Nine9®

E®

Main Catalog

2025



“Awarded PATENTS”

No Need To Choose
Nine9 Does It All!



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

CREATIVITY

EVEREDE TOOL CO.

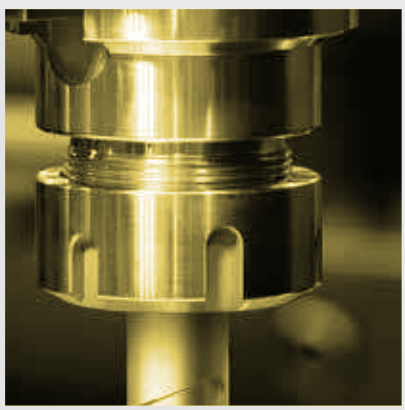
Indexable tooling since 1932

Nine9®

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







PASSION
PERSEVERANCE
DETERMINATION



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

INNOVATION PATENTS

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

PRODUCT MILESTONE

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

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



2001 "NC Spot Drill-CT" launched



2002 "Quick Change High Speed Boring Tools" launched



2004 "Power Mill" launched



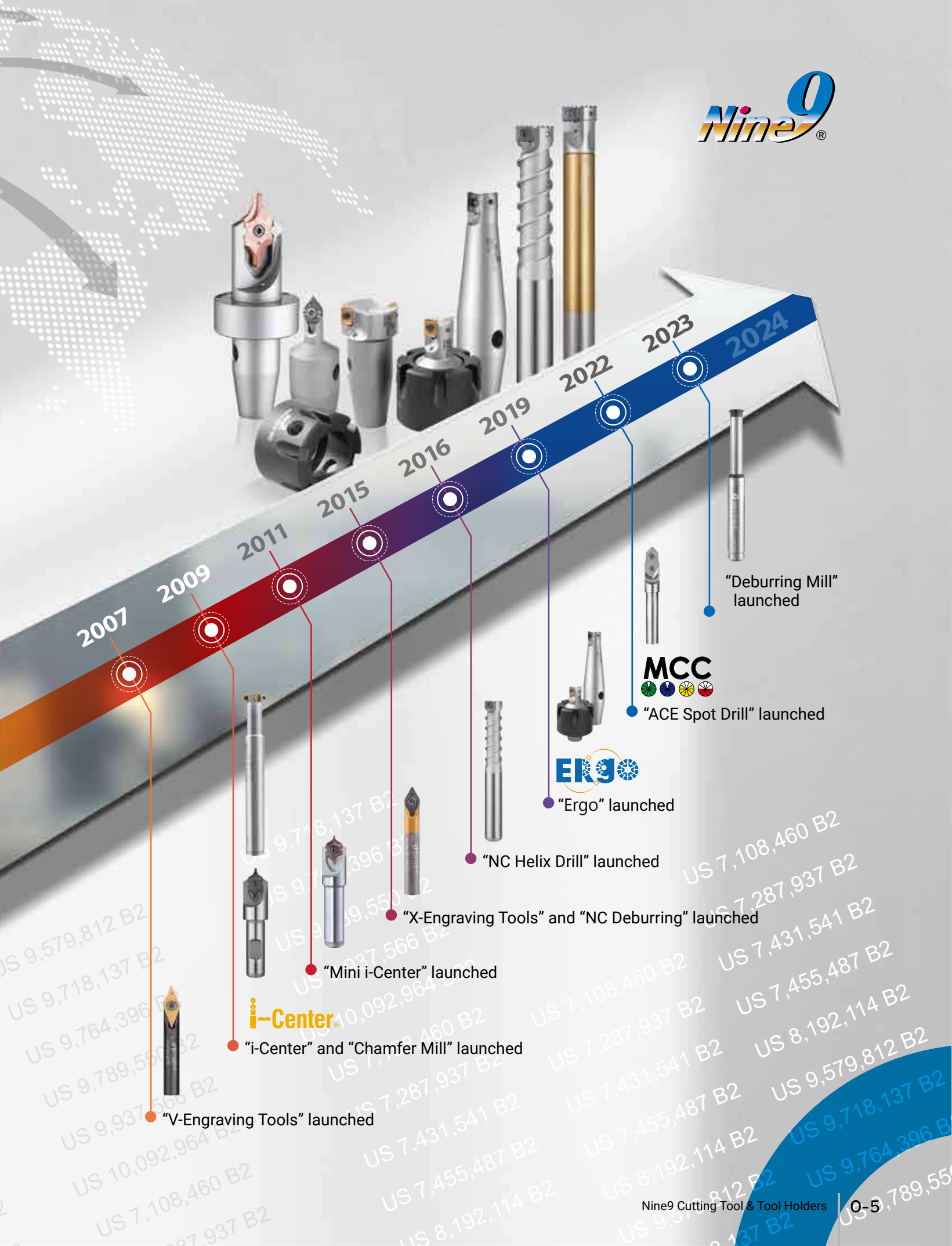
2005 "NC Spot Drill-PR" launched



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



US 7,431,[illegible] B2
US 7,455,407 B2
US 8,192,114 B2
US 9,579,812 B2
US 9,718,137 B2
[illegible]764,396 B2


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

ACE Spot Drill | 90° / 120° / 142°





Accuracy! Coolant! Efficiency!

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

Micro Spot Drill | 90° / 120° / 142°





0.1 and 0.2mm bottom width

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

NC Spot Drill | 60° ~ 145°





One tool will perform multiple applications

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

Corner Rounding | RC0.5 ~ 10.0mm





Various corner radius inserts can fit on same holder

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

Indexable Center Drill « i-Center »


DIN 332 R


DIN 332 A+B


DIN 332 A


ANSI 60°

Pilot dia.
1~10mm
(0.039"~ 0.394")



Long Tool Life! No need tool length resetting

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

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


Engraving



Different Angle! Burr-Free!

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

NC Deburring | 60° /90°











Insert has 6 flutes, 6 times higher feed rate

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

MCC Mill | 55°/ 60°/ 90°


Deburring


Back Deburring


Grooving


Thread Mill



60°/90° Front and back deburring. 55°/60° threading application

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

Chamfer Mill | 45°



Front and back chamfering. Ultra high speed & feed rate

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



Ergo System | ER11 / ER16 / ER20

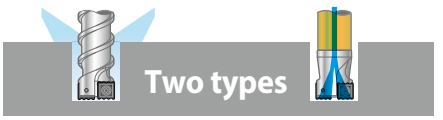
ERgo Monoblock System

Integrated ER taper-shank cutter

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



NC Helix Drill | Ø13mm~Ø65mm



Ideal for automation production. Excellent swarf removal

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



Super Power Drill | 5xD ~ 10xD



Ref. Metric catalog

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

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



Super Drill | 3xD & 4xD

3xD : Ø10 ~ Ø30mm
4xD : Ø16 ~ Ø30mm

Ref. Metric catalog



Smallest indexable drill from ø10mm.

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

Power Mill | start from Ø10mm

Ref. Metric catalog



Indexable milling cutter ø10mm. Higher wear resistance!

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

Boring Tool | Ø5mm~Ø50mm



Ref. Metric catalog



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

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

MINIMUM CONSUMABLE CUTTING

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

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



90° ACE Spot Drill , double ended (3.5%)

Used less than 5% raw material



Used less than 10% raw material

90° Indexable Spot Drill (7%)



Used less than 30% raw material

90° Screw Fit Spot Drill (13%)





Used less than 50% raw material

90° Double Ended Solid Carbide Spot Drill





Used 100%

90° Solid Carbide Spot Drill





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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. 2-27
2	99619-V82-5/8.12 2071 KIT	82°	V08212T3-NC2071	1 x 5/8" holder + 3 inserts + 1 key	P. 2-28
3	99616-06-1/4.05 2071 KIT	90°	N9MT05T1CT-NC2071	1 x 1/4" holder + 6 inserts + 1 key	P. 2-29
	99616-3/8.08 NC40 KIT		N9MT080208CT-NC40	1 x 3/8" holder + 6 inserts + 1 key	P. 2-30
	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. 2-31
	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. 2-31
	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. 2-32
5	99619-142-5/8.08 2071 KIT	142°	V1420803-NC2071	1 x 5/8" holder + 3 inserts + 1 key	P. 2-35



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. 3-71
99619-V045-03K-32		V04506T1W06-2032		
99619-V045-03K-31		V04506T1W06-9031		
99619-V060-03K-71	60°	V06006T1W06-2071		P. 3-72
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. 3-73
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. 4-79
99619-X060-DB90-02K-32	90°	X060A90T6-NC2032		



Nine9® Accuracy Coolant Efficiency

ACE Spot Drill >>>

Spotting Concept!

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

P M K N

MCC Minimum Consumable Cutting Indicator 5%

Dual Clamping Screwed Design

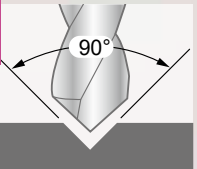
- Ensures vibration free during cutting.



Features >>>

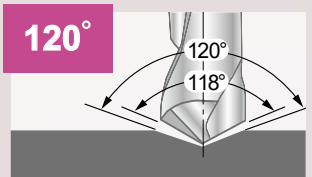
3 Angles : 90° / 120° / 142°

90°



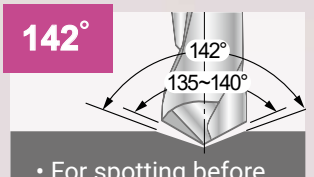
- For 90° point angle drill.

120°



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

142°



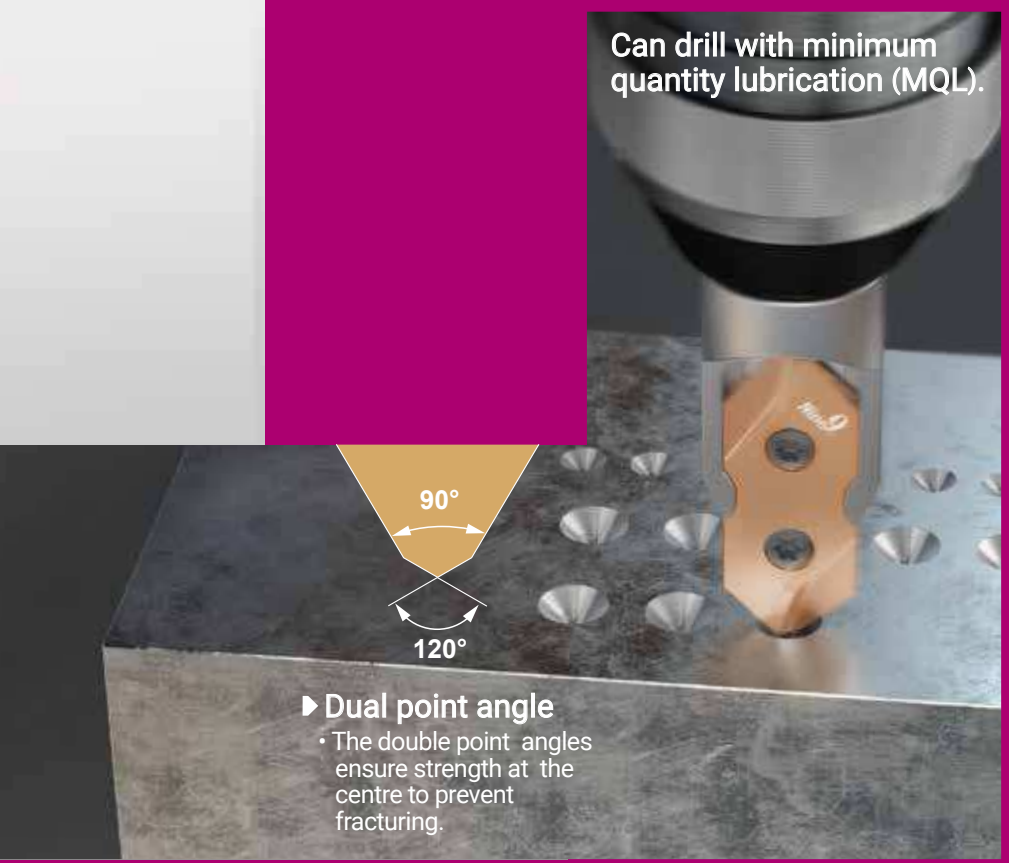
- For spotting before drilling by 135°~140° point angle high performance drill.

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

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

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

Applications



Internal Coolant

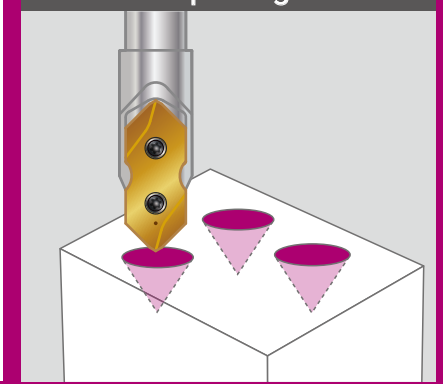


2-flutes Edged



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

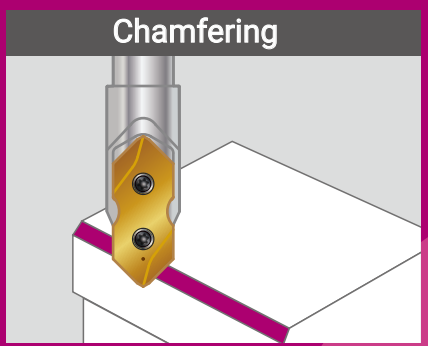
Spotting



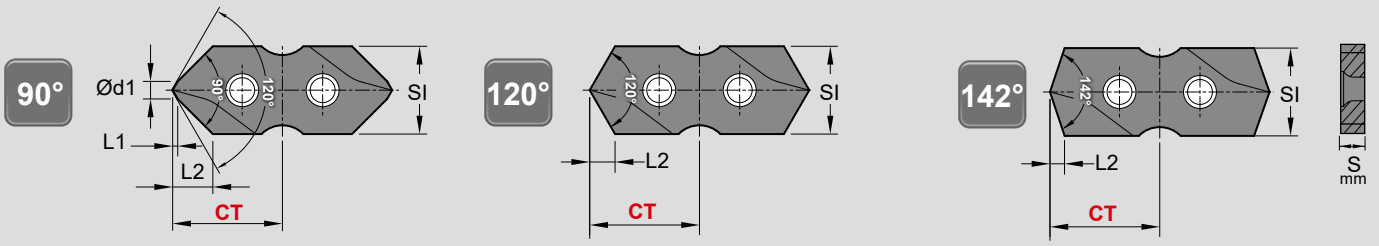
Countersink



Chamfering



Insert of ACE Spot Drill

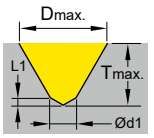


Inserts >>

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

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

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

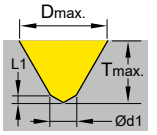


SI	Angle ±0.02"	Parts No.		Coating	Grade	Dimensions Ød1	Dimensions L1	Dimensions L2	Dmax.	Tmax.	S	CT ±0.025
06	90°	S9MT06T1-090	NC2057	AlTiN+TiSiN	P35	1.2 (0.047")	0.35 (0.014")	2.75 (0.108")	5.5 (0.217")	2.5 (0.098")	1.8 (0.071")	7.5 (0.295")
			NC5254	Helica								
			XP9000	Uncoated								
	120°	S9MT06T1-120	NC2057	AlTiN+TiSiN		-	-	1.73 (0.068")	5.5 (0.217")	1.6 (0.063")		
			NC5254	Helica								
			XP9000	Uncoated								
	142°	S9MT06T1-142	NC2057	AlTiN+TiSiN		-	-	1.03 (0.041")	5.5 (0.217")	0.95 (0.037")		7.0 (0.276")
			NC5254	Helica								
			XP9000	Uncoated								
08	90°	S9MT0802-090	NC2057	AlTiN+TiSiN	P35	1.6 (0.063")	0.46 (0.018")	3.6 (0.142")	7.5 (0.295")	3.4 (0.134")	2.4 (0.094")	10 (0.394")
			NC5254	Helica								
			XP9000	Uncoated								
	120°	S9MT0802-120	NC2057	AlTiN+TiSiN		-	-	2.3 (0.090")	7.5 (0.295")	2.2 (0.087")		
			NC5254	Helica								
			XP9000	Uncoated								
	142°	S9MT0802-142	NC2057	AlTiN+TiSiN		-	-	1.38 (0.054")	7.5 (0.295")	1.29 (0.051")		9 (0.354")
			NC5254	Helica								
			XP9000	Uncoated								

The quantity of insert per box.:

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

Insert of ACE Spot Drill



Inserts >>

SI	Angle ±0.02"	Parts No.		Coating	Grade	Dimensions			Dmax.	Tmax.	S	CT ±0.025
						Ød1	L1	L2				
10	90°	S9MT1003-090	NC2057	AlTiN+TiSiN	P35	2 (0.079")	0.58 (0.023")	4.6 (0.181")	9.5 (0.374")	4.4 (0.173")	3.0 (0.118")	12.50 (0.492")
			NC5254	Helica								
			XP9000	Uncoated								
	120°	S9MT1003-120	NC2057	AlTiN+TiSiN		-	-	2.9 (0.114")	9.5 (0.374")	2.7 (0.106")		
			NC5254	Helica								
			XP9000	Uncoated								
	142°	S9MT1003-142	NC2057	AlTiN+TiSiN		-	-	1.72 (0.068")	9.5 (0.374")	1.64 (0.065")		11.50 (0.453")
			NC5254	Helica								
			XP9000	Uncoated								
12	90°	S9MT1203-090	NC2057	AlTiN+TiSiN	P35	2.4 (0.094")	0.69 (0.027")	5.5 (0.217")	11.5 (0.453")	5.3 (0.209")	3.0 (0.118")	15 (0.059")
			NC5254	Helica								
			XP9000	Uncoated								
	120°	S9MT1203-120	NC2057	AlTiN+TiSiN		-	-	3.5 (0.138")	11.5 (0.453")	3.3 (0.130")		
			NC5254	Helica								
			XP9000	Uncoated								
	142°	S9MT1203-142	NC2057	AlTiN+TiSiN		-	-	2.07 (0.081")	11.5 (0.453")	1.98 (0.078")		13.5 (0.531")
			NC5254	Helica								
			XP9000	Uncoated								
16	90°	S9MT1603-090	NC2057	AlTiN+TiSiN	P35	3.2 (0.126")	0.92 (0.036")	7.3 (0.287")	15.5 (0.610")	7.0 (0.276")	3.18 (0.125")	20 (0.787")
			NC5254	Helica								
			XP9000	Uncoated								
	120°	S9MT1603-120	NC2057	AlTiN+TiSiN		-	-	4.6 (0.181")	15.5 (0.610")	4.4 (0.173")		
			NC5254	Helica								
			XP9000	Uncoated								
	142°	S9MT1603-142	NC2057	AlTiN+TiSiN		-	-	2.76 (0.109")	15.5 (0.610")	2.67 (0.105")		18 (0.709")
			NC5254	Helica								
			XP9000	Uncoated								
20	90°	S9MT2004-090	NC2057	AlTiN+TiSiN	P35	4.0 (0.157")	1.16 (0.046")	9.2 (0.362")	19.5 (0.768")	8.9 (0.350")	4.76 (0.187")	25 (0.984")
			NC5254	Helica								
			XP9000	Uncoated								
	120°	S9MT2004-120	NC2057	AlTiN+TiSiN		-	-	5.8 (0.228")	19.5 (0.768")	5.6 (0.220")		
			NC5254	Helica								
			XP9000	Uncoated								
	142°	S9MT2004-142	NC2057	AlTiN+TiSiN		-	-	3.44 (0.135")	19.5 (0.768")	3.36 (0.132")		22 (0.866")
			NC5254	Helica								
			XP9000	Uncoated								

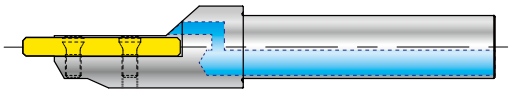
The quantity of insert per box.:

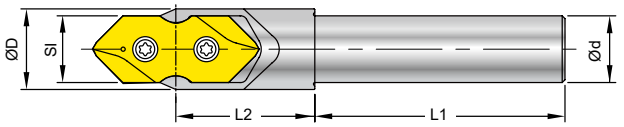
SI 06	SI 08	SI 10	SI 12	SI 16	SI 20
5 pcs	5 pcs	5 pcs	5 pcs	2 pcs	1 pcs

Holders of ACE Spot Drill



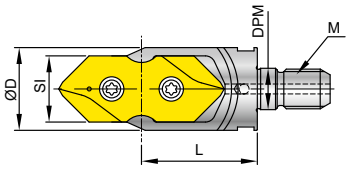
Cylindrical Shank >>





Sl	Parts No.	Ød	L1	L2	ØD	Screw	Key
06	99688-Sl06-06	6 (0.236")	27 (1.063")	14 (0.551")	8 (0.315")	NS-18037 / 0.6Nm	NK-T6
08	99688-Sl08-08	8 (0.315")	36 (1.417")	19 (0.748")	10.5 (0.413")	NS-20045 / 0.6Nm	NK-T6
10	99688-Sl10-10	10 (0.394")	40 (1.575")	22.5 (0.886")	13 (0.512")	NS-25060 / 0.9Nm	NK-T7
12	99688-Sl12-12	12 (0.472")	45 (1.772")	25 (0.984")	15.5 (0.610")	NS-30072 / 2.0Nm	NK-T9
16	99688-Sl16-16	16 (0.630")	48 (1.890")	32 (1.260")	21 (0.827")	NS-35080 / 2.5Nm	NK-T15
20	99688-Sl20-20	20 (0.787")	50 (1.969")	35 (1.378")	26 (1.024")	NS-50125 / 5.5Nm	NK-T20

Screw Fit Cutter >>

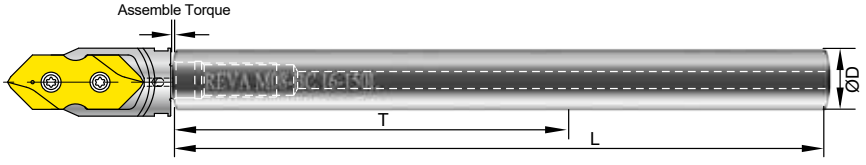


Sl	Parts No.	ØD	L	M	DPM	Screw	Key
06	99688-Sl06-M04	8 (0.315")	14.5 (0.571")	M4xP0.7	4.5 (0.177")	NS-18037 / 0.6Nm	NK-T6
08	99688-Sl08-M05	10 (0.394")	19 (0.748")	M5xP0.8	5.5 (0.217")	NS-20045 / 0.6Nm	NK-T6
10	99688-Sl10-M06	12 (0.472")	22 (0.866")	M6xP1.0	6.5 (0.256")	NS-25060 / 0.9Nm	NK-T7
12	99688-Sl12-M08	16 (0.630")	25 (0.984")	M8xP1.25	8.5 (0.335")	NS-30072 / 2.0Nm	NK-T9
16	99688-Sl16-M10	20 (0.787")	31 (1.220")	M10xP1.5	10.5 (0.413")	NS-35080 / 2.5Nm	NK-T15
20	99688-Sl20-M12	25 (0.984")	35 (1.378")	M12xP1.75	12.5 (0.492")	NS-50125 / 5.5Nm	NK-T20

Extension Bar >>

Solid Carbide Type >>

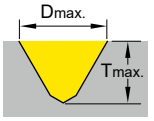
• With internal coolant hole.



