Nine9®

E®

Main Catalog 2021

Product Milestone

2019
"Ergo" launched

2016
"NC Helix Drill" launched

2015
"X-Engraving Tools" and "NC Deburring" launched

2011
"Mini i-Center" launched

2009
"i-Center" and "Chamfer Mill" launched

2007
"V-Engraving Tools" launched

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

2004
"Power Mill" launched

2003
"NC Spot Drill-PR" launched

2002
"Quick Change High Speed Boring Tools" launched

2001
"NC Spot Drill-CT" launched

1999
"Indexable Power Drill" launched

1995
- Small hole fine boring tools launched
- OEM/ODM service
- Standardized "High Efficiency" boring tools range

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

EVEREDE TOOL CO.®

Indexable tooling since 1932

Nine9®

Everede Tool Company has been the exclusive U.S.A. representative since 2002.

US 7,108,460 B2

US 7,287,937 B2

US 7,431,541 B2

US 7,455,487 B2

US 8,192,114 B2

US 9,579,812 B2

US 9,718,137 B2

US 9,764,396 B2

US 9,789,550 B2

US 9,937,566 B2

US 10,092,964 B2

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

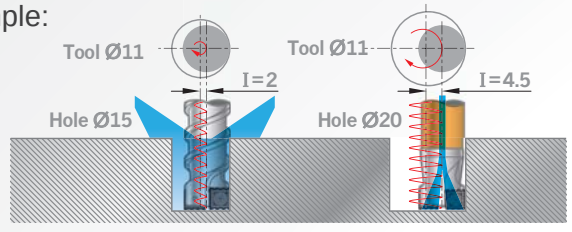
NC Helix Drill

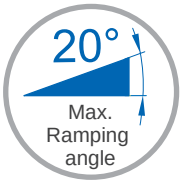
Ø0.512” ~ Ø2.56”
(Ø13 ~ Ø65mm)

P.1-1

Ideal for automation production
Excellent swarf removal

- Cuts materials by Helical interpolation.
- Just four tools can drill Ø0.512” ~ Ø2.56” holes.
- Serrated cutting edge minimizes cutting chips.
- Good for drilling on soft and long cutting chip material.
- New remarkable tool design to eliminate machining processes.
- Example:





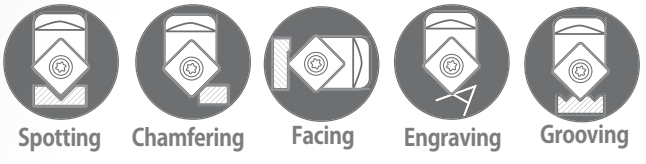
NC Spot Drill

60° ~ 145°

P.2-1

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 ~ 6.0mm

P.2-17

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.

All inserts fit in the same tool holder!

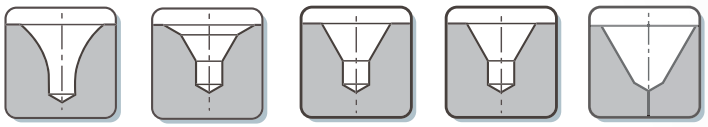
P.2-29

Indexable Center Drill « i-Center »

Pilot dia.
.039" ~ .394"
(1~10mm)

Long Tool Life!
No need for tool length resetting

- Excellent repeatability by insert type within 0.0008" (0.02mm) in radial direction.
- Shorten set up and center drilling time.
- 0.0020" (0.05mm) axial positional accuracy.
- Coolant can be supplied through the center of holder.



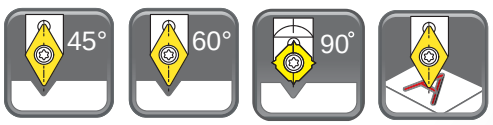
P.2-41

45° / 60° / 90°

Engraving

Different Angle!
Burr-Free!

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



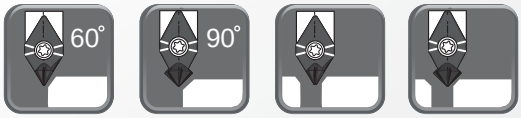
P.2-49

60° /90°

NC Deburring

Insert has 6 flutes,
6 times higher feed rate.

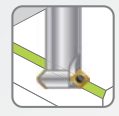
- Ideal for fine hole deburring.
- Smallest chamfer diameter Ø0.02"(Ø0.5mm)
- Achieve high speed and feed rate on CNC machine.
- Retain exceptional positional accuracy of the deburring depth and diameter.

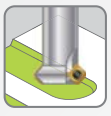


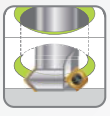
Chamfer Mill 45° P.2-50

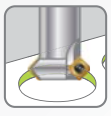
Front and Back Chamfering.
Ultra high speed & feed rate

- Smallest chamfer insert in the world.
- Smallest counter sink diameter Ø0.276” (Ø7mm).
- 4 times faster and up to 10 times higher feed rate than competitors.
- Dual relief angle insert, special edge honning and optimized coated.


Chamfering


Face Milling


Back Circular Chamferiing


Countersink

Super Power Drill 5xD ~ 10xD

Refe. Metric catalog

A truely straignt hole can be expected.

5 ~ 10xD: Ø0.748” ~ Ø1.575” (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.


Special pocket design for center pilot insert

Super Drill 3xD & 4xD P.3-1

Smallest indexable drill from 10mm.

3xD: Ø0.394” ~ Ø1.181” (Ø10 ~ Ø30mm)
4xD: Ø0.630“ ~ Ø1.181” (Ø16 ~ Ø30mm)

- Smallest indexable drill from 10mm.
- Same insert for outer and inner insert.
- Chip breaker of SD insert provides excellent chip control property due to its engineered design.
- Better surface finish and better diameter accuracy.
- Possible to drill into angled surfaces without pre-drilling.

Refe. Metric catalog

Ø0.394"~Ø12.402"
Ø10mm ~ Ø315mm

Power Mill

Web

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.
- High precision providing good productivity and surface finish.

0.197" ~ 1.969"
Ø5mm ~ Ø50mm

P.4-1

Boring Tool

You Tube

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

- Eccentrical mechanism boring bars.
- Adjusting range: ±0.004" (±0.1mm).
- Ø0.197" ~ Ø1.969" boring bars are interchangeable.
- Ideal for small hole boring with excellent accuracy.
- Good for fine boring operation on milling machines, machining centers and special purpose machines.
- Replace solid carbide reamers.

P.6-1

ER11, ER16, ER20, ER25 Ergo System

You Tube

Integrated ER taper-shank cutter

- Optimize the rigidity.
- Easy and simple assembly.
- Quick change, saving huge machine downtime.
- Excellent repeatability, saving set-up time.

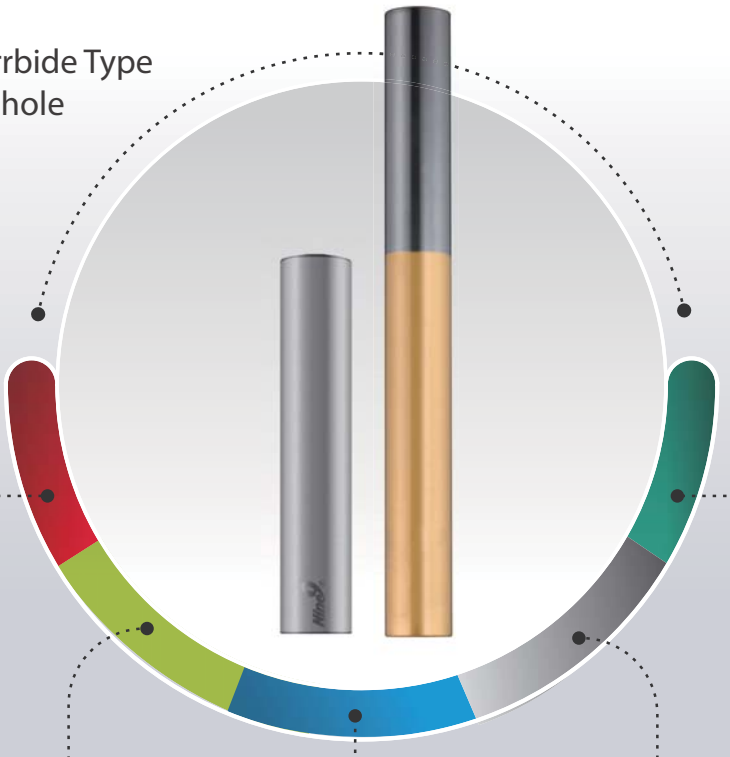
The ergo system are include milling cutters, spot drills, chamfering tools, corner rounding, engraving tools, deburring tools, center drills and boring tools.

Modular System

Extension bar's quick change head allows for fast and easy switching between different drilling or milling heads.

For NC Helix Drill, NC Spot Drill, Chamfer Mill, Power Mill and Direct Adjusting Boring Bar

- Steel Type & Solid Carrbide Type
- With internal coolant hole



NC Helix Drill

Drilling
Slotting
Rough milling

see P1-6

NC Spot Drill

Spotting
Engraving
Grooving
Chamfering

see P2-10
P2-11

Chamfer Mill

Chamfering
Face milling
Countersink

see P2-52

Power Mill

Face milling
Torus milling
Round milling

Refer to main catalogue
P4-4

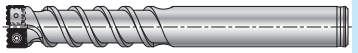
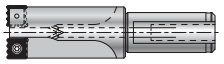
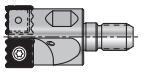
Boring Head

Direct adjusting
Fine boring

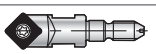
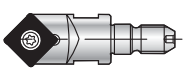
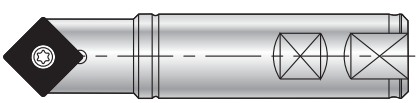
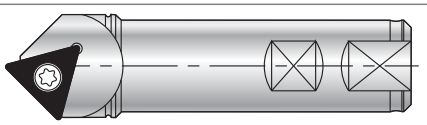
Refer to main catalogue
P5-18

Contents

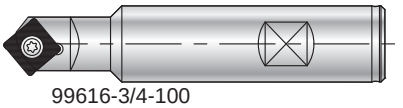
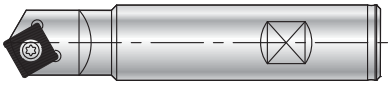
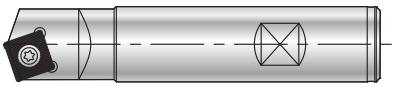
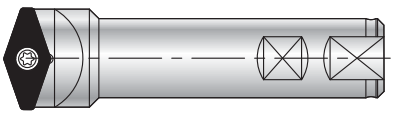
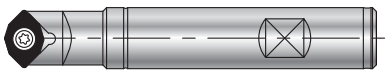
1 NC Helix Drill

Diameter	Holder	Inserts	Max. Drilling Depth	Regular Surface	Angled Surfaces	Step Hole	Page
Ø13 ~ Ø50 (Ø0.512”~Ø1.969”)	 99321	 N9MX...	75 (2.953”)	•	•	•	1-5
Ø45 ~ Ø65 (Ø1.654”~Ø2.560”)	 99321-025-4265		50 (1.969”)	•	•	•	1-6
Ø13~Ø50 (Ø0.512”~Ø1.969”)	 99323		160 (6.299”)	•	•	•	1-6

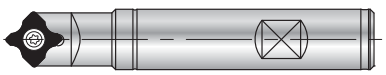
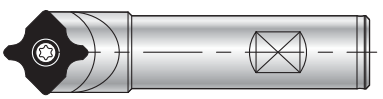
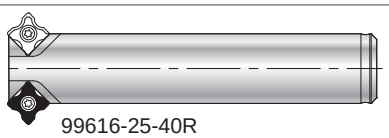
2 NC Spot Drill

Angle	Holder	Insert	D min.	D max.	Spotting	Chamfering	Grooving	Engraving	Page
60°	 99616-09V	 V9MT0802	1 (0.039”)	9 (0.354”)	•	•	•	•	2-6
	 99616-13V	 V9MT12T3	2 (0.079”)	13 (0.512”)	•	•	•	•	
82°	 99619-V082-3/8	 V0820802	2 (0.079”)	9 (0.354”)	•	•	•	•	2-7
	 99619-V082-5/8	 V08212T3	2 (0.079”)	14 (0.551”)	•	•	•	•	
	NEW  99619-X060...	 X060A90W	0.10 (0.004”)	2.2 (0.087”)	•				2-8
	 99616-06-6	 N9MT05T1	1 (0.039”)	6 (0.236”)	•	•		•	2-9
	 99616-08-8	 N9MT0602	1 (0.039”)	8 (0.315”)	•	•	•	•	
	 99616-3/8  99616-10-M6	 N9MT0802	2 (0.079”)	10 (0.394”)	•	•	•	•	2-10
90°	 99616-14...  99616-14-M8	 N9MT11T3	3 (0.118”)	14 (0.551”)	•	•	•	•	2-11
	 99616-22...	 N9MT1704	3 (0.118”)	22 (0.866”)	•	•	•	•	2-12
	 99616-25-CT28	 N9MT2204	4 (0.157”)	25 (0.984”)	•	•			2-13

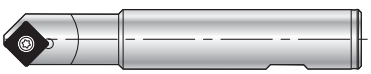
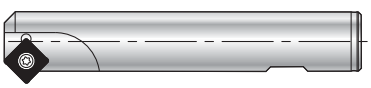
2 NC Spot Drill

Angle	Holder	Insert	D min.	D max.	Spotting	Chamfering	Grooving	Page
100°	 99616-3/4-100	 N9MT11T3	3 (0.118")	16 (0.630")	•	•		2-14
120°	 99616-3/4-120		3 (0.118")	17 (0.669")	•	•		
142°	 99616-3/4-142...		3 (0.118")	18 (0.728")	•	•		
	 99619-V142...	 V1421604	2 (0.079")	32 (1.260")	•			2-15
145° + 90°	 99616-3/8 / 14... / 22 ...	 WSP / M4~M16	3.3 (0.130")	20 (0.787")	•	•	•	2-16

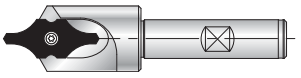
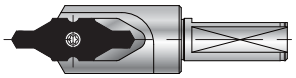
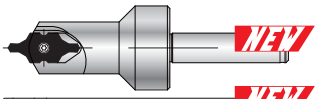
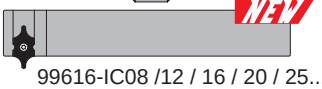
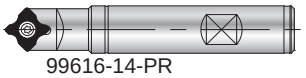
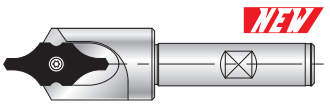
2 Corner Rounding

Angle	Holder	Inserts	Radius	Circular Corner Rounding	Corner Rounding	Back Corner Rounding	Page
RC	 99616-06...RC	 N9MT05T1RC (2 cutting edge insert)	0.5 / 0.75 / 1.0	•	•		2-18
	 99616-14...RC	 N9MT11T3RC (2 cutting edge insert)	1/64" ~ 1/8"	•	•		2-19
	 99616-22...RC	 N9MT1704RC (2 cutting edge insert)	3/16" & 1/4"	•	•		2-20
R	 99616-16-25R	 N9MT11T3R (4 cutting edge insert)	1.0 / 1.5 / 2.0 / 2.5 / 3.0	•	•		2-22
	 99616-16-30R			•	•	•	
	 99616-25-40R			•	•	•	

2 Large 45° Chamfering

Angle	Holder	Inserts	Chamfering min.	Chamfering max.	Chamfering	Side Grooving	Back Chamfering	Page
45°	 99616-18...LA	 N9MT11T308LA (4 cutting edge insert)	6 (0.236")	18 (0.709")	•			2-24
	 99616-28...LA		16 (0.236")	28 (1.102")	•	•	•	

2 Center Drilling / i-Center

Angle	Holder	Inserts	Pilot Dia. min.	Pilot Dia. max.					Page
R		 DIN332 Form R	1.0 (0.039")	10 (0.394")	•				2-31
A+B		 DIN332 Form A+B	1.0 (0.039")	10 (0.394")		•			2-31
A	 NEW	 DIN332 Form A	2.0 (0.079")	3.15 (0.124")			•		2-32
60°	 NEW 99616-IC08 /12 / 16 / 20 / 25...	 ANSI 60°	5/64"	3/8"			•		2-32
PR	 99616-14-PR	 N9MT11T3PR	2.0 (0.079")	3.0 (0.124")	• * Similar to DIN 332 Form R				2-37
NEW R	 NEW	 DIN332 Form R	1.0 (0.039")	3.15 (0.124")	•				2-35
NEW A+B		 DIN332 Form A+B	1.0 (0.039")	3.15 (0.124")		•			2-35
NEW 60°,90° & 120°	99616-IC10-12F	 Spotting & Csink	-	10 (0.394")				•	2-36

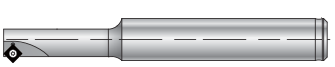
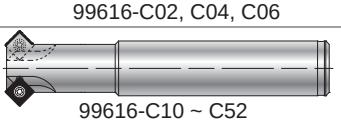
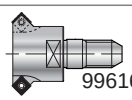
2 Engraving Tools

Angle	Holder	Inserts	Bottom Width min.	Bottom Width max.	T max.	Spotting	Engraving	Page
45°	 99619-V045...	 V04506T1W	0.45 (0.018")	2.1 (0.083")	2.0 (0.079")	•	•	2-43
60°	 99619-V060...	 V06006T1W	0.25 (0.010")	2.7 (0.106")	2.0 (0.079")	•	•	2-44
60°	 99616-10...SW	 N9MT0802	0.2 (0.008")	1.1 (0.043")	0.8 (0.031")	•	•	2-45
90°	 99616-10...SW	 N9MT0802	0.2 (0.008")	2.0 (0.079")	0.9 (0.035")	•	•	

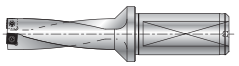
2 NC Deburring

Angle	Holder	Inserts	Depth min.	Depth max.	Deburring	Chamfering	Page
60°	 99619-X060...	 X060A60T6	0.1 (0.004")	1.9 (0.075")	•	•	2-49
90°	 99619-X060...	 X060A90T6	0.5 (0.020")	2.0 (0.079")	•	•	

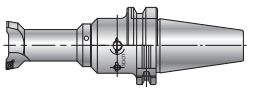
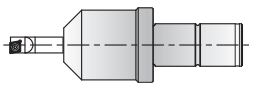
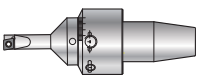
2 Front and Back Chamfer Mill

Angle	Holder	Inserts	Chamfering min.	Chamfering max.	Chamfering	Face Milling	Page
45°	 99616-C02, C04, C06	 N9GX04T002 (4 Cutting edge)	6.8 (0.268")	13.2 (0.520")	•		2-51
	 99616-C10 ~ C52	 N9GX... (4 Cutting edge)	7 (0.276")	32 (1.260")	•	•	2-52
	 NEW 99616-CM16 ~ CM29	 N9GX... (4 Cutting edge)	11 (0.433")	29.5 (1.161")	•	•	

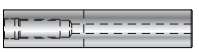
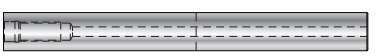
3 Super Drill 3xD

Diameter	Holder	Inserts	Drilling Depth	Half Hole	Angled Surface	Round workpiece offset Drilling	Page
Ø13 ~ Ø30 (Ø0.512”~Ø1.181”)	 99313	N9GX...	30 ~ 90 (1.181” ~ 3.543”)	•	•	•	3-2

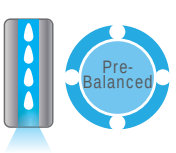
4 Boring Tool

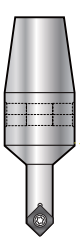
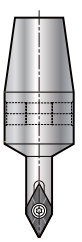
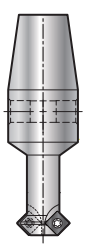
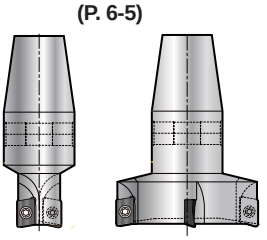
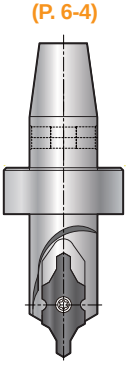
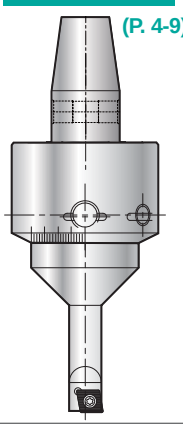
Diameter	Holder	ISO Insert	Boring Depth	Adjusting Range	Page
Ø5 ~ Ø50 (Ø0.197”~Ø1.969”)	 99146	G grade	10 ~ 70 (0.394” ~ 2.756”)	±0.12 (±0.005”)	4-3
Ø5 ~ Ø20 (Ø0.197”~ Ø0.787”)	 99151	G, F grade	20 ~ 100 (0.787” ~ 3.937”)	±0.1 (±0.004”)	4-7
Ø5 ~ Ø25 (Ø0.197”~Ø0.984”)	 NEW 99820-B01 (ER20 Taper-shank)	G, F grade	20 ~ 50 (0.787” ~ 1.969”)	±0.12 (±0.005”)	4-9

5 Accessory

Diameter	Holder	Type	Length	Max. Overhang Length	Page
Ø10 ~ Ø25 (Ø0.394”~Ø0.984”)	 99801-xxS (M5 ~ M12)	Steel	75 ~ 120 (2.953” ~ 4.724”)	25 ~ 50 (0.984” ~ 1.969”)	5-2
Ø10 ~ Ø25 (Ø0.394”~Ø0.984”)	 99801-xxW (M5 ~ M12)	Solid Carbide	100 ~ 200 (3.937” ~ 7.874”)	60 ~ 125 (2.362” ~ 4.921”)	5-2

6 NEW Ergo Integrated ER taper-shank cutter



NC Spot Drill & Corner Rounding	Engraving & Deburring	Chamfer Mill	Ø10 ~ Ø32mm Power Mill (Ø0.394” ~ Ø1.260”)	indexable Center Drill	Boring Tool
(P. 6-3)	(P. 6-3)	(P. 6-4)	(P. 6-5)	(P. 6-4)	(P. 4-9)
					

Nine9 Inserts >> Quick Pick

Nine9 inserts apply for modern machining by its special geometry which is able to run at higher speed and feed rate. In addition, the indexable insert eliminates the tool's changing time. Carbide insert with latest coating technology extends tool life dramatically. Nine9-insert helps you to save money and increase productivity.

Products		Grade	Coating	P Steel	M Stainless Steel	K Cast Iron	N Non-Ferrous	H Hardened Steel Up to 56 HRC	S Titanium
NC Helix Drill		NC5072	TiAlN	●	●	◎	◎	○	◎
		NC2032	TiAlN	◎	○	●	◎	◎	○
NC Spot Drill	NEW 	NC2032	TiAlN	●	◎	●			
	NEW 	NC2035	ALDURA	◎		○		●	
	NEW 	XP9001	Polished		○		●		
		NC10	TiAlN		●	●	◎		
		NC40	TiN	●	○	◎			
		NC2071 (H-NC40)	TiN	●	●	◎	◎		●
		NC9076	DLC		◎		●		◎
		NC60	Cermet	◎	○			●	
Corner Rounding		NC2071	TiN	●	○	●			
		NC9036	DLC		●		●		◎
i-Center		NC2033	TiAlN	●	○	●		○	
		NC5074	Helica	●	○	◎			
	NEW 	NC2057	AL(L)	●	●	◎			

● Best ◎ Suit ○ Possible

Products	Grade	Coating	P Steel	M Stainless Steel	K Cast Iron	N Non-Ferrous	H Hardened Steel Up to 56 HRC	S Titanium
Engraving	NC2032	TiAlN	●	○	●			
	NC2071	TiN	◎	●		◎		
	NC9031	TiN		◎		●		
	NC2035	ALDURA	◎		○		●	
	NC9036	DLC		◎		●		◎
	NC40, 60-NC40	TiN	●		●	◎		
	NC10	TiAlN	◎		●	●		
NC Deburring	NC2032	TiAlN	●	○	◎	●		
Chamfer Mill	NC2032	AlTiN	●	○	●		◎	
	NC9071	TiN	○	●		●		
Super Drill	NC2032	AlTiN	●	○	●		◎	●
Boring Tool	NC30	TiAlN	●	◎	●			
	NC2032	AlTiN			●			
	NC2033	TiAlN	●	◎	●			
	NC9036	DLC				●		
	U-XP9001	--				●		

● Best ◎ Suit ○ Possible

Economy pack for larger end users. Do not miss it!

STARTER KITS

• NC Spot Drill-CT 60° / 82° / 90° / 100° / 120° / 142°

Fig.	Parts No.	Angle	Insert	Content	Page
1	99616-13V-5/8.12 2071 KIT	60°	V9MT12T3CT-NC2071	1 x 5/8" holder + 3 inserts + 1 key	P. 2-6
2	99619-V82-5/8.12 2071 KIT	82°	V08212T3-NC2071	1 x 5/8" holder + 3 inserts + 1 key	P. 2-7
3	99616-06-1/4.05 2071 KIT	90°	N9MT05T1CT-NC2071	1 x 1/4" holder + 6 inserts + 1 key	P. 2-9
	99616-3/8.08 NC40 KIT		N9MT080208CT-NC40	1 x 3/8" holder + 6 inserts + 1 key	P. 2-10
	99616-3/8.08 NC10 KIT		N9MT080204CT-NC10		
	99616-14-1/2.11 NC40 KIT		N9MT11T3CT-NC40	1 x 1/2" holder + 6 inserts + 1 key	P. 2-11
	99616-14-1/2.11 NC10 KIT		N9MT11T3CT-NC10		
	99616-14-1/2.11 NC60 KIT		N9MT11T3CT-NC60		
	99616-14-5/8.11 NC40 KIT		N9MT11T3CT-NC40	1 x 5/8" holder + 6 inserts + 1 key	P. 2-11
	99616-14-5/8.11 NC10 KIT		N9MT11T3CT-NC10		
	99616-14-5/8.11 NC60 KIT		N9MT11T3CT-NC60		
4	99616-22-3/4.17 2071 KIT	90°	N9MT1704CT-NC2071	1 x 3/4" holder + 3 inserts + 1 key	P. 2-12
5	99619-142-5/8.08 2071 KIT	142°	V1420803-NC2071	1 x 5/8" holder + 3 inserts + 1 key	P. 2-15

STARTER KITS

• V045 / V060 Engraving Tool Kit

Parts No.	Angle	Insert included	Content	Page
99619-V045-03K-71	45°	V04506T1W06-2071	1 x 40 L holder + 3 inserts + 1 key	P. 2-43
99619-V045-03K-32		V04506T1W06-2032		
99619-V045-03K-31		V04506T1W06-9031		
99619-V060-03K-71	60°	V06006T1W06-2071		P. 2-44
99619-V060-03K-32		V06006T1W06-2032		
99619-V060-03K-35		V06006T1W06-2035		
99619-V060-03K-31		V06006T1W06-9031		

• SW 60° / 90° Engraving Tools Kit

Parts No.	Angle	Insert included	Content	Page
99616-3/8.08W-60 NC40 KIT	60°	N9MT080201W60-NC40	1 x Ø3/8" holder + 2 inserts + 1 key	P. 2-45
99616-3/8.08W NC40 KIT	90°	N9MT080201W-NC40		
99616-3/8.08W NC10 KIT		N9MT080201W-NC10		

• NC Deburring Kit

Parts No.	Angle	Insert included	Content	Page
99619-X060-DB60-02K-32	60°	X060A60T6-NC2032	1 x 60 L Carbide holder 1 x T7 key 2 x inserts	P. 2-49
99619-X060-DB90-02K-32	90°	X060A90T6-NC2032		

• Chamfering Kit

Fig	Parts No.	Insert included	Holder included	Content	Page
1	99616-C1020-32	N9GX04T002-NC2032	99616-C10 + 99616-C20	2 x holders + 10 inserts + 1 key	P. 2-52
	99616-C1020-71	N9GX04T002-NC9071			
2	99616-C3040-32	N9GX060204-NC2032	99616-C30 + 99616-C40		
	99616-C3040-71	N9GX060204-NC9071			
3	99616-C5052-32	N9GX090308-NC2032	99616-C50 + 99616-C52		
	99616-C5052-71	N9GX090308-NC9071			

NC Helix Drill

One Tool Performs Multiple Applications

Rough Milling, Drilling & Slotting

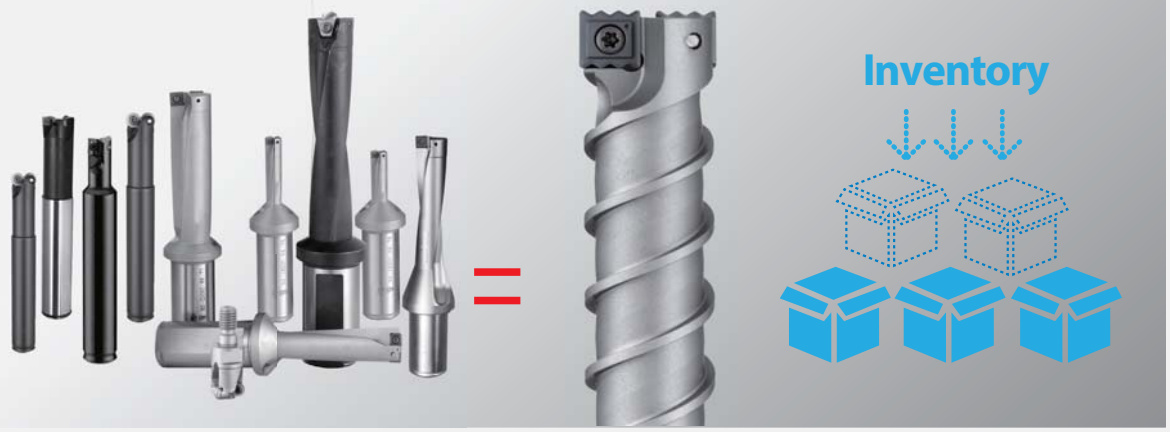
Cuts material by helical interpolation;
serrated cutting edge minimizes chip length.
Low spindle power is required, good for drilling material that generates long, soft chips.

Reduce Your Tool Inventory

Only four tools for making Ø .512"~Ø2.559" (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!



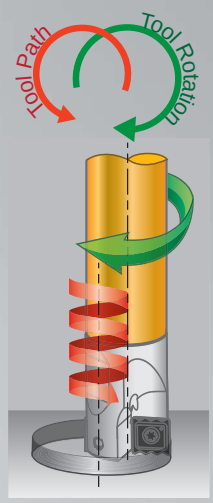
◄ **Cylindrical shank**
Apply external coolant

◄ **Patented Screw fit**
With center coolant hole

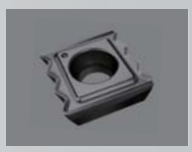
Swarf Control:
Small & Short

Extension Bar ►
For 4xDc ~ 8xDc deep hole drilling

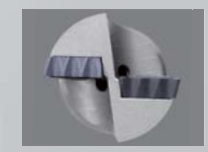
Ti6Al4V, Titanium



All NC Helix Drill must be programmed by helical interpolation



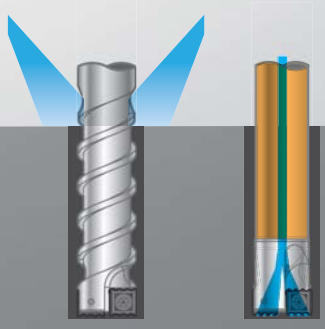
2 cutting edges insert

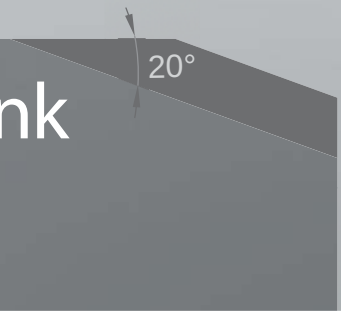


≃ Flat bottom shape

20° Ramping Angle

Either linear or circular ramping.



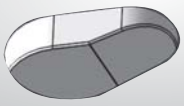
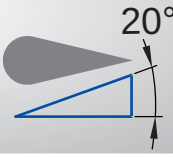


Two types of shank

Drilling depth up to 8xDc

01 Lower spindle power consumption Easy to cut!

Feature
<Page 1-13>

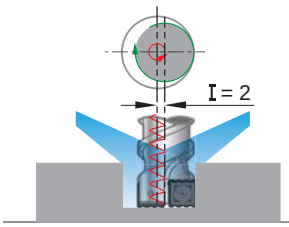
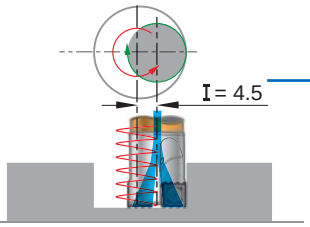
Circular milling	Ramping Angle
	

- 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 Just four tools for drilling Ø.512"~Ø2.559"(Ø13~65mm)

Feature
<Page 1-13>

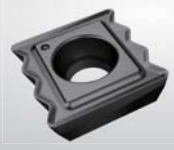
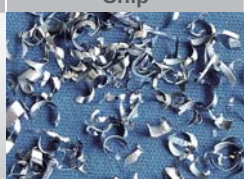
Example :

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 Special insert geometry - exceptional swarfs control.

Feature
<Page 1-12>

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

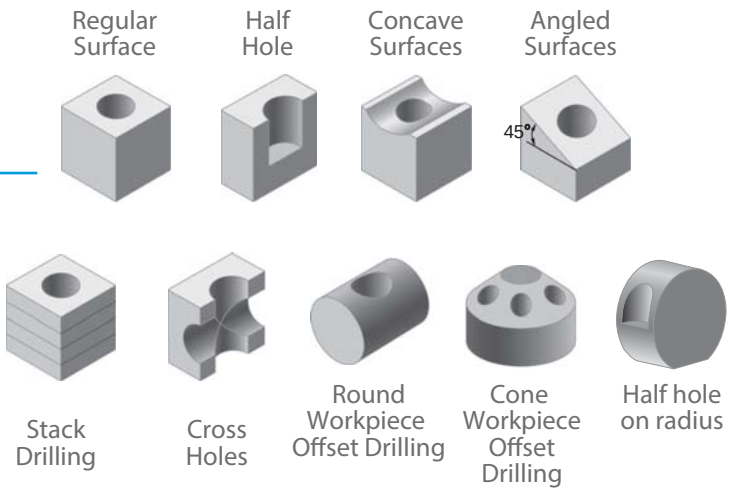
<Page 1-14>

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

05 Feature



Roughness Measuring

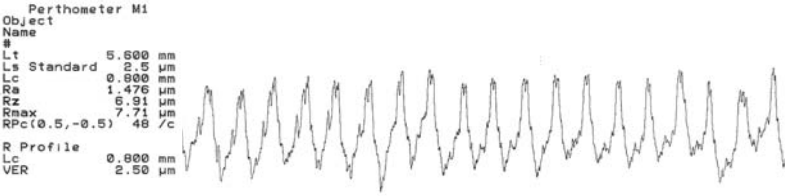
Feature 06

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

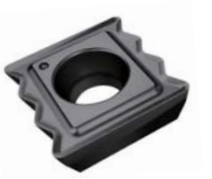
Workpiece


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



Insert

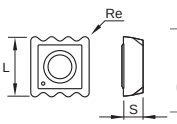


NC5072 : P40, TiAlN coating.
General purpose, suitable for almost all kind of steel, stainless steel and Titanium.
Recommended while clamping devices is unstable or deep hole drilling or apply on low power machines.

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	◎	○	●	◎	○	◎

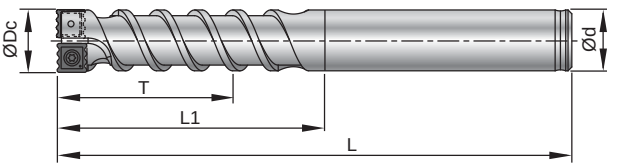
Parts No.		Grade	Coating		Dimensions L	Dimensions S	Dimensions Re	Screw	Key
N9MX04T002	NC5072	P40	TiAlN		4.75 (0.187")	1.8 (0.071")	0.2 (0.008")	NS-18037 / 0.6 Nm (5.31 in.-lb.)	NK-T6
	NC2032	K20F							
N9MX05T103	NC5072	P40	TiAlN		5.75 (0.226")	2.0 (0.079")	0.3 (0.012")	NS-20045 / 0.6 Nm (5.31 in.-lb.)	NK-T6
	NC2032	K20F							
N9MX070204	NC5072	P40	TiAlN		7.5 (0.295")	2.4 (0.094")	0.4 (0.016")	NS-25045 / 0.9 Nm (7.97 in.-lb.)	NK-T7
	NC2032	K20F							
N9MX100306	NC5072	P40	TiAlN		10.0 (0.394")	3.18 (0.125")	0.6 (0.024")	NS-30072 / 2.0 Nm (17.7 in.-lb.)	NK-T9
	NC2032	K20F							
N9MX12T308	NC5072	P40	TiAlN		12.5 (0.492")	3.97 (0.156")	0.8 (0.031")	NS-35080 / 2.5 Nm (22.13 in.-lb.)	NK-T15
	NC2032	K20F							

Holder

Cylindrical Shank (made from hardened high alloy steel)

▸ Helical chip-removing groove >>

- Designed for CNC machines with external coolant.
- Unique helical groove design generates chip-removing coolant stream.
- The helical groove is designed for the coolant to remove swarf from the cutting zone.

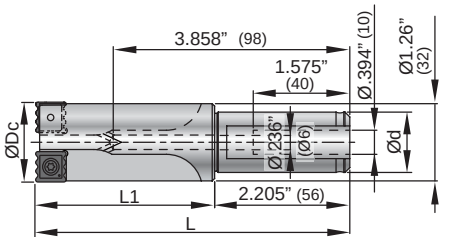


Parts No.	Type	Capable of drill dia. Dmin.	Capable of drill dia. Dmax.	ØDc	T	L1	L	Ød	Insert type	Max. ramping angle
99321-010-1320	BC10-HD11-1320	13 (0.512")	20 (0.787")	11 (0.433")	30 (1.181")	40 (1.575")	80 (3.150")	10 (0.394")	N9MX04T002	20°
99321-012-1525	BC12-HD13-1525	15 (0.591")	25 (0.984")	13 (0.512")	36 (1.417")	50 (1.969")	100 (3.937")	12 (0.472")	N9MX05T103	20°
99321-016-2030	BC16-HD17-2030	20 (0.787")	30 (1.181")	17 (0.669")	50 (1.969")	60 (2.362")	110 (4.331")	16 (0.630")	N9MX070204	20°
99321-020-2540	BC20-HD22-2540	25 (0.984")	40 (1.575")	22 (0.866")	60 (2.362")	70 (2.756")	125 (4.921")	20 (0.787")	N9MX100306	20°
99321-025-3050	BC25-HD27-3050	30 (1.181")	50 (1.969")	27 (1.063")	75 (2.953")	85 (3.346")	165 (6.496")	25 (0.984")	N9MX12T308	20°

Side Lock Shank

With Internal Coolant

• Special size is available on request.



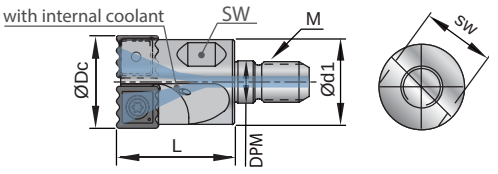
Parts No.	Type	Capable of drill dia.		ØDc	L	L1	Ød	Max. Depth	Insert type	Max. ramping angle
		Dmin.	Dmax.							
99321-025-4265	SL25-HD33-4265	42 (1.654")	65 (2.559")	33 (1.299")	130 (5.118")	74 (2.913")	25 (0.984")	50 (1.969")	N9MX12T308	9°

Screw Fit Cutter

With Internal Coolant

• Designed for CNC machines with internal coolant.
• Standard screw-fit body adapts to almost any kind of the screw-fit tool holder or extension bar in the market.
• Possible apply for enlarge hole.

* Use open ended spanner to tighten the cutter.

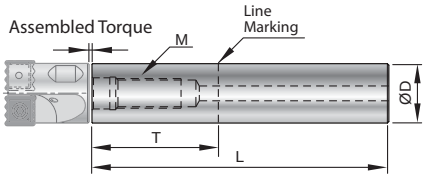


Parts No.	Type	Capable of drill dia.		ØDc	L	M	DPM	Ød1	SW	Insert type	Max. ramping angle
		Dmin.	Dmax.								
99323-010-1320	M05-HD11-1320	13 (0.512")	20 (0.787")	11 (0.433")	20 (0.787")	M5	5.5 (0.217")	10 (0.394")	8 (0.315")	N9MX04T002	20°
99323-012-1525	M06-HD13-1525	15 (0.591")	25 (0.984")	13 (0.512")	25 (0.984")	M6	6.5 (0.256")	12 (0.472")	10 (0.394")	N9MX05T103	20°
99323-016-2030	M08-HD17-2030	20 (0.787")	30 (1.181")	17 (0.669")	25 (0.984")	M8	8.5 (0.335")	16 (0.630")	14 (0.551")	N9MX070204	20°
99323-020-2540	M10-HD22-2540	25 (0.984")	40 (1.575")	22 (0.866")	30 (1.181")	M10	10.5 (0.413")	20 (0.787")	18 (0.709")	N9MX100306	20°
99323-025-3050	M12-HD27-3050	30 (1.181")	50 (1.969")	27 (1.063")	35 (1.378")	M12	12.5 (0.492")	25 (0.984")	23 (0.906")	N9MX12T308	20°

Extension Bar

Steel Type

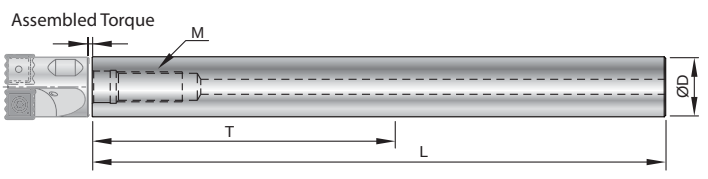
• T is the maximum overhang length.
• With internal coolant hole.



