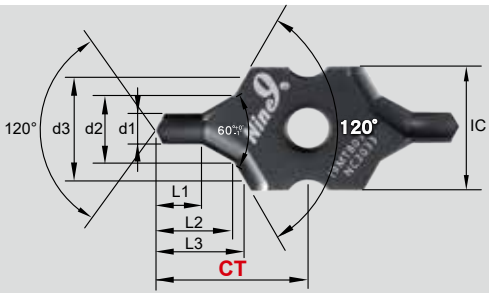
2 cutting flutes design

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
NEW 10	031200	I9MT1003R0100-NC2057	AL(L)	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

DIN332 Form A+B

DIN332
Form A+B



2 cutting flutes design

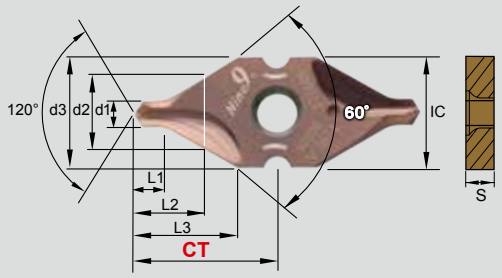
For DIN332 Form A+B Center Hole >>

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
NEW 10	031000	I9MT1003B0100-NC2057	AL(L)	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

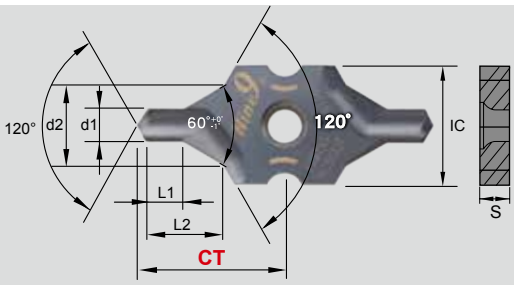
* Notice: The d3 size is different from DIN332 center hole.

DIN332 Form A & ANSI 60°

DIN332 Form A



ANSI 60°



For DIN332 Form A Center Hole >>

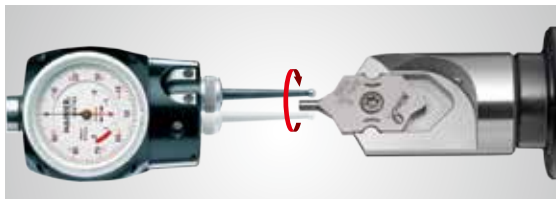
IC	Code	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	S	CT ±0.025
08	032114	I9MT08T1A0200-NC5074	Helica	P40	2.0	+0.14 0	4.25	8	2.15	4.10	7.35	2.00	10.5
	032115	I9MT08T1A0250-NC5074			2.5		5.3		2.58	5.00	7.34		
	032116	I9MT08T1A0315-NC5074			3.15	+0.18 0	6.7		3.23	6.30	7.43		

For ANSI 60° Center Hole >>

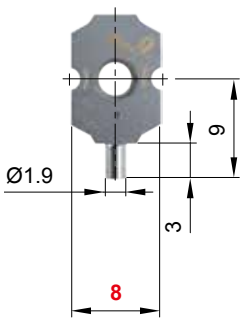
IC	Code	Parts No.	Coating	Grade	Size	d1			d2		L1		L2	S	CT ±0.025
						mm			mm		mm		mm		
12	033101	I9MT12T2A2-NC2033	TiAlN	K20F	#2	5/64	1.98	+0.14 0	3/16	4.76	5/64	1.98	4.4	2.54	12.6
	033102	I9MT12T2A3-NC2033			#3	7/64	2.78		1/4	6.35	7/64	2.78	5.9		13.8
	033103	I9MT12T2A4-NC2033			#4	1/8	3.18	+0.18 0	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

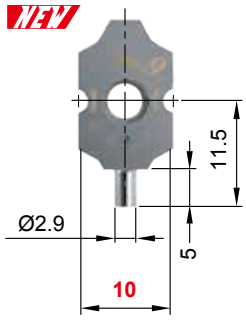
Measuring Master >>

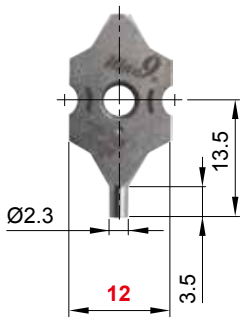
- Apply on lathe to align the center of work spindle and tool.
- Each insert has just one measuring tip.
- Concentricity: ±0.01mm

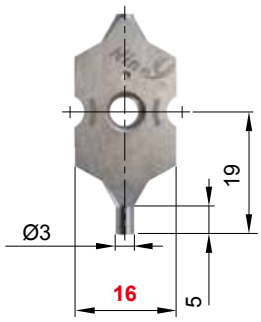


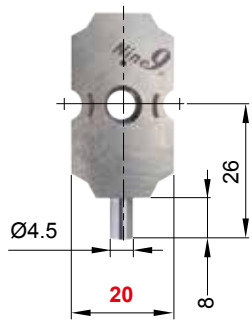
IC08	IC10	IC12	IC16	IC20
I9MT08T1-MM	I9MT1003-MM	I9MT12T2-MM	I9MT1603-MM	I9MT2004-MM







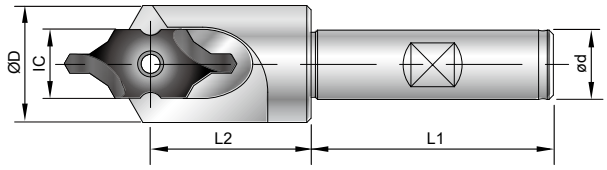




Holders of Indexable Center Drill

Holder >>

- Made of hardened high alloy steel, 58 HRC.
- IC08 shank is cylindrical shank.
  Other shanks are weldon shank.



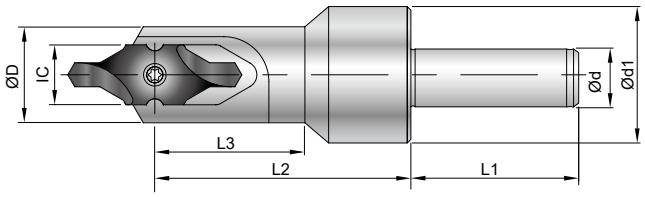
IC08

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"					
NEW 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.

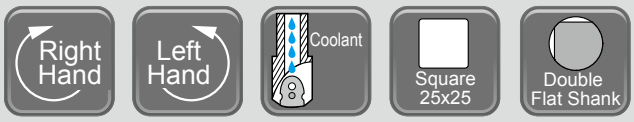
Cylindrical Shank with Pre-balanced >>

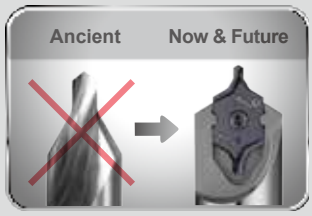
- Pre-balanced holder enhance the stability of centering to get high accurate profile.
- G6.3 / 10,000 r.p.m.



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

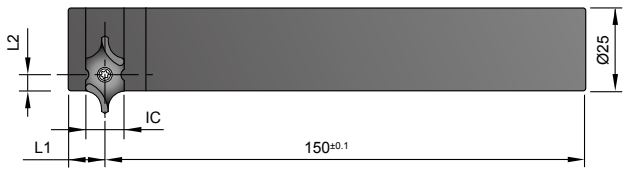
Holders of Indexable Center Drill





Square Shank 25 x 25 Right / Left Hand >>

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

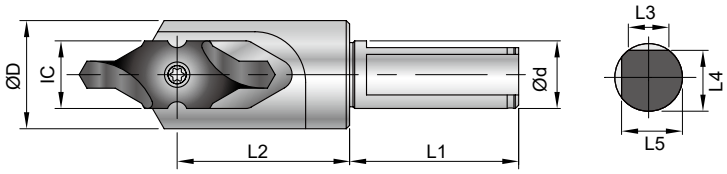


IC	Code	Parts No.	L1	L2	Screw	Key
08	822022	00-99616-IC08-R2525MF	8	3.25	*NS-25060 0.9 Nm	NK-T7
	822012	00-99616-IC08-L2525MF				
12	823022	00-99616-IC12-R2525MF	11	4.9	NS-30072 2.0 Nm	NK-T9
	823012	00-99616-IC12-L2525MF				
16	824022	00-99616-IC16-R2525MF	13	4.9	NS-35080 2.5 Nm	NK-T15
	824012	00-99616-IC16-L2525MF				

*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.

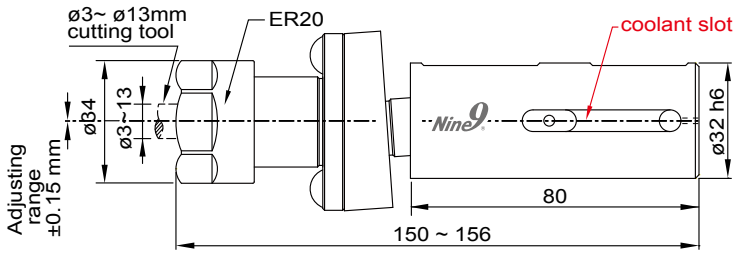
Center Height Adjusting Sleeve

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.

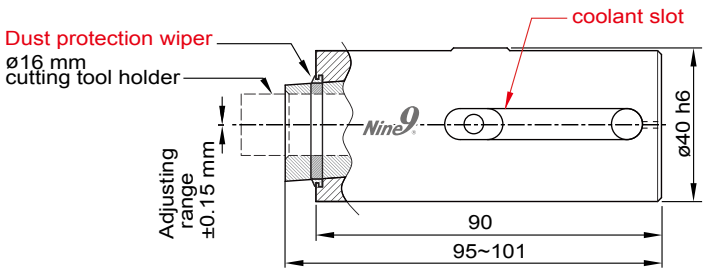
Parts No.:00-99600-320H >>

Type : SB32-IDER20



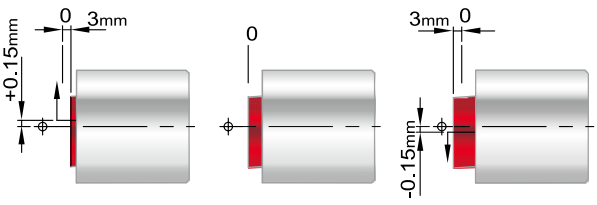
Parts No.:00-99600-400H >>

Type : SB40-ID16

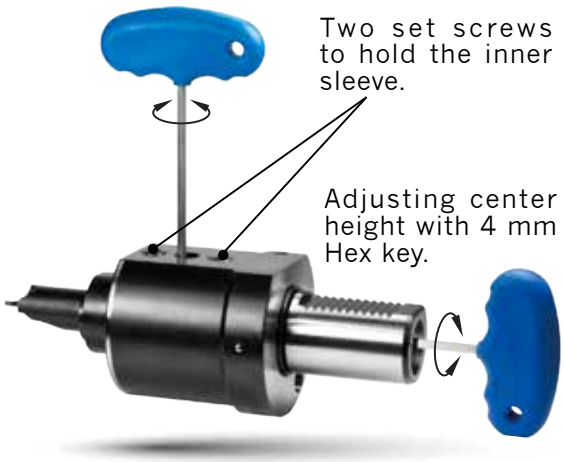


Applications >>

- 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").



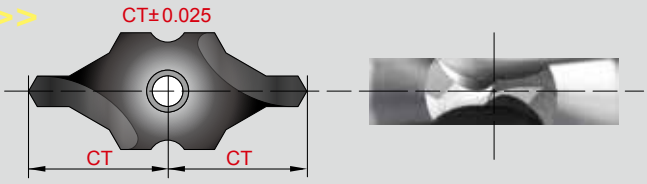
Tightening screw 4mm Hex key



Performance

Profit by making the right choice >>

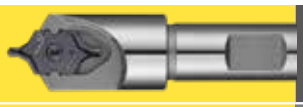
- High speed and feed rate reduce cutting time.
- The unique design increases tool life and reduces change over time.

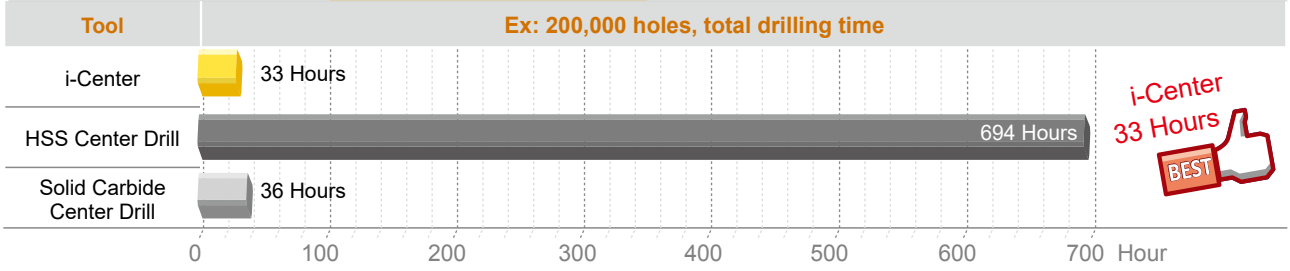


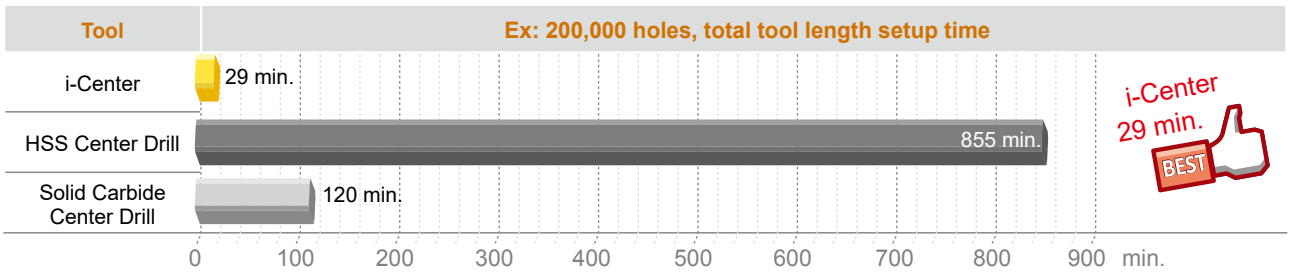
▲ 2 cutting edges ▲ 2 cutting flutes design

Comparison >>

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

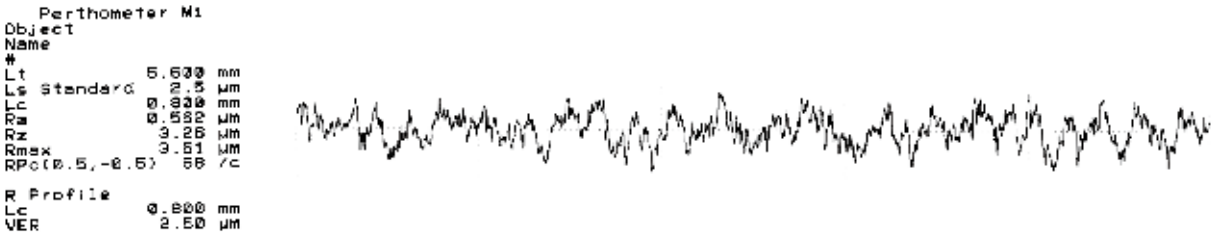
Diameter of tool : Ø3.15 mm Depth of drilling : 7.2 mm				
Comparison		**i-Center**	**HSS Center Drill (TiN Coating)**	**Solid Carbide Center Drill**
Cutting speed	**m/min.**	65	17	65
Spindle speed	**r.p.m.**	6570	1718	6570
Feed rate f =	**mm/rev.**	0.12	0.02	0.1
Feed rate F=	**mm/min.**	788.4	34.4	657
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



i-Center Enquiry Form

Previous process tool >>

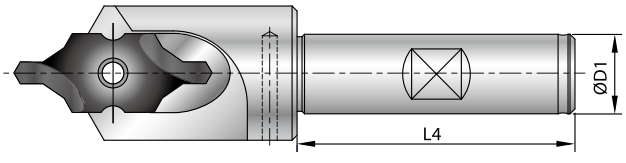
Challenge or improvement >>

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)	

Special Tool holder shank dimensions >>

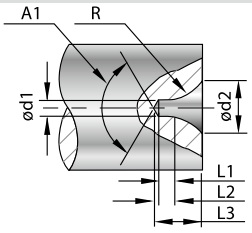
☐ Special tool holder shank, please fill in D1 and L4.
☐ As attached workpiece drawing.
☐ Metric ☐ Inch ☐ Right ☐ Left



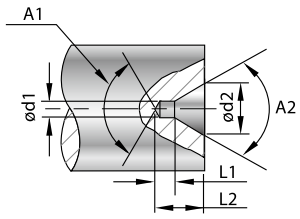
Center hole dimension >>

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

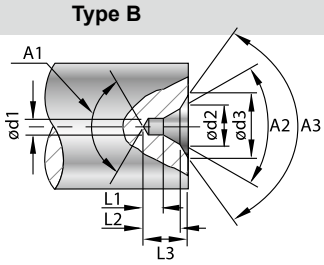
Type R



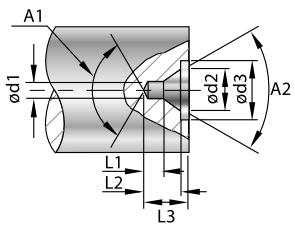
Type A



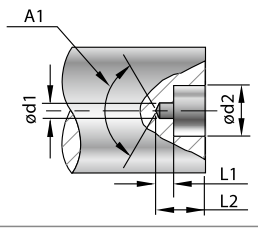
Type B



Type C



Other

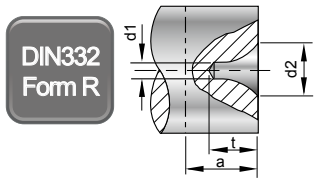


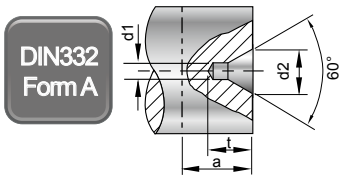
Dimension Table	A1	A2	A3	ød1	ød2	ød3
Dimension						
Tolerance	—	+0° -1°	±1°	±0.05	±0.05	—

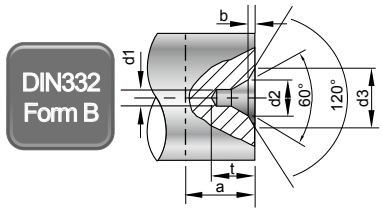
Dimension Table	L1	L2	L3	R	øD1	L4
Dimension						
Tolerance	±0.05	±0.05	±0.05	±0.5	h6	—

Technical Standard
ISO 2541-1972 / DIN332

60° Center holes





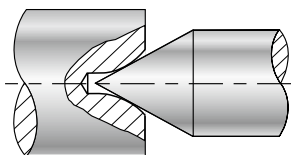


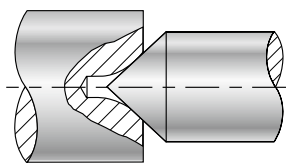
STD	DIN332 Form R ISO 2541-1972			DIN332 Form A ISO 866-1975			DIN332 Form B ISO 2540 1973				
d1	d2	t	a	d2	t	a	d2	b	d3	t	a
1	2.12	1.9	3	2.12	1.9	3	2.12	0.3	3.15	2.2	3.5
1.25	2.65	2.3	4	2.65	2.3	4	2.65	0.4	4	2.7	4.5
1.6	3.35	2.9	5	3.35	2.9	5	3.35	0.5	5	3.4	5.5
2	4.25	3.7	6	4.25	3.7	6	4.25	0.6	6.3	4.3	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

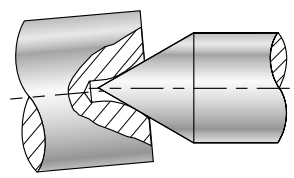
* a: Minimum material will be cut. If the center hole will be removed after turning or grinding. (mm/inch)

Advantage of Form R center hole

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

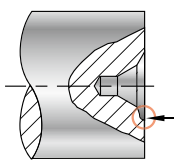


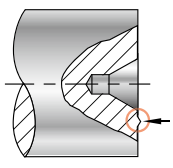


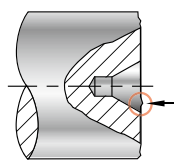


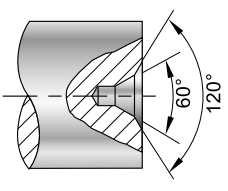
Advantage of Form B center hole

Avoid scar or distortion while transportation	Burr	Rough surface of workpiece	Total solution





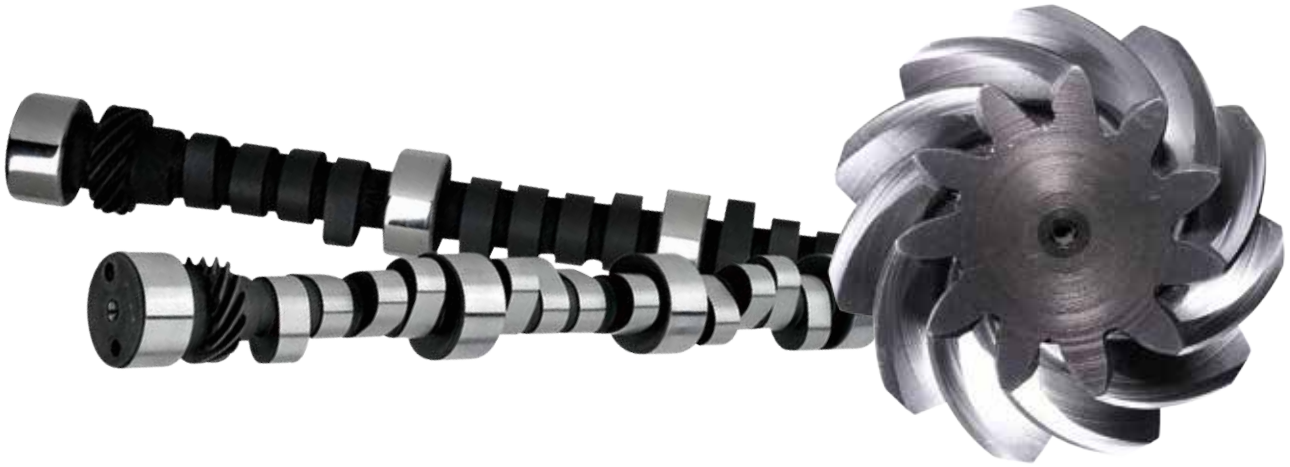


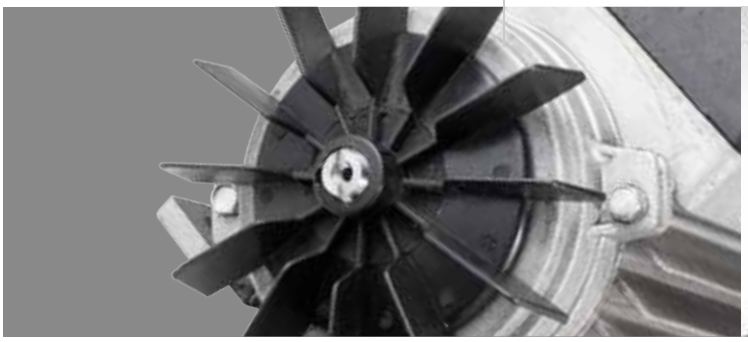


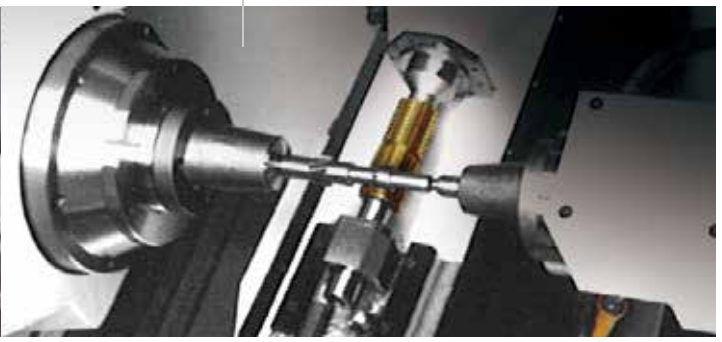
i-Center Applications

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.





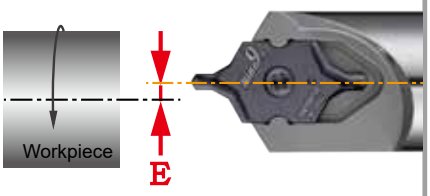


Technical Guide

Before you start, please pay attention the following conditions

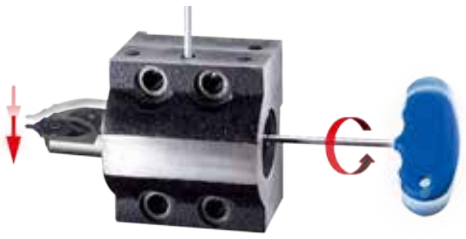
1 Center misalignment

E must be < 0.02mm.



2 Center height adjusting sleeve

When CNC lathe turret center is misaligned ≥ 0.15mm, please use center height adjusting sleeve.
(See page 1-51)

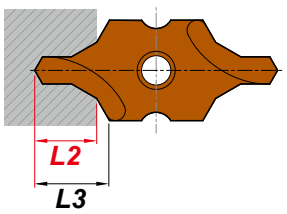


3 Internal coolant

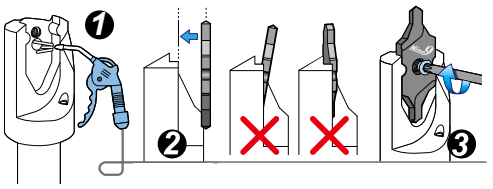
Internal coolant is recommended.

4 DIN 332 Form A+B

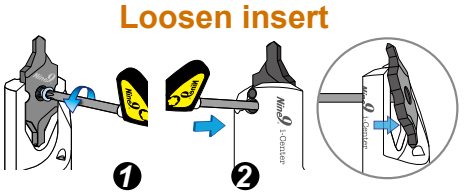
Reduce 30% of Spindle speed and keep same feed rate (inch/rev.) while depth L2 is reached.



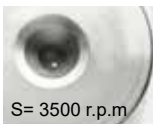
5 Clamping insert



Loosen insert



6 Possible to run on low r.p.m machine



Calculate spindle speed and feed rate

- 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

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 (#2~#4)

Workpiece material		Vc (m/min.)	d1 (pilot dia.)	IC08 / IC10		IC12				
				Ø1~1.25	Ø1.6~3.15	Ø2 (#2)	Ø2.5 (#3)	Ø3.15 (#4)		
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		
	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		
	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		
	High alloy steel C>0.3%	< 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	Casting 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	Al, and 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 (#5~#10)

Workpiece material		Vc m/min.	d1 (pilot dia.)	IC16		IC20			IC25		
				Ø4 (#5)	Ø5	(#6)	Ø6.3 (#7)	Ø8 (#8)	Ø10 (#10)		
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			
	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			
	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			
	High alloy steel C>0.3%	< 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	Casting 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	Al, and 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

Micro Spotting / Engraving

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.

Features

High Positive Rake Angle

- Indexable insert.
- Suitable for engraving all types of materials, such as plastic, non-ferrous metal, aluminum, copper, carbon steel and stainless steel.

Multi-Side Grinding

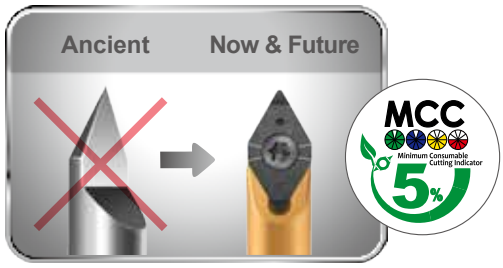
- Full peripherally ground insert to ensure efficient repeatability.
- It performs excellently without producing any burrs, especially in copper, aluminum and stainless steel.

High Speed, High Feed Rate

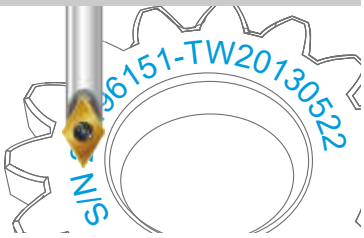
- Designed to run at high speed, up to 40,000 r.p.m.
- Feed rate 0.08mm (0.003") / rev. apply to aluminum; 0.05mm (0.002") / rev. apply to stainless steel.
- Reduces engraving cycle time!

Economical

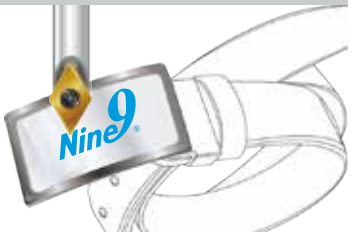
- Each indexable insert has 2 cutting edges.
- No need to reset after changing insert or cutting edge.
- Excellent repeatability!