Part No.	Type	Ød	T	L	M	Assemble Torque
99801-08W	BC08-075M04W	8 (0.315")	25 (0.984")	75 (2.953")	M4xP0.7	3.5 Nm
99801-10W	BC10-100M05W	10 (0.394")	50 (1.969")	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

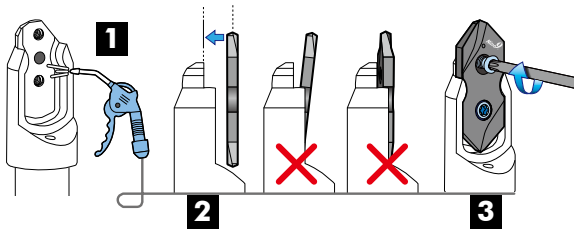
Tips: One holder supports different angle inserts.



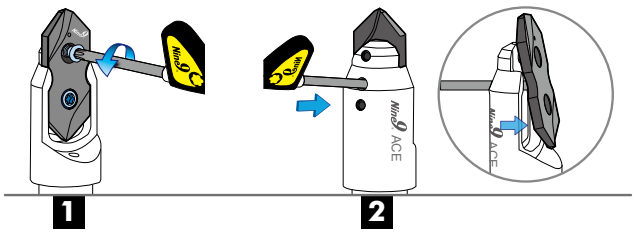


Holder	99688-SI06			99688-SI08			99688-SI10			99688-SI12			99688-SI16			99688-SI20		
Insert Spec.	S9MT06T1			S9MT0802			S9MT1003			S9MT1203			S9MT1603			S9MT2004		
Angle	90°	120°	142°	90°	120°	142°	90°	120°	142°	90°	120°	142°	90°	120°	142°	90°	120°	142°
																		
Dmax.	5.5 (0.217")			7.5 (0.295")			9.5 (0.374")			11.5 (0.453")			15.5 (0.610")			19.5 (0.768")		
Tmax.	2.5 (0.098")	1.6 (0.063")	0.95 (0.037")	3.4 (0.134")	2.2 (0.087")	1.29 (0.051")	4.4 (0.173")	2.7 (0.106")	1.64 (0.065")	5.3 (0.209")	3.3 (0.130")	1.98 (0.078")	7.0 (0.276")	4.4 (0.173")	2.67 (0.105")	8.9 (0.350")	5.6 (0.220")	3.36 (0.132")

Clamping insert



Loosen insert



Cutting data see next page. Calculate spindle speed and feed rate

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

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

Cutting Data

SI06- S9MT06T1

Workpiece Material		SFM	IPR (inch/rev.)			Grade of insert
			90°	120°	142°	
P	Carbon steel C<0.3%	390 ~ 820	0.0008” ~ 0.0031”	0.0008” ~ 0.0039”	0.0008” ~ 0.0039”	NC5254
P	Carbon steel C>0.3%	330 ~ 720				NC2057
P	Low alloy steel C<0.3%	330 ~ 660	0.0008” ~ 0.0028”	0.0008” ~ 0.0031”	0.0008” ~ 0.0031”	NC5254
P	High alloy steel	265 ~ 590	0.0008” ~ 0.0024”	0.0008” ~ 0.0028”	0.0008” ~ 0.0028”	NC2057
M	Stainless steel	100 ~ 265	0.0004” ~ 0.0012”	0.0004” ~ 0.0012”	0.0004” ~ 0.0012”	NC5254
K	Cast iron	265 ~ 590	0.0008” ~ 0.0031”	0.0008” ~ 0.0039”	0.0008” ~ 0.0039”	NC2057
N	Non-ferrous metal	500 ~ 985	0.0012” ~ 0.0039”	0.0012” ~ 0.0047”	0.0012” ~ 0.0047”	XP9000

SI08 - S9MT0802

Workpiece Material		SFM	IPR (inch/rev.)			Grade of insert
			90°	120°	142°	
P	Carbon steel C<0.3%	390 ~ 820	0.0012” ~ 0.0039”	0.0012” ~ 0.0047”	0.0012” ~ 0.0047”	NC5254
P	Carbon steel C>0.3%	330 ~ 720				NC2057
P	Low alloy steel C<0.3%	330 ~ 660	0.0012” ~ 0.0031”	0.0012” ~ 0.0039”	0.0012” ~ 0.0039”	NC5254
P	High alloy steel	265 ~ 590	0.0012” ~ 0.0028”	0.0012” ~ 0.0031”	0.0012” ~ 0.0031”	NC2057
M	Stainless steel	100 ~ 265	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	NC5254
K	Cast iron	265 ~ 590	0.0012” ~ 0.0039”	0.0012” ~ 0.0047”	0.0012” ~ 0.0047”	NC2057
N	Non-ferrous metal	500 ~ 985	0.0012” ~ 0.0047”	0.0012” ~ 0.0059”	0.0012” ~ 0.0059”	XP9000

SI10 - S9MT1003

Workpiece Material		SFM	IPR (inch/rev.)			Grade of insert
			90°	120°	142°	
P	Carbon steel C<0.3%	390 ~ 820	0.0016” ~ 0.0059”	0.0020” ~ 0.0079”	0.0020” ~ 0.0079”	NC5254
P	Carbon steel C>0.3%	330 ~ 720				NC2057
P	Low alloy steel C<0.3%	330 ~ 660	0.0012” ~ 0.0047”	0.0020” ~ 0.0059”	0.0020” ~ 0.0059”	NC5254
P	High alloy steel	265 ~ 590	0.0012” ~ 0.0039”	0.0016” ~ 0.0047”	0.0016” ~ 0.0047”	NC2057
M	Stainless steel	100 ~ 265	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	NC5254
K	Cast iron	265 ~ 590	0.0012” ~ 0.0047”	0.0020” ~ 0.0059”	0.0020” ~ 0.0059”	NC2057
N	Non-ferrous metal	500 ~ 985	0.0016” ~ 0.0079”	0.0020” ~ 0.0098”	0.0020” ~ 0.0098”	XP9000

Cutting Data

SI12 - S9MT1203

	Workpiece Material	SFM	IPR (inch/rev.)			Grade of insert
			90°	120°	142°	
P	Carbon steel C<0.3%	390 ~ 820	0.0020” ~ 0.0080”	0.0024” ~ 0.0098”	0.0024” ~ 0.0098”	NC5254
P	Carbon steel C>0.3%	330 ~ 720				NC2057
P	Low alloy steel C<0.3%	330 ~ 660	0.0016” ~ 0.0059”	0.0020” ~ 0.0080”	0.0020” ~ 0.0079”	NC5254
P	High alloy steel	265 ~ 590	0.0016” ~ 0.0047”	0.0020” ~ 0.0063”	0.0020” ~ 0.0063”	NC2057
M	Stainless steel	100 ~ 265	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	NC5254
K	Cast iron	265 ~ 590	0.0016” ~ 0.0059”	0.0020” ~ 0.0080”	0.0020” ~ 0.0080”	NC2057
N	Non-ferrous metal	500 ~ 985	0.0020” ~ 0.0087”	0.0024” ~ 0.0098”	0.0024” ~ 0.0098”	XP9000

SI16 - S9MT1603

	Workpiece Material	SFM	IPR (inch/rev.)			Grade of insert
			90°	120°	142°	
P	Carbon steel C<0.3%	390 ~ 820	0.0020” ~ 0.0079”	0.0024” ~ 0.0098”	0.0024” ~ 0.0098”	NC5254
P	Carbon steel C>0.3%	330 ~ 720				NC2057
P	Low alloy steel C<0.3%	330 ~ 660	0.0016” ~ 0.0060”	0.0020” ~ 0.0079”	0.0020” ~ 0.0079”	NC5254
P	High alloy steel	265 ~ 590	0.0016” ~ 0.0047”	0.0020” ~ 0.0063”	0.0020” ~ 0.0063”	NC2057
M	Stainless steel	100 ~ 265	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	NC5254
K	Cast iron	265 ~ 590	0.0016” ~ 0.0060”	0.0020” ~ 0.0079”	0.0020” ~ 0.0079”	NC2057
N	Non-ferrous metal	500 ~ 985	0.0020” ~ 0.0098”	0.0024” ~ 0.0098”	0.0024” ~ 0.0098”	XP9000

SI20 - S9MT2004

	Workpiece Material	SFM	IPR (inch/rev.)			Grade of insert
			90°	120°	142°	
P	Carbon steel C<0.3%	390 ~ 820	0.0020” ~ 0.0098”	0.0024” ~ 0.0118”	0.0024” ~ 0.0118”	NC5254
P	Carbon steel C>0.3%	330 ~ 720				NC2057
P	Low alloy steel C<0.3%	330 ~ 660	0.0016” ~ 0.0079”	0.0020” ~ 0.0098”	0.0020” ~ 0.0098”	NC5254
P	High alloy steel	265 ~ 590	0.0016” ~ 0.0060”	0.0020” ~ 0.0079”	0.0020” ~ 0.0079”	NC2057
M	Stainless steel	100 ~ 265	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	0.0004” ~ 0.0016”	NC5254
K	Cast iron	265 ~ 590	0.0016” ~ 0.0079”	0.0020” ~ 0.0098”	0.0020” ~ 0.0098”	NC2057
N	Non-ferrous metal	500 ~ 985	0.0020” ~ 0.0118”	0.0024” ~ 0.0118”	0.0024” ~ 0.0118”	XP9000

Micro Spot Drill ››

90° / 120° / 142°

0.1 & 0.2mm (0.0039" & 0.0079")

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

P M K N H

MCC Minimum Consumable Cutting Indicator 5%



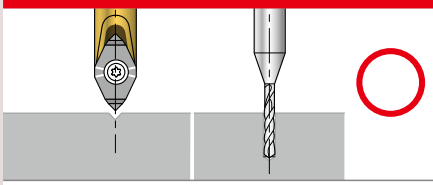
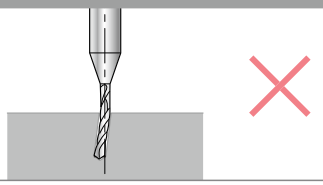
◗ One Holder Supports The Entire X060 Series Insert.



Features >

◗ Each Insert Has 2 Cutting Edges.

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

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

0.0039” & 0.0079” Micro Spot Drill 90°, 120° & 142°

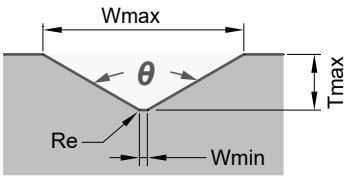


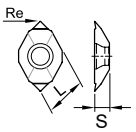
Inserts >>

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

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

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

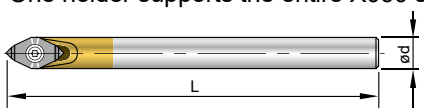


Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
90°	X060A90W010R	NC2032	TiAlN	K20F		6 (0.236”)	2.05 (0.081”)	0.02 (0.0008”)	0.1 (0.004”)	1.1 (0.043”)	0.5 (0.020”)
		NC2035	ALDURA								
		XP9001	Uncoated								
90°	*X060A90W020R	NC2032	TiAlN	K20F				0.04 (0.0015”)	0.2 (0.008”)	2.2 (0.087”)	1.0 (0.040”)
		NC2035	ALDURA								
		XP9001	Uncoated								
NEW 120°	X060A120W010R	NC2032	TiAlN	K20F				0.02 (0.0008”)	0.1 (0.004”)	2.53 (0.100”)	0.7 (0.028”)
NEW 142°	X060A142W010R	NC2032	TiAlN	K20F				0.02 (0.0008”)	0.1 (0.004”)	2.42 (0.095”)	0.4 (0.016”)

* X060A90W020R is also good for engraving.

Holder >>

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





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		60 (2.362”)		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937”)		
NEW 99619-X060-08	Steel	8 (0.315”)	60 (2.362”)		

Cutting Data >>

Workpiece Material	S (r.p.m)	IPR (inch/rev.) X060A90W010R	IPR (inch/rev.) X060A90W020R	IPR (inch/rev.) X060A120W010R X060A142W010R	Grade of Insert
P Carbon steel	8000 ~ 40000	0.00008 ~ 0.0005	0.00008 ~ 0.0006	0.00008 ~ 0.0006	NC2032
P Alloy steel		0.00008 ~ 0.0004	0.00008 ~ 0.0004	0.00008 ~ 0.0004	NC2032, NC2035
M Stainless steel		0.00008 ~ 0.0003	0.00008 ~ 0.0004	0.00008 ~ 0.0004	NC2032
K Cast iron		0.00008 ~ 0.0004	0.00008 ~ 0.0004	0.00008 ~ 0.0004	NC2032
N Non-ferrous metal		0.00008 ~ 0.0006	0.00008 ~ 0.0008	-	XP9001
H Hardened steel < HRC50		0.00008 ~ 0.0002	0.00008 ~ 0.0002	-	NC2035

NC Spot Drill >>>

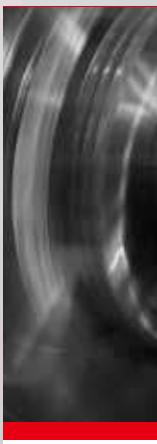
No Need To Choose, Nine9 Does It All!

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

P M K N S H

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

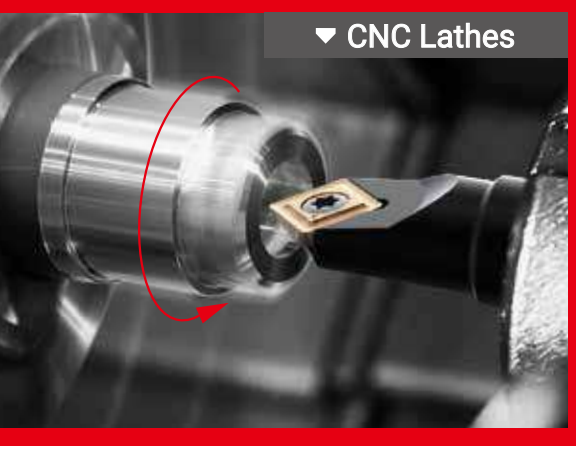




Features >>>

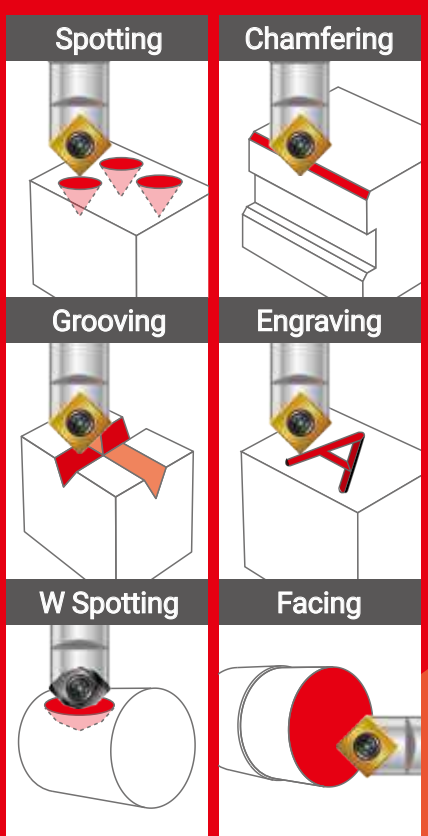
- **Spotting Produces Better Hole Position And Geometrically Uniform Holes.**
- **Available Shank Diameter- Ø5, Ø6, Ø8, Ø10, Ø12, Ø16, Ø20, Ø25mm, Ø1/4", Ø3/8", Ø1/2", Ø5/8", Ø3/4", Ø1", M5, M6 And M8.**
- **60° / 82° / 90° / 100° / 142° / 145° Angle For Different Applications.**
  - Suitable for spotting,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

Applications





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



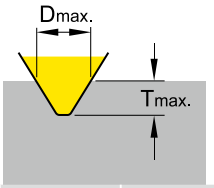
60° N9MT11T3P60

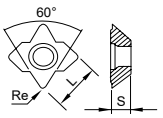


Inserts >>

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

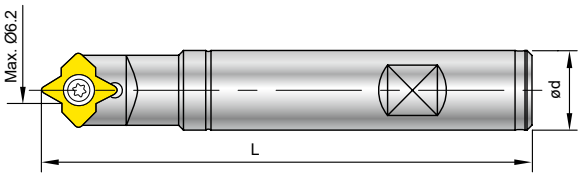
NC40: • Universal grade for all unhardened steel and cast iron.
• Each insert has 2 cutting edges.



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.



Ø16



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



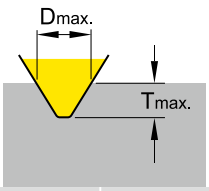
Inserts >>

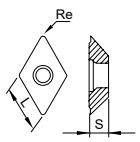
- 60 degree indexable spotting insert, Dmax 13mm.
- Special geometry with supporting edges for using in high speed machining.
- Excellent tool for grooving. Saving machining time!

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

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

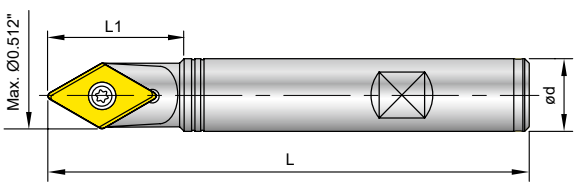
NC9076: • For non-ferrous material such as aluminum, al-alloy, titanium, brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



Parts No.		Coating	Grade		Dimensions			Dmax.	Tmax.
					L	S	Re		
V9MT0802CT	NC5071	TiAlN & TiN	K20F		8 (0.315")	2.38 (0.094")	0.4 (0.016")	9 (0.354")	7.3 (0.287")
	NC2071	TiN							
	NC9076	DLC							
V9MT12T3CT	NC5071	TiAlN & TiN	K20F		12.7 (0.5")	3.97 (0.156")	0.8 (0.031")	13 (0.512")	10.3 (0.405")
	NC2071	TiN							
	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.



Ø8 (0.315")

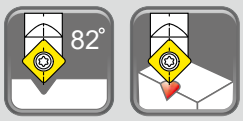


Ø5/8"



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



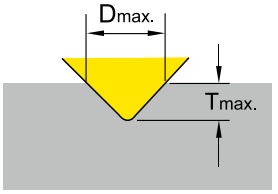
Inserts >>

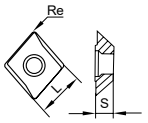
- 82 degree indexable spotting insert, Dmax. 14mm (0.551”).
- Match the geometry of Amercian standard flat head screw hole.
- Special geometry with supporting edges for high speed machining.

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

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

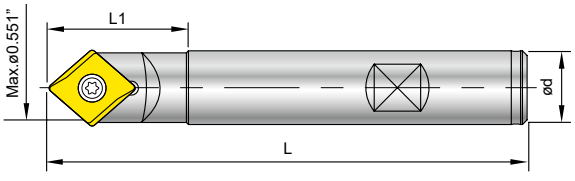
NC9076: • For non-ferrous material such as aluminum, al-alloy, titanium, brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
V0820802	NC5071	TiAlN & TiN	K20F		8 (0.315”)	2.38 (0.094”)	0.4 (0.016”)	9 (0.354”)	4.8 (0.189”)
	NC2071	TiN							
	NC9076	DLC							
V08212T3	NC5071	TiAlN & TiN	K20F		12.7 (0.5”)	3.97 (0.156”)	0.8 (0.031”)	14 (0.551”)	7.5 (0.295”)
	NC2071	TiN							
	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.



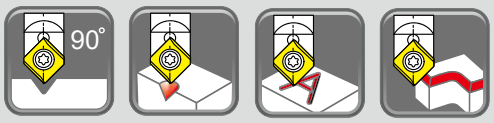
Ø3/8”



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



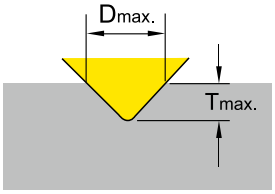
Inserts >>

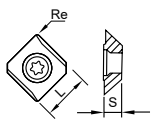
- Mini spotting drill with indexable insert, low cutting power required.
- Especially good for Swiss type automatic lathes and CNC lathes.

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

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

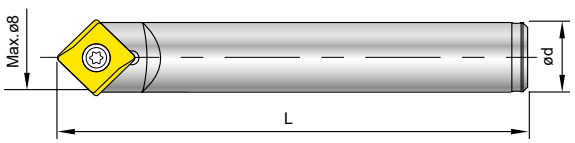
NC9076: • For non-ferrous material such as aluminum, titanium, brass, copper and stainless steel.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.

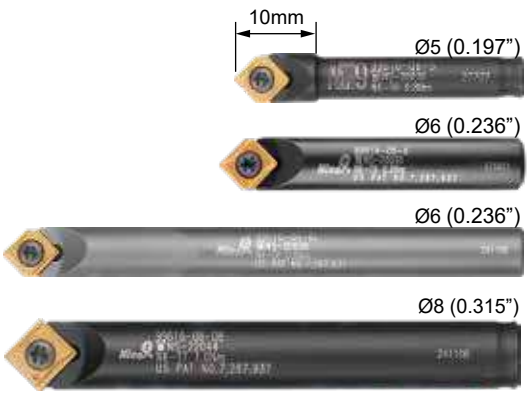


Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT05T1CT	NC5071	TiAlN & TiN	K20F		5 (0.197")	1.8 (0.071")	0.4 (0.016")	5.5 (0.217")	2.43 (0.096")
	NC2071	TiN							
	NC9076	DLC							
N9MT0602CT	NC5071	TiAlN & TiN	K20F		6.35 (0.250")	2.38 (0.094")	0.4 (0.016")	8 (0.315")	3.8 (0.150")
	NC2071	TiN							
	NC9076	DLC							

Holder >>

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





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.

90° N9MT0802



Inserts >>

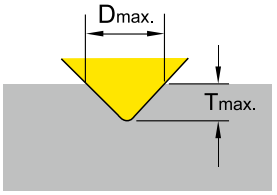
NC40: • General purpose, universal grade for all unhardened steel.
• Each insert has 4 cutting edges.

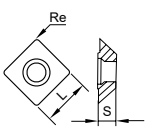
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.