Parts No.	Type	ØD	T	L	M	Assembled Torque
99801-10S	BC10-075M05S	10 (0.394")	25 (0.984")	75 (2.953")	M5xP0.8	6.5 Nm
99801-12S	BC12-075M06S	12 (0.472")	25 (0.984")	75 (2.953")	M6xP1.0	11.0 Nm
99801-16S	BC16-090M08S	16 (0.630")	35 (1.378")	90 (3.543")	M8xP1.25	25.0 Nm
99801-20S	BC20-100M10S	20 (0.787")	40 (1.575")	100 (3.937")	M10xP1.5	50.0 Nm
99801-25S	BC25-120M12S	25 (0.984")	50 (1.969")	120 (4.724")	M12xP1.75	60.0 Nm

Solid Carbide Type

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



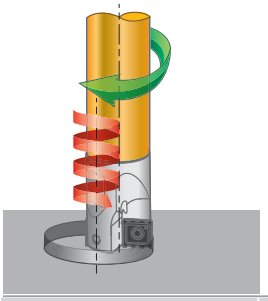
Parts No.	Type	ØD	T	L	M	Assembled Torque
99801-10W	BC10-100M05W	10 (0.394")	60 (2.362")	100 (3.937")	M5xP0.8	6.5 Nm
99801-12W	BC12-100M06W	12 (0.472")	60 (2.362")	100 (3.937")	M6xP1.0	11.0 Nm
99801-16W	BC16-150M08W	16 (0.630")	80 (3.150")	150 (5.906")	M8xP1.25	25.0 Nm
99801-20W	BC20-200M10W	20 (0.787")	100 (3.937")	200 (7.874")	M10xP1.5	50.0 Nm
99801-25W	BC25-200M12W	25 (0.984")	125 (4.921")	200 (7.874")	M12xP1.75	60.0 Nm

Technical Guide

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

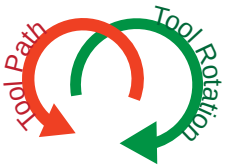
1 Programming

All NC Helix Drills must be programmed using helical interpolation



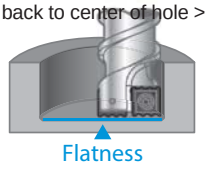
2 Recommend of Direction

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



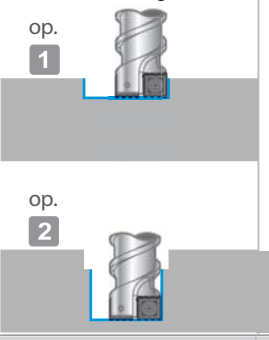
3 Flatness on blind hole bottom

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 73 psi.(5 bar).
Aim nozzle toward the tool body, let the coolant effectively enter the hole.

6 For Start

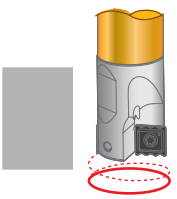
SFM	fz	Pitch (By Spindle Power)

Result adjusting

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

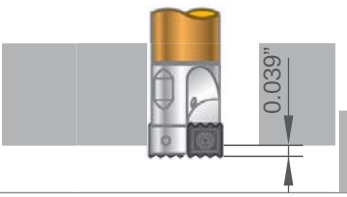
7 Through hole

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



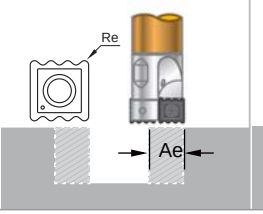
8 Through hole Add 1mm to the required depth (Z)

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.

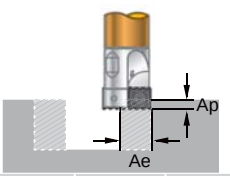


10 Internal coolant

High pressure is recommended.
Minimum 145 psi. (10 bar).
Recommended for 3xDc ~8xDc Use.

※ Choosing a suitable drill body.

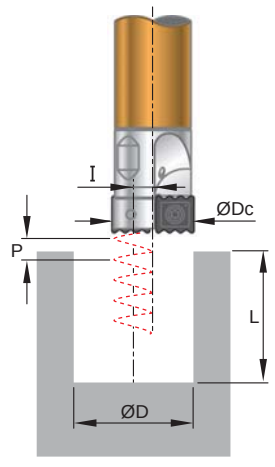
- Required hole diameter is within the recommended range (**blue numbers**).
- Required hole diameters (more than one size), choose the drill can cover more different hole diameters.
- For 3xDc~8xDc drilling, 99323 series is recommended.



Drilling diameter	Coolant type	Max. drilling depth	Tool type	Dc	Insert type	Re	Min. Ae	Max. Ae	Max. Ap
0.512"~ **0.590"~ 0.787"**	Internal	3.150"	99323-010-1320	0.433"	N9MX04T002	0.008"	0.062"	0.417"	0.138"
	External	1.181"	99321-010-1320	0.433"					
0.590"~ **0.787"~ 0.984"**	Internal	3.346"	99323-012-1525	0.512"	N9MX05T103	0.012"	0.076"	0.488"	0.169"
	External	1.417"	99321-012-1525	0.512"					
0.787"~ **0.984"~ 1.181"**	Internal	4.134"	99323-016-2030	0.669"	N9MX070204	0.016"	0.098"	0.638"	0.220"
	External	1.969"	99321-016-2030	0.669"					
0.984"~ **1.181"~ 1.575"**	Internal	5.118"	99323-020-2540	0.866"	N9MX100306	0.024"	0.130"	0.819"	0.295"
	External	2.362"	99321-020-2540	0.866"					
1.181"~ **1.575"~ 1.969"**	Internal	6.299"	99323-025-3050	1.063"	N9MX12T308	0.031"	0.164"	1.000"	0.354"
	External	2.953"	99321-025-3050	1.063"					
1.654"~ **1.969"~ 2.559"**	Internal	1.969"	99321-025-4265	1.299"	N9MX12T308	0.031"	0.164"	1.236"	0.354"

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)	Formula
	$S = \frac{3.82 \times SFM}{Dc}$ r.p.m. $F = S \times IPR$ IPM $d = D - Dc$ Inch $I = \frac{(D-Dc)}{2}$ Inch	Dc = Dia. of Drill — Inch D = Dia. of Hole — Inch L = Depth of Drilling — Inch Vc = Cutting Speed — SFM S = Spindle Speed — r.p.m. I = Circular radius — Inch fz = Feed rate — Inch / tooth F = Table feed rate — IPM d = Circular diameter (D-Dc) — Inch P = Pitch of helical interpolation — Inch T = Cutting time — sec. Q = Chip removal volume rate — Inch³ / min. Z = Insert tooth

Cutting time (T)

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

Chip removal Volume rate (Q)

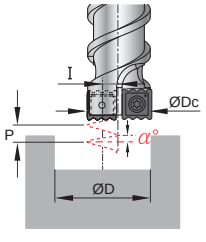
$$Q = \frac{\pi \times D^2 \times L \times 60}{4 \times T} \text{ Inch}^3/\text{min.}$$

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

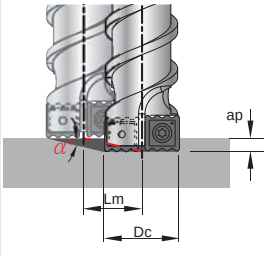


Circular ramping (α)

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

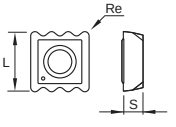
P < 2.2 x Circular radius (I)

α < 20°



Linear ramping (α)

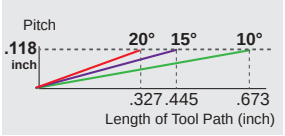
$$\alpha = \tan^{-1}\frac{ap}{Lm} \text{ degree}$$



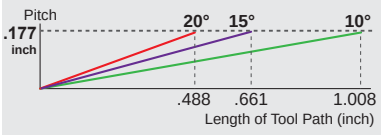
Max. ap < 3/4 of insert length

※ **Length of tool path for linear ramping.**
Length of tool path for Circular ramping= (D-Dc) x 3.14

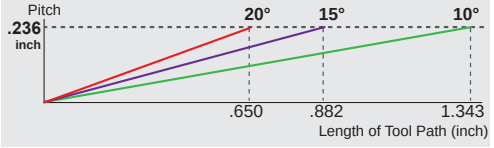
▪ N9MX04T002



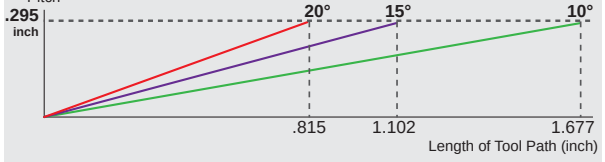
▪ N9MX05T103



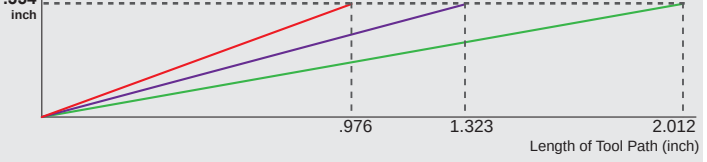
▪ N9MX070204



▪ N9MX100306



▪ N9MX12T308



Cutting Data

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

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

Workpiece material		SFM		Ø .512"				Ø .630"				Ø .787"			
		99321	99323	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch		
P	Carbon steel 0.25% C	394	656	.0010	.0236	.0315	.0394	.0022	.0354	.0472	.0591	.0031	.0472	.0630	.0787
P	Carbon steel 0.45% C	394	656	.0010	.0236	.0315	.0394	.0022	.0354	.0472	.0591	.0031	.0472	.0630	.0787
P	Carbon steel 0.60% C	328	492	.0010	.0236	.0295	.0354	.0020	.0315	.0433	.0531	.0028	.0394	.0551	.0709
P	Low alloy steel	230	394	.0008	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0024	.0394	.0512	.0630
P	High alloy steel	197	295	.0008	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0024	.0394	.0512	.0630
M	Stainless steel	197	295	.0008	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0024	.0394	.0512	.0630
K	Cast iron	230	394	.0010	.0236	.0315	.0394	.0022	.0354	.0472	.0591	.0031	.0472	.0630	.0787
N	Al	1150	1638	.0010	.0354	.0472	.0591	.0022	.0512	.0709	.0886	.0031	.0709	.0945	.1181
N	Cu	656	1310	.0010	.0276	.0374	.0472	.0022	.0394	.0551	.0709	.0031	.0551	.0748	.0945
S	Ni- alloy	66	92	.0004	.0197	.0256	.0315	.0006	.0276	.0374	.0472	.0012	.0354	.0512	.0630
S	Titanium	131	197	.0004	.0197	.0256	.0315	.0006	.0276	.0374	.0472	.0012	.0354	.0512	.0630
H	Hardened	197	295	.0008	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0024	.0394	.0512	.0630

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

Workpiece material		SFM		Ø .590"				Ø .787"				Ø .984"			
		99321	99323	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch		
P	Carbon steel 0.25%C	394	656	.0014	.0472	.0630	.0787	.0026	.0591	.0787	.0984	.0035	.0709	.0945	.1181
P	Carbon steel 0.45% C	394	656	.0014	.0472	.0630	.0787	.0026	.0591	.0787	.0984	.0035	.0709	.0945	.1181
P	Carbon steel 0.60%C	328	492	.0012	.0433	.0591	.0709	.0024	.0512	.0701	.0886	.0031	.0630	.0846	.1063
P	Low alloy steel	230	394	.0010	.0394	.0512	.0630	.0020	.0472	.0630	.0787	.0028	.0551	.0748	.0945
P	High alloy steel	197	295	.0010	.0394	.0512	.0630	.0020	.0472	.0630	.0787	.0028	.0551	.0748	.0945
M	Stainless steel	197	295	.0010	.0394	.0512	.0630	.0020	.0472	.0630	.0787	.0028	.0551	.0748	.0945
K	Cast iron	230	394	.0014	.0472	.0630	.0787	.0026	.0512	.0748	.0984	.0035	.0709	.0945	.1181
N	Al	1150	1638	.0014	.0709	.0945	.1181	.0026	.0866	.1173	.1476	.0035	.1063	.1417	.1772
N	Cu	656	1310	.0014	.0551	.0748	.0945	.0026	.0709	.0945	.1181	.0035	.0827	.1122	.1417
S	Ni- alloy	66	92	.0005	.0394	.0512	.0630	.0009	.0472	.0630	.0787	.0012	.0551	.0748	.0945
S	Titanium	131	197	.0005	.0394	.0512	.0630	.0009	.0472	.0630	.0787	.0012	.0551	.0748	.0945
H	Hardened	197	295	.0010	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0028	.0394	.0512	.0630

Cutting Data

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

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

	Workpiece material	SFM 99321	SFM 99323	Ø .787" fz Inch/tooth	Ø .787" Pitch Inch			Ø .984" fz Inch/tooth	Ø .984" Pitch Inch			Ø1.181" fz Inch/tooth	Ø1.181" Pitch Inch		
P	Carbon steel 0.25% C	394	656	.0016	.0709	.0945	.1181	.0031	.0827	.1102	.1378	.0041	.0945	.1260	.1575
P	Carbon steel 0.45% C	394	656	.0016	.0709	.0945	.1181	.0031	.0827	.1102	.1378	.0041	.0945	.1260	.1575
P	Carbon steel 0.60% C	328	492	.0014	.0630	.0846	.1063	.0028	.0748	.1004	.1260	.0035	.0827	.1122	.1417
P	Low alloy steel	230	394	.0012	.0551	.0748	.0945	.0026	.0630	.0866	.1102	.0031	.0748	.1004	.1260
P	High alloy steel	197	295	.0012	.0551	.0748	.0945	.0026	.0630	.0866	.1102	.0031	.0748	.1004	.1260
M	Stainless steel	197	295	.0012	.0551	.0748	.0945	.0026	.0630	.0866	.1102	.0031	.0748	.1004	.1260
K	Cast iron	230	394	.0016	.0709	.0945	.1181	.0031	.0827	.1102	.1378	.0041	.0945	.1260	.1575
N	Al	1150	1638	.0016	.1063	.1417	.1772	.0031	.1220	.1594	.1969	.0041	.1417	.1890	.2362
N	Cu	656	1310	.0016	.0827	.1122	.1417	.0031	.0984	.1319	.1654	.0041	.1102	.1496	.1890
S	Ni- alloy	66	92	.0006	.0551	.0748	.0945	.0012	.0630	.0866	.1102	.0016	.0748	.1004	.1260
S	Titanium	131	197	.0006	.0551	.0748	.0945	.0012	.0630	.0866	.1102	.0016	.0748	.1004	.1260
H	Hardened	197	295	.0012	.0551	.0748	.0945	.0026	.0630	.0866	.1102	.0031	.0748	.1004	.1260

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

	Workpiece material	SFM 99321	SFM 99323	Ø .984" fz Inch/tooth	Ø .984" Pitch Inch			Ø1.260" fz Inch/tooth	Ø1.260" Pitch Inch			Ø1.575" fz Inch/tooth	Ø1.575" Pitch Inch		
P	Carbon steel 0.25% C	394	656	.0020	.0709	.0945	.1181	.0037	.0945	.1260	.1575	.0047	.1181	.1575	.1969
P	Carbon steel 0.45% C	394	656	.0020	.0709	.0945	.1181	.0037	.0945	.1260	.1575	.0047	.1181	.1575	.1969
P	Carbon steel 0.60% C	328	492	.0016	.0630	.0846	.1063	.0031	.0866	.1142	.1417	.0043	.1063	.1417	.1772
P	Low alloy steel	230	394	.0014	.0551	.0748	.0945	.0028	.0748	.1004	.1260	.0037	.0945	.1260	.1575
P	High alloy steel	197	295	.0014	.0551	.0748	.0945	.0028	.0748	.1004	.1260	.0037	.0945	.1260	.1575
M	Stainless steel	262	295	.0014	.0551	.0748	.0945	.0028	.0748	.1004	.1260	.0037	.0945	.1260	.1575
K	Cast iron	230	394	.0020	.0709	.0945	.1181	.0037	.0945	.1260	.1575	.0047	.1181	.1575	.1969
N	Al	1150	1638	.0020	.1063	.1417	.1772	.0037	.1417	.1890	.2362	.0047	.1772	.2362	.2953
N	Cu	656	1310	.0020	.0827	.1122	.1417	.0037	.1142	.1516	.1890	.0047	.1417	.1890	.2362
S	Ni- alloy	131	164	.0008	.0551	.0748	.0945	.0014	.0748	.1004	.1260	.0018	.0945	.1260	.1575
S	Titanium	262	295	.0008	.0551	.0748	.0945	.0014	.0748	.1004	.1260	.0018	.0945	.1260	.1575
H	Hardened	262	295	.0014	.0551	.0748	.0945	.0028	.0748	.1004	.1260	.0037	.0945	.1260	.1575

Cutting Data

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

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

Workpiece material		SFM		Ø1.181"				Ø1.575"				Ø1.969"			
		99321	99323	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch		
P	Carbon steel 0.25% C	394	656	.0022	.0945	.1260	.1575	.0047	.1181	.1575	.1969	.0053	.1417	.1890	.2362
P	Carbon steel 0.45% C	394	656	.0022	.0945	.1260	.1575	.0047	.1181	.1575	.1969	.0053	.1417	.1890	.2362
P	Carbon steel 0.60% C	328	492	.0020	.0866	.1142	.1417	.0039	.1063	.1417	.1772	.0047	.1260	.1693	.2126
P	Low alloy steel	230	394	.0016	.0748	.1004	.1260	.0035	.0945	.1260	.1575	.0043	.1142	.1516	.1890
P	High alloy steel	197	295	.0016	.0748	.1004	.1260	.0035	.0945	.1260	.1575	.0043	.1142	.1516	.1890
M	Stainless steel	197	295	.0016	.0748	.1004	.1260	.0035	.0945	.1260	.1575	.0043	.1142	.1516	.1890
K	Cast iron	230	394	.0022	.0945	.1260	.1575	.0045	.1181	.1575	.1969	.0053	.1417	.1890	.2362
N	Al	1150	1638	.0022	.1417	.1890	.2362	.0045	.1772	.2362	.2953	.0053	.2126	.2835	.3543
N	Cu	656	1310	.0022	.1142	.1516	.1890	.0045	.1417	.1890	.2362	.0053	.1693	.2264	.2835
S	Ni- alloy	66	92	.0008	.0748	.1004	.1260	.0018	.0945	.1260	.1575	.0022	.1142	.1516	.1890
S	Titanium	131	197	.0008	.0748	.1004	.1260	.0018	.0945	.1260	.1575	.0022	.1142	.1516	.1890
H	Hardened	197	295	.0016	.0748	.1004	.1260	.0035	.0945	.1260	.1575	.0043	.1142	.1516	.1890

99321-025-4265 >>

Workpiece material		SFM	Ø1.654"				Ø2.165"				Ø2.559"			
		99321	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch		
P	Carbon steel 0.25% C	656	.0031	.1181	.1575	.1969	.0047	.1299	.1732	.2165	.0053	.1417	.1890	.2362
P	Carbon steel 0.45% C	492	.0031	.1181	.1575	.1969	.0047	.1299	.1732	.2165	.0053	.1417	.1890	.2362
P	Carbon steel 0.60% C	428	.0030	.1063	.1417	.1772	.0043	.1181	.1575	.1969	.0047	.1260	.1693	.2126
P	Low alloy steel	394	.0026	.0945	.1260	.1575	.0037	.1024	.1378	.1732	.0043	.1142	.1516	.1890
P	High alloy steel	295	.0026	.0945	.1260	.1575	.0037	.1024	.1378	.1732	.0043	.1142	.1516	.1890
M	Stainless steel	295	.0026	.0945	.1260	.1575	.0037	.1024	.1378	.1732	.0043	.1142	.1516	.1890
K	Cast iron	394	.0031	.1181	.1575	.1969	.0047	.1299	.1732	.2165	.0053	.1417	.1890	.2362
N	Al	1638	.0031	.1772	.2362	.2953	.0047	.1929	.2579	.3228	.0053	.2126	.2835	.3543
N	Cu	656	.0031	.1417	.1890	.2362	.0047	.1575	.2087	.2598	.0053	.1693	.2264	.2835
S	Ni- alloy	92	.0012	.0945	.1260	.1575	.0018	.1024	.1378	.1732	.0022	.1142	.1516	.1890
S	Titanium	295	.0012	.0945	.1260	.1575	.0018	.1024	.1378	.1732	.0022	.1142	.1516	.1890
H	Hardened	295	.0026	.0945	.1260	.1575	.0037	.1024	.1378	.1732	.0043	.1142	1516	.1890

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

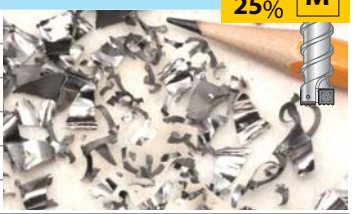
Hole size: Ø 0.984" x 1.969" L / Tool: 99321-016-2030

Material: SAE8620 — load 28% P

Vc	= 262.4	SFM
S	= 1500	r.p.m.
fz	= .0059	IPR
F	= 8.850	IPM
P	= .236	Inch
T	= 63	sec.

Material: SUS304 (Stainless steel 304) — load 25% M

Vc	= 262.4	SFM
S	= 1500	r.p.m.
fz	= .0031	IPR
F	= 4.65	IPM
P	= .236	Inch
T	= 118	sec.



Material: C1100 — load 25% N

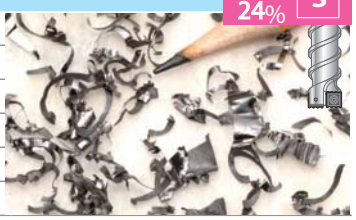
Vc	= 393.6	SFM
S	= 2250	r.p.m.
fz	= .0039	IPR
F	= 8.775	IPM
P	= .236	Inch
T	= 63	sec.

Material: AL6061T6 — load 20% N

Vc	= 590.4	SFM
S	= 3370	r.p.m.
fz	= .0079	IPR
F	= 26.623	IPM
P	= .236	Inch
T	= 21	sec.

Material: TiAl6V4 — load 24% S

Vc	= 262.4	SFM
S	= 1500	r.p.m.
fz	= .0031	IPR
F	= 4.65	IPM
P	= .236	Inch
T	= 118	sec.



Material: Inconel 718 (Drill with internal coolant) — load 24% S

Vc	= 131.2	SFM
S	= 750	r.p.m.
fz	= .0118	IPR
F	= 8.85	IPM
P	= .079	Inch
T	= 100	sec.

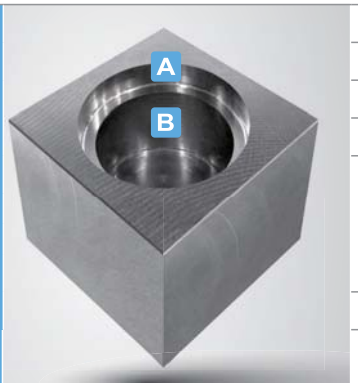
Suggested insert grades for best result >>

Example 2

Diameter (inch)		.984"		
Depth (mm)		1.969"		
Tool (Dc=17mm)		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		N9MX070204-**NC5072**	N9MX070204-**NC5072**	N9MX070204-**NC2032**
No. of Edges		2	2	2
Vc = (SFM)		394	131	262
S = (r.p.m.)		2250	750	1500
fz = (IPR)		.0079"	.0051	.0040"
F = (IPM)		17.78	3.83	6.0
Pitch = (Inch)		.236"	.118"	.118"
Machine Load = % (BT40, 22.5KW)		35%	20%	20%
Tool Life (hole)		150	108	18
Chip Removal Volume (cm^3)		3682	2651	441.78

To produce step hole Ø2.106" & Ø1.772" by one tool >>

Example 3

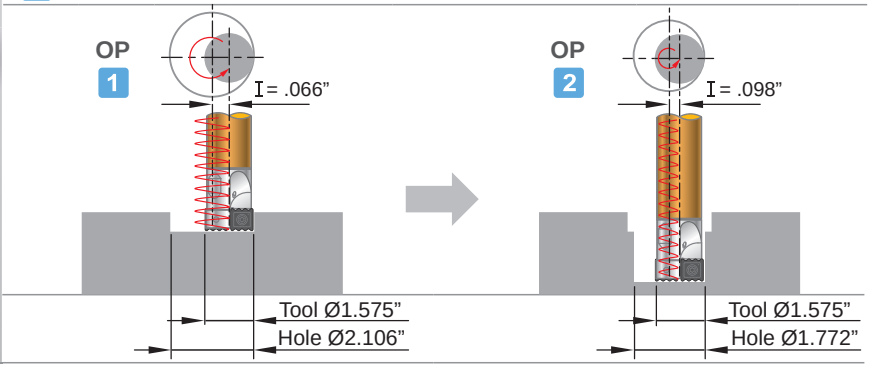


Application

- 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

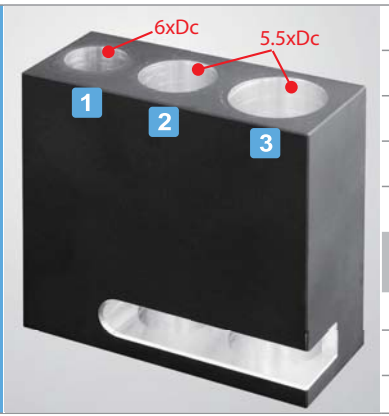
Hole	Dc Inch	D Inch	L Inch	Vc SFM	S r.p.m	fz IPR	F IPM	I Inch	P Inch	T sec.
A	Ø1.575	Ø2.106	.394	984	2400	.0059	14.16	.266	.197	14
B		Ø1.772	1.260	984	2400	.0059	14.16	.098	.079	42



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

Fig.	Dc Inch	D Inch	I Inch	L Inch	Vc SFM	S r.p.m	fz IPR	fcut IPR	F IPM	P mm	α deg
1	Ø .669	Ø .787	.059	3.937	394	2250	.0016	.0023	9	.118	17.67
2		Ø .984	.157	3.740	328	1900	.0031	.0041	13	.177	10.16
3		Ø 1.181	.256	3.740	197	1200	.0041	.0052	12	.236	7.81

Low spindle power is not a problem! BT30 machine, Ø1.181" hole diameter, 3.3xDc drill depth >>

Example 5

Maximum drilling capacity of the 5.5 kw spindle is Ø0.63”

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

Dc Inch	D Inch	L Inch	Vc SFM	S r.p.m	fz IPR	fcut IPR	F IPM	I Inch	P Inch	T sec.
Ø .866	Ø1.181	2.756	656	* 2893	.0047	.0039	22.85	.157	.110	62

* 3000 r.p.m. is used.

Drilling diameter, increase flexibility and occupy few tools in CNC machine.

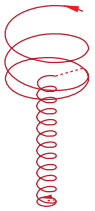
One tool performs multiple patterns >>

Example 6

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

Fig.	Dc Inch	Vc SFM	S r.p.m	fz IPR	F IPM	P Inch	T sec.
1	Ø .669	656	3800	.0030	22.8	.157	67
2		656	3800	.0030	22.8	.157	95
3		656	3800	.0030	22.8	.157	80

Tool Path 1



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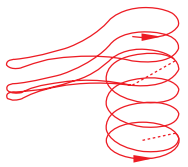

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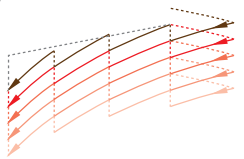

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%
G40 G80 G69
G28 G91 Z0
G28 G91 X0 Y0
G00 G90
G126
G00 G90 X0. Y0.
G52 X18. Y-20.
G00 G90 X0. Y0.
T5
M06
#1= 6.5 (X1)
#11= -6.5 (X1=-I)
#6= 1.5 (X2)
#7= -1.5 (X2=-I)
#2= 0. (Y)
#3= 2.0 (Z1-1)
#13= -2.0 (Z1-2)
#16= -10.0 (Z1-1)
#17= -12.0 (Z1-2)
#4= 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

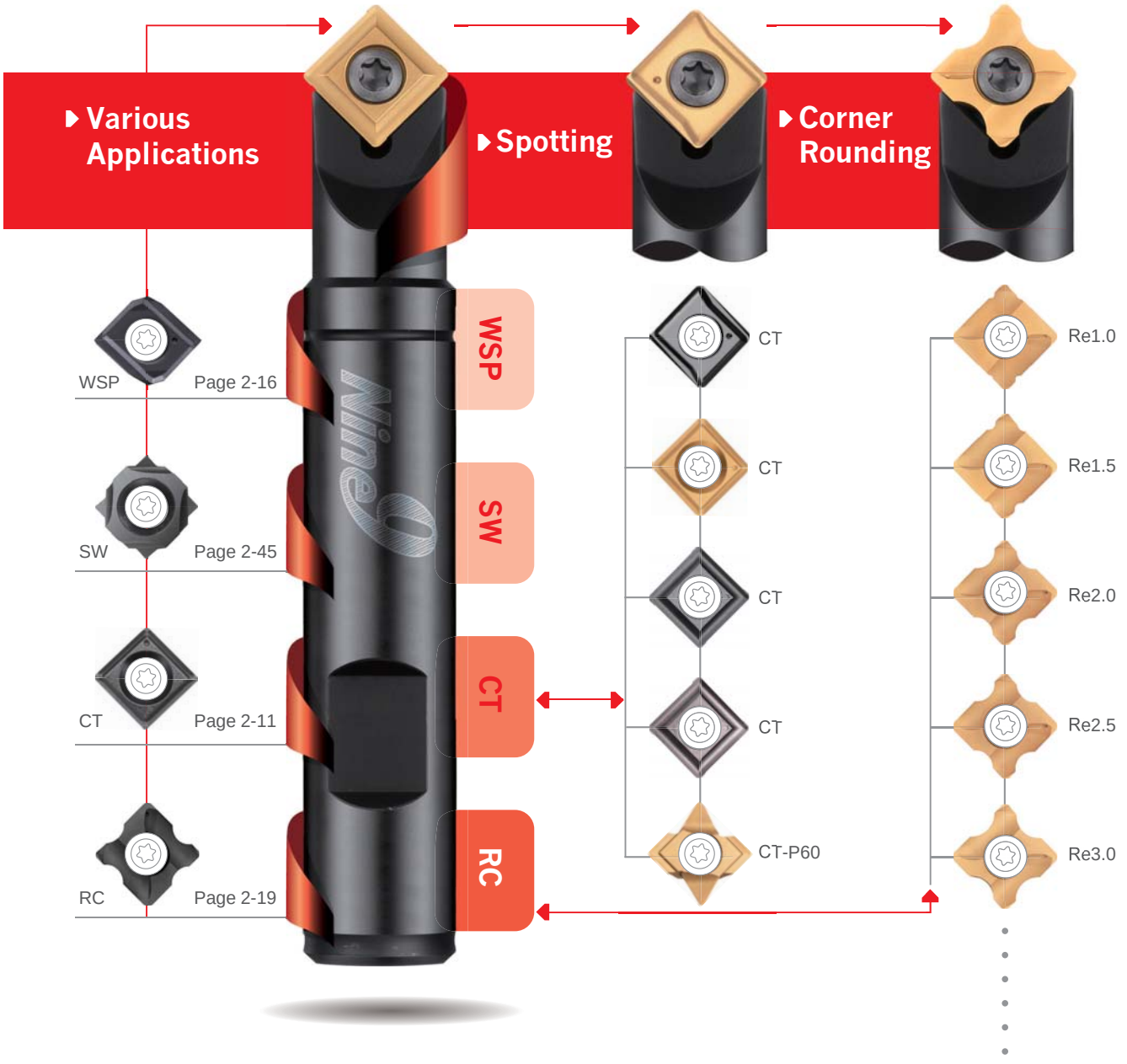
G00 G90 X92.56 Y-14.507
G01 Z#1 F#4
G02 X108.5 Y-20.416 Z#2 R72. F#5
G03 X92.56 Y-14.507 Z#3 R72. F#5
G01 Z#2
G03 X75.679 Y-12.5 Z#3 R72. F#5
G01 Z#2
G03 X58.798 Y-14.507 Z#3 R72. F#5
G01 Z#2
G03 X42.858 Y-20.416 Z#3 R72. F#5
G01 Z#2
G00 G90 Z5.
#1= #1 - #6 (Z up)
#2= #2 - #6 (Z1.)
#3= #3 - #6 (Z2.)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