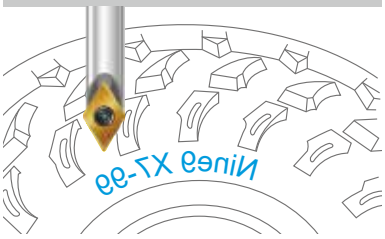
Serial number



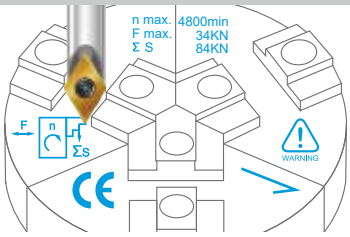
Logo outlines



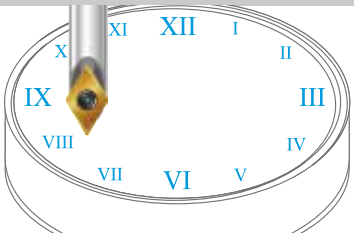
Mold & Die



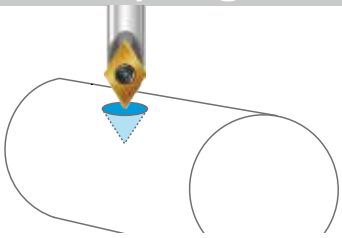
Product info



Dial scales



Spotting



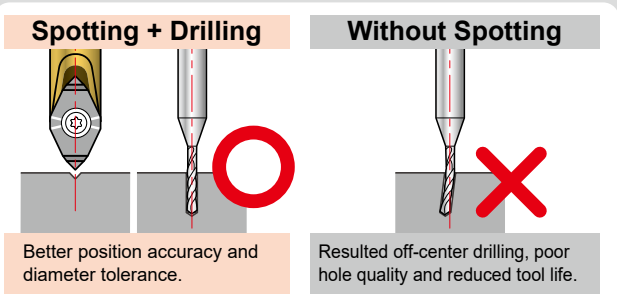
Applications

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

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

- **Special forms are available on request.**

0.1mm Micro Spotting 90°, 120° & 142°

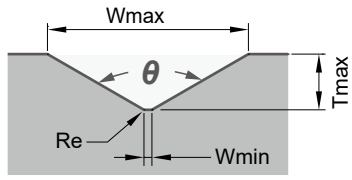


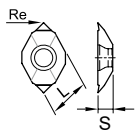
Inserts >>

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

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

XP9001: • Mirror polished, for non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

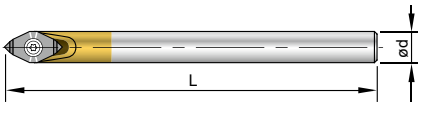


Angle	Code	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
90°	01X0082	X060A90W010R	NC2032	TiAlN	K20F		6	2.05	0.02	0.10	1.1	0.5
	01X0221		NC2035	ALDURA								
	01X0220		XP9001	Polished								
90°	01X0207	*X060A90W020R	NC2032	TiAlN	K20F		6	2.05	0.04	0.20	2.2	1.0
	01X0208		NC2035	ALDURA								
	01X0209		XP9001	Polished								
120°	01X0222	X060A120W010R	NC2032	TiAlN	K20F		6	2.05	0.02	0.10	2.53	0.7
142°	01X0223	X060A142W010R	NC2032	TiAlN	K20F		6	2.05	0.02	0.10	2.42	0.4

* X060A90W020R is also good for engraving.

Holder >>

• One holder supports the entire X060 series of engraving inserts.



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			
NEW 69X004	00-99619-X060-06XL	Carbide	6	100		
NEW 69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

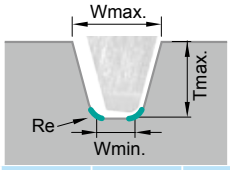
X060 Engraving Tool 30°

Inserts >>

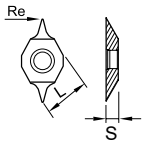
NC2032: • For all kinds of steel from < 40 HRC, carbon steel, alloy steel,and cast iron.

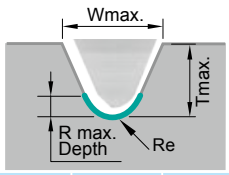
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

XP9001: • Mirror polished, for non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

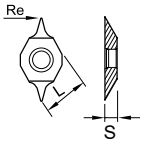


• Radius Angled Form

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	0.74	0.6
	01X0141		NC2035	ALDURA								
	01X0142		XP9001	Polished								



• 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	0.84	0.6
	01X0132		NC2035	ALDURA								
	01X0134		XP9001	Polished								

Holder >>

• One holder supports the entire X060 series of engraving inserts.

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			
NEW 69X004	00-99619-X060-06XL	Carbide	6	100		
NEW 69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

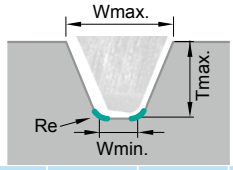
X060 Engraving Tool 45°

Inserts >>

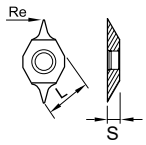
NC2032: • For all kinds of steel from < 40 HRC, carbon steel, alloy steel,and cast iron.

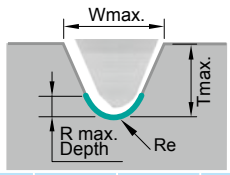
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

XP9001: • Mirror polished, for non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

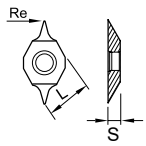


• Radius Angled Form

Angle	Code	Parts No.		Coating	Grade		Dimensions			Wmin.	Wmax.	Tmax.
							L	S	Re			
45°	01X0021	X060A45W020R	NC2032	TiAlN	K20F		6	2.05	0.04	0.20	1.03	0.8
	01X0153		NC2035	ALDURA								
	01X0154		XP9001	Polished								

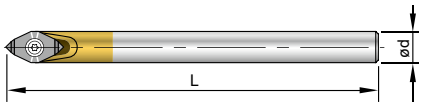


• Radius Form

Angle	Code	Parts No.		Coating	Grade		Dimensions			R max. Depth	Wmax.	Tmax.
							L	S	Re			
45°	01X0013	X060A45R020	NC2032	TiAlN	K20F		6	2.05	0.2	0.12	1.1	0.8
	01X0149		NC2035	ALDURA								
	01X0150		XP9001	Polished								

Holder >>

• One holder supports the entire X060 series of engraving inserts.



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			
NEW 69X004	00-99619-X060-06XL	Carbide	6	100		
NEW 69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

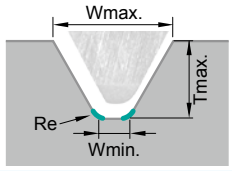
X060 Engraving Tool 60°

Inserts >>

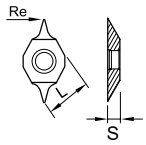
NC2032: • For all kinds of steel from < 40 HRC, carbon steel, alloy steel,and cast iron.

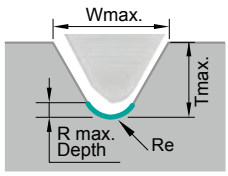
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

XP9001: • Mirror polished, for non-ferrous metal, aluminum, brass, copper, plastic, acrylic.

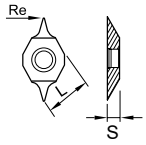


• Radius Angled Form

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



• Radius Form

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

Holder >>

• One holder supports the entire X060 series of engraving inserts.

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			
NEW 69X004	00-99619-X060-06XL	Carbide	6	100		
NEW 69X005	00-99619-X060-08	Steel	8	60		

*Torque screwdriver is recommended.

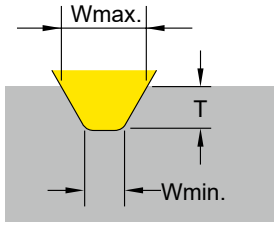
V045 Engraving Tool 45°

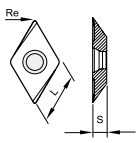
Inserts >>

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

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

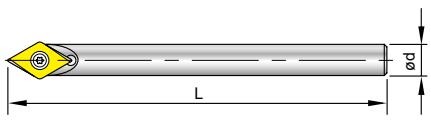
NC9031: • Fully positive ground rake angle, very sharp edge for shallow engraving.
• For non-ferrous metal such as aluminum, brass, copper, titanium, plastic and acrylic.



Angle	Code	Parts No.		Coating	Grade		Dimensions			W		T	
							L	S	Re	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		
NEW	691004	00-99619-V045-08	Steel	8	60		

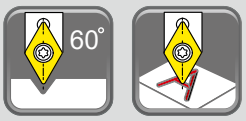
*Torque screwdriver is recommended.

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	

Engraving Tool 60°

V060



Inserts >>

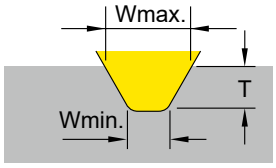
NC2071: • Strong edge on chip-breaker, best suited for min. DOC 0.2mm.
• Universal grade for all kinds of steel <30HRC, non-ferrous metal and stainless steel.

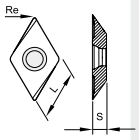
NC2032: • Long tool life.
• For all kinds of steel from 30~50 HRC, carbon steel, alloy steel,and cast iron.

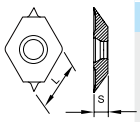
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

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.

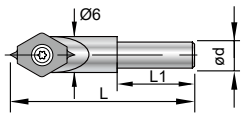


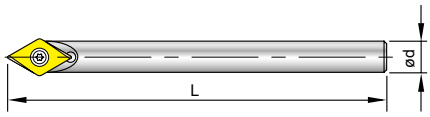
Angle	Code	Parts No.		Coating	Grade		Dimensions			W		T	
							L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
60°	0106001	V06006T1W06	NC2071	TiN	K20F		6.35	2.0	0.2	0.65	2.7	0.20	2.0
	0106002		NC2032	TiAlN						0.65		0.20	
	0106003		NC2035	ALDURA						0.65		0.20	
	0106004		NC9031	TiN						0.45		0.05	

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.

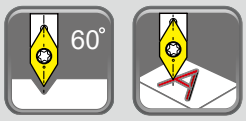




Angle	Code	Parts No.	Shank	Ød	L	L1	Screw	Key
60°	692004	00-99619-V060-04	Steel	4	30	12	*NS-22044 0.9Nm	NK-T7
	692001	00-99619-V060-06	Steel	6	40	---		
	692002	00-99619-V060-06L	Carbide		60	---		
	692003	00-99619-V060-06XL	Carbide		100	---		
NEW	692005	00-99619-V060-08	Steel	8	60	---		

*Torque screwdriver is recommended.

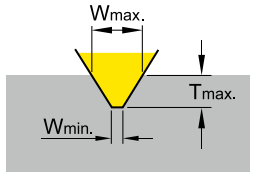
W060 W060 Engraving Tools

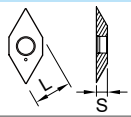


Inserts >>

- 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.

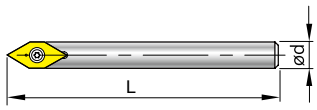
NC2032: • Universal grade for all unhardened steel.



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				4.5	1.3	0.2	0.66	0.4
	01W2003	W06004S103-NC2032				4.5	1.3	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 — Tmax.: 0.2mm

	Work Material	S (r.p.m)	f (mm/rev.)	Grade of Insert	Depth of cut (mm) 1st	2nd	3rd	~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.002 ~ 0.015	NC2032	0.1	0.05	0.03	0.02	0.02
P	Carbon steel C>0.3%	8000 ~ 40000	0.002 ~ 0.012	NC2032	0.1	0.05	0.03	0.02	0.02
P	Alloy steel	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.08	0.03	0.03	0.02	0.02
M	Stainless Steel	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.08	0.03	0.03	0.02	0.02
K	Cast iron	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.1	0.05	0.03	0.02	0.02
N	Aluminum ≧ Non-Ferrous Metal	8000 ~ 40000	0.002 ~ 0.020	NC2032	0.1	0.05	0.03	0.02	0.02

S102 — Tmax.: 0.4mm

	Work Material	S (r.p.m)	f (mm/rev.)	Grade of Insert	Depth of cut (mm) 1st	2nd	3rd	4th	~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.002 ~ 0.015	NC2032	0.2	0.1	0.05	0.03	0.03	0.02
P	Carbon steel C>0.3%	8000 ~ 40000	0.002 ~ 0.012	NC2032	0.15	0.1	0.05	0.03	0.03	0.02
P	Alloy steel	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.12	0.08	0.05	0.03	0.03	0.02
M	Stainless Steel	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.12	0.05	0.05	0.03	0.03	0.02
K	Cast iron	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.15	0.1	0.05	0.03	0.03	0.02
N	Aluminum ≧ Non-Ferrous Metal	8000 ~ 40000	0.002 ~ 0.020	NC2032	0.2	0.1	0.1	0.05	0.03	0.02

S103 — Tmax.: 0.6mm

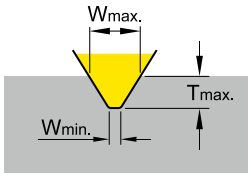
	Work Material	S (r.p.m)	f (mm/rev.)	Grade of Insert	Depth of cut (mm) 1st	2nd	3rd	4th	~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.002 ~ 0.015	NC2032	0.25	0.1	0.05	0.05	0.03	0.02
P	Carbon steel C>0.3%	8000 ~ 40000	0.002 ~ 0.012	NC2032	0.2	0.1	0.05	0.05	0.03	0.02
P	Alloy steel	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.15	0.1	0.05	0.03	0.03	0.02
M	Stainless Steel	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.15	0.05	0.05	0.03	0.03	0.02
K	Cast iron	8000 ~ 40000	0.002 ~ 0.010	NC2032	0.2	0.1	0.05	0.05	0.03	0.02
N	Aluminum ≧ Non-Ferrous Metal	8000 ~ 40000	0.002 ~ 0.020	NC2032	0.3	0.1	0.1	0.05	0.03	0.02

Engraving 60°/90° N9MT080201W

SW

Inserts >>

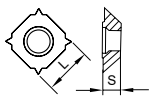
- No need to reset tool length after changing insert or cutting edge.
- The inserts can be used for small diameter spotting.
- Each insert has 4 cutting edges.



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

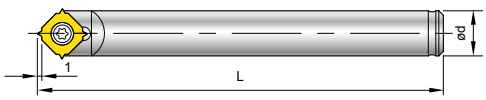
NC40: • Universal grade for all unhardened steel.

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		8	2.38	0.2	2.0	0.9
	013406		NC10	TiAlN	K20F		8	2.38	0.2	2.0	0.9

Holder >>

- For SW engraving using ***NC Spot Drill*** shank.



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		

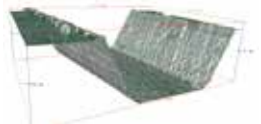
Cutting Data >>

(Tmax.: 0.8 mm)

	Work Material	S (r.p.m)	f (mm/rev.)	Grade of Insert	Depth of cut (mm) 1st	2nd	3rd	Finishing
P	All unhardened steel	5000 ~ 20000	0.008 ~ 0.02	60-NC40,NC40	0.3	0.2	0.2	0.05
K	Cast iron	5000 ~ 20000	0.008 ~ 0.02	60-NC40, NC10	0.3	0.2	0.2	0.05
N	Non-Ferrous Metal	5000 ~ 20000	0.008 ~ 0.02	NC10	0.3	0.2	0.2	0.05

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			

Cutting data / Tool	00-99619-V060-06 V06006T1W06-NC2071	00-99619-V060-06 V06006T1W06-NC2071	00-99619-V060-06 V06006T1W06-NC2035
Workpiece material	SKD 51	SS	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

Attention >>

Clamping the engraving insert

- Place and hold the insert in the insert pocket against the positioning side.
- See illustration below:

• 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.

Engraving Applications

Tip >>

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.

Components

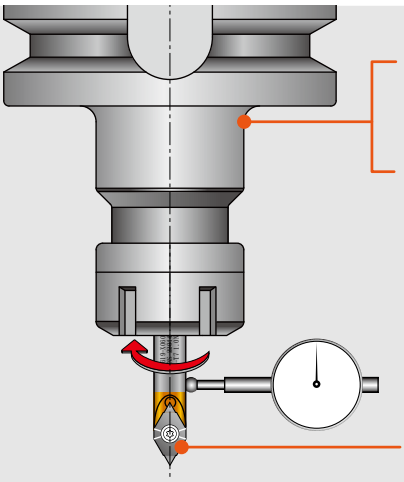
Luxury goods

Mold & Die

Product

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
tighten Torque 0.9Nm.

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

Cutting Data >> 0.1mm Micro Spotting

X060A90W010R

Workpiece Meterial		S (r.p.m)	f (mm/rev.)	Grade of insert
P	Carbon steel C<0.3%	8000 ~ 40000	0.002 ~ 0.012	NC2032
P	Carbon steel C>0.3%		0.002 ~ 0.010	NC2032
P	Alloy steel		0.002 ~ 0.010	NC2032, NC2035
M	Stainless steel		0.002 ~ 0.008	NC2032
K	Casting iron		0.002 ~ 0.010	NC2032
N	Non-ferrous metal (Al, Cu)		0.002 ~ 0.015	XP9001
N	Copper, Brass		0.002 ~ 0.015	XP9001
H	Hardened steel up 56 HRC		0.002 ~ 0.006	NC2035

X060A120W010R / X060A142W010R

Workpiece Meterial		S (r.p.m)	f (mm/rev.)	Grade of insert
P	Carbon steel C<0.3%	8000 ~ 40000	0.001 ~ 0.015	NC2032
P	Carbon steel C>0.3%		0.001 ~ 0.012	NC2032
P	Alloy steel		0.001 ~ 0.010	NC2032
M	Stainless steel		0.001 ~ 0.010	NC2032
K	Casting iron		0.001 ~ 0.010	NC2032

Cutting Data >> X060 Engraving

▸ X060A30W020R

(Tmax. : 0.6mm)

Workpiece Meterial		S (r.p.m)	f (mm/rev.) Radius Angled	f (mm/rev.) Radius	Grade of insert	Depth of cut (mm) 1st	2nd	3rd	4th	5th ~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.001 ~ 0.010	0.002 ~ 0.015	NC2032	0.2	0.1	0.05	0.05	0.05	0.02
P	Carbon steel C>0.3%		0.001 ~ 0.008	0.002 ~ 0.012	NC2032	0.15	0.1	0.05	0.05	0.05	0.02
P	Alloy steel		0.001 ~ 0.006	0.002 ~ 0.010	NC2032, NC2035	0.15	0.1	0.05	0.05	0.03	0.02
M	Stainless Steel		0.001 ~ 0.006	0.002 ~ 0.010	NC2032	0.1	0.05	0.05	0.03	0.03	0.02
K	Cast iron		0.001 ~ 0.006	0.002 ~ 0.010	NC2032	0.15	0.1	0.05	0.05	0.03	0.02
N	Aluminum		0.001 ~ 0.012	0.002 ~ 0.020	XP9001	0.2	0.1	0.1	0.05	0.05	0.02
N	Copper, Brass		0.001 ~ 0.012	0.002 ~ 0.020	XP9001	0.2	0.1	0.1	0.05	0.05	0.02
H	Hardened Steel Up to 56 HRC		0.001 ~ 0.005	0.002 ~ 0.006	NC2035	0.1	0.05	0.03	0.03	0.02	0.01

▸ X060A45W020R

(Tmax. : 0.8mm)

Workpiece Meterial		S (r.p.m)	f (mm/rev.) Radius Angled	f (mm/rev.) Radius	Grade of insert	Depth of cut (mm) 1st	2nd	3rd	4th	5th ~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.002 ~ 0.012	0.002 ~ 0.015	NC2032	0.3	0.2	0.1	0.05	0.05	0.03
P	Carbon steel C>0.3%		0.002 ~ 0.010	0.002 ~ 0.012	NC2032	0.25	0.15	0.1	0.05	0.05	0.03
P	Alloy steel		0.002 ~ 0.010	0.002 ~ 0.010	NC2032, NC2035	0.2	0.1	0.05	0.05	0.05	0.03
M	Stainless Steel		0.002 ~ 0.008	0.002 ~ 0.010	NC2032	0.2	0.1	0.05	0.05	0.05	0.03
K	Cast iron		0.002 ~ 0.010	0.002 ~ 0.010	NC2032	0.2	0.1	0.1	0.05	0.05	0.03
N	Aluminum		0.002 ~ 0.015	0.002 ~ 0.020	XP9001	0.3	0.2	0.1	0.1	0.05	0.03
N	Copper, Brass		0.002 ~ 0.015	0.002 ~ 0.020	XP9001	0.3	0.2	0.1	0.1	0.05	0.03
H	Hardened Steel Up to 56 HRC		0.002 ~ 0.006	0.002 ~ 0.006	NC2035	0.15	0.1	0.05	0.05	0.03	0.02

▸ X060A60W020R

(Tmax. : 1.0mm)

Workpiece Meterial		S (r.p.m)	f (mm/rev.) Radius Angled	f (mm/rev.) Radius	Grade of insert	Depth of cut (mm) 1st	2nd	3rd	4th	5th ~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.002 ~ 0.012	0.002 ~ 0.015	NC2032	0.3	0.2	0.1	0.1	0.05	0.03
P	Carbon steel C>0.3%		0.002 ~ 0.010	0.002 ~ 0.012	NC2032	0.3	0.2	0.1	0.1	0.05	0.03
P	Alloy steel		0.002 ~ 0.010	0.002 ~ 0.010	NC2032, NC2035	0.3	0.1	0.1	0.05	0.05	0.03
M	Stainless Steel		0.002 ~ 0.008	0.002 ~ 0.010	NC2032	0.2	0.1	0.1	0.05	0.05	0.03
K	Cast iron		0.002 ~ 0.010	0.002 ~ 0.010	NC2032	0.3	0.1	0.1	0.05	0.05	0.03
N	Aluminum		0.002 ~ 0.015	0.002 ~ 0.020	XP9001	0.3	0.2	0.1	0.1	0.05	0.03
N	Copper, Brass		0.002 ~ 0.015	0.002 ~ 0.020	XP9001	0.3	0.2	0.1	0.1	0.05	0.03
H	Hardened Steel Up to 56 HRC		0.002 ~ 0.006	0.002 ~ 0.006	NC2035	0.2	0.1	0.05	0.05	0.03	0.02

▸ X060A90W020R

(Tmax. : 1.0mm)

Workpiece Meterial		S (r.p.m)	f (mm/rev.)	Grade of insert	Depth of cut (mm) 1st	2nd	3rd	4th	5th ~	Finishing
P	Carbon steel C<0.3%	8000 ~ 40000	0.002 ~ 0.015	NC2032	0.35	0.25	0.15	0.1	0.05	0.03
P	Carbon steel C>0.3%		0.002 ~ 0.012	NC2032	0.3	0.2	0.1	0.1	0.05	0.03
P	Alloy steel		0.002 ~ 0.010	NC2032, NC2035	0.3	0.1	0.1	0.05	0.05	0.03
M	Stainless steel		0.002 ~ 0.010	NC2032	0.2	0.1	0.1	0.05	0.05	0.03
K	Casting iron		0.002 ~ 0.010	NC2032	0.3	0.1	0.1	0.05	0.05	0.03
N	Non-ferrous metal (Al, Cu)		0.002 ~ 0.020	XP9001	0.4	0.3	0.2	0.1	0.05	0.03
N	Copper, Brass		0.002 ~ 0.020	XP9001	0.4	0.3	0.2	0.1	0.05	0.03
H	Hardened steel up 56 HRC		0.002 ~ 0.006	NC2035	0.2	0.1	0.05	0.05	0.03	0.02

Cutting Data >> V045/V060 Engraving

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	Casting iron	5000~40000	0.008~0.03	NC2032
N	Aluminum≧Non-ferrous metal	5000~40000	0.008~0.08	NC2071,NC9031
H	Hardened steel up to 56 HRC	6000~35000	0.003~0.01	NC2035

(Tmax. : 2.0mm)

Material \ Ap		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	Casting iron	0.8	0.6	0.3	0.2	0.1	~	~	0.05
N	Aluminum≧Non-ferrous metal	1.0	0.8	0.2	~	~	~	~	0.05
H	Hardened steel up to 56 HRC	0.2	0.2	0.15	0.15	0.1	0.1	0.1	0.05

V060 T1W03

Work Material		S (r.p.m)	f (mm/rev.)	Grade of Insert
P	Carbon steel C<0.3%	8000 ~ 40000	0.005 ~ 0.010	NC2032
P	Carbon steel C>0.3%	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	Casting iron	6000 ~ 35000	0.005 ~ 0.015	NC2032
N	Aluminum	8000 ~ 40000	0.005 ~ 0.015	NC9036
N	Copper, Brass	8000 ~ 40000	0.005 ~ 0.010	NC9036
S	Titanium	6000 ~ 15000	0.003 ~ 0.010	NC9036

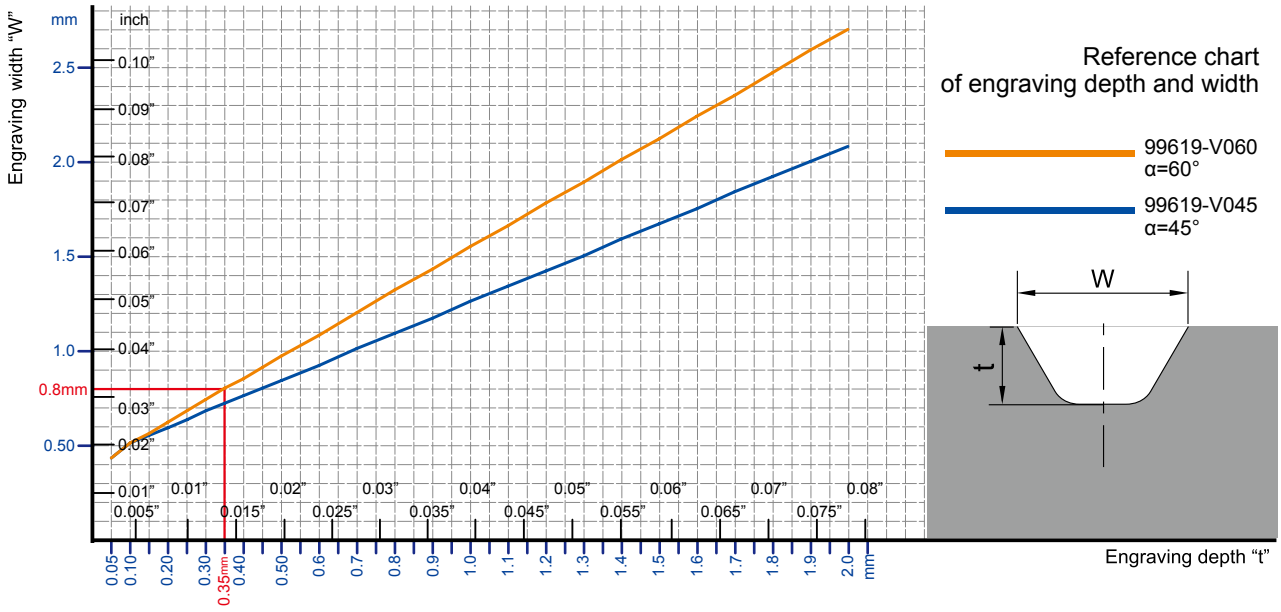
(Tmax. : 0.8mm)

Material \ Ap		1st	2nd	3rd	4th	5th	~	Fine finishing
P	Carbon steel C<0.3%	0.3	0.2	0.1	0.1	0.05	0.05	0.03
P	Carbon steel C>0.3%	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	Casting iron	0.2	0.1	0.1	0.1	0.05	0.05	0.03
N	Aluminum	0.2	0.1	0.1	0.1	0.05	0.05	0.03
N	Copper, Brass	0.2	0.1	0.1	0.1	0.05	0.05	0.03
S	Titanium	0.2	0.1	0.1	0.1	0.05	0.05	0.03

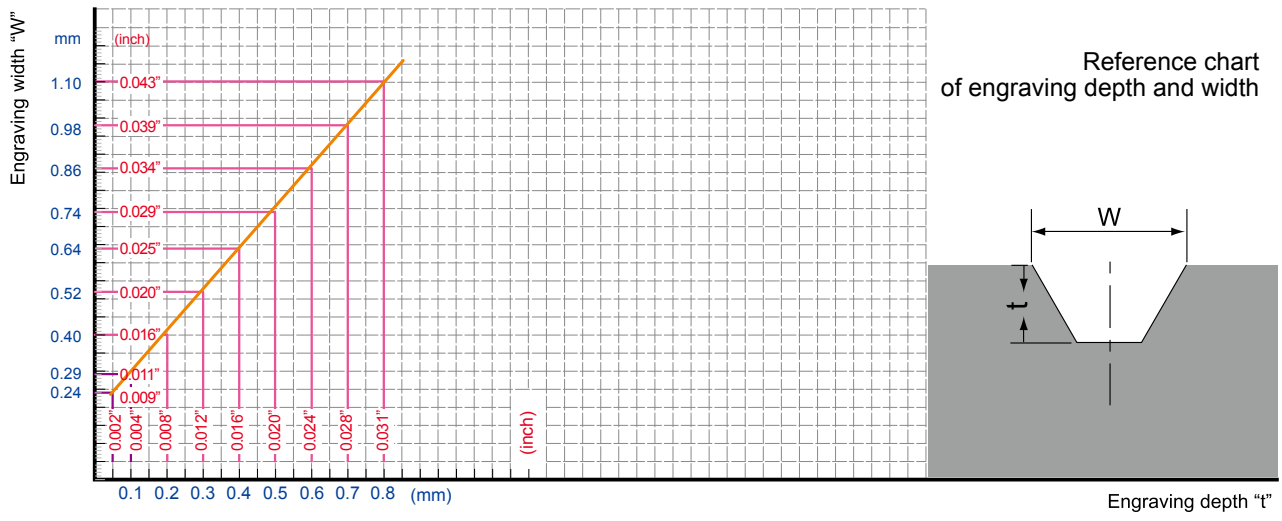
Engraving Depth and Width Reference Chart >>

- 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



V060 T1W03



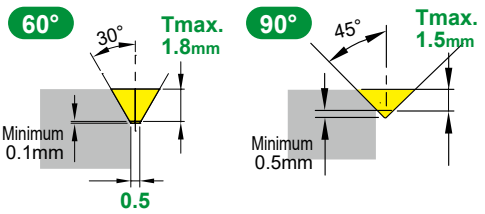
NC Deburring 60° & 90°

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

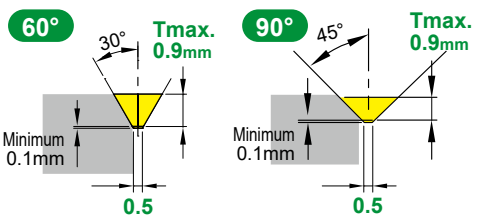
Features

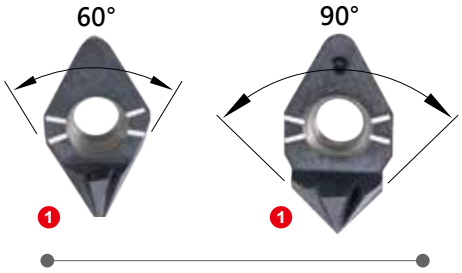
- Ideal for fine hole deburring.
- Indexable type, high precision ground carbide insert.
- Using same tool holder of X060 engraving tool.
- Long tool life.