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

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

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

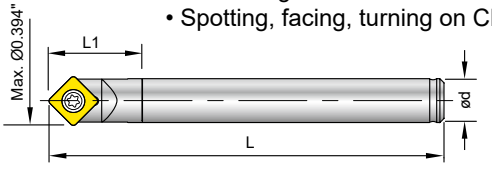


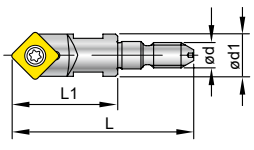
Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT080208CT	NC40	TiN	K20F		8.31 (0.327")	2.38 (0.094")	0.8 (0.031")	10 (0.394")	4.5 (0.177")
N9MT080204CT	NC40	TiN	K20F				0.4 (0.016")		
	NC10	TiAlN							
N9MT0802CT2T	H-NC5071	TiAlN & TiN	K20F				0.8 (0.031")		
	H-NC40	TiN							
	H-NC9076	DLC							

* H type is with supporting edge.

Holder >>

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





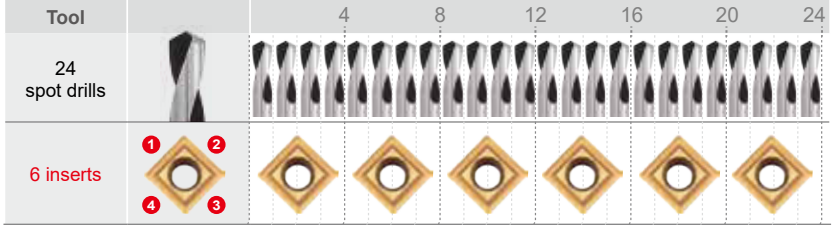


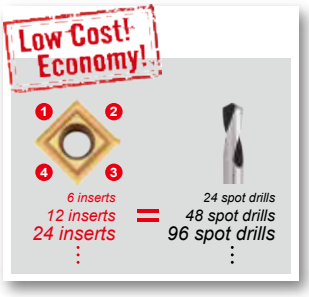


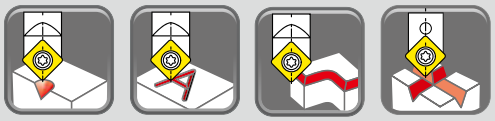
Parts No.	Ød	Ød1	L	L1	Screw	Key
99616-10	10 (0.394")	-	90 (3.543")	18.31 (0.720")	NS-30055 2.0 Nm	NK-T8
99616-3/8	3/8"	-	90 (3.543")	18.31 (0.720")		
99616-10-M6	M6	10 (0.394")	43 (1.693")	25.00 (0.984")		

Note: • Balanced type holder is on request. • Nine9 extension bar for M6 screw fit holder, see page 8-138.

Comparison >>







Inserts >>

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

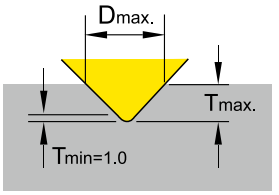
NC10: • High positive angle and fully ground cutting edge and relief angle.
• Universal grade for non-ferrous metal, cast iron and stainless steel.
• Each insert has 4 cutting edges.

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

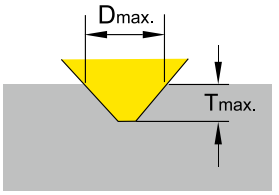
NEW H-NC5071: • For carbon steel C>0.3%, high alloy steel C>0.3% and cast iron.
• Each insert has 2 cutting edges.

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

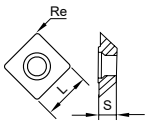
H-NC9076: • High positive geometry and sharp edge.
• For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.
• Produces excellent surface finish on non-ferrous metal.
• Each insert has 2 cutting edges.



NC40 / Wiper design / NC60



Other grade

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-NC5071	TiAlN & TiN	K20F						
	H-NC40	TiN	K20F				0.8 (0.031")		
	H-NC9076	DLC	K20F						

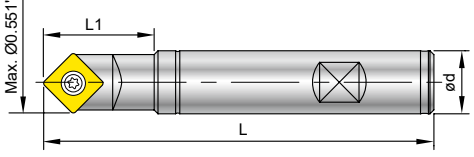
* H type is with supporting edge.

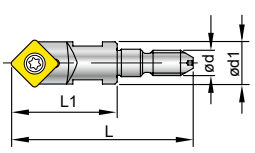
Holder >>

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





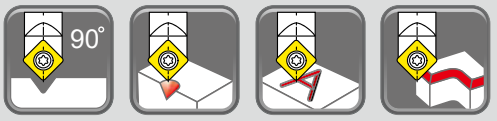




Parts No.	Ød	Ød1	L	L1	Screw	Key
99616-14-150L	16 (0.630")	-	150 (5.906")	29.03 (1.143")	NS-35080 2.5 Nm	NK-T15
99616-14-220L	20 (0.787")	-	220 (8.661")	28.03 (1.103")		
99616-14-1/2	1/2"	-	4"	28.03 (1.103")		
99616-14-5/8	5/8"	-	4"	28.03 (1.103")		
99616-14-M8	M8	14 (0.551")	48 (1.890")	30.00 (1.181")		

• Refer to Page 8-138 for extension bars.

90° N9MT1704



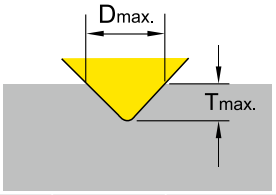
Inserts >>

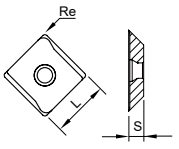
• 90 degree indexable spot drill insert, Dmax. 22mm.

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

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

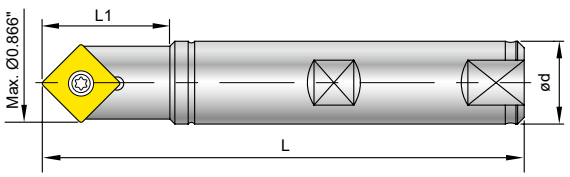
NC2071: • For carbon steel, low alloy steel, stainless steel, non-ferrous and titanium.
• Each insert has 2 cutting edges.



Parts No.		Coating	Grade		Dimensions			Dmax.	Tmax.
					L	S	Re		
N9MT1704CT	NC5071	TiAlN & TiN	K20F		17 (0.669")	4.76 (0.187")	1.2 (0.047")	22 (0.866")	10.4 (0.409")
	NC9036	DLC	K20F						
	NC2071	TiN	K20F						

Holder >>

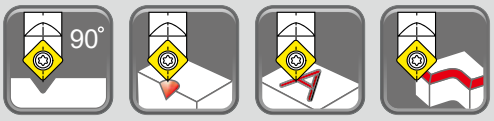
• 90 degree spotting drill with indexable insert.
• Spotting produces better hole positioning and geometrically uniform holes.
• Applications : • Spotting, engraving, grooving and chamfering on milling machines, machining centers.
• Spotting, facing on CNC Lathes.



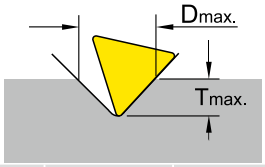
Ø3/4", Ø1"



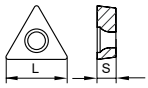
Parts No.	Ød	L	L1	Screw	Key
99616-22-3/4	3/4"	4"	35 (1.378")	NS-50125 5.5 Nm	NK-T20
99616-22-1	1"	6"	34 (1.339")		



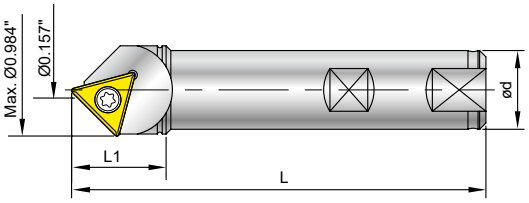
N9MT220408



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

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

* 5 pcs per box.



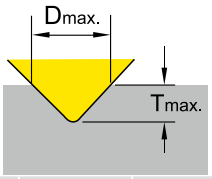


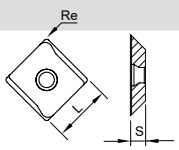
Parts No.	Ød	L	L1	Screw	Key
99616-1-CT28	1"	120 (4.72")	30 (1.181")	NS-40100 3.5Nm	NK-T15

N9MT2506 >> NEW

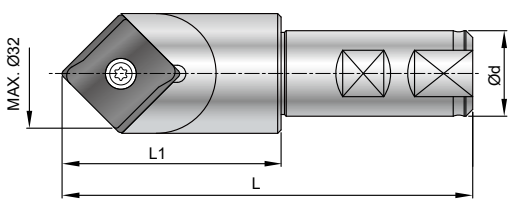
NC2033:
- For carbon steel, alloy steel, high alloy steel, cast iron and hardened steel < 50 HRC.
- Each insert has 2 cutting edges.

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



Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
N9MT2506CT	NC2033	TiAlN	K20F		25 (0.984")	6.35 (0.250")	1.2 (0.047")	32 (1.260")	15.4 (0.606")
	XP9000	Uncoated							

* 2 pcs per box.

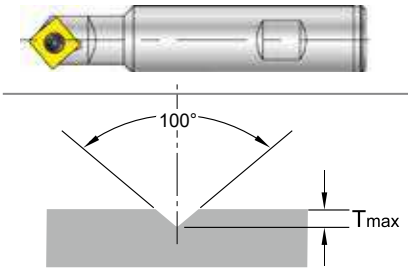
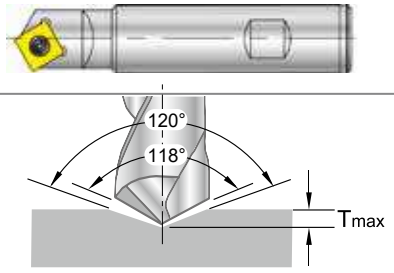
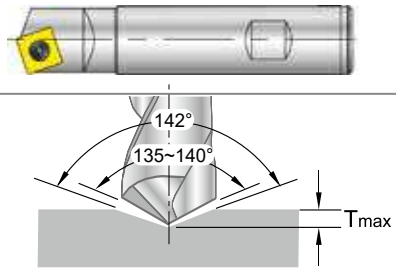




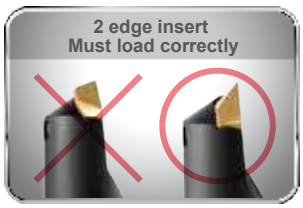
Parts No.	Ød	L	L1	Screw	Key
99616-32-25	25 (0.984")	120 (4.724")	64 (2.520")	NS-60180 5.5 Nm	NK-UT25
99616-32-1	1"				

N9MT11T3CT2T-H



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.

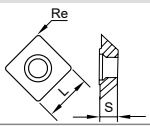
Inserts >>



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

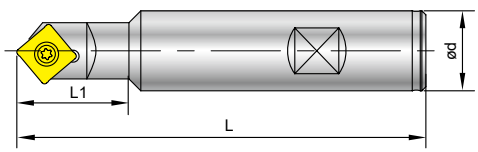
H-NC40:
- K20F grade, TiN coated.
- General purpose for all kinds of steel and cast iron.
- Each insert has 2 cutting edges.

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.

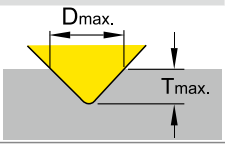
Parts No.		Coating	Grade		Dimensions		
					L	S	Re
N9MT11T3CT2T	H-NC40	TiN	K20F		11.11 (0.437")	3.97 (0.156")	0.8 (0.031")
	H-NC9076	DLC					

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.





Parts No.	Angle	Ød	L	L1	Screw / Key	Dmax.	Tmax.	
99616-20-100	100°	20 (0.787")	4"	31 (1.220")	NS-35080 2.5 Nm / NK-T15	16 (0.630")	6.3 (0.248")	
99616-3/4-120	120°	3/4"		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")	

V14208 / V14216

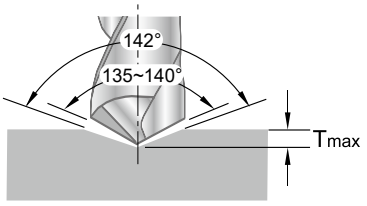
142°

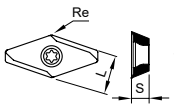


Inserts >>

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

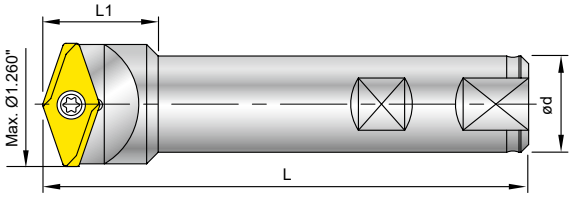
NC2071:
- High positive geometry, fully ground cutting edge and relief angle.
- Universal grade for all unhardened steel and cast iron.
- Each insert has 2 cutting edges.



Parts No.	Coating	Grade		Dimensions			Dmax.	Tmax.
				L	S	Re		
V1420803-NC2071	TiN	K20F		8 (0.315”)	3.18 (0.125”)	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 >>

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



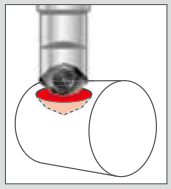


Parts No.	Ød	L	L1	Insert Type	Screw	Key
99619-V142-5/8	5/8”	4”	25 (0.984”)	V1420803-NC2071	NS-30072 2.0 Nm	NK-T9
99619-V142-1.000	1”	4.75”	30 (1.181”)	V1421604-NC2071	NS-50125 5.5 Nm	NK-T20

145°
+
90°

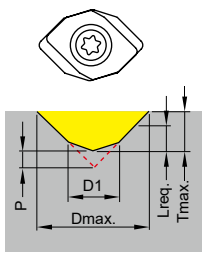
WSP Spotting Combined spotting and chamfering 145° + 90°





Inserts >>

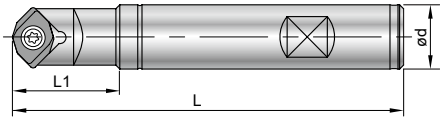
NC2033: • Fully ground cutting edge and relief angle.
• Universal grade for steel, cast iron and hardened steel < 50 HRC.
• Each insert has 2 cutting edges.

Parts No.	Coating	Grade		Thread Size	*D1±0.05 (±0.002")	P	Dmax.	Tmax.
N9MT0802M04C-NC2033	TiAlN	K20F		M4	3.30 (0.130")	1.17 (0.046")	8 (0.315")	2.83 (0.111")
N9MT0802M05C-NC2033				M5	4.20 (0.165")	1.48 (0.058")		2.52 (0.099")
N9MT0802M06C-NC2033				M6	5.00 (0.197")	1.76 (0.069")		2.24 (0.088")
N9MT11T3M08C-NC2033	TiAlN	K20F		M8	6.80 (0.266")	2.39 (0.094")	13 (0.512")	4.11 (0.162")
N9MT11T3M10C-NC2033				M10	8.50 (0.335")	2.97 (0.117")		3.53 (0.139")
N9MT11T3UNC25-NC2033	TiAlN	K20F		1/4	5.08 (0.200")	1.80 (0.171")	13 (0.512")	4.70 (0.185")
N9MT11T3UNC31-NC2033				5/16	6.53 (0.257")	2.30 (0.091")		4.20 (0.165")
N9MT11T3UNC38-NC2033				3/8	7.94 (0.313")	2.78 (0.109")		3.72 (0.146")
N9MT1704M12C-NC2033	TiAlN	K20F		M12	10.25 (0.404")	3.59 (0.141")	20 (0.787")	6.61(0.260")
N9MT1704M14C-NC2033				M14	12.00 (0.472")	4.19 (0.165")		5.87(0.231")
N9MT1704M16C-NC2033				M16	14.00 (0.551")	4.88 (0.192")		5.11(0.201")

Note: *D1 refer to the Tap Pre-drilling sizes. / Lreq : please see page 2-48 for details.

Holder >>

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



Ø10 Ø3/8"



Ø16 Ø5/8"



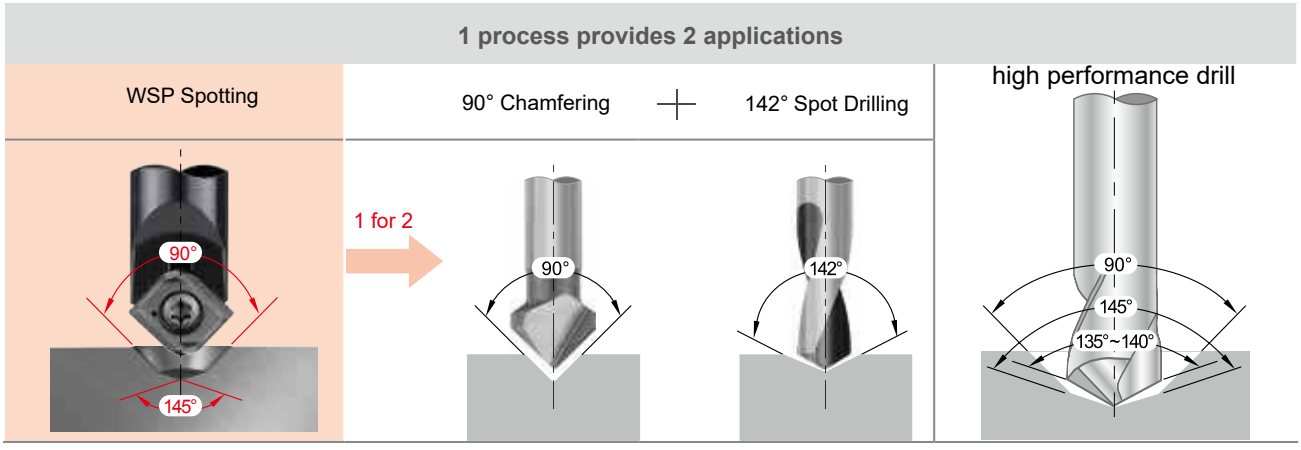
Ø20 Ø3/4"



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

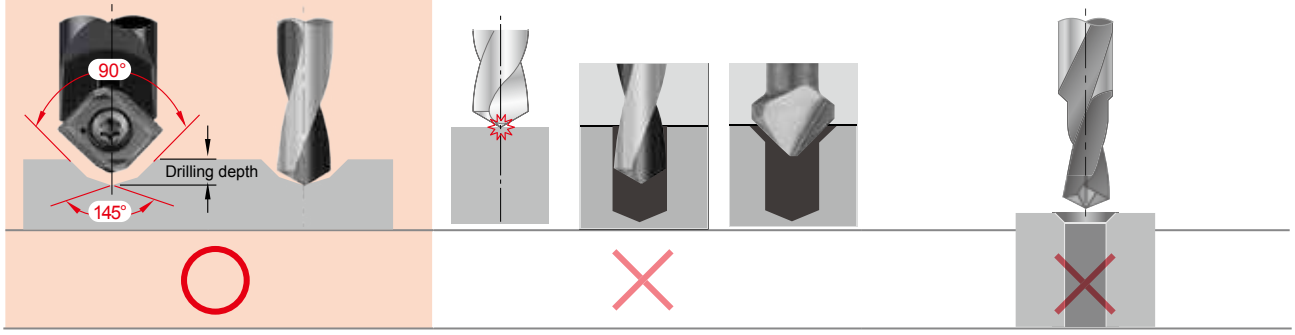
Combined spotting and chamfering 145° + 90° >>

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



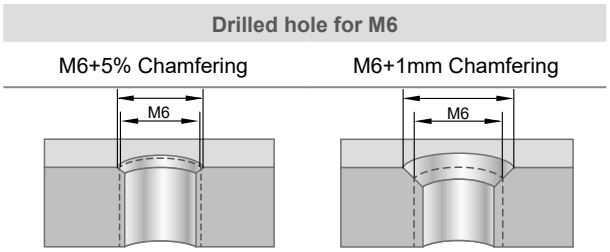
Comparison >>

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



Example >>

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



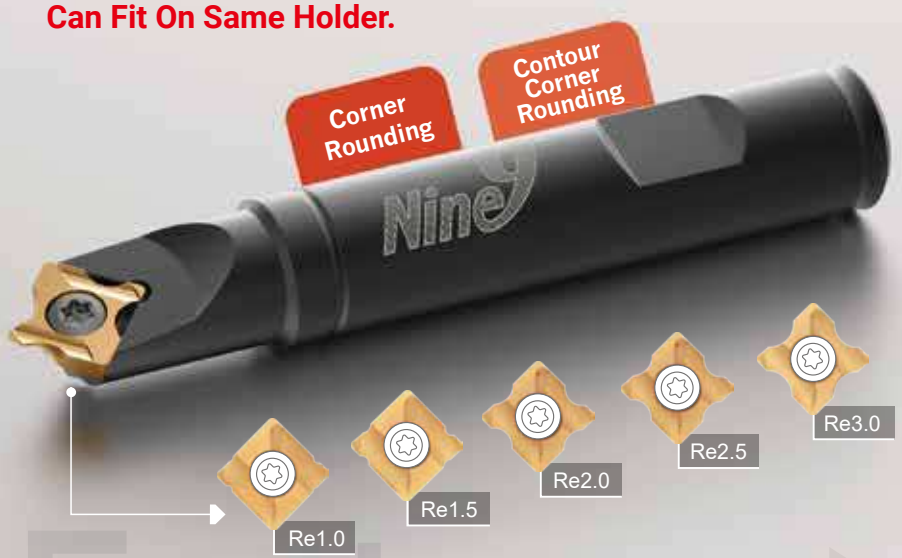
Corner Rounding

Type of RC / Radius 0.5 ~10mm

Produces smooth and excellent surface finish on workpiece.

P M K N S

Various Corner Radius Inserts Can Fit On Same Holder.





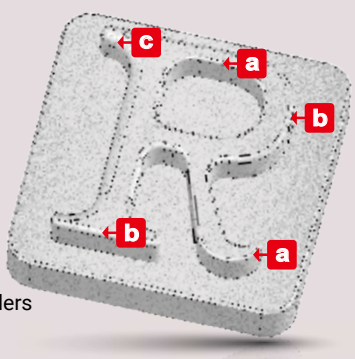
Features

Each Insert Has 2 Cutting Edges

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

Example

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





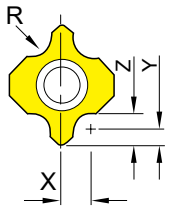
RC0.5 ~ RC1.0

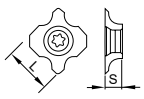
Inserts >>

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

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

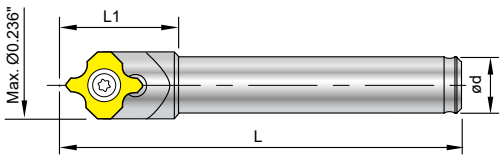
NC9036:
- For non-ferrous material such as aluminum, acrylic, titanium, brass, copper and stainless steel.
- High positive geometry and sharp edge produces excellent surface finish.
- Each insert has 2 cutting edges.