%
```

No Need To Choose Nine9 Does It All! >>

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

Various inserts can fit on the same tool holder



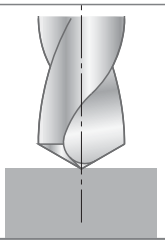
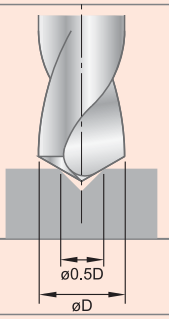
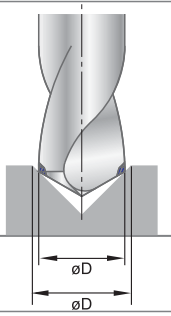
A New Drilling Concept!

0.5xD of spotting >>

Although today's drill manufacturers may not recommend spot drilling 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	 ø0.5D øD	 øD øD
	✕	○	✕

Various Applications of NC Spot Drill >>

Use on CNC lathes, CNC turning centers, Machining centers, Milling machines, SPM machines.....

Turning Center

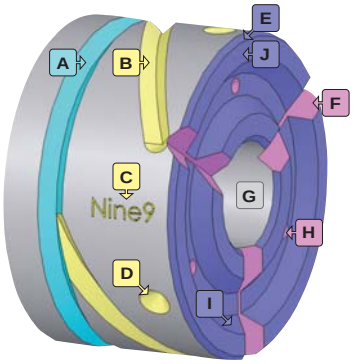
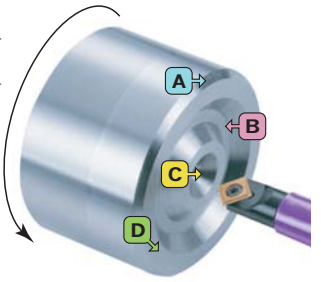


Fig	Applications
A	Grooving
B	Helical groove milling
C	Engraving
D	Spot drilling
E	Chamfer turning
F	Face groove milling
G	Internal turning
H	Spot drilling on end surface
I	Internal Chamfering
J	Facing grooveing

Machining Center

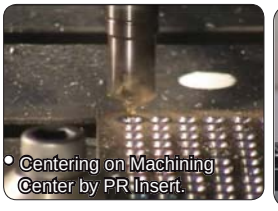
Fig	Applications
A	Engraving
B	Chamfering
C	Profile chamfering
D	Spotting

CNC Lathes



- A External and internal chamfering
- B Grooving
- C Spotting
- D Facing

Application Example >>



NC Spot Drill >>

NC Spot Drill with indexable carbide insert.

High efficiency! Low cost!

CNC lathes, CNC turning centers and machining centers.

Features

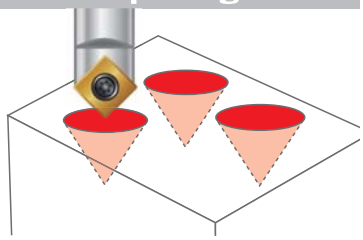
- **Spotting produces better hole position and geometrically uniform holes**
- **Available shank diameter- Ø5, Ø6, Ø8, Ø10, Ø16, Ø20, Ø25mm, Ø3/8'', Ø1/2'', Ø5/8'', Ø1/4", Ø3/4'', Ø1", M5, M6 and M8.**
- **One tool will perform multiple applications**
  - Long tool life.
  - Each insert has 2 or 4 cutting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

▲Machining Center

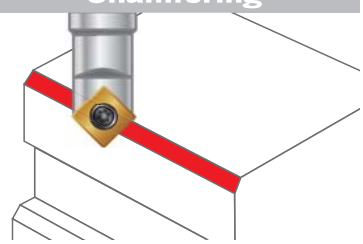
a Engraving
b Spotting
c Chamfering
d Grooving

▼ ALL IN ONE!!

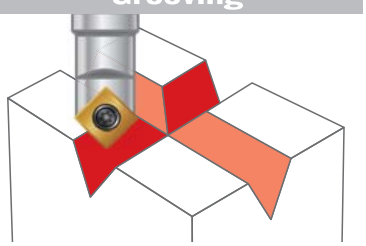
Spotting



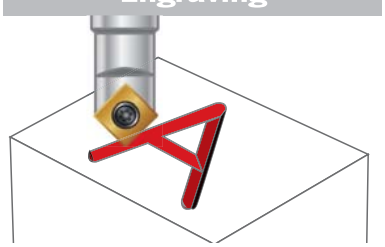
Chamfering



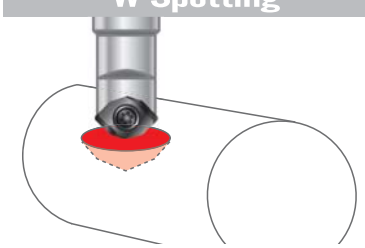
Grooving



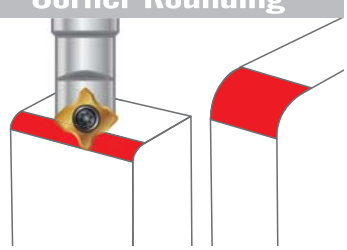
Engraving



W Spotting



Corner Rounding



▲ CNC Lathes

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

2

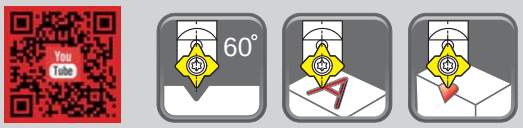
NC Spot Drill

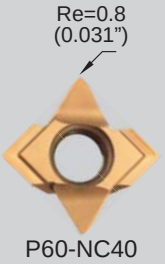
Multifunctional:

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

* Some features produced with a special insert

60° N9MT11T3P60

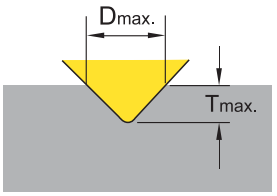


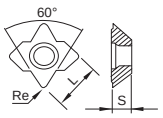


Inserts >>

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

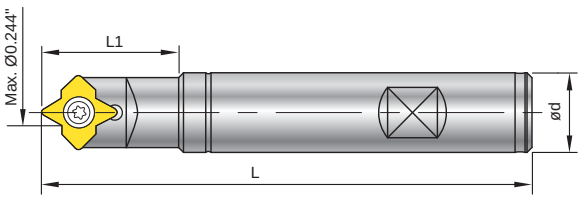
NC40:
- Universal grade for all unhardened steel and cast iron.
- P35 grade, TiN coated.
- Each insert has 2 cutting edges.



Parts No.	Coating	Grade		Dimensions			Dmax.	Tmax.
				L	S	Re		
N9MT11T3P60-NC40	TiN	P35		11 (0.433")	3.97 (0.156")	0.8 (0.031")	6.2 (0.244")	4 (0.157")

Holder >>

- 60 degree spotting drill with indexable insert.
- ***Using standard NC Spot Drill shank.***
- A single cutting edge design creates higher precision and position when spotting.
- Applications:
  - For spotting, engraving, small grooving on milling machines, machining centers.
  - For carbon steel, alloy steel and cast iron, general purpose.



Parts No.	Ød	L	L1	Screw	Key
99616-14-1/2	1/2"	4"	28.03 (1.103")	NS-35080 2.5 Nm	NK-T15
99616-14-5/8	5/8"	4"			

V9MT0802 / V9MT12T3

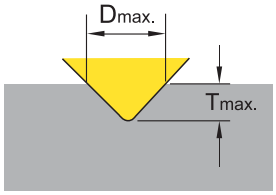
60°

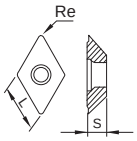
Inserts >>

- 60 degree indexable spotting insert, Dmax 0.512".
- Special geometry with supporting edges for use in high speed machining.
- Excellent tool for grooving and saving machining time!

NC2071: • K20F grade, TiN coated, high positive ground cutting edge and relief angle.
- Universal grade for carbon steel, alloy steel and cast iron.
- Each insert has 2 cutting edges.

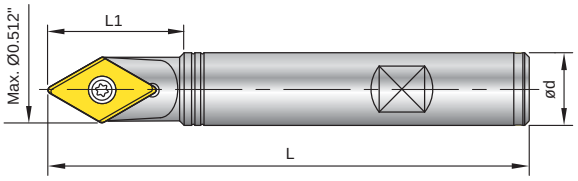
NC9076: • High positive geometry and sharp edge.
- DLC coating performs very well for AL, AL-alloy, copper, brass and bronze.
- Excellent performance on non-ferrous metal.
- Each insert has 2 cutting edges.



Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
V9MT0802CT	NC2071	TiN	K20F		8 (0.315")	2.38 (0.094")	0.4 (0.016")	9 (0.354")	7.3 (0.287")
NEW	NC9076	DLC							
V9MT12T3CT	NC2071	TiN	K20F		12.7 (0.5")	3.97 (0.156")	0.8 (0.031")	13 (0.512")	10.3 (0.405")
	NC9076	DLC							

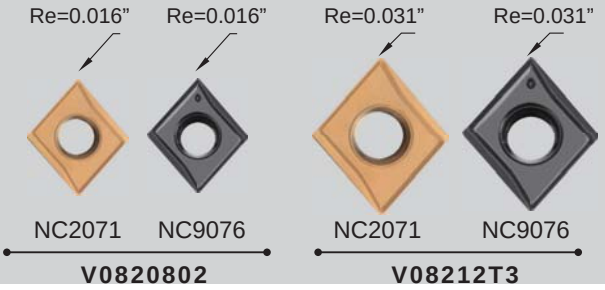
Holder >>

- 60° degree spotting drill with indexable insert.
- 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.



Parts No.	Ød	L	L1	Insert Type	Screw	Key
99616-09V	8 (0.315")	60 (2.362")	-	V9MT08	NS-25045 0.9Nm	NK-T7
99616-13V-5/8	5/8"	4"	30 (1.181")	V9MT12	NS-35080 2.5Nm	NK-T15

82° V0820802 / V08212T3

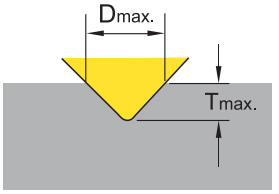


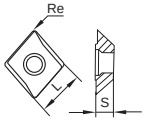
Inserts >>

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

NC2071:
- K20F grade, TiN coated, high positive ground cutting edge and relief angle.
- Universal grade for carbon steel, alloy steel and cast iron.
- Each insert has 2 cutting edges.

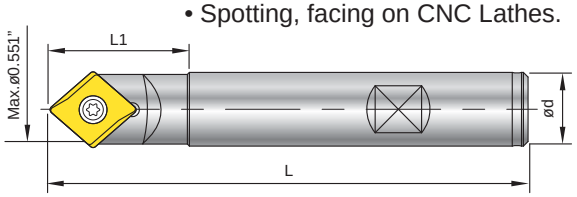
NC9076:
- High positive geometry and sharp edge.
- DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
- Produces excellent surface finish on non-ferrous metal.
- Each insert has 2 cutting edges.



Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
V0820802	NC2071	TiN	K20F		8 (0.315”)	2.38 (0.094”)	0.4 (0.016”)	9 (0.354”)	4.8 (0.189”)
	NC9076	DLC							
V08212T3	NC2071	TiN	K20F		12.7 (0.5”)	3.97 0.156”)	0.8 (0.031”)	14 (0.551”)	7.5 (0.295”)
	NC9076	DLC							

Holder >>

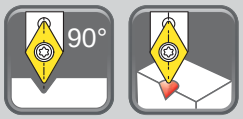
- 82 degree spotting drill with indexable insert.
- Special cutting edge design gives higher precision and position when spotting.
- Applications : • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
  • Spotting, facing on CNC Lathes.



Ø3/8”

Ø5/8”

Parts No.	Ød	L	L1	Insert Type	Screw	Key
99619-V082-3/8	3/8”	3.5”	28 (0.102”)	V0820802	NS-30055 2.0 Nm	NK-T8
99619-V082-5/8	5/8”	4”	30 (1.181”)	V08212T3	NS-35080 2.5 Nm	NK-T15



Mini Spotting 0.004" & 0.008"

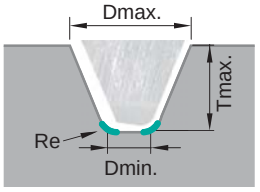
Inserts >>

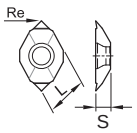
• For small spotting.

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.

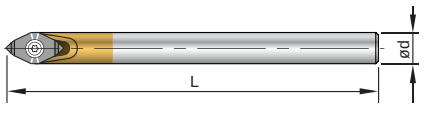
XP9001: • Mirror polished, for non-ferrous metal, aluminum, brass, copper, plastic, acrylic.



Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmin.	Dmax.	Tmax.
X060A90W010R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.02 (0.0008")	0.10 (0.004")	1.1 (0.043")	0.5 (0.020")
	NC2035	ALDURA								
	XP9001	Polished								
X060A90W020R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.04 (0.0015")	0.20 (0.008")	2.2 (0.087")	1.0 (0.040")
	NC2035	ALDURA								
	XP9001	Polished								

Holder >>

• Also using for deburring tool.

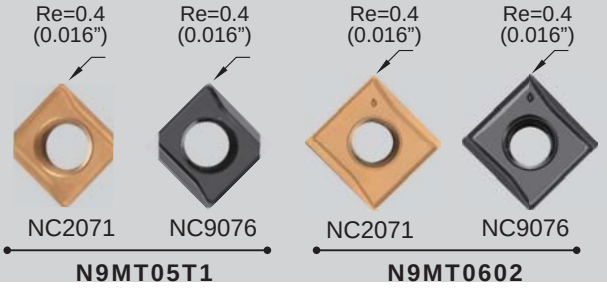


Steel Type

Carbide Type / Steel Type

Parts No.	Shank	Ød	L	Screw	Key
99619-X060-06	Steel	6 (0.236")	40 (1.575")	NS-22044 0.9Nm	NK-T7
99619-X060-06L	Carbide	6 (0.236")	60 (2.362")		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide	6 (0.236")	100 (3.937")		

90° N9MT05T1 / N9MT0602

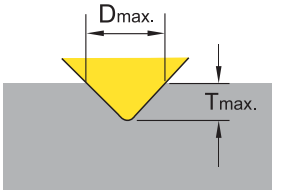


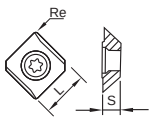
Inserts >>

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

NC2071:
- K20F grade, TiN coated, fully ground cutting edge and relief angle.
- Geometry with supporting edges to stabilize the cutting condition on low power machine.
- Each insert has 2 cutting edges, for carbon steel, alloy steel and cast iron.

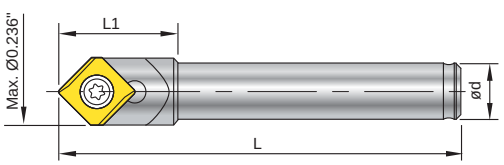
NC9076:
- High positive geometry and sharp edge.
- DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
- Produces an excellent surface finish on non-ferrous metal.
- Each insert has 2 cutting edges.



Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT05T1CT	NC2071	TiN	K20F		5 (0.197")	1.8 (0.071")	0.4 (0.016")	6 (0.236")	2.8 (0.110")
	NC9076	DLC							
N9MT0602CT	NC2071	TiN	K20F		6.35 (0.250")	2.38 (0.094")	0.4 (0.016")	8 (0.315")	3.8 (0.150")
	NC9076	DLC							

Holder >>

- Smallest indexable spotting drill holder.
- Spotting produces better hole positioning and geometrically uniform holes.
- Applications : • Spotting, engraving, and chamfering on milling machines, machining centers.
  • Spotting, facing on CNC Lathes.



Ø5 (0.197")

Ø6 (0.236")

Ø6 (0.236")

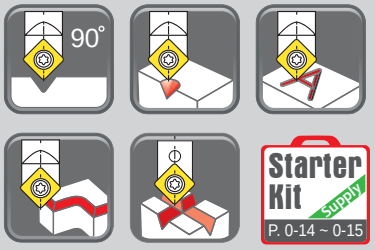
Ø8 (0.315")

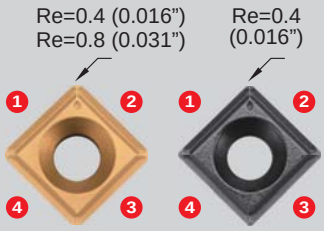
Parts No.	Ød	L	L1	Insert Type	Screw	Key
99616-06-5	5 (0.197")	35 (1.378")	10 (0.394")	N9MT05	NS-20036 0.6 Nm	NK-T6
99616-06-6	6 (0.236")	35 (1.378")	--			
99616-06-1/4	1/4"	35 (1.378")	--			
99616-06-6L	6 (0.236")	60 (2.362")	--			
99616-08-8	8 (0.315")	60 (2.362")	--	N9MT06	NS-22044 0.9 Nm	NK-T7

Note: 99616-06-6L is carbide shank holder.

N9MT0802

90°





NC40 NC10 H-NC40 H-NC9076

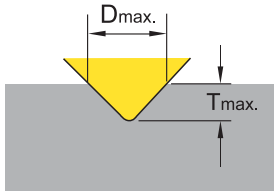
Inserts >>

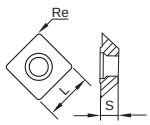
NC40:
- General purpose, universal grade for all unhardened steel and cast iron.
- Each insert has 4 cutting edges.

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

H-NC40:
- Best choice for spotting application.
- Special geometry with supporting edges for use in high speed machining.
- Sharp edge good for long cutting chip metals, such as low carbon steel, stainless steel and Ti, Ti-alloy.
- Each insert has 2 cutting edges.

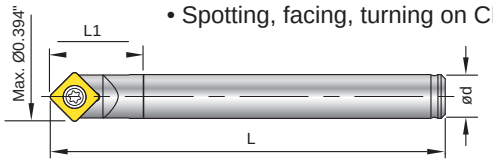
H-NC9076:
- High positive geometry and sharp edge. DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
- Produces excellent surface finish when chamfering non-ferrous metal.
- Each insert has 2 cutting edges.

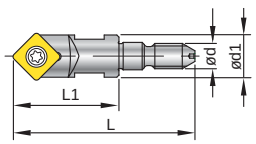


Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT080208CT	NC40	TiN	K20F		8.31 (0.327")	2.38 (0.094")	0.8 (0.031")	10 (0.394")	4.5 (0.177")
N9MT080204CT	NC40	TiN	K20F				0.4 (0.016")		
	NC10	TiAlN							
N9MT0802CT2T	H-NC40	TiN	K20F				0.8 (0.031")		
	H-NC9076	DLC							

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.

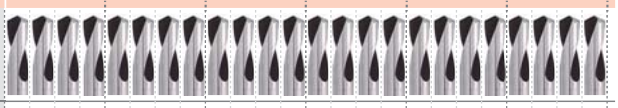
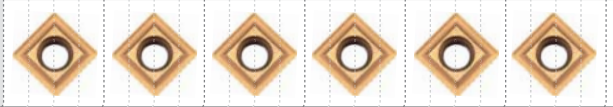


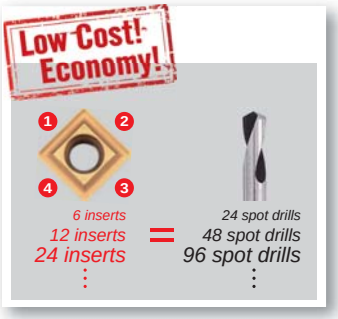


Parts No.	Ød	Ød1	L	L1	Screw	Key
99616-10	10 (0.394")	-	90 (3.543")	18.31 (0.720")	NS-30055 2.0 Nm	NK-T8
99616-3/8	3/8"	-	90 (3.543")	18.31 (0.720")		
99616-10-M6	M6	10 (0.394")	43 (1.693")	25.00 (0.984")		

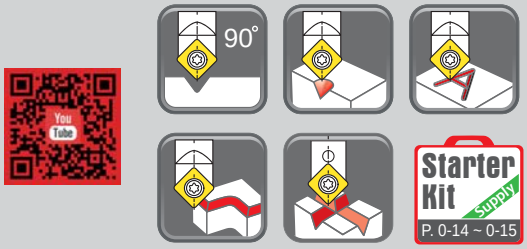
Note: • Balanced type holder is on request. • Nine9 extension bar for M6 screw fit holder, see page 5-2.

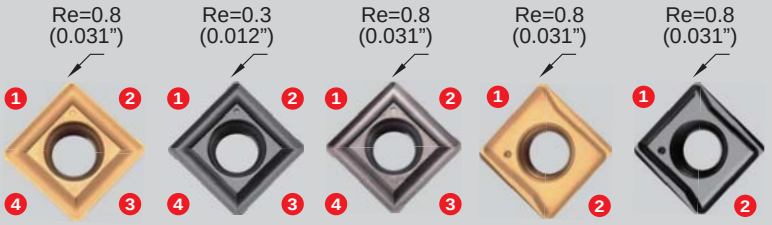
Comparison >>

Tool		4	8	12	16	20	24
24 spot drills							
6 inserts							



90° N9MT11T3





Inserts >>

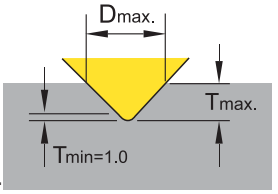
NC40: • General purpose, universal grade for all unhardened steel and cast iron.
• Each insert has 4 cutting edges.

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

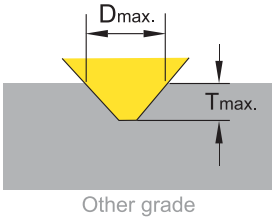
NC60: • Cermet insert, fully ground cutting and relief angle, for hardened steel up to HRC55.
• Each insert has 4 cutting edges.

H-NC40: • Best choice for spotting application.
• Special geometry with supporting edges for use in high speed machining.
• Sharp edge good for long cutting chip metals, such as low carbon steel, stainless steel and Ti, Ti-alloy.
• Each insert has 2 cutting edges.

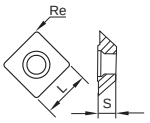
H-NC9076: • High positive geometry and sharp edge same as grade H-NC40. DLC coated, super good for Al, Al-alloy, copper, brass and bronze.
• Produces excellent surface finish when chamfering non-ferrous metal.
• Each insert has 2 cutting edges.



NC40 / NC10 / NC60

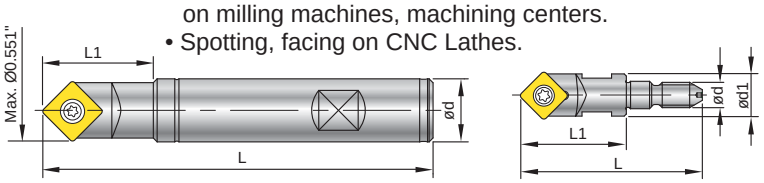


Other grade

Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT11T3CT	NC40	TiN	P35		11.11 (0.433")	3.97 (0.156")	0.8 (0.031")	14 (0.551")	7 (0.276")
	NC10	TiAlN	K10F				0.3 (0.012")		
	NC60	CERMET					0.8 (0.031")		
N9MT11T3CT2T	H-NC40	TiN	K20F				0.8 (0.031")		
	H-NC9076	DLC	K20F				0.8 (0.031")		

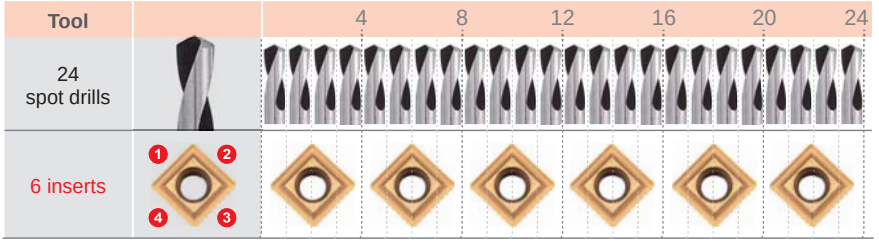
Holder >>

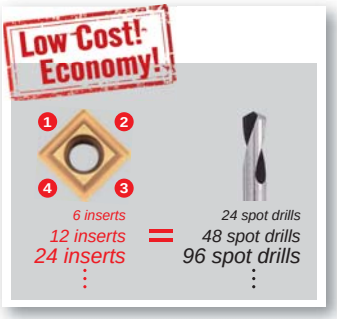
• The widest range of inserts for spot drilling, milling and turning see page 2-1.
• Applications : • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
• Spotting, facing on CNC Lathes.



Parts No.	Ød	Ød1	L	L1	Screw	Key
99616-14-150L	16 (0.630")	-	150 (5.906")	29.03 (1.143")	NS-35080 2.5 Nm	NK-T15
99616-14-220L	20 (0.787")	-	220 (8.661")	28.03 (1.103")		
99616-14-1/2	1/2"	-	4"	28.03 (1.103")		
99616-14-5/8	5/8"	-	4"	28.03 (1.103")		
99616-14-M8	M8	14 (0.551")	48 (1.890")	30.00 (1.181")		

Comparison >>





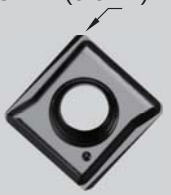
N9MT1704

90°

Re=1.2 (0.047")

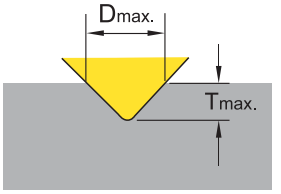
NC2071

Re=1.2 (0.047")



NC9036

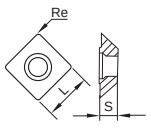
Inserts >>



• 90 degree indexable spot drill insert, Dmax 0.87 inch.

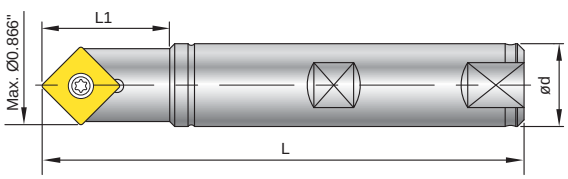
NC2071 : • K20F grade, TiN coated, high positive geometry, fully ground cutting edge and relief angle.
• Universal grade for all unhardened steel and cast iron.
• Each insert has 2 cutting edges.

NEW 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.

Parts No.	Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT1704CT NC2071	TiN	K20F		17 (0.669")	4.76 (0.187")	1.2 (0.047")	22 (0.866")	10.4 (0.409")
NEW NC9036	DLC	K20F						

Holder >>

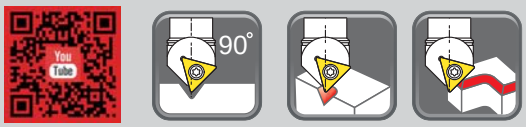
• 90 degree spotting drill with indexable insert.
• Spotting produces better hole positioning and geometrically uniform holes.
• Applications : • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
• Spotting, facing on CNC Lathes.



Ø3/4", Ø1"

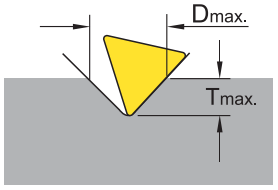
Parts No.	Ød	L	L1	Screw	Key
99616-22-3/4	3/4"	4"	35 (1.378")	NS-50125 5.5 Nm	NK-T20
99616-22-1	1"	6"	34 (1.339")		

90° N9MT220408



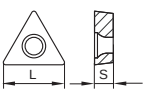
NC40

Inserts >>



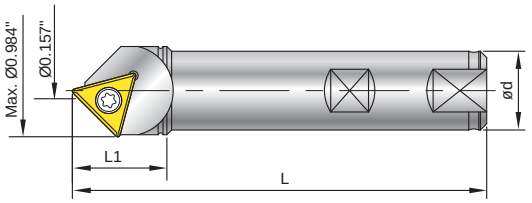
- For spotting diameter up to 1 Inch.
- Fully ground cutting edge and relief angle.

NC40:
- P35, TiN coated.
- Universal grade for carbon steel, alloy steel and cast iron.
- Each insert has 3 cutting edges.

Parts No.	Coating	Grade		Dimensions			Dmax.	Tmax.
				L	S	Re		
N9MT220408CT-NC40	TiN	P35		20.83 (0.820")	4.76 (0.187")	---	25 (0.984")	12.2 (0.480")

Holder >>

- Large spotting diameter with indexable insert.
- Spotting produces better hole positioning and geometrically uniform holes.
- Applications : • Spotting and chamfering on milling machine, machining centers.

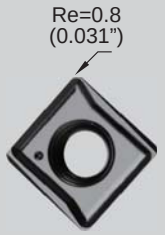


Ø1"

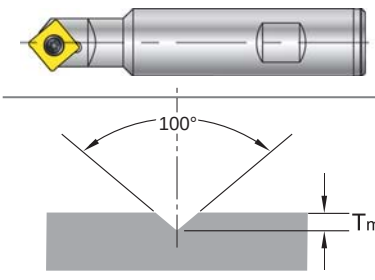
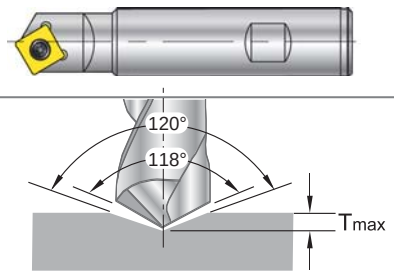
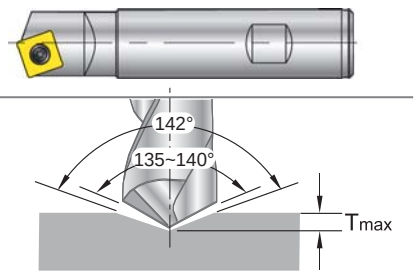
Parts No.	Ød	L	L1	Screw	Key
99616-1-CT28	1"	120 (4.72")	30 (1.181")	NS-40100 3.5Nm	NK-T15

N9MT11T3CT2T-H

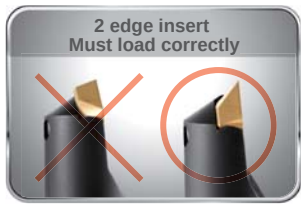
H-NC40



H-NC9076

100 degree	120 degree	142 degree
		
• 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.

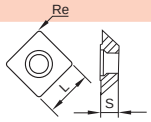
Inserts >>



• Special geometry with supporting edges to reduce the vibration in high speed machining.

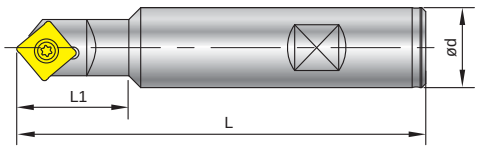
H-NC40:
- K20F grade, TiN coated.
- General purpose for all kinds of steel and cast iron.
- Each insert has 2 cutting edges.

H-NC9076:
- High positive geometry and sharp edge.
- DLC coated, specially developed for Al, Al-alloy, copper, brass and bronze.
- Produces excellent surface finish when chamfering non-ferrous metal.
- Each insert has 2 cutting edges.

Parts No.		Coating	Grade		Dimensions		
					L	S	Re
N9MT11T3CT2T	H-NC40	TiN	K20F		11.11 (0.437")	3.97 (0.156")	0.8 (0.031")
	H-NC9076	DLC					

Holder >>

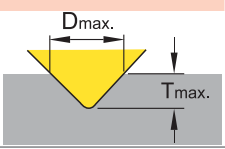
• Indexable insert spotting drill holders for 100°/120°/142° spotting.
• Reduces spotting time. Increases tool life and position accuracy of the next drilling operation.



Ø3/4"

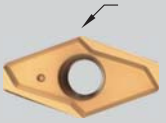
Ø3/4"

Ø3/4"

Parts No.	Angle	Ød	L	L1	Screw / Key	Dmax.	Tmax.	
99616-3/4-100	100°	3/4"	4"	31 (1.220")	NS-35080 2.5 Nm / NK-T15	16 (0.630")	6.3 (0.248")	
99616-3/4-120	120°			30 (1.181")		17 (0.669")	4.76 (0.187")	
99616-3/4-142	142°			30 (1.181")		18.5 (0.728")	3.16 (0.124")	

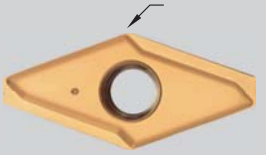
142° V14208 / V14216

Re=0.8 (0.031")



V1420803-NC2071

Re=1.2 (0.047")

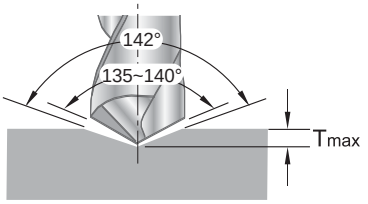


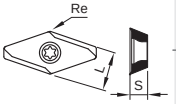
V1421604-NC2071

Inserts >>

- For spotting before drilling by 135° - 140° point angle high performance drill.
- 142 degree indexable spotting drills. Maximum diameter up to 1.26".

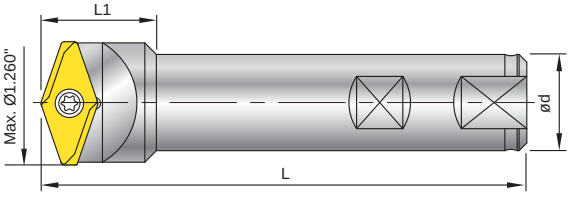
NC2071:
- K20F grade, TiN coated, high positive geometry, fully ground cutting edge and relief angle.
- Each insert has 2 cutting edges.
- Universal grade for all unhardened steel and cast iron.



Parts No.	Coating	Grade		Dimensions			Dmax.	Tmax.
				L	S	Re		
V1420803-NC2071	TiN	K20F		8 (0.315")	2.38 (0.094")	0.8 (0.031")	16 (0.630")	2.8 (0.110")
V1421604-NC2071	TiN	K20F		14 (0.551")	4.76 (0.187")	1.2 (0.047")	32 (1.260")	5.5 (0.217")

Holder >>

- Spot drilling prior to drilling may allow for higher drill rates.
- Save total machining time!
- Extend your drill life with 142 degree spotting. Reduce your drilling costs!
- Higher accuracy of positioning and diameter tolerance!



Ø5/8"

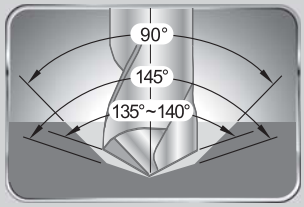
Ø1"

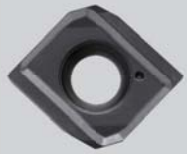
Parts No.	Ød	L	L1	Insert Type	Screw	Key
99619-V142-5/8	5/8"	4"	25 (0.984")	V1420803-NC2071	NS-30072 2.0 Nm	NK-T9
99619-V142-1.000	1"	4.75"	30 (1.181")	V1421604-NC2071	NS-50125 5.5 Nm	NK-T20

W Spotting

Combined spotting and chamfering 145° + 90°

145° + 90°

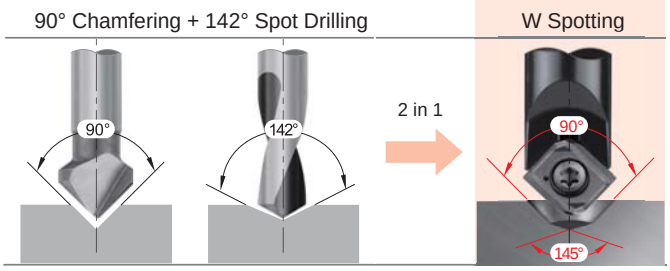




NC2033

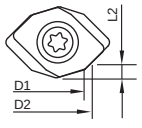
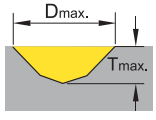
- Reduces process to one operation. Shortens cycle time.
- Use to spot prior to drilling with high performance drills for higher accuracy of hole position.
- ***Utilizes standard NC Spot Drill holders.***

1 process provides 2 applications



Inserts >>

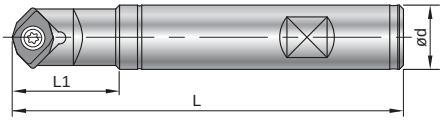
NC2033:
- Fully ground cutting edge and relief angle.
- Universal grade for steel and cast iron.
- Each insert has 2 cutting edges.

Parts No.	Coating	Grade		Thread Size	*D1±0.05 (±0.002")	D2	L2	Dmax.	Tmax.
N9MT0802M04C-NC2033	TiAlN	K20F		M4	3.30 (0.130")	4.20 (0.165")	0.93 (0.037")	8 (0.315")	2.83 (0.111")
N9MT0802M05C-NC2033				M5	4.20 (0.165")	5.25 (0.207")	1.14 (0.045")		2.52 (0.099")