6 Flutes insert



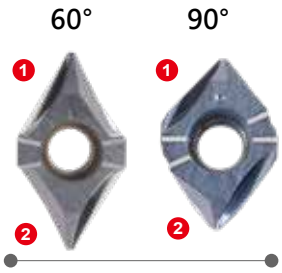
3 Flutes insert





X060A..T6

6 flutes, 1 cutting edge



X060A..T3

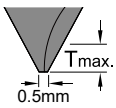
3 flutes, 2 cutting edges
Economical

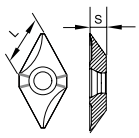
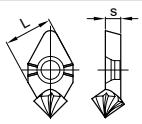
NC Deburring 60°& 90°

Inserts >>

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

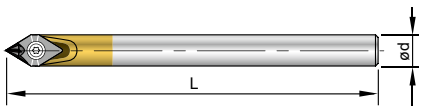
XP9001: • For non-ferrous metal, aluminum, brass, copper, plastic and acrylic



Angle	Code	Part No.	Coating	Grade	Flutes		Dimensions L	Dimensions S	Tmin.	Tmax.
NEW 60°	01X611	X060A60T3-NC2032	TiAlN	K20F	3		6	2.8	0.1	0.9
	01X612	X060A60T3-XP9001	-							
NEW 90°	01X911	X060A90T3-NC2032	TiAlN							
	01X912	X060A90T3-XP9001	-							
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.



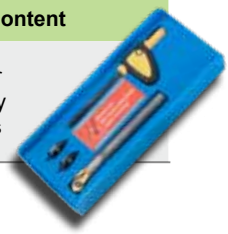
Code	Part No.	Shank	Ød	L	Screw	Key
69X001	00-99619-X060-06	Steel	6	40	*NS-22044 0.9Nm	NK-T7
69X002	00-99619-X060-06L	Carbide	6	60		
69X003	00-99619-X060-06LS	Steel	6			
NEW 69X004	00-99619-X060-06XL	Carbide	6	100		
NEW 69X005	00-99619-X060-08	Steel	8	60		

*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 C<0.3%	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	Casting iron	6000~35000	0.005-0.03	
N	Aluminum, Non-Ferrous Metal	8000~40000	0.005-0.05	XP9001

Deburring Mill 60° & 90°

For both front and back deburring and threading applications.

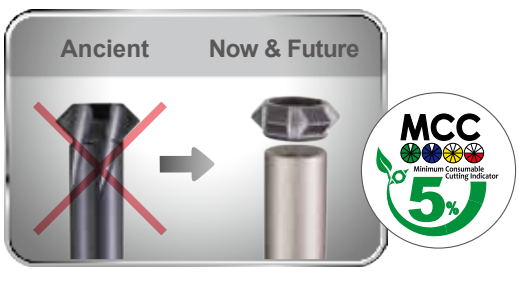
Features

60° deburring mill insert- also for threading application

- Thanks to special insert geometry and Nine9 clamping system it provides high precision and accurate position.
- The smallest insert Ø5.0 can do M6xP0.75 internal threading and deburring.
- For external threading, different pitch can be done by NC programing. For example: Ø10.0mm insert can do external threading pitch from P1.25 to P2.0mm, save your tool inventory.
- Each insert has 6 flutes.

90° deburring mill insert

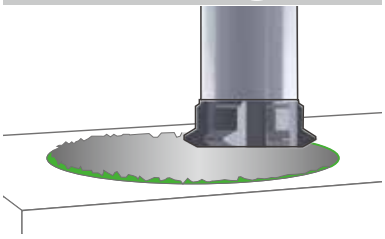
- Front & back deburring in one operation.
- Minimum deburring bore from Ø3.8mm to Ø10mm.
- Each insert has 6 flutes.



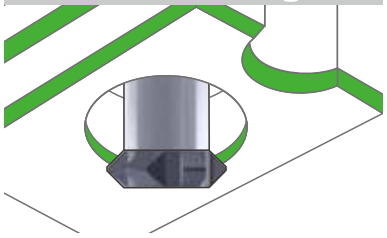
NEW

- 6 cutting flutes provide higher feed rate, optimized performance and reduced cycle time.

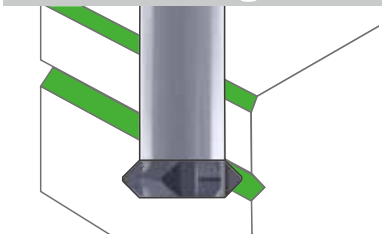
Deburring



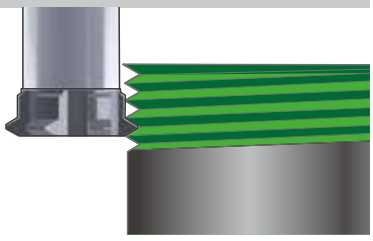
Back Deburring



Grooving

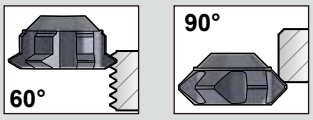


Thread Mill



- For front and back deburring. Smallest size from 5mm.

Deburring Mill 60° & 90° NEW



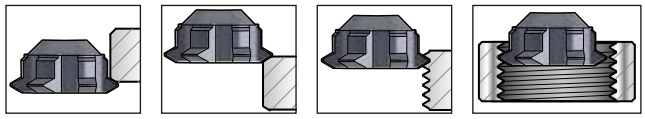
Inserts >>

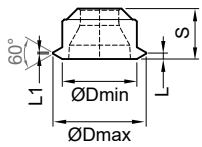
NC2032: • TiAlN coating provides longer tool life.
• For all kinds of steel from < 60 HRC, carbon steel, alloy steel and cast iron.

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.

60° deburring mill

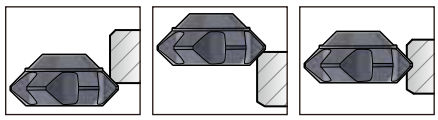
• For front and back deburring.
• Also for threading application.

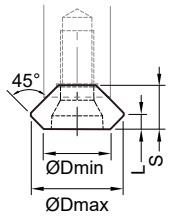


Code	Parts No.	Coating	Grade		Thread Size		ØDmin	ØDmax	L	L1	S
					Internal	External					
01R2101	R06005-05006-32	TiAlN	K20F		M6xP0.75	P0.7	3.8	5.0	0.38	0.06	2.45
01R2102	R06005-05006-00	-									
01R2103	R06005-05010-32	TiAlN			M6xP1.0	P0.8	3.8	5.0	0.40	0.1	2.45
01R2104	R06005-05010-00	-									
01R2105	R06007-06810-32	TiAlN			M8xP1.0 M8xP1.25	P1.0	5.0	6.8	0.45	0.1	3.25
01R2106	R06007-06810-00	-									
01R2107	R06010-08510-32	TiAlN			M10xP1.0 M10xP1.25 M10xP1.5	P1.0	6.8	8.5	0.54	0.1	4.60
01R2108	R06010-08510-00	-									
01R2109	R06010-10010-32	TiAlN			M12xP1.75 M14xP2.0 M16xP2.0 -12UNC / UNF	P1.25 P1.5 P1.75 P2.0	6.8	10.0	0.97	0.1	4.60
01R2110	R06010-10010-00	-									

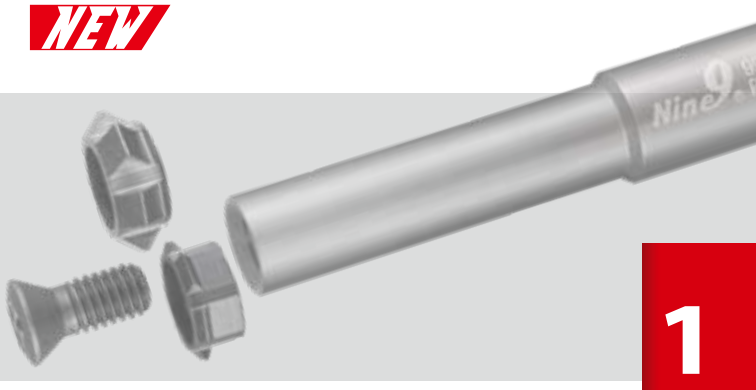
90° deburring mill

• Front & back deburring in one operation.



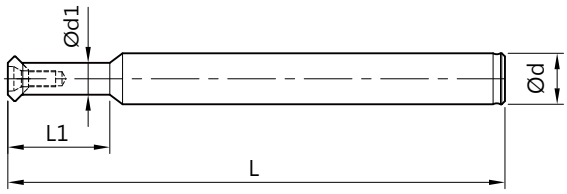
Code	Parts No.	Coating	Grade		ØDmin	ØDmax	L	S
01R4101	R09005-05060-32	TiAlN	K20F		3.8	5.0	0.9	2.45
01R4102	R09005-05060-00	-						
01R4103	R09007-07020-32	TiAlN			5.0	7.0	1.1	3.25
01R4104	R09007-07020-00	-						
01R4105	R09010-10010-32	TiAlN			7.1	10.0	1.5	4.60
01R4106	R09010-10010-00	-						

Deburring Mill 60° & 90° NEW



Holder >>

- Made of hardened high alloy steel.
- For both 60° and 90° deburring inserts.



Code	Parts No.	Type	Ød	Ød1	L1	L	Insert Type	Screw	Key
70R101	00-99626-CR05-05-043	BC05-CR05-043	5	3.5	**18**	43	Rxxx05	*NS-20045 0.6Nm	NK-T6
70R301	00-99626-CR07-06-052	BC06-CR07-052	6	5	**24**	52	Rxxx07	*NS-25060 0.9Nm	NK-T7
70R601	00-99626-CR10-08-070	BC08-CR10-070	8	6.8	**30**	70	Rxxx10	NS-35080 2.5Nm	NK-T15

*Torque screwdriver is recommended.

Cutting Data >>

60° deburring mill

	Workpiece material	Vc (m/min.)	Feed rate (mm / tooth)	Grade of insert
P	Carbon steel	80 ~150	0.002 ~ 0.013	NC2032
P	Alloy steel	60 ~ 120	0.002 ~ 0.01	NC2032
M	Stainless steel	50 ~ 100	0.002 ~ 0.01	NC2032
K	Casting iron	50 ~ 100	0.002 ~ 0.01	NC2032
N	Al, and non-ferrous metal	100 ~ 300	0.002 ~ 0.013	XP9000
H	Hardened steel < 60 HRC	30 ~ 60	0.002 ~ 0.008	NC2032

90° deburring mill

	Workpiece material	Vc (m/min.)	Feed rate (mm / tooth)	Grade of insert
P	Carbon steel	120 ~ 250	0.005 ~ 0.12	NC2032
P	Alloy steel	100 ~ 200	0.005 ~ 0.10	NC2032
M	Stainless steel	60 ~ 150	0.005 ~ 0.10	NC2032
K	Casting iron	80 ~ 180	0.005 ~ 0.10	NC2032
N	Al, and non-ferrous metal	150 ~ 500	0.005 ~ 0.15	XP9000
H	Hardened steel < 60 HRC	40 ~ 100	0.005 ~ 0.05	NC2032

Chamfer Mill 45° >>

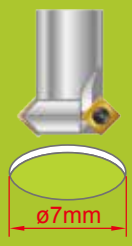
Nine9 chamfer mill
is designed for chamfering and countersinking with an indexable insert.
The insert is a specifically designed for use in high speed machining ; the multiple flutes provide for increased feed rate, optimizing performance and reducing cutting time.

Features

Ultra high speed and feed rate is the biggest advantage of Nine9 Chamfer Mills.
It is not a traditional chamfer tool, it runs 4 times faster in cutting speed and 10 times higher in feed rate. It is the most efficient tool you ever met.

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.

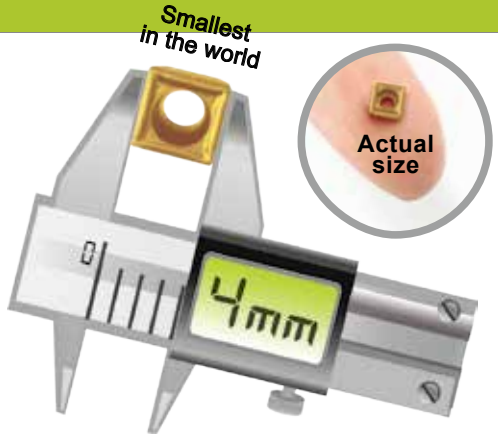


Applications >>

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

Economical >>

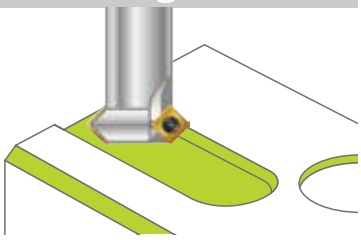
- Each insert has 4 cutting edges.
- Long tool life.



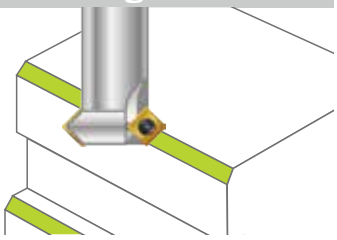
Screw fit cutter

- High performance chamfer tool for upgrading your machining process.

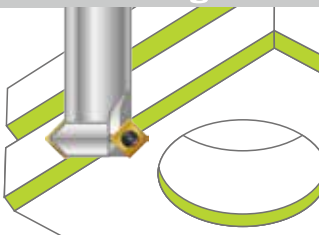
Face Milling



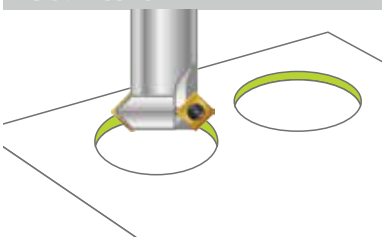
Chamfering



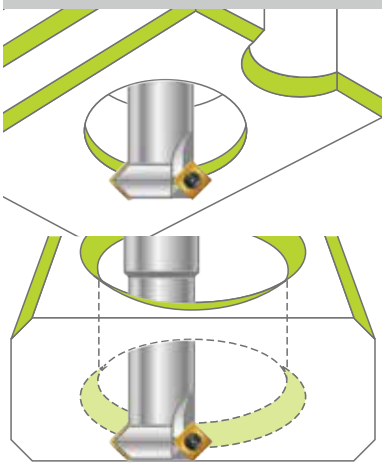
Back Chamfering



Countersink



Back Circular Chamfering



▲ For front and back chamfering.
Eliminates 2nd operation or deburring time.

Indexable Chamfer Mill

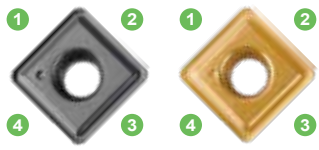
Features >>

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

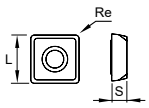
Inserts >>

NC2032:
- AlTiN coating, very long tool life.
- For carbon steel, alloy steel, cast iron and hardened steel up to 56HRC
- 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.



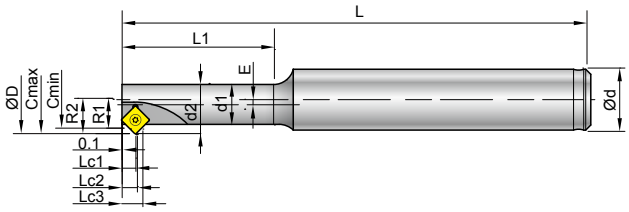
NC2032 NC9071

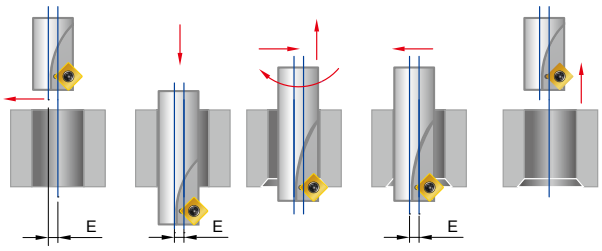
Code	Parts No.		Coating	Grade		Dimensions			Screw	Key
						L	S	Re		
021401	N9GX04T002	NC2032	AlTiN	K20F		4.0	1.8	0.2	*NS-18037 0.6Nm	NK-T6
021402		NC9071	TiN							
023401	N9GX060204	NC2032	AlTiN			6.35	2.38	0.4	*NS-22055 0.9Nm	NK-T7
023402		NC9071	TiN							
025401	N9GX090308	NC2032	AlTiN			9.52	3.18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



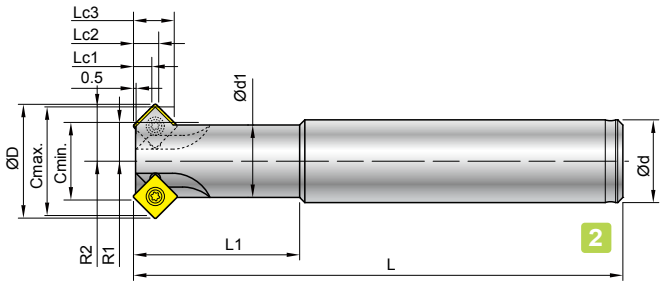


Code	Parts No.	Type	Cmin ø	Cmax ø	ød	ød1	ød2	øD	R1	R2	L	L1	Lc1	Lc2	Lc3	E	○z	insert Screw / Key
701003	00-99616-C02	BC10-C02-80	6.8	8.8	10	5.25	6.5	9	3.4	4.4	80	20	2.56	2.93	3.93	1.25	1	N9GX04T002
701004	00-99616-C04	BC12-C04-100	8.5	10.8	12	6.45	8	11.1	4.25	5.4	100	25	2.51	2.98	4.13	1.55	1	*NS-18037 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.



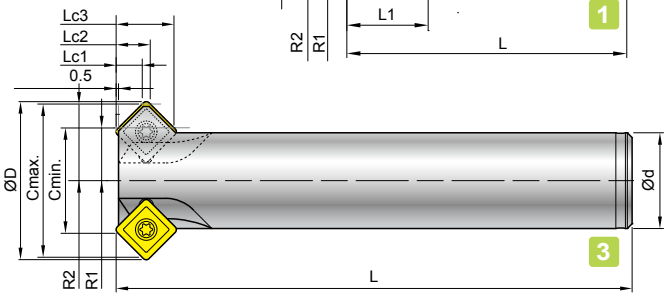
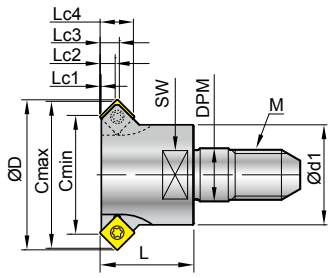


Fig	Code	Parts No.	Type	Cmin ø	Cmax ø	ød	ød1	øD	R1	R2	L	L1	Lc1	Lc2	Lc3	○z	insert Screw / Key
1	701001	00-99616-C10	BC10-C07-60	7	11	10	7.5	12	3.5	5.5	60	15	2.6	2.9	4.6	2	N9GX04T002
	701002	00-99616-C20	BC12-C11-100	11	16	12	9.6	16.15	5.5	8.0	100	25	2.6	2.9	5.0	4	*NS-18037 0.6Nm NK-T6
2	703001	00-99616-C30	BC16-C15-120	15	21	16	14	22	7.5	10.5	120	40	3.5	4.9	7.9	4	N9GX060204
	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	*NS-22055 0.9Nm NK-T7
3	705001	00-99616-C50	BC20-C22-130	22	32	20	--	33	11	16	130	--	5.5	7.1	12.1	4	N9GX090308
2	705002	00-99616-C52	BC25-C22-180	22	32	25	20	33	11	16	180	80	5.5	7.1	12.1	4	NS-30072 2.0Nm NK-T9

*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.



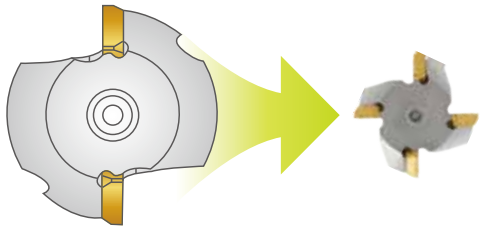
Code	Parts No.	Type	Cmin ø	Cmax ø	øD	M	SW	ød1	DPM	L	Lc1	Lc2	Lc3	Lc4	○z	insert Screw / Key
721101	00-99616-CM16-M05	M05-CM16	11	16	16.15	M5	8	10	5.5	15	0.09	2.59	2.9	5.4	3	N9GX04T002
721201	00-99616-CM20-M06	M06-CM20	15	20	20.15	M6	11	12	6.5	16	0.09	2.59	2.9	5.4	4	*NS-18037 0.6Nm / NK-T6
723301	00-99616-CM23-M08	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	N9GX060204 *NS-22055 0.9Nm / NK-T7

*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



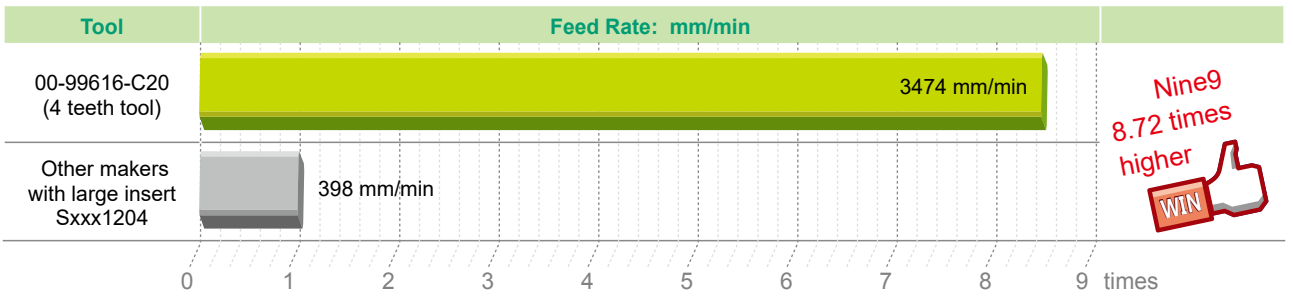
Feed Rate =
Feed per Tooth x Spindle Speed x **No. of Flute** mm/min.

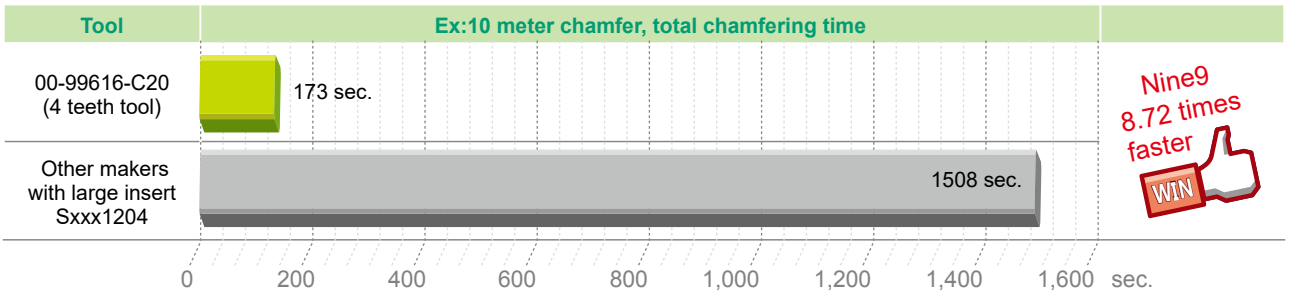
UP **Spindle Speed** = $\frac{\text{Cutting Speed x 1000}}{\pi \text{ x Cmin.}}$

Test Result >> Example 1

• 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 C>0.3%	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	Al, and 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
				N9GX04T002	N9GX060204	N9GX090308	
Material Group		Sample Code (JIS)		Max. Chamfering 1.5mm	Max. Chamering 2.5mm	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 C>0.3%	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	Casting iron	FC25	120-150-180	0.06~0.10	0.10~0.15	0.10~0.20	NC2032
N	Al, and non-ferrous metal	A6061	200-400-600	0.06~0.15	0.10~0.25	0.10~0.25	NC9071
H	Hardened steel<50 HRC	SKD61	80-90-100	0.06~0.10	0.06~0.12	0.10~0.15	NC2032

ERgo Monoblock System

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.
Internal coolant, pre-balanced.

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.

- **Ergo provide customized tooling service.**

a Ergo Holder (Integrated ER taper)

b Ergo Nut

c High Strength Ergo Pin

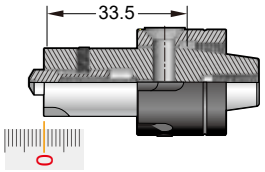
Patented

Quick Change

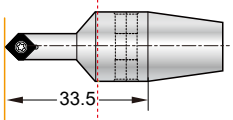
2 Ergo

OAL:33.5mm group

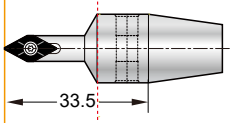
Tool Length Setter



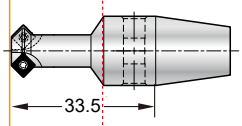
Multi-Functional Tool



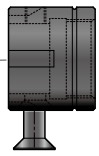
Engraving & Deburring



Chamfer Mill

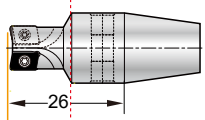


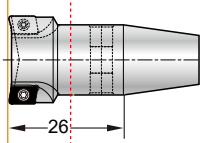
M19 Nut

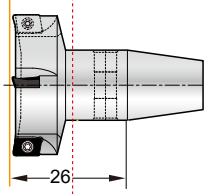


OAL:26mm group

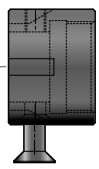
Power Mill
Ø10 ~ Ø32mm





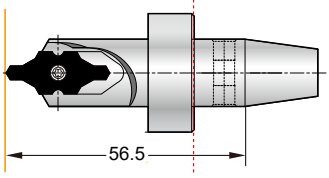


M22 Nut



OAL:56.5mm

i-Center



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.

ER16 i-Center

Internal coolant

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

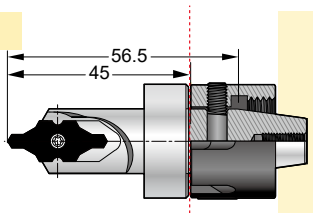
Centering
DIN 332 R
DIN 332 A+B

Spotting & Csink
60°, 90° & 120°

I9MT1003

R / A+B
Ø1.0~Ø3.15

60° 90° 120°



ER16 X060

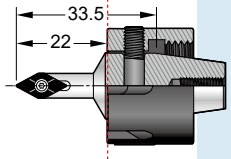
G4.0 20,000 r.p.m.

Spotting/Engraving
30° ~ 142°

Deburring
60° & 90°

X060

30° 45° 60° 90° 120° 142° 60° 90°



ER16 Multi-Functional Tool

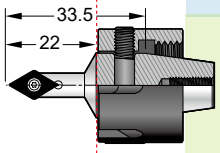
G6.3 10,000 r.p.m.

Spotting

Chamfering

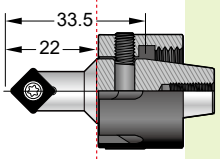
V060

60°



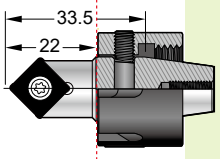
N9MT0802

90°



N9MT11T3

90°



ER16 Chamfer Mill

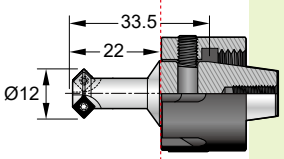
G6.3 10,000 r.p.m.

Front & Back Chamfering

Face Milling

N9GX04T002

45°



ER11 / ER16 / ER20 Power Mill

Internal coolant

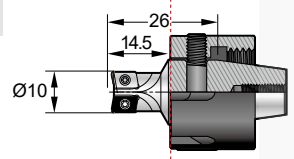
G6.3 10,000 r.p.m.

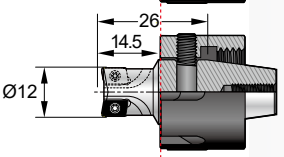
Ø10 ~ Ø32

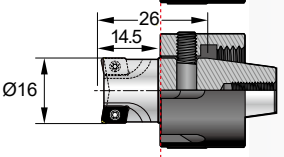
Smaller, sharper
and more effective teeth.

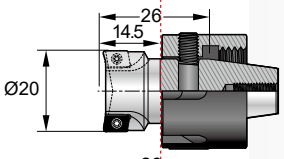
A9GT0602

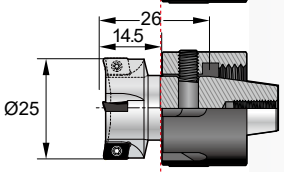
Re 0.1
Re 0.2
&
Re 0.5

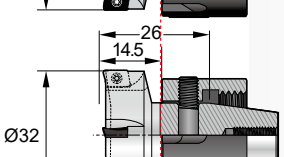






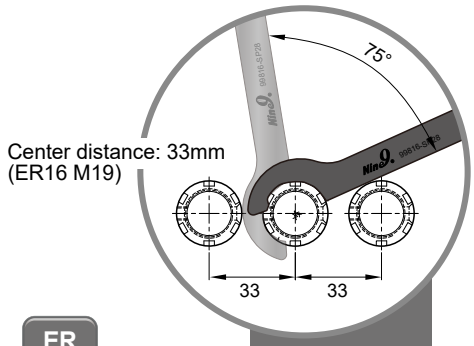






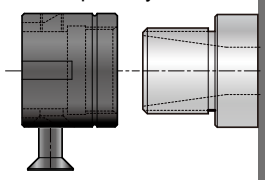
Ergo
Monoblock System

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	

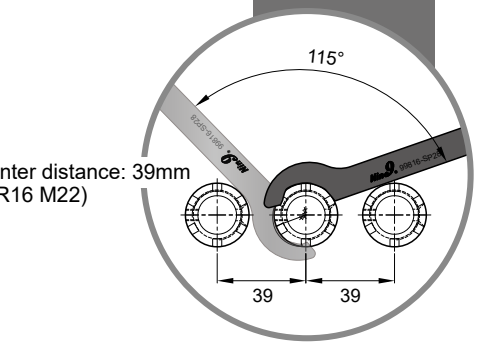


ER 11
ER 16
ER 20

Pin & Nut
are sold separately.