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*** basic holder.





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



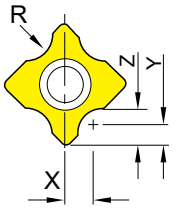
RC1.0 ~ RC3.0

Inserts >>

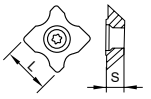
- Combination corner rounding and 45° chamfering application on same insert.
- Each insert has 2 cutting edges.

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

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

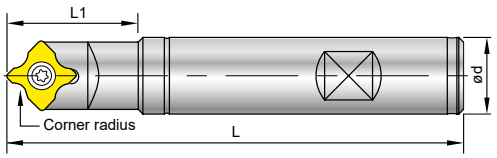


Insert Radius	Parts No.		Coating	Grade	offset X	offset Y	offset Z		Dimensions L	Dimensions S
1.0	N9MT11T3RC10	NC40	TiN	K20F	2.75 (0.108")	1.5 (0.059")	2.5 (0.098")		11.11 (0.433")	3.97 (0.156")
		NC9036	DLC							
1.5	N9MT11T3RC15	NC40	TiN	K20F	3.25 (0.128")	1.5 (0.059")	3 (0.118")			
		NC9036	DLC							
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.



Ø1/2", Ø5/8"



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"				

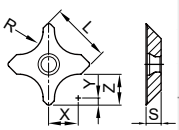
* additional holder found on page 2-31.



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

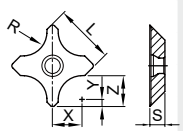
N9MT1704RC >>

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

Corner radius(R)	Parts No.		Coating	Grade	offset X	offset Y	offset Z		Dimensions L	Dimensions 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							

N9MT2506RC >> NEW

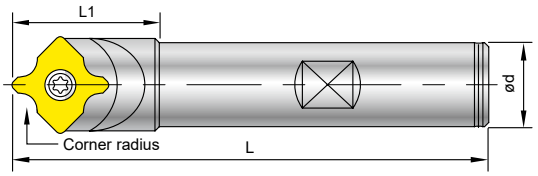
NC2033: • For carbon steel, alloy steel, high alloy steel, cast iron and hardened steel < 50 HRC.
XP9000: • High positive geometry and sharp edge produces excellent surface finish.
• For non-ferrous material such as aluminum, titanium, brass, copper and long cutting chip metal.

Corner Radius(R)	Parts No.		Coating	Grade	offset X	offset Y	offset Z		Dimensions L	Dimensions S
7.0	N9MT2506RC70	NC2033	TiAlN	K20F	9.5 (0.374")	3 (0.118")	10 (0.394")		25 (0.984")	6.35 (0.250")
		XP9000	Uncoated							
8.0	N9MT2506RC80	NC2033	TiAlN	K20F	10.5 (0.413")	3 (0.118")	11 (0.433")			
		XP9000	Uncoated							
9.0	N9MT2506RC90	NC2033	TiAlN	K20F	11.5 (0.4523")	3 (0.118")	12 (0.472")			
		XP9000	Uncoated							
10.0	N9MT2506RC100	NC2033	TiAlN	K20F	12.5 (0.492")	3 (0.118")	13 (0.512")			
		XP9000	Uncoated							
5/16	N9MT2506RC5/16	NC2033	TiAlN	K20F	0.411"	0.118"	0.430"			
		XP9000	Uncoated							
3/8	N9MT2506RC3/8	NC2033	TiAlN	K20F	0.474"	0.118"	0.493"			
		XP9000	Uncoated							

* 2 pcs per box.

Holder >>

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



99616-32-XX



Parts No.	Ød	L	L1	ØD	Insert Type	Screw	Key
99616-22-3/4	3/4"	4"	34 (1.339")	23.25 (0.915")	N9MT1704	NS-50125 5.5 Nm	NK-T20
99616-22-1	1"	6"					
99616-32-25	25	120 (4.724")	64 (2.520")	32.56 (1.282")	N9MT2506	NS-60180 5.5 Nm	NK-UT25
99616-32-1	1"						

Corner Rounding

Type of R / Radius 1.0~3.0mm

Produces smooth and excellent surface finish on workpiece.

P K

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





Features

Each Insert Has 4 Cutting Edges

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



N9MT11T3R

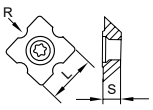


R1.0~R3.0

Inserts >>

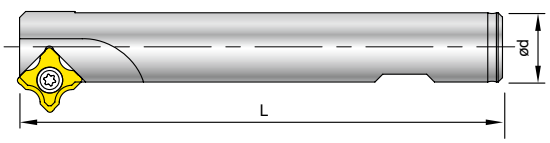
- For front and back corner rounding.
- Various corner radius inserts can fit on same holder.
- Coated carbide inserts for excellent tool life.
- Each insert has 4 cutting edges.

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

Corner radius(R)	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 2-45)

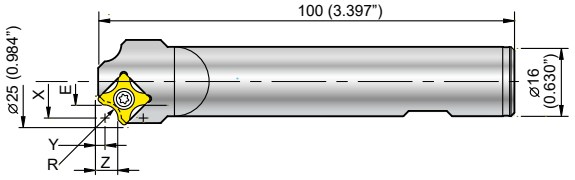
R N9MT11T3R



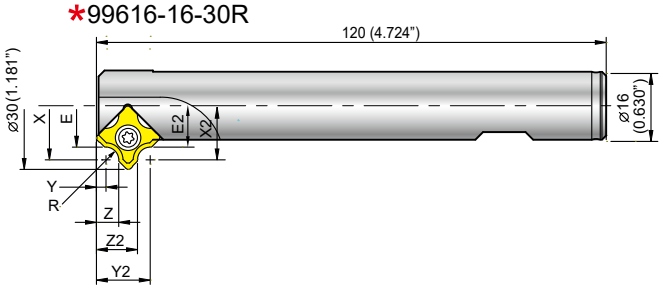


Cutting Position >>

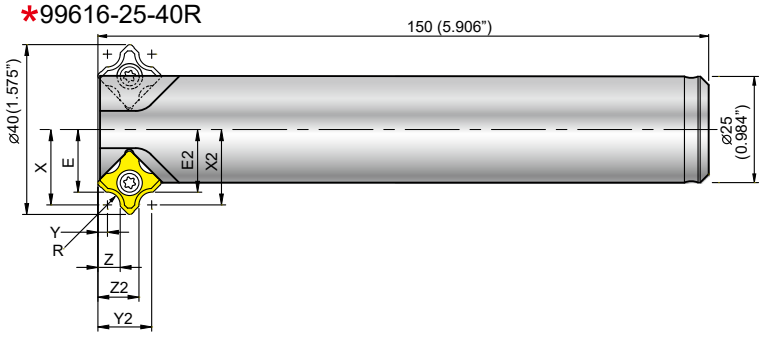
99616-16-25R



*99616-16-30R



*99616-25-40R



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

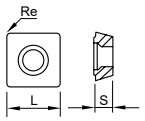
Corner Radius	Holder	Ød	Front Chamfering				Back Chamfering				Z
			E	X	Y	Z	E2	X2	Y2	Z2	
R1.0	99616-16-25R	16 (0.630")	8.25 (0.325")	9.25 (0.364")	3.25 (0.128")	4.25 (0.167")	---	---	---	---	1
	99616-16-30R		10.75 (0.423")	11.75 (0.463")			10.75 (0.423")	11.75 (0.463")	11.65 (0.459")	10.65 (0.419")	1
	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 2-45)

N9MT11T308LA 45° Chamfering Tool

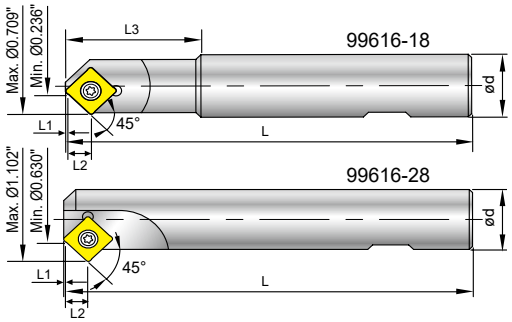
Inserts >>

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

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.

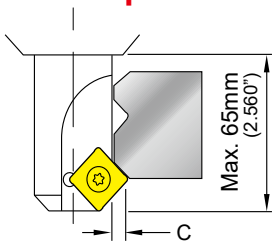




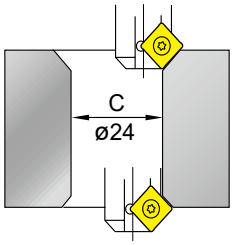


Parts No.	Chamfering	Ød	L	L1	L2	L3	Z	Insert type	Screw / Key
99616-18	Ø6-Ø18 (Ø0.236" ~ Ø0.709")	20 (0.787")	120 (4.724")	1.15 (0.045")	7.55 (0.297")	40 (1.632")	1	N9MT11T308LA	NS-35080 2.5 Nm / NK-T15
99616-28	Ø16-Ø28 (Ø0.630" ~ Ø1.102")	20 (0.787")	120 (4.724")	1.15 (0.045")	7.55 (0.297")	--			

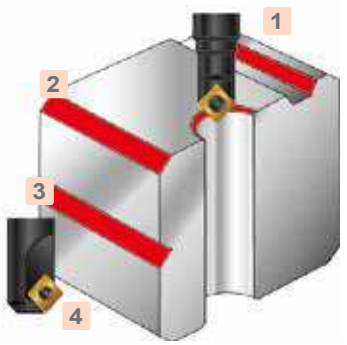
Example >>



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



Min.diameter for shift
Ø24mm. (0.945")



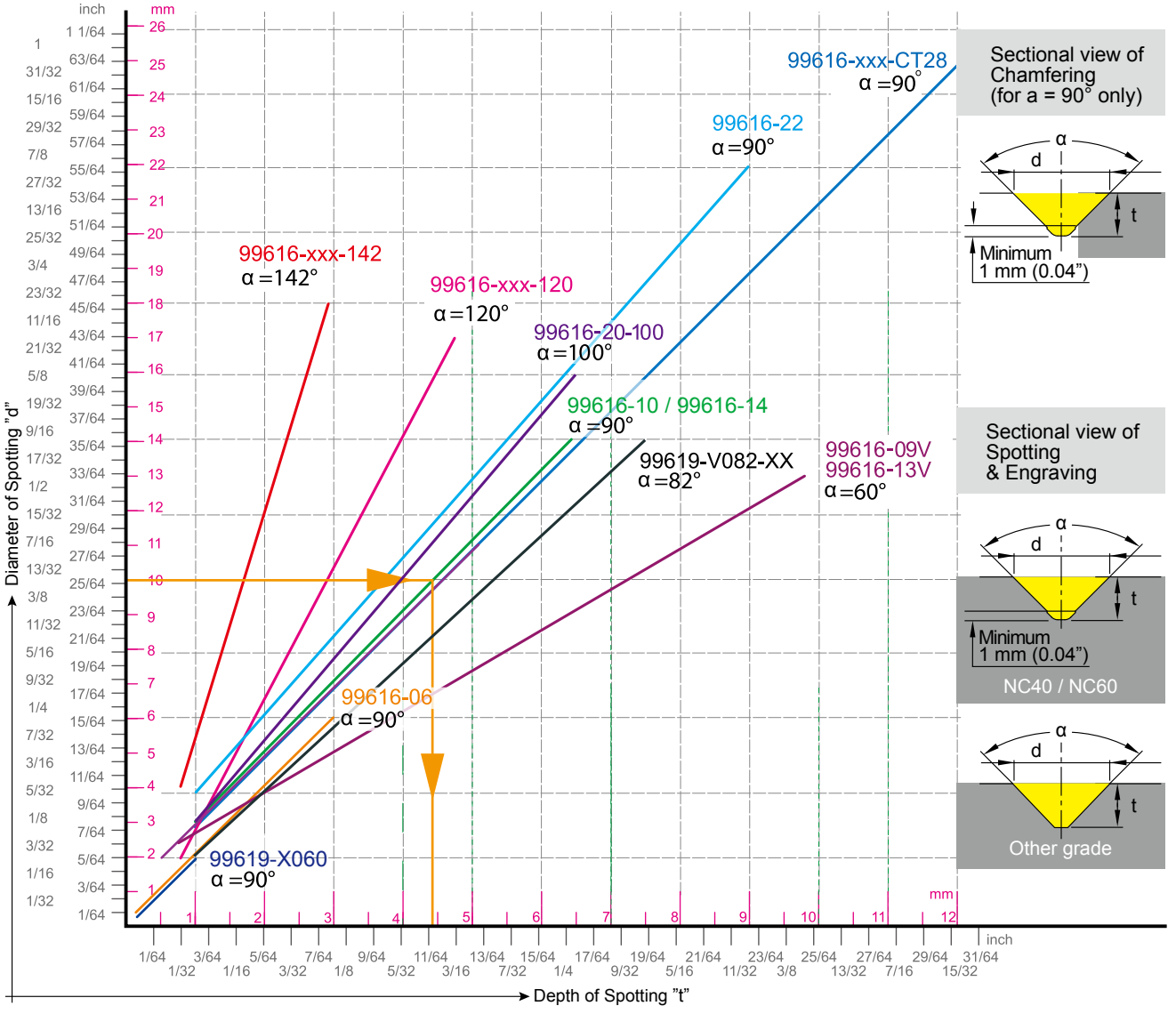
Action	
1	External and internal chamfering
2	Side chamfering
3	Side grooving
4	Back chamfering

More >>

• Also can fit with 99616-XX-25R/30R/40R holders. (Please see page 2-44)

Cutting Data

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



Instruction >>

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

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

Cutting Data

Determine spindle speed and feed rate:

- Choose spotting depth to decide spotting diameter according to the Diameter/Depth chart on page 2-46.
- The spindle speed should be calculated by the maximum diameter of spotting, chamfering and grooving.

For Insert V9MT0802CT / N9MT05T1CT / N9MT0602CT

	Workpiece material	SFM	IPR (inch/rev.) Spotting / Grooving	IPR (inch/rev.) Chamfering	NC2071	NC5071	NC9076
P	Carbon steel C<0.3%	500 ~ 1050	0.0012” ~ 0.0028”	0.0020” ~ 0.0059”	●		
P	Carbon steel C>0.3%	330 ~ 820	0.0008” ~ 0.0024”	0.0012” ~ 0.0047”		●	
P	Low alloy steel C<0.3%	330 ~ 820	0.0008” ~ 0.0024”	0.0016” ~ 0.0047”	●		
P	High alloy steel	195 ~ 590	0.0008” ~ 0.0020”	0.0012” ~ 0.0039”		●	
M	Stainless steel	210 ~ 410	0.0008” ~ 0.0016”	0.0012” ~ 0.0031”	●	○	◎
K	Cast iron	500 ~ 820	0.0012” ~ 0.0028”	0.0020” ~ 0.0059”	◎	●	
N	Non-ferrous metal	500 ~ 1050	0.0012” ~ 0.0028”	0.0020” ~ 0.0059”	◎		●
S	Ti, Ti-alloy	200 ~ 260	0.0008” ~ 0.0024”	0.0008” ~ 0.0024”	●		◎
S	Heat resistant alloy	100 ~ 200	-	0.0012” ~ 0.0028”	○	◎	
H	Hardened steel < HRC50	100 ~ 200	0.0008” ~ 0.0024”	0.0008” ~ 0.0024”		○	

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

● Best ◎ Suit ○ Possible

For Insert N9MT0802 / N9MT11T3CT

	Workpiece material	SFM	IPR (inch/rev.) Spotting / Grooving	IPR (inch/rev.) Chamfering	NC40	NC10	NC60	H-NC5071	H-NC40	H-NC9076
P	Carbon steel C<0.3%	500 ~ 1050	0.0020” ~ 0.0039”	0.0039” ~ 0.0094”	●				●	
P	Carbon steel C>0.3%	330 ~ 820	0.0016” ~ 0.0031”	0.0031” ~ 0.0079”				●		
P	Low alloy steel C<0.3%	330 ~ 820	0.0016” ~ 0.0031”	0.0031” ~ 0.0079”	●		◎		●	
P	High alloy steel	195 ~ 590	0.0012” ~ 0.0028”	0.0020” ~ 0.0059”			◎	●		
M	Stainless steel	210 ~ 410	0.0012” ~ 0.0024”	0.0031” ~ 0.0079”	○	●		○	●	◎
K	Cast iron	500 ~ 820	0.0020” ~ 0.0039”	0.0039” ~ 0.0098”	●	●		●	◎	
N	Non-ferrous metal	500 ~ 1050	0.0020” ~ 0.0039”	0.0039” ~ 0.0098”		◎			◎	●
S	Ti, Ti-alloy	200 ~ 260	0.0012” ~ 0.0031”	0.0012” ~ 0.0031”					●	◎
S	Heat resistant alloy	100 ~ 200	-	0.0020” ~ 0.0039”				◎	○	
H	Hardened steel < HRC56	100 ~ 200	0.0012” ~ 0.0031”	0.0012” ~ 0.0031”			●	○		

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

● Best ◎ Suit ○ Possible

Cutting Data

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

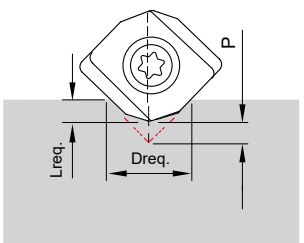
	Workpiece material	SFM	IPR (inch/rev.) Spotting / Grooving	IPR (inch/rev.) Chamfering	NC2071	NC5071	NC9076 (NC9036)	NC40	NC2033	XP9000
P	Carbon steel C<0.3%	500 ~ 1050	0.0020” ~ 0.0039”	0.0039” ~ 0.0094”	●			●		
P	Carbon steel C>0.3%	330 ~ 820	0.0016” ~ 0.0031”	0.0031” ~ 0.0079”		●			●	
P	Low alloy steel C<0.3%	330 ~ 820	0.0016” ~ 0.0031”	0.0031” ~ 0.0079”	●			●		
P	High alloy steel	195 ~ 590	0.0012” ~ 0.0028”	0.0020” ~ 0.0059”		●			●	
M	Stainless steel	210 ~ 410	0.0012” ~ 0.0024”	0.0031” ~ 0.0079”	●	○	◎	○	○	
K	Cast iron	500 ~ 820	0.0020” ~ 0.0039”	0.0039” ~ 0.0098”	◎	●		◎	●	
N	Non-ferrous metal	500 ~ 1050	0.0020” ~ 0.0039”	0.0039” ~ 0.0098”	◎		●			●
S	Ti, Ti-alloy	200 ~ 260	0.0012” ~ 0.0031”	0.0012” ~ 0.0031”	●		◎			
S	Heat resistant alloy	100 ~ 200	-	0.0020” ~ 0.0039”	○	◎				
H	Hardened steel < HRC50	100 ~ 200	0.0012” ~ 0.0031”	0.0012” ~ 0.0031”		○			◎	

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

● Best ◎ Suit ○ Possible

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

W spotting



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”

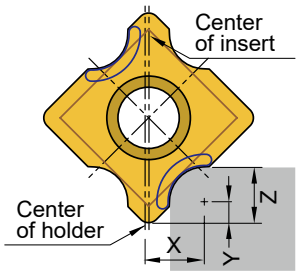
WSP spotting



	Workpiece material	SFM	IPR (inch/rev.)	Grade of Insert
P	Carbon steel	500 ~ 1050	0.0020” ~ 0.0060”	NC2033
P	Alloy steel	410 ~ 820	0.0020” ~ 0.0040”	NC2033
M	Stainless steel	260 ~ 500	0.0015” ~ 0.0031”	NC2033
K	Cast iron	330 ~ 660	0.0020” ~ 0.0040”	NC2033
H	Hardened steel < HRC50	100 ~ 200	0.0012” ~ 0.0031”	NC2033

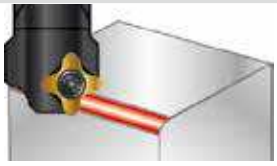
Cutting Data

For Insert N9MT05T1RC / N9MT11T3RC / N9MT1704RC / N9MT2506RC

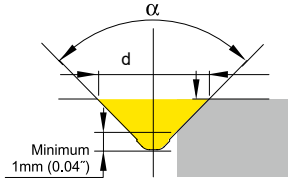
Corner Rounding	Calculate spindle speed		
	$d = 2 \times X$	inch	d = diameter of the tool X = tool radius offset (ref. page 2-39~41 for RC inserts)
	$S = \frac{SFM \times 3.82}{d}$	r.p.m.	Vc = Cutting speed ft/min. S = Spindle Speed -r.p.m.
	$F = S \times f$	inch	F = Feed rate inch f = inch/rev.
	Calculate tool length offest on machining center		
	X, Y & Z ref. to insert's spec		X = tool radius offset Y = distance to the center of radius. Z = distance of cut

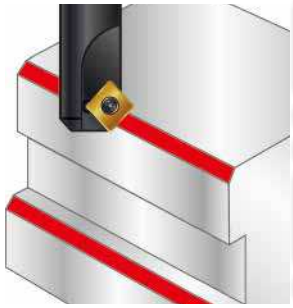
RC Insert		Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	P	Carbon steel	500 ~ 1050	0.0020" ~ 0.0039"	NC40, NC2071, NC2033
	P	Alloy steel	330 ~ 820	0.0020" ~ 0.0039"	NC40, NC2071, NC2033
	P	High alloy steel	260 ~ 500	0.0016" ~ 0.0031"	NC40, NC2071, NC2033
	M	Stainless steel	210 ~ 410	0.0020" ~ 0.0039"	NC9036
	K	Cast iron	500 ~ 820	0.0020" ~ 0.0039"	NC40, NC2071, NC2033
	N	Al, Al-alloys(Si<12%)	500 ~ 1050	0.0020" ~ 0.0039"	NC9036, XP9000
	N	Casting Al-alloys(Si>12%)	330 ~ 1050	0.0020" ~ 0.0039"	NC9036, XP9000
	N	Cu, Cu-alloy, casting cu-alloy	500 ~ 820	0.0020" ~ 0.0039"	NC9036, XP9000
	S	Ti, Ti-alloy	130 ~ 260	0.0012" ~ 0.0031"	NC9036
	H	Hardened steel < HRC50	100 ~ 200	0.0012" ~ 0.0031"	NC2033

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

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

For LA Insert >> 45° Chamfering

45° Chamfering	Formula	
	$S = \frac{(3.82 \times SFM)}{d}$	α = point angle 90°
		d = effective diameter
	$F = f \times S$	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
	P	Carbon steel	500 ~ 1050	0.0020" ~ 0.0040"	NC40
	P	Alloy steel	330 ~ 820	0.0016" ~ 0.0031"	NC40
	P	High alloy steel	200 ~ 260	0.0012" ~ 0.0023"	NC40
	M	Stainless steel	210 ~ 410	0.0012" ~ 0.0023"	NC10
	K	Cast iron	500 ~ 820	0.0020" ~ 0.0040"	NC10, NC40
	N	Al, Al-alloys(Si<12%)	500 ~ 1050	0.0020" ~ 0.0040"	NC10
	N	Casting Al-alloys(Si>12%)	330 ~ 1050	0.0020" ~ 0.0040"	NC10
	N	Cu, Cu-alloy, casting cu-alloy	500 ~ 820	0.0020" ~ 0.0040"	NC10
	H	Hardened steel < HRC56	200 ~ 260	0.0020" ~ 0.0040"	NC60

i-Center®

Center Drill >>>

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

P M K N

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





Features >>>

High Speed, High Feed Rate

- The special ground insert and rigid holder design facilitate high performance speed and feed rates. For example, drilling alloy steel at 6000 rpm and feed rate of 600 mm/min. (24 inch/min.) 0.1 mm/rev. (0.004 inch/rev.).