N9MT0802M06C-NC2033				M6	5.00 (0.197")	6.30 (0.248")	1.39 (0.055")		2.24 (0.088")
N9MT11T3M08C-NC2033	TiAlN	K20F		M8	6.80 (0.266")	8.40 (0.331")	1.81 (0.071")	13 (0.512")	4.11 (0.162")
N9MT11T3M10C-NC2033				M10	8.50 (0.335")	10.50(0.413")	2.28 (0.090")		3.53 (0.139")
N9MT11T3UNC25-NC2033	TiAlN	K20F		1/4	5.08 (0.200")	6.70 (0.264")	1.55 (0.061")	13 (0.512")	4.70 (0.185")
N9MT11T3UNC31-NC2033				5/16	6.53 (0.257")	8.40 (0.331")	1.90 (0.075")		4.20 (0.165")
N9MT11T3UNC38-NC2033				3/8	7.94 (0.313")	10.00(0.394")	2.22 (0.087")		3.72 (0.146")
N9MT1704M12C-NC2033	TiAlN	K20F		M12	10.25(0.404")	12.60(0.496")	2.91(0.115")	20 (0.787")	6.61(0.260")
N9MT1704M14C-NC2033				M14	12.00(0.472")	14.70(0.579")	3.22(0.127")		5.87(0.231")
N9MT1704M16C-NC2033				M16	14.00(0.551")	16.80(0.661")	3.51(0.138")		5.11(0.201")

Note: * D1 refer to the Tap Pre-drilling sizes. * Technical information, please refer to page 2-27.

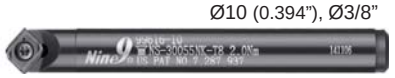
Holder >>

- Holders and inserts are interchangeable.
- Applications: Spotting, grooving and chamfering.



Parts No.	Ød	L	L1	Insert Type	Thread Size	Screw	Key
99616-10	10 (0.394")	89.08±0.29 (3.507" ±0.011")	16.95±0.29 (0.667" ±0.011")	N9MT0802	M4~M6	NS-30055 2.0Nm	NK-T8
99616-3/8	3/8"						
99616-14-1/2	1/2"	97.55±0.55 (3.839" ±0.021")	26.73±0.55 (1.052" ±0.021")	N9MT11T3	M8~M10	NS-35080 2.5Nm	NK-T15
99616-14-5/8	5/8"				1/4~3/8		
99616-22-3/4	3/4"	96.24±0.64 (3.780" ±0.025")	31.4±0.64 (1.236" ±0.025")	N9MT1704	M12~M16	NS-50125 5.5Nm	NK-T20

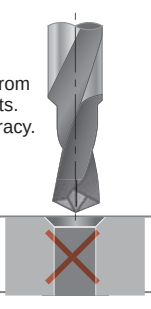
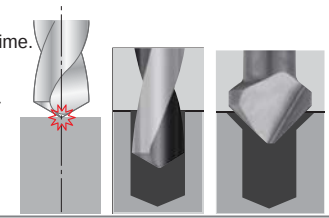
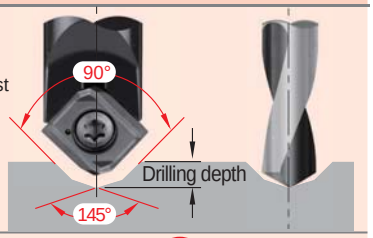
Ø10 (0.394"), Ø3/8"



Ø1/2", Ø5/8"

Ø20(0.787"), Ø3/4"

Comparison >>

Carbide Step Drill	Drill + Spotting	W Spotting + Drill
• Tool cost is high. Shorter tool life. • Can't drill directly from solid on round parts. Bad position accuracy.	• Longer drilling time. Shorter tool life • Guided at the weakest corner of drill.	• Shorter drilling time. Longer tool life. • Guided at the strongest corner of drill. • Also for chamfering or grooving application.
		
✕	✕	○

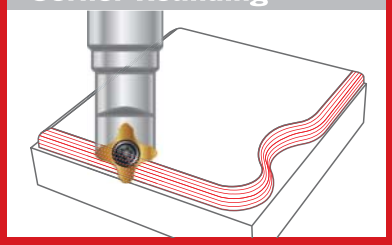
Corner Rounding » Type of RC

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.

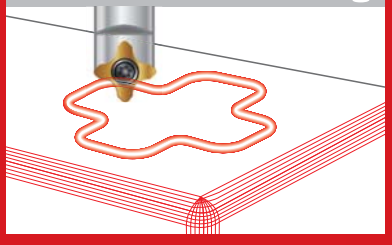
Features

- 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.

Corner Rounding



Circular Corner Rounding



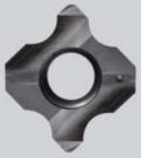
◀ Applications

- a Radius 0.5
- b Radius 1.0
- c Radius 2.0

N9MT05T1RC

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

NC2071



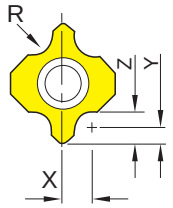
NC9036

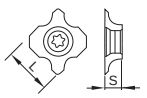
Inserts >>

- Various corner radius inserts can fit on same holder.
- Very small X offset 1.25mm (0.05") 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.

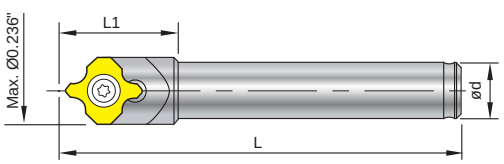
NC9036:
- For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
- High positive geometry and sharp edge produces excellent surface finish.
- Each insert has 2 cutting edges.



Insert Radius	Parts No.		Coating	Grade	offset				Dimensions	
					X	Y	Z		L	S
0.5	N9MT05T1RC05	NC2071	TiN	K20F	1.25 (0.05")	0.75 (0.03")	1.25 (0.05")		5 (0.197")	1.8 (0.070")
		NC9036	DLC							
0.75	N9MT05T1RC075	NC2071	TiN	K20F	1.50 (0.059")	0.75 (0.03")	1.50 (0.059")			
		NC9036	DLC							
1.0	N9MT05T1RC10	NC2071	TiN	K20F	1.75 (0.069")	0.75 (0.03")	1.75 (0.069")			
		NC9036	DLC							

Holder >>

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



Ø5 (0.197")

Ø6 (0.236")

Ø6(0.236")

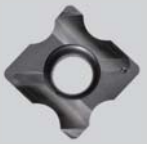
Parts No.	Ød	L	L1	Screw	Key
99616-06-5	5 (0.197")	35 (1.378")	10 (0.394")	 NS-20036 0.6 Nm	 NK-T6
99616-06-6	6 (0.236")	35 (1.378")	-		
99616-06-1/4	1/4"	35 (1.378")	-		
99616-06-6L	6 (0.236")	60 (2.362")	-		

* 99616-06-6L is carbide shank holder

RC N9MT11T3RC

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


NC40

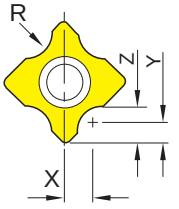

NC9036

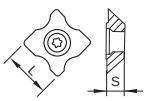
Inserts >>

- Higher cutting speed and feed rate.
- Combination corner rounding and 45° chamfering application on same insert.
- Various corner radius inserts can fit on same holder.
- Carbide insert provides for long tool life.

NC40:
- Submicron carbide insert, K20F, TiN coated, universal design for all kinds of materials.
- Inserts are CNC ground for precision radius location.
- Each insert has 2 cutting edges.

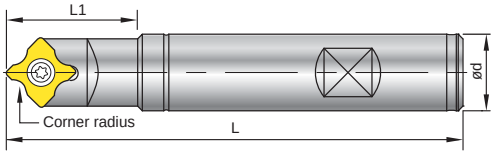
NC9036:
- For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
- High positive geometry and sharp edge produces excellent surface finish.
- Each insert has 2 cutting edges.



Insert Radius	Parts No.		Coating	Grade	offset X	offset Y	offset Z		Dimensions L	Dimensions S
1.0	N9MT11T3RC10	NC40	TiN	K20F	2.75 (0.108")	1.5 (0.059")	2.5 (0.098")		11.11 (0.433")	3.97 (0.156")
		NC9036	DLC							
1.5	N9MT11T3RC15	NC40	TiN	K20F	3.25 (0.128")	1.5 (0.059")	3 (0.118")			
		NC9036	DLC							
2.0	N9MT11T3RC20	NC40	TiN	K20F	3.75 (0.148")	1.5 (0.059")	3.5 (0.138")			
		NC9036	DLC							
2.5	N9MT11T3RC25	NC40	TiN	K20F	4.25 (0.167")	1.5 (0.059")	4 (0.157")			
		NC9036	DLC							
3.0	N9MT11T3RC30	NC40	TiN	K20F	4.75 (0.187")	1.4 (0.055")	4.4 (0.173")			
		NC9036	DLC							
1/64	N9MT11T3RC1/64	NC40	TiN	K20F	0.086"	0.059"	0.0747"		0.437"	0.156"
		NC9036	DLC							
1/32	N9MT11T3RC1/32	NC40	TiN	K20F	0.101"	0.059"	0.090"			
		NC9036	DLC							
1/16	N9MT11T3RC1/16	NC40	TiN	K20F	0.133"	0.059"	0.122"			
		NC9036	DLC							
3/32	N9MT11T3RC3/32	NC40	TiN	K20F	0.164"	0.059"	0.153"			
		NC9036	DLC							
1/8	N9MT11T3RC 1/8	NC40	TiN	K20F	0.199"	0.055"	0.180"			
		NC9036	DLC							

Holder >>

- For corner rounding using ***NC Spot Drill*** shank.
- Good for small workpieces.
- Same insert can also be used to produce a 45 degree edge chamfer.



Parts No.	Ød	L	L1	Screw	Key
99616-14-1/2	1/2"	4"	28.03 (1.103")	NS-35080 2.5 Nm	NK-T15
99616-14-5/8	5/8"				

Ø1/2", Ø5/8"

* additional holder found on page 2-11..

N9MT1704RC

RC4.0~RC6.0
All are interchangeable on same holder


NC2071

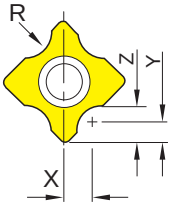

NC9036

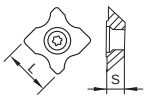
Inserts >>

- Higher cutting speed and feed rate.
- Combination corner rounding and 45° chamfering application on same insert.
- Various corner radius inserts can fit on same holder.
- Carbide insert provides for long tool life.

NC2071:
- Submicron carbide insert, K20F, TiN coated, universal design for all kinds of materials.
- Inserts are CNC ground for precision radius location.
- Each insert has 2 cutting edges.

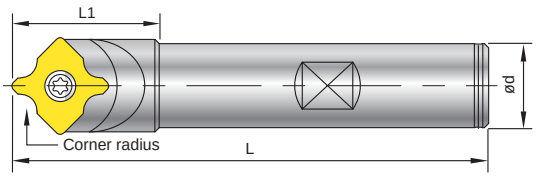
NC9036:
- For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
- High positive geometry and sharp edge produces excellent surface finish.
- Each insert has 2 cutting edges.



Corner radius(R)	Parts No.		Coating	Grade	offset				Dimensions	
					X	Y	Z		L	S
4.0	N9MT1704RC40	NC2071	TiN	K20F	6.15 (0.242")	2 (0.079")	6 (0.236")		17 (0.669")	4.76 (0.187")
		NC9036	DLC							
5.0	N9MT1704RC50	NC2071	TiN	K20F	7.10 (0.280")	2 (0.079")	7 (0.276")			
		NC9036	DLC							
6.0	N9MT1704RC60	NC2071	TiN	K20F	8.10 (0.319")	2 (0.079")	8 (0.315")			
		NC9036	DLC							
3/16	N9MT1704RC3/16	NC2071	TiN	K20F	0.270"	0.078"	0.268"		0.669"	0.187"
		NC9036	DLC							
1/4	N9MT1704RC1/4	NC2071	TiN	K20F	0.333"	0.078"	0.330"			
		NC9036	DLC							

Holder >>

- For corner rounding using ***NC Spot Drill*** shank.
- Good for small workpieces, which need large corner rounding.
- 45 degree chamfering is available by using straight position of cutting edge.



Ø3/4", Ø1"

Parts No.	Ød	L	L1	Screw	Key
99616-22-3/4	3/4"	4"	34 (1.339")	NS-50125 5.5 Nm	NK-T20
99616-22-1	1"	6"			

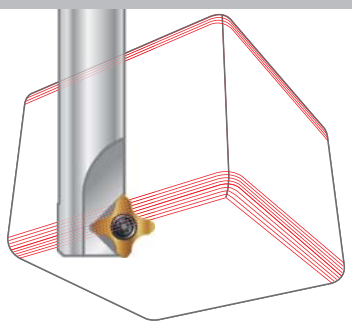
Corner Rounding >> Type of R

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.

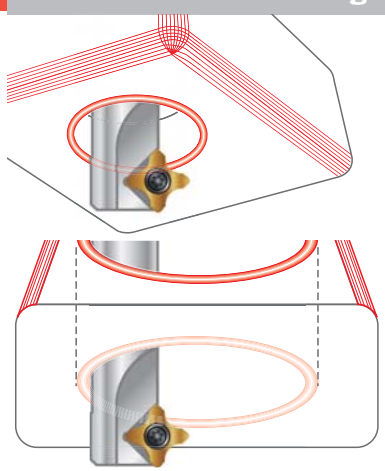
Features

- 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



Back Circular Corner Rounding



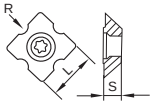
N9MT11T3R

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

Inserts >>

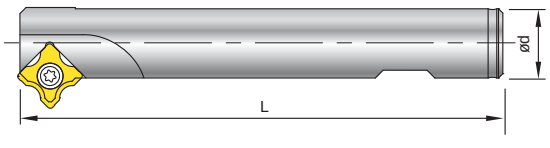
- For front and back corner rounding.
- Various corner radius inserts can fit on same holder.
- Coated carbide inserts for excellent tool life.
- Each insert has 4 cutting edges.

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

Corner radius(R)	Parts No.	Coating	Grade		Dimensions	
					L	S
1.0	N9MT11T3R10-NC2071	TiN	P35		11.11 (0.433")	3.97 (0.156")
1.5	N9MT11T3R15-NC2071					
2.0	N9MT11T3R20-NC2071					
2.5	N9MT11T3R25-NC2071					
3.0	N9MT11T3R30-NC2071					

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.



Parts No.	Ød	L	Z	Screw	Key
99616-16-25R	16 (0.630")	100 (3.94")	1	NS-35080 2.5 Nm	NK-T15
99616-16-30R	16 (0.630")	120 (4.72")	1		
99616-25-40R	25 (0.984")	150 (5.91")	4		

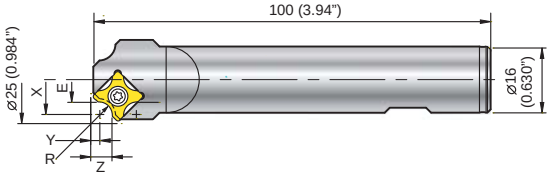
More >>

- Also can fit with N9MT11T308LA inserts for front and back chamfering. (Please see page 2-24)

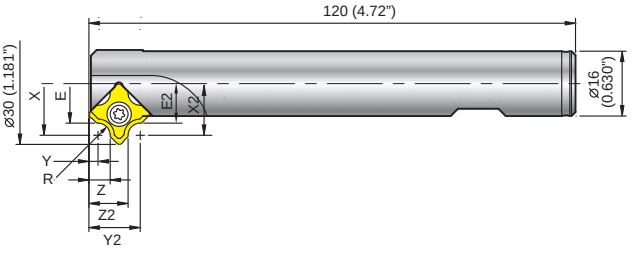
R N9MT11T3R

Cutting Position >>

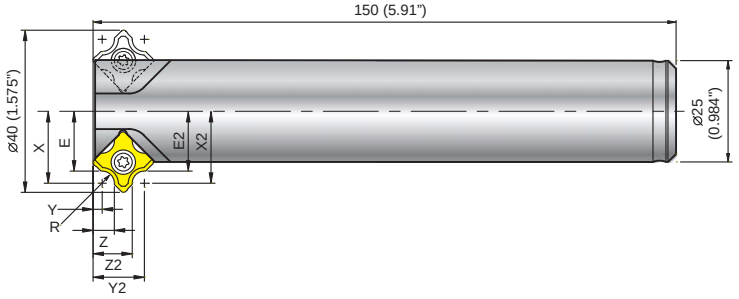
99616-16-25R



*99616-16-30R



*99616-25-40R

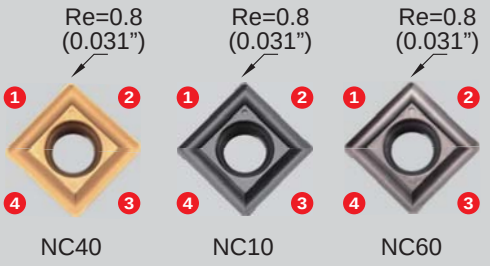


99616-16-30R & 99616-25-40R
*For front and back corner rounding.
*Eliminates 2nd operation or deburring time.

Insert Radius	Holder	Ød	Front Chamfering				Back Chamfering				Z
			E	X	Y	Z	E2	X2	Y2	Z2	
R1.0	99616-16-25R	16 (0.630")	8.25 (0.325")	9.25 (0.364")	3.25 (0.128")	4.25 (0.167")	----	----	----	----	1
	99616-16-30R		10.75 (0.423")	11.75 (0.463")			10.75 (0.423")	11.75 (0.463")	11.65 (0.459")	10.65 (0.419")	1
	99616-25-40R	25 (0.984")	15.75 (0.620")	16.75 (0.659")			15.75 (0.620")	16.75 (0.659")			4
R1.5	99616-16-25R	16 (0.630")	8 (0.315")	9.5 (0.374")	3 (0.118")	4.5 (0.177")	----	----	----	----	1
	99616-16-30R		10.5 (0.413")	12 (0.472")			10.5 (0.413")	12 (0.472")	11.9 (0.469")	10.4 (0.409")	1
	99616-25-40R	25 (0.984")	15.5 (0.610")	17 (0.670")			15.5 (0.610")	17 (0.670")			4
R2.0	99616-16-25R	16 (0.630")	7.75 (0.305")	9.75 (0.384")	2.75 (0.108")	4.75 (0.187")	----	----	----	----	1
	99616-16-30R		10.25 (0.404")	12.25 (0.482")			10.25 (0.404")	12.25 (0.482")	12.15 (0.478")	10.15 (0.400")	1
	99616-25-40R	25 (0.984")	15.25 (0.600")	17.25 (0.680")			15.25 (0.600")	17.25 (0.680")			4
R2.5	99616-16-25R	16 (0.630")	7.5 (0.295")	10 (0.394")	2.5 (0.098")	5 (0.197")	----	----	----	----	1
	99616-16-30R		10 (0.394")	12.5 (0.492")			10 (0.394")	12.5 (0.492")	12.4 (0.488")	9.9 (0.390")	1
	99616-25-40R	25 (0.984")	15 (0.590")	17.5 (0.689")			15 (0.590")	17.5 (0.689")			4
R3.0	99616-16-25R	16 (0.630")	7.25 (0.285")	10.25 (0.404")	2.25 (0.09")	5.25 (0.207")	----	----	----	----	1
	99616-16-30R		9.75 (0.384")	12.75 (0.502")			9.75 (0.384")	12.75 (0.502")	12.65 (0.498")	9.65 (0.380")	1
	99616-25-40R	25 (0.984")	14.75 (0.580")	17.75 (0.699")			14.75 (0.580")	17.75 (0.699")			4

* Also can fit with N9MT11T308LA inserts for front and back chamfering. (Please see page 2-24)

N9MT11T308LA 45° Chamfering Tool

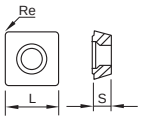


Inserts >>

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

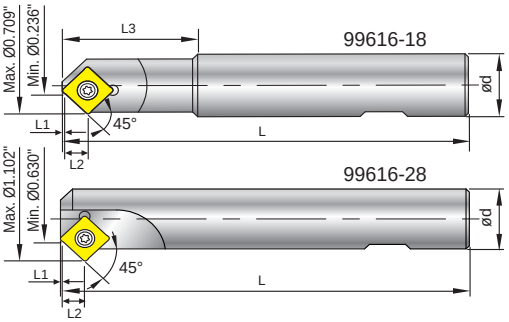
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for Al, Al-alloy, non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.

NC60: • Cermet insert, for hardened steel up to HRC56 .
• Each insert has 4 cutting edges.

Parts No.		Coating	Grade		Dimensions		
					L	S	Re
N9MT11T308LA	NC40	TiN	P35		11.11 (0.433")	3.97 (0.156")	0.8 (0.031")
	NC10	TiAN	K10F				
	NC60	Cermet					

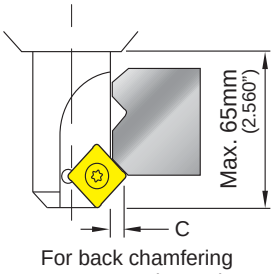
Holder >>

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

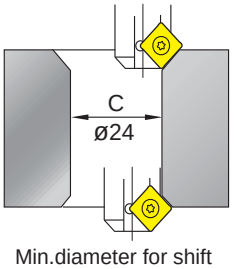


Parts No.	Chamfering	Ød	L	L1	L2	L3	Z	Insert type	Screw / Key
99616-18	Ø6-Ø18 (Ø0.236" ~ Ø0.709")	20 (0.787")	120 (4.724")	1.15 (0.045")	7.55 (0.297")	40 (1.632")	1	N9MT11T308LA	NS-35080 2.5 Nm / NK-T15
99616-28	Ø16-Ø28 (Ø0.630" ~ Ø1.102")	20 (0.787")	120 (4.724")	1.15 (0.045")	7.55 (0.297")	--			

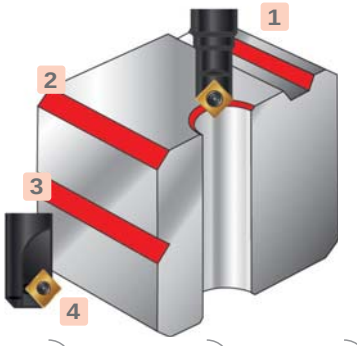
Example >>



For back chamfering
Max. 2mm (0.079")
CØ16-Ø28
(0.630" ~1.102")



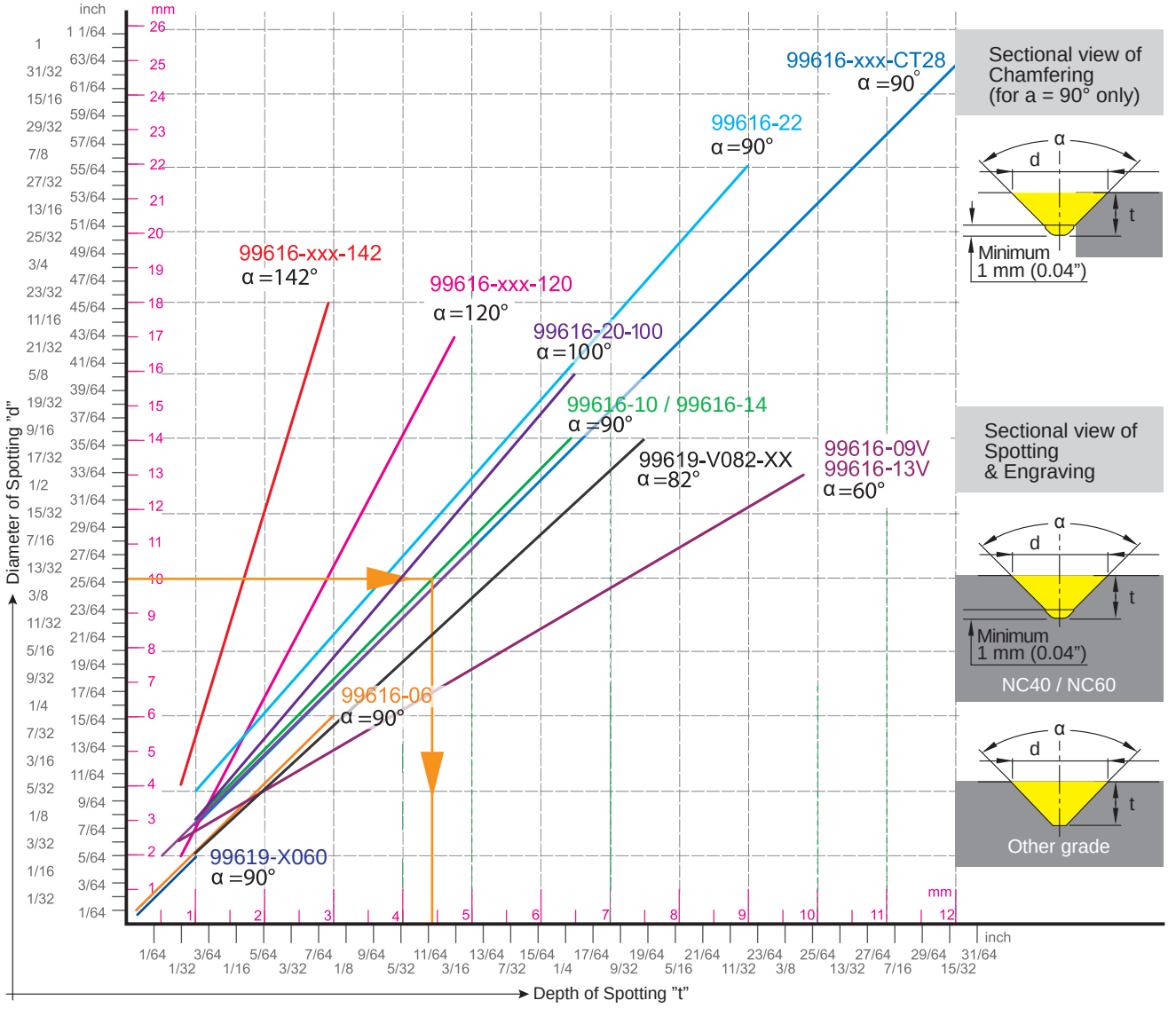
Min.diameter for shift
Ø24mm. (0.945")



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 Using >>

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 = IPR x RPM

Inch

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

$$F = f \times S$$

d = diameter-inch **f = IPR =** inch/rev.

S = Spindle Speed-r.p.m. **F =** inch/min.

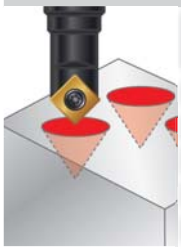
SFM = Surface Speed-ft./min. Vc (m/min.) x 3.28

Cutting Data

N9MT-CT >> Insert Multi-function

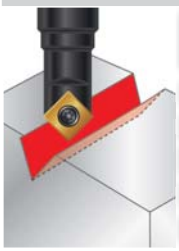
Determine spindle speed and feed rate:

- Choose spotting depth to decide spotting diameter according to the Diameter/Depth chart on page 2-25.
- The spindle speed should be calculated by the maximum diameter of spotting, chamfering and grooving.

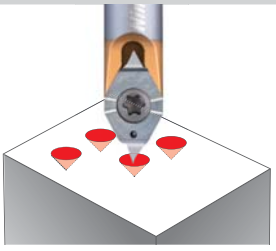
Spotting	Workpiece material	SFM	IPR (inch/rev.) V9MT0802CT N9MT05T1CT N9MT0602CT	IPR (inch/rev.) V9MT12T3CT V082... N9MT11T3CT N9MT1704CT N9MT2204CT V142...	Grade of Insert
	P Carbon Steel	500~820	0.0012~0.0028	0.0020~0.0040	NC40, NC2071
	P Alloy Steel	330~660	0.0008~0.0024	0.0016~0.0024	NC40, NC2071
	M Stainless Steel	210~410	0.0008~0.0016	0.0010~0.0024	NC10, NC60, NC40, NC2071, NC9036
	K Cast iron	260~500	0.0012~0.0028	0.0020~0.0040	NC40, NC10, NC2071
	N Non-Ferrous Metal (Al, Cu)	500~1050	0.0012~0.0028	0.0020~0.0040	NC10, NC9076, NC2071, NC9036
	S Ti, Ti-alloy	200~260	0.0008~0.0024	0.0012~0.0024	NC9076, NC9036
	H Hardened steel HRC 40°~56°	100~200	0.0008~0.0024	0.0012~0.0031	NC60

* For technical construction reasons, the insert is not located on the center of the holder.
* Inserts with supporting edges can increase feed rate 50%.

Chamfering	Workpiece material	SFM	IPR (inch/rev.) V9MT0802CT N9MT05T1CT N9MT0602CT	IPR (inch/rev.) V9MT12T3CT V082... N9MT11T3CT N9MT1704CT N9MT2204CT V142...	Grade of Insert
	P Carbon Steel	500~1050	0.0012~0.0028	0.0020~0.0040	NC40, NC2071
	P Alloy Steel	330~820	0.0008~0.0024	0.0016~0.0024	NC40, NC2071
	M Stainless Steel	210~410	0.0008~0.0016	0.0010~0.0024	NC10, NC60, NC40, NC2071, NC9036
	K Cast iron	500~820	0.0012~0.0028	0.0020~0.0040	NC40, NC10, NC2071
	N Non-Ferrous Metal (Al, Cu)	500~1050	0.0012~0.0028	0.0020~0.0040	NC10, NC9076, NC2071, NC9036
	S Ti, Ti-alloy	200~260	0.0008~0.0024	0.0012~0.0024	NC9076, NC9036
	H Hardened steel HRC 40°~56°	100~200	0.0008~0.0024	0.0012~0.0031	NC60

Grooving	Workpiece material	SFM	IPR (inch/rev.) V9MT0802CT N9MT05T1CT N9MT0602CT	IPR (inch/rev.) V9MT12T3CT V082... N9MT11T3CT N9MT1704CT N9MT2204CT V142...	Grade of Insert
	P Carbon Steel	500~820	0.0012~0.0028	0.0020~0.0040	NC40, NC2071
	P Alloy Steel	330~660	0.0008~0.0024	0.0016~0.0024	NC40, NC2071
	M Stainless Steel	210~410	0.0008~0.0016	0.0010~0.0024	NC10, NC60, NC40, NC2071, NC9036
	K Cast iron	260~500	0.0012~0.0028	0.0020~0.0040	NC40, NC10, NC2071
	N Non-Ferrous Metal (Al, Cu)	500~1050	0.0012~0.0028	0.0020~0.0040	NC10, NC9076, NC2071, NC9036
	S Ti, Ti-alloy	200~260	0.0008~0.0024	0.0012~0.0024	NC9076, NC9036
	H Hardened steel HRC 40°~56°	100~200	0.0008~0.0024	0.0012~0.0031	NC60

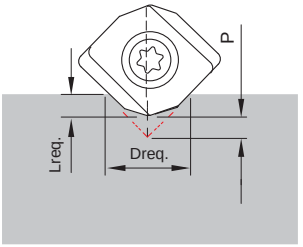
X060A90 >> Mini Spot Drill

Spotting	Work Material	S (r.p.m.)	IPR (inch/rev.) X060A90W010R	IPR (inch/rev.) X060A90W020R	Grade of Insert
	P Carbon steel C<0.3%	8000 ~ 40000	0.00008 ~ 0.0005	0.00008 ~ 0.0006	NC2032
	P Carbon steel C>0.3%		0.00008 ~ 0.0004	0.00008 ~ 0.0005	NC2032
	P Alloy steel		0.00008 ~ 0.0004	0.00008 ~ 0.0004	NC2032, NC2035
	M Stainless steel		0.00008 ~ 0.0003	0.00008 ~ 0.0004	NC2032
	K Casting iron		0.00008 ~ 0.0004	0.00008 ~ 0.0004	NC2032
	N Non-ferrous metal (Al, Cu)		0.00008 ~ 0.0006	0.00008 ~ 0.0008	XP9001
	H Hardened steel up 56 HRC		0.00008 ~ 0.0002	0.00008 ~ 0.0002	NC2035

Cutting Data

W Spotting >> 145° + 90° W Spotting

W 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

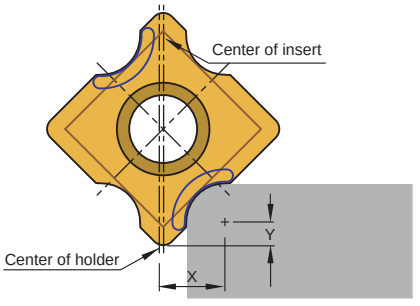
	M4	M5	M6	M8	M10	M12	M14	M16	1/4-20 UNC	5/16-18 UNC	3/8-16 UNC
P =	0.046”	0.058”	0.069”	0.094”	0.117”	0.141”	0.165”	0.192”	0.071”	0.091”	0.109”

W spotting	Work Material	SFM	IPR (inch/rev.)
	Carbon Steel	500 ~ 1050	0.0020 ~ 0.0060
	Alloy Steel	410 ~ 820	0.0020 ~ 0.0040
	Stainless Steel	260 ~ 500	0.0015 ~ 0.0031
	Cast iron	330 ~ 660	0.0020 ~ 0.0040

N9MT-RC Insert >> Corner Rounding

Determine spindle speed and feed:
To decide running speed of the tools and feed rate, please calculate spindle speed and feed rate according to the following formula and cutting data:

Corner Rounding	Calculate spindle speed



d = 2 x X **inch**

$$S = \frac{SFM \times 3.82}{d}$$ **r.p.m.**

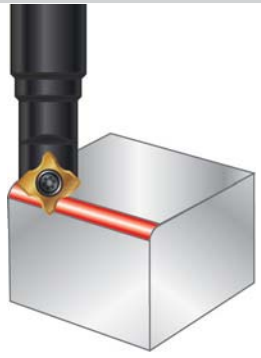
F = S x f **inch**

d = diameter of the tool for calculation purpose
X = tool radius offset (ref. page 2-18~20 for RC inserts)
SFM = Cutting speed ft/min.
S = Spindle Speed -r.p.m.
F = Feed rate inch
f = inch/rev.

Calculate tool length offest on machining center

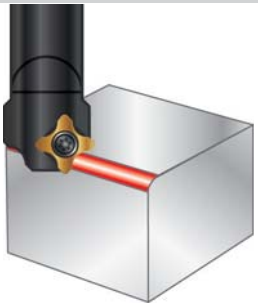
TL = TL’-Y,
H = X

X = tool radius offset (ref. page 2-18~20 for RC inserts)
Y = distance to the center of radius. (ref. page 2-18~20 for RC inserts)
TL’ = tool length
TL = tool length offset.
H = tool radius offset

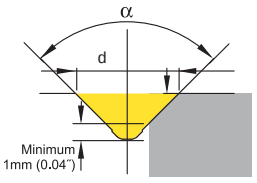
RC Insert	Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	Carbon Steel	500~1050	0.0020~0.0040	NC40, NC2071
	Alloy steel	330~820	0.0020~0.0040	NC40, NC2071
	High alloy steel	260~500	0.0016~0.0031	NC40, NC2071
	Stainless Steel	210~410	0.0020~0.0040	NC9036
	Gray cast iron	500~820	0.0020~0.0040	NC40, NC2071
	Aluminum, Al-alloy Si < 12%	500~1050	0.0020~0.0040	NC9036
	Al-alloy Si >12%	330~1050	0.0020~0.0040	NC9036
	Copper	600~820	0.0020~0.0040	NC9036
	Brass and Bronze	500~820	0.0020~0.0040	NC9036
	Ti, Ti-alloy	130~260	0.0012~0.0031	NC9036

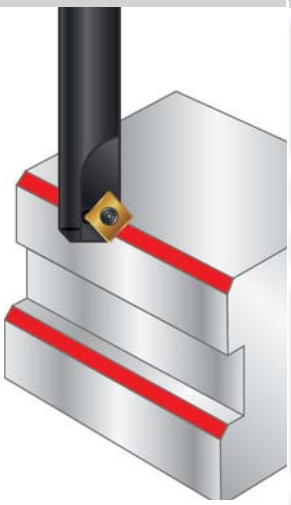
Cutting Data

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

R Insert	Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	Carbon Steel	500~1050	0.0020~0.0040	NC2071
	Alloy steel	330~820	0.0016~0.0031	NC2071
	High alloy steel	200~260	0.0012~0.0023	NC2071
	Cast iron	500~820	0.0020~0.0040	NC2071

LA Insert >> 45° Chamfering

45˚ Chamfering	Formula	
	$S = \frac{(3.82 \times SFM)}{d}$ $F = f \times S$	**α =** point angle 90° **d =** effective diameter **SFM =** Surface Speed-ft./min.. Vc (m/min.) x 3.28 **S =** Spindle Speed-r.p.m. **f =** **IPR=** inch/rev.