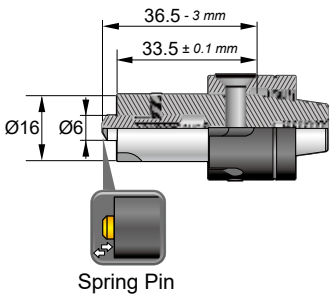


Pre-Balanced



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.

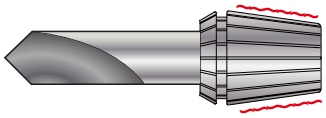


Ergo Setter TP
99816-TP

Ergo's Features

Optimize the rigidity >>

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

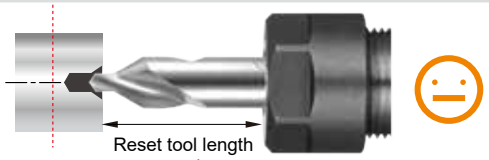
Ergo Integrated design	Cutting tool + Spring collet
	
• Improve tool concentricity • Increase rigidity	• When tightening ER nut, be cautious of uneven tightening situation. • Chips, rust, or collet deform.

Excellent repeatability, saving set-up time >>

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

Ergo indexable cutter

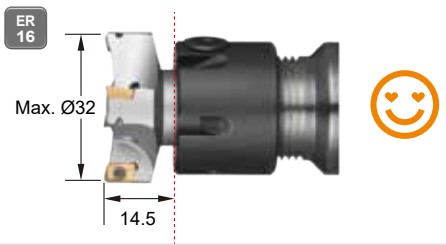
Solid carbide center drill



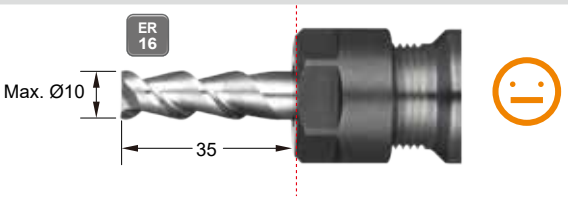
Dimension is not limited by the ER16 collet clamping range >>

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

Ergo indexable cutter



Solid carbide end mill



Easy and simple assembly >>

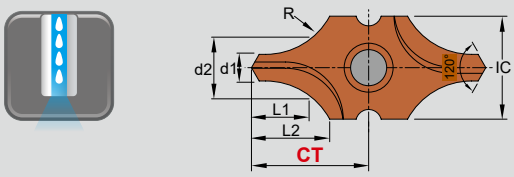
- A simple Ergo cutter has minimal assemble parts, changing tool takes just few seconds.
- Thanks to ER taper, the repeatability of assemble tolerance is ±0.1mm while changing same tool length of Ergo holder.

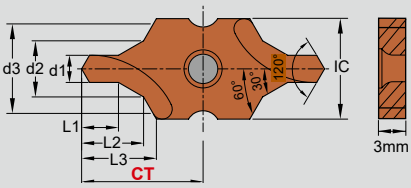
Ergo cutter	Solid carbide cutter
	
• Saving 50% your time	• Must clean ER collet and check tool shank condition EVERY TIME!

i-Center Indexable Center Drill

ER 16

IC 10





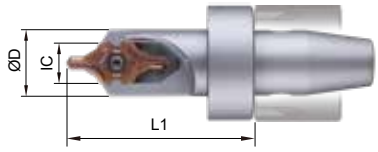
For DIN332 Form R Center Hole >>

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

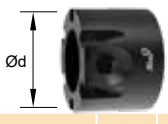
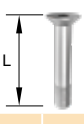
IC	Code	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	CT ±0.025
10	031000	I9MT1003B0100-NC2057	AL(L)	P35	1.00	+ 0.14 0	2.12	3.15	1.3	2.21	2.51	12.35
	031001	I9MT1003B0125-NC2057			1.25		2.65	4.00	1.6	2.75	3.14	
	031002	I9MT1003B0150-NC2057			1.50		3.18	4.50	2.0	3.45	3.84	
	031003	I9MT1003B0160-NC2057			1.60		3.35	5.00	2.0	3.46	3.93	
	031004	I9MT1003B0200-NC2057			2.00		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.

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

*Torque screwdriver is recommended.

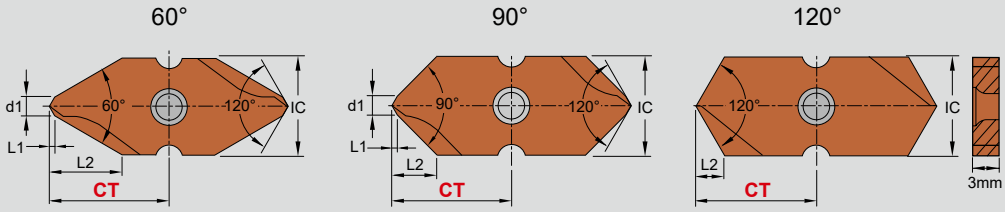
Accessory >>

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

i-Center Spotting & Countersink

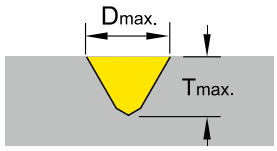
ER 16

IC 10



Insert >>

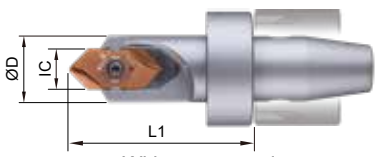
- Double-edged cutting, fully ground insert for improving machining stability.
- NC2057: Universal grade for all kind of steel.
- Each insert has 2 cutting edges.



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

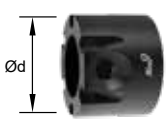
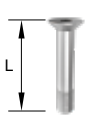
Basic Holder >>

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

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

*Torque screwdriver is recommended.

Accessory >>

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

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 >>

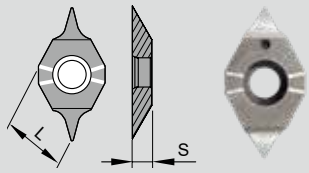
Workpiece Material		Vc (m/min.)		d1 (Pilot Diameter) Ø1	Ø1.25	Ø1.50	Ø1.60	Ø2.0	Ø2.50	Ø3.0	Ø3.15		
P	Carbon steel C<0.3%	< 80	S r.p.m.	2000 ~ 10000	2000 ~ 10000	1800 ~ 9000	1600 ~ 8000	1600 ~ 8000	1400 ~ 7000	1300 ~ 6500	1200 ~ 6000	●	○
			f mm/rev.	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.05	0.02 ~ 0.05	0.02 ~ 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 C>0.3%	< 60	S r.p.m.	1000 ~ 6000	1000 ~ 6000	900 ~ 5500	800 ~ 4800	800 ~ 4800	700 ~ 4200	600 ~ 4000	600 ~ 3600	●	○
			f mm/rev.	0.01 ~ 0.02	0.01 ~ 0.02	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.04	0.02 ~ 0.06	0.02 ~ 0.08	0.03 ~ 0.08		
M	Stainless steel	< 20	S r.p.m.	1000 ~ 3000	1000 ~ 3000	900 ~ 2700	800 ~ 2400	800 ~ 2400	700 ~ 2100	600 ~ 2000	600 ~ 1800	● ≥ 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	Al, and non-ferrous metal	< 200	S r.p.m.	6000 ~ 20000	6000 ~ 20000	5000 ~ 18000	4800 ~ 16000	4800 ~ 16000	4200 ~ 14000	4000 ~ 13000	3600 ~ 12000	●	○
			f mm/rev.	0.01 ~ 0.03	0.01 ~ 0.03	0.01 ~ 0.04	0.01 ~ 0.04	0.01 ~ 0.04	0.02 ~ 0.05	0.02 ~ 0.05	0.02 ~ 0.06		

●Best ○Possible

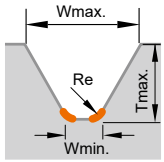
Spotting & Countersink >>

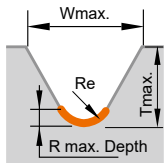
Workpiece Material		Spotting Vc (m/min)	Spotting f (mm/rev.) 60°	Spotting f (mm/rev.) 90°	Spotting f (mm/rev.) 120°	Countersink Vc (m/min)	Countersink f (mm/rev.)
P	Carbon steel C<0.3%	120 ~ 250	0.08 ~ 0.20	0.15 ~ 0.25	0.10 ~ 0.30	120 ~ 250	0.20 ~ 0.50
	Carbon steel C>0.3%	100 ~ 220	0.08 ~ 0.20	0.10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

X060 Micro Spotting & Engraving



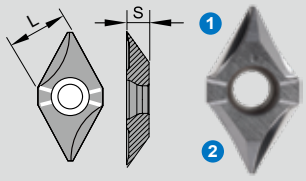
Engraving & Spotting >>

Angle	Code	Parts No.	Coating	Grade	Radius Angled Form	L	S	Re	Wmin.	Wmax.	Tmax.	P	M	N
30°	01X0140	X060A30W020R NC2032	TiAlN	K20F		6	2.05	0.04	0.20	0.74	0.6	●	●	
	01X0142	XP9001	Polished											●
45°	01X0021	X060A45W020R NC2032	TiAlN	K20F		6	2.05	0.04	0.20	1.03	0.8	●	●	
	01X0154	XP9001	Polished											●
60°	01X0063	X060A60W020R NC2032	TiAlN	K20F		6	2.05	0.04	0.20	1.36	1.0	●	●	
	01X0166	XP9001	Polished											●
90°	01X0082	X060A90W010R NC2032	TiAlN	K20F		6	2.05	0.02	0.10	1.10	0.5	●	●	
	01X0220	XP9001	Polished											●
	01X0207	X060A90W020R NC2032	TiAlN	K20F		6	2.05	0.04	0.20	2.20	1.0	●	●	
	01X0209	XP9001	Polished											●
120°	01X0222	X060A120W010R	NC2032	TiAlN	K20F	6	2.05	0.02	0.10	2.53	0.7	●	●	
142	01X0223	X060A142W010R	NC2032	TiAlN	K20F	6	2.05	0.02	0.10	2.42	0.4	●	●	

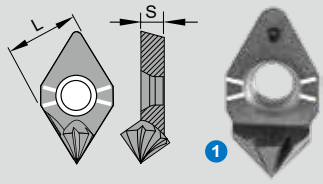
Angle	Code	Parts No.	Coating	Grade	Radius Form	L	S	Re	R max. Depth	Wmax.	Tmax.	P	M	N
30°	01X0119	X060A30R020 NC2032	TiAlN	K20F		6	2.05	0.2	0.15	0.84	0.6	●	●	
	01X0134	XP9001	Polished											●
45°	01X0013	X060A45R020 NC2032	TiAlN	K20F		6	2.05	0.2	0.12	1.1	0.8	●	●	
	01X0150	XP9001	Polished											●
60°	01X0117	X060A60R020 NC2032	TiAlN	K20F		6	2.05	0.2	0.10	1.39	1.0	●	●	
	01X0159	XP9001	Polished											●

X060 Deburring

ER 16

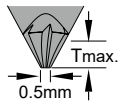
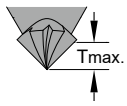


3 flutes,
2 cutting edges



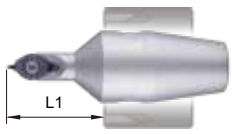
6 flutes,
single cutting edge

Deburring >>

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

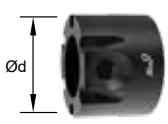
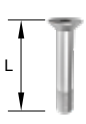
Basic Holder >>

- 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.

Accessory >>

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

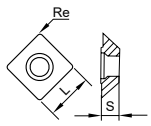
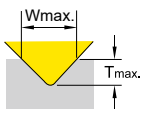
Cutting Data >>

- For Engraving and Spotting cutting data, please refer to page 1-70~71.
  For Deburring, please refer to page 1-75.

Multi-Functional Tool Spotting & Chamfering

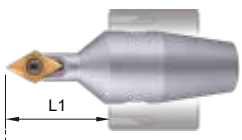
Inserts >>

●Best ◎Suit ○Possible

Angle	Code	Parts No.	Coating	Grade		L	S	Re	Dmax.	Tmax.	P	M	N
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			8.31	2.38	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		11.11	3.97	0.3				●	◎

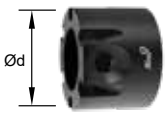
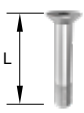
Basic Holder >>

• 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.

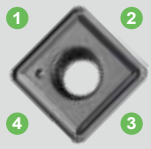
Accessory >>

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

Cutting Data >>

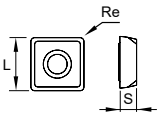
please refer to page 1-73 for 60° insert, page 1-41 for 90° insert.

45° Chamfer Mill



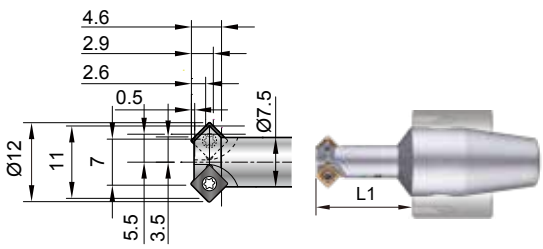
Inserts >>

●Best ◎Suit ○Possible

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

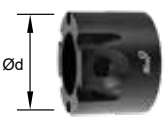
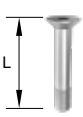
Basic Holder >>

- 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.

Accessory >>

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

Cutting Data >> please refer to page 1-85.

Power Mill

ER 11 | ER 16 | ER 20

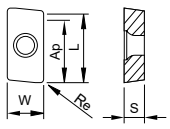

H type


U type

Inserts >>

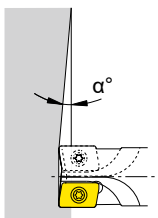
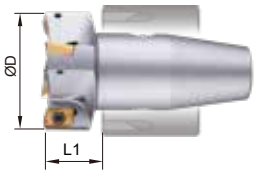
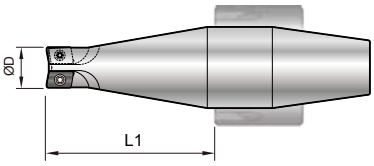
NEW • U type insert is fully ground for reducing the cutting resistance during the cutting, best choice for long shank cutter.

●Best ◎Suit ○Possible

Code	Parts No.		Coating	Grade	Insert	Re	Ap	L	W	S	P	M	N
05A122	A9GT060201H	NC2033	TiAlN	K20F		0.1	5	6.5	4	2.45	●	●	
05A123		NC9031	TiN								◎	◎	●
05A132	A9GT060202H	NC2033	TiAlN	K20F		0.2	5	6.5	4	2.45	●	●	
05A133		NC9031	TiN								◎	◎	●
05A102	A9GT060205H	NC2033	TiAlN	K20F		0.5	5	6.5	4	2.45	●	●	
05A103		NC9031	TiN								◎	◎	●
05A142	A9GT060201U	NC2032	TiAlN	K20F		0.1	5	6.5	4	2.45	●		◎
05A143	A9GT060202U	NC2032	TiAlN	K20F		0.2	5	6.5	4	2.45	●		◎
05A144	A9GT060205U	NC2032	TiAlN	K20F		0.3	5	6.5	4	2.45	●		◎

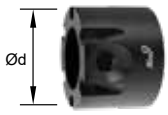
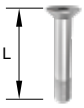
Basic Holder >>

- G6.3 / 10,000 r.p.m.
- Customized cutter is available on request. Please refer to page 2-103.

ER Taper	Code	Parts No.	ØD	Basic Holder	L1	No. of teeth	α°	Screw / Key
NEW 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	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	
NEW 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	
NEW ER16	16-51A101	00-99816-10A06-32L	10		32	2	5	
	16-51A102	00-99816-10A06-40L	10		40	2	5	
NEW ER20	20-51A101	00-99820-10A06-40L	10		40	2	5	
	20-51A124	00-99820-12A06-40L	12		40	2	4	

*Torque screwdriver is recommended.

Accessory >>

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

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 C > 0.3%	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	NC2033
N	Al, and non-ferrous metal (Cu)	200 ~ 500	0.02 ~ 0.07	2.0	4.0	2	NC9031 NC2032

Performance >>

Ergo power mill Ø10 	Indexable milling cutter Ø10 	Carbide end mill Ø10 

Result - Surface Quality

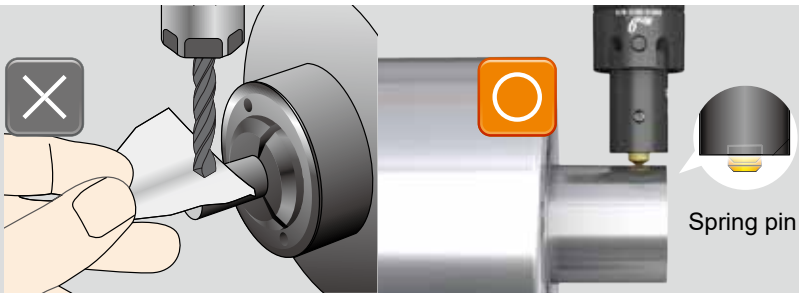
VB=0.04 mm No chipping	VB=0.04 mm Partial chipping	VB=0.20 mm Extensive chipping

Measure VB value (tool wearing) and chipping condition

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

Ergo Setter TP

ER 16



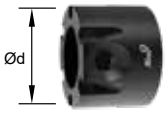
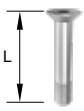
Quick and simple tool length setting >>

Tool length setter >>

- 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)

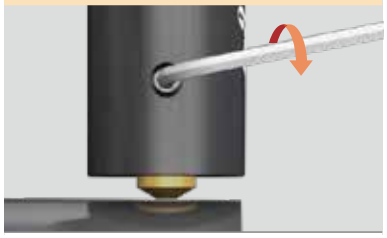
Accessory >>

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

Setting process >>

• Step-1

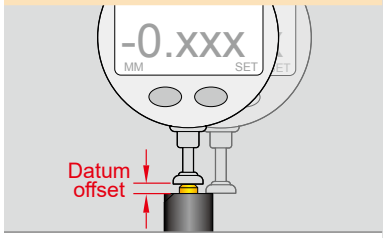
Set Temporary Position



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

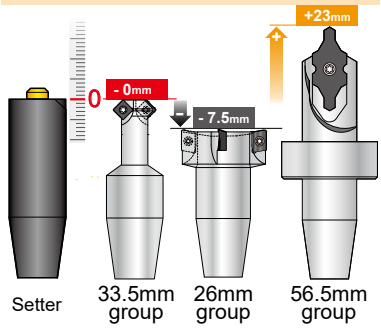
Get The Datum Position



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

• Step-3

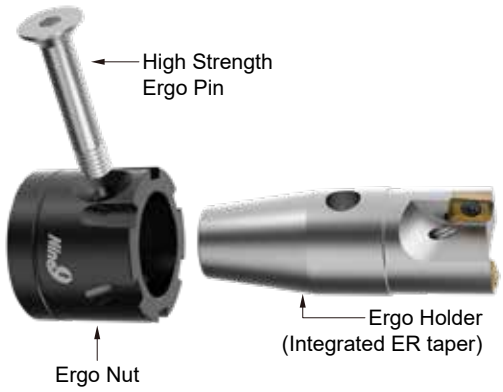
Input Tool Length Offset



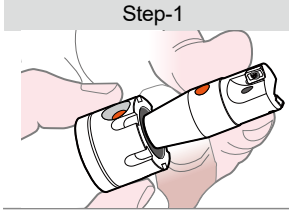
3-1: Choose an Ergo tool to install, and input the offset value to CNC controller directly.

Assembly Steps

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

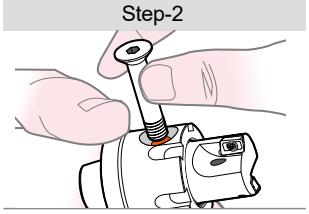


Step-1



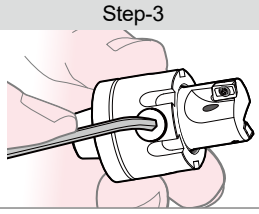
Place Ergo holder into Ergo nut and align to screw hole.

Step-2



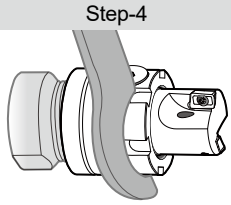
Put Ergo pin into screw hole.

Step-3



Lock Ergo pin screw.

Step-4



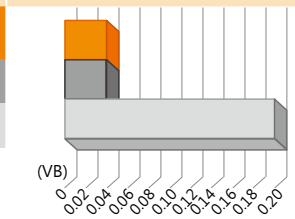
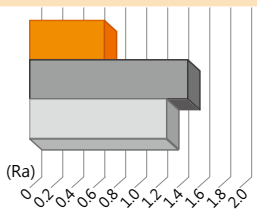
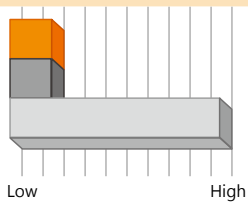
Tighten into ER holder or driven tool spindle.

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	

Enquiry Form

Company >>

Challenge or improvement >>

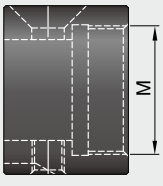
• The following information should be checked while discussing with customer.

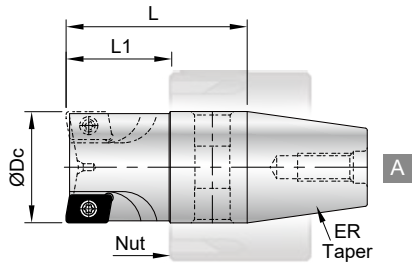
Machine		Current tool	
Machine Type		Cutting Speed	☐ HSS ☐ Solid Carbide
Spindle Speed	Max. r.p.m.		m/min. SFM
Power of Spindle motor	☐ KW ☐ HP	Others	
Coolant supply	☐ NO ☐ If yes, ☐ External ☐ Internal bar(psi)	Feed Rate	mm/rev. inch/rev.
Workpiece Material			

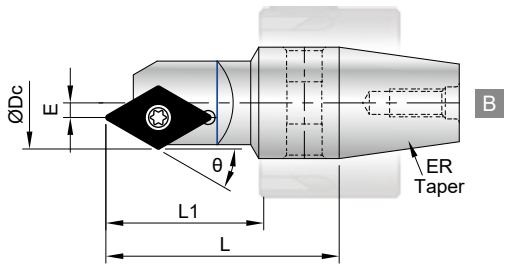
ER Taper-shank dimensions >>

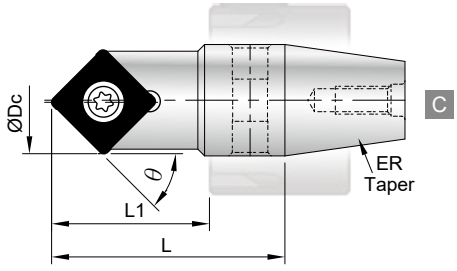
• MOQ: 2 pcs / Lead Time: 10 ~ 12 Weeks.

Style		
☐ A	☐ B	☐ C

Cutter Dia. : (ØDc)				
L1 : (See chart for Max.)		θ :		E :
Internal Coolant	☐ Yes		☐ No	
ER Nut	☐ N9ER16-M19 ☐ N9ER16-M22 ☐ N9ER20-M24 ☐ N9ER20-M25 ☐ N9ER25-M32			
Nut Specifications 		M		
	☐ ER16	M19xP1.0		
	☐ ER16	M22xP1.5		
	☐ ER20	M24xP1.0		
	☐ ER20	M25xP1.5		
	☐ ER25	M32xP1.5		





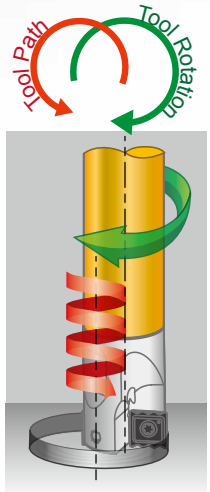


ER Taper Specifications			
ØDc	L1 Max.	L Max.	ER Taper
10 ~ 32	22	34	ER16
	26.5	40	ER20
	30.5	50	ER25

NC Helix Drill

One Tool Performs Multiple Applications

Rough Milling,
Drilling & Slotting



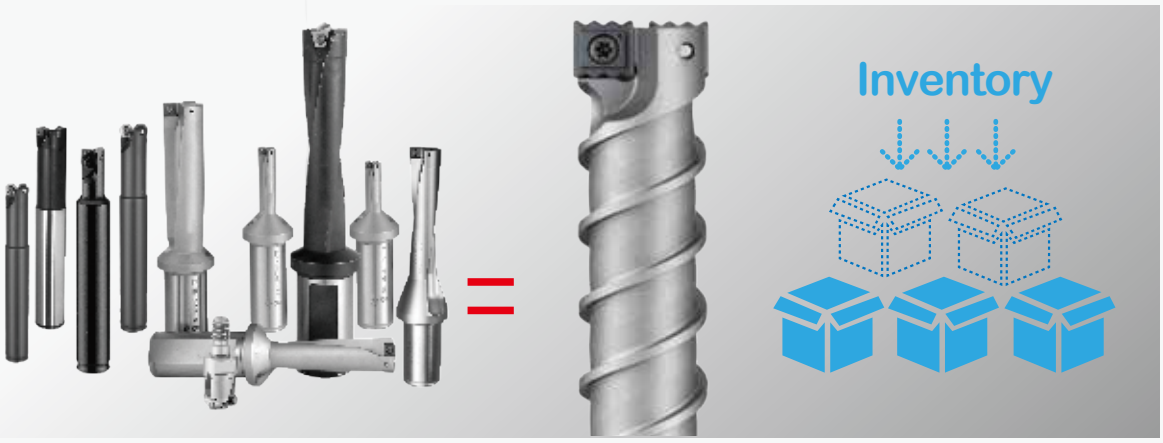
All NC Helix Drill must be programmed by helical interpolation

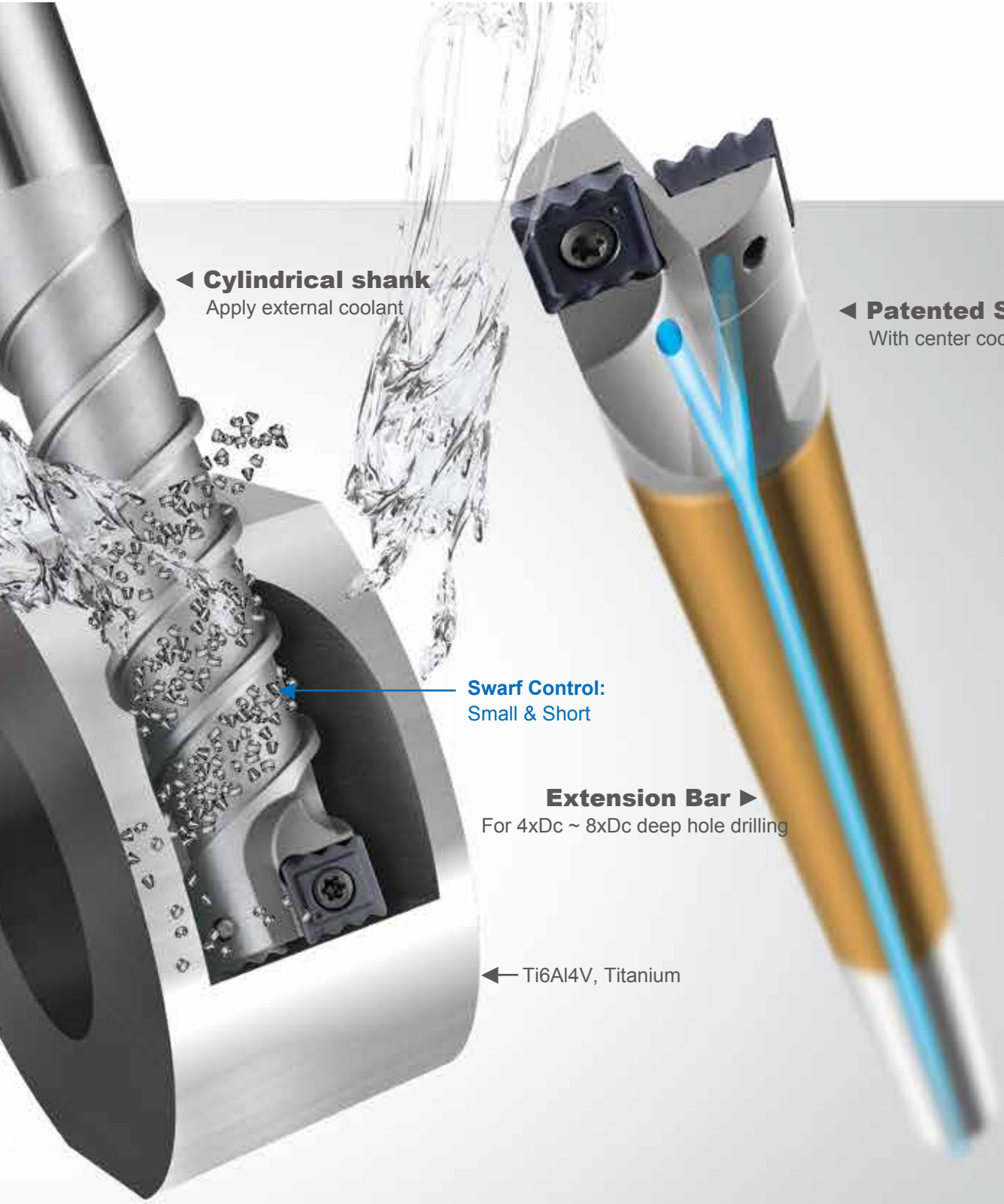
Reduce Your Tool Inventory

Only four tools for making Ø13~Ø65mm hole from solid.

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.

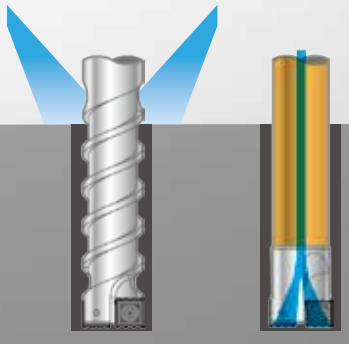
Low Cost! Economy!