Excellent Repeatability

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

Easy Tool Length Setting

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

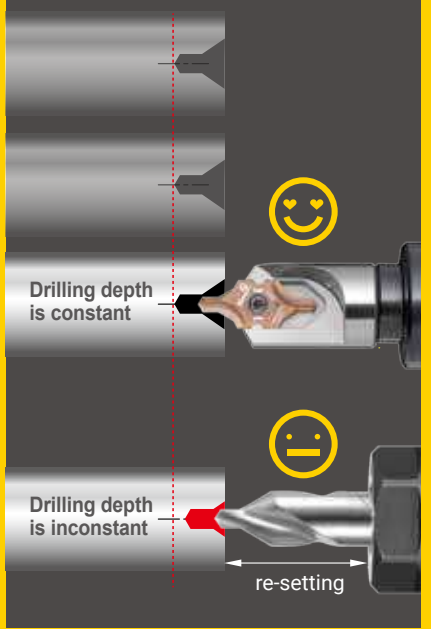
Extended Tool Life

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

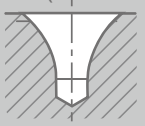
Applications



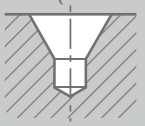
Excellent repeatability
No need tool length re-setting while changing insert or cutting edge.



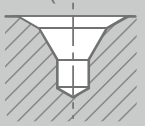
DIN 332 Form R
Ø1.0~Ø10 (0.039”~0.394”)



DIN 332 Form A
Ø2.0~Ø3.15 (0.079”~0.124”)



DIN 332 Form A+B
Ø1.0~Ø10 (0.039”~0.394”)



ANSI 60°
#2.0~#10



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



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

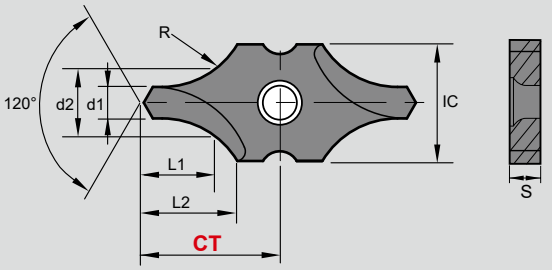
NC2057 
• P35 grade, AlTiN + TiSiN coating, Universal grade for all kind of steel.
• Double-edged cutting, fully ground insert for improving machining stability. (IC10 inserts)

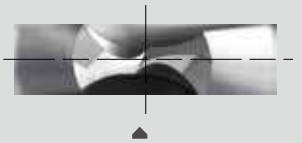
NC5074 
• P40 grade, Helica (AlCrN) coating, design for small diameter center drill (IC08 inserts).

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

DIN332 Form R

DIN332 Form R





2 cutting flutes design



For DIN332 Form R Center Hole >>

2

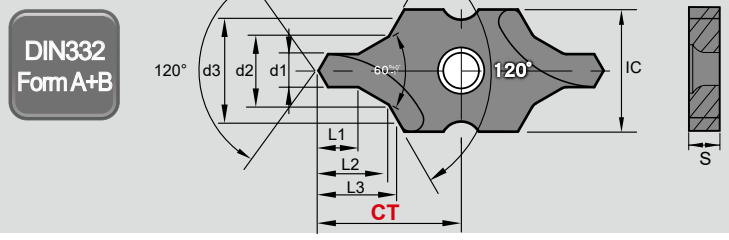
i-Center

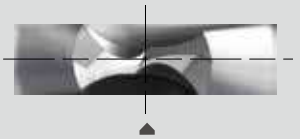
IC	Parts No.	Coating	Grade	d1		d2	L1	L2	R	S	CT ±0.025 (0.001")
08 (0.315")	I9MT08T1R0100-NC5074	Helica	P40	1.00 (0.039")	+ 0.14 (0.006") 0	2.12 (0.083")	2.16 (0.085")	4.14 (0.163")	2.8 (0.110")	2.00 (0.079")	7.55 (0.297")
	I9MT08T1R0125-NC5074			1.25 (0.049")		2.65 (0.104")	2.74 (0.108")	4.64 (0.183")	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")
10 (0.394")	I9MT1003R0100-NC2057	AlTiN+ TiSiN	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")	3.00 (0.118")	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")		
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")

The quantity of insert per box.:

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

DIN332 Form A+B





2 cutting flutes design



For DIN332 Form A+B Center Hole >>

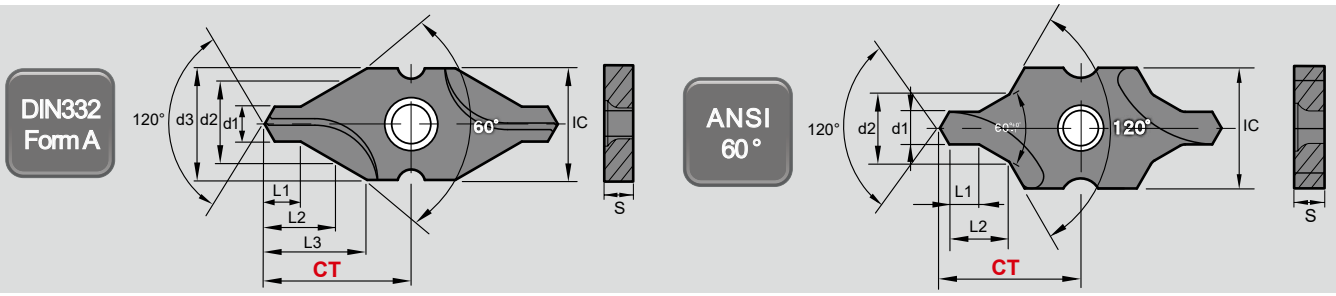
IC	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	S	CT ±0.025 (0.001")
08 (0.315")	I9MT08T1B0100-NC5074	Helica	P40	1.00 (0.039")	+ 0.14 (0.006") 0	2.12 (0.083")	3.15 (0.124")	1.3 (0.051")	2.21 (0.087")	2.51 (0.099")	2.00 (0.079")	7.55 (0.297")
	I9MT08T1B0125-NC5074			1.25 (0.049")		2.65 (0.104")	4.0 (0.157")	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")
10 (0.394")	I9MT1003B0100-NC2057	AlTiN+ TiSiN	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")	3.00 (0.118")	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")		
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")

The quantity of insert per box.:

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

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

DIN332 Form A & ANSI 60°





For DIN332 Form A Center Hole >>

The quantity of insert per box.:

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

IC	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	S	CT ±0.025 (0.001")
08 (0.315")	I9MT08T1A0200-NC5074	Helica	P40	2.0 (0.079")	+ 0.03 (0.001") 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")	+ 0.03 (0.001") 0	6.70 (0.264")		3.23 (0.127")	6.30 (0.248")	7.43 (0.293")		

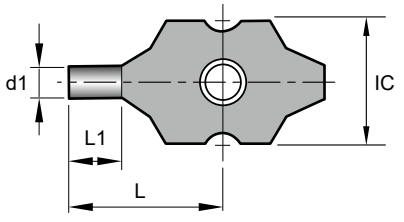


For ANSI 60° Center Hole >>

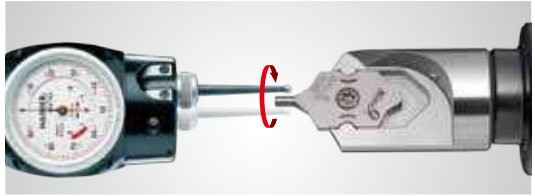
IC	Parts No.	Coating	Grade	Size	d1			d2		L1		L2	S	CT ±0.025 (0.001")
						mm			mm		mm	mm		
12 (0.472")	I9MT12T2A2-NC2033	TiAlN	K20F	#2	5/64	1.98	+0.14 (0.006") 0	3/16	4.76	5/64	1.98	4.4 (0.173")	2.54 (0.1")	12.6 (0.496")
	I9MT12T2A3-NC2033			#3	7/64	2.78		1/4	6.35	7/64	2.78	5.9 (0.232")		13.8 (0.543")
	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")
20 (0.787")	I9MT2004A6-NC2033			#6	7/32	5.56		1/2	12.7	7/32	5.56	11.8 (0.465")	4.76 (0.187")	27.75 (1.093")
	I9MT2004A7-NC2033			#7	1/4	6.35	+0.22 (0.009") 0	5/8	15.88	1/4	6.35	14.6 (0.575")		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")

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")



IC	Parts No.	d1	L	L1
08 (0.315")	I9MT08T1-PATTERN	Ø1.9 (0.075")	9.0 (0.354")	3.0 (0.118")
10 (0.394")	I9MT1003-PATTERN	Ø2.9 (0.114")	11.5 (0.453")	5.0 (0.197")
12 (0.472")	I9MT12T2-PATTERN	Ø2.3 (0.091")	13.5 (0.531")	3.5 (0.138")
16 (0.630")	I9MT1603-PATTERN	Ø3.0 (0.118")	19.0 (0.748")	5.0 (0.197")
20 (0.787")	I9MT2004-PATTERN	Ø4.5 (0.177")	26.0 (1.024")	8.0 (0.315")

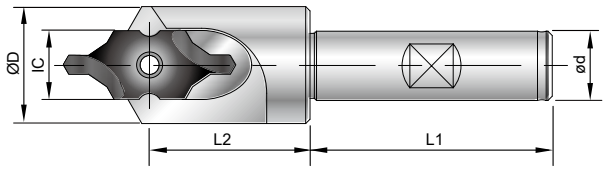


Holders of Indexable Center Drill



Holder >>

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

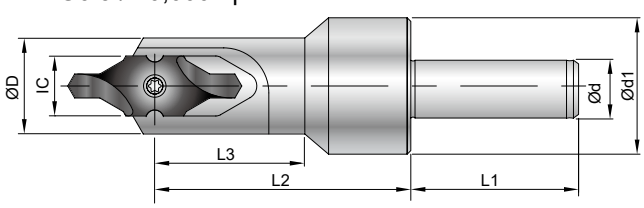




IC	Parts No.	Type	ød	L1	L2	ØD	Screw	Key
08 (0.315")	99616-IC08-10F	BC10-IC08F	10 (0.394")	30 (1.181")	18.5 (0.728")	12 (0.472")	NS-25060 0.9 Nm	NK-T7
	99616-IC08-3/8F	BC3/8"-IC08F	3/8"					
10 (0.394")	99616-IC10-12F	SB12-IC10F	12 (0.472")	45 (1.772")	24.5 (0.965")	16 (0.630")	NS-25060 0.9 Nm	NK-T7
12 (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 >>

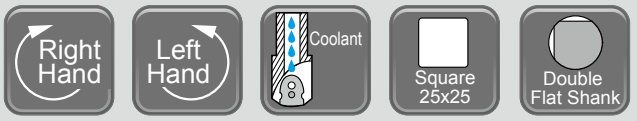
- Pre-balanced holder enhance the stability of centering to get high accurate profile.
- G6.3 / 10,000 r.p.m.

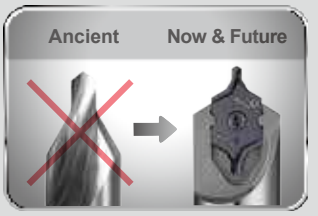




IC	Parts No.	Type	Ød	Ød1	L1	L2	L3	ØD	Screw	Key
08 (0.315")	99616-IC08-10B	BC10-IC08B	10 (0.394")	22 (0.866")	30 (1.181")	33.5 (1.319")	19 (0.748")	12 (0.472")	NS-25060 0.9 Nm	NK-T7
12 (0.472")	99616-IC12-12B	BC12-IC12B	12 (0.472")	34 (1.339")	48 (1.890")	51 (2.008")	30 (1.181")	21 (0.827")	NS-30072 2.0 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

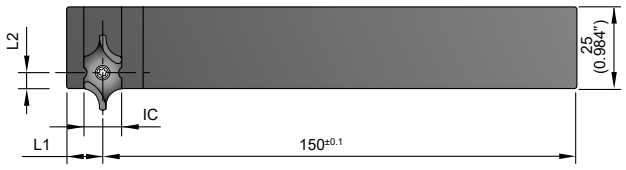
Holders of Indexable Center Drill





Square Shank 25 x 25 Right / Left Hand >>

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

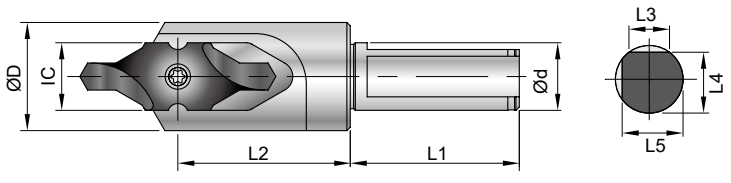




IC	Parts No.	L1	L2	Screw	Key
08 (0.315")	99616-IC08-R2525MF	8 (0.315")	3.25 (0.128")	NS-25060 0.9 Nm	NK-T7
	99616-IC08-L2525MF				
12 (0.472")	99616-IC12-R2525MF	11 (0.433")	4.9 (0.193")	NS-30072 2.0 Nm	NK-T9
	99616-IC12-L2525MF				
16 (0.630")	99616-IC16-R2525MF	13 (0.512")	4.9 (0.193")	NS-35080 2.5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

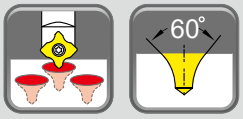
Double Flat Shank >> Non-Stock Item

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



IC	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

N9MT11T3PR Radius Center Drilling





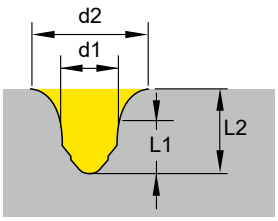


NC40

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.

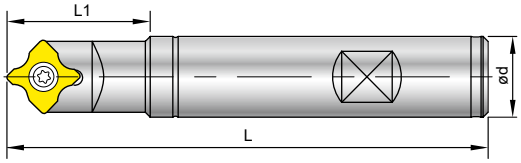
NC40:
- Universal grade for all unhardened steel and cast iron.
- Radius curve eliminates the sharp transition from drill point to countersink angle.
- The risk of breakage is reduced.
- Each insert has 2 cutting edges.



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 2-31).

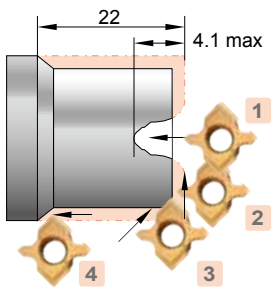




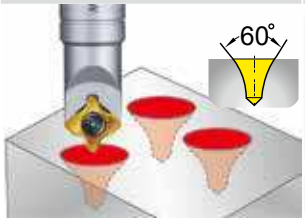
Parts No.	Ød	L	L1	Screw	Key
99616-14-PR	16 (0.630")	100 (3.94")	30 (1.224")	NS-35080 2.5 Nm	NK-T15

Turning and Centering Capacity on CNC Lathes

	Action
1	Center Drilling
2	Facing
3	Chamfering
4	External Turning



Cutting Data >>

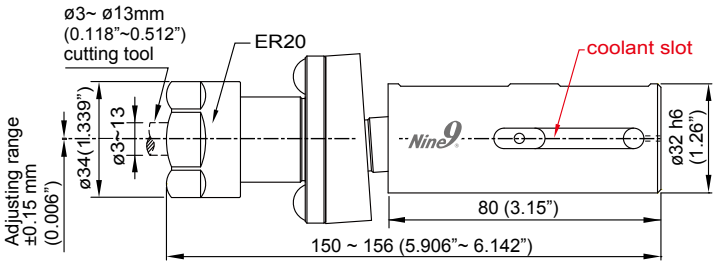
Center Drilling	Work Material	SFM	IPR (inch/rev.)	Grade of Insert
	Carbon steel	260 ~ 500	0.0020~0.0040	NC40
	Alloy steel	260 ~ 500	0.0020~0.0040	
	High alloy steel	260 ~ 500	0.0020~0.0040	
	Cast iron	260 ~ 500	0.0020~0.0040	

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.

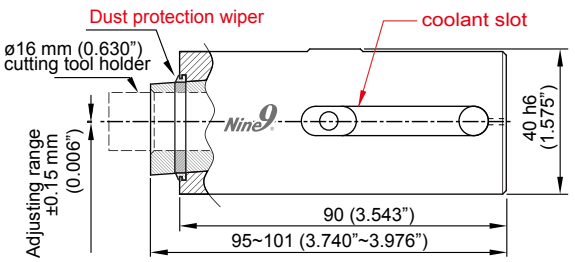
Parts No.:99600-320H >>





Type : SB32-IDER20

Parts No.:99600-400H >>

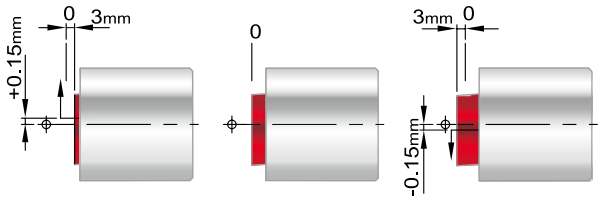


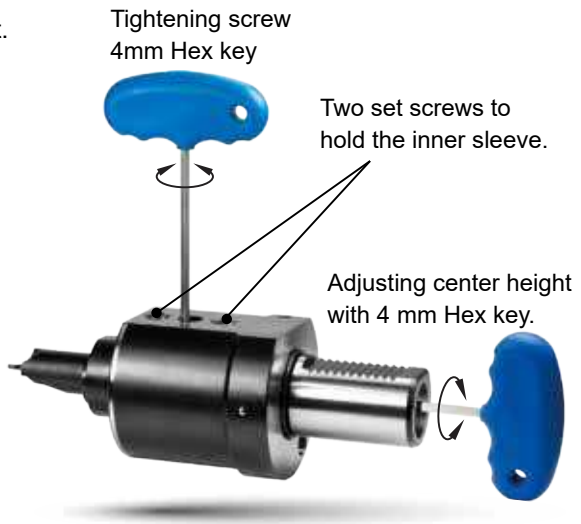


Type : SB40-ID16

Applications >>

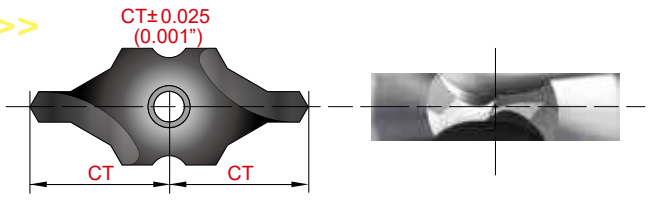
- Used when the CNC lathes need to adjust the center height.
- This sleeve can be clamped by VDI 40, VDI 50 E2 tool holders,and other types internal turning tool holders.
- Center height adjusting range: ±0.15 mm(.006").
- Total axial movement is 6mm(.236").





Profit by making the right choice >>

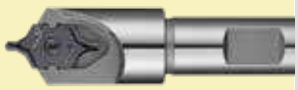
- High speed and feed rate reduce cutting time.
- The unique design increases tool life and reduces change over time.

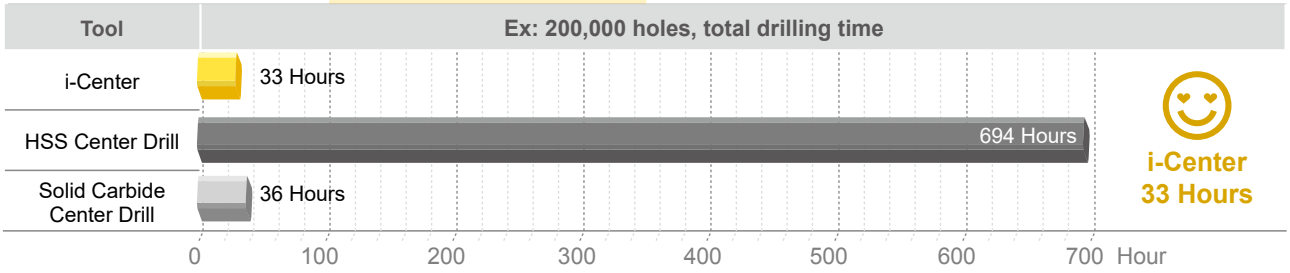


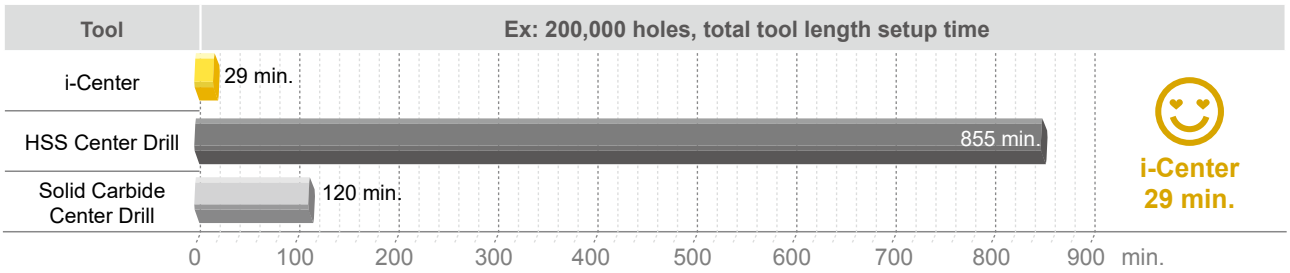
▲ 2 cutting edges ▲ 2 cutting flutes design

Comparison >>

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

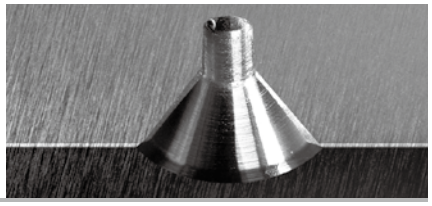
Diameter of tool : Ø3.15 mm Depth of drilling : 7.2 mm				
Comparison		**i-Center**	**HSS Center Drill (TiN Coating)**	**Solid Carbide Center Drill**
Cutting speed	**m/min.**	65	17	65
Spindle speed	**r.p.m.**	6570	1718	6570
Feed rate f =	**mm/rev.**	0.12	0.02	0.1
Feed rate F=	**mm/min.**	788.4	34.4	657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

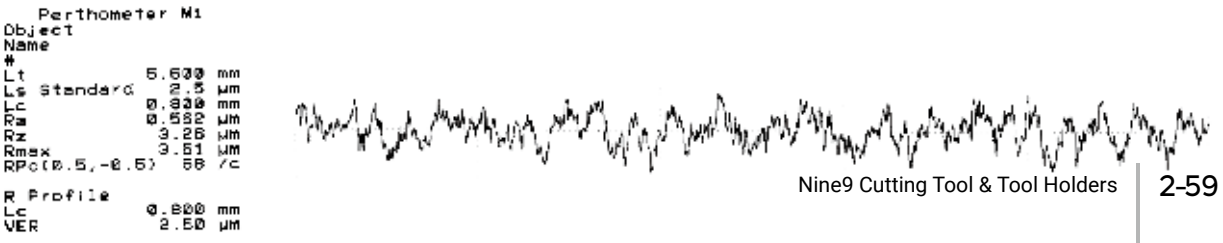




Surface finish >>

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





i-Center Enquiry Form

Previous process tool >>

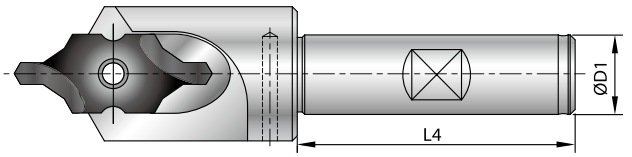
Challenge or improvement >>

The following information should be checked while discussing with customer.