45˚ Chamfering	Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	Carbon Steel	500~1050	0.0020~0.0040	NC40
	Alloy Steel	330~820	0.0016~0.0031	NC40
	High alloy steel	200~260	0.0012~0.0023	NC40
	Stainless Steel	210~410	0.0012~0.0023	NC10
	Gray cast iron	500~820	0.0020~0.0040	NC10, NC40
	Aluminum, Al-alloy Si < 12%	500~1050	0.0020~0.0040	NC10
	Al-alloy Si >12%	330~1050	0.0020~0.0040	NC10
	Copper	600~820	0.0020~0.0040	NC10
	Brass and Bronze	500~820	0.0020~0.0040	NC10
	Hardened steel HRC 40~°56°	200~260	0.0020~0.0040	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 r.p.m. and feed rate of 600 mm/min. (24 inch/min.), 0.1 mm/rev. (0.004 inch/rev.).

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.

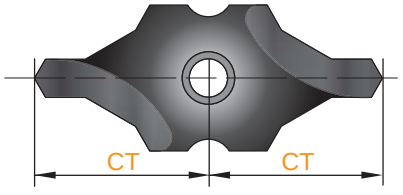
Excellent Repeatability

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

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

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.



CT ±0.025mm (0.001”)

NC2033

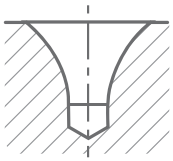
NC5074 (IC08)

NEW

NC2057 (IC10)

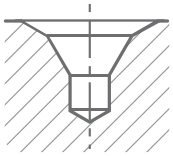
DIN 332 Form R

Ø1.0~Ø10



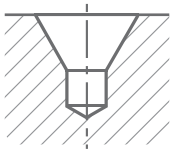
DIN 332 Form A + B

Ø1.0~Ø10



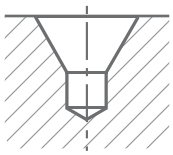
DIN 332 Form A

Ø2.0~Ø3.15



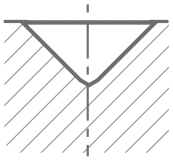
ANSI 60°

#2.0~#10



Spotting & Csink

60°, 90° & 120°



Inserts:

◀ 2 cutting flutes design
No offset.

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

NC2033:

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

NC5074:

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

NEW

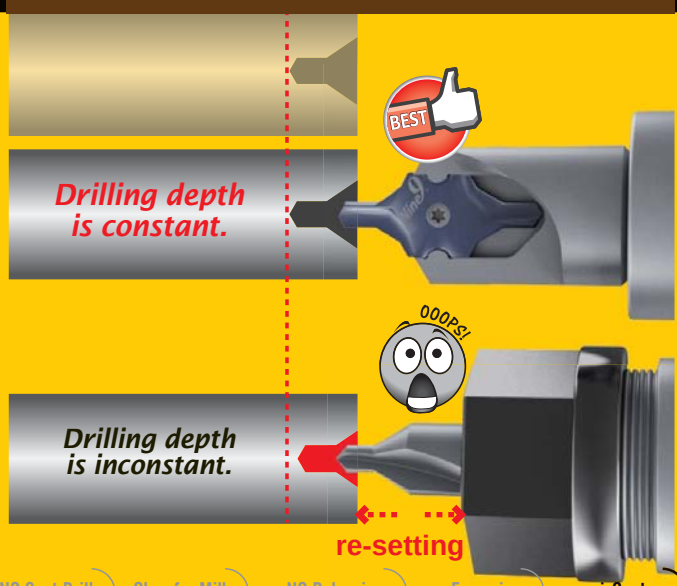
NC2057:

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

2

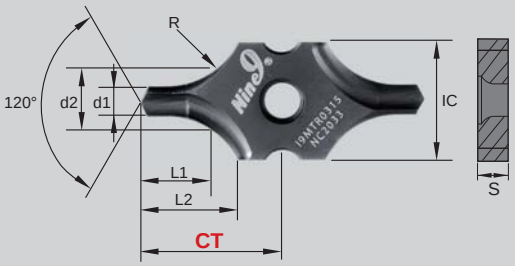
i-Center

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

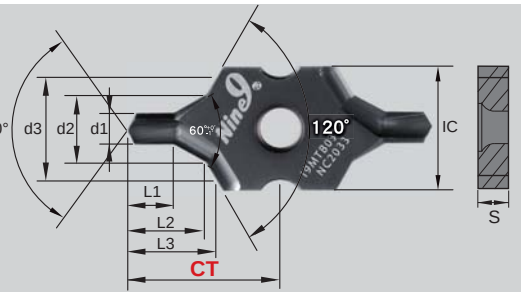


IC08, IC12, IC16, IC20, IC25 Indexable Center Drill

DIN332 Form R



DIN332 Form A+B



DIN332 Form R

IC	Parts No.	Coating	Grade	d1	d2	L1	L2	R	S	CT ±0.025 (0.001")
08 (0.315")	I9MT08T1R0100-NC5074	Helica (AlCrN)	P40	1.00 (0.039") + 0.14 (0.006") 0	2.12 (0.083")	2.16 (0.085")	4.14 (0.163")	2.8 (0.110")	2.00 (0.079")	7.55 (0.297")
	I9MT08T1R0125-NC5074			1.25 (0.049")	2.65 (0.104")	2.74 (0.108")	4.64 (0.183")	3.5 (0.138")		7.90 (0.311")
	I9MT08T1R0160-NC5074			1.60 (0.063")	3.35 (0.132")	3.45 (0.136")	5.13 (0.202")	4.5 (0.177")		8.40 (0.331")
	I9MT08T1R0200-NC5074			2.00 (0.079")	4.25 (0.167")	4.45 (0.175")	6.08 (0.240")	5.65 (0.222")		9.10 (0.358")
12 (0.472")	I9MT12T2R0200-NC2033	TiAlN	K20F	2.00 (0.079") + 0.14 (0.006") 0	4.25 (0.167")	4.45 (0.175")	6.64 (0.261")	5.65 (0.222")	2.54 (0.1")	11.73 (0.462")
	I9MT12T2R0250-NC2033			2.50 (0.098")	5.3 (0.209")	5.59 (0.220")	8.11 (0.319")	7.15 (0.281")		13.00 (0.512")
	I9MT12T2R0315-NC2033			3.15 (0.124") + 0.18 (0.007") 0	6.7 (0.264")	7.21 (0.284")	9.63 (0.379")	9.0 (0.354")		14.00 (0.551")
16 (0.630")	I9MT1603R0400-NC2033			4.00 (0.157")	8.5 (0.335")	9.06 (0.357")	12.23 (0.481")	11.0 (0.433")	3.18 (0.125")	19.40 (0.764")
	I9MT1603R0500-NC2033			5.00 (0.197")	10.6 (0.417")	11.45 (0.450")	14.2 (0.481")	14.0 (0.551")		19.40 (0.764")
20 (0.787")	I9MT2004R0630-NC2033			6.30 (0.248") + 0.22 (0.009") 0	13.2 (0.520")	14.63 (0.576")	18.2 (0.717")	18.0 (0.709")	4.76 (0.187")	28.40 (1.118")
	I9MT2004R0800-NC2033			8.00 (0.315")	17.0 (0.669")	18.63 (0.733")	20.44 (0.805")	22.5 (0.886")		28.30 (1.114")
25 (0.984")	I9MT2506R1000-NC2033			10.00 (0.394")	21.2 (0.835")	23.51 (0.926")	25.8 (1.016")	28.0 (1.102")	6.35 (0.25")	34.20 (1.346")

* Technical information, please refer to page 2-39.

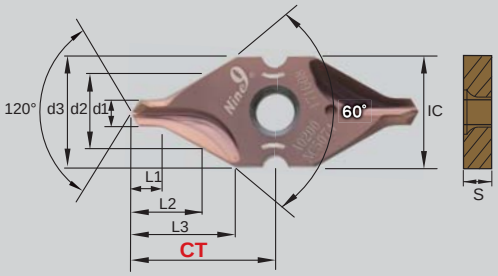
DIN332 Form A+B

IC	Parts No.	Coating	Grade	d1	d2	d3	L1	L2	L3	S	CT ±0.025 (0.001")
08 (0.315")	I9MT08T1B0100-NC5074	Helica (AlCrN)	P40	1.00 (0.039") + 0.14 (0.006") 0	2.12 (0.083")	3.15 (0.124")	1.3 (0.051")	2.21 (0.087")	2.51 (0.099")	2.00 (0.079")	7.55 (0.297")
	I9MT08T1B0125-NC5074			1.25 (0.049")	2.65 (0.104")	4.0 (0.157")	1.6 (0.063")	2.75 (0.108")	3.14 (0.124")		7.90 (0.311")
	I9MT08T1B0160-NC5074			1.60 (0.063")	3.35 (0.132")	5.0 (0.197")	2.0 (0.079")	3.46 (0.136")	3.93 (0.155")		8.40 (0.331")
	I9MT08T1B0200-NC5074			2.00 (0.079")	4.25 (0.167")	6.3 (0.248")	2.5 (0.098")	4.39 (0.173")	4.98 (0.196")		9.10 (0.358")
12 (0.472")	I9MT12T2B0200-NC2033	TiAlN	K20F	2.00 (0.079") + 0.14 (0.006") 0	4.25 (0.167")	6.3 (0.248")	2.5 (0.098")	4.39 (0.173")	4.98 (0.196")	2.54 (0.1")	11.73 (0.462")
	I9MT12T2B0250-NC2033			2.50 (0.098")	5.3 (0.209")	8.0 (0.315")	3.1 (0.122")	5.53 (0.218")	6.28 (0.247")		13.00 (0.512")
	I9MT12T2B0315-NC2033			3.15 (0.124") + 0.18 (0.007") 0	6.7 (0.264")	10.0 (0.394")	3.9 (0.154")	6.90 (0.272")	7.85 (0.309")		14.00 (0.551")
16 (0.630")	I9MT1603B0400-NC2033			4.00 (0.157")	8.5 (0.335")	12.5 (0.492")	5.0 (0.197")	8.9 (0.350")	10.03 (0.395")	3.18 (0.125")	19.40 (0.764")
	I9MT1603B0500-NC2033			5.00 (0.197")	10.6 (0.417")	16.0 (0.630")	6.3 (0.248")	11.15 (0.439")	12.68 (0.499")		19.40 (0.764")
20 (0.787")	I9MT2004B0630-NC2033			6.30 (0.248") + 0.22 (0.009") 0	13.2 (0.520")	18.0 (0.709")	8.0 (0.315")	13.98 (0.550")	15.33 (0.604")	4.76 (0.187")	28.40 (1.118")
	I9MT2004B0800-NC2033			8.00 (0.315")	17.0 (0.669")	20 (0.787")	10.1 (0.398")	17.89 (0.704")	18.73 (0.737")		28.30 (1.114")
25 (0.984")	I9MT2506B1000-NC2033			10.00 (0.394")	21.2 (0.835")	25 (0.984")	12.8 (0.504")	22.5 (0.886")	23.57 (0.928")	6.35 (0.25")	34.20 (1.346")

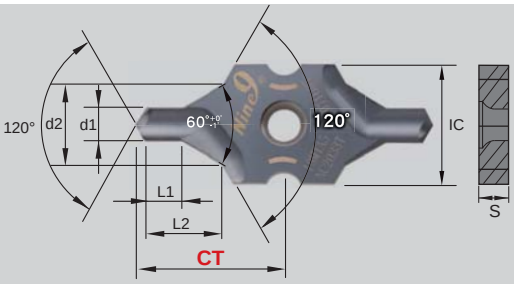
* Technical information, please refer to page 2-39.

IC08, IC12, IC16, IC20, IC25 Indexable Center Drill

DIN332 Form A



ANSI 60°



DIN332 Form A

IC	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	S	CT ±0.025 (0.001")
08 (0.315")	I9MT08T1A0200-NC5074	Helica (AlCrN)	P40	2.0 (0.079")	+ 0.14 (0.006") 0	4.25 (0.167")	8 (0.315")	2.15 (0.085")	4.10 (0.161")	7.35 (0.289")	2.00 (0.079")	10.5 (0.413")
	I9MT08T1A0250-NC5074			2.5 (0.098")		5.3 (0.209")		2.58 (0.102")	5.00 (0.197")	7.34 (0.289")		
	I9MT08T1A0315-NC5074			3.15 (0.124")	+ 0.18 (0.007") 0	6.70 (0.264")		3.23 (0.127")	6.30 (0.248")	7.43 (0.293")		

* Technical information, please refer to page 2-39.

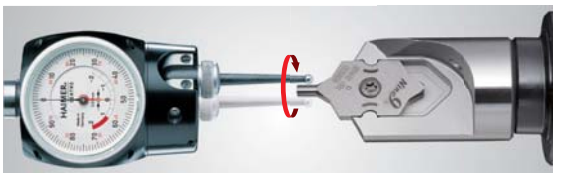
ANSI 60°

IC	Parts No.	Coating	Grade	Size	d1			d2		L1		L2	S	CT ±0.025 (0.001")
						mm			mm		mm	mm	mm	
12 (0.472")	I9MT12T2A2-NC2033	TiAlN	K20F	#2	5/64	1.98	+ 0.14 (0.006") 0	3/16	4.76	5/64	1.98	4.4 (0.173")	2.54 (0.1")	12.6 (0.496")
	I9MT12T2A3-NC2033			#3	7/64	2.78		1/4	6.35	7/64	2.78	5.9 (0.232")		13.8 (0.543")
	I9MT12T2A4-NC2033			#4	1/8	3.18	+ 0.18 (0.007") 0	5/16	7.94	1/8	3.18	7.3 (0.287")		14.25 (0.561")
16 (0.630")	I9MT1603A5-NC2033			#5	3/16	4.76		7/16	11.11	3/16	4.76	10.3 (0.406")	3.18 (0.125")	20.0 (0.787")
	I9MT2004A6-NC2033			#6	7/32	5.56		1/2	12.7	7/32	5.56	11.8 (0.465")		27.75 (1.093")
20 (0.787")	I9MT2004A7-NC2033			#7	1/4	6.35	+ 0.22 (0.009") 0	5/8	15.88	1/4	6.35	14.6 (0.575")	4.76 (0.187")	28.5 (1.122")
	I9MT2004A8-NC2033			#8	5/16	7.94		3/4	19.05	5/16	7.94	17.6 (0.693")		29.0 (1.141")
25 (0.984")	I9MT2506A10-NC2033			#10	3/8	9.53		0.98"	25.0	3/8	9.53	22.9 (0.902")	6.35 (0.25")	34.9 (1.374")

* Technical information, please refer to page 2-39.

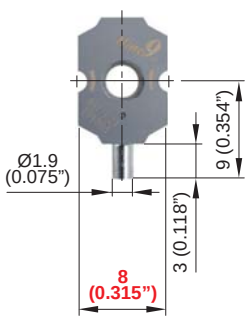
Measuring Master >>

- Apply on lathe to align the center of work spindle and tool.
- Each insert has just one measuring tip.
- Concentricity: ±0.01mm (0.004")



IC08 (0.315")

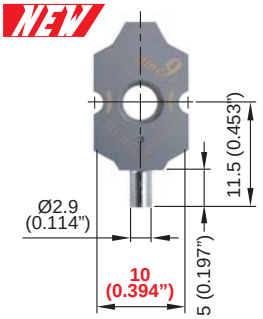
I9MT08T1-PATTERN



IC10 (0.394")

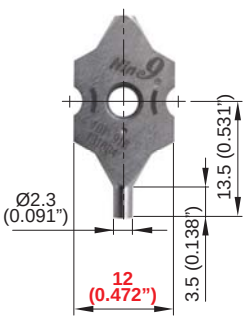
I9MT1003-PATTERN

NEW



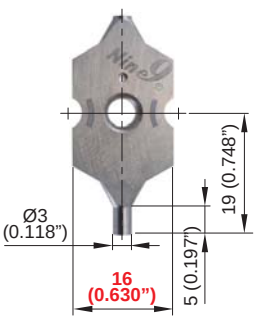
IC12 (0.472")

I9MT12T2-PATTERN



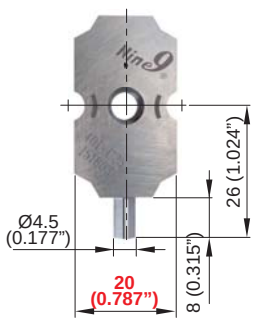
IC16 (0.630")

I9MT1603-PATTERN



IC20 (0.787")

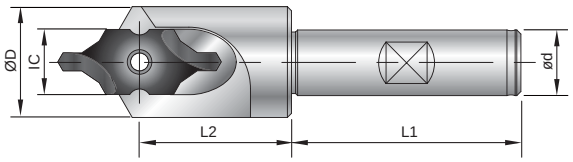
I9MT2004-PATTERN



IC08, IC12, IC16, IC20, IC25 Indexable Center Drill

Weldon Shank >>

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



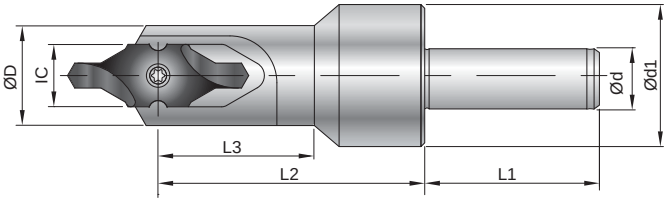
IC08

IC12, IC16, IC20, IC25

IC	Parts No.	Type	Ød	L1	L2	ØD	Screw	Key
08 (0.315")	99616-IC08-10F	BC10-IC08F	10 (0.394")	30 (1.181")	18.5 (0.728")	12 (0.472")	NS-25060 0.9 Nm	NK-T7
	99616-IC08-3/8F	BC3/8"-IC08F	3/8"					
12 (0.472")	99616-IC12-16F	SB16-IC12F	16 (0.630")	48 (1.890")	30.5 (1.201")	21 (0.827")	NS-30072 2.0 Nm	NK-T9
	99616-IC12-5/8F	SB5/8"-IC12F	5/8"					
16 (0.630")	99616-IC16-16F	SB16-IC16F	16 (0.630")	48 (1.890")	37 (1.457")	27 (1.063")	NS-35080 2.5 Nm	NK-T15
	99616-IC16-5/8F	SB5/8"-IC16F	5/8"					
20 (0.787")	99616-IC20-20F	SB20-IC20F	20 (0.787")	50 (1.969")	51 (2.008")	32 (1.260")	NS-50125 5.5 Nm	NK-T20
	99616-IC20-3/4F	SB3/4"-IC20F	3/4"					
25 (0.984")	99616-IC25-25F	SB25-IC25F	25 (0.984")	56 (2.205")	56 (2.205")	43 (1.693")	NS-50125 5.5 Nm	NK-T20
	99616-IC25-1F	SB 1"-IC25F	1"					

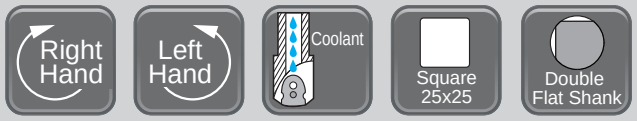
Cylindrical Shank with Pre-balanced >> NEW

- Made of hardened high alloy steel, 58 HRC.
- G6.3 / 10,000 r.p.m.



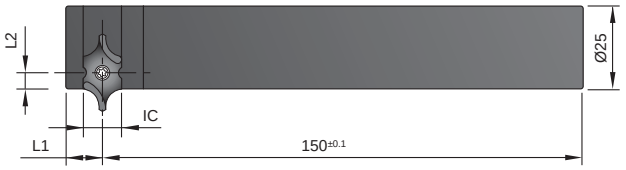
IC	Parts No.	Type	Ød	Ød1	L1	L2	L3	ØD	Screw	Key
08 (0.315")	99616-IC08-10B	BC10-IC08B	10 (0.394")	22 (0.866")	30 (1.181")	33.5 (1.319")	19 (0.748")	12 (0.472")	NS-25060 0.9 Nm	NK-T7
12 (0.472")	99616-IC12-12B	BC12-IC12B	12 (0.472")	34 (1.339")	48 (1.890")	51 (2.008")	30 (1.181")	21 (0.827")	NS-30072 2.0 Nm	NK-T9
16 (0.630")	99616-IC16-16B	BC16-IC16B	16 (0.630")	39 (1.535")	48 (1.890")	67 (2.638")	37 (1.457")	27 (1.063")	NS-35080 2.5 Nm	NK-T15
20 (0.787")	99616-IC20-20B	BC20-IC20B	20 (0.787")	49 (1.929")	50 (1.969")	86 (3.386")	51 (2.008")	32 (1.260")	NS-50125 5.5 Nm	NK-T20
25 (0.984")	99616-IC25-25B	BC25-IC25B	25 (0.984")	59 (2.323")	56 (2.205")	99 (3.898")	56 (2.205")	43 (1.693")	NS-50125 5.5 Nm	NK-T20

IC08, IC12, IC16, IC20, IC25 Indexable Center Drill



Square Shank 25 x 25 Right / Left Hand >>

- For used on lathe.
- Made of hardened alloy steel, 40 HRC.
- Other sizes are available on request.

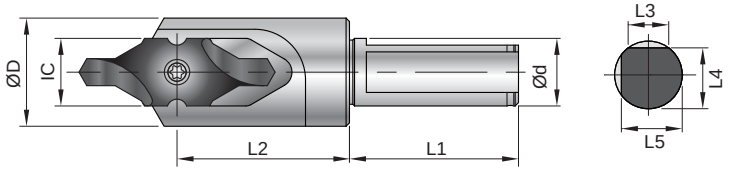


IC	Parts No.	L1	L2	Screw	Key
08 (0.315")	99616-IC08-R2525MF	8 (0.315")	3.25 (0.128")	NS-25060 0.9 Nm	NK-T7
	99616-IC08-L2525MF				
12 (0.472")	99616-IC12-R2525MF	11 (0.433")	4.9 (0.193")	NS-30072 2.0 Nm	NK-T9
	99616-IC12-L2525MF				
16 (0.630")	99616-IC16-R2525MF	13 (0.512")	4.9 (0.193")	NS-35080 2.5 Nm	NK-T15
	99616-IC16-L2525MF				

Double Flat Shank >> Non-Stock Item

NEW

- Made of hardened high alloy steel, 58 HRC.
- Double flat shank type for used on lathe.
- 180° for insert at top, 90° for insert at front.

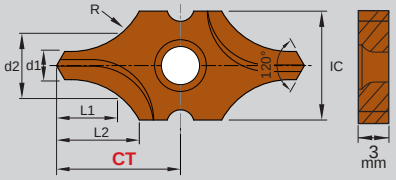


IC	Parts No.	Type	Ød	L1	L2	L3	L4	L5	ØD	Screw	Key
08 (0.315")	99616-IC08-10S	SL10-IC08S	10 (0.394")	30 (1.181")	18.5 (0.728")	6 (0.236")	9 (0.354")	9 (0.354")	12 (0.472")	NS-25060 0.9 Nm	NK-T7
12 (0.472")	99616-IC12-16S	SL16-IC12S	16 (0.630")	48 (1.890")	30.5 (1.201")	9.33 (0.367")	14.5 (0.571")	14.5 (0.571")	21 (0.827")	NS-30072 2.0 Nm	NK-T9
16 (0.630")	99616-IC16-16S	SL16-IC16S	16 (0.630")	48 (1.890")	37 (1.457")	9.33 (0.367")	14.5 (0.571")	14.5 (0.571")	27 (1.063")	NS-35080 2.5 Nm	NK-T15
20 (0.787")	99616-IC20-20S	SL20-IC20S	20 (0.787")	50 (1.969")	51 (2.008")	12 (0.472")	18 (0.709")	18 (0.709")	32 (1.260")	NS-50125 5.5 Nm	NK-T20
25 (0.984")	99616-IC25-25S	SL25-IC25S	25 (0.984")	56 (2.205")	56 (2.205")	13.57 (0.534")	23 (0.905")	23 (0.905")	43 (1.693")	NS-50125 5.5 Nm	NK-T20

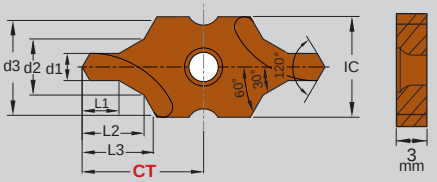
IC10 Indexable Center Drill

NEW

DIN332 FormR



DIN332 FormA+B



Insert >>

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

▲ 2 Cutting flutes design
No offset

DIN332 Form R

IC	Parts No.	Coating	Grade	d1		d2	L1	L2	R	CT ±0.025 (0.001")
10 (0.394")	I9MT1003R0100-NC2057	AL(L)	P35	1.00 (0.039")	+ 0.14 (0.006") 0	2.12 (0.083")	2.16 (0.085")	4.72 (0.186")	2.8 (0.110")	12.35 (0.486")
	I9MT1003R0125-NC2057			1.25 (0.049")		2.65 (0.104")	2.74 (0.108")	5.22 (0.206")	3.5 (0.138")	
	I9MT1003R0150-NC2057			1.50 (0.059")		3.60 (0.142")	3.67 (0.144")	6.14 (0.242")	5.0 (0.197")	
	I9MT1003R0160-NC2057			1.60 (0.063")		3.35 (0.132")	3.45 (0.136")	5.32 (0.210")	4.5 (0.177")	
	I9MT1003R0200-NC2057			2.00 (0.079")		4.25 (0.167")	4.45 (0.175")	6.50 (0.256")	5.65 (0.222")	
	I9MT1003R0250-NC2057			2.50 (0.098")		5.30 (0.209")	5.59 (0.220")	7.66 (0.302")	7.15 (0.281")	
	I9MT1003R0300-NC2057			3.00 (0.118")	+ 0.18 (0.007") 0	5.70 (0.224")	6.92 (0.272")	9.50 (0.374")	10.00 (0.394")	
	I9MT1003R0315-NC2057			3.15 (0.124")		6.70 (0.264")	7.21 (0.284")	8.93 (0.352")	9.00 (0.354")	

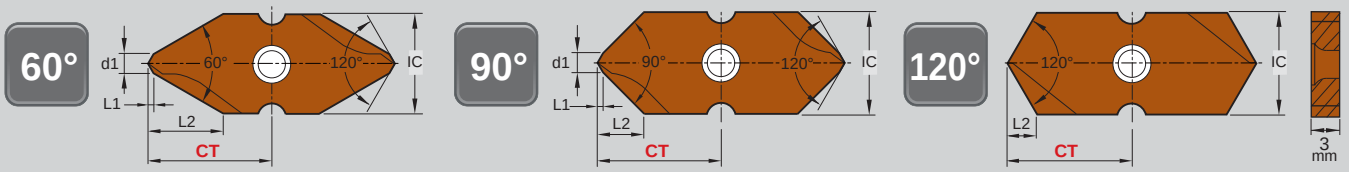
* Cutting Data, please refer to page 2-40.

DIN332 Form A+B

IC	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	CT ±0.025 (0.001")
10 (0.394")	I9MT1003B0100-NC2057	AL(L)	P35	1.00 (0.039")	+ 0.14 (0.006") 0	2.12 (0.083")	3.15 (0.124")	1.3 (0.051")	2.21 (0.087")	2.51 (0.099")	12.35 (0.486")
	I9MT1003B0125-NC2057			1.25 (0.049")		2.65 (0.104")	4.0 (0.157")	1.6 (0.063")	2.75 (0.108")	3.14 (0.124")	
	I9MT1003B0150-NC2057			1.50 (0.059")		3.18 (0.125")	4.50 (0.177")	2.0 (0.079")	3.45 (0.136")	3.84 (0.151")	
	I9MT1003B0160-NC2057			1.60 (0.063")		3.35 (0.132")	5.0 (0.197")	2.0 (0.079")	3.46 (0.136")	3.93 (0.155")	
	I9MT1003B0200-NC2057			2.00 (0.079")		4.25 (0.167")	6.3 (0.248")	2.5 (0.098")	4.39 (0.173")	4.98 (0.196")	
	I9MT1003B0250-NC2057			2.50 (0.098")		5.3 (0.209")	8.0 (0.315")	3.1 (0.122")	5.53 (0.218")	6.28 (0.247")	
	I9MT1003B0300-NC2057			3.00 (0.118")	+ 0.18 (0.007") 0	6.46 (0.254")	9.00 (0.354")	4.1 (0.161")	7.10 (0.280")	7.83 (0.308")	
	I9MT1003B0315-NC2057			3.15 (0.124")		6.7 (0.264")	10.0 (0.394")	3.9 (0.154")	6.90 (0.272")	7.85 (0.309")	

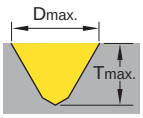
* Cutting Data, please refer to page 2-40.

IC10 Indexable Center Drill



● For Spotting & Csink

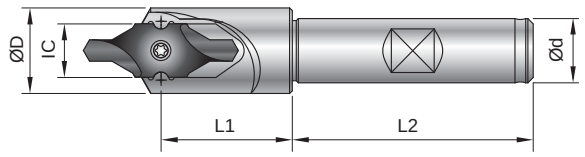
◀ 2 Cutting flutes design
No offset



IC	Angle	Parts No.	Coating	Grade	d1	L1	L2	Dmax.	Tmax.	CT ±0.025 (0.001")
10 (0.394")	60°	I9MT1003CT060-NC2057	AL(L)	P35	2 (0.079")	0.58 (0.023")	7.5 (0.295")	10 (0.394")	7.5 (0.295")	12.35 (0.486")
	90°	I9MT1003CT090-NC2057			2 (0.079")	0.58 (0.023")	4.6 (0.181")	10 (0.394")	4.6 (0.181")	
	120°	I9MT1003CT120-NC2057			-	-	2.9 (0.114")	10 (0.394")	2.9 (0.114")	

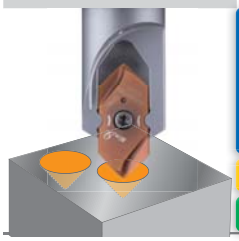
Weldon Shank >>

• Made of hardened high alloy steel, 58HRC.

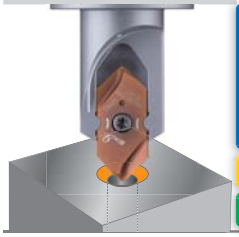


IC	Parts No.	Type	Ød	L1	L2	ØD	Screw	Key
10 (0.394")	99616-IC10-12F	SB12-IC10F	12 (0.472")	24.5 (0.965")	45 (1.772")	16 (0.630")	NS-25060 / 0.9Nm	NK-T7

Cutting Data

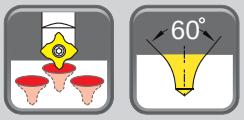


Spotting		Workpiece Material	SFM	IPR (inch/rev.) 60°	IPR (inch/rev.) 90°	IPR (inch/rev.) 120°		
	P	Carbon steel C<0.3%	410 ~ 820	0.003" ~ 0.008"	0.006" ~ 0.010"	0.004" ~ 0.012"	●	○
	P	Carbon steel C>0.3%	330 ~ 730	0.003" ~ 0.008"	0.004" ~ 0.002"	0.004" ~ 0.012"	●	○
	P	Low alloy steel C<0.3%	330 ~ 660	0.002" ~ 0.006"	0.003" ~ 0.008"	0.004" ~ 0.010"	●	○
	P	High alloy steel C>0.3%	260 ~ 590	0.002" ~ 0.005"	0.003" ~ 0.008"	0.004" ~ 0.010"	●	○
	M	Stainless steel	200 ~ 410	0.002" ~ 0.004"	0.002" ~ 0.005"	0.003" ~ 0.006"	≥ 5 bar ●	○
	N	Al, and non-ferrous metal	500 ~ 1050	0.003" ~ 0.008"	0.004" ~ 0.010"	0.004" ~ 0.012"	●	○



Countersink		Workpiece Material	SFM	IPR (inch/rev.) 60°	IPR (inch/rev.) 90°	IPR (inch/rev.) 120°		
	P	Carbon steel C<0.3%	410 ~ 820	0.008" ~ 0.020"			●	○
	P	Carbon steel C>0.3%	330 ~ 730	0.008" ~ 0.016"			●	○
	P	Low alloy steel C<0.3%	330 ~ 660	0.006" ~ 0.016"			●	○
	P	High alloy steel C>0.3%	260 ~ 590	0.004" ~ 0.012"			●	○
	M	Stainless steel	200 ~ 410	0.003" ~ 0.012"			≥ 5 bar ●	○
	N	Al, and non-ferrous metal	500 ~ 1050	0.008" ~ 0.020"			●	○

N9MT11T3PR Radius Center Drilling

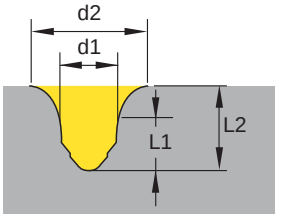


NC40

Inserts >>

- Create 60° center holes SIMILAR to DIN 332 Form R.
- Carbide insert can stand very long tool life.
- Easy tool length setting, saving tool changing time.

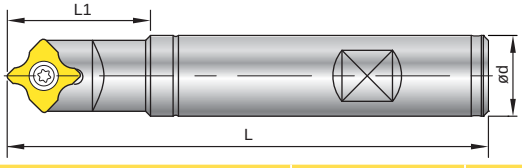
NC40:
- Universal grade for all unhardened steel and cast iron.
- Radius curve eliminates the sharp transition from drill point to countersink angle.
- The risk of breakage is reduced.
- Each insert has 2 cutting edges.



Parts No.	Coating	Grade	Dimensions			
			d1	d2	L1	L2
N9MT11T3PR20-NC40	TiN	P35	2.0 (0.078")	5.4 (0.213")	2.7 (0.106")	3.3 (0.130")
N9MT11T3PR25-NC40			2.5 (0.098")	5.9 (0.232")	3.0 (0.118")	3.7 (0.146")
N9MT11T3PR30-NC40			3.0 (0.118")	6.4 (0.252")	3.3 (0.130")	4.0 (0.157")

Holder >>

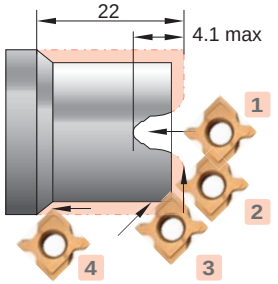
- PR holder has small offset value.
- Also apply as a 90° spotting drill while fitted with N9MT11T3CT2T-H insert (page 2-14).



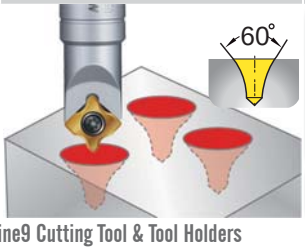
Parts No.	Ød	L	L1	Screw	Key
99616-14-PR	16 (0.630")	100 (3.94")	30 (1.224")	NS-35080 2.5 Nm	NK-T15

Turning and Centering Capacity on CNC Lathes

	Action
1	Center Drilling
2	Facing
3	Chamfering
4	External Turning



Cutting Data >>

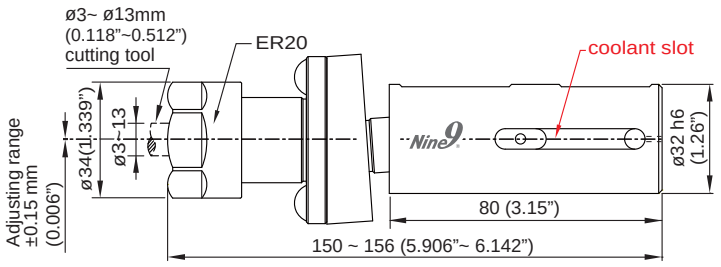
Center Drilling	Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	Carbon Steel	260 ~ 500	0.0020~0.0040	NC40
	Alloy steel	260 ~ 500	0.0020~0.0040	
	High alloy steel	260 ~ 500	0.0020~0.0040	
	Cast iron	260 ~ 500	0.0020~0.0040	

Center Height Adjusting Sleeve

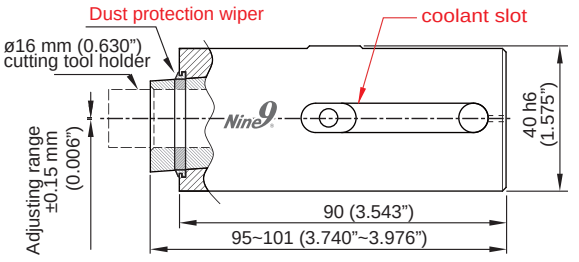
Principle >>

- 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.:99600-320H ▸ Type : SB32-IDER20

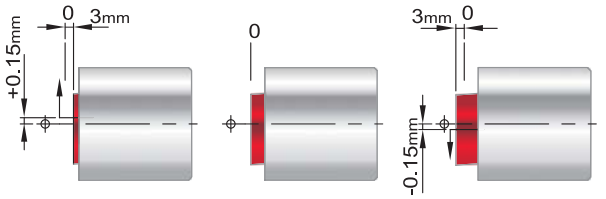


Parts No.:99600-400H ▸ Type : SB40-ID16



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").

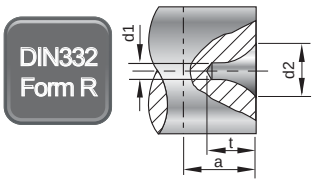


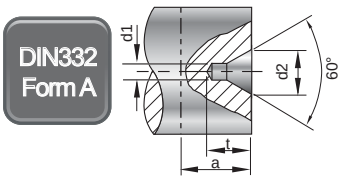
2

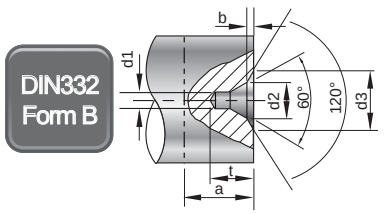
i-Center

Technical Specifications

60° Center holes

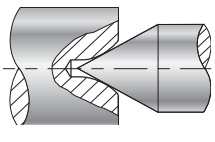
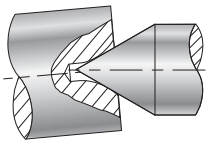




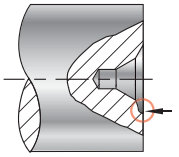
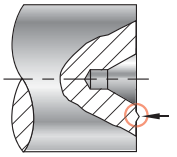
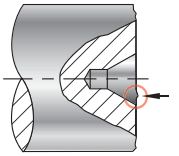
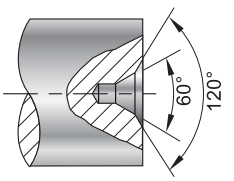


STD	DIN332 Form R ISO 2541-1972			DIN332 Form A ISO 866-1975			DIN332 Form B ISO 2540 1973				
d1	d2	t	a	d2	t	a	d2	b	d3	t	a
1	2.12	1.9	3	2.12	1.9	3	2.12	0.3	3.15	2.2	3.5
1.25	2.65	2.3	4	2.65	2.3	4	2.65	0.4	4	2.7	4.5
1.6	3.35	2.9	5	3.35	2.9	5	3.35	0.5	5	3.4	5.5
2	4.25	3.7	6	4.25	3.7	6	4.25	0.6	6.3	4.3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

Advantage of Form R Center hole

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

Advantage of Form B Center hole

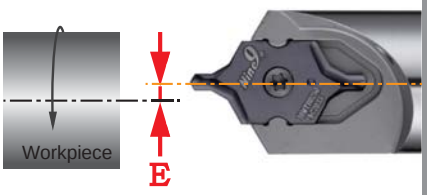
Avoid scar or distortion while transportation	Burr	Rough surface of workpiece	Total solution
			

Before you start, please pay attention the following conditions

1

Center misalignment