20° Ramping Angle

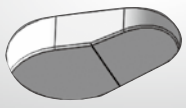
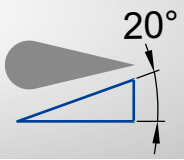
Either linear or circular ramping.



Two types of shank

Drilling depth up to 8xDc

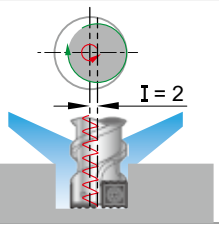
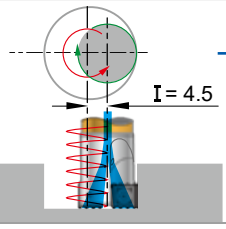
01 Feature
Lower spindle power consumption Easy to cut!

Circular milling	Ramping Angle
	

- 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.

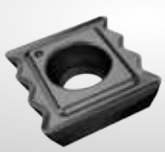
02 Feature
Just four tools for drilling Ø13~Ø65 mm or larger

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.

03 Feature
Special insert geometry - exceptional swarfs control.

Insert	Chip
	

- 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.

“One tool” performs multiple applications

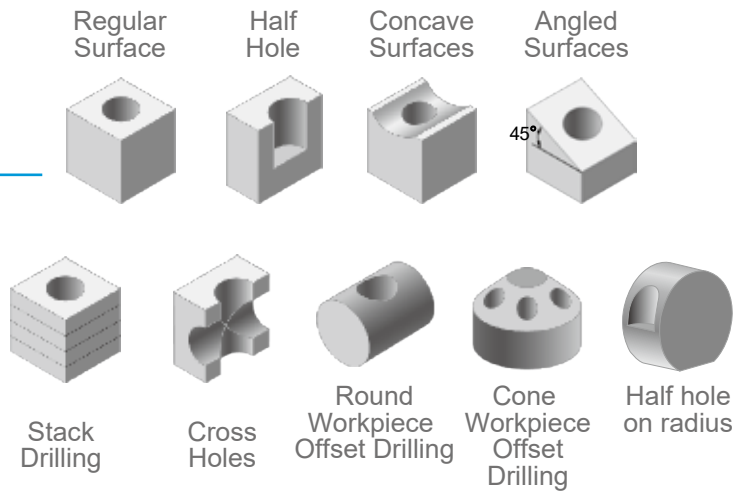
04 Feature

Shape


- Not only a drill, but an end mill too.
- Small radius path to cut a hole or step hole, various curved cavity shapes on different materials, reduce tool number and cutting time.

Functions in variable conditions It’s so easy!

05 Feature



Roughness Measuring

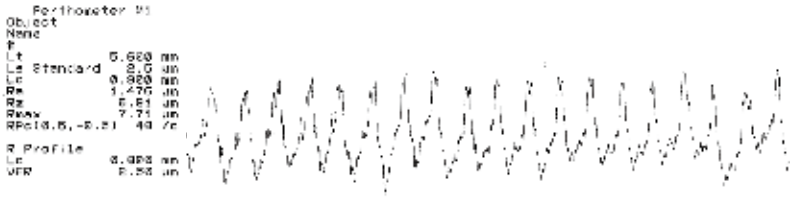
Feature 06

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

Workpiece

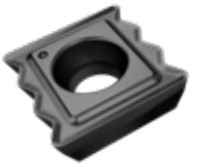

Make “ One more turn” after reached the depth.
Ex :
:
G03 I-1.5 Z-30 P5
G03 I-1.5 <make one more turn >
G01 X0 Y0 < afterward, let tool back to center of hole >

Flatness



3 NC Helix Drill

Insert

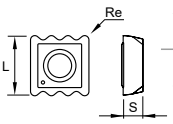


NC5072 : P40, TiAlN coating.
General purpose, suitable for almost all kind of steel, stainless steel and Titanium.
Recommended while clamping devices is unstable or deep hole drilling or apply on low power machines .

NC2032 : K20F, TiAlN coating.
Design for high performance cutting, special good for cast iron and hardened material <HRC50°.

● Best ◎ Suit ○ Possible

	P Steel	M SS	K Cast Iron	N Aluminum	S Titanium	H Hardened
NC5072	●	●	◎	◎	◎	○
NC2032	◎	○	●	◎	○	◎

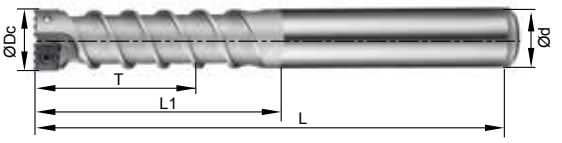
Code	Parts No.		Grade	Coating		Dimensions L	S	Re	Screw	Key
041021	01-N9MX04T002	NC5072	P40	TiAlN		4.75	1.8	0.2	*NS-18037 0.6Nm	NK-T6
041001		NC2032	K20F							
042021	01-N9MX05T103	NC5072	P40	TiAlN		5.75	2.0	0.3	*NS-20045 0.6Nm	NK-T6
042001		NC2032	K20F							
043021	01-N9MX070204	NC5072	P40	TiAlN		7.5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

*Torque screwdriver is recommended.

Holder

Cylindrical Shank >>

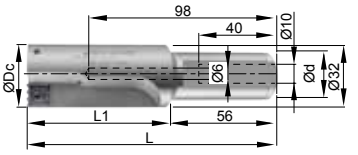
- Made from hardened high alloy steel 48 HRC.
- Unique helical groove design generates chip-removing coolant stream.
- Designed for CNC machine with external coolant.



Code	Parts No.	Type	Capable of drill dia. mm Dmin.	Dmax.	ØDc	T	L1	L	Ød	Insert type	Max. ramping angle
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 48 HRC.
- With internal coolant
- Special size is available on request.

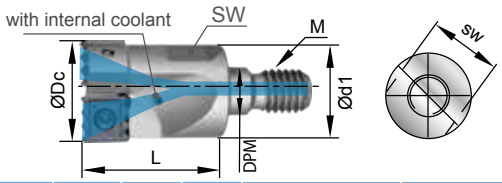


Code	Parts No.	Type	Capable of drill dia. mm Dmin.	Dmax.	ØDc	L	L1	Ød	Max. Depth	Insert type	Max. ramping angle
405002	00-99321-025-4265	SL25-HD33-4265	**42**	**65**	33	130	74	25	50	N9MX12T308	9°

Screw Fit Cutter >>

* Use open ended spanner to tighten the cutter.

- Made from hardened high alloy steel 42 HRC.
- 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.



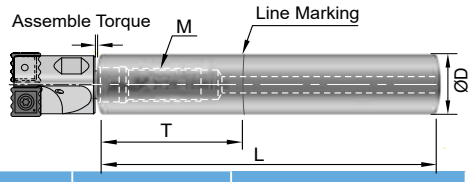
Code	Part No.	Type	Capable of drill dia. mm		ØDc	L	M	DPM	Ød1	SW	Insert type	Max. ramping angle
			Dmin.	Dmax.								
421001	00-99323-010-1320	M05-HD11-1320	**13**	**20**	11	20	M5	5.5	10	8	N9MX04T002	20°
422001	00-99323-012-1525	M06-HD13-1525	**15**	**25**	13	25	M6	6.5	12	10	N9MX05T103	20°
423001	00-99323-016-2030	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 >>

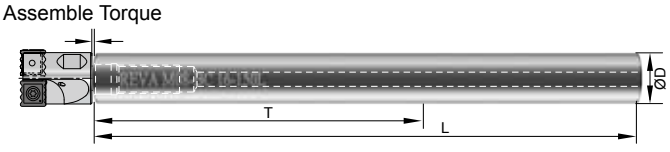
- T is the maximum overhang length.
- With internal coolant hole.



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 (REVA) >>

- T is the maximum overhang length.
- With internal coolant hole.
- Carbide extension bar with longer tool length is available on request.



Parts No.	Type	ØD	T	L	M	Assembled Torque
0-398010-100M05	M05-BC10-100L	10	60	100	M5xP0.8	6.5 Nm
0-398012-100M06	M06-BC12-100L	12	60	100	M6xP1.0	11.0 Nm
0-398016-150M08	M08-BC16-150L	16	80	150	M8xP1.25	25.0 Nm
0-398020-200M10	M10-BC20-200L	20	100	200	M10xP1.5	50.0 Nm
0-398025-200M12	M12-BC25-200L	25	125	200	M12xP1.75	60.0 Nm

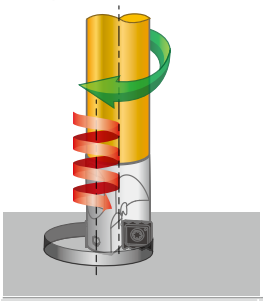
** Nine9 TiN coated extension bar is also available please refer to page 7-159.

Technical Guide

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

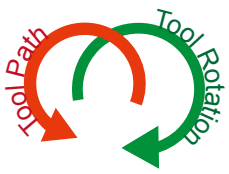
1 Programming

All NC Helix Drills must be programmed using helical interpolation



2 Recommend of Direction

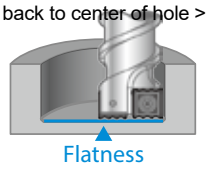
Tool path of moving downward by CCW (G03) ,Tool Rotation by CW direction is recommended.



3 Flatness on blind hole bottom

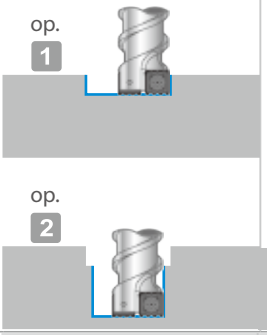
Make one more turn after reaching depth.
Ex. :

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



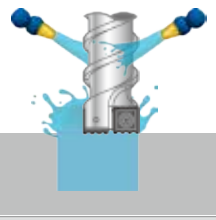
4 Step Hole

From solid is more safe and reduce the cutting time.



5 External coolant

Lower pressure higher volume is recommended.
Minimum 5 bar.
Aim nozzle toward the tool body, let the coolant effectively enter the hole.



6

For Start

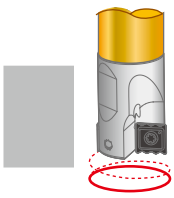
Vc	fz	Pitch (By Spindle Power)

Result adjusting

Upgrade	Improve
P adj. 1	fz adj. 1
Vc adj. 2	P adj. 2
fz adj. 3	

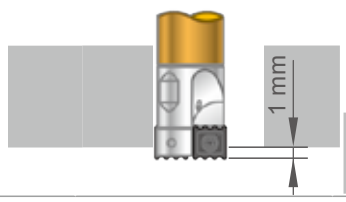
7 Through hole

To avoid insert breakage due to the force from circular interpolation, reduce Vc 50% at last cycle.



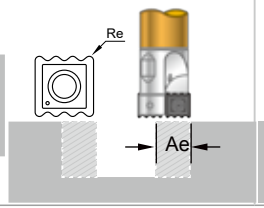
8 Through hole Add 1mm to the required depth (Z)

To make sure there is no material left in the hole.



9 Enlarge Hole

Choosing a 99323 drill body with internal coolant. Max. Ae=Dc- (Rex2) for enlarging hole.

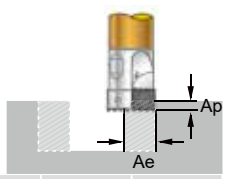


10 Internal coolant

High pressure is recommended.
Minimum 10 bar.
Recommended for 3xDc ~8xDc Use.

※ Choosing a suitable drill body.

- Required hole diameter is within the recommended range (**blue numbers**).
- Required hole diameters (more than one size), choose the drill can cover more different hole diameters.
- For 3xDc~8xDc drilling, 99323 series is recommended.

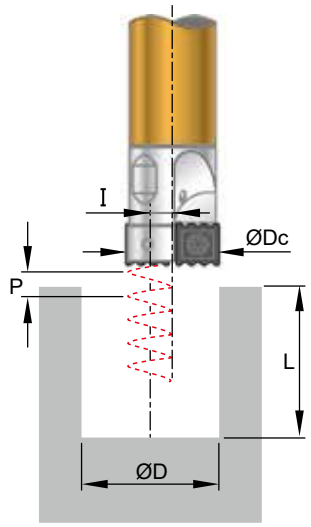


Drilling diameter	Coolant type	Max. drilling depth	Tool type	Dc	Insert type	Re	Min. Ae	Max. Ae	Max. Ap
13-15-20	Internal	80 mm	00-99323-010-1320	11	N9MX04T002	0.2	1.58	10.6	3.5
	External	30 mm	00-99321-010-1320	11					
15-20-25	Internal	85 mm	00-99323-012-1525	13	N9MX05T103	0.3	1.92	12.4	4.3
	External	36 mm	00-99321-012-1525	13					
20-25-30	Internal	105 mm	00-99323-016-2030	17	N9MX070204	0.4	2.5	16.2	5.6
	External	50 mm	00-99321-016-2030	17					
25-30-40	Internal	130 mm	00-99323-020-2540	22	N9MX100306	0.6	3.3	20.8	7.5
	External	60 mm	00-99321-020-2540	22					
30-40-50	Internal	160 mm	00-99323-025-3050	27	N9MX12T308	0.8	4.17	25.4	9
	External	75 mm	00-99321-025-3050	27					
42-50-65	Internal	50 mm	00-99321-025-4265	33	N9MX12T308	0.8	4.17	31.4	9

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

※ The NC Helix Drill is programmed using "Helical interpolation" on CNC machine, CNC controller must have 3-axis simultaneously motion function.

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

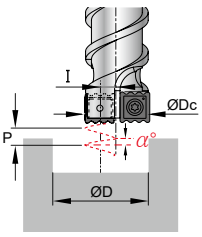
Dc	=	Dia. of drill	mm
D	=	Dia. of hole	mm
L	=	Depth of drilling	mm
Vc	=	Cutting speed	m/min.
S	=	Spindle speed	r.p.m.
I	=	Circular radius	mm
fz	=	Feed rate	mm/tooth
F	=	Table feed rate	mm/min.
d	=	Circular diameter (D-Dc)	mm
P	=	Pitch of helical interpolation	mm
T	=	Cutting time	sec.
Q	=	Chip removal volume rate	cm³ / min.
Z	=	Insert tooth	

Actual Feed Rate (fcut)

As different spindle power, you can reference this table, fcut= fz x (PF), then you can get the actual feed rate.

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

Ramping Angle

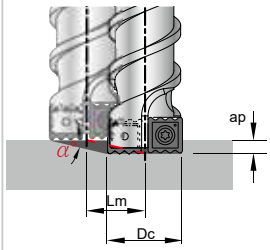


Circular ramping (α)

$$\alpha = \tan^{-1} \frac{P}{(D-Dc) \times \pi} \text{ degree}$$

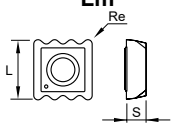
P < 2.2 x Circular radius (I)

α < 20°



Linear ramping (α)

$$\alpha = \tan^{-1} \frac{ap}{Lm} \text{ degree}$$

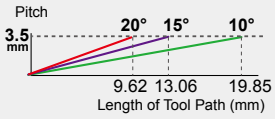


Max. ap < 3/4 of insert length

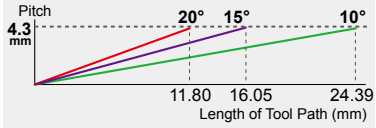
※ **Length of tool path for linear ramping.**

Length of tool path for Circular ramping= (D-Dc) x 3.14

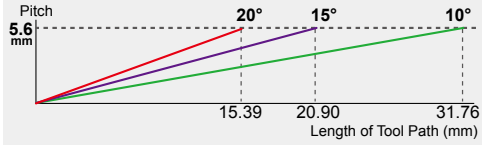
▪ N9MX04T002



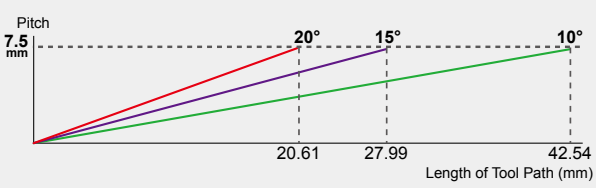
▪ N9MX05T103



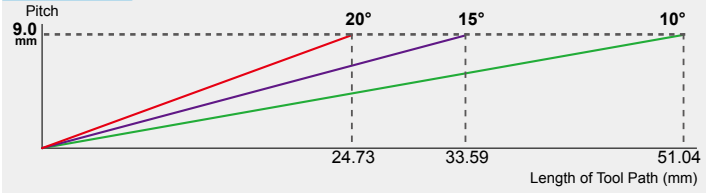
▪ N9MX070204



▪ N9MX100306



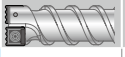
▪ N9MX12T308



Cutting Data

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

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

Workpiece material		Vc m/min.		Ø13				Ø16				Ø20			
		99321 	99323 	fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm		
P	Carbon steel 0.25%C	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
P	Carbon steel 0.45% C	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
P	Carbon steel 0.60%C	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
P	Low alloy steel	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
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
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
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
N	Al	345	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
N	Cu	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
S	Ni- alloy	20	28	0.01	0.50	0.65	0.80	0.015	0.70	0.95	1.20	0.03	0.90	1.30	1.60
S	Titanium	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
H	Hardened	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

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

Workpiece material		Vc m/min.		Ø15				Ø20				Ø25			
		99321 	99323 	fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm			fz mm/tooth	Pitch mm		
P	Carbon steel 0.25%C	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
P	Carbon steel 0.45% C	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
P	Carbon steel 0.60%C	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
P	Low alloy steel	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
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
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
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
N	Al	345	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
N	Cu	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
S	Ni- alloy	20	28	0.0125	1.00	1.30	1.60	0.0225	1.20	1.60	2.00	0.03	1.40	1.90	2.40
S	Titanium	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
H	Hardened	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

Cutting Data

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

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

	Workpiece material	Vc m/min. 99321	Vc m/min. 99323	Ø20 fz mm/tooth	Ø20 Pitch mm			Ø25 fz mm/tooth	Ø25 Pitch mm			Ø30 fz mm/tooth	Ø30 Pitch mm		
P	Carbon steel 0.25%C	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
P	Carbon steel 0.45% C	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
P	Carbon steel 0.60%C	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
P	Low alloy steel	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
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
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
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
N	Al	345	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
N	Cu	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
S	Ni- alloy	20	28	0.015	1.40	1.90	2.40	0.03	1.60	2.20	2.80	0.04	1.90	2.55	3.20
S	Titanium	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
H	Hardened	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

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

	Workpiece material	Vc m/min. 99321	Vc m/min. 99323	Ø25 fz mm/tooth	Ø25 Pitch mm			Ø32 fz mm/tooth	Ø32 Pitch mm			Ø40 fz mm/tooth	Ø40 Pitch mm		
P	Carbon steel 0.25%C	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
P	Carbon steel 0.45% C	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
P	Carbon steel 0.60%C	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
P	Low alloy steel	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
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
M	Stainless steel	80	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
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
N	Al	345	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
N	Cu	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
S	Ni- alloy	40	50	0.02	1.40	1.90	2.40	0.035	1.90	2.55	3.20	0.045	2.40	3.20	4.00
S	Titanium	80	90	0.02	1.40	1.90	2.40	0.035	1.90	2.55	3.20	0.045	2.40	3.20	4.00
H	Hardened	80	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

Cutting Data

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

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

	Workpiece material	Vc m/min. 99321	Vc m/min. 99323	Ø30 fz mm/tooth	Ø30 Pitch mm			Ø40 fz mm/tooth	Ø40 Pitch mm			Ø50 fz mm/tooth	Ø50 Pitch mm		
P	Carbon steel 0.25%C	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
P	Carbon steel 0.45% C	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
P	Carbon steel 0.60%C	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
P	Low alloy steel	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
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
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
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
N	Al	345	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
N	Cu	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
S	Ni- alloy	20	28	0.02	1.90	2.55	3.20	0.045	2.40	3.20	4.00	0.055	2.90	3.85	4.80
S	Titanium	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
H	Hardened	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

00-99321-025-4265 >>

	Workpiece material	Vc m/min. 99321	Ø42 fz mm/tooth	Ø42 Pitch mm			Ø55 fz mm/tooth	Ø55 Pitch mm			Ø65 fz mm/tooth	Ø65 Pitch mm		
P	Carbon steel 0.25%C	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
P	Carbon steel 0.45% C	150	0.08	3.00	3.60	4.40	0.12	3.30	4.40	5.50	0.135	3.60	4.80	6.00
P	Carbon steel 0.60%C	130	0.075	2.70	3.60	4.40	0.11	3.00	4.00	5.00	0.12	3.20	4.30	5.40
P	Low alloy steel	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
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
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
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
N	Al	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
N	Cu	200	0.08	3.60	4.00	4.40	0.12	4.00	5.30	6.60	0.135	4.30	5.75	7.20
S	Ni- alloy	28	0.03	2.40	3.20	4.00	0.045	2.60	3.50	4.40	0.055	2.90	3.85	4.80
S	Titanium	90	0.03	2.40	3.20	4.00	0.045	2.60	3.50	4.40	0.055	2.90	3.85	4.80
H	Hardened	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

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.

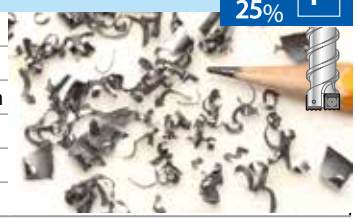
Example 1

SAE8620 | SUS304 | C1100 | AL6061T6 | TiAl6V4 | Inconel 718

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

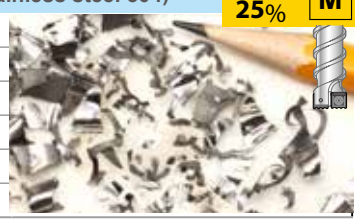
Material: SAE8620 — load 25% P

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.

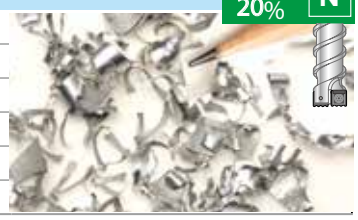


Material: C1100 — load 25% N

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.

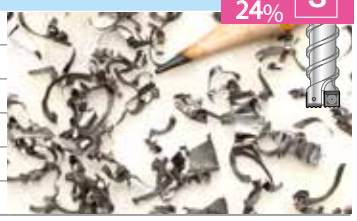
Material: AL6061T6 — load 20% N

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.

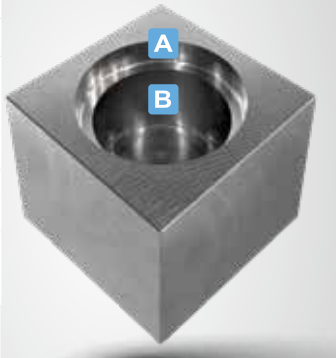
▸Suggested insert grades for best result >>

Example 2

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 >>

Example 3

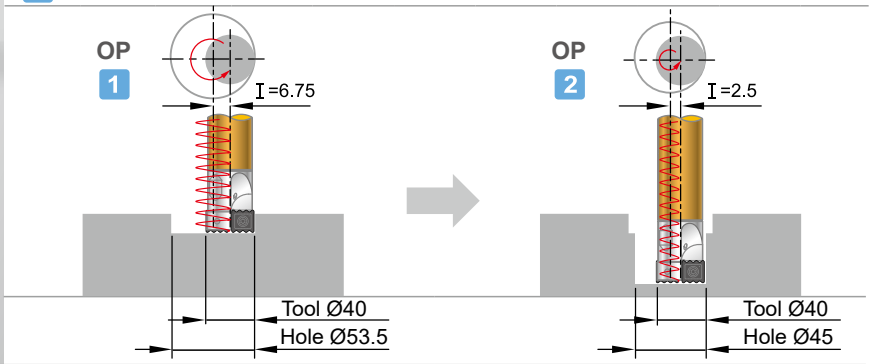


Application

- 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

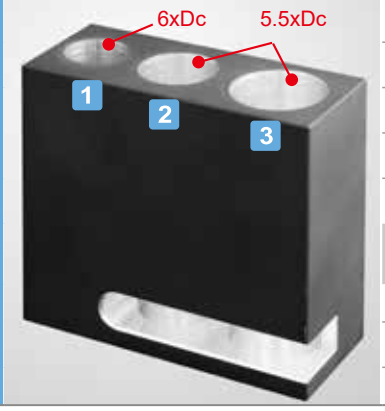
Hole	Dc mm	D mm	L mm	Vc m/min.	S r.p.m.	fz mm/tooth	F mm/min.	l mm	P mm	T sec.
A	Ø40	Ø53.5	10	300	2400	0.08	380	6.75	5.0	13.3
B		Ø45.0	32	300	2400	0.08	380	2.5	2.0	39.48



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 >>

Example 4



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

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.

Example 5

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.

One tool performs multiple patterns >> (this is only programming example, no refer to cutting parameters)

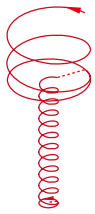
Example 6

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

Tool Path

1



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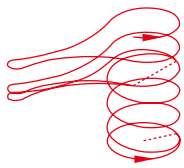

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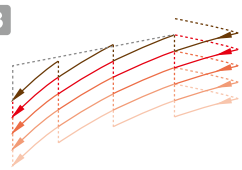


```
%
G40 G80 G69
G28 G91 Z0
G28 G91 X0 Y0
G00 G90
G126
G00 G90 X0. Y0.
G52 X18. Y-20.
G00 G90 X0. Y0.
T5
M06
#1= 6.5 (X1)
#11= -6.5 (X1=-I)
#6= 1.5 (X2)
#7= -1.5 (X2=-I)
#2= 0. (Y)
#3= 2.0 (Z1-1)
#13= -2.0 (Z1-2)
#16= -10.0 (Z1-1)
#17= -12.0 (Z1-2)
#4= 190.0 (F1-1)
#5= 570.0 (F1-2)
#14= 190.0 (F1-1)
#15= 380.0 (F1-2)
#8= 3 (L1=Deepth/P#9)
#9= 4.0 (P1=Z#3-DOWN Pitch)
#18= 7 (L2=Deepth/P#9)
#19= 2.0 (P2=Z#16-DOWN Pitch)
M88
G00 G90 X#1 Y#2
S3800 M03
G43 H05 Z30. (M08)
Z10.
Z5.
G01 Z#3 F#4
M97 P1000 L#8
G03 I#11 F#4
G01 X#6 Y#2 (Holes 2)
M97 P2000 L#18
G03 I#7 F#14
G01 X0. Y0.
G00 G90 Z10. M05
G00 G90 Z20. M89
G00 G90 Z30. M09
G28 G91 Z0. M05
M00
G28 G91 Y0.
M30
N1000
G03 I#11 Z#13 F#5
#13= #13 - #9
M99
N2000
G03 I#7 Z#17 F#15
#17= #17 - #19
M99

%
```

```
%
G40 G80 G69
G28 G91 Z0
G28 G91 X0 Y0
G00 G90
G126
G00 G90 X0. Y0.
G52 X0. Y0.
G00 G90 X0. Y0.
T5
M06
#12= 1.0 (Z-UP)
#13= 0.0 (Z1)
#14= -1.512 (Z2)
#15= -2.608 (Z3)
#16= -2.904 (Z4)
#17= -4.0 (Z5-1) (Z2-1)
#4= 190.0 (F1)
#5= 570.0 (F2)
#7= -6.5 (X2=-I)
#18= -12.0 (Z2-2)
#19= 4.0 (P2=Z#17-DOWN
PITCH)
G00 G90 X25. Y-51.
M88
S3800 M03
G43 H05 Z30. (M08)
Z10.
G01 Z#12 F#4
M97 P1000 L2
G01 X35.757 Y-55.924 F#4
G03 X35.757 Y-46.076 R-6.5
G02 X15.537 Y-49.599 R20.
G03 X15.537 Y-52.401 R-1.5
G02 X35.757 Y-55.924 R20.
G01 X46.5 Y-51.
M97 P2000 L3
G03 I#7 F#4
G01 X40. Y-51.
G00 G90 Z10. M05
G00 G90 Z20. M89
G00 G90 Z30. M09
G28 G91 Z0. M05
M00
G28 G91 Y0.
M30

N1000
G01 X35.757 Y-55.924 Z#13
F#4
G03 X35.757 Y-46.076 R-6.5
Z#14 F#5
G02 X15.537 Y-49.599 R20. Z#15
G03 X15.537 Y-52.401 R-1.5 Z#16
G02 X35.757 Y-55.924 R20. Z#17

#13= #13 - 4.0
#14= #14 - 4.0
#15= #15 - 4.0
#16= #16 - 4.0
#17= #17 - 4.0
M99

N2000
G03 I#7 Z#18 F#5
#18= #18 - #19
M99

%
```

```
%
G40 G80 G69
G28 G91 Z0
G28 G91 X0 Y0
G00 G90
G126
G00 G90 X0. Y0.
G52 X0. Y0.
G00 G90 X0. Y0.
T5
M06
#1= 4.0 (Z up)
#2= 0.0 (Z1)
#3= -4.0 (Z2)
#4= 210.0 (F1)
#5= 420.0 (F2)
#6= 4.0 (Z#13-Pitch)
G00 G90 X92.56 Y-14.507
M88
S2800 M03
G43 H05 Z30. (M08)
Z10.
Z5.
M97 P1000 L5 (Z-Pitch)
G00 G90 Z30. M05
M09
M89
G28 G91 Z0. M05
M00
G28 G91 Y0.
M30

N1000

G00 G90 X92.56 Y-14.507
G01 Z#1 F#4
G02 X108.5 Y-20.416 Z#2 R72.
F#5
G03 X92.56 Y-14.507 Z#3 R72.
F#5
G01 Z#2
G03 X75.679 Y-12.5 Z#3 R72. F#5
G01 Z#2
G03 X58.798 Y-14.507 Z#3 R72.
F#5
G01 Z#2
G03 X42.858 Y-20.416 Z#3 R72.
F#5
G01 Z#2
G00 G90 Z5.
#1= #1 - #6 (Z up)
#2= #2 - #6 (Z1.)
#3= #3 - #6 (Z2.)
M99

%
```

Super Power Drill

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, making deep hole drilling up to 12xD possible.