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

Special Tool holder shank dimensions >>

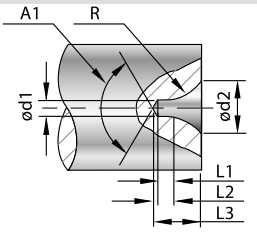
☐ Special tool holder shank, please fill in D1 and L4.
☐ As attached workpiece drawing.
☐ Metric ☐ Inch ☐ Right ☐ Left



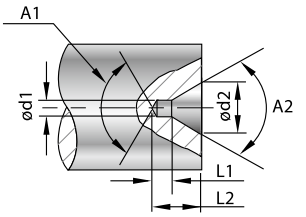
Center hole dimension >>

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

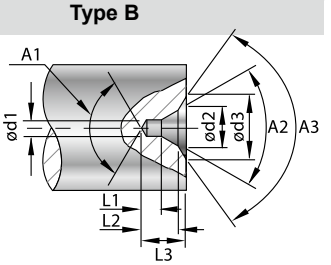
Type R



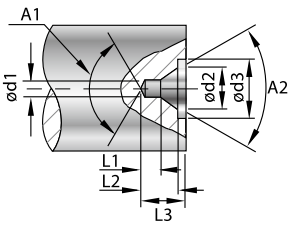
Type A



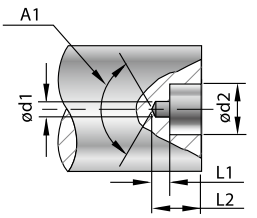
Type B



Type C



Other

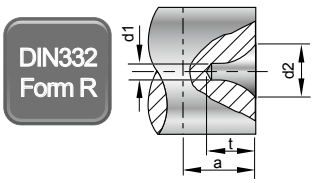


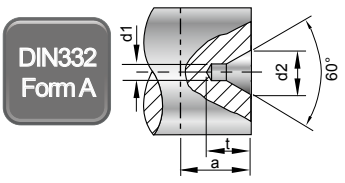
Dimension Table	A1	A2	A3	ød1	ød2	ød3
Dimension						
Tolerance	—	+0° -1°	±1°	±0.05	±0.05	—

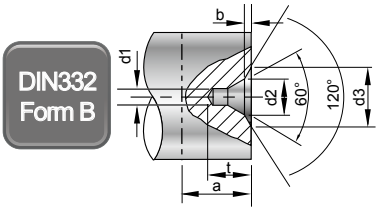
Dimension Table	L1	L2	L3	R	øD1	L4
Dimension						
Tolerance	±0.05	±0.05	±0.05	±0.5	h6	—

Technical Standard
ISO 2541-1972 / DIN332

60° Center holes >>



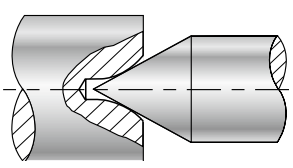
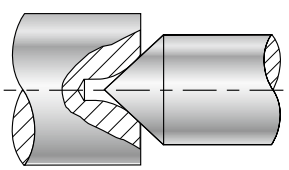
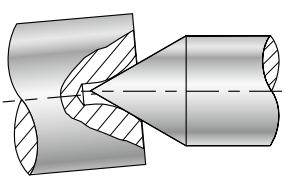




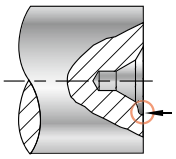
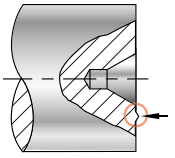
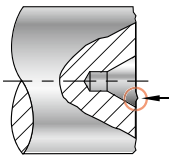
STD	DIN332 Form R ISO 2541-1972			DIN332 Form A ISO 866-1975			DIN332 Form B ISO 2540 1973				
d1	d2	t	a	d2	t	a	d2	b	d3	t	a
1	2.12	1.9	3	2.12	1.9	3	2.12	0.3	3.15	2.2	3.5
1.25	2.65	2.3	4	2.65	2.3	4	2.65	0.4	4	2.7	4.5
1.6	3.35	2.9	5	3.35	2.9	5	3.35	0.5	5	3.4	5.5
2	4.25	3.7	6	4.25	3.7	6	4.25	0.6	6.3	4.3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

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

Form R center hole apply for >>

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

Form B center hole apply for >>

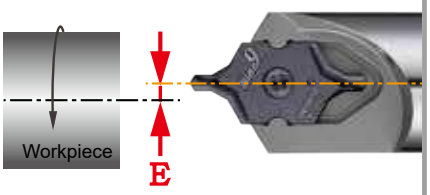
Avoid scar or distortion while transportation	Burr	Rough surface of workpiece
		

Technical Guide

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

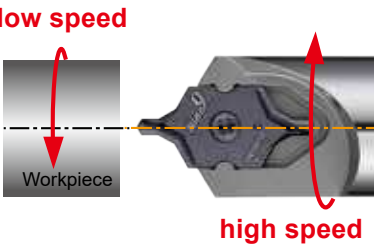
Center misalignment

E must be < 0.02mm (0.0008").



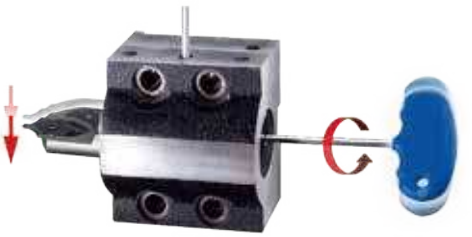
Driving Tool

low speed : high speed
1 : 3



Center height adjusting sleeve

When CNC lathe turret center is misaligned ≥ 0.15mm (0.006"), please use center height adjusting sleeve. (See page 2-58)



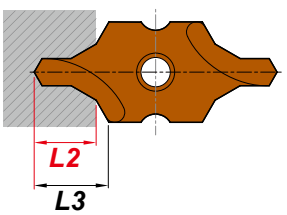
Internal coolant

Internal coolant is recommended.

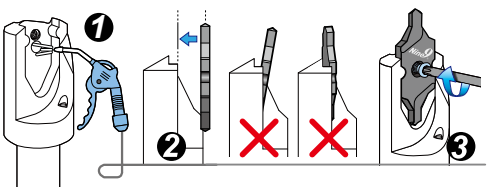


DIN 332 Form A+B

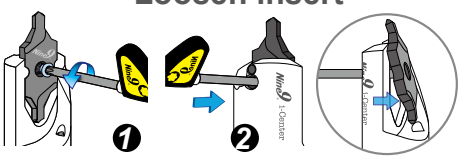
Reduce 30% of Spindle speed and keep same feed rate (inch/rev.) while depth L2 is reached.



Clamping insert



Loosen insert



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 (A2~A4)

● Best ○ Possible

Workpiece material	d1	IC08 / IC10		IC12				
		Ø1~1.25mm (0.039"~0.049")	Ø1.6~3.15 (0.063"~0.124")	Ø2mm A2 (0.079")	Ø2.5 A3 (0.098")	Ø3.15 A4 (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	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		
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		
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 (A5~A10)

● Best ○ Possible

Workpiece material	d1	IC16	IC20			IC25		
		Ø4 A5 (0.157")	Ø5 A6 (0.197")	Ø6.3 A7 (0.248")	Ø8 A8 (0.315")	Ø10 A10 (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	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		
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		
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 Tool >>>

30° / 45° / 60° / 90°

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

P M K N H S





No Need To Reset After Changing Insert Or Cutting Edge

- 2 Cutting Edges.
- Excellent repeatability!

Features >>>

High Positive Rake Angle

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

Multi-Side Grinding

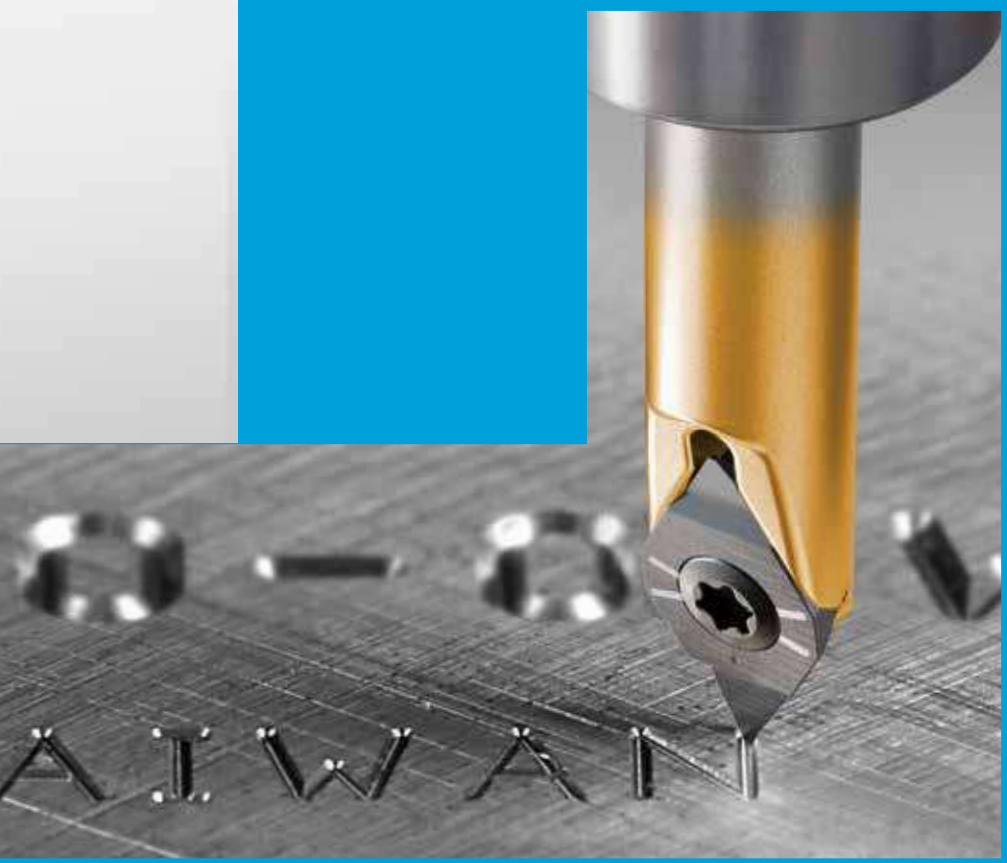
- Full peripherally ground insert to ensure efficient repeatability.
- It performs excellently without producing any burrs, especially in copper, aluminum and stainless steel.

High Speed, High Feed Rate

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

Special forms are available on request

Applications



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

Ultrasonic welding drum

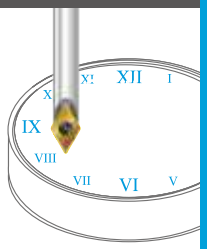


Mold & Die

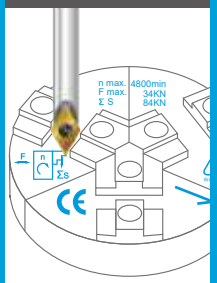


"Widely be used for marking on machine components, medical components, gun components, mold and die, automotive parts, gears, bearings and luxury goods."

Dial scales



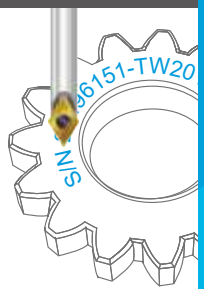
Product info



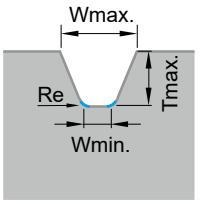
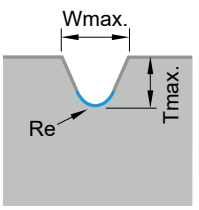
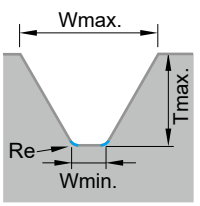
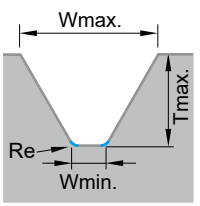
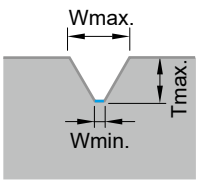
Logo outlines



Serial number



Engraving Tool System

Type	Form	Angle	Insert	Wmin.	Wmax.	Tmax.	Holder
X060 Series	 Radius Angled	**30°**	 X060A30W...	0.2 (0.008”)	0.52 (0.020")	0.6 (0.024")	 99619-X060... Ø6 (0.236”) Ø8 (0.315”)
		45°	 X060A45W...		0.86 (0.034")	0.8 (0.031")	
		60°	 X060A60W...		1.36 (0.054")	1.0 (0.039")	
		90°	 X060A90W...		2.2 (0.087")	1.0 (0.039")	
	 Radius	**30°**	 X060A30R...	Re: 0.2 (0.008”)	0.63 (0.025")	0.6 (0.024")	
		45°	 X060A45R...		0.93 (0.037")	0.8 (0.031")	
		60°	 X060A60R...		1.39 (0.055")	1.0 (0.039")	
V045 V060 Series	 Radius Angled	**45°**	 V04506T1W	0.45 (0.018”)	2.1 (0.083”)	2.0 (0.079”)	 V04506T1W Ø6 (0.236”) Ø8 (0.315”)
				0.65 (0.026”)			
	 Radius Angled / Angled	**60°**	 V06006T1W	0.25 (0.01”)	1.1 (0.043”)	0.8 (0.031”)	 V06006T1W Ø4 (0.157”) Ø6 (0.236”) Ø8 (0.315”)
				0.45 (0.018”)	2.7 (0.106”)	2.0 (0.079”)	
				0.65 (0.026”)	2.7 (0.106”)	2.0 (0.079”)	
N9MT-W Series	 Angled	**60°**	 N9MT080201W -60-NC40	0.2 (0.008”)	1.1 (0.043”)	0.8 (0.031”)	 99616-10...SW Ø10 (0.394”) Ø3/8"
		90°	 N9MT080201W	0.2 (0.008”)	2.0 (0.079”)	0.9 (0.035”)	

X060 Engraving Tool 30° NEW



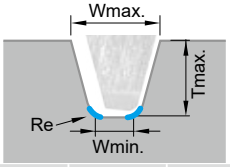
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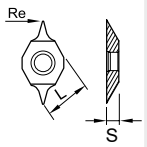
NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

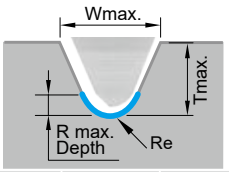
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 50.

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

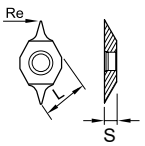
• Radius Angled Form



Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
30°	X060A30W020R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.04 (0.0015")	0.20 (0.008")	0.52 (0.020")	0.6 (0.024")
		NC2035	ALDURA								
		XP9001	Uncoated								



• Radius Form

Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	R max. Depth	Wmax.	Tmax.
30°	X060A30R020	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.2 (0.008")	0.15 (0.006")	0.63 (0.025")	0.6 (0.024")
		NC2035	ALDURA								
		XP9001	Uncoated								

Holder >>

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





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		60 (2.362")		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937")		
99619-X060-08	Steel	8 (0.315")	60 (2.362")		

45° X060 Engraving Tool 45° NEW

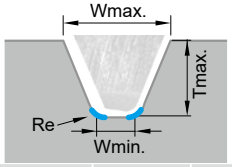


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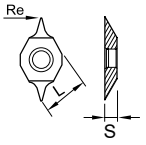
NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

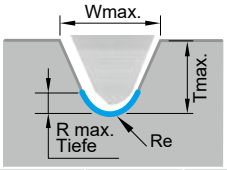
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 50.

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

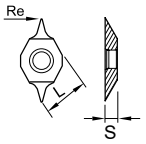


• Radius Angled Form

Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
45°	X060A45W020R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.04 (0.0015")	0.20 (0.008")	0.86 (0.034")	0.8 (0.031")
		NC2035	ALDURA								
		XP9001	Uncoated								

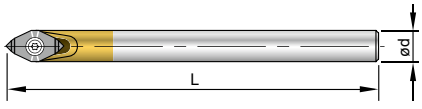


• Radius Form

Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	R max. Depth	Wmax.	Tmax.
45°	X060A45R020	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.2 (0.008")	0.12 (0.005")	0.93 (0.037")	0.8 (0.031")
		NC2035	ALDURA								
		XP9001	Uncoated								

Holder >>

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





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		60 (2.362")		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937")		
99619-X060-08	Steel	8 (0.315")	60 (2.362")		

X060 Engraving Tool 60° NEW

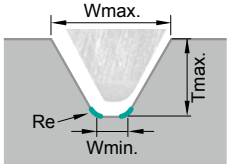


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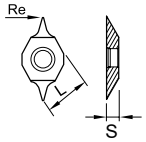
NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

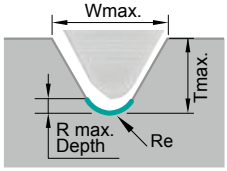
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 50.

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

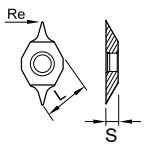


• Radius Angled Form

Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
60°	X060A60W020R	NC2032	TiAlN	K20F		6 (0.236”)	2.05 (0.081”)	0.04 (0.0015”)	0.2 (0.008”)	1.36 (0.054")	1.0 (0.039")
		NC2035	ALDURA								
		XP9001	Uncoated								



• Radius Form

Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	R max. Depth	Wmax.	Tmax.
60°	X060A60R020	NC2032	TiAlN	K20F		6 (0.236”)	2.05 (0.081”)	0.2 (0.008”)	0.1 (0.004")	1.39 (0.055")	1.0 (0.039")
		NC2035	ALDURA								
		XP9001	Uncoated								

Holder >>

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





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		60 (2.362”)		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937”)		
99619-X060-08	Steel	8 (0.315”)	60 (2.362”)		

90° X060 Engraving Tool 90° NEW

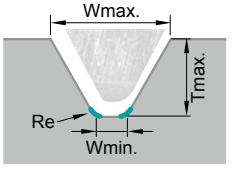


Inserts >>

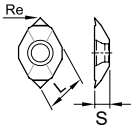
NC2032: • For all kinds of steel from < HRC 40, carbon steel, alloy steel,and cast iron.

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

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

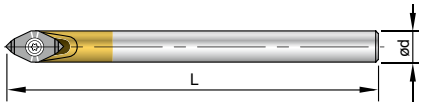


• Radius Angled Form

Angle	Parts No.		Coating	Grade		Dimensions			Wmin.	Wmax.	Tmax.
						L	S	Re			
90°	X060A90W020R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.04 (0.0015")	0.2 (0.008")	2.2 (0.087")	1.0 (0.039")
		NC2035	ALDURA								
		XP9001	Uncoated								

Holder >>

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





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		60 (2.362")		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937")		
99619-X060-08	Steel	8 (0.315")	60 (2.362")		

V045 Engraving Tool 45°

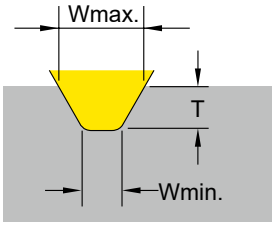


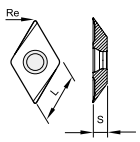
Inserts >>

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

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

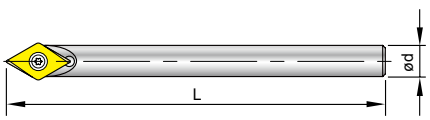
NC9031: • Fully positive ground rake angle, very sharp edge for shallow engraving.
• For non-ferrous metal such as aluminum, brass, copper, titanium, plastic and acrylic.



Angle	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 >>

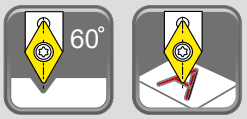
• Carbide shank holders for high speed cutting.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.





Angle	Parts No.	Shank	Ød	L	Screw	Key
45°	99619-V045-06	Steel	6 (0.236”)	40 (1.575”)	NS-22044 0.9Nm	NK-T7
	99619-V045-06L	Carbide		60 (2.362”)		
	99619-V045-06XL	Carbide		100 (3.937”)		
	99619-V045-08	Steel	8 (0.315”)	60 (2.362”)		

60° V060 Engraving Tool 60°



Inserts >>

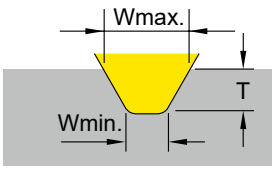
NC2071: • Strong edge on chip-breaker, best suited for min. DOC 0.2mm.
• Universal grade for all kinds of steel <HRC 30, non-ferrous metal and stainless steel.

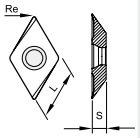
NC2032: • Long tool life.
• For all kinds of steel from HRC 30~50, carbon steel, alloy steel,and cast iron.

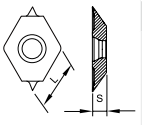
NC2035: • ALDURA coating, reduces heat and tool wear.
• For steel with heat treatment up to HRC 56.