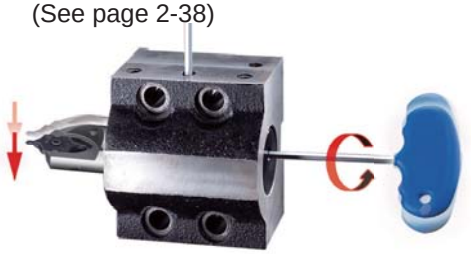
E must be < 0.0008".



2

Center height adjusting sleeve

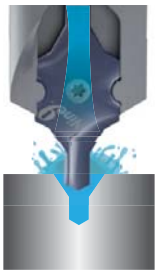
When CNC lathe turret center is misaligned ≥ 0.006", please use center height adjusting sleeve.
(See page 2-38)



3

Internal coolant

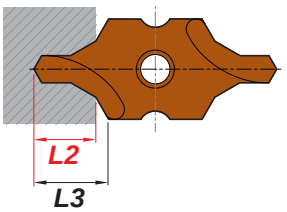
Internal coolant is recommended.



4

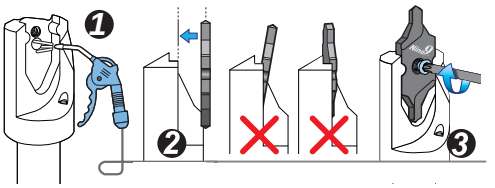
DIN 332 Form A+B

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

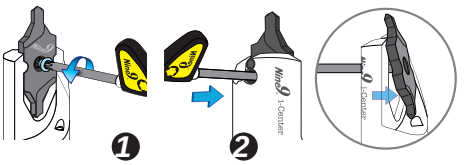


5

Clamping insert

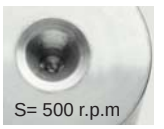


Loosen insert



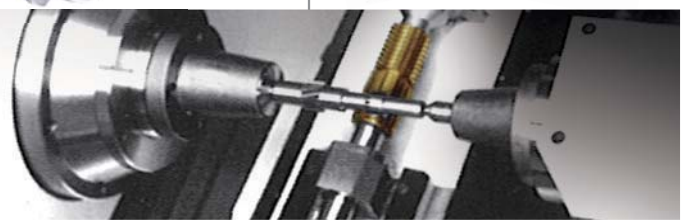
6

Possible to run on low r.p.m machine



Applications

Various centering applications and products - shafts of engine, transmission gear boxes, bearings, motors, grinding parts, spindles, gear reducers, cooling fan, universal joints...



Cutting Data

Ø1~Ø3.15 (#2~#4)

● Best ○ Possible

Workpiece material	d1	IC08 / IC10		IC12 / IC10				
		Ø1~1.25mm (0.039"~0.049")	Ø1.6~3.15 (0.063"~0.124")	Ø2mm #2 (0.079")	Ø2.5 #3 (0.098")	Ø3.15 #4 (0.124")		
Carbon steel C<0.3%	SFM	21 ~ 125	30 ~ 255	35 ~160	40 ~180	40 ~ 195	●	○
	IPR inch/rev.	.0008 ~ .0020	.0012 ~ .0024	.0016 ~ .0031	.0024 ~ .0039	.0031 ~ .0047		
Carbon steel C>0.3%	SFM	21 ~115	30 ~ 230	35 ~145	40 ~180	40 ~175	●	○
	IPR inch/rev.	.0008 ~ .0020	.0012 ~ .0020	.0012 ~ .0020	.0024 ~ .0039	.0031 ~ .0047		
Low alloy steel C<0.3%	SFM	21 ~100	30 ~200	35~ 130	40 ~160	40 ~155	●	○
	IPR inch/rev.	.0004 ~ .0016	.0008 ~ .0020	.0008 ~ .0020	.0016 ~ .0031	.0024 ~ .0039		
High alloy steel C>0.3%	SFM	11 ~75	15 ~155	20 ~95	21 ~ 120	20 ~115	●	○
	IPR inch/rev.	.0004 ~ .0008	.0004 ~ .0016	.0004 ~ .0016	.0008 ~ .0024	.0016 ~ .0031		
Stainless Steel	SFM	11 ~ 35	15 ~75	20 ~ 45	21 ~60	20 ~55	● ≥ 5 bar	○
	IPR inch/rev.	.0001 ~ .0004	.0002 ~ .0008	.0004 ~ .0008	.0004 ~ .0012	.0008 ~ .0020		
Grey cast iron	SFM	21 ~115	30 ~ 230	35 ~145	41 ~180	40 ~175	Air	
	IPR inch/rev.	.0004 ~ .0016	.0008 ~ .0024	.0008 ~ .0024	.0016 ~ .0031	.0024 ~ .0039		
Al, and non-ferrous metal	SFM	62 ~255	80 ~ 515	100 ~515	121 ~400	118~ 390	●	○
	IPR inch/rev.	.0004 ~ .0012	.0004 ~ .0016	.0004 ~ .0016	.0008 ~ .0020	.0008 ~ .0024		

Ø4~Ø10 (#5~#10)

● Best ○ Possible

Workpiece material	d1	IC16		IC20			IC25		
		Ø4 #5 (0.157")	Ø5 (0.197")	#6 (0.197")	Ø6.3 #7 (0.248")	Ø8 #8 (0.315")	Ø10 #10 (0.394")		
Carbon steel C<0.3%	SFM	50 ~ 245	52 ~ 255		55 ~ 260	58 ~ 285	60 ~ 290	●	○
	IPR inch/rev.	.0031 ~ .0055	.0039 ~ .0063		.0039 ~ .0063	.0047 ~ .0071	.0055 ~ .0079		
Carbon steel C>0.3%	SFM	50 ~ 220	52 ~ 230		55 ~ 235	58 ~ 255	60 ~ 265	●	○
	IPR inch/rev.	.0031 ~ .0055	.0039 ~ .0063		.0039 ~ .0063	.0047 ~ .0071	.0055 ~ .0079		
Low alloy steel C<0.3%	SFM	50 ~ 195	52 ~ 205		55 ~ 205	58 ~ 225	60 ~ 235	●	○
	IPR inch/rev.	.0024 ~ .0039	.0031 ~ .0047		.0031 ~ .0055	.0039 ~ .0063	.0047 ~ .0079		
High alloy steel C>0.3%	SFM	25 ~ 145	26 ~ 150		30 ~ 155	30 ~ 170	30 ~ 175	●	○
	IPR inch/rev.	.0016 ~ .0031	.0024 ~ .0039		.0031 ~ .0047	.0039 ~ .0063	.0039 ~ .0063		
Stainless Steel	SFM	25 ~ 70	26 ~ 75		27 ~ 78	30 ~ 85	30 ~ 88	● ≥ 5 bar	○
	IPR inch/rev.	.0008 ~ .0024	.0008 ~ .0024		.0016 ~ .0031	.0016 ~ .0031	.0020 ~ .0039		
Grey cast iron	SFM	50 ~ 220	52 ~ 230		55 ~ 235	60 ~ 255	60 ~ 265	Air	
	IPR inch/rev.	.0024 ~ .0039	.0031 ~ .0047		.0031 ~ .0055	.0039 ~ .0063	.0047 ~ .0071		
Al, and non-ferrous metal	SFM	150 ~ 490	155 ~ 515		160 ~ 520	172 ~ 570	177 ~ 585	●	○
	IPR inch/rev.	.0008 ~ .0024	.0016 ~ .0031		.0016 ~ .0031	.0024 ~ .0039	.0024 ~ .0039		

Calculate spindle speed and feed rate >>

Using your “d1” value and Surface Speed SFM from the data sheet, calculate spindle speed “S” (r.p.m.).
Example: I9MT12T2T2A2 has d1: 0.078”, material: SS304
S (r.p.m.) = 3.82 x 35 / 0.078 = **1714 r.p.m.** ►► 3.82 x 160 / 0.078 =**7835 r.p.m.**

Inch

$$S = \frac{(3.82 \times SFM)}{d1}$$

F = IPR x r.p.m.

d1 = diameter-inch **f = IPR =** inch/rev.

S = Spindle Speed-r.p.m. **F =** inch/min.

SFM = Surface Speed-ft./min.

Engraving 45°/ 60° / 90°

This is a revolutionary new concept of engraving tools with indexable carbide inserts. They offer you the ability to produce HIGH QUALITY ENGRAVING in most materials. The latest coated carbide grades help you to obtain 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

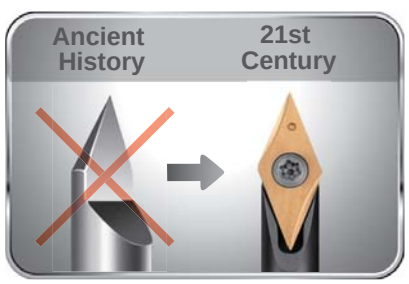
- Full peripherally ground insert to ensure efficient repeatability.
- It performs excellently without producing any burrs, especially in copper, aluminum and stainless steel.

High Speed, High Feed Rate

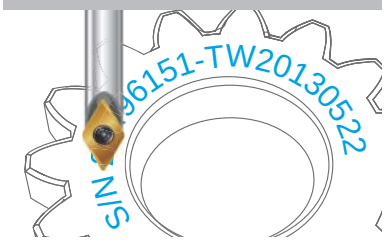
- Designed to run at high speed, up to 40,000 r.p.m.
- Feed rate 0.08mm (0.003") / rev. apply to aluminum; 0.05mm (0.002") / rev. apply to stainless steel.
- Reduces engraving cycle time!

Economical

- Each indexable insert has 2 cutting edges.
- No resharpening required. Tool length is unchanged.
- No need to reset after changing insert or cutting edge.
- Excellent repeatability!

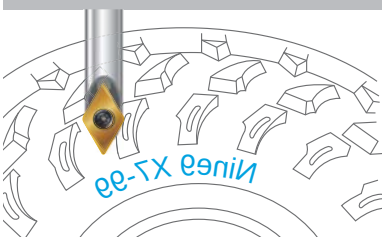


Serial number

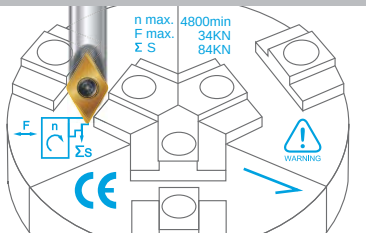


Logo outlines

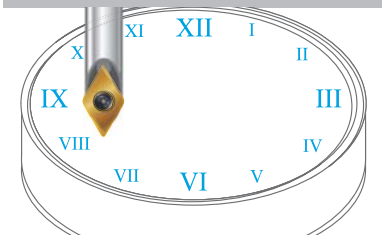
Mold & Die



Product info



Dial scales



Applications

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

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

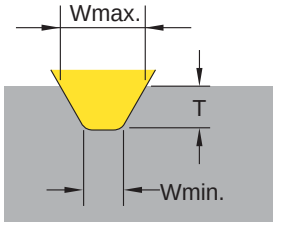
V045 Engraving Tool 45°

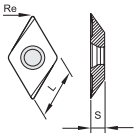
Inserts >>

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

NC2071: • Strong edge on chip groove best suited for min. DOC .008".
• Universal grade for all kinds of steel <30HRC, non-ferrous metal and stainless steel.

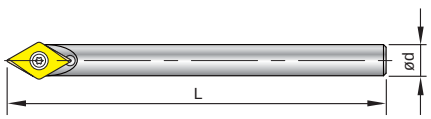
NC9031: • Fully positive ground rake angle, very sharp edge - first choice for shallow engraving.
• For non-ferrous metal such as aluminum, brass, copper, titanium, plastic and acrylic.



Angle	Parts No.		Coating	Grade		Dimensions			W		T	
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
45°	V04506T1W06	NC2071	TiN	K20F		6.35 (0.250")	2.0 (0.079")	0.2 (0.008")	0.65 (0.026")	2.1 (0.083")	0.2 (0.008")	2.0 (0.079")
		NC2032	TiAlN						0.65 (0.026")		0.2 (0.008")	
		NC9031	TiN						0.45 (0.018")		0.05 (0.002")	

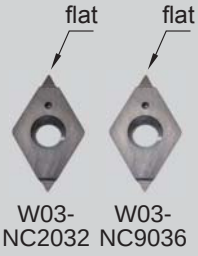
Holder >>

* • Carbide shank holders designed for shrink-fit holder, engraving machines, high speed cutting.
* • XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.



Angle	Parts No.	Ød	L	Screw	Key
45°	99619-V045-06	6 (0.236")	40 (1.575")	 NS-22044 0.9Nm	 NK-T7
	* 99619-V045-06L		60 (2.462")		
	* 99619-V045-06XL		100 (3.937")		

Note: • DC Slim chuck, see page 5-1.



Inserts >>

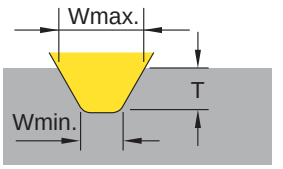
NC2032: • Long tool life
• For all kinds of steel from 30~50 HRC, carbon steel, alloy steel,and cast iron.

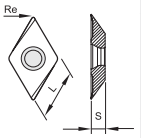
NC2071: • Strong edge on chip groove best suited for min. DOC .008".
• Universal grade for all kinds of steel <30HRC, non-ferrous metal and stainless steel.

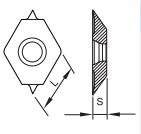
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to 56 HRC.

NC9031: • Fully postive ground rake angle very sharp edge for shallow engraving.
• 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.

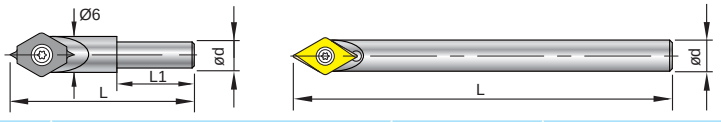


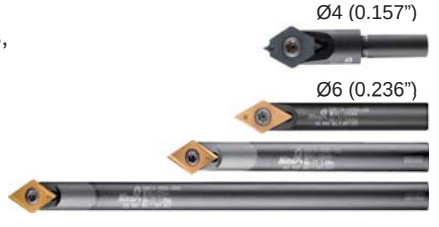
Angle	Parts No.		Coating	Grade		Dimensions			W		T	
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
60°	V06006T1W06	NC2071	TiN	K20F		6.35 (0.250")	2.0 (0.079")	0.2 (0.008")	0.65 (0.026")	2.7 (0.106")	0.2 (0.008")	2.0 (0.079")
		NC2032	TiAlN						0.65 (0.026")		0.2 (0.008")	
		NC2035	ALDURA						0.65 (0.026")		0.2 (0.008")	
		NC9031	TiN						0.45 (0.018")		0.05 (0.002")	

Angle	Parts No.		Coating	Grade		Dimensions			W		T	
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
60°	V06006T1W03	NC2032	TiAlN	K20F		6.35 (0.250")	2.0 (0.079")	---	0.25 (0.01")	1.1 (0.043")	0.05 (0.002")	0.8 (0.031")
		NC9036	DLC									

Holder >>

* • Carbide shank holders designed for shrink-fit holder, engraving machines, high speed cutting.
* • XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.

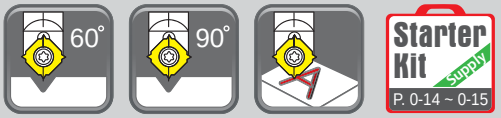




Angle	Parts No.	Ød	L	L1	Screw	Key
60°	99619-V060-04	4 (0.157")	30 (1.181")	12 (0.472")	 NS-22044 0.9Nm	 NK-T7
	99619-V060-06	6 (0.236")	40 (1.575")	---		
	* 99619-V060-06L		60 (2.462")	---		
	* 99619-V060-06XL		100 (3.937")	---		

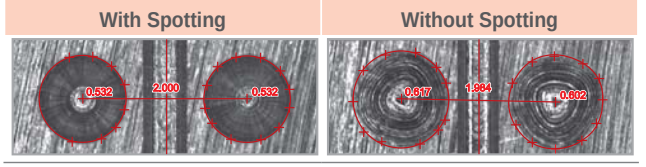
Note: • DC Slim chuck, see page 5-1.

60°
90° N9MT080201W



Inserts >>

- No resharpening required.
- For marking all types of workpieces.
- Also can be used for small diameter spotting.
- Each insert has 4 cutting edges.

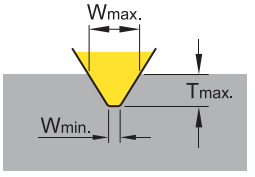


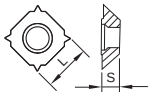
Best positioning accuracy!

60-NC40: • Submicron carbide insert, TiN coated,
very positive angle for 60° engraving for all kinds of steel and cast iron.

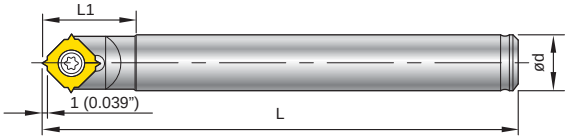
NC40: • Submicron carbide insert, TiN coated,
for all unhardened steel and cast iron, general purpose.

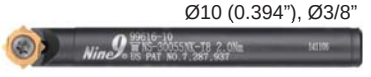
NC10: • Submicron carbide insert, TiAlN coated,
for Al, Al-alloy, hardened steel 40-50 HRC, stainless steel.



Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Wmin.	Wmax.	Tmax.
60°	N9MT080201W	60-NC40	TiN	K20F		8 (0.315")	2.38 (0.094")	0.2 (0.008")	1.1 (0.043")	0.8 (0.031")
90°		NC40	TiN	K20F		8 (0.315")	2.38 (0.094")	0.2 (0.008")	2.0 (0.079")	0.9 (0.035")
90°		NC10	TiAlN	K20F		8 (0.315")	2.38 (0.094")	0.2 (0.008")	2.0 (0.079")	0.9 (0.035")

Holder >>





Parts No.	Ød	L	L1	Screw	Key
99616-10	10 (0.394")	90 (3.543")	18 (0.709")	NS-30055 2.0 Nm	NK-T8
99616-3/8	3/8"	90 (3.543")			

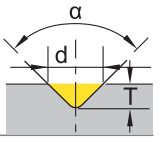
Cutting Data

Engraving : Width of engraving=diameter of cutting="d"
Depth of engraving=depth of cutting="T"

• Tool shank runout should be below 0.01mm
Attention:The calculated result "d" is only for calculation of spindle speed.

Engraving

• For α = 90° insert, d=2xT
• For α = 60° insert, d=1.73xT

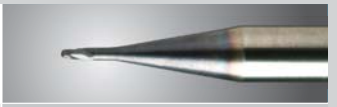
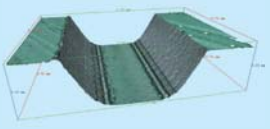
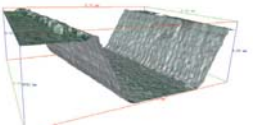
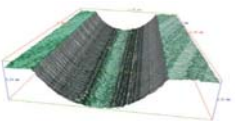


(Tmax.: 0.0315")

Work Material	S (r.p.m)	IPR (inch/rev.)	Insert Grade	Depth of cut (inch) 1st	2nd	3rd	Finishing
P All unhardened steel	5000 ~ 20000	0.0003" ~ 0.0008"	60-NC40,NC40	0.012"	0.008"	0.008"	0.002"
K Cast iron			60-NC40, NC10				
N Non-Ferrous Metal			NC10				

Performance

Comparison >>

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

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 >>

Selecting the speed and feed rate

- Select the spindle speed and feed rate according to the selected material's cutting data.
- The downward feed rate of the Z-axis should be reduced to **50%** of the table feed rate.

Cutting fluid and cooling condition

- Emulsion is recommended for engraving on steel, stainless steel, Al and Al-alloy.
- Blown cooled air is recommended for engraving on cast iron and plastic.

Setting-up the tool holder

- The tool shank runout should be below 0.01 mm.(0.0004")
- Shrink fit chucks, hydraulic chuck and high precision spring collet chucks are recommended.
- Pre-balance the tool holder minimum G6.3/10,000 R.P.M. is necessary.

Clamping the engraving insert

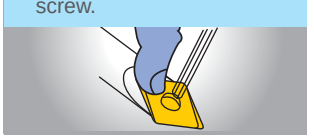
- Place and hold the insert in the insert pocket against the positioning side.
- See illustration below:

• Step-1

Place the insert in the insert pocket.

• Step-2

Push insert against insert pocket and insert the screw.



• Step-3

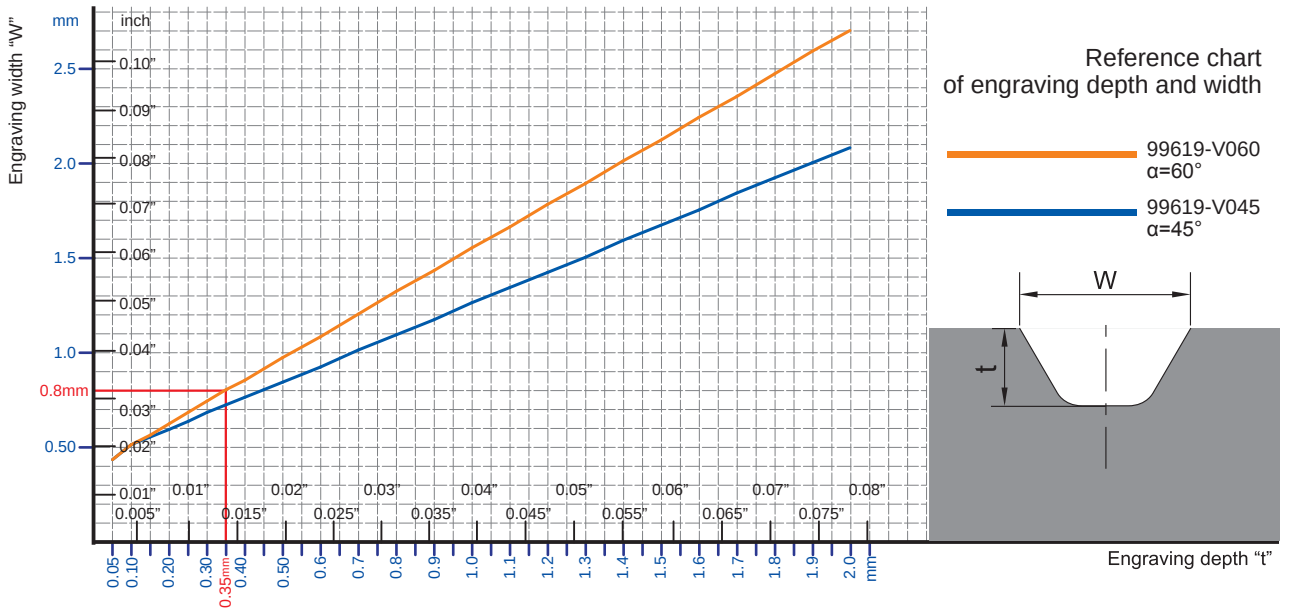
Tighten the insert screw.

Cutting Data

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 >>



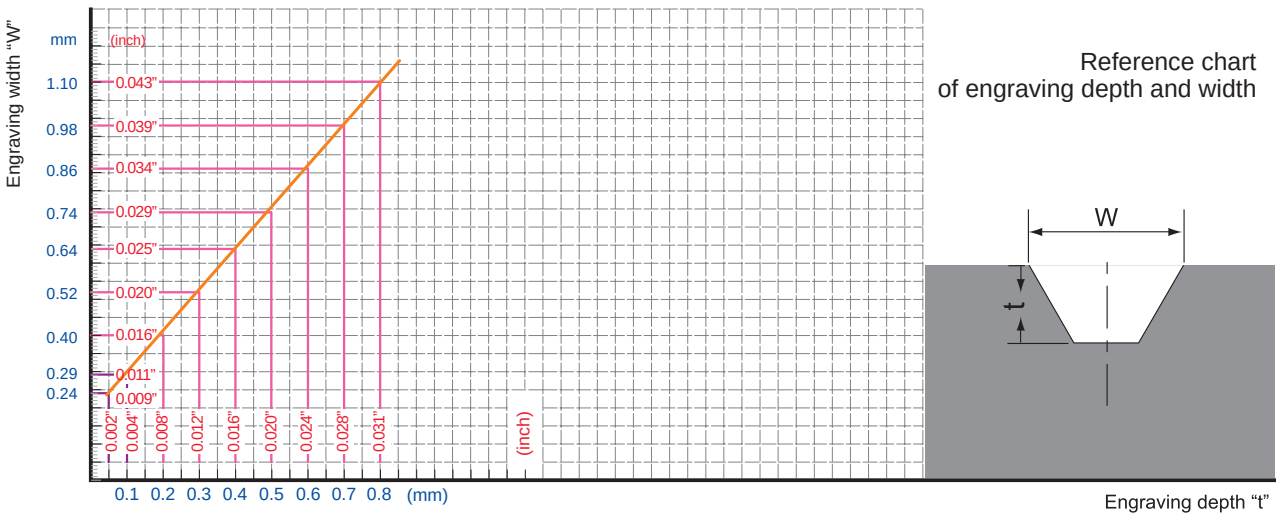
Work Material	S (r.p.m.)	IPR (inch/rev.)	Grade of Insert
Carbon steel	5000~40000	0.0003~0.0020	NC2071,NC2032
Alloy steel	5000~40000	0.0003~0.0012	NC2032,NC2071
Stainless Steel	5000~40000	0.0003~0.0020	NC2071,NC9031
Cast iron	5000~40000	0.0003~0.0012	NC2032
Aluminum≧Non-Ferrous Metal	5000~40000	0.0003~0.0031	NC2071,NC9031
Hardened steel up to 56 HRC	6000~35000	0.0001~0.0004	NC2035

Tmax.:0.079"

Material \ Ap	1st	2nd	3rd	4th	5th	6th	~	Fine finishing
Carbon steel	0.031"	0.024"	0.012"	0.008"	0.004"	~	~	0.002"
Alloy steel	0.020"	0.016"	0.012"	0.012"	0.008"	0.008"	0.004"	0.002"
Stainless Steel	0.020"	0.016"	0.012"	0.012"	0.008"	0.008"	0.004"	0.002"
Cast iron	0.031"	0.024"	0.012"	0.008"	0.004"	~	~	0.002"
Aluminum≧Non-Ferrous Metal	0.039"	0.031"	0.008"	~	~	~	~	0.002"
Hardened steel up to 56 HRC	0.008"	0.008"	0.006"	0.006"	0.004"	0.004"	0.004"	0.002"

Cutting Data

V060 T1W03 >>



Work Material	S (r.p.m.)	IPR (inch/rev.)	Grade of Insert
Carbon steel C<0.3%	8000 ~ 40000	0.0002 ~ 0.0004	NC2032
Carbon steel C>0.3%	8000 ~ 40000	0.0002 ~ 0.0006	NC2032
Alloy steel	6000 ~ 35000	0.0002 ~ 0.0004	NC2032
Stainless Steel	8000 ~ 35000	0.0001 ~ 0.0004	NC9036
Cast iron	6000 ~ 35000	0.0002 ~ 0.0006	NC2032
Aluminum	8000 ~ 40000	0.0002 ~ 0.0006	NC9036
Copper, Brass	8000 ~ 40000	0.0002 ~ 0.0004	NC9036
Titanium	6000 ~ 15000	0.0001 ~ 0.0004	NC9036

Tmax.:0.0315"

Material \ Ap	1st	2nd	3rd	4th	5th	—	Fine finishing
Carbon steel C<0.3%	0.0118"	0.0080"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
Carbon steel C>0.3%	0.0118"	0.0080"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
Alloy steel	0.0118"	0.0040"	0.0040"	0.0020"	0.0020"	0.0020"	0.0012
Stainless Steel	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
Cast iron	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
Aluminum	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
Copper, Brass	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
Titanium	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012

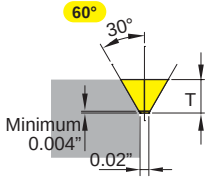
NC Deburring

60° 90° Starter Kit Supply P. 0-14 ~ 0-15

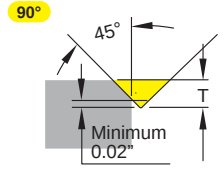
Achieve high speed and high feed deburring and chamfering on CNC machine.
Retain exceptional positional accuracy of the deburring depth and diameter.

Insert has 6 flutes, capable of running 6 times higher feed rate.

Deburring

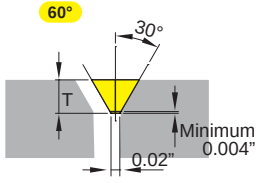


Tmin. :0.004" / Tmax.:0.075"

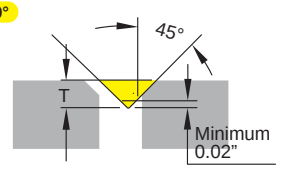


Tmin. :0.020" / Tmax.:0.079"

Chamfering



Tmin. :0.004" / Tmax.:0.075"

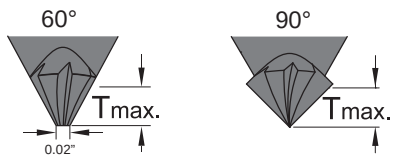


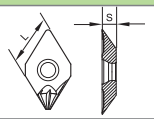
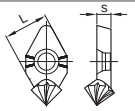
Tmin. :0.020" / Tmax.:0.079"

Inserts >>

- Indexable type, high precision ground carbide insert.
- Ideal for fine hole deburring.
- TiAlN coated carbide insert can stand very long life.

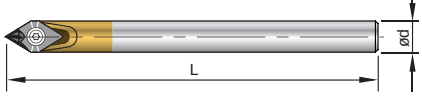
NC2032: • For all kinds of steel from < 40 HRC, carbon steel, alloy steel, cast iron, aluminum and non-ferrous metal.



Angle	Part No.	Coating	Grade		Dimensions L	Dimensions S	Tmin.	Tmax.
60°	X060A60T6-NC2032	TiAlN	K20F		6 (0.236")	2.0 (0.079")	0.1 (0.004")	1.9 (0.075")
90°	X060A90T6-NC2032	TiAlN	K20F				0.5 (0.020")	2.0 (0.079")

Holder >>

- Provides high rigidity and anti-vibration.



Steel Type

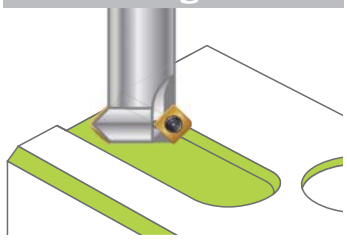
Carbide Type / Steel Type

Parts No.	Shank	Ød	L	Screw	Key
99619-X060-06	Steel, 40 HRC	6 (0.236")	40 (1.575")	NS-22044 0.9Nm	NK-T7
99619-X060-06L	Carbide	6 (0.236")	60 (2.362")		
99619-X060-06LS	Steel, 40 HRC	6 (0.236")	60 (2.362")		
NEW 99619-X060-06XL	Carbide	6 (0.236")	100 (3.937")		

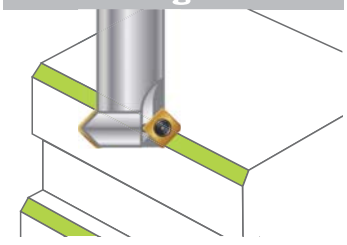
Cutting Data >>

Workpiece Material	S (r.p.m.)	Feed Rate (inch / tooth)	Grade of Insert
Carbon Steel C<0.3%	8000 ~ 40000	0.00020 ~ 0.0020	NC2032
Alloy steel	6000 ~ 35000	0.00020 ~ 0.0016	
Stainless Steel	6000 ~ 25000	0.00020 ~ 0.0012	
Cast iron	6000 ~ 35000	0.00020 ~ 0.0012	
Aluminum, Non-Ferrous Metal	8000 ~ 40000	0.00020 ~ 0.0020	

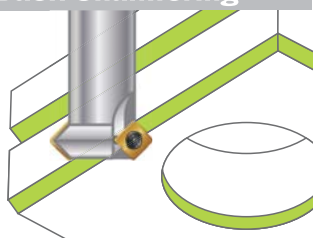
Face Milling



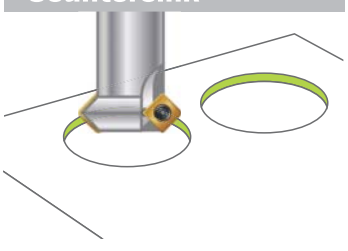
Chamfering



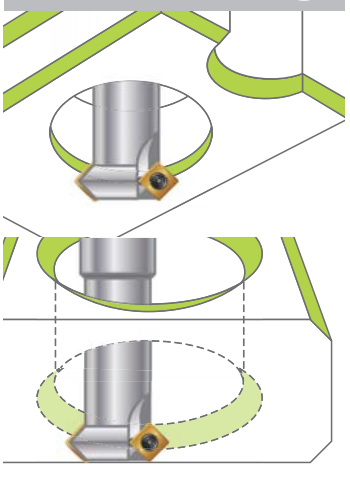
Back Chamfering



Countersink



Back Circular Chamfering



Chamfer Mill 45° >>

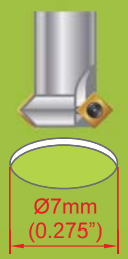
Designed for chamfering and countersinking with an indexable insert. The insert is a specifically designed for use in high speed machining ; the multiple flutes provide for increased feed rate, optimizing performance and reducing cutting time.

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.

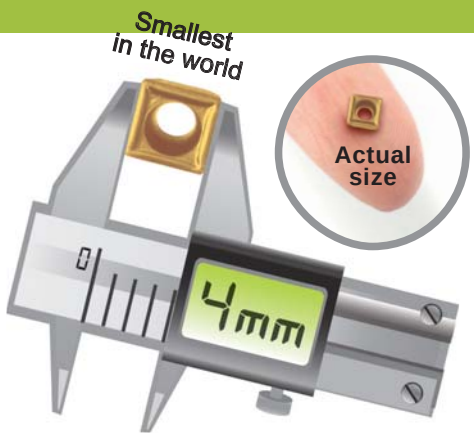
Excellent Repeatability >>

- Smallest Indexable counter sink, diameter Ø7mm.
- 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.
- For front and back chamfering. Eliminates 2nd operation or deburring time.



Applications >>

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



Screw fit cutter

45° Indexable Chamfer Mill

Features >>

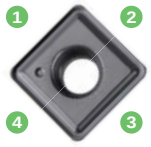
- Benefitting from the specially ground dual-relief insert and optimized coating, higher feed rates and cutting speeds can be achieved on chamfering operations.
- Each insert has 4 cutting edges, reducing cost of inserts.
- Fine edge honning cutting edge, good chip breaking condition and long tool life.

Starter Kit Supply P. 0-14 ~ 0-15

Inserts >>

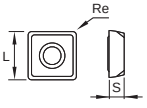
NC2032: • K20F grade, AlTiN coated. The 1st choice for high carbon, high alloy and hardened steels as well as cast iron.

NC9071: • K20F grade, TiN coated, high positive rake angle and honed sharp edge. The best choice for low carbon steel, low carbon alloy steel,stainless steel, Al, Al-alloy, Brass, Bronze and most of the non-ferrous metal.



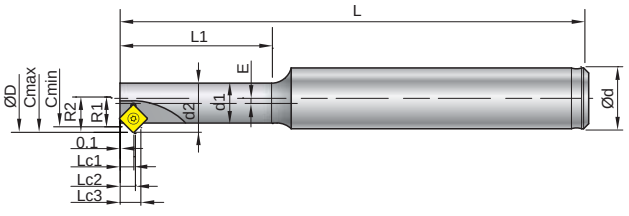
NC2032

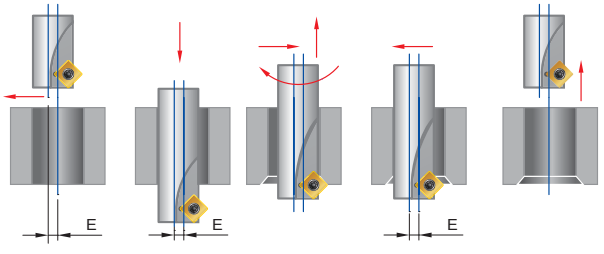

NC9071

Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Screw	Key
N9GX04T002	NC2032	AlTiN	K20F		4.0 (0.157")	1.8 (0.070")	0.2 (0.008")	NS-18037 0.6Nm	NK-T6
	NC9071	TiN							
N9GX060204	NC2032	AlTiN			6.35 (0.250")	2.38 (0.094")	0.4 (0.016")	NS-22055 0.9Nm	NK-T7
	NC9071	TiN							
N9GX090308	NC2032	AlTiN			9.52 (0.375")	3.18 (0.125")	0.8 (0.031")	NS-30072 2.0Nm	NK-T9
	NC9071	TiN							

Holder_ 99616-C02, C04, C06 >>

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

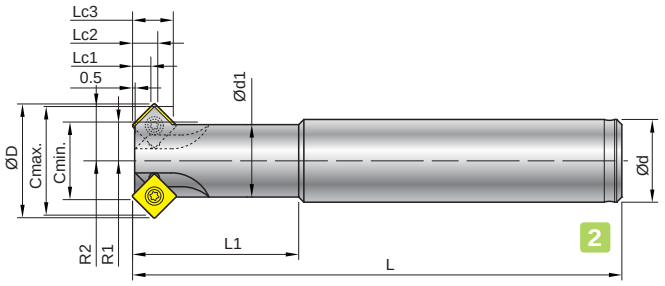




Parts No.	Thread Size	Cmin ø	Cmax ø	ød	ød1	ød2	øD	R1	R2	L	L1	Lc1	Lc2	Lc3	E	z	insert Screw / Key
99616-C02	M8	6.8 (0.268")	8.8 (0.346")	10 (0.394")	5.25 (0.207")	6.5 (0.256")	9 (0.354")	3.4 (0.134")	4.4 (0.173")	80 (3.15")	20 (0.787")	2.56 (0.100")	2.93 (0.115")	3.93 (0.155")	1.25 (0.049")	1	N9GX04T002 NS-18037 0.6Nm NK-T6