With patented center pilot insert which aids accurate and steady deep hole drilling. Better finished surface, and possible reduce your boring process.

Deep Hole Drilling

up to 12xD

Indexable drills with carbide center pilot insert

- Better surface finish
- Better straightness
- Better roundness

Application


Heat Exchanger


Semi-finished Product

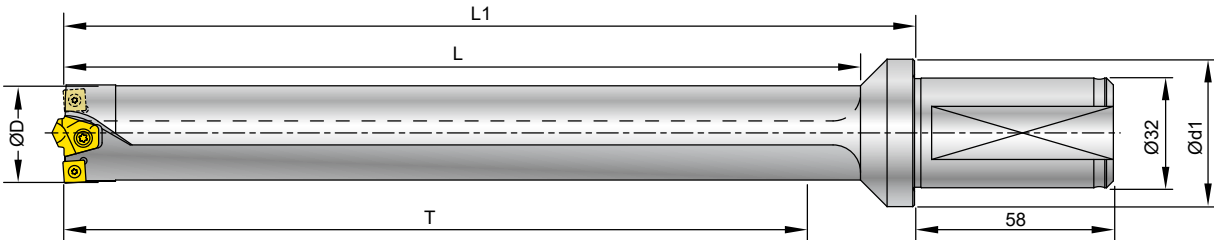

Pressure Vessel


Oil & Gas


Military

Holder

19mm~40mm



Parts No.	ØD mm (inch)	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.

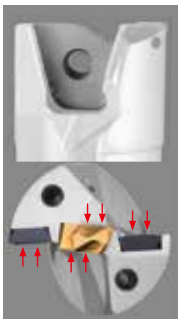
Parts No.	ØD mm (inch)	T	L	L1	Ød1	Insert / Screw / Key	
						Center	Periphery
00-99307-30150	30 (1.181″)	150	182	198	43	99307-CD8 x 1 pc. NS-35120 2.5Nm NK-T15	N9GX060204 x 2 pcs. *NS-22055 / 0.9Nm NK-T7
00-99307-30200		200	232	248			
00-99307-30250		250	282	298			
00-99307-30300		300	332	348			
00-99307-31150	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		
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		N9GX090308 x 2 pcs. NS-30072 / 2.0Nm NK-T9
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

Center Pilot Insert >>

NC2032

NC40

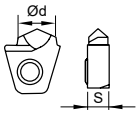


Patented pocket design

- 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.
- High precision fully ground and edge honing to increase tool life and surface finish.
- Patented insert pocket to absorb the cutting forces, supporting the center pilot insert functional while drilling.

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.

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

Periphery Insert >>

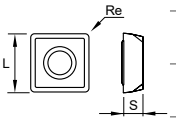
NC2032

NC40

- 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: 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.

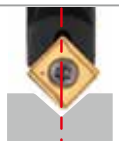
Parts No.		Coating	Grade		Dimensions			Screw	Key
					L	S	re		
N9GX04T002	NC2032	AlTiN	K20F		4.07	1.8	0.2	*NS-18037 0.6Nm	NK-T6
N9GX05T103	NC2032	AlTiN	K20F		5.07	2.0	0.3	*NS-20045 0.6Nm	
N9GX060204	NC2032	AlTiN	K20F		6.35	2.38	0.4	*NS-22062 0.9Nm	NK-T7
N9GX06020431	NC40	TiN	P35		6.35	2.38	0.4		
N9GX090308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

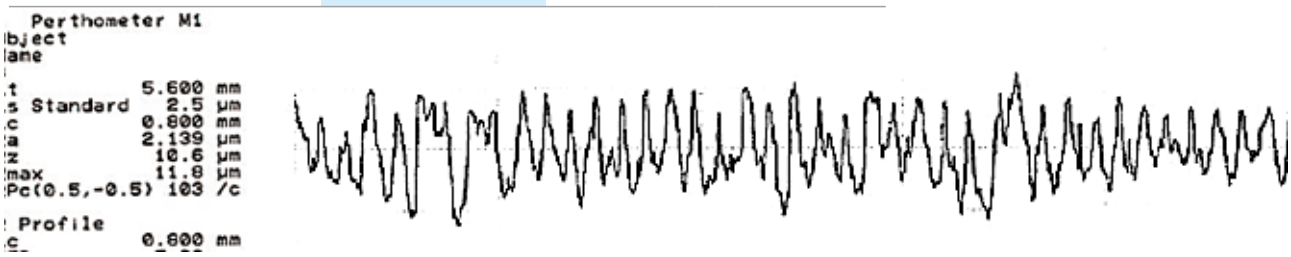
Step 1	Tool: 99616-14-12-02S to make a spot.		Pilot Insert: 99307-CD6 / 99307-CD8 Spotting Diameter: ø5 mm / ø7 mm Spotting Depth: 2.8 mm / 3.8 mm
Step 2	Tool: 99307-20200 to make a 10xD deep hole.		Then the spot hole will guide the pilot insert at the beginning and stablized the drill to get the perfect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

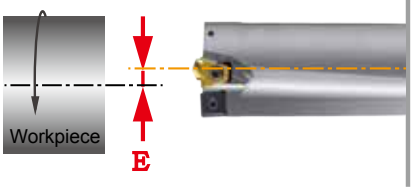
Center Pilot Insert	Material:Carbon steel (S45C)		
99307-CD8-NC40 N9GX060204-NC2032	**Vc**	80	m/min.
	S	880	r.p.m.
	f	0.10	mm/rev.
	F	88.0	mm/min.
	Ra	2.139	μm
	Rmax	11.8	μm



Attention >> Please pay attenation to following conditions before you start.

1 Center misalignment

E must be < 0.05mm.

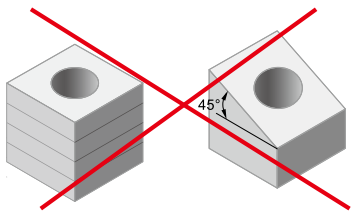


2 Internal coolant

High volume is recommended. Minimum coolant pressure is 10 bar.

3 Application of drilling

Not apply for stack drilling and angled surface drilling.



Machining Power Requirement for Drilling

5xD~10xD

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)

$$Md = \frac{f \times \pi \times D2 \times Kc}{4000} Nm$$

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

Technical Guide

Internal coolant is required.

The coolant is feed directly into the inserts cutting face, cooling the top of the drill and preventing chip adhesion, which allows for quick and smooth chip evacuation.

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		
	Casting steel	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	Casting 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	Al, and non-ferrous metal Ex.:A6061	—	—	—	—	—	—	—	—
		—	—	—	—	—	—	—	—
H	Hardened steel <HRC 50° 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		

Important Information

- Recommand to make a spot hole first by spot drill. See page 4-121 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.
- Minimum coolant pressure is 10 bar (about 150 psi.).
- Increase 20% of the cutting speed and the feed rate for horizontal spindle machine.
- For the CNC lathes, maximum miss-alignment of drill center and spindle center is ±0.05 mm, it is not necessary to drill center hole in advance.

Super Drill

3xD & 4xD

Ø10mm ~ Ø30mm

SMALLEST DIMENSION

3xD : Ø10 to Ø30 mm

4xD : Ø16 to Ø30 mm

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.
  Coolant supply is needed.

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

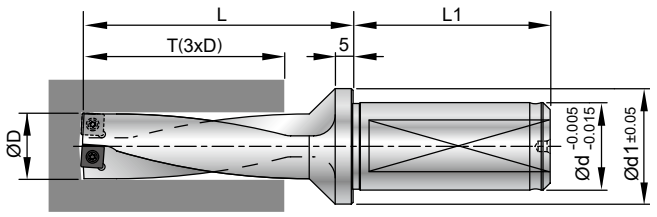
≃ Flat bottom shape

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.

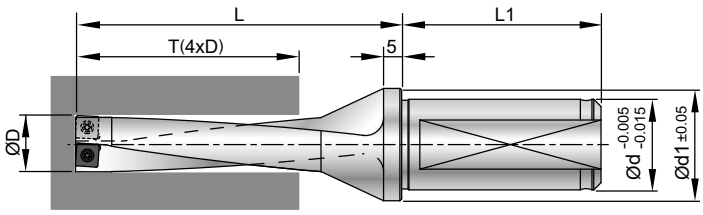
Holder 3xD 10mm~30mm



Parts No.	ØD	T	L	L1	Ød	Ød1	Insert Screw / Key	Radial Adjustment	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	49	20	27		0.25	10.8
00-99313-10.5	10.5	31.5	52	49	20	27		0.25	11.0
00-99313-11	11.0	33.0	52	49	20	27		0.20	11.4
00-99313-11.5	11.5	34.5	55	49	20	27		0.20	11.9
00-99313-12	12.0	36.0	55	49	20	27		0.15	12.3
00-99313-12.5	12.5	37.5	58	49	20	27		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	49	20	27		0.30	14.1
00-99313-14	14.0	42.0	61	49	20	27		0.25	14.5
00-99313-14.5	14.5	43.5	64	49	20	27		0.25	15.0
00-99313-15	15.0	45.0	64	49	20	27		0.20	15.4
00-99313-15.5	15.5	46.5	67	49	20	27		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	55	25	31		0.40	17.3
00-99313-17	17.0	51.0	76	55	25	31		0.35	17.7
00-99313-17.5	17.5	52.5	78	55	25	31		0.35	18.2
00-99313-18	18.0	54.0	78	55	25	31		0.30	18.6
00-99313-18.5	18.5	55.5	80	55	25	31		0.30	19.1
00-99313-19	19.0	57.0	80	55	25	31		0.25	19.5
00-99313-19.5	19.5	58.5	85	55	25	31		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	55	25	31		0.50	21.5
00-99313-21	21.0	63.0	87	55	25	31		0.45	21.9
00-99313-21.5	21.5	64.5	88	55	25	31		0.45	22.4
00-99313-22	22.0	66.0	88	55	25	31		0.40	22.8
00-99313-22.5	22.5	67.5	90	55	25	31		0.40	23.3
00-99313-23	23.0	69.0	90	55	25	31		0.35	23.7
00-99313-23.5	23.5	70.5	92	55	25	31		0.35	24.2
00-99313-24	24.0	72.0	92	55	25	31		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	58	32	43		0.50	27.0
00-99313-27	27.0	81.0	117	58	32	43		0.40	27.8
00-99313-28	28.0	84.0	126	58	32	43		0.40	28.8
00-99313-29	29.0	87.0	127	58	32	43		0.30	29.6
00-99313-30	30.0	90.0	130	58	32	43		0.30	30.6

*Torque screwdriver is recommended.

Holder 4xD 16mm~30mm

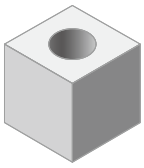
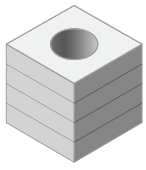
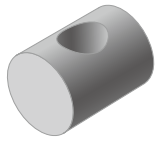


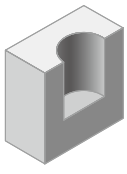
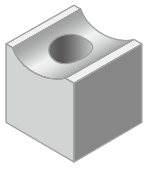
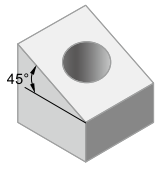
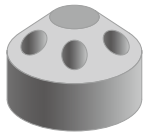
Parts No.	ØD	T	L	L1	Ød	Ød1	Insert Screw / Key	Radial Adjustment	D max
00-99314-16	16	64	90	55	25	31	N9GX060204	0.40	16.8
00-99314-17	17	68	93	55	25	31	*NS-22055 0.9Nm	0.35	17.7
00-99314-18	18	72	96	55	25	31	NK-T7	0.30	18.6
00-99314-19	19	76	99	55	25	31		0.25	19.5
00-99314-20	20	80	105	55	25	31	N9GX070304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

*Torque screwdriver is recommended.

Functions in variable conditions

Material Classifiction for Calculation

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%

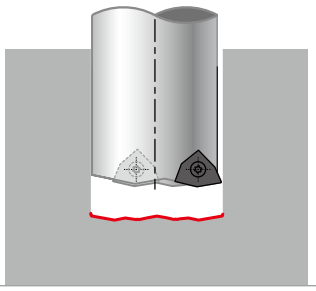
* SPD, SD both are suitable.

Insert

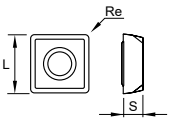
Features

- 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.
- Same insert for outer and inner insert.
- Square insert with 4 cutting edges, reducing cost per insert.
- Better surface finish.
- Better diameter accuracy.

NC2032

Nine9 SD	Other makers
	

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.

Technical Guide

Cutting Data

	Work piece material	T= Length/ Dia.	Vc (m/min.)	f (mm/rev.)					Grade of Insert
				N9GX 04T002	N9GX 05T103	N9GX 060204	N9GX 070304	N9GX 090308	
				Dia. 10~12.5	Dia. 13~15.5	Dia. 16~19.5	Dia. 20~24	Dia. 25~30	
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	
	Casting steel	T=3D	80~180	0.03~0.06	0.04~0.08	0.06~0.10	0.06~0.10	0.08~0.12	NC2032
		T=4D	60~120	—	—	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	Casting 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 <HRC 50° 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		Inch	
$S = \frac{Vc \times 1000}{\pi \times d}$	**d =** diameter -mm	$S = \frac{(3.82 \times SFM)}{d}$	**d =** 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 = f x S**	**f = IPR =** inch/rev.
	F = mm/min.		**F =** IPM=RPM x f / 25.4

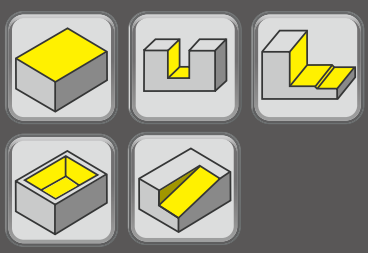
Power Mill

Indexable milling cutter 10mm.
Patented dual relief angle insert!
Higher feed rate. Higher wearing resistance!

Features

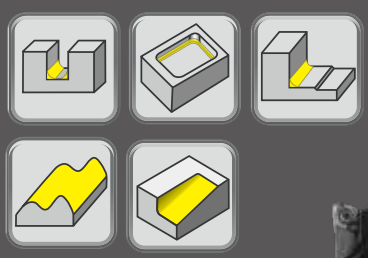
A Series- Shoulder Face Mills

Dia. range: Ø10 ~ Ø25mm



C Series- Torus Radius Mills

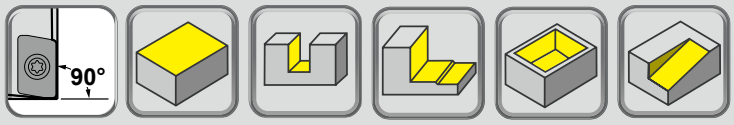
Dia. range: Ø10 ~ Ø26mm



▸ **Integrated ER taper-shank**

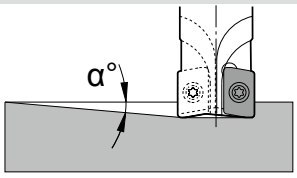
Please see page 2-98.

A Series Shoulder Face Mills

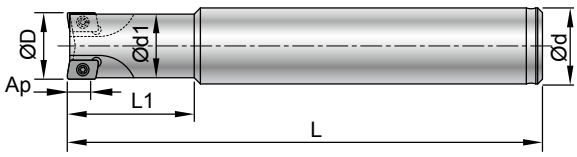


- Strong insert with high positive geometry and helical cutting edges.
- Shoulder mill with good cutting performance and cutting edge strength. which produce perfect 90° shoulders.

Holder

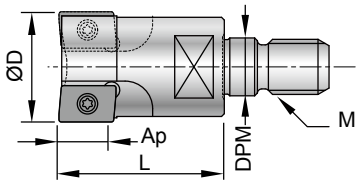


Cylindrical Shank >>



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

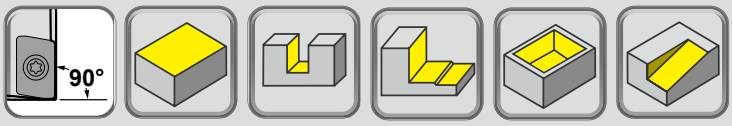
Screw-Fit Type >>



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

* For Nine9 extension bar, see page 7-159.

A Series Shoulder Face Mills



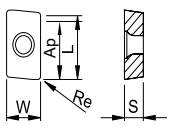
Insert

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.

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.

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.

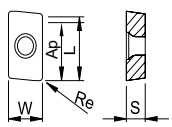
NC9031 :
- Sharp cutting edge and high positive rake angle, low friction coefficient for non-ferrous metal.
- Good for Al, Al-alloy, Copper, Copper alloy and Non-Ferrous metal.

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		6.5	4	2.45	0.1	5	
	A9GT060202U	NC2032	TiAlN	K20F		6.5	4	2.45	0.2	5	
	A9GT060205U	NC2032	TiAlN	K20F		6.5	4	2.45	0.5	5	
	A9GT060201H	NC2033	TiAlN	K20F		6.5	4	2.45	0.1	5	
		NC9031	TiN	K20F							
	A9GT060202H	NC2033	TiAlN	K20F		6.5	4	2.45	0.2	5	
		NC9031	TiN	K20F							
	A9GT060205H	NC2033	TiAlN	K20F		6.5	4	2.45	0.5	5	
		NC9031	TiN	K20F							
	A9GT060210H	NC2033	TiAlN	K20F		6.5	4	2.45	1.0	5	

*Torque screwdriver is recommended.

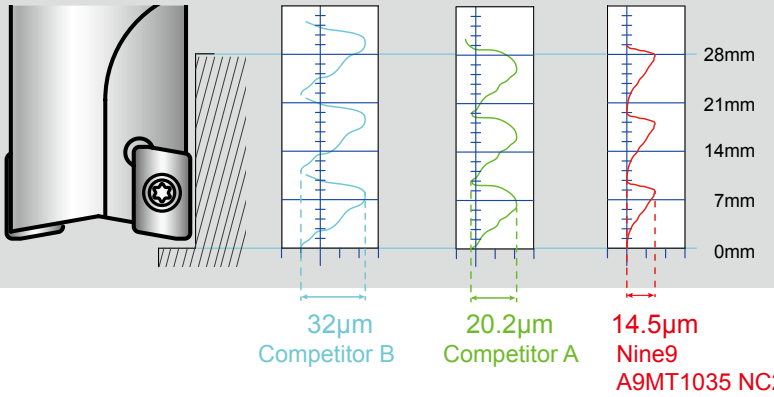
NC2032 :
- High rigidity, special edge honing, resistance of impact during milling operation.
- Special chip breaker design for high removal rate.
- Good for hard cutting carbon steel and alloy steel.

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
	A9GT103505H	NC9031	TiN	K20F		10	6.6	3.5	0.5	9	NK-T7

*Torque screwdriver is recommended.

A Series Shoulder Face Mills



Surface Roughness Comparison

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

Cutting Data

- Reduce the feed rate 30% from the below table for slotting operation.
- Ramping Angle should be Under α°.

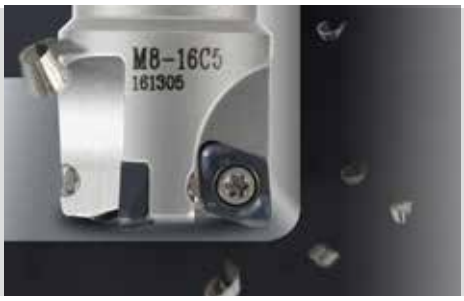
Insert Size: 6.5mm (Holder dia. Ø10~Ø17mm) : >>

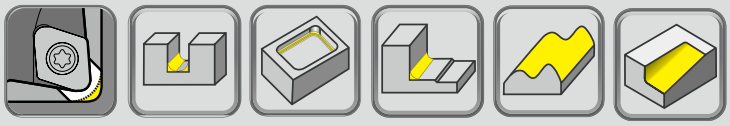
	Work Material	Sample Code (JIS)	Vc (m/min)	fz (mm/tooth)	Ap(mm)	Ap(mm)	Ae(mm)	Grade of Insert
P	Carbon Steel	P5	80~150	0.03~0.07	1.5	4	1.5	NC5072
								NC2033
P	Low-alloy Steel, C ≤ 0.3%	SCM440	80~150	0.03~0.07	1.5	4	1	NC5072
								NC2033
P	High-alloy Steel, C > 0.3%	SKD11	60~120	0.03~0.07	1	2.5	1	NC5072
								NC2033
M	Stainless Steel	SUS304	60~120	0.01~0.05	0.5	2	1	NC5072
								NC2033
K	Casting Iron	FC25	60~120	0.03~0.07	1	2.5	1	NC5072
								NC2033
K	Malleable Cast Iron, Grey Cast Iron		100~150	0.03~0.07	1.5	4	1.5	NC5072
								NC2033
N	Al, Al-alloy	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, C ≤ 0.3%	SCM440	150~250	0.08~0.15	3	8	2	NC2032
P	High-alloy Steel, C > 0.3%	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	Casting Iron	FC25	120~200	0.08~0.12	2	5	2	NC2032
K	Malleable Cast Iron, Grey Cast Iron		100~150	0.06~0.10	3	8	3	NC2032
N	Al, Al-alloy	A6061	200~500	0.03~0.07	5	8	3	NC9031

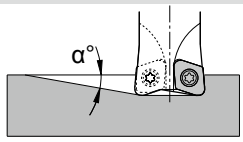
C Series Torus Radius Mills



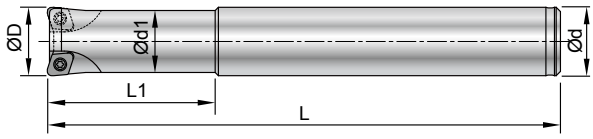


- Good for corner finishing.
- Series C is developed for replacement of the other milling cutters with ram feed.

Holder

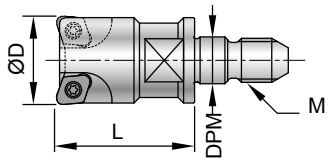


Cylindrical Shank >>



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

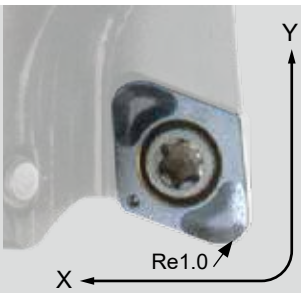
Screw-Fit Type >>



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

* For Nine9 extension bar, see page 7-159.

C Series Torus Radius Mills



Features:

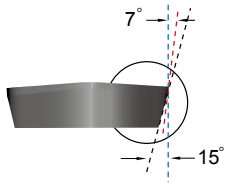
- Submicron carbide inserts are fully ground.
- Special design milling cutter and ground insert for semi-finishing 3D surface milling for mold industry.

Insert

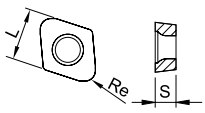
NC30 : • Flat cutting edge design, universal type for all kind of materials.

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

Dual Relief Angle Insert



Higher feed rate!
Higher wearing resistance!

Parts No.	Coating	Grade		Dimensions L	S	Re	Screw	Key
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

	Work Material	Sample Code (JIS)	Vc (m/min)	fz (mm/tooth)	Cutting Depth Ap(mm)	Grade of Insert
P	Carbon Steel	P5	150~300	0.2~0.5	0.2~0.5	NC30
						NC2032
	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

* Recommand Ae below 2.5mm.

EMB Boring Bars

Easy Adjustment / High Efficiency / Low Cost

EMB boring bars are “Eccentrical Mechanism Boring bars” which can adjust to required diameter via an eccentrical mechanism. The boring bar is not at the center of the holder, but offset from the center.

Patent No:
108599(Taiwan),
ZL96201178.9(China)
I265836(Taiwan),
ZL200510101469.5(China),
US 7455487 B2(USA)

EMB Boring Bar Family

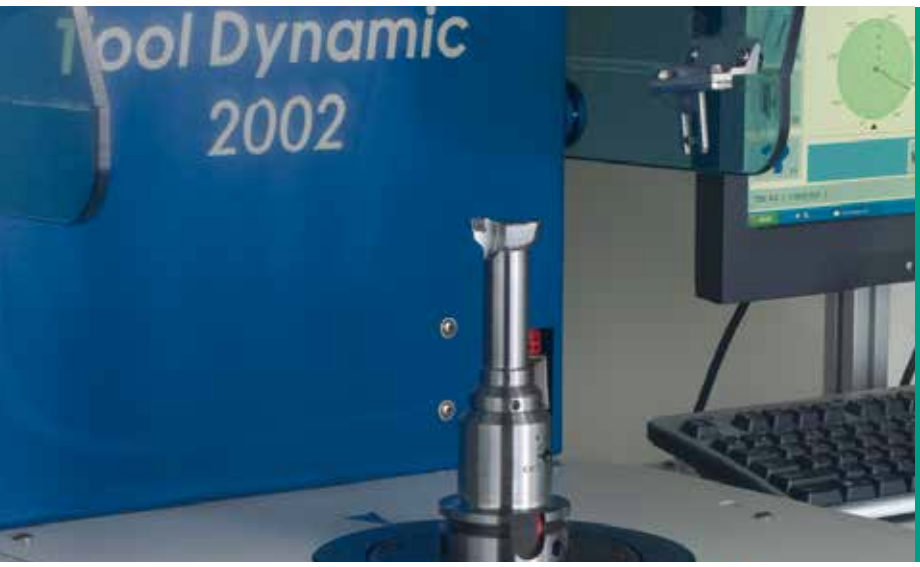
00-99101: 0.03 mm/div. adjustment range ±0.5., Ø6.5mm~Ø25.5mm boring bars.
00-99121: 0.01 mm/div. adjustment range ±0.1., Ø4.9mm~Ø25.1mm boring bars.
00-99146: 0.01 mm/div. adjustment range ±0.12., G6.3, 10000 r.p.m.
Ø4.87mm~Ø50.12mm boring bars are interchangeable.
00-99151: Deep hole boring 4 ~ 6XD.
Ø4.87mm~Ø20.12mm boring size.

00-99101
00-99121

00-99146-BT30H
00-99146-BT40H
00-99146-BT50H
00-99146-HSK63AH
00-99146-CAT40H

00-99146-SB32H

00-99151A-xxxW



Direct Adjusting Boring Bar

The Patented tool structure applies bit angle variation to produce slight size variation in diametric direction. Excellent for applications on single size boring tools, deep hole boring tools, special tools, etc. It features easy control of μ accuracy.

▸Direct Adjusting Boring Bar Family

00-99043 screw fit boring head:
Adjustment range ±0.1,
Ø13.9mm~Ø25.1mm boring head.

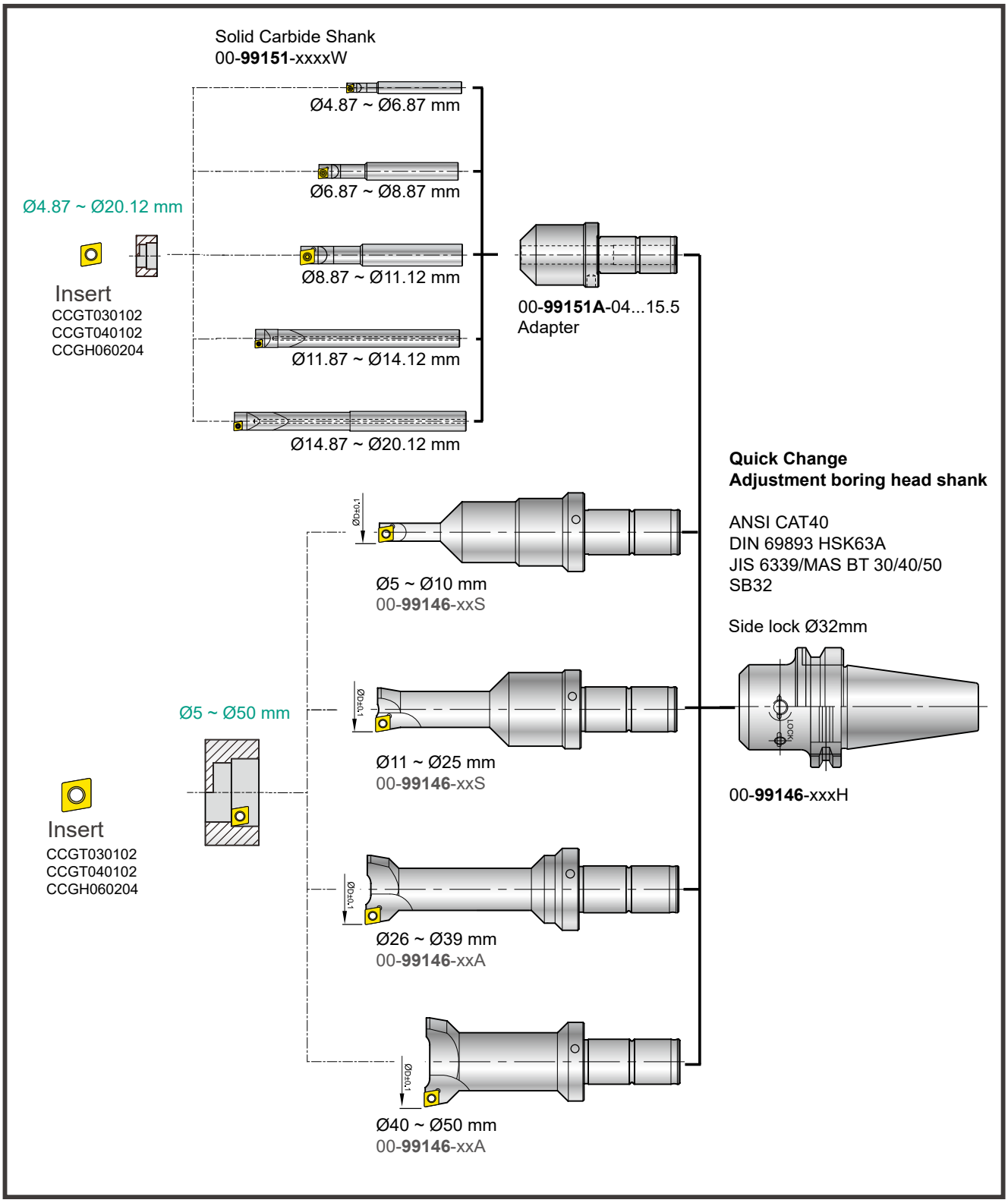
00-99801 extension bar:
Made by steel and solid carbide,
125mm maximum boring length.