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

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

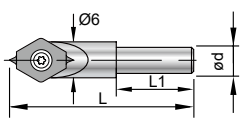


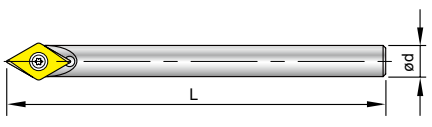
Angle	Parts No.		Coating	Grade		Dimensions			W		T	
						L	S	Re	Wmin.	Wmax.	Tmin.	Tmax.
60°	V06006T1W06	NC2071	TiN	K20F		6.35 (0.250”)	2.0 (0.079”)	0.2 (0.008”)	0.65 (0.026”)	2.7 (0.106”)	0.2 (0.008”)	2.0 (0.079”)
		NC2032	TiAlN						0.65 (0.026”)		0.2 (0.008”)	
		NC2035	ALDURA						0.65 (0.026”)		0.2 (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 for high speed cutting.
• XL (100mm length) is only for Al, Al-alloy cutting, unbalanced <0.6gm.







Angle	Parts No.	Shank	Ød	L	L1	Screw	Key
60°	99619-V060-04	Steel	4 (0.157”)	30 (1.181”)	12 (0.472”)	NS-22044 0.9Nm	NK-T7
	99619-V060-06	Steel	6 (0.236”)	40 (1.575”)	---		
	99619-V060-06L	Carbide		60 (2.462”)	---		
	99619-V060-06XL	Carbide		100 (3.937”)	---		
	99619-V060-08	Steel	8 (0.315”)	60 (2.462”)	---		

N9MT080201W Engraving Tool 60° / 90°

60°
90°



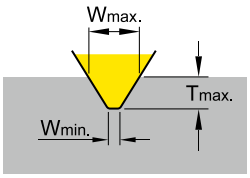
Inserts >>

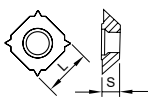
- No need to reset tool length after changing insert or cutting edge.
- The inserts can be used for small diameter spotting.
- Each insert has 4 cutting edges.

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

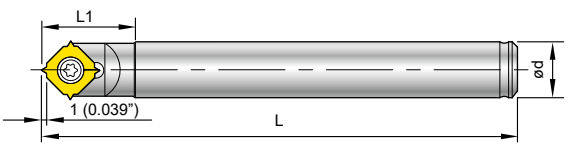
NC40: • Universal grade for all unhardened steel.

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



Angle	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 >>

(Tmax.: 0.0315")



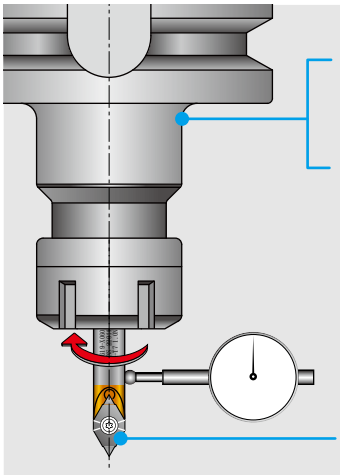
Workpiece Meterial	S (r.p.m)	IPR (inch/rev.)	Depth of cut (inch) 1st	2nd	3rd	Finishing	Insert Grade
P Alloy steel	5000 ~ 20000	0.0003" ~ 0.0008"	0.012"	0.008"	0.008"	0.002"	60-NC40,NC40
K Cast iron							60-NC40, NC10
N Non-ferrous metal							NC10

Comparison >>

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

Attention >>



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

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

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

4 Tool shank runout:
below 0.01 mm.

5 Torque screwdriver is recommended

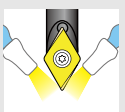
6 Cutting fluid and cooling condition

Emusion / Oil



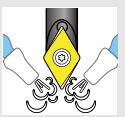
P Steel
M Stainless Steel
S Titanium
H Hardened Steel

Oil



N Non-Ferrous

Air



K Cast Iron

Clamping the engraving insert

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

• Step-1

Place the insert in the insert pocket.



• Step-2

Push insert against insert pocket and insert the screw.



• Step-3

Tighten the insert screw.



Cutting Data >> X060 Engraving

X060A30W020R / X060A30R020

(Tmax. : 0.024")

Workpiece Material	S (r.p.m)	IPR (inch/rev.)		Depth of cut (inch)						Grade of Insert
		Radius Angled	Radius	1st	2nd	3rd	4th	5th ~	Finishing	
P Carbon steel	8000 ~ 40000	0.00004" ~ 0.00039"	0.00008" ~ 0.00059"	0.006"	0.004"	0.002"	0.002"	0.002"	0.0008"	NC2032
P Alloy steel		0.00004" ~ 0.00024"	0.00008" ~ 0.00039"	0.006"	0.004"	0.002"	0.002"	0.001"	0.0008"	NC2032, NC2035
M Stainless steel		0.00004" ~ 0.00024"	0.00008" ~ 0.00039"	0.004"	0.002"	0.002"	0.001"	0.001"	0.0008"	NC2032
K Cast iron		0.00004" ~ 0.00024"	0.00008" ~ 0.00039"	0.006"	0.004"	0.002"	0.002"	0.001"	0.0008"	NC2032
N Non-ferrous metal		0.00004" ~ 0.00047"	0.00008" ~ 0.00079"	0.008"	0.004"	0.004"	0.002"	0.002"	0.0008"	XP9001
H Hardened steel < HRC50		0.00004" ~ 0.00020"	0.00008" ~ 0.00024"	0.004"	0.002"	0.001"	0.001"	0.0008"	0.0004"	NC2035

X060A45W020R / X060A45R020

(Tmax. : 0.031")

Workpiece Material	S (r.p.m)	IPR (inch/rev.)		Depth of cut (inch)						Grade of Insert
		Radius Angled	Radius	1st	2nd	3rd	4th	5th ~	Finishing	
P Carbon steel	8000 ~ 40000	0.00008" ~ 0.00047"	0.00008" ~ 0.00059"	0.010"	0.006"	0.004"	0.002"	0.002"	0.001"	NC2032
P Alloy steel		0.00008" ~ 0.00039"	0.00008" ~ 0.00039"	0.008"	0.004"	0.002"	0.002"	0.002"	0.001"	NC2032, NC2035
M Stainless steel		0.00008" ~ 0.00031"	0.00008" ~ 0.00039"	0.008"	0.004"	0.002"	0.002"	0.002"	0.001"	NC2032
K Cast iron		0.00008" ~ 0.00039"	0.00008" ~ 0.00039"	0.008"	0.004"	0.004"	0.002"	0.002"	0.001"	NC2032
N Non-ferrous metal		0.00008" ~ 0.00059"	0.00008" ~ 0.00079"	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"	XP9001
H Hardened steel < HRC50		0.00008" ~ 0.00024"	0.00008" ~ 0.00024"	0.006"	0.004"	0.002"	0.002"	0.001"	0.0008"	NC2035

X060A60W020R / X060A60R020

(Tmax. : 0.039")

Workpiece Material	S (r.p.m)	IPR (inch/rev.)		Depth of cut (inch)						Grade of Insert
		Radius Angled	Radius	1st	2nd	3rd	4th	5th ~	Finishing	
P Carbon steel	8000 ~ 40000	0.00008" ~ 0.00047"	0.00008" ~ 0.00059"	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"	NC2032
P Alloy steel		0.00008" ~ 0.00039"	0.00008" ~ 0.00039"	0.012"	0.004"	0.004"	0.002"	0.002"	0.001"	NC2032, NC2035
M Stainless steel		0.00008" ~ 0.00031"	0.00008" ~ 0.00039"	0.008"	0.004"	0.004"	0.002"	0.002"	0.001"	NC2032
K Cast iron		0.00008" ~ 0.00039"	0.00008" ~ 0.00039"	0.012"	0.004"	0.004"	0.002"	0.002"	0.001"	NC2032
N Non-ferrous metal		0.00008" ~ 0.00059"	0.00008" ~ 0.00079"	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"	XP9001
H Hardened steel < HRC50		0.00008" ~ 0.00024"	0.00008" ~ 0.00024"	0.008"	0.004"	0.002"	0.002"	0.001"	0.0008"	NC2035

X060A90W020R

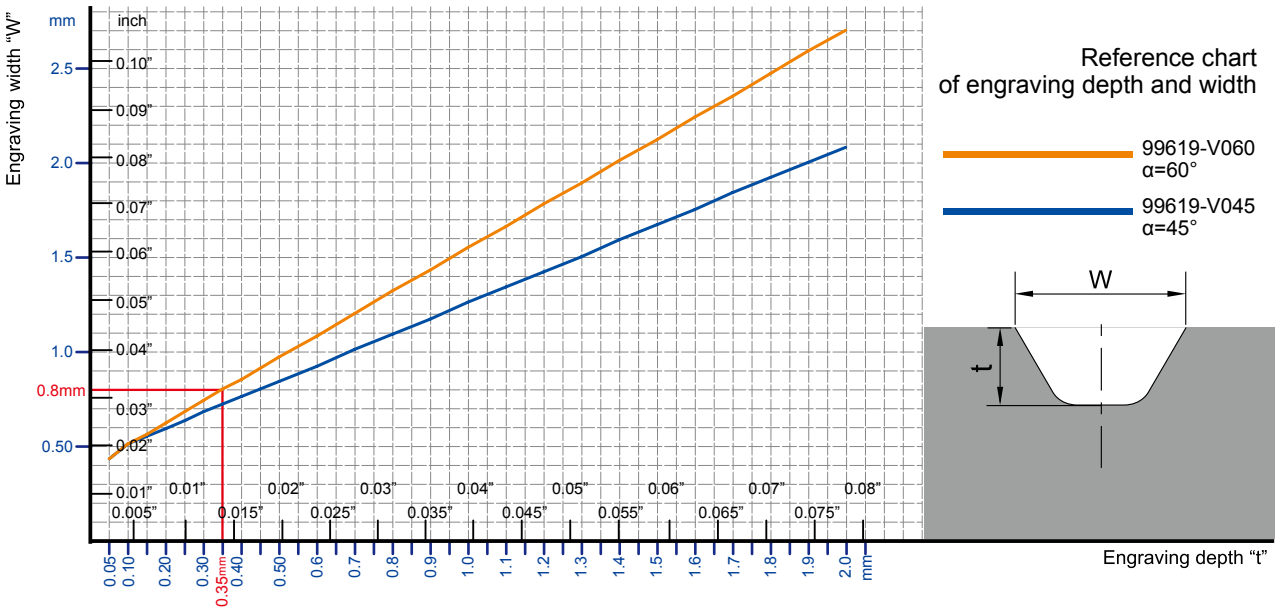
(Tmax. : 0.039")

Workpiece Material	S (r.p.m)	IPR (inch/rev.)	Depth of cut (inch)						Grade of Insert
			1st	2nd	3rd	4th	5th ~	Finishing	
P Carbon steel	8000 ~ 40000	0.00008" ~ 0.00059"	0.012"	0.008"	0.004"	0.004"	0.002"	0.001"	NC2032
P Alloy steel		0.00008" ~ 0.00039"	0.012"	0.004"	0.004"	0.002"	0.002"	0.001"	NC2032, NC2035
M Stainless steel		0.00008" ~ 0.00039"	0.008"	0.004"	0.004"	0.002"	0.002"	0.001"	NC2032
K Cast iron		0.00008" ~ 0.00039"	0.012"	0.004"	0.004"	0.002"	0.002"	0.001"	NC2032
N Non-ferrous metal		0.00008" ~ 0.00079"	0.016"	0.012"	0.008"	0.004"	0.002"	0.001"	XP9001
H Hardened steel < HRC50		0.00008" ~ 0.00024"	0.008"	0.004"	0.002"	0.002"	0.001"	0.0008"	NC2035

Cutting Data >> V045/V060 Engraving

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

V045/V060 T1W06

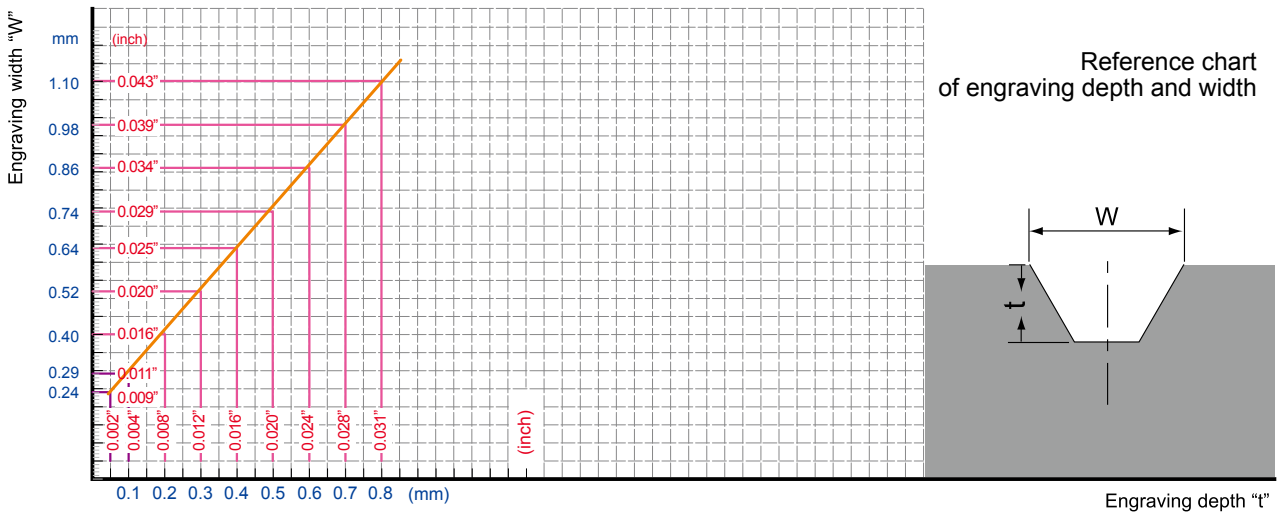


Work Material		S (r.p.m)	IPR (inch/rev.)	Grade of Insert
P	Carbon steel	5000~40000	0.0003~0.0020	NC2071,NC2032
P	Alloy steel	5000~40000	0.0003~0.0012	NC2032,NC2071
M	Stainless steel	5000~40000	0.0003~0.0020	NC2071,NC9031
K	Cast iron	5000~40000	0.0003~0.0012	NC2032
N	Non-ferrous metal	5000~40000	0.0003~0.0031	NC2071,NC9031
H	Hardened steel < HRC56	6000~35000	0.0001~0.0004	NC2035

(Tmax.:0.079")

Material \ Ap		1st	2nd	3rd	4th	5th	6th	~	Fine finishing
P	Carbon steel	0.031"	0.024"	0.012"	0.008"	0.004"	~	~	0.002"
P	Alloy steel	0.020"	0.016"	0.012"	0.012"	0.008"	0.008"	0.004"	0.002"
M	Stainless steel	0.020"	0.016"	0.012"	0.012"	0.008"	0.008"	0.004"	0.002"
K	Cast iron	0.031"	0.024"	0.012"	0.008"	0.004"	~	~	0.002"
N	Non-ferrous metal	0.039"	0.031"	0.008"	~	~	~	~	0.002"
H	Hardened steel < HRC56	0.008"	0.008"	0.006"	0.006"	0.004"	0.004"	0.004"	0.002"

V060 T1W03



Workpiece Meterial		S (r.p.m)	IPR (inch/rev.)	Grade of Insert
P	Carbon steel	8000 ~ 40000	0.0002 ~ 0.0006	NC2032
P	Alloy steel	6000 ~ 35000	0.0002 ~ 0.0004	NC2032
M	Stainless steel	8000 ~ 35000	0.0001 ~ 0.0004	NC9036
K	Cast iron	6000 ~ 35000	0.0002 ~ 0.0006	NC2032
N	Non-ferrous metal	8000 ~ 40000	0.0002 ~ 0.0006	NC9036
S	Ti, Ti-alloy	6000 ~ 15000	0.0001 ~ 0.0004	NC9036

(Tmax.:0.0315")

Material \ Ap		1st	2nd	3rd	4th	5th	~	Fine finishing
P	Carbon steel	0.0118"	0.0080"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
P	Alloy steel	0.0118"	0.0040"	0.0040"	0.0020"	0.0020"	0.0020"	0.0012
M	Stainless steel	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
K	Cast iron	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
N	Non-ferrous metal	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012
S	Ti, Ti-alloy	0.0080"	0.0040"	0.0040"	0.0040"	0.0020"	0.0020"	0.0012

NC Deburring >>>

60° & 90°

Ideal for fine hole deburring.

P M K N

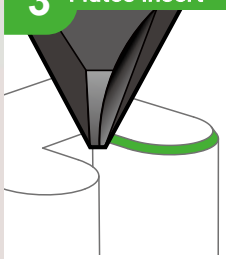
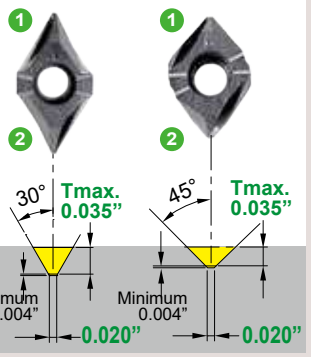
Indexable Type, High Precision Ground Carbide Insert.

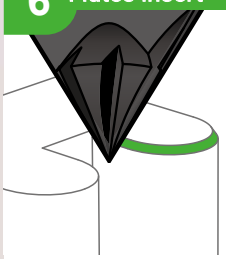
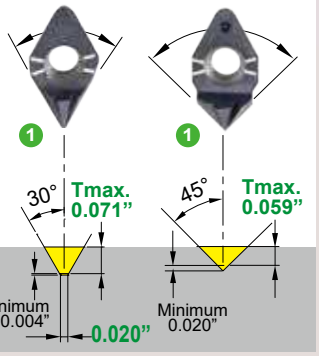
- Achieve high speed and high feed deburring and chamfering on CNC machine.
- Retain exceptional positional accuracy of the deburring depth and diameter.





Features>

X060A..T3			
3 Flutes insert	2 cutting edges		
	60°	90°	
			
• Good for interior angles < 90°. • The chip removing space is bigger.	30° Tmax. 0.035” Minimum 0.004” 0.020”	45° Tmax. 0.035” Minimum 0.004” 0.020”	

X060A..T6			
6 Flutes insert	single cutting edge		
	60°	90°	
			
• Good for simple contours. • Fast deburring, Time saving!	30° Tmax. 0.071” Minimum 0.004” 0.020”	45° Tmax. 0.059” Minimum 0.020”	

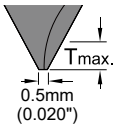
NC Deburring 60°& 90°

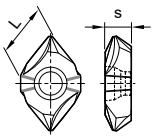
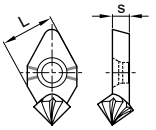


Inserts >>

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

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



Angle	Part No.	Coating	Grade	Flutes		Dimensions L	Dimensions S	Tmin.	Tmax.
60°	X060A60T3-NC2032	TiAlN	K20F	3		6 (0.236")	2.8 (0.110")	0.1 (0.004")	0.9 (0.035")
	X060A60T3-XP9001	Uncoated							
90°	X060A90T3-NC2032	TiAlN							
	X060A90T3-XP9001	Uncoated							
NEW 60°	X060A60T6-NC2032	TiAlN	K20F	6		6 (0.236")	2.0 (0.079")	0.1 (0.004")	1.8 (0.071")
NEW 90°	X060A90T6-NC2032							0.5 (0.020")	1.5 (0.059")

Holder >>

• Using same tool holder of X060 engraving tool.





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		60 (2.362")		
99619-X060-06LS	Steel				
99619-X060-06XL	Carbide		100 (3.937")		
NEW 99619-X060-08	Steel	8 (0.315")	60 (2.362")		

Cutting Data >>

Workpiece Material		S (r.p.m.)	Feed Rate (inch / tooth)	Grade of Insert
P	Carbon steel	8000~40000	0.00020 ~ 0.0020	NC2032
P	Alloy steel	6000~35000	0.00020 ~ 0.0016	
M	Stainless steel	6000~25000	0.00020 ~ 0.0012	
K	Cast iron	6000~35000	0.00020 ~ 0.0012	
N	Non-ferrous metal	8000~40000	0.00020 ~ 0.0020	XP9001

MCC Mill >>>

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

P M K N H

MCC Minimum Consumable Cutting Indicator 5%

- Various MCC inserts can fit on the same holder.
- Ø5(mm)
- 6 Cutting Flutes



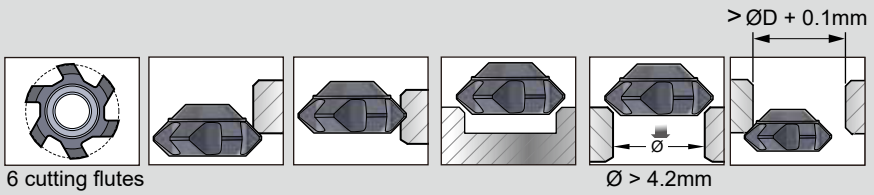
Features >>>

- **Thanks for special insert geometry and Nine9 clamping system to provide high precision and accurate position.**
- **Specialized on narrow space below 10mm by indexable inserts.**
  - Min. deburring bore from Ø4.2 ~ Ø10mm.
  - The smallest insert Ø5.0 can do M6xP0.75 internal threading and deburring.
  - For external different threading pitch can be done by NC programing.
    For example: Ø10.0mm insert can do external, threading pitch from P1.25 to P2.0mm, save your tool inventory.





MCC Mill- Deburring



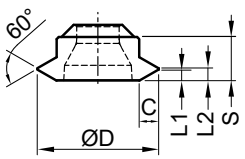


Inserts >>

NC2032: • TiAlN coating provides longer tool life.
• For all kinds of steel < 60 HRC, carbon steel, alloy steel and cast iron.
XP9000: • High positive and sharp edge produces excellent surface finish.
• For non-ferrous material such as aluminum, brass, copper and soft material.

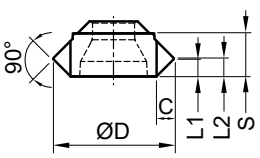
60° deburring

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

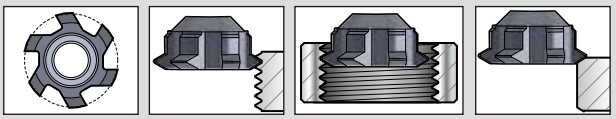
Insert Type	Parts No.	Coating	Grade		ØD ±0.025	L1	L2	S ±.025	C	Plunge 0.1C min. hole	Plunge 0.1C max. hole
CR05	R06005-05010-32	TiAlN	K20F		5.0 (.197")	0.35 (.014")	0.45 (.018")	2.0 (.079")	0.40 (.016")	4.1 (.161")	4.8 (.189")
	R06005-05010-00	Uncoated									
CR07	R06007-06810-32	TiAlN	K20F		6.8 (.268")	0.40 (.016")	0.50 (.020")	2.35 (.093")	0.50 (.020")	5.7 (.224")	6.6 (.260")
	R06007-06810-00	Uncoated									
CR10	R06010-08510-32	TiAlN	K20F		8.5 (.335")	0.49 (.019")	0.59 (.023")	3.60 (.142")	0.65 (.026")	7.1 (.280")	8.3 (.327")
	R06010-08510-00	Uncoated									
	R06010-10010-32	TiAlN			10.0 (.394")	0.90 (.035")	1.00 (.039")	3.60 (.142")	1.20 (.047")	7.1 (.280")	9.8 (.386")
	R06010-10010-00	Uncoated									

90° deburring

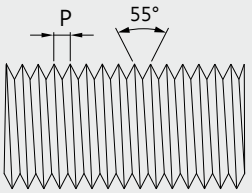
• Front and back deburring in one operation.