99616-C04	M10	8.5 (0.335")	10.8 (0.425")	12 (0.472")	6.45 (0.254")	8 (0.315")	11.1 (0.437")	4.25 (0.167")	5.4 (0.212")	100 (3.94")	25 (0.984")	2.51 (0.099")	2.98 (0.117")	4.13 (0.163")	1.55 (0.061")	1	
99616-C06	M12 1/2	10.26 (0.404")	13.2 (0.520")	12 (0.472")	7.88 (0.310")	9.75 (0.384")	13.5 (0.531")	5.13 (0.202")	6.6 (0.260")	100 (3.94")	30 (1.181")	2.51 (0.099")	2.98 (0.117")	4.45 (0.175")	1.88 (0.074")	1	

99616-C10~99616-C52 >>

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



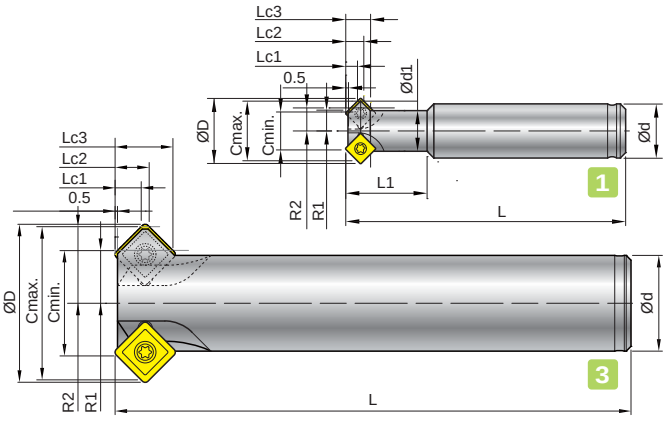
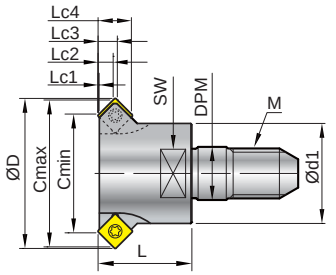


Fig	Parts No.	Type	Cmin ø	Cmax ø	ød	ød1	øD	R1	R2	L	L1	Lc1	Lc2	Lc3	⌬z	insert Screw / Key
1	99616-C10	BC10-C07-60	7 (0.276")	11 (0.433)	10 (0.394")	7.5 (0.295")	12 (0.472")	3.5 (0.138")	5.5 (0.217")	60 (2.362")	15 (0.590")	2.6 (0.102")	2.9 (0.114")	4.6 (0.181")	2	N9GX04T002 NS-18037 0.6Nm NK-T6
	99616-C20	BC12-C11-100	11 (0.433")	16 (0.630")	12 (0.472")	9.6 (0.378")	16.15 (0.636")	5.5 (0.217")	8.0 (0.315")	100 (3.937")	25 (0.984")	2.6 (0.102")	2.9 (0.114")	5.0 (0.197")	4	
2	99616-C30	BC16-C15-120	15 (0.590")	21 (0.827")	16 (0.630")	14 (0.551")	22 (0.866")	7.5 (0.295")	10.5 (0.413")	120 (4.724")	40 (1.575")	3.5 (0.138")	4.9 (0.193")	7.9 (0.311")	4	N9GX060204 NS-22055 0.9Nm NK-T7
	99616-C40	BC20-C19-130	19 (0.748")	25 (0.984")	20 (0.787")	18 (0.709)	26 (1.024")	9.5 (0.374")	12.5 (0.492")	130 (5.118")	50 (1.969")	3.5 (0.138")	4.9 (0.193")	7.9 (0.311")	4	
3	99616-C50	BC20-C22-130	22 (0.866")	32 (1.260")	20 (0.787")	--	33 (1.299")	11 (0.039")	16 (0.630")	130 (5.118")	--	5.5 (0.217")	7.1 (0.280")	12.1 (0.476")	4	N9GX090308 NS-30072 2.0Nm NK-T9
2	99616-C52	BC25-C22-180	22 (0.866")	32 (1.260")	25 (0.984")	20 (0.787")	33 (1.299")	11 (0.039")	16 (0.630")	180 (7.090")	80 (3.150")	5.5 (0.217)	7.1 (0.280")	12.1 (0.476")	4	

NEW Screw Fit Cutter_ 99616-CM16~99616-CM29 >>

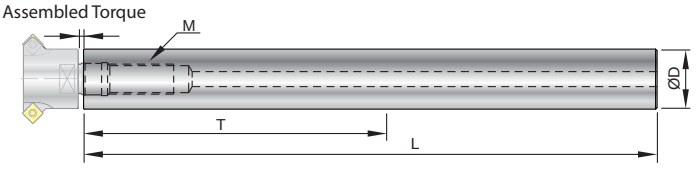
- Quick and easy to change system and provides chamfering flexibility.
- Capable of extended overhangs by almost any kind of the screw-fit tool holder or extension bar in the market.



Parts No.	Type	Cmin ø	Cmax ø	øD	M	SW	ød1	DPM	L	Lc1	Lc2	Lc3	Lc4	⌬z	insert Screw / Key
99616-CM16-M05	M05-CM16	11 (0.433)	16 (0.630")	16.15 (0.636")	M5	8 (0.315")	10 (0.394")	5.5 (0.217")	13 (0.512")	0.09 (0.004")	2.59 (0.102")	2.9 (0.114")	5.4 (0.213")	3	N9GX04T002 NS-18037 0.6Nm NK-T6
99616-CM20-M06	M06-CM20	15 (0.590"	20 (0.787")	20.15 (0.793")	M6	10 (0.394")	12 (0.472")	6.5 (0.256")	13 (0.512")	0.09 (0.004")	2.59 (0.102")	2.9 (0.114")	5.4 (0.213")	4	
99616-CM23-M08	M08-CM23	19 (0.748")	23.5 (0.925")	24 (0.945")	M8	14 (0.551")	16 (0.630")	8.5 (0.335")	15 (0.590")	0.16 (0.006")	2.41 (0.095")	3.08 (0.121")	5.33 (0.210")	4	N9GX060204 NS-22055 0.9Nm NK-T7
99616-CM29-M10	M10-CM29	23 (0.906")	29 (1.142")	30 (1.181")	M10	18 (0.709")	20 (0.787")	10.5 (0.413")	17 (0.670")	0.54 (0.021")	3.54 (0.139")	4.87 (0.192")	7.87 (0.310")	4	

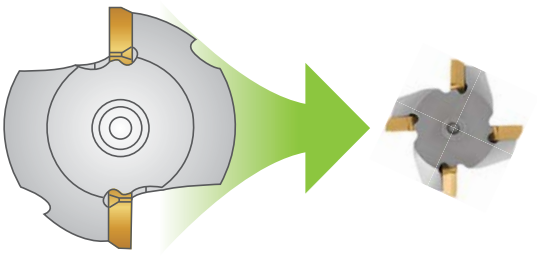
Solid Carbide Extension Bar >>

- 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	Assembled Torque
99801-10W	BC10-100M05W	10 (0.394")	60 (2.362")	100 (3.937")	M5xP0.8	6.5 Nm
99801-12W	BC12-100M06W	12 (0.472")	60 (2.362")	100 (3.937")	M6xP1.0	11.0 Nm
99801-16W	BC16-150M08W	16 (0.630")	80 (3.150")	150 (5.906")	M8xP1.25	25.0 Nm
99801-20W	BC20-200M10W	20 (0.787")	100 (3.937")	200 (7.874")	M10xP1.5	50.0 Nm
99801-25W	BC25-200M12W	25 (0.984")	125 (4.921")	200 (7.874")	M12xP1.75	60.0 Nm

Performance

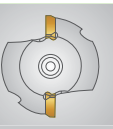


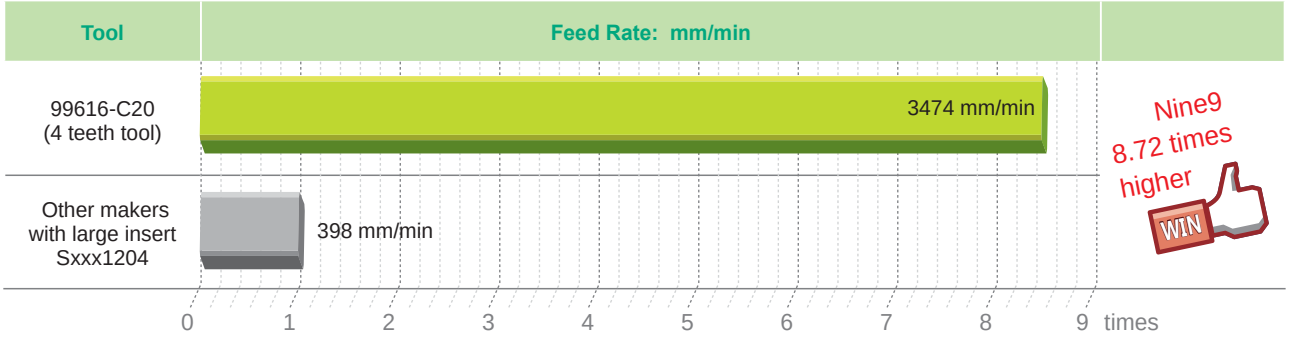
Feed Rate =
Feed per Tooth x Spindle Speed x **No. of Flute** mm/min.

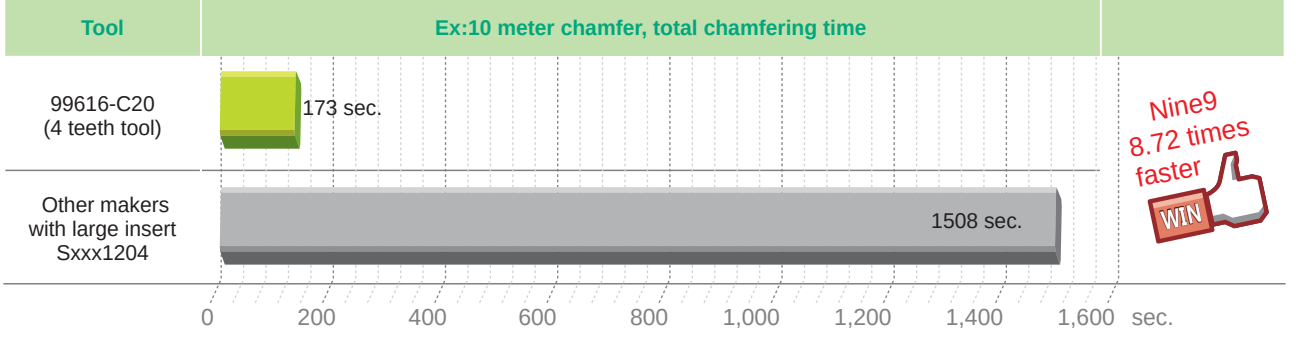
UP **Spindle Speed** = $\frac{\text{Cutting Speed x 1000}}{\pi \text{ x Cmin.}}$

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		Grade of insert	SFM	Feed Rate inch / tooth
Material Group	Sample Code (AISI)			N9GX04T002
				Max. Chamfering 0.059 inch
Carbon steel C<0.3%	1050	NC9071	200-260-390	0.0007" ~ 0.0030"
Carbon steel C>0.3%	1050	NC2032	200-260-390	0.0007" ~ 0.0030"
Low alloy steel C<0.3%	4130	NC9071	200-260-390	0.0004" ~ 0.0020"
High alloy steel C>0.3%	D2	NC2032	200-260-390	0.0007" ~ 0.0030"
Stainless Steel	304	NC9071	100-200-330	0.0004" ~ 0.0020"
Cast iron	A48 35B / No 35B	NC2032	200-260-390	0.0007" ~ 0.0023"
Al, and non-ferrous metal	6061	NC9071	260-330-500	0.0011" ~ 0.0040"

99616-C10~C52 Cutting Data >>

Workpiece material		Grade of insert	SFM	Feed Rate inch / tooth		
Material Group	Sample Code (AISI)			N9GX04T002	N9GX060204	N9GX090308
				Max. Chamfering 0.059 inch	Max. Chamfering 0.098 inch	Max. Chamfering 0.157 inch
Carbon steel C<0.3%	1050	NC9071	500-820-1150	0.002"~0.005"	0.004"~0.010"	0.004"~0.010"
Carbon steel C>0.3%	1050	NC2032	660-1050-1310	0.002"~0.004"	0.004"~0.008"	0.004"~0.010"
Low alloy steel C<0.3%	4130	NC9071	590-790-860	0.002"~0.004"	0.004"~0.008"	0.004"~0.008"
High alloy steel C>0.3%	D2	NC2032	390-500-660	0.002"~0.004"	0.004"~0.006"	0.004"~0.006"
Stainless Steel	304	NC9071	390-500-590	0.002"~0.004"	0.002"~0.006"	0.004"~0.008"
Casting iron	A48 35B / No 35B	NC2032	390-500-590	0.002"~0.004"	0.004"~0.006"	0.004"~0.008"
Al, and non-ferrous metal	6061	NC9071	660-1310-1970	0.002"~0.006"	0.004"~0.010"	0.004"~0.010"
Hardened steel<HRC50°	H13	NC2032	265-300-330	0.002"~0.004"	0.002"~0.005"	0.004"~0.006"

Super Drill

Ø10 ~ Ø30

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

SMALLEST DIMENSION

3xD : Ø10 to Ø30 mm.

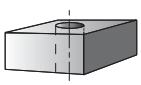
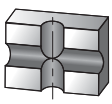
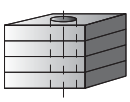
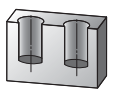
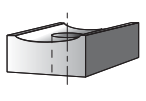
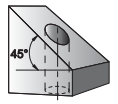
SMALLER CUTTING CHIP

- The center and peripheral inserts are positioned in order to divide the cutting chips into smaller spiral shapes. It helps the cutting chips 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.

◘ Application & TECH. >>

Application	Regular Surface 100%	Cross Holes 80%	Stack Drilling 80%~70%	Round Workpiece Offset Drilling 80%~60%	Plunge Drilling 80%	Concave Surfaces 80%	Angled Surfaces 80%~70%	Cone Workpiece Offset Drilling 80%~70%
Workpiece Shape								

Refe. Metric catalog for whole range

Ordering Code:
N9GX04T002-NC2032

4 cutting edges insert NC2032, K20F grade AlTiN coated

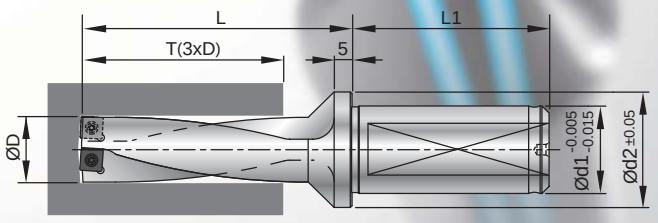
Chip breaker of SPD insert provides excellent chip control property due to its engineered design

Easy and simple change of cutting edge without inconvenience

≃ Flat bottom shape

Angled Surfaces

Possible to drill into angled surfaces without pre-drilling



Ordering code	ØD	T	L	d1	d2	L1	Insert Screw / Key	Radial Adjustment	D max
99313-10	10.0	30.0	49	20	27	49		0.25	10.5
99313-10.3	10.3	30.9	52	20	27	49		0.25	10.8
99313-10.5	10.5	31.5	52	20	27	49	N9GX04T002	0.25	11.0
99313-11	11.0	33.0	52	20	27	49	NS-18037 0.6Nm	0.20	11.4
99313-11.5	11.5	34.5	55	20	27	49		0.20	11.9
99313-12	12.0	36.0	55	20	27	49	NK-T6	0.15	12.3
99313-12.5	12.5	37.5	58	20	27	49		0.15	12.8

Work Material	SFM	IPR (inch / rev.)
Carbon Steel	200~985	0.0010 ~ 0.0030
Stainless Steel	200~500	0.0010 ~ 0.0020
Cast Iron	265~400	0.0020 ~ 0.0030
Hardened Steel	200~330	0.0010 ~ 0.0020

* Adjust speed and feed percentage by applications.

EMB Boring Bars

Easy Adjustment / High Efficiency / Low Cost

EMB boring bars are "**E**ccentrical **M**echanism **B**oring 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

BT30 / 40 / 50, HSK63A, CAT40 & SB32:
0.01 mm/div. adjustment range ±0.12., G6.3, 10000 r.p.m.
Ø4.87mm~Ø50.12mm boring bars are interchangeable.

C20-IDxxx:
Deep hole boring 4 ~ 6XD. Ø4.87mm~Ø20.12mm boring size.

99820-B01:
0.01 mm/div, adjustment range ±0.12mm.,
Ø4.87mm~Ø25.1mm boring bars are interchangeable.

BT30-146-51
BT40-146-56
BT50-146-77
HSK63A-146-72
CAT40-146-56

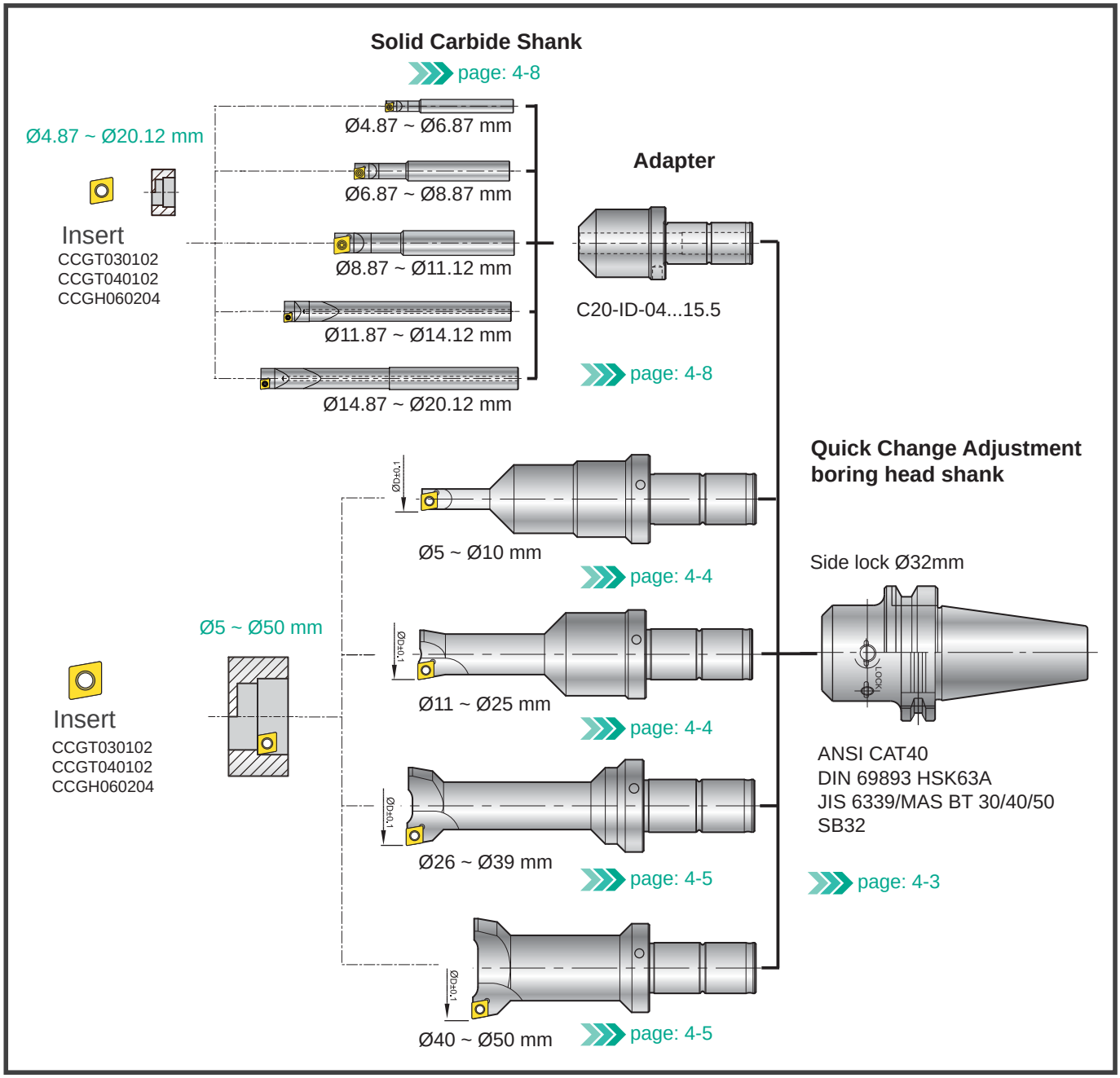
SB32-146-31

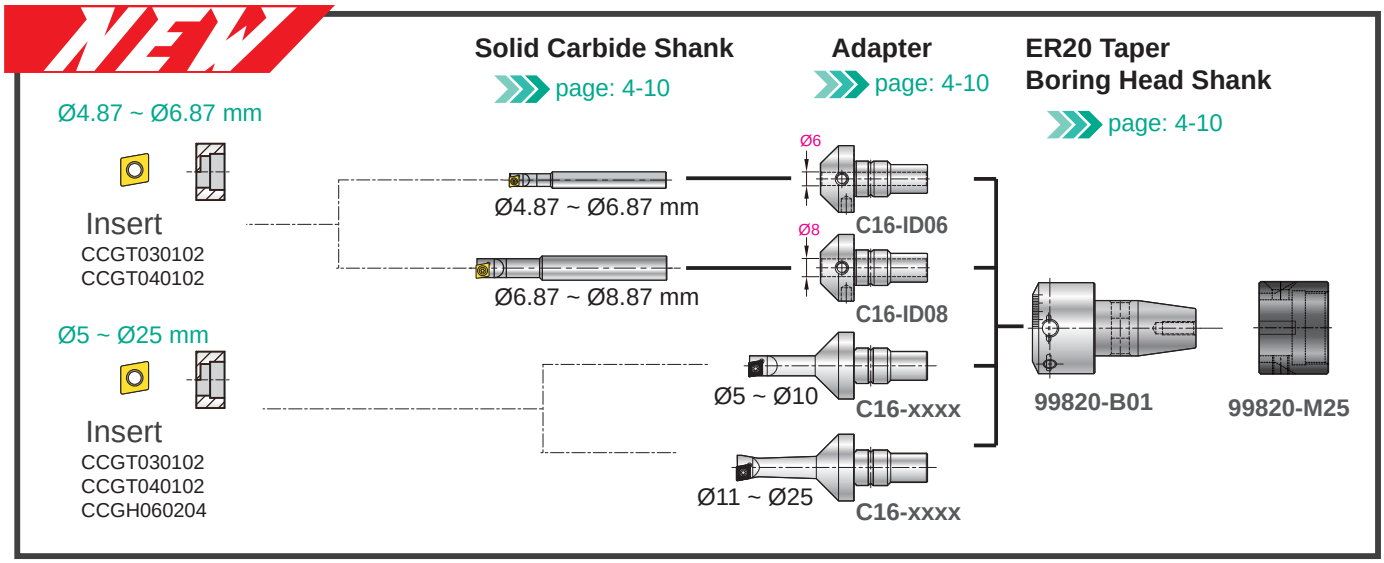
C20-IDxxx

99820-B01

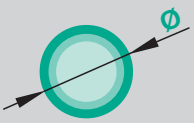
NEW

System

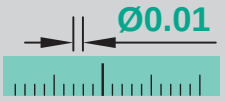

Solid Carbide Shank
page: 4-8
Ø4.87 ~ Ø20.12 mm
Ø4.87 ~ Ø6.87 mm
Ø6.87 ~ Ø8.87 mm
Ø8.87 ~ Ø11.12 mm
Ø11.87 ~ Ø14.12 mm
Ø14.87 ~ Ø20.12 mm
Insert
CCGT030102
CCGT040102
CCGH060204
Adapter
C20-ID-04...15.5
page: 4-8
Quick Change Adjustment boring head shank
Ø5 ~ Ø10 mm
page: 4-4
Side lock Ø32mm
Ø5 ~ Ø50 mm
Ø11 ~ Ø25 mm
page: 4-4
Insert
CCGT030102
CCGT040102
CCGH060204
ANSI CAT40
DIN 69893 HSK63A
JIS 6339/MAS BT 30/40/50
SB32
Ø26 ~ Ø39 mm
page: 4-5
page: 4-3
Ø40 ~ Ø50 mm
page: 4-5


NEW
Solid Carbide Shank
page: 4-10
Adapter
page: 4-10
ER20 Taper Boring Head Shank
page: 4-10
Ø4.87 ~ Ø6.87 mm
Insert
CCGT030102
CCGT040102
Ø4.87 ~ Ø6.87 mm
Ø6.87 ~ Ø8.87 mm
Ø6
C16-ID06
Ø8
C16-ID08
Ø5 ~ Ø25 mm
Insert
CCGT030102
CCGT040102
CCGH060204
Ø5 ~ Ø10
C16-xxxx
Ø11 ~ Ø25
C16-xxxx
99820-B01
99820-M25

99146 Quick Change High Speed EMB Boring Bar



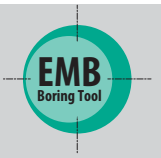
Diameter range:
4.87mm ~ 50.12mm



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

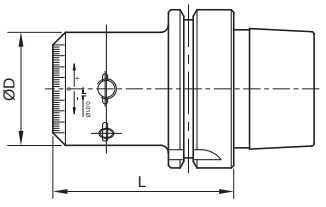
- Low cost micro adjustable boring heads.

High Speed

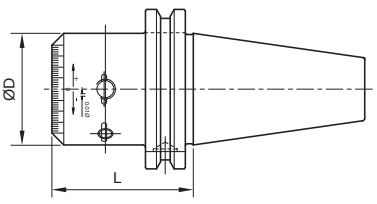
- Boring bar design ensures accurate high speed boring. Grade balance is G6.3 10000 r.p.m., all sizes are guaranteed.
- Surface speeds of carbide inserts up to 700 m/min.
- Combination bore / chamfer / facing tools can be ordered on request.

Boring Head Shank

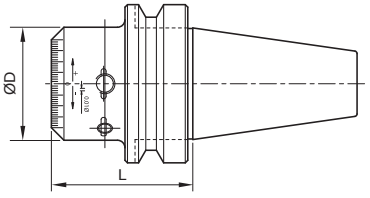
• HSK63



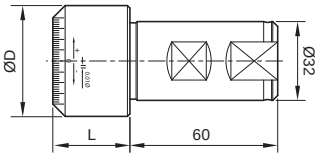
• CAT40



• BT



• SB32

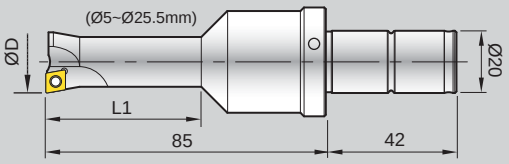


Parts No.	ØD	L
HSK63A-146-72	45	72
CAT40-146-56	45	56.3
BT30-146-51	45	51.3
BT40-146-56	45	56.3
BT50-146-77	45	77.3
SB32-146-31	45	31.3

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: C20-0800-16LH.

* Other sizes are available on request.

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

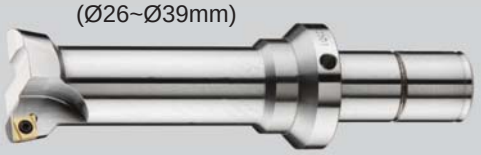
Parts No.	ØD	L1	Insert Screw / Key
C20-1725-42L	17.12~17.37	42.50	
C20-1750-43L	17.37~17.62	43.75	
C20-1775-43L	17.62~17.87	43.75	
C20-1800-45L	17.87~18.12	45.00	
C20-1825-45L	18.12~18.37	45.00	
C20-1850-46L	18.37~18.62	46.25	
C20-1875-46L	18.62~18.87	46.25	
C20-1900-47L	18.87~19.12	47.50	
C20-1925-47L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

99146 Quick Change High Speed EMB Boring Bar

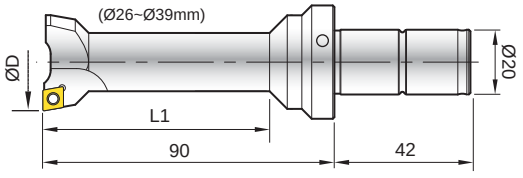
Boring Bar Ø26~Ø50

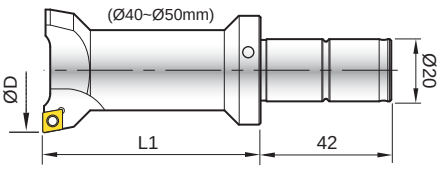
- Alloy Steel Shank
- Boring Depth : L1, 2~3xD

(Ø26~Ø39mm)



(Ø40~Ø50mm)





Ø26~Ø39mm

* H type with internal coolant can be ordered on request.
Ordering example: C20-3600-70LH.

Parts No.	ØD	L1	Insert Screw / Key
C20-2600-50L	25.87~26.12	50	
C20-2700-50L	26.87~27.12	50	
C20-2800-50L	27.87~28.12	50	
C20-2900-50L	28.87~29.12	50	
C20-3000-50L	29.87~30.12	50	
C20-3100-70L	30.87~31.12	70	CC...0602...
C20-3200-70L	31.87~32.12	70	NS-25060
C20-3300-70L	32.87~33.12	70	0.9Nm
C20-3400-70L	33.87~34.12	70	NK-T7
C20-3500-70L	34.87~35.12	70	
C20-3600-70L	35.87~36.12	70	
C20-3700-70L	36.87~37.12	70	
C20-3800-70L	37.87~38.12	70	
C20-3900-70L	38.87~39.12	70	

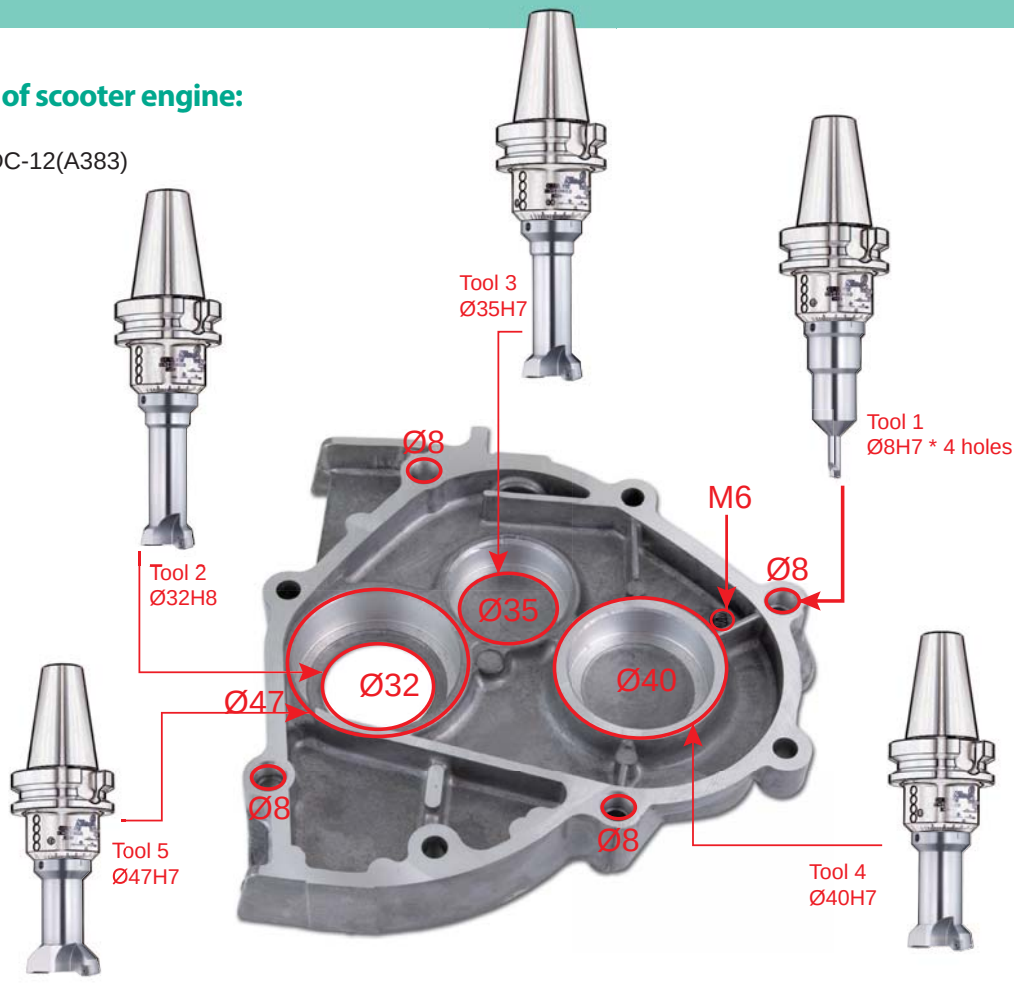
Ø40~Ø50mm

* H type with internal coolant can be ordered on request.
Ordering example: C20-4700-70LH.

Parts No.	ØD	L1	Insert Screw / Key
C20-4000-70L	39.87-40.12	70	
C20-4100-70L	40.87-41.12	70	
C20-4200-70L	41.87-42.12	70	
C20-4300-70L	42.87-43.12	70	
C20-4400-70L	43.87-44.12	70	CC...0602...
C20-4500-70L	44.87-45.12	70	NS-25060
C20-4600-70L	45.87-46.12	70	0.9Nm
C20-4700-70L	46.87-47.12	70	NK-T7
C20-4800-70L	47.87-48.12	70	
C20-4900-70L	48.87-49.12	70	
C20-5000-70L	49.87-50.12	70	

Machining a cover of scooter engine:

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

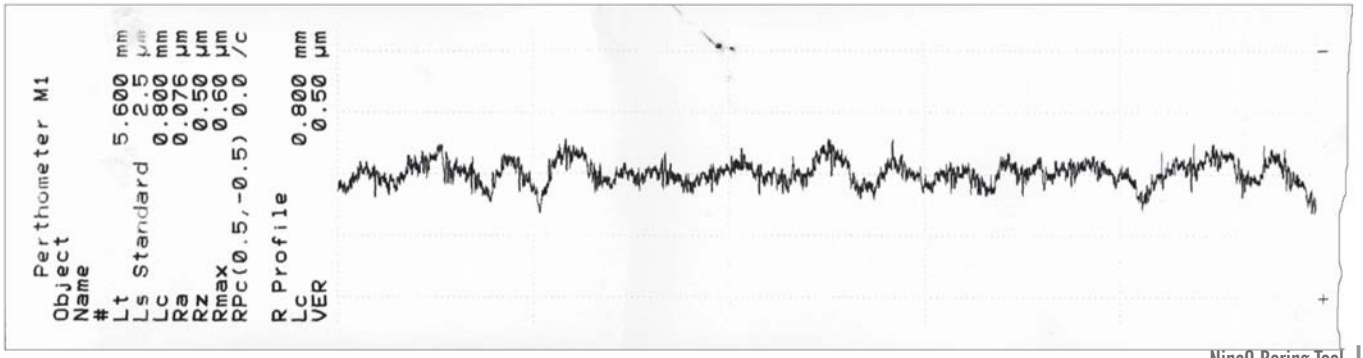


TOOL LIST by Nine9 Boring Bar 99146-series :

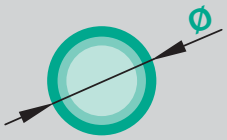
No.	Boring Bar	Grade of insert	Dia. mm	Depth	r.p.m.	F = mm/min.	Machining time
1	C20-146-0824	CCGT040102 NC30	Ø8H7	8 mm	8000	400	1.2 sec.
2	C20-3200-70L	CCGT060202HP NC9031	Ø32H8	8 mm	2985	209	2.3 sec.
3	C20-3500-70L		Ø35H7	12 mm	2730	191	3.8 sec.
4	C20-4000-70L		Ø40H7	15 mm	2400	168	5.4 sec.
5	C20-4700-70L		Ø47H7	15 mm	2030	142	6.4 sec.

Working Example

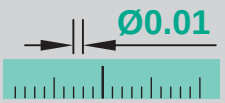
Material	Vc m/min.	f mm/rev.	Roughness			Tool holder	Insert
			Ra	Rz	Rmax		
Al alloy, 6061	150	0.2	0.076μm	0.50μm	0.6μm	99146-BT40-26A	CCGH0602U NC9036



99151 Deep hole boring 4~6XD

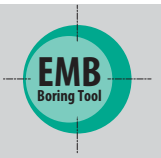


Diameter range:
4.87mm ~ 20.12mm



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

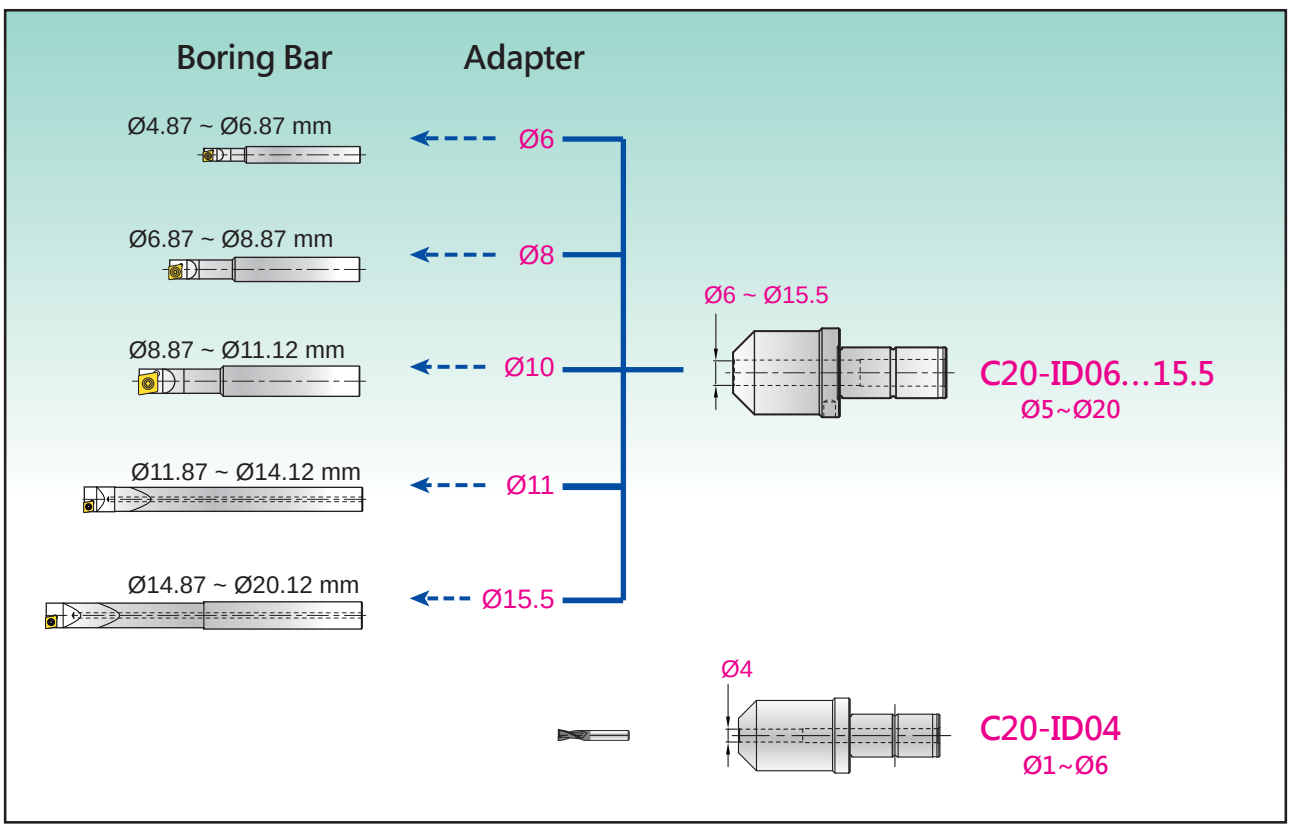
• 4~6xD boring depth, Good balance condition is maintained .

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

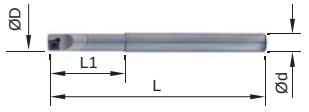
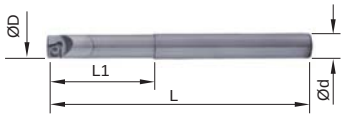
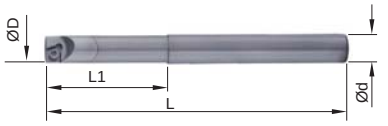
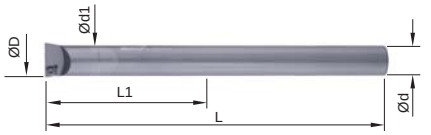
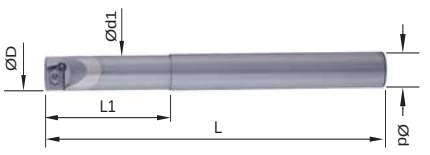
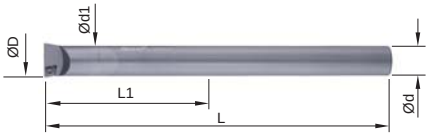
Adapter

- Economical solution of small dia. boring bar.

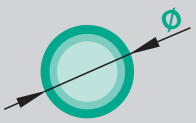
Parts No.	ØD	L
C20-ID04	4	49
C20-ID06	6	52
C20-ID08	8	49
C20-ID10	10	42
C20-ID11	11	21.5
C20-ID15.5	15.5	21.5

Boring Bar Ø5~Ø20

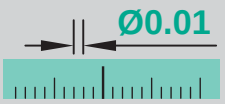
- Solid Carbide Shank
- Boring Depth : L1, 4~6xD

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

99820-B01 ER20 Taper Boring Shank



Diameter range:
4.87mm ~ 25.12mm



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

- Dimensions are easy to read. They are indicated on the tools and are easily adjusted on a tool presetter or in machining center.
- 2 ~ 4xD boring depth, Good balance condition is maintained .

Interchangeable Boring Bars from Diameters of 5 mm to 25 mm

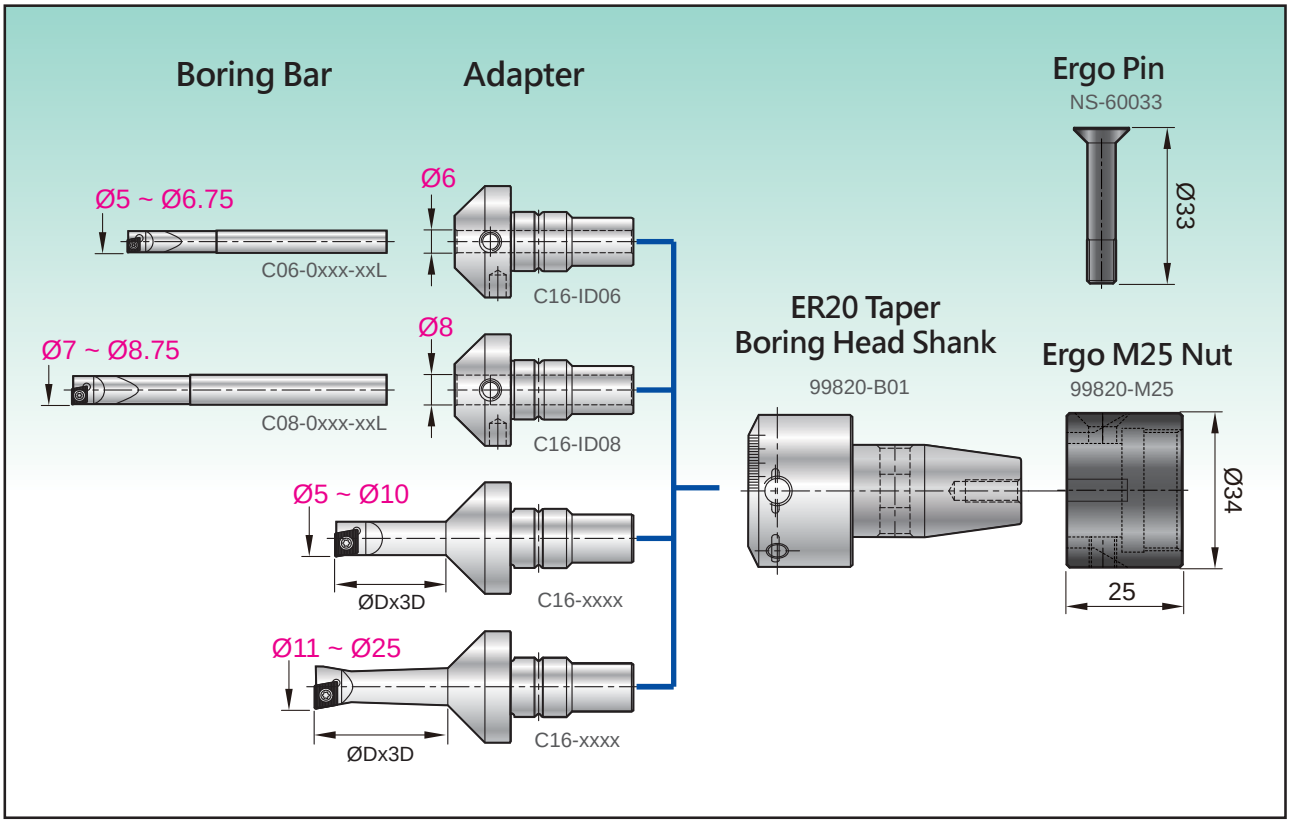
- This simple boring tool has minimal components. In minutes, the boring bar may be changed and the boring dimension set on the tool presetter.

Economic

- Low cost micro adjustable boring heads.

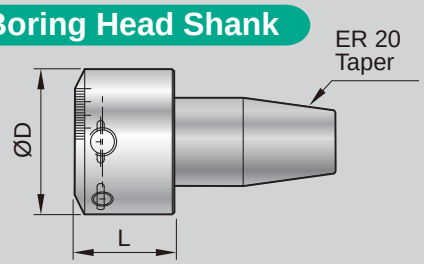
Optimize the rigidity

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



99820-B01 ER20 Taper Boring Shank

Boring Head Shank



Basic Holder		
Parts No.	ØD	L
99820-B01	41	28

Accessory

Set of Ergo Nut

Parts No.	Ød
99820-M24S	34
99820-M25S	

Ergo Nut

Parts No.	Ød
99820-M24	34
99820-M25	

High Strength Ergo Pin

Parts No.	L
NS-60033	33

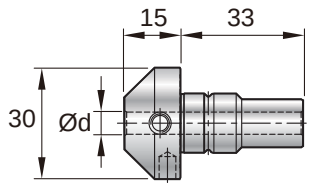
L-Key

Parts No.
NK-LW4

34-36mm Spanner

Parts No.
99820-SP36

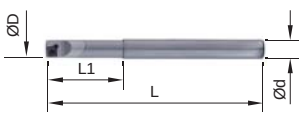
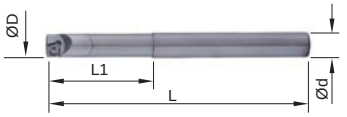
Adapter



Parts No.	Ød
C16-ID06	6
C16-ID08	8

Boring Bar Ø4.87~Ø8.87

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

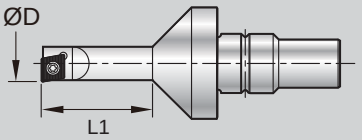
Parts No.	ØD	Ød	L1	L	Insert Screw / Key	Fig.
C06-0500-20L	4.87~5.12	6	20	70	CCGT030102 NS-16030 / 0.4Nm NK-T6	
C06-0525-20L	5.12~5.37	6	20	70		
C06-0550-22L	5.37~5.62	6	22	70		
C06-0575-22L	5.62~5.87	6	22	70		
C06-0600-24L	5.87~6.12	6	24	70		
C06-0625-24L	6.12~6.37	6	24	70		
C06-0650-26L	6.37~6.62	6	26	70		
C06-0675-26L	6.62~6.87	6	26	70		
C08-0700-28L	6.87~7.12	8	28	85	CCGT040102 NS-20036 / 0.6Nm NK-T6	
C08-0725-28L	7.12~7.37	8	28	85		
C08-0750-30L	7.37~7.62	8	30	85		
C08-0775-30L	7.62~7.87	8	30	85		
C08-0800-32L	7.87~8.12	8	32	85		
C08-0825-32L	8.12~8.37	8	32	85		
C08-0850-34L	8.37~8.62	8	34	85		
C08-0875-34L	8.62~8.87	8	34	85		

99820-B01 ER20 Taper Boring Shank

NEW

Boring Bar - Ø5mm ~ Ø10mm

- Made by high alloy tool steel, the rigidity is enough for 2 ~ 3xD boring depth.
- All of C16-xxx... boring bars are interchangeable to fit same boring head.



* H type with internal coolant can be order on request.
ordering code:C16-0618H

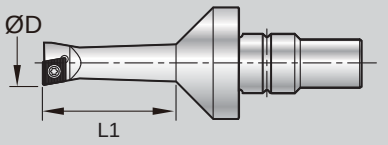
Part No.	ØD	L1	Insert	Key / Screw
C16-0500-15L	4.87-5.12	15	CCGT030102	NK-T6 / NS-16030 0.4Nm
C16-0525-15L	5.12-5.37	15		
C16-0550-15L	5.37-5.62	15		
C16-0575-15L	5.62-5.87	15		
C16-0600-18L	5.87-6.12	18		
C16-0625-18L	6.12-6.37	18		
C16-0650-18L	6.37-6.62	18		
C16-0675-18L	6.62-6.87	18		
C16-0700-21L	6.87-7.12	21	CCGT040102	NK-T6 / NS-20036 0.6Nm
C16-0725-21L	7.12-7.37	21		
C16-0750-21L	7.37-7.62	21		
C16-0775-21L	7.62-7.87	21		
C16-0800-24L	7.87-8.12	24		
C16-0825-24L	8.12-8.37	24		
C16-0850-24L	8.37-8.62	24		
C16-0875-24L	8.62-8.87	24		
C16-0900-27L	8.87-9.12	27	CC...0602...	NK-T7 / NS-25045 0.9Nm
C16-0925-27L	9.12-9.37	27		
C16-0950-27L	9.37-9.62	27		
C16-0975-27L	9.62-9.87	27		
C16-1000-30L	9.87-10.12	30		
C16-1025-30L	10.12-10.37	30		
C16-1050-30L	10.37-10.62	30		
C16-1075-30L	10.62-10.87	30		

99820-B01 ER20 Taper Boring Shank

NEW

Boring Bar - Ø11mm ~ Ø25mm

- Made by high alloy tool steel, the rigidity is enough for 2 ~ 3xD boring depth.
- All of C16-xxx... boring bars are interchangeable to fit same boring head.



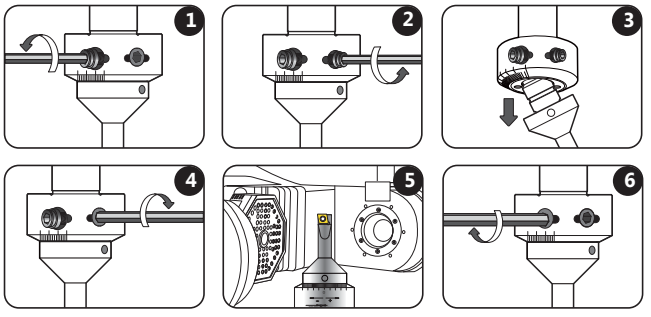
* H type with internal coolant can be order on request.
ordering code:C16-1751H

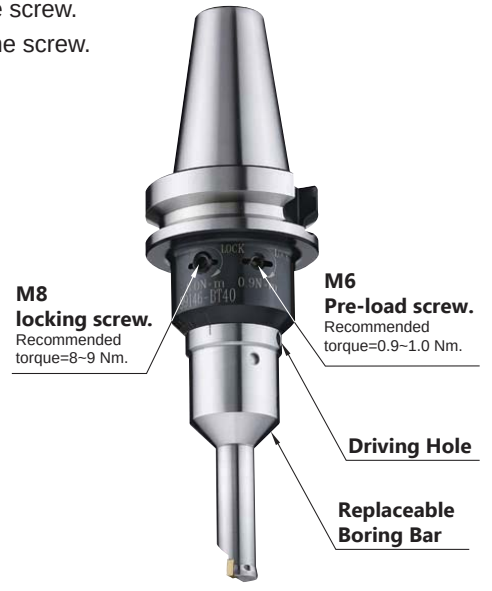
Part No.	ØD	L1	Insert	Key / Screw
C16-1100-33L	10.87-11.12	33	CC...0602...	NK-T7 / NS-25045 0.9Nm
C16-1125-33L	11.12-11.37	33		
C16-1150-33L	11.37-11.62	33		
C16-1175-33L	11.62-11.87	33		
C16-1200-36L	11.87-12.12	36		
C16-1225-36L	12.12-12.37	36		
C16-1250-36L	12.37-12.62	36		
C16-1275-36L	12.62-12.87	36		
C16-1300-39L	12.87-13.12	39		
C16-1325-39L	13.12-13.37	39		
C16-1350-39L	13.37-13.62	39		
C16-1375-39L	13.62-13.87	39		
C16-1400-42L	13.87-14.12	42		
C16-1425-42L	14.12-14.37	42		
C16-1450-42L	14.37-14.62	42		
C16-1475-42L	14.62-14.87	42		
C16-1500-45L	14.87-15.12	45		
C16-1525-45L	15.12-15.37	45		
C16-1550-45L	15.37-15.62	45		
C16-1575-45L	15.62-15.87	45		
C16-1600-48L	15.87-16.12	48		
C16-1625-48L	16.12-16.37	48		
C16-1650-48L	16.37-16.62	48		
C16-1675-48L	16.62-16.87	48		
C16-1700-51L	16.87-17.12	51	CC...0602...	NK-T7 / NS-25060 0.9Nm
C16-1725-51L	17.12-17.37	51		
C16-1750-51L	17.37-17.62	51		
C16-1775-51L	17.62-17.87	51		

Part No.	ØD	L1	Insert	Key / Screw
C16-1800-50L	17.87-18.12	50	CC...0602...	NK-T7 / NS-25060 0.9Nm
C16-1825-50L	18.12-18.37	50		
C16-1850-50L	18.37-18.62	50		
C16-1875-50L	18.62-18.87	50		
C16-1900-50L	18.87-19.12	50		
C16-1925-50L	19.12-19.37	50		
C16-1950-50L	19.37-19.62	50		
C16-1975-50L	19.62-19.87	50		
C16-2000-50L	19.87-20.12	50		
C16-2025-50L	20.12-20.37	50		
C16-2050-50L	20.37-20.62	50		
C16-2075-50L	20.62-20.87	50		
C16-2100-50L	20.87-21.12	50		
C16-2125-50L	21.12-21.37	50		
C16-2150-50L	21.37-21.62	50		
C16-2175-50L	21.62-21.87	50		
C16-2200-50L	21.87-22.12	50		
C16-2225-50L	22.12-22.37	50		
C16-2250-50L	22.37-22.62	50		