00-99021 Direct adjusting boring bar
Adjustment range ±0.1,
Ø15.9mm~Ø50.1mm boring head.

System

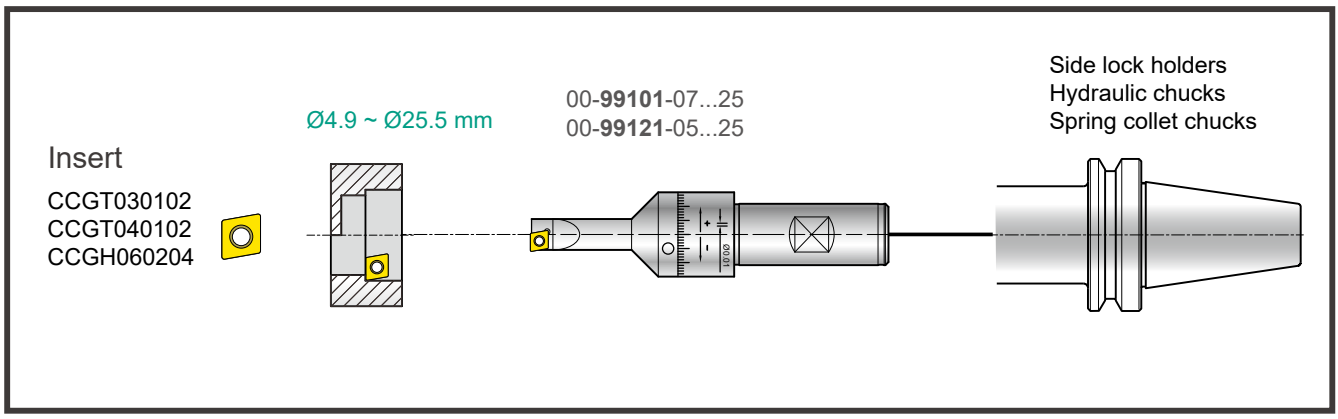
Cycle Time Position Accuracy

Quick Change High Speed EMB Boring Bars >>

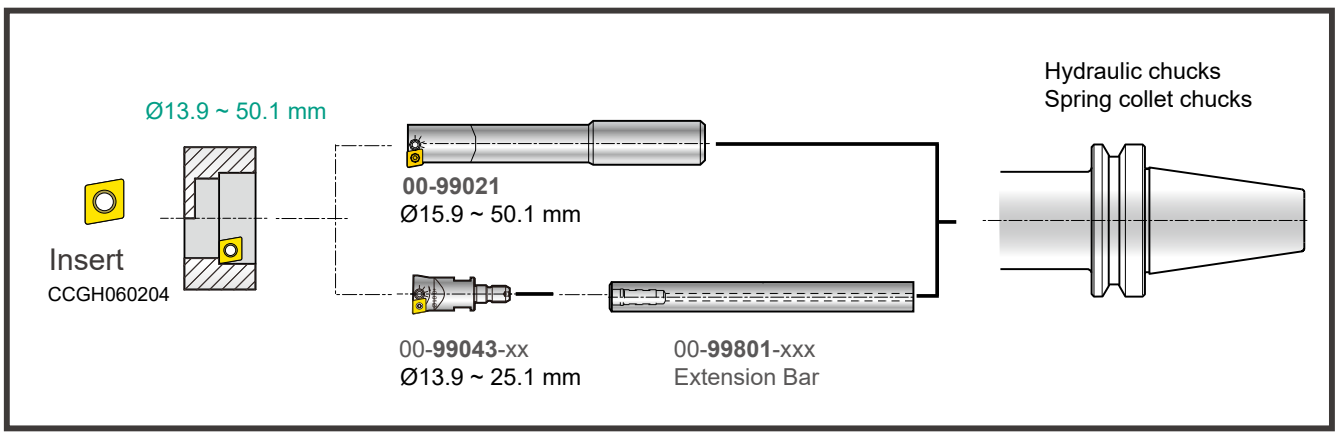


Roughness True Roundness

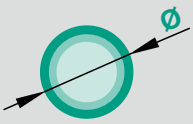
99101/99121 EMB Boring Bars >>



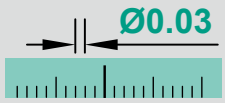
Direct Adjusting Boring Bar >>



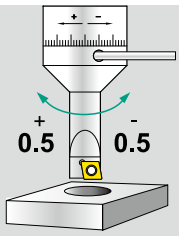
99101 EMB Boring Bars 0.03 mm/div.



Diameter range:
6.5mm ~ 25.5mm



Each division 0.03mm shown on the tools, they are adjustable on the tool presetter or machine easily.



Total adjustment range ±0.5mm.

Adjusted to required diameter by eccentric mechanism, it is simple and backlash free.

Easy Handling

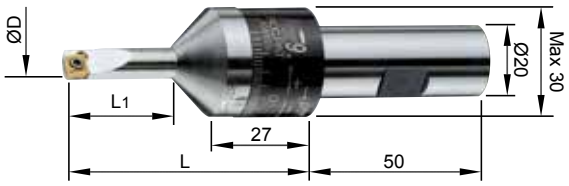
- Minimum readout division is 0.03 mm, it is easy for setting up fine boring.

Economic

- Low cost, high efficiency. It can replace end mill and brazed tool bits.
- The indexable insert allows a variety of materials to be cut .

Application

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

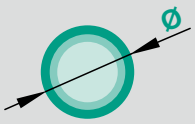


* H type with internal coolant can be ordered on request from Dia. 7mm. Ordering example: 00-99101-07H.
* Other sizes are available on request.

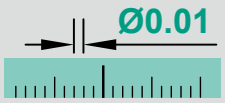
Part No.	Type		ØD	L1	L	Insert	Screw / Key
00-99101-07	SB20-0721-03	Adjustment range:±0.5mm Each Division 0.03mm	6.5-7.5	21	60	CC...040102	*NS-20036 0.6Nm / NK-T6
00-99101-08	SB20-0824-03		7.5-8.5	24	63		
00-99101-09	SB20-0927-03		8.5-9.5	27	65	CC...0602...	*NS-25045 0.9Nm / NK-T7
00-99101-10	SB20-1030-03		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.

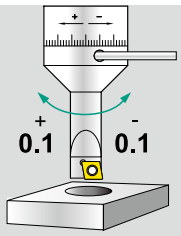
99121 EMB Boring Bars 0.01 mm/div.



Diameter range:
4.9mm ~ 25.1mm



Each division 0.01mm shown on the tools, they are adjustable on the tool presetter or machine easily.



Total adjustment range ±0.1mm.

Adjusted to required diameter by eccentric mechanism, it is simple and backlash free.

Easy Handling

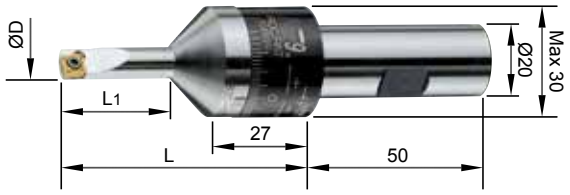
• Minimum readout division is 0.01 mm, it is easy for setting up fine boring.

Economic

• Low cost, high efficiency. It can replace end mill and brazed tool bits.
• The indexable insert allows a variety of materials to be cut .

Application

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

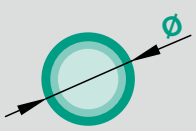


* H type with internal coolant can be ordered on request from Dia. 7mm. Ordering example: 00-99121-07H.
* Other sizes are available on request.

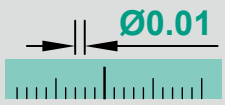
Part No.	Type		ØD	L1	L	Insert	Screw / Key
00-99121-05	SB20-0515-01	Adjustment range:±0.1mm Each Division 0.01mm	4.9-5.1	15	54	CC...030102	*NS-16030 0.4Nm / NK-T6
00-99121-06	SB20-0618-01		5.9-6.1	18	57		
00-99121-07	SB20-0721-01		6.9-7.1	21	60	CC...040102	*NS-20036 0.6Nm / NK-T6
00-99121-08	SB20-0824-01		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



Diameter range:
4.87mm ~ 50.12mm



Each division 0.01mm shown on the tools, they are adjustable on the tool presetter or machine easily.

Adjustment range:
+0.12 / -0.13mm.

Balance grade:
G6.3 10000 r.p.m

Adjusted to required diameter by eccentric mechanism, it is simple and backlash free.

Easy Handling

- Dimensions are easy to read. They are indicated on the tools and are easily adjusted on a tool presetter or in machining center.
- No backlash.

Interchangeable Boring Bars from Diameters of 5 mm to 50 mm

- This simple boring tool has minimal components. In minutes, the boring bar may be changed and the boring dimension set on the tool presetter.

Low Cost For Machining Small Holes

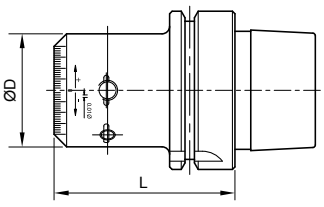
- Low cost micro adjustable boring heads.

High Speed

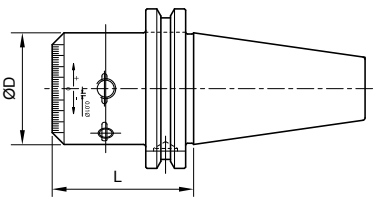
- Boring bar design ensures accurate high speed boring. Grade balance is G6.3 10000 r.p.m., all sizes are guaranteed.
- Surface speeds of carbide inserts up to 700 m/min.
- Combination bore / chamfer / facing tools can be ordered on request.

Boring Head Shank >>

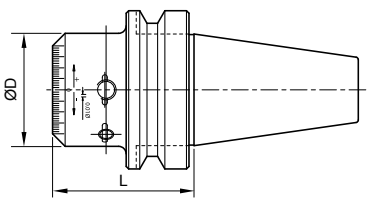
- HSK63



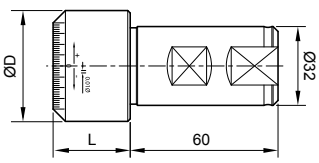
- CAT40



- BT



- SB32

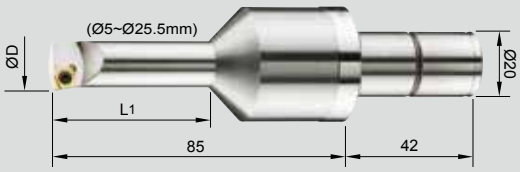


Part No.	Type	ØD	L
00-99146-HSK63AH	HSK63A-146-72	45	72
00-99146-CAT40H	CAT40-146-56	45	56.3
00-99146-BT30H	BT30-146-51	45	51.3
00-99146-BT40H	BT40-146-56	45	56.3
00-99146-BT50H	BT50-146-77	45	77.3
00-99146-SB32H	SB32-146-31	45	31.3

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	
00-99146-1000S	C20-1000-25L	9.87~10.12	25.00	
00-99146-1025S	C20-1025-25L	10.12~10.37	25.00	
00-99146-1050S	C20-1050-26L	10.37~10.62	26.25	
00-99146-1075S	C20-1075-26L	10.62~10.87	26.25	
00-99146-1100S	C20-1100-27L	10.87~11.12	27.50	
00-99146-1125S	C20-1125-27L	11.12~11.37	27.50	
00-99146-1150S	C20-1150-28L	11.37~11.62	28.75	
00-99146-1175S	C20-1175-28L	11.62~11.87	28.75	
00-99146-1200S	C20-1200-30L	11.87~12.12	30.00	
00-99146-1225S	C20-1225-30L	12.12~12.37	30.00	CC...0602...
00-99146-1250S	C20-1250-31L	12.37~12.62	31.25	
00-99146-1275S	C20-1275-31L	12.62~12.87	31.25	*NS-25045 0.9Nm
00-99146-1300S	C20-1300-32L	12.87~13.12	32.50	
00-99146-1325S	C20-1325-32L	13.12~13.37	32.50	NK-T7
00-99146-1350S	C20-1350-33L	13.37~13.62	33.75	
00-99146-1375S	C20-1375-33L	13.62~13.87	33.75	
00-99146-1400S	C20-1400-35L	13.87~14.12	35.00	
00-99146-1425S	C20-1425-35L	14.12~14.37	35.00	
00-99146-1450S	C20-1450-36L	14.37~14.62	36.25	
00-99146-1475S	C20-1475-36L	14.62~14.87	36.25	
00-99146-1500S	C20-1500-37L	14.87~15.12	37.50	
00-99146-1525S	C20-1525-37L	15.12~15.37	37.50	
00-99146-1550S	C20-1550-38L	15.37~15.62	38.75	
00-99146-1575S	C20-1575-38L	15.62~15.87	38.75	
00-99146-1600S	C20-1600-40L	15.87~16.12	40.00	CC...0602... Screw: *NS-25060 0.9Nm Key: NK-T7
00-99146-1625S	C20-1625-40L	16.12~16.37	40.00	
00-99146-1650S	C20-1650-41L	16.37~16.62	41.25	
00-99146-1675S	C20-1675-41L	16.62~16.87	41.25	
00-99146-1700S	C20-1700-42L	16.87~17.12	42.50	

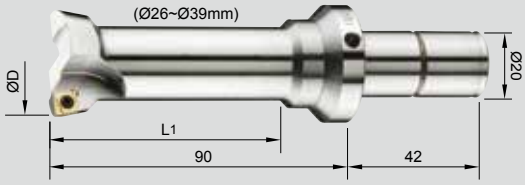
Part No.	Type	ØD	L1	Insert Screw / Key
00-99146-1725S	C20-1725-42L	17.12~17.37	42.50	
00-99146-1750S	C20-1750-43L	17.37~17.62	43.75	
00-99146-1775S	C20-1775-43L	17.62~17.87	43.75	
00-99146-1800S	C20-1800-45L	17.87~18.12	45.00	
00-99146-1825S	C20-1825-45L	18.12~18.37	45.00	
00-99146-1850S	C20-1850-46L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

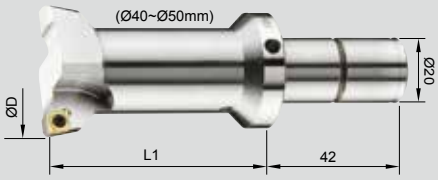
*Torque screwdriver is recommended.

99146 Quick Change High Speed EMB Boring Bar

Boring Bar Ø26~Ø50 >>

- Alloy Steel Shank
- Boring Depth : L1, 2~3xD





Ø26~Ø39mm >>

* H type with internal coolant can be ordered on request.
Ordering example: 00-99146-36AH.

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

Ø40~Ø50mm >>

* H type with internal coolant can be ordered on request.
Ordering example: 00-99146-45AH.

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

*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	

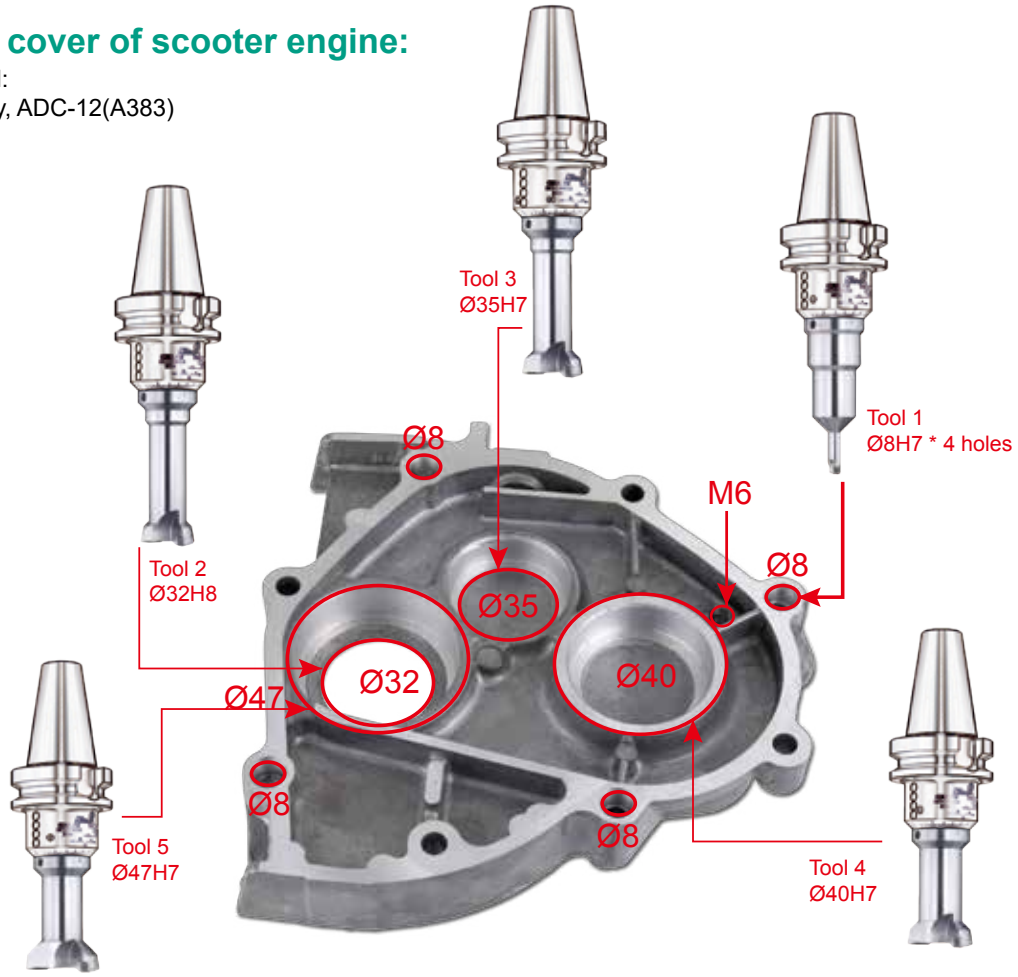
(Insert is not included, please order seperately)

- 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

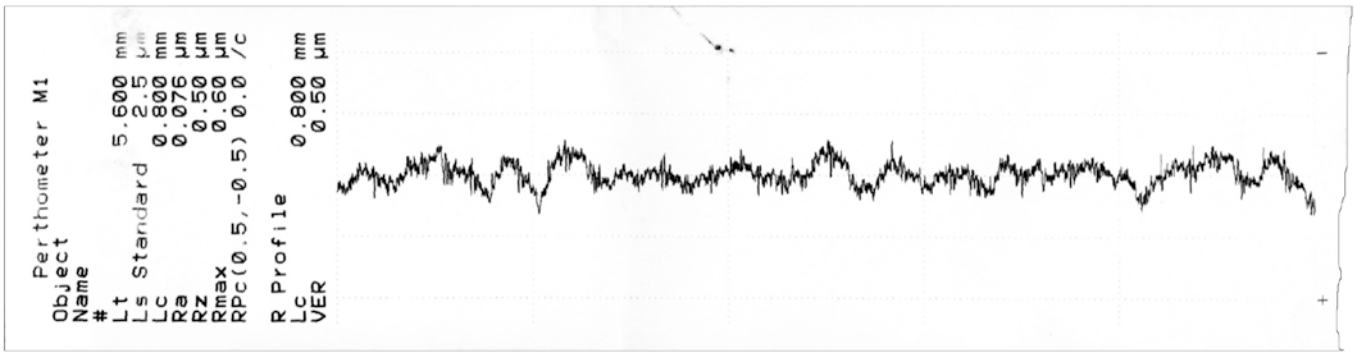


TOOL LIST by Nine9 Boring Bar 99146-series :

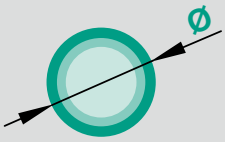
No.	Boring Bar	Grade of insert	Dia. mm	Depth	r.p.m.	F = mm/min.	Machining time
1	00-99146-08A	CCGT040102 NC30	Ø8H7	8 mm	8000	400	1.2 sec.
2	00-99146-32A	CCGT060202HP NC9031	Ø32H8	8 mm	2985	209	2.3 sec.
3	00-99146-35A		Ø35H7	12 mm	2730	191	3.8 sec.
4	00-99146-40A		Ø40H7	15 mm	2400	168	5.4 sec.
5	00-99146-47A		Ø47H7	15 mm	2030	142	6.4 sec.

Working Example

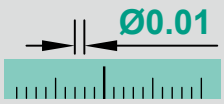
Material	Vc m/min.	f mm/rev.	Roughness			Tool holder	Insert
			Ra	Rz	Rmax		
Al alloy, 6061	150	0.2	0.076μm	0.50μm	0.6μm	99146-BT40-26A	CCGH0602U NC9036



99151 Deep hole boring 4~6XD



Diameter range:
4.87mm ~ 20.12mm



Each division 0.01mm shown on the tools, they are adjustable on the tool presetter or machine easily.

Adjustment range:
+0.12 / -0.13mm.

Adjusted to required diameter by eccentric mechanism, it is simple and backlash free.

Easy Handling

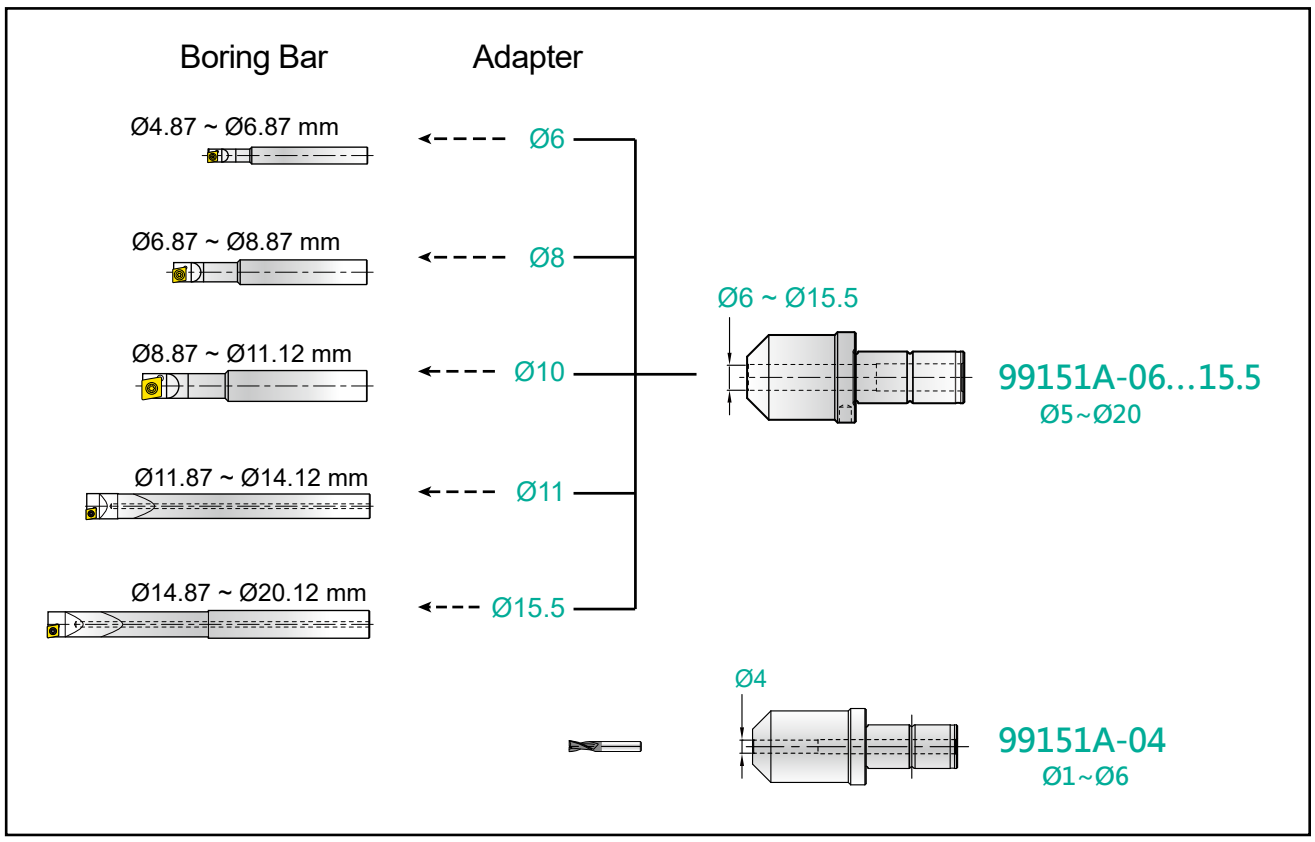
• 4~6xD boring depth, Good balance condition is maintained .

Economic

• Low cost, high efficiency. It can replace end mill and brazed tool bits.
• The indexable insert allows a variety of materials to be cut .

Application

• Replace end mill or reamer in small hole boring.
• Apply for electronic parts and micro machining parts.



99151 Deep hole boring 4~6XD

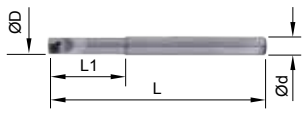
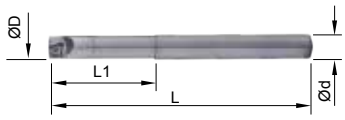
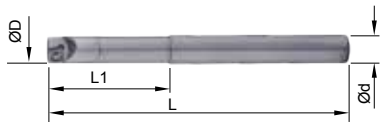
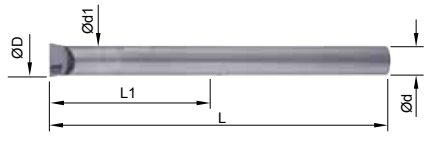
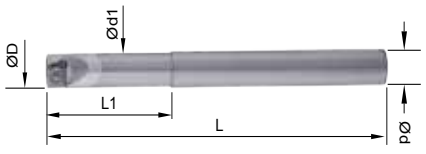
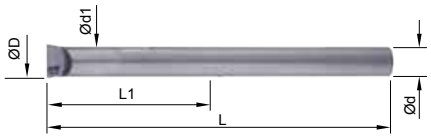
Adapter >>

• Economical solution of small dia. boring bar.

Part No.	Type	ØD	L
00-99151A-04	C20-ID04	4	49
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

Boring Bar Ø5~Ø20 >>

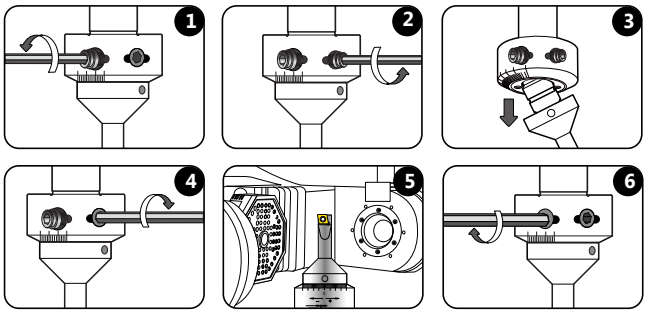
• Solid Carbide Shank
• Boring Depth : L1, 4~6xD

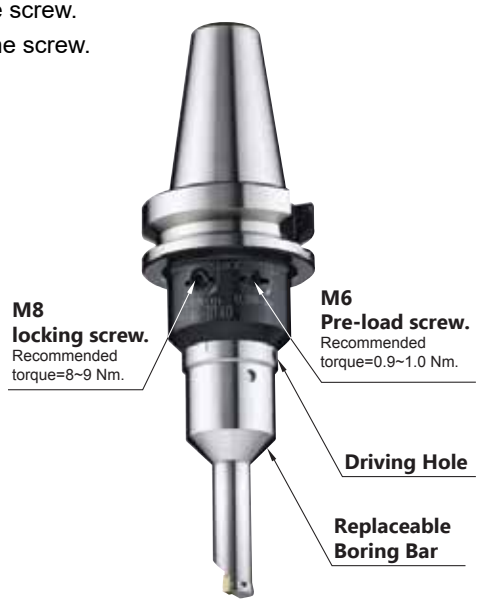
Part No.	Type	ØD	Ød	Ød1	L1	L	Insert Screw / Key	Fig.
00-99151-0500W	C06-0500-20L	4.87~5.12	6	-	20	70	CCGT030102 *NS-16030 / 0.4Nm NK-T6	
00-99151-0525W	C06-0525-20L	5.12~5.37	6	-	20	70		
00-99151-0550W	C06-0550-22L	5.37~5.62	6	-	22	70		
00-99151-0575W	C06-0575-22L	5.62~5.87	6	-	22	70		
00-99151-0600W	C06-0600-24L	5.87~6.12	6	-	24	70		
00-99151-0625W	C06-0625-24L	6.12~6.37	6	-	24	70		
00-99151-0650W	C06-0650-26L	6.37~6.62	6	-	26	70		
00-99151-0675W	C06-0675-26L	6.62~6.87	6	-	26	70		
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	8	-	28	85		
00-99151-0750W	C08-0750-30L	7.37~7.62	8	-	30	85		
00-99151-0775W	C08-0775-30L	7.62~7.87	8	-	30	85		
00-99151-0800W	C08-0800-32L	7.87~8.12	8	-	32	85		
00-99151-0825W	C08-0825-32L	8.12~8.37	8	-	32	85		
00-99151-0850W	C08-0850-34L	8.37~8.62	8	-	34	85		
00-99151-0875W	C08-0875-34L	8.62~8.87	8	-	34	85		
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	10	-	36	110		
00-99151-0950W	C10-0950-38L	9.37~9.62	10	-	38	110		
00-99151-0975W	C10-0975-38L	9.62~9.87	10	-	38	110		
00-99151-1000W	C10-1000-40L	9.87~10.12	10	-	40	110		
00-99151-1025W	C10-1025-40L	10.12~10.37	10	-	40	110		
00-99151-1050W	C10-1050-42L	10.37~10.62	10	-	42	110		
00-99151-1075W	C10-1075-42L	10.62~10.87	10	-	42	110		
00-99151-1100W	C10-1100-44L	10.87~11.12	10	-	44	110		
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	11	-	70	120		
00-99151-1400WS	C11-1400-120L	13.87~14.12	11	-	70	120		
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	15.5	-	100	180		
00-99151-1800W	C15.5-1800-180L	17.87~18.12	15.5	-	100	180		
00-99151-1900W	C15.5-1900-180L	18.87~19.12	15.5	-	100	180		
00-99151-2000W	C15.5-2000-180L	19.87~20.12	15.5	-	100	180		

*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

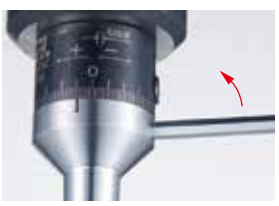
To Reduce Diameter

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

Precisely Ground Inserts

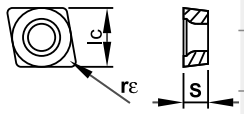
NC30 : • Universal grade for casting iron, carbon steel, alloy steel, stainless steel.