C16-2275-50L	22.62-22.87	50		
C16-2300-50L	22.87-23.12	50		
C16-2325-50L	23.12-23.37	50		
C16-2350-50L	23.37-23.62	50		
C16-2375-50L	23.62-23.87	50		
C16-2400-50L	23.87-24.12	50		
C16-2425-50L	24.12-24.37	50		
C16-2450-50L	24.37-24.62	50		
C16-2475-50L	24.62-24.87	50		
C16-2500-50L	24.87-25.12	50		

Quick Change High Speed EMB Boring Bar - 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.





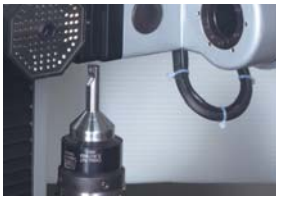
- Procedures For Adjustment

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)

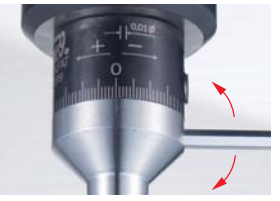
To Increase Diameter

To Reduce Diameter

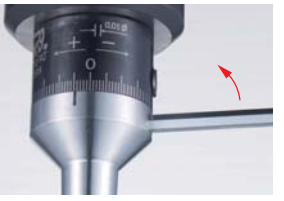
On Milling Machine and Machining Centers

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)

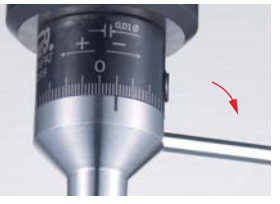


(Step 2)



To Increase Diameter

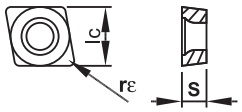
(Step 3)



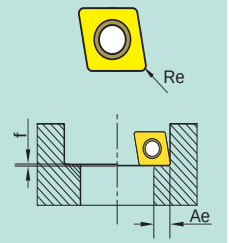
(Step 4)

To Reduce Diameter

Precisely Ground Inserts

Inserts		Description	CCGT030102	CCGT040102	CCGH0602U	CCFT060204	CCFW060204
NC30		K20F, TiAlN coated, universal grade for casting iron, carbon steel, alloy steel, stainless steel.	•	•			
NC2032		K20F, AlTiN coated, for high speed cutting of casting iron.					•
NC2033		K20F, TiAlN coated, good for carbon steel, alloy steel, stainless steel.				•	
NC9036		K20F, DLC coated, long tool life. Good for Al, Al-alloy, Copper and non-ferrous metal.	•	•		•	
U-XP9001		K20F. It's a super finishing insert with large corner radius for high feed rate for cutting Al, Al-alloy and non-ferrous metal.			•		
Dimension		lc	3.5	4.3	6.35	6.35	6.35
		S	1.4	1.8	2.38	2.38	2.38
		rε	0.2	0.2	-	0.4	0.4

Cutting Data



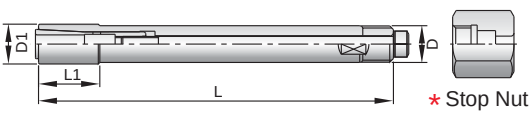
• Note: Super fine finishing insert U-XP9001 with special specified cutting width 0.15mm.(Radius) (see table below)

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

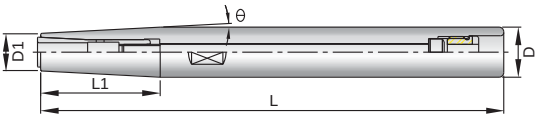
Material	Cutting conditions or surface finishes	Grade of insert	Cutting Speed Vc(m/min.)	feed rate f (mm/rev.)	Re0.2	Re0.4
					Ae (mm)	
Carbon Steel	Regular cutting	NC2033	120-150-200	0.05-0.07-0.10	0.05	0.1
	Interrupted cutting	NC30	100-120-140	0.04-0.05-0.08	0.05	0.1
Alloy Steel	Regular cutting	NC2033	100-120-140	0.05-0.07-0.10	0.05	0.1
	Interrupted cutting	NC30	80-100-120	0.04-0.05-0.08	0.05	0.1
Stainless Steel	Regular cutting	NC2033	80-100-120	0.05-0.07-0.10	0.05	0.1
	Interrupted cutting	NC30	70-80-100	0.05-0.07-0.10	0.05	0.1
Cast Iron	Regular cutting	NC2032 NC30	80-100-120	0.05-0.07-0.10	0.05	0.1
Brass, Bronze and Al-alloy Si >6%	Regular cutting	NC9036	150-200-300	0.05-0.07-0.10	0.05	0.1
	Super mirror finish	U-XP9001	150-200-300	0.15-0.2-0.25	0.05	
Al, Al-alloy, non-ferrous metal	Regular cutting	NC9036	150-200-300	0.05-0.07-0.10	0.05	0.1
	Super mirror finish	U-XP9001	150-200-300	0.15-0.20-0.25	0.05	
Hardened Steel <HRC 50	Regular cutting	NC30	80-100-120	0.04-0.06-0.08	0.05	0.1

DC Slim Chuck

Extension Adaptor >>



* Stop Nut

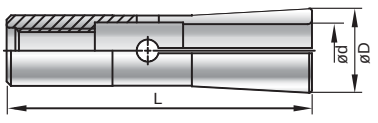


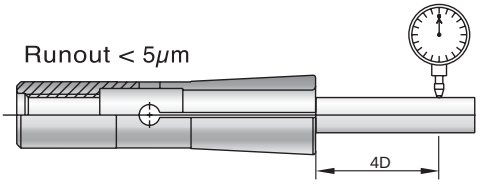
Parts No.	Type of Holder	d	L	L1	øD	D1	θ	Collet	Back Screw	Stop Screw	Hexagon Key	Stop Nut
329090-102	ST10-DC4-90	2~4	90	14	10	9	--	DC4	M4 * L60	--	301940~632	TP-M8
-112	ST12-DC4-120	2~4	120	38	12	9	3°		M4 * L85	OP-M8		--
329090-212	ST12-DC6-120	2~6	120	40	12	14	--	DC6	M5 * L95	--	301940~642	TP-M12
-222	ST16-DC6-150	2~6	150	38	16	14	3°		M5 * L100	OP-M10		--
-232	ST20-DC6-200	2~6	200	70	20	14	3°		M5 * L100	OP-M10		--
-242	ST25-DC6-250	2~6	250	115	25	14	3°		M5 * L100	OP-M10	301940~643	--

* 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	9.6
L	31	36

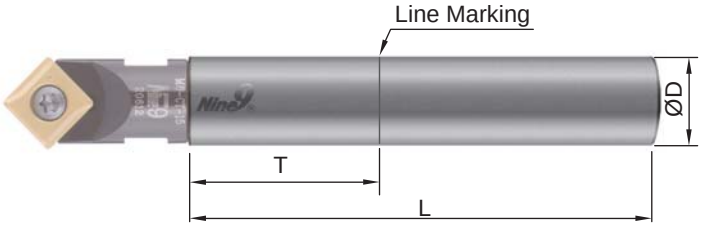
DC4-E		DC6-E	
Parts No.	Size(mm)	Parts No.	Size(mm)
300090-102	2.0	300090-203	3.0
300090-103	3.0	300090-204	4.0
300090-104	4.0	300090-206	6.0

Extension Bar

For NC Spot Drill, Chamfer Mill, NC Helix Drill, Power Mill and Direct Adjusting Boring Bar

Steel Type >>

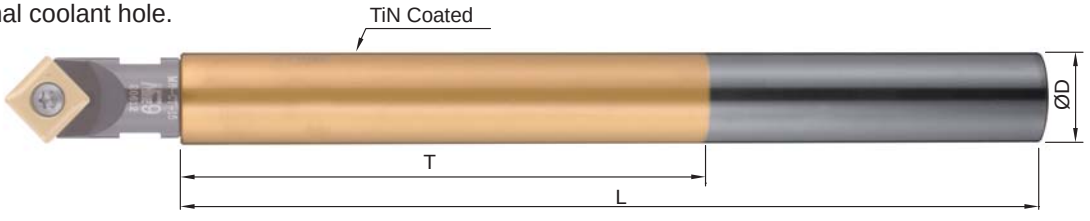
- T is the maximum overhang length.
- With internal coolant hole.



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

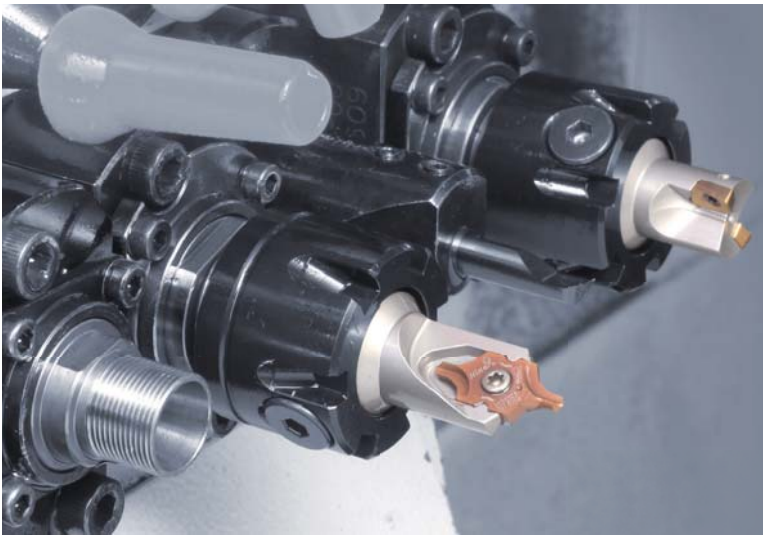


Parts No.	Type	ØD	T	L	M	Assemble Torque
99801-10W	BC10-100M05W	10	50	100	M5xP0.8	6.5 Nm
99801-12W	BC12-100M06W	12	60	100	M6xP1.0	11.0 Nm
99801-14W	BC14-120M08W	14	70	120	M8xP1.25	25.0 Nm
99801-16W	BC16-150M08W	16	80	150	M8xP1.25	25.0 Nm
99801-18W	BC18-150M10W	18	90	150	M10xP1.5	50.0 Nm
99801-20W	BC20-200M10W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

Patented

ERgo Monoblock System

Integrated ER taper-shank cutter



ERgo *just say "ergo".*

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

Concept:

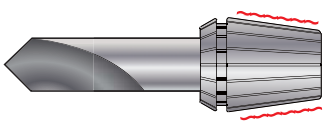
An integrated ER taper- shank cutter, eliminate assembly tolerance.
A clamping force gained from the 3 parts including **Ergo nut**, **high strength Ergo pin** and **ER taper.**
Ergo nut drives the pin to push Ergo holder into ER taper. It is

" A simple way to maximize clamping force "

Optimize the rigidity

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

Integrated design



Cutting tool
+ Spring collet

Easy and simple assembly

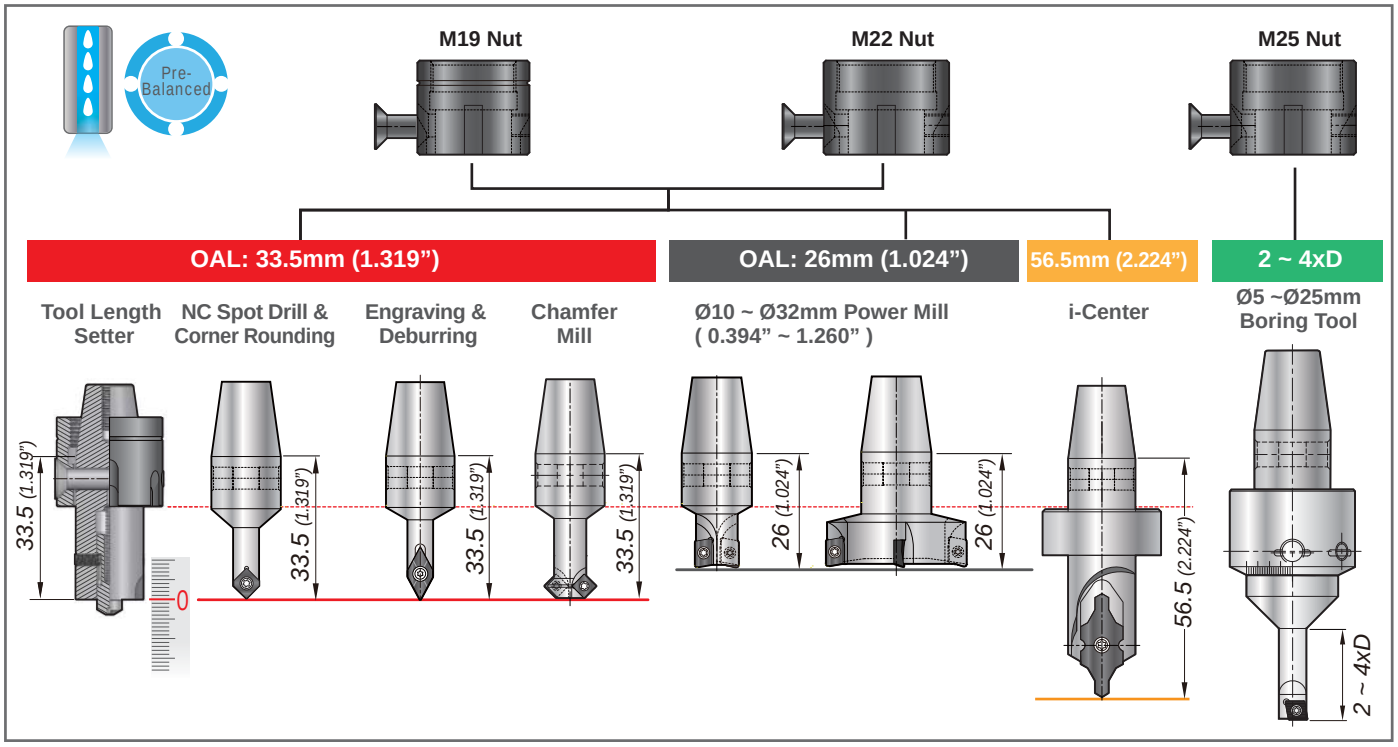
- A simple Ergo cutter has minimal assemble parts, changing tool takes just few seconds.
- Thanks to ER taper, the repeatability of assemble tolerance is ±0.1mm (0.0039") while changing same tool length Ergo holder.

Ergo cutter

Solid carbide cutter

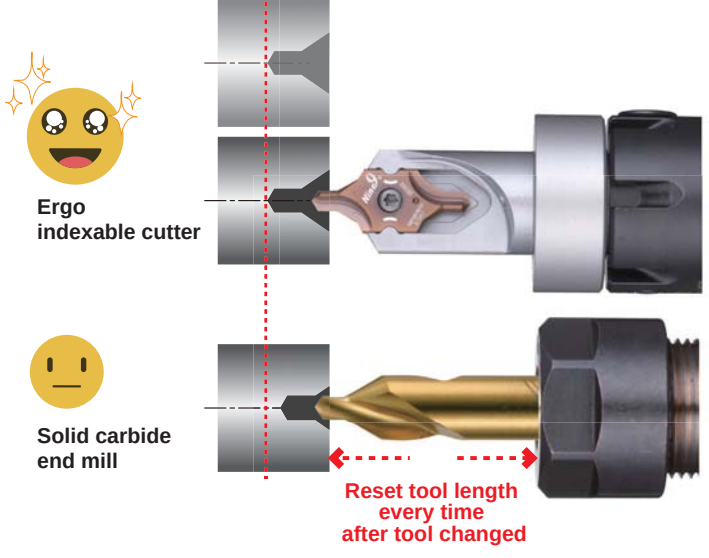
Quick change, saving huge machine downtime.

- The simplest way to get tools on the machine.
- Fixed tool length of Ergo system.
- No need to reset tool length while changing tools.



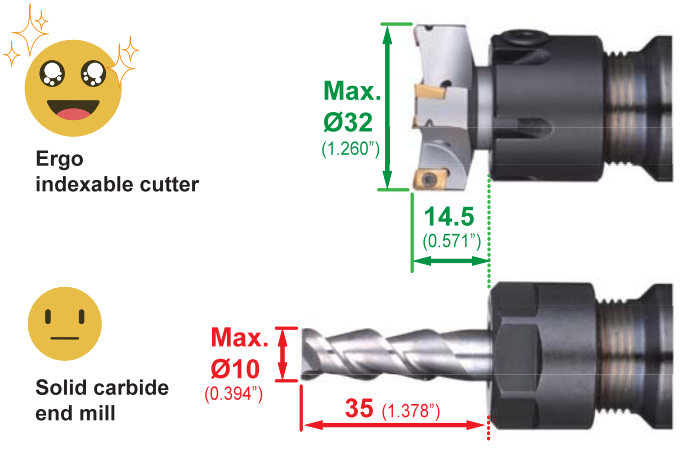
Excellent repeatability, saving set-up time.

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

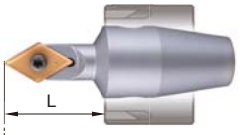


Dimension is not limited by the ER16 collet clamping range

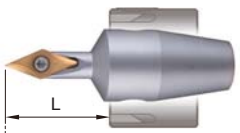
- Ergo ER16 covers milling cutter range from 10 to 32mm.
- More efficiency and the possibilities to machine bigger parts.
- The shorter tool length, the better run-out accuracy.



NC Spot Drill & Corner Rounding

Angle	Parts No.	Basic Holder	L	Screw / Key	Insert Type	Dmax. D min.	Dmax. D max.	Page
60°	99816-09V		22 (0.866")	NS-25045 0.9Nm / NK-T7	V9MT0802	1 (0.039")	9 (0.354")	2-6
90°	99816-606		22 (0.866")	NS-20036 0.6 Nm / NK-T6	N9MT05T1	1 (0.039")	6 (0.236")	2-9
RC					N9MT05T1RC	R 0.5	R 1.0	2-18
90°	99816-610		22 (0.866")	NS-30055 2.0 Nm / NK-T8	N9MT0802	2 (0.079")	10 (0.394")	2-10
90°+ 145°					N9MT08M04~M06	3.3 (0.130")	8 (0.315")	2-16
90°	99816-614		22 (0.866")	NS-35080 2.5 Nm / NK-T15	N9MT11T3	3 (0.118")	14 (0.551")	2-11
90°+ 145°					N9MT11T3M08, M10,1/4, 5/16, 3/8	6.8 (0.268")	13 (0.512")	2-16
RC					N9MT11T3RC	R 1.0	R 3.0	2-19

Engraving Tool

Angle	Parts No.	Basic Holder	L	Screw / Key	Insert Type	T Wmin.	T Wmax.	T Tmax.	Page
45°	99816-V045		22 (0.866")	NS-22044 0.9Nm / NK-T7	V04506T1W	0.45 (0.018")	2.1 (0.083")	2.0 (0.079")	2-43
60°	99816-V060		22 (0.866")	NS-22044 0.9Nm / NK-T7	V06006T1W	0.25 (0.010")	2.7 (0.106")	2.0 (0.079")	2-44

Set of Ergo Nut

* Nut, pin & L-key are included.

Parts No.	Ød
99816-M19S	25 (0.984")
99816-M22S	28 (1.102")

Ergo Nut

Parts No.	Ød
99816-M19	25 (0.984")
99816-M22	28 (1.102")

High Strength Ergo Pin

Parts No.	L
NS-50025	25 (0.984")
NS-50028	28 (1.102")

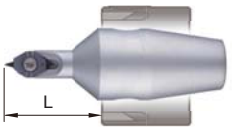
L-Key

Parts No.
NK-LW3

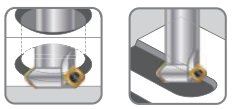
25~28mm Ergo Spanner

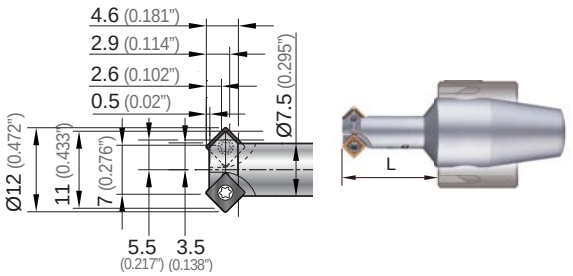
Parts No.
99816-SP28

Mini Spot Drill & Deburring Tool

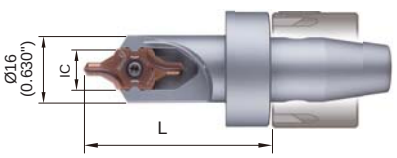
Angle	Parts No.	Basic Holder	L	Screw / Key	Insert Type	Dmax. Dmin.	Dmax.	Page
Spotting 90°	99816-X060		22 (0.866")	NS-22044 0.9Nm / NK-T7	X060A90W	0.10 (0.004")	2.2 (0.087")	2-8
Deburring 60°					X060A60T6	Tmin. 0.1 (0.004")	Tmax. 1.9 (0.075")	2-49
Deburring 90°					X060A90T6	0.5 (0.020")	2.0 (0.079")	2-49

Chamfer mill



Angle	Parts No.	Basic Holder	L	No. of teeth	Screw / Key	Insert Type	Page
45°	99816-C10		22 (0.866")	2	NS-18037 0.6Nm / NK-T6	N9GX04T002	2-51

indexable Center Drill, Spotting & Countersink

IC	Parts No.	Basic Holder	L	Screw / Key	Insert Type	Page
10	99816-IC10BH	 With center coolant	45 (1.772")	NS-25060 0.9Nm / NK-T7	Form R I9MT1003R	2-35
					Form A+B I9MT1003B	2-35
					60°, 90° & 120° I9MT1003CT	2-36

Set of Ergo Nut

* Nut, pin & L-key are included.

Parts No.	Ød
99816-M19S	25 (0.984")
99816-M22S	28 (1.102")

Ergo Nut

Parts No.	Ød
99816-M19	25 (0.984")
99816-M22	28 (1.102")

High Strength Ergo Pin

Parts No.	L
NS-50025	25 (0.984")
NS-50028	28 (1.102")

L-Key

Parts No.
NK-LW3

25~28mm Ergo Spanner

Parts No.
99816-SP28

ER11/ER16 ER20/ER25 Power Mill

Ø10~Ø32mm

G6.3 10000 r.p.m

Insert

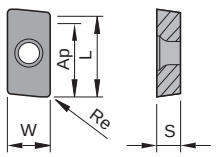
- Small radius Re0.1 can reduce cutting resistance in general.

● Best ◎ Suit ○ Possible

Grade	P	M	N
NC2033	●	●	
NC9031	◎	◎	●

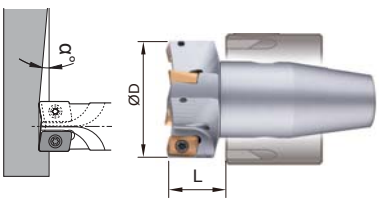

NC2033


NC9031

Parts No.		Coating	Grade	Insert	Re	Ap	L	W	S
A9GT0602 01H	NC2033	TiAlN	K20F		0.1 (0.004")	5 (0.197")	6.5 (0.259")	4 (0.157")	2.45 (0.096")
	NC9031	TiN							
A9GT0602 02H	NC2033	TiAlN	K20F		0.2 (0.008")				
	NC9031	TiN							
A9GT0602 05H	NC2033	TiAlN	K20F		0.5 (0.020")				
	NC9031	TiN							

Basic Holder& Accessory

- Customized cutter is on request. Please refer to P6-9.

ER Taper	Parts No.	Basic Holder	ØD	L	No. of teeth	α°	Screw / Key
ER11	99811-10A06		**10** (0.394")	14 (0.551")	2	5	NS-18037 0.6Nm / NK-T6
	99811-12A06		**12** (0.472")		2	4	
ER16	99816-10A06		**10** (0.394")	14.5 (0.571")	2	5	
	99816-12A06		**12** (0.472")		2	4	
	99816-16A06		**16** (0.630")		3	2	
	99816-20A06		**20** (0.787")		3	2	
	99816-25A06		**25** (0.984")		4	1.3	
	99816-32A06		**32** (1.260")		4	1	
ER20	99820-12A06		**12** (0.472")	26 (1.024")	2	4	
	99820-16A06		**16** (0.630")		3	2	
	99820-20A06		**20** (0.787")		3	2	
	99820-25A06		**25** (0.984")		4	1.3	
ER25	99825-12A06		**12** (0.472")	33 (1.299")	2	4	
	99825-16A06		**16** (0.630")		3	2	
	99825-20A06		**20** (0.787")		3	2	
	99825-25A06		**25** (0.984")		4	1.3	

Set of Ergo Nut

* Nut, pin & L-key are included.

ER	Parts No.	Ød
ER11	99811-M13S	19 (0.748")
ER16	99816-M19S	25 (0.984")
	99816-M22S	28 (1.102")
ER20	99820-M24S	34 (1.339")
	99820-M25S	
ER25	99825-M32S	42 (1.653")

Ergo Nut

Parts No.	Ød
99811-M13	19 (0.748")
99816-M19	25 (0.984")
99816-M22	28 (1.102")
99820-M24	34 (1.339")
99820-M25	
99825-M32	42 (1.653")

High Strength Ergo Pin

Parts No.	L
NS-40019	19 (0.748")
NS-50025	25 (0.984")
NS-50028	28 (1.102")
NS-60033	33 (1.299")
NS-80041	41 (1.614")

L-Key

Parts No.
NK-LW25
NK-LW3
NK-LW4
NK-LW5

Ergo Spanner

Parts No.
99811-SP20
99816-SP28
99820-SP36
99825-SP42

Cutting Data

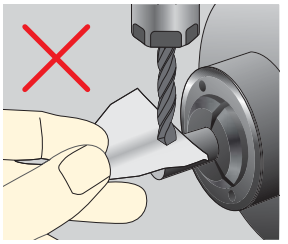
	Work Material	Grade	SFM	fz (inch/tooth)	Ap(inch)	Ap(inch)	Ae(inch)
P	Carbon Steel	NC2033	260 ~ 500	0.002" ~ 0.003"	0.059"	0.118"	0.039"
P	Low-alloy Steel C ≤ 0.3%						
P	High-alloy Steel C > 0.3%	NC2033	200 ~ 410	0.001" ~ 0.002"	0.039"	0.984"	0.039"
M	Stainless Steel	NC2033	200 ~ 410	0.001" ~ 0.002"	0.020"	0.079"	0.039"
N	Al, and non-ferrous metal (Cu)	NC9031	660 ~ 1640	0.001" ~ 0.003"	0.079"	0.157"	0.079"

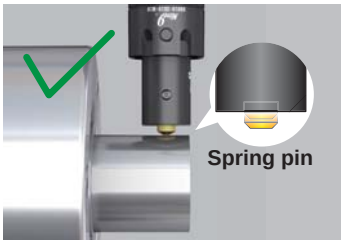
ER16 Ergo Setter TP

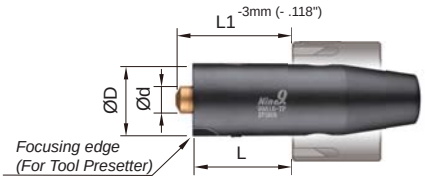
Quick and simple tool length setting

Setter & Accessory

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





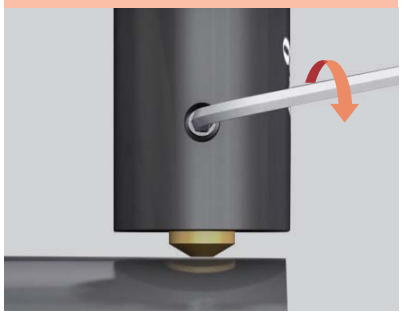
Parts No.	Setter	ØD	Ød	L	L1	L-Key
99816-TP		16 (0.630")	6 (0.236")	22 (0.866")	25 (0.984")	NK-LW15 / 2 Nm

Set of Ergo Nut		Ergo Nut		High Strength Ergo Pin		L-Key	25~28mm Ergo Spanner
 * Nut, pin & L-key are included.							
Parts No.	Ød	Parts No.	Ød	Parts No.	L	Parts No.	Parts No.
99816-M19S	25 (0.984")	99816-M19	25 (0.984")	NS-50025	25 (0.984")	NK-LW3	99816-SP28
99816-M22S	28 (1.102")	99816-M22	28 (1.102")	NS-50028	28 (1.102")		

Setting process

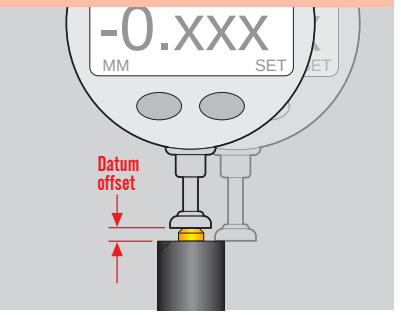
* Mind the cutting depth of Engraving! *If cutting depth is less than 0.1mm,* You must reset tool length when change new insert or cutting edge.

1. Set Temporary Position



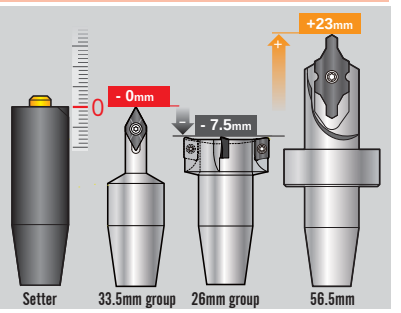
1: Move the setter tip to touch the center-top of workpiece.
2: Press spring pin 1~2 mm down.
3: Tighten screw to fix spring pin, and get a temporary length of setter.
4: Input the temporary length value to the CNC controller.

2. Get The Datum Position



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

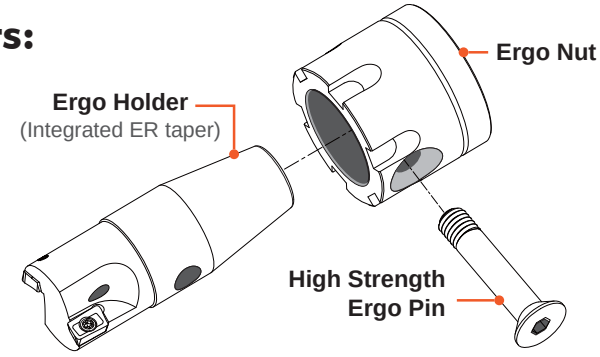
3. Input Tool Length Offset



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

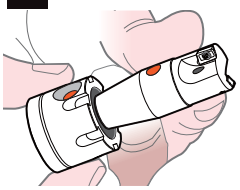
Assembly Steps

Ergo parts:



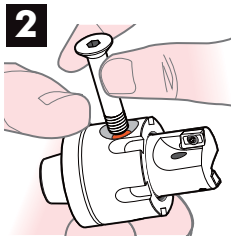
Make sure all parts are clean while re-assembly or change tool.

1



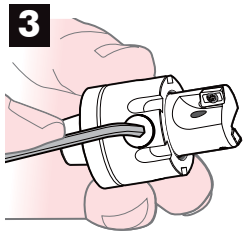
Place Ergo holder into Ergo nut and to align screw hole.

2



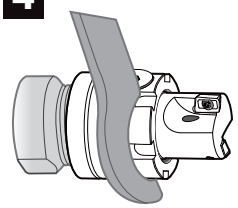
Put Ergo pin into screw hole

3



Lock Ergo pin screw.

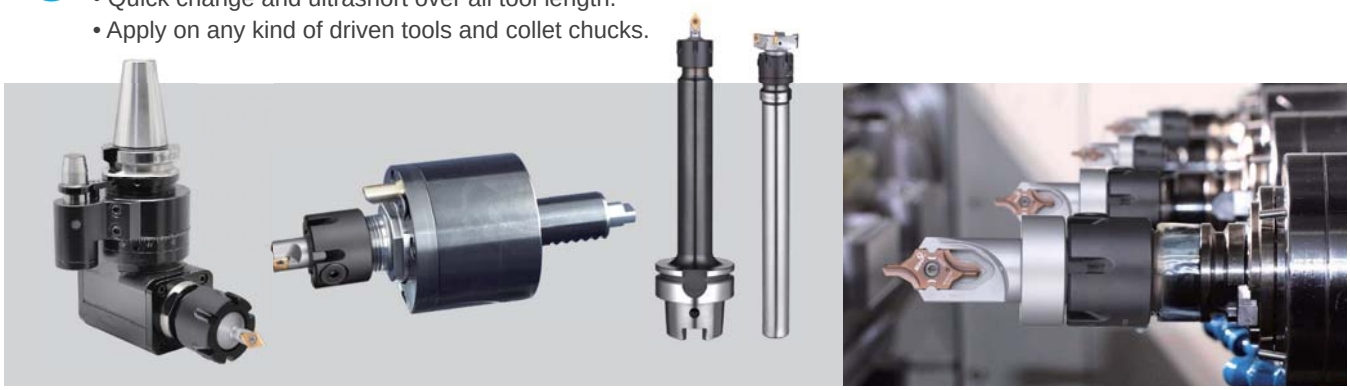
4



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 kind of driven tools and collet chucks.

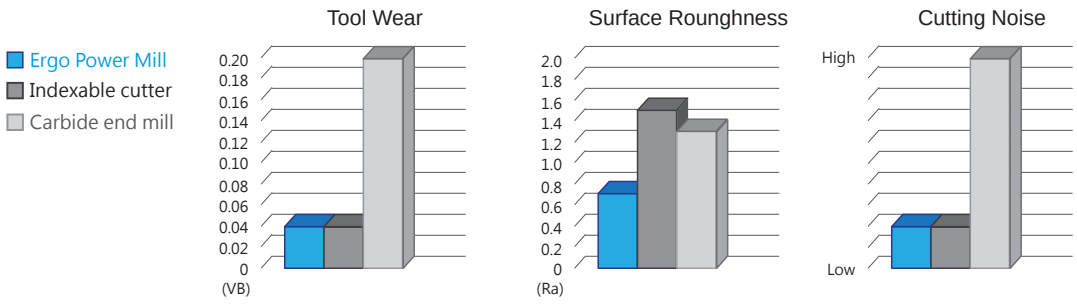


Performance

Material	Testing length	Tool Overhang	Machine: HAAS VM-3, BT40 / 22.5KW					
			SFM	S (r.p.m.)	f (inch/z)	F (IPM)	Ap (inch)	Ae (inch)
S50C (Carbon Steel)	78.74”	6.772” (by ER collet chuck)	260	2500	0.0012”	3	0.039	0.236”

Using Ergo system, you can believe :

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



ER16 Ergo Sets ~ *For your first ordering.* ~

• **The insert is not included.**

Nut	Series	Parts No.	Contents
With ER16 Mini Nut (M19 x 1.0 P)	NC Spot Drills & Corner Rounding	99816-09V-M19S	Ergo Holder x 1 Ergo ER16 Mini Nut x 1 High Strength Ergo pin x 1 3mm L key x 1 Insert Key x 1  * The insert is not included.
		99816-606-M19S	
		99816-610-M19S	
		99816-614-M19S	
	Engraving Tools & Deburring Tools	99816-V045-M19S	
		99816-V060-M19S	
		99816-X060-M19S	
	Chamfer Mills	99816-C10-M19S	
	Power Mills	99816-10A06-M19S	
		99816-12A06-M19S	
		99816-16A06-M19S	
		99816-20A06-M19S	
		99816-25A06-M19S	
		99816-32A06-M19S	
	i-Center	99816-IC10BH-M19S	
	Tool Length Setter	99816-TP-M19S	
With ER16 Nut (M22 x 1.5 P)	NC Spot Drills & Corner Rounding	99816-09V-M22S	Ergo Holder x 1 Ergo ER16 Nut x 1 High Strength Ergo pin x 1 3mm L key x 1 Insert Key x 1  * The insert is not included.
		99816-606-M22S	
		99816-610-M22S	
		99816-614-M22S	
	Engraving Tools & Deburring Tools	99816-V045-M22S	
		99816-V060-M22S	
		99816-X060-M22S	
	Chamfer Mills	99816-C10-M22S	
	Power Mills	99816-10A06-M22S	
		99816-12A06-M22S	
		99816-16A06-M22S	
		99816-20A06-M22S	
		99816-25A06-M22S	
		99816-32A06-M22S	
	i-Center	99816-IC10BH-M22S	
	Tool Length Setter	99816-TP-M22S	

Power Mill Inquiry Form

Company:

The following information should be checked while discussing with customer.

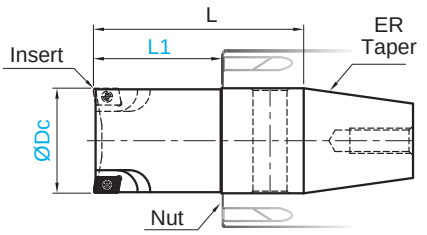
Machine		
Spindle Speed	Max.	r.p.m.
Power of Spindle motor	☐ KW	☐ HP
Coolant supply	☐ NO ☐ If yes,	☐ External ☐ Internal

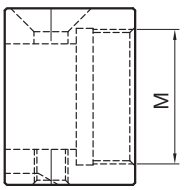
Current tool		
Cutting Speed	m/min.	SFM
Feed Rate	mm/rev.	inch/rev.

ER Taper-shank dimensions:

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

Cutter Dia.: (ØDc)	(Ø10 ~ Ø32)
L1 : (See chart for Max.)	
Center Coolant:	☐ Yes ☐ No
ER Nut :	☐ N9ER16-M19 ☐ N9ER16-M22 ☐ N9ER20-M25 ☐ N9ER25-M32
Current Insert: (Please provide sample.)	
Insert Brand:	ISO Code:





• Specifications

ØDc	L1 Max.	L Max.	ER Taper
10 ~ 32	22	34	ER16
	26	42	ER20
	33	52	ER25

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

Boring Tool Inquiry Form

Company:

The following information should be checked while discussing with customer.

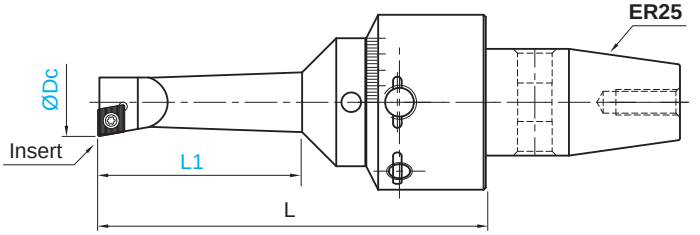
Machine		
Spindle Speed	Max.	r.p.m.
Power of Spindle motor	☐ KW	☐ HP
Coolant supply	☐ NO ☐ If yes,	☐ External ☐ Internal

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

ER Taper-shank dimensions:

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

Boring Dia.: (ØDc)	(Ø5 ~ Ø25)
L1 :	(Max.50mm and 3xDc)
Center Coolant:	☐ Yes ☐ No
ER Nut :	**N9ER25-M32**
Current Insert: (Please provide sample.)	
Insert Brand:	ISO Code: CC***...



• Specifications

ØDc	L1 Max.	L Max.	ER Taper
5 ~ 25	50	94	ER25

Notes

ER16 — NC Spot Drill / Corner Rounding

P. 6-3

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

One tool will perform multiple applications

ER16 — Engraving / Deburring Mini Spotting

P. 6-3

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

Engraving 45° & 60°

Deburring 60° & 90°

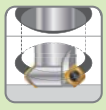
Spotting 0.1 & 0.2

ER16 — Chamfer Mill

P. 6-4

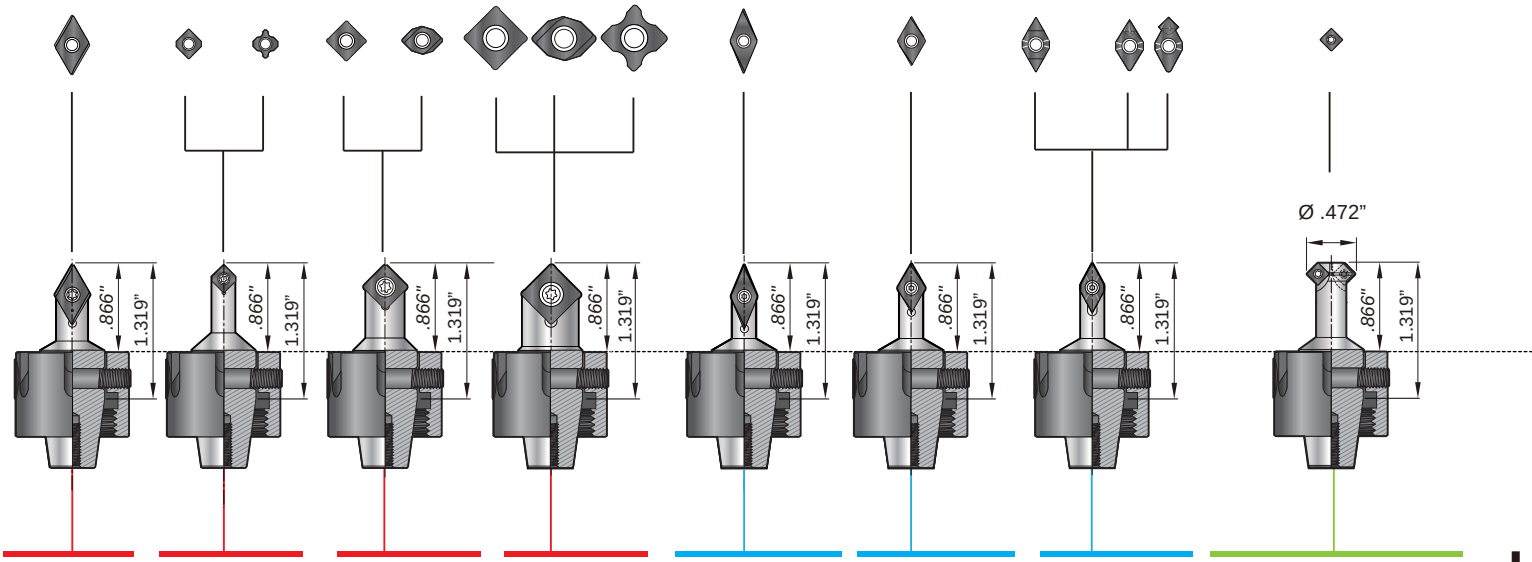
G6.3 10,000 r.p.m.

Front & Back Chamfering



Face Milling

V9MT0802	N9MT05T1	N9MT0802	N9MT11T3	V045	V060	X060	X060	N9GX04T002
60°	90° RC 0.5~1.0	90° 145° + 90°	90° 145° + 90° RC 1.0~3.0 (1/64 ~ 1/8)	Engraving 45°	Engraving 60°	Mini Spotting 90°	Deburring 60° / 90°	45°



99816-09V	99816-606	99816-610	99816-614	99816-V045	99816-V060	99816-X060	99816-C10

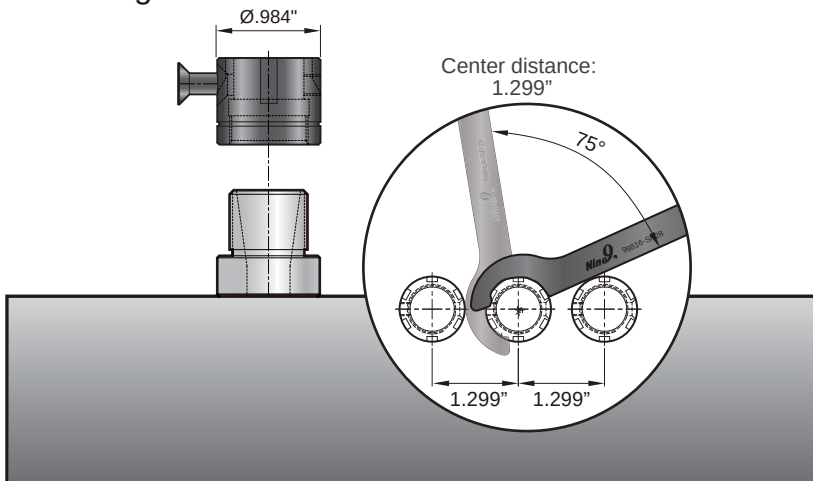
OAL= 1.319"

Ergo Monoblock System

99811 / 99816
99820 / 99825

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

Ergo ER16 Mini Nut



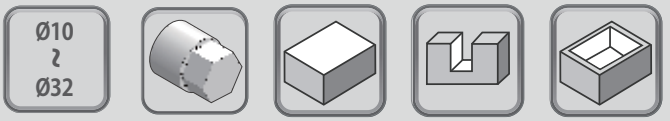
ER11 / ER16 / ER20 / ER25

P. 6-5

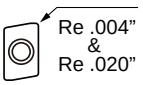
Power Mill

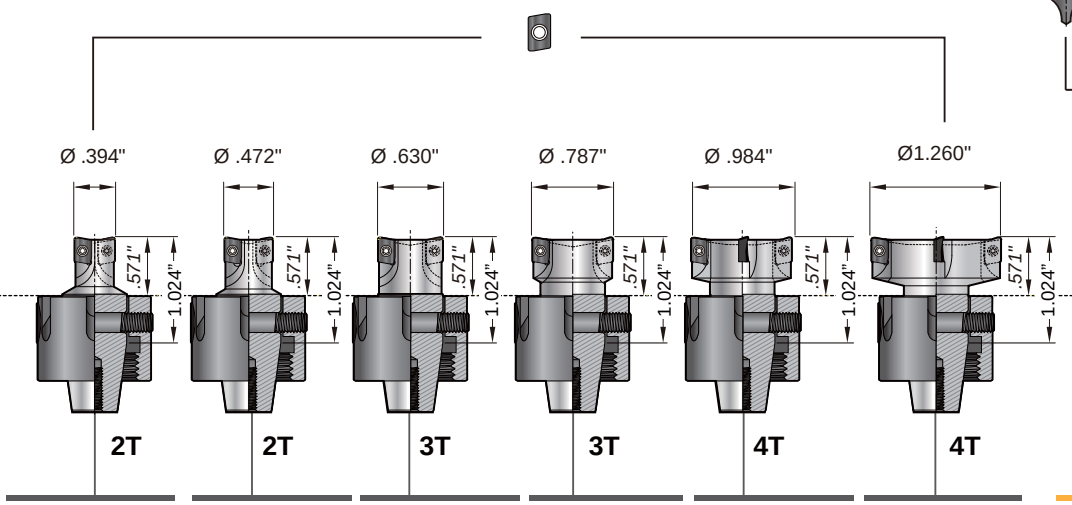
Center Coolant / G6.3 10,000 r.p.m.

Smaller, sharper and more effective teeth.



A9GT0602 New





99816-10A06 | 99816-12A06 | 99816-16A06 | 99816-20A06 | 99816-25A06 | 99816-32A06

OAL= 1.024"

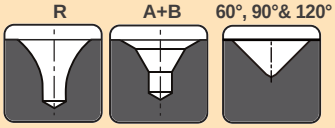
P. 6-4

ER16

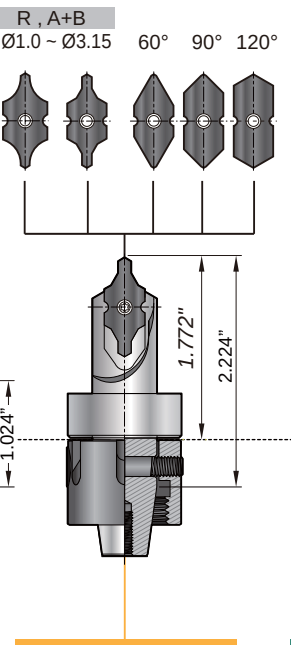
i-Center

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

Centering		Spotting & Csink
DIN 332 R	DIN 332 A+B	60°, 90°& 120°



I9MT1003 New

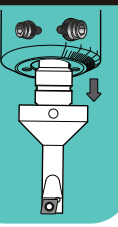


99816-IC10BH

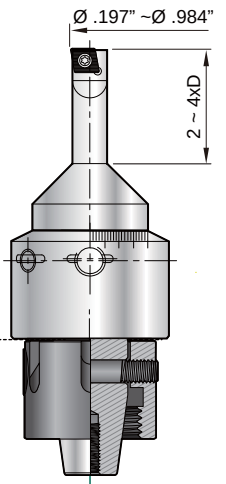
OAL= 2.224"

P. 4-9

ER20 Boring Tool

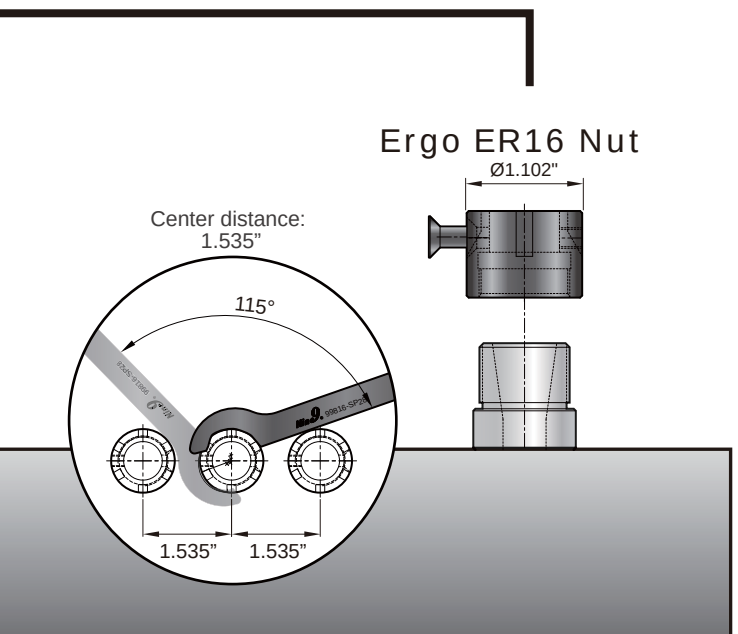


CCGT...



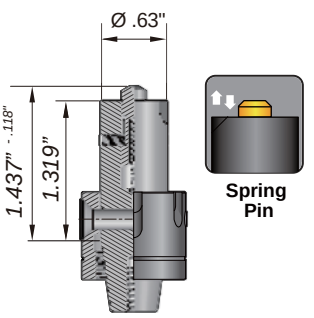
99820-B01

Ergo ER16 Nut



P. 6-6

ER16 Ergo Setter TP



99816-TP

Assembled Parts

- Insert
- Holder
- Nut & Pin
- Ergo Sets (See P. 6-8)

No Need To Choose
Nine9 Does It All

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850 W. Hawthorne Lane
West Chicago, IL 60185
800-621-5486
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