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.

U-XP9001 : • Super finishing insert with large corner radius for high feed rate.
• Good for Al, Al-alloy and non-ferrous metal.

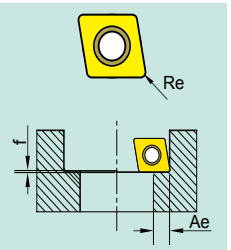
Parts No.		Coating	Grade		Dimensions			Screw	Key
					Ic	S	Re		
CCGT030102	NC30	TiAlN	K20F		3.5	1.4	0.2	*NS-16030 0.4Nm	NK-T6
	NC9036	DLC							
CCGT040102	NC30	TiAlN	K20F		4.3	1.8	0.2	*NS-20036 0.6Nm	NK-T6
	NC9036	DLC							
CCGH0602U	U-XP9001	Polished	K20F		6.35	2.38	-		
CCFT060204	NC2033	TiAlN	K20F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

*Torque screwdriver is recommended.

Cutting Data

• Note: Super fine finishing insert U-XP9001 with special specified cutting width 0.15mm.(Radius) (see table below)

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



	Material	Cutting conditions or surface finishes	Cutting Speed Vc(m/min.)	feed rate f (mm/rev.)	Re0.2 Ae (mm)	Re0.4 Ae (mm)	Grade of Insert	
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	Brass, Bronze and Al-alloy Si >6%	Regular cutting	150-200-300	0.05-0.07-0.10	0.05	0.1	NC9036	
		Super mirror finish	150-200-300	0.15-0.2-0.25	0.05		U-XP9001	
	Al, Al-alloy, 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	0.05		U-XP9001	
H	Hardened Steel <HRC 50	Regular cutting	80-100-120	0.04-0.06-0.08	0.05	0.1	NC30	

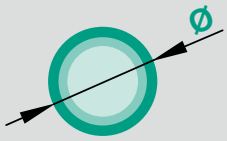
Direct Adjusting Boring Bar

No Backlash! Micrometric Adjustment! Extra long!

The Patented tool structure applies bit angle variation to produce slight size variation in diametric direction.
Excellent for applications on single size boring tools, deep hole boring tools, special tools, etc. It features easy control of μ accuracy.

USA Patent

Direct Adjusting Boring Bar



Diameter range:
13.9mm ~ 50.1mm

Adjustment range:
+0.1 / -0.1mm.

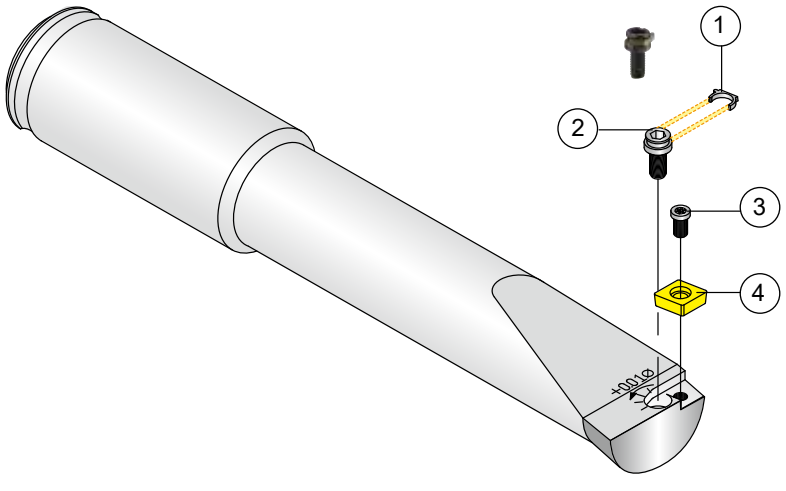
Direct Adjusting Boring Bar Family >>

00-99021:
Boring bar with direct adjustment :
Adjustment range ±0.1,
Ø15.9mm~Ø50.1mm boring head.

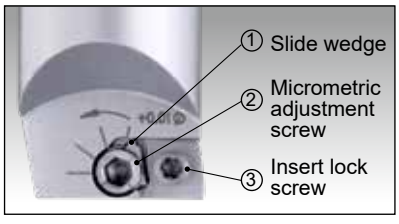
00-99043:
Screw fit boring head with direct adjustment
for anti-vibration extension bar :
Adjustment range ±0.1,
Ø13.9mm~Ø25.1mm boring head.

Features >>

- Patented adjustment mechanism, to push insert directly by wedge and screw after insert clamped.
- The boring diameter is adjusted by pushiing the micrometric adjustment screw after the insert screw has been tightened.
- There is no backlash while adjusting boring diameter.



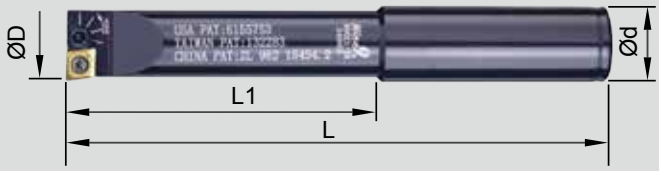
① Slide wedge
② Micrometric adjustment screw
③ Insert lock screw
④ Insert



Direct Adjusting Boring Bar

Cylindrical Shank >>

- Patented adjustment mechanism, to push insert directly by wedge and screw after insert clamped.
- Good for machining centers and special purpose machine for micrometric adjustment.



Ø16 ~ Ø50, Alloy Steel Shank >>

- Boring depth: L1, 4xD.
- Total adjustment range: 0.2mm.

Part No.	Type	ØD	Ød	L1	L	Insert / Screw	Adjustment Screw
00-99021-16	BC16-FB16	15.9~16.1	16	66	114	CC...0602... / Insert lock Screw: *NS-25060 / 0.9Nm Key:NK-T7 (2.5mm)	99021-A
00-99021-18	BC16-FB18	17.9~18.1	16	72	112		
00-99021-20	BC16-FB20	19.9~20.1	16	80	130		
00-99021-22	BC20-FB22	21.9~22.1	20	88	138		
00-99021-25	BC25-FB25	24.9~25.1	25	100	156		
00-99021-27	BC25-FB27	26.9~27.1	25	108	164	CC...09.... / Insert lock Screw: NS-35080 / 2.5Nm Key:NK-T15 (4mm)	99021-D
00-99021-28	BC25-FB28	27.9~28.1	25	112	168		
00-99021-30	BC25-FB30	29.9~30.1	25	120	176		
00-99021-32	BC25-FB32	31.9~32.1	25	128	184		
00-99021-35	BC32-FB35	34.9~35.1	32	140	200		
00-99021-37	BC32-FB37	36.9~37.1	32	140	200		
00-99021-40	BC32-FB40	39.9~40.1	32	140	200		
00-99021-42	BC32-FB42	41.9~42.1	32	140	200		
00-99021-45	BC32-FB45	44.9~45.1	32	140	200		
00-99021-47	BC32-FB47	46.9~47.1	32	140	200		
00-99021-50	BC32-FB50	49.9~50.1	32	140	200		

*Torque screwdriver is recommended.

Direct Adjusting Boring Bar

Screw Fit Boring Head >>

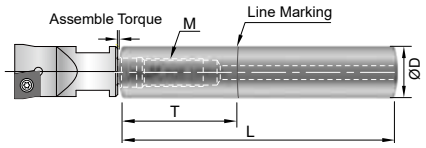
- Integrated with direct adjustment for fine boring, adjustment range ±0.1mm.

Part No.	Type	ØD	L	M	DPM	Insert / Screw	Adjustment screw
00-99043-14	M6-FB14	13.9~14.1	25	M6xP1.0	6.5	CC...0602... / Insert lock screw: *NS-25045 / 0.9Nm Key:NK-T7	99021-A
00-99043-15	M6-FB15	14.9~15.1	25	M6xP1.0	6.5		
00-99043-16	M8-FB16	15.9~16.1	25	M8xP1.25	8.5	CC...0602... / Insert lock screw: *NS-25060 / 0.9Nm Key:NK-T7	99021-A
00-99043-17	M8-FB17	16.9~17.1	25	M8xP1.25	8.5		
00-99043-18	M8-FB18	17.9~18.1	25	M8xP1.25	8.5		
00-99043-19	M8-FB19	18.9~19.1	30	M8xP1.25	8.5		
00-99043-20	M10-FB20	19.9~20.1	30	M10xP1.5	10.5		
00-99043-21	M10-FB21	20.9~21.1	30	M10xP1.5	10.5		
00-99043-22	M10-FB22	21.9~22.1	30	M10xP1.5	10.5		
00-99043-23	M10-FB23	22.9~23.1	30	M10xP1.5	10.5		
00-99043-24	M10-FB24	23.9~24.1	30	M10xP1.5	10.5		
00-99043-25	M10-FB25	24.9~25.1	30	M10xP1.5	10.5		

*Torque screwdriver is recommended.

Steel Extension Bar >>

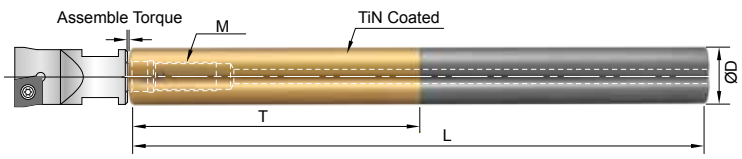
- T is the maximum overhang length.
- With internal coolant hole.



Parts No.	Type	ØD	T	L	M	Assemble Torque
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 Extension Bar >>

- T is the maximum overhang length.
- With internal coolant hole.
- Carbide extension bar with longer tool length is available on request. (REVA brand)



Parts No.	Type	ØD	T	L	M	Assemble Torque
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

Procedures For Adjustment

● Extension bar is TiN coated to show the maximum usable boring length.

On Tool Presetter

1. Turn screw-2 clockwise to the bottom end before tighten the insert.

2. Tighten the insert by screw 1.
   (If you have tool presetter, follow step 3-5; if you don't, jump to step 6-9.)

3. Put the boring bar on the spindle of the tool presetter.

4. Measure the diameter of the boring bar by tool presetter; it should be smaller than nominal diameter. Adjusting the diameter of the boring bar by turning screw-2 counter-clockwise using the Allen-key to increase diameter until required diameter is achieved.

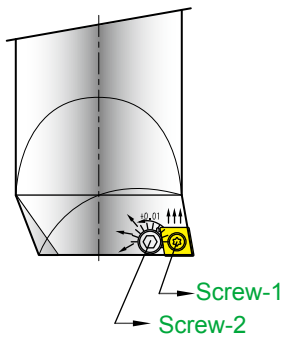
5. If the diameter has been adjusted too big, please loosen the screw-2, and then screw-1. Repeat step 2-4 until the required diameter is achieved.

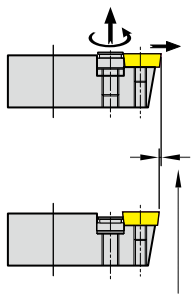
6. Put the boring bar on the machine spindle and make a test cut, about 5 mm deep. Measure hole diameter of the test cut.

7. Moving the boring bar to the tool diameter setter. The insert of the boring bar should touch the ceramic probe gently. Setting the dial gage to "zero" and adjust diameter by turning screw-2 counter-clockwise using the Allen key.

8. Read and note the "Adjusting amount" on the dial gage.
   Adjusting amount=(Nominal diameter-test cut diameter)/2 (mm or inch.)

9. Make test cut and measure again until required adjusting amount is achieved.





Adjusting Range 0.2 mm

Adjusting boring diameter on the presetter.

Direction to increase boring diameter.

Precisely Ground Inserts

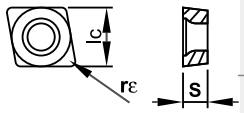
NC60 : • Cermet insert, for hardened steel and super finished of the high alloy steel.

NC10 : • 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 : • Super finishing insert with large corner radius for high feed rate.
• Good for Al, Al-alloy and non-ferrous metal.

Parts No.		Coating	Grade		Dimensions			Screw	Key
					Ic	S	Re		
CCGH060204	NC60	CERMET			6.35	2.38	0.4		
CCFT060204	NC2033	TiAlN	K20F		6.35	2.38	0.4	*NS-25060 0.9Nm	NK-T7
	NC9036	DLC							
CCFW060204	NC2032	AlTiN	K20F		6.35	2.38	0.4		
CCGT09T304HP	NC10	TiAlN	K20F		9.52	3.97	0.4	NS-35080 2.5Nm	NK-T15

*Torque screwdriver is recommended.

Cutting Data

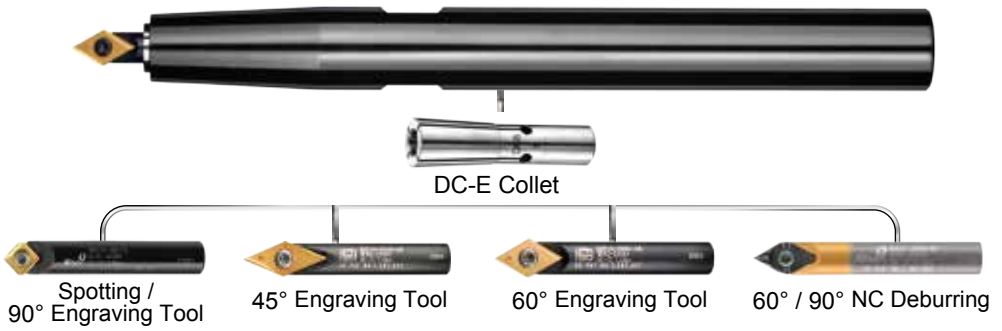
Spindle speed $S = \frac{Vc \times 1000}{\pi \times D}$ r.p.m. Feed rate: f x S mm/min

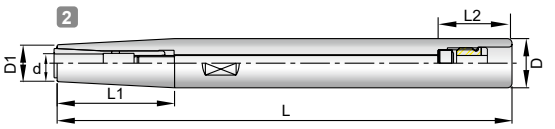
	Material	Cutting conditions or surface finishes	Cutting Speed Vc (m/min)	feed rate f (mm/rev.)	Grade of Insert
P	Carbon Steel	Regular cutting	120-150-180	0.05-0.07-0.10	NC60
		Interrupted cutting	100-120-140	0.04-0.05-0.08	NC2033 / NC10
	Alloy Steel	Regular cutting	100-120140	0.05-0.07-0.10	NC60
		Interrupted cutting	80-100-120	0.04-0.05-0.08	NC2033 / NC10
M	Stainless Steel	Regular cutting	70-80-100	0.05-0.07-0.10	NC2033 / NC10
K	Cast Iron	Regular cutting	80-100-120	0.05-0.07-0.10	NC10 / NC2032
N	Al, Al-alloy, non-ferrous metal	Regular cutting (DLC)	150-200-300	0.05-0.07-0.10	NC9036

Accessory

DC Slim Chuck

▸ Extension Adaptor >>



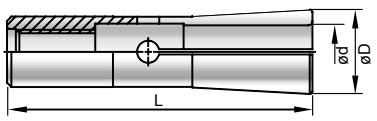


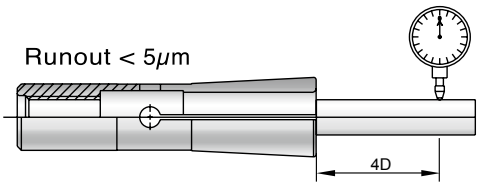
Parts No.	Type of Holder	Fig.	d	L	L1	L2	øD	D1	Stop Nut	Spanner	Recommended Torque	Collet
0-329090-102	ST10-DC4-90	1	2~4	90	14	--	10	9	TP-M8	301940~632	4Nm	DC4
-112	ST12-DC4-120	2	2~4	120	38	--	12	9	--		4Nm	
0-329090-212	ST12-DC6-120	1	1~6	120	40	--	12	14	TP-M12	301940~643	5Nm	DC6
-222	ST16-DC6-150	2	1~6	150	35	24	16	14	--		5Nm	
-232	ST20-DC6-200	2	1~6	200	70	74	20	14	--		5Nm	
-242	ST25-DC6-250	2	1~6	250	115	124	25	14	--	301940~644	5Nm	

* Stop nut is applied when clamping and unclamping tools.

▸ DC-E Collet >>

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





Type	DC-4E	DC-6E
D	7.1	9.6
L	31	36

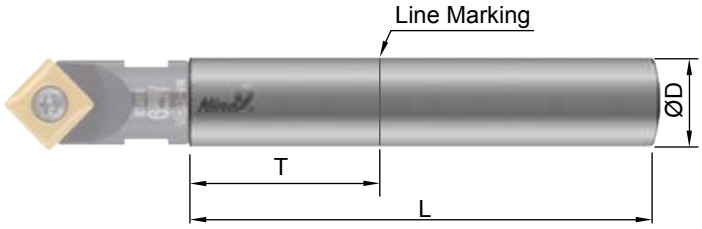
DC4-E		DC6-E	
Parts No.	Size(mm)	Parts No.	Size(mm)
0-300090-102	2.0	0-300090-203	3.0
0-300090-103	3.0	0-300090-204	4.0
0-300090-104	4.0	0-300090-206	6.0

Extension Bar

For NC Spot Drill, Chamfer Mill, NC Helix Drill, Power Mill and Direct adjusting boring bar

Steel Type >>

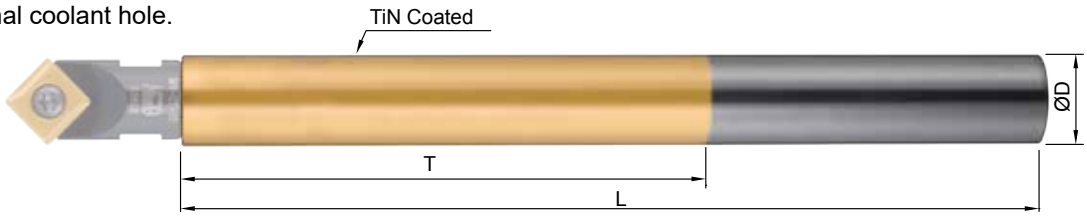
- T is the maximum overhang length.
- With internal coolant hole.



Part No.	Type	ØD	T	L	M	Assemble Torque
00-99801-10S	BC10-075M05S	10	25	75	M5xP0.8	6.5Nm
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 >>

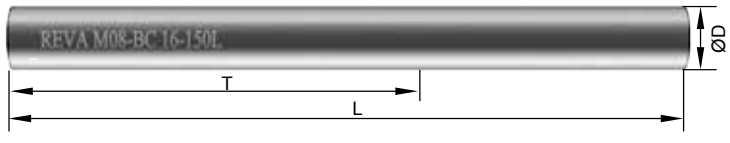
- T is the maximum overhang length.
- With internal coolant hole.



Part No.	Type	ØD	T	L	M	Assemble Torque
00-99801-10W	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

REVA Solid Carbide Extension Bar >>

- With internal coolant hole.
- Carbide extension bar with longer tool length is available on request.



Parts No.	Type	ØD	T	L	M	Assembled Torque
0-398010-100M05	M05-BC10-100L	10	60	100	M5xP0.8	6.5 Nm
0-398012-100M06	M06-BC12-100L	12	60	100	M6xP1.0	11.0 Nm
0-398016-150M08	M08-BC16-150L	16	80	150	M8xP1.25	25.0 Nm
0-398020-200M10	M10-BC20-200L	20	100	200	M10xP1.5	50.0 Nm
0-398025-200M12	M12-BC25-200L	25	125	200	M12xP1.75	60.0 Nm

ACE Spot Drill >>

Spotting Countersink Chamfering

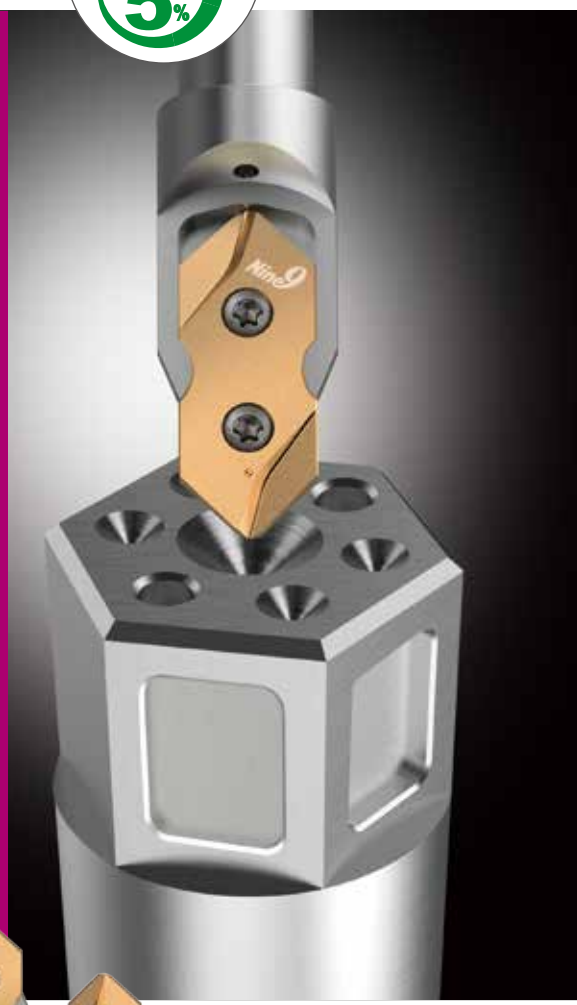
Accuracy! Coolant! Efficiency!

High rigidity, HPC high performance cutting, ultra-long tool life.

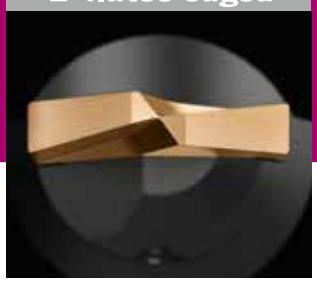
MCC Minimum Consumable Cutting Indicator 5%

Features

- **3 angles : 60° / 90° / 120°**
- **3 different sizes of insert and holder, larger size is available on request.**
- **2-flutes edged is symmetric, it reduces the lateral force.**
  - High rigidity, HPC high performance cutting, ultra-long tool life.
  - Dual clamping screwed design ensures the vibration free during the cutting.
  - Each insert has 2 cutting edges
  - Holder with internal coolant.
  - Ultra long tool life.
  - Good for use on CNC lathe, Swiss type machine, small machine and weak clamping situation.

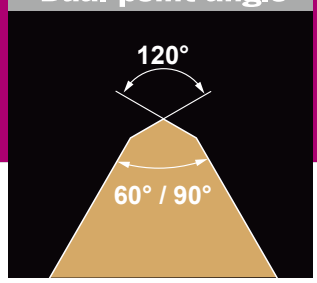


2-flutes edged



• It is symmetric.

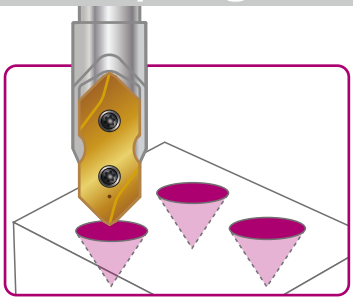
Dual point angle



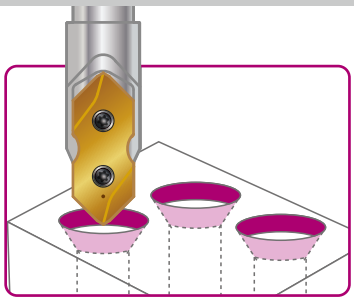
• The double point angles ensure strength at the centre to prevent fracturing.

NEW

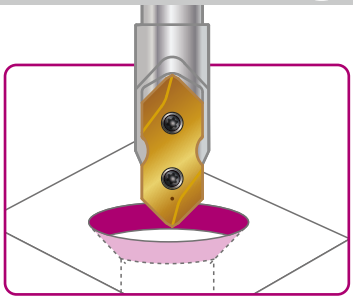
Spotting



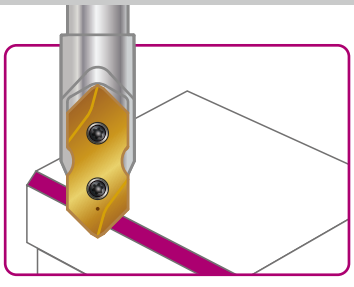
Countersink



Contour Chamfering



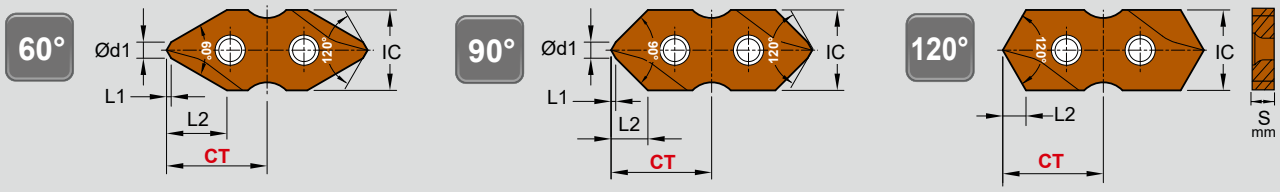
Chamfering



▸ Can drill with minimum quantity lubrication (MQL).

▸ Excellent repeatability.
No need tool length re-setting by insert type.
Ultra long tool life.

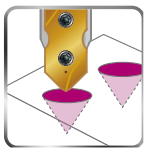
ACE Spot Drill Spotting & Countersink



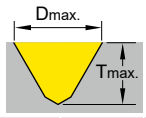
Inserts >>

NC2057: • Universal grade for alloy steel and cast iron.
• 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.

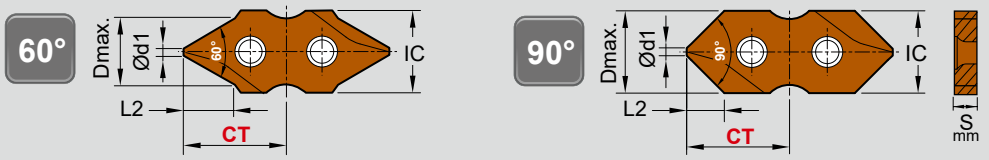


For Spotting & Countersink >>



IC	Angle ±0.5	Code	Parts No.	Coating	Grade	Ød1	L1	L2	Dmax.	Tmax.	S	CT ±0.025
08	60°	06A121	S9MT0802-060 NC2057	AL(L)	P35	1.6	0.46	6.0	8	6.0	2.4	10
		06A122	S9MT0802-060 XP9000	-								
	90°	06A131	S9MT0802-090 NC2057	AL(L)		1.6	0.46	3.6	8	3.6		
		06A132	S9MT0802-090 XP9000	-								
	120°	06A141	S9MT0802-120 NC2057	AL(L)		-	-	2.3	8	2.3		
		06A142	S9MT0802-120 XP9000	-								
10	60°	06A221	S9MT1003-060 NC2057	AL(L)	P35	2	0.58	7.5	10	7.5	3.0	12.50
		06A222	S9MT1003-060 XP9000	-								
	90°	06A231	S9MT1003-090 NC2057	AL(L)		2	0.58	4.6	10	4.6		
		06A232	S9MT1003-090 XP9000	-								
	120°	06A241	S9MT1003-120 NC2057	AL(L)		-	-	2.9	10	2.9		
		06A242	S9MT1003-120 XP9000	-								
12	60°	06A321	S9MT1203-060 NC2057	AL(L)	P35	2.4	0.69	9.0	12	9.0	3.0	15
		06A322	S9MT1203-060 XP9000	-								
	90°	06A331	S9MT1203-090 NC2057	AL(L)		2.4	0.69	5.5	12	5.5		
		06A332	S9MT1203-090 XP9000	-								
	120°	06A341	S9MT1203-120 NC2057	AL(L)		-	-	3.5	12	3.5		
		06A342	S9MT1203-120 XP9000	-								

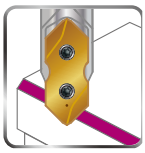
ACE Spot Drill Chamfering



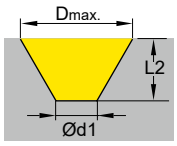
Inserts >>

NC2055: • ALDURA coating, reduces heat and tool wear.
• For hardened steel up to 56 HRC.
• 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.



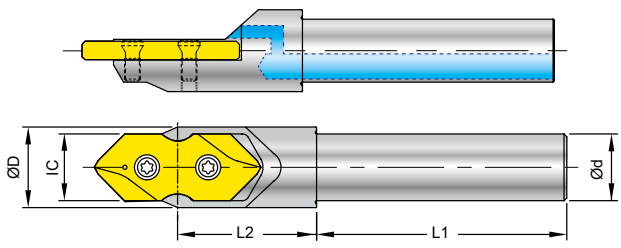
For Chamfering >>



IC	Angle ±0.5	Code	Parts No.		Coating	Grade	Ød1	L2	Dmax.	S	CT ±0.025
08	60°	06A123	S9MT0802-D060	NC2055	ALDURA	P35	0.5	5	6.27	2.4	10
		06A124		XP9000	-						
	90°	06A133	S9MT0802-D090	NC2055	ALDURA	P35	0.5	3.75	8		
		06A134		XP9000	-						

Cylindrical Shank >>

• Made of hardened high alloy steel, 58 HRC.
• Internal coolant.



IC	Code	Order No.	Ød	L1	L2	ØD	Screw	Key
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

*Torque screwdriver is recommended.

Larger size insert is on request.

No Need To Choose
Nine9 Does It All

Always Better
JIMMORE
International Corp.