Insert Type	Parts No.	Coating	Grade		ØD ±0.025	L1	L2	S ±.025	C	Plunge 0.1C min. hole	Plunge 0.1C max. hole
CR05	R09005-05060-32	TiAlN	K20F		5.0 (.197")	0.60 (.024")	1.20 (.047"	2.0 (.079")	0.40 (.016")	4.1 (.161")	4.8 (.189")
	R09005-05060-00	Uncoated									
CR07	R09007-07020-32	TiAlN	K20F		7.0 (.276"	1.00 (.039")	1.20 (.047")	2.35 (.093")	0.7 (.028")	5.3 (.209")	6.8 (.268")
	R09007-07020-00	Uncoated									
CR10	R09010-10010-32	TiAlN	K20F		10.0 (.394")	1.45 (.057")	1.55 (.061")	3.60 (.142")	1.20 (.047")	7.4 (.291")	9.8 (.386")
	R09010-10010-00	Uncoated									

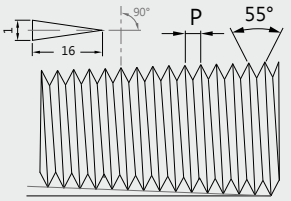
MCC Mill- Threading



6 cutting flutes



55° Parallel thread

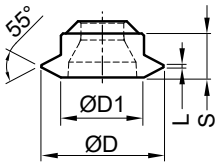


55° Tapered thread

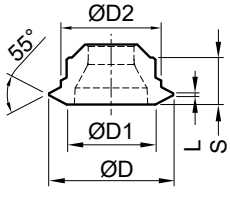
Inserts >>

NC2032: • TiAlN coating provides longer tool life.
• For all kinds of steel < 50 HRC, carbon steel, alloy steel and cast iron.
XP9000: • High positive and sharp edge produces excellent surface finish.
• For non-ferrous material such as aluminum, brass, copper and soft material.

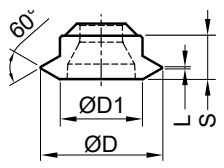
55° Parallel Thread

Insert Type	Parts No.	Coating	Grade		ØD ±0.025	ØD1	L	S ±0.025	Pitch range TPI
CR07	R05507-06512-32	TiAlN	K20F		6.56 (.258")	5.32 (.209")	0.12 (.005")	2.35 (.093")	28
	R05507-06512-00	Uncoated							
CR10	R05510-10018-32	TiAlN	K20F		10.0 (.394")	6.92 (.272")	0.18 (.007")	3.60 (.142")	19 - 14
	R05510-10018-00	Uncoated							

55° PT Threading (Tapered Thread)

Insert Type	Parts No.	Coating	Grade		ØD ±0.025	ØD1	ØD2	L	S ±0.025	Pitch range TPI
CR10	R05510-09516-32	TiAlN	K20F		9.50 (.374")	6.8 (.268")	7.68 (.302")	0.16 (.006")	3.60 (.142")	19
	R05510-09516-00	Uncoated								
	R05510-10025-32	TiAlN	K20F		10.0 (.394")	6.8 (.268")	7.58 (.298")	0.25 (.010")	3.60 (.142")	14
	R05510-10025-00	Uncoated								

60° Parallel Thread

Insert Type	Parts No.	Coating	Grade		ØD ±0.025	ØD1	L	S ±0.025	Pitch range mm	Pitch range TPI
CR05	R06005-05006-32	TiAlN	K20F		5.0 (.197")	3.9 (.154")	0.06 (.002")	2.0 (.079")	0.6 - 0.75	32 - 28
	R06005-05006-00	Uncoated								
	R06005-05010-32	TiAlN			5.0 (.197")	3.9 (.154")	0.10 (.004")	2.0 (.079")	0.8 - 1.0	28 - 24
	R06005-05010-00	Uncoated								
CR07	R06007-06810-32	TiAlN	K20F		6.8 (.268")	5.5 (.217")	0.10 (.004")	2.35 (.093")	0.8 - 1.25	28 - 20
	R06007-06810-00	Uncoated								
CR10	R06010-08510-32	TiAlN	K20F		8.5 (.335")	6.9 (.272")	0.10 (.004")	3.60 (.142")	1.0 - 1.5	24 - 18
	R06010-08510-00	Uncoated								
	R06010-10010-32	TiAlN			10.0 (.394")	6.9 (.272")	0.10 (.004")	3.60 (.142")	1.0 - 2.0	24 - 13
	R06010-10010-00	Uncoated								

MCC Mill

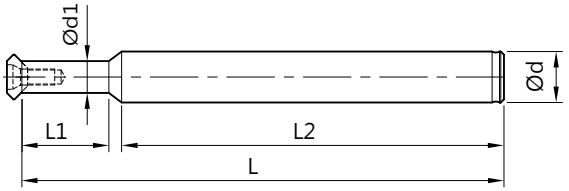
Feature >>

• Patented pocket design for accurate positioning.



Holder >>

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





Insert Type	Parts No.	Type	Shank	Ød	Ød1	L1	L2	L	Screw / Key
CR05	00-99626-CR05-06-039	BC06-CR05-039	Steel	6 (.236")	3.5 (.138")	4 (.157")	33 (1.299")	39 (1.535")	*NS-20045 0.6Nm / NK-T6
	00-99626-CR05-06-045	BC06-CR05-045		6 (.236")	3.5 (.138")	10 (.394")	33 (1.299")	45 (1.772")	
	00-99626-CR05-08-076	BC08-CR05-076		8 (.315")	3.5 (.138")	10 (.394")	60 (2.362")	74 (2.913")	
	00-99626-CR05-05-043	BC05-CR05-043		5 (.197")	3.5 (.138")	16 (.630")	24.25 (0.955")	41 (1.614")	
	00-99626-CR05-06-051	BC06-CR05-051		6 (.236")	3.5 (.138")	16 (.630")	33 (1.299")	51 (2.008")	
	00-99626-CR05-06-051W	BC06-CR05-051W	Carbide	6 (.236")	3.5 (.138")	16 (.630")	33 (1.299")	51 (2.008")	
CR07	00-99626-CR07-06-041	BC06-CR07-041	Steel	6 (.236")	5.0 (.197")	6 (.236")	33 (1.299")	41 (1.614")	*NS-25060 0.9Nm / NK-T7
	00-99626-CR07-08-078	BC08-CR07-078		8 (.315")	5.0 (.197")	13.65 (0.537")	60 (2.362")	75.65 (2.978")	
	00-99626-CR07-06-049	BC06-CR07-049		6 (.236")	5.0 (.197")	14 (.551")	33 (1.299")	49 (1.929")	
	00-99626-CR07-06-052	BC06-CR07-052		6 (.236")	5.0 (.197")	21.65 (0.852")	27.5 (1.083")	49.65 (1.955")	
	00-99626-CR07-06-057	BC06-CR07-057		6 (.236")	5.0 (.197")	22 (.866")	33 (1.299")	57 (2.244")	
	00-99626-CR07-06-057W	BC06-CR07-057W	Carbide	6 (.236")	5.0 (.197")	22 (.866")	33 (1.299")	57 (2.244")	
CR10	00-99626-CR10-08-049	BC08-CR10-049	Steel	8 (.315")	6.8 (.268")	7 (.276")	40 (1.575")	49 (1.929")	NS-35080 2.5Nm / NK-T15
	00-99626-CR10-08-082	BC08-CR10-082		8 (.315")	6.8 (.268")	16.4 (0.646")	60 (2.362")	78.4 (3.087")	
	00-99626-CR10-08-059	BC08-CR10-059		8 (.315")	6.8 (.268")	17 (.669")	40 (1.575")	59 (2.323")	
	00-99626-CR10-08-069	BC08-CR10-069		8 (.315")	6.8 (.268")	27 (1.063")	40 (1.575")	69 (2.717")	
	00-99626-CR10-08-084W	BC08-CR10-084W	Carbide	8 (.315")	6.8 (.268")	27 (1.063")	55 (2.165")	84 (3.307")	

*Torque screwdriver is recommended.

Single Set >>

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

Example:

Parts No.	Insert included				Holder included		Content
	Type / grade	ØD ±0.025	C	S ±.025	Shank	L	
00-99626-R106-4101	R09005-05060-32	5.0 (.197")	0.4 (.016")	2.00 (.079")	00-99626-CR05-06-051	51 (2.007")	1 tool holder + 1 inserts + 1 key
00-99626-R306-4301	R09007-07020-32	7.0 (.276")	0.7 (.028")	2.35 (.093")	00-99626-CR07-06-057	57 (2.244")	
00-99626-R606-4601	R09010-10010-32	10.0 (.394")	1.20 (.047")	3.60 (.142")	00-99626-CR10-08-069	49 (1.929")	

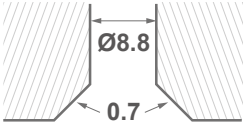
Cutting Data

60° & 90° deburring mill >>

	Workpiece material	SFM	Feed rate (inch / tooth)	Grade of insert
P	Carbon steel	260 ~ 660	0.0002" ~ 0.0047"	NC2032
P	Alloy steel	200 ~ 500	0.0002" ~ 0.0043"	NC2032
M	Stainless steel	130 ~ 390	0.0002" ~ 0.0043"	NC2032
K	Cast iron	200 ~ 500	0.0002" ~ 0.0043"	NC2032
N	Non-ferrous metal	330 ~ 500	0.0002" ~ 0.0059"	XP9000
H	Hardened steel < 60 HRC	100 ~ 260	0.0002" ~ 0.0020"	NC2032

Performance >>

Work Task: 0.7 back chamfering
Material: Stainless Steel
Machine: MECTRON MTS-C420



Tool		 MCC Deburring Mill	 Carbide chamfering cutter
Deburring		0.7 mm	0.7 mm
Dia. of cutter	**mm**	7	8
Teeth of cutter		6	3
Spindle Speed	**r.p.m.**	2500	2500
Feed rate	**mm/min**	300	150
		RESULT	
Tool life		***720*** workpiece **8 times higher**	90 workpiece

Comparison of Surface Quality >>

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

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



Tool: Other brand chamfering cutter



Cutting Data

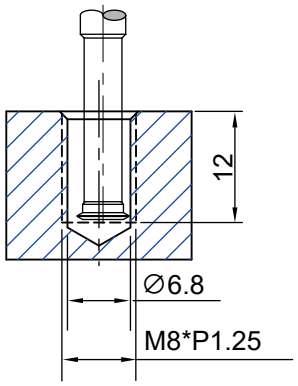
55° & 60° thread milling >>

	Workpiece material	SFM	Feed rate (inch / tooth)	Grade of insert
P	Carbon steel	130 ~ 390	0.00008" ~ 0.0005"	NC2032
P	Alloy steel	100 ~ 300	0.00008" ~ 0.0004"	NC2032
M	Stainless steel	100 ~ 260	0.00008" ~ 0.0004"	NC2032
K	Cast iron	130 ~ 330	0.00008" ~ 0.0004"	NC2032
N	Non-ferrous metal	200 ~ 660	0.00008" ~ 0.0005"	XP9000
H	Hardened steel < 50 HRC	66 ~ 200	0.00008" ~ 0.0003"	NC2032

Sample program of internal thread milling

Workpiece: Carbon steel
Thread: M8xP1.25
Prebore: ø6.8 depth 12 mm
Tool holder: 00-99626-CR07-06-049
Insert: R06007-06810-32

Cutting data:
Vc= 100 m/min. fz= 0.005mm/tooth
S= 4680 rpm F= 140.4 mm/min. (feed rate of tool center)



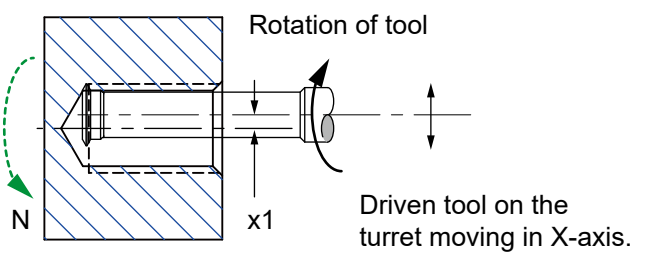

```
%1030
G00G90X0.Y0.
S4680 M03
G43H03Z30. M08
Z5.
G01 Z-12. F200.
G03 X0.65 Y0. R0.8 F46.8
G03 I-0.65 Z0-10.75 F140.4
G03 I-0.65 Z-9.5
G03 I-0.65 Z-8.25
G03 I-0.65 Z-7.
G03 I-0.65 Z-5.75
G03 I-0.65 Z-4.5
G03 I-0.65 Z-3.25
G03 I-0.65 Z-2.
G03 I-0.65 Z-0.75
G03 I-0.65 Z0.5
G00 G90 Z5. M09
G00 G90 Z30. M05
G28 G91 Z0.
M30
%
```

For thread milling on
CNC turning machine without Y-axis.

Ftc=F= S * fz * z

Work spindle speed N:
N = Ftc/2*π * x1

x1 is the depth of thread



Z-axis feed rate= pitch of thread (mm)
Direction of N depends on the left hand or right hand thread.

Chamfer Mill >>>

45° Front And Back Chamfering!

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

P M K N H



Economical

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



Features >>>

Excellent Repeatability

- Smallest Indexable counter sink, diameter Ø7 mm (0.275”).
- The insert is dual-relief angle, specially edge honning and optimized coated for high cutting speed.
- Optimized the number of teeth on the holder to achieve higher feed rate.



Applications

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

Eliminate 2nd Operation Or Deburring Time.

Applications

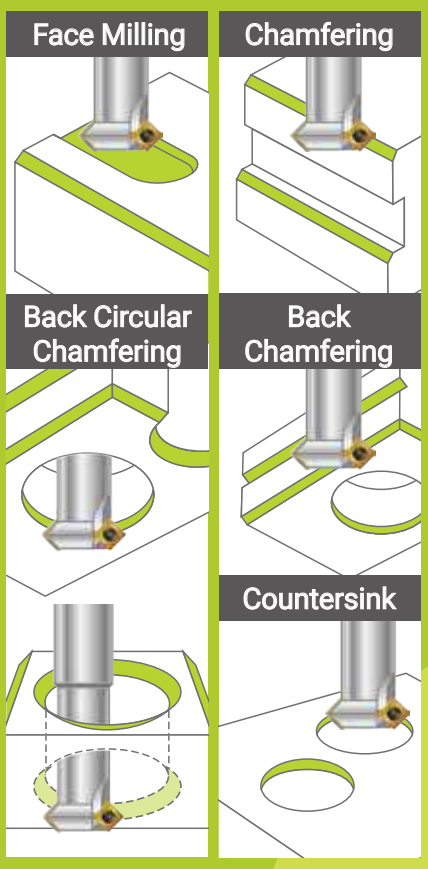






"
- Ultra high speed and feed rate.
- 4 times faster in cutting speed and up to 10 times higher in feed rate.

"



Indexable Chamfer Mill

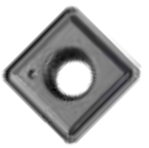
Features >>

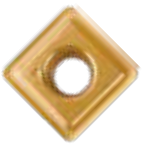
- Benefiting from the specially ground dual-relief insert and optimized coating, higher feed rate and cutting speed can be achieved on chamfering operation.
- Each insert has 4 cutting edges, reducing insert cost.
- Fine edge honning cutting edge, good chip breaking condition and long tool life.

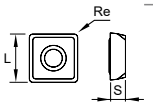
Inserts >>

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

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

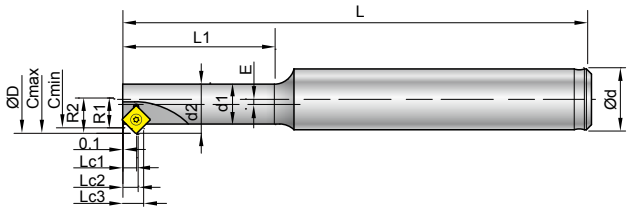

NC2032

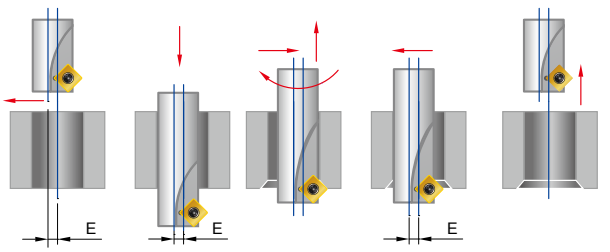

NC9071

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 >>

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

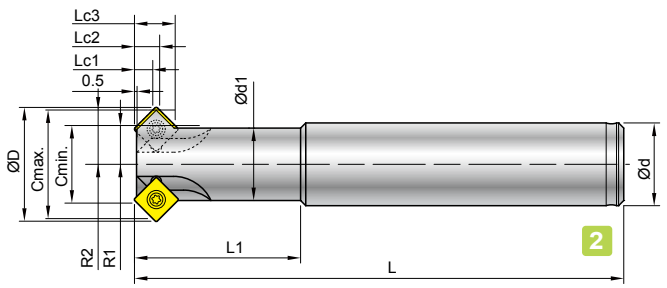




Parts No.	Thread Size	Cmin ø	Cmax ø	ød	ød1	ød2	øD	R1	R2	L	L1	Lc1	Lc2	Lc3	E	◇z	Insert Screw / Key
99616-C02	M8	6.8 (0.268")	8.8 (0.346")	10 (0.394")	5.25 (0.207")	6.5 (0.256")	9 (0.354")	3.4 (0.134")	4.4 (0.173")	80 (3.15")	20 (0.787")	2.56 (0.100")	2.93 (0.115")	3.93 (0.155")	1.25 (0.049")	1	N9GX04T002 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	

Holder >>

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



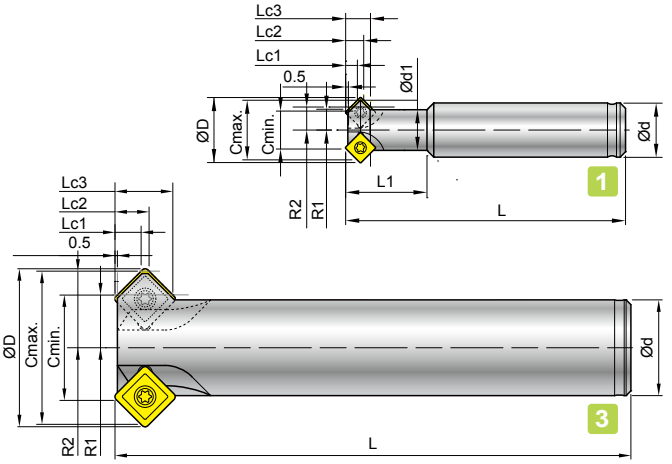
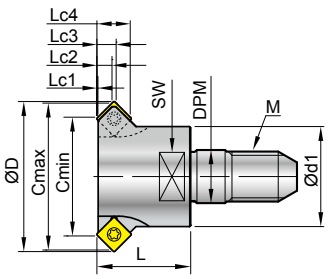


Fig	Parts No.	Type	Cmin ø	Cmax ø	ød	ød1	øD	R1	R2	L	L1	Lc1	Lc2	Lc3	◌z	Insert Screw / Key
1	99616-C10	BC10-C07-60	7 (0.276")	11 (0.433)	10 (0.394")	7.5 (0.295")	12 (0.472")	3.5 (0.138")	5.5 (0.217")	60 (2.362")	15 (0.590")	2.6 (0.102")	2.9 (0.114")	4.6 (0.181")	2	N9GX04T002 NS-18037 0.6Nm NK-T6
	99616-C20	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	

Screw Fit Cutter >>

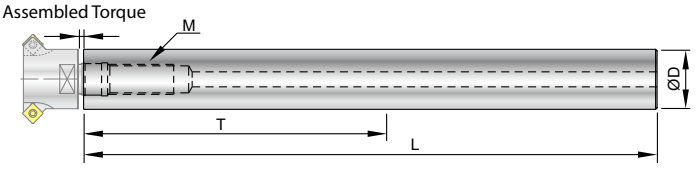
- Quick and easy to change system and provides chamfering flexibility.
- Capable of extended overhangs by almost any kind of the screw-fit tool holder or extension bar in the market.



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
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	NS-18037 0.6Nm NK-T6
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	
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	N9GX060204 NS-22055 0.9Nm / NK-T7

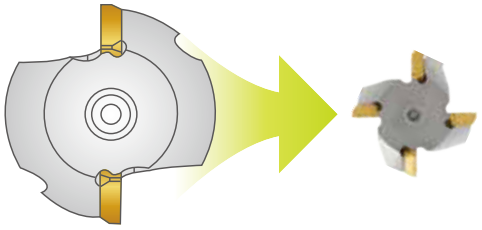
Solid Carbide Extension Bar >>

- 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

Performance



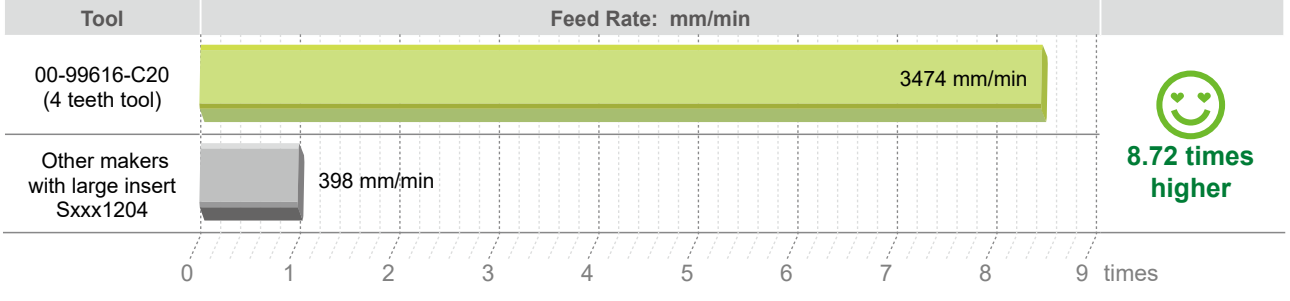
Feed Rate =
Feed per Tooth x Spindle Speed x **No. of Flute** mm/min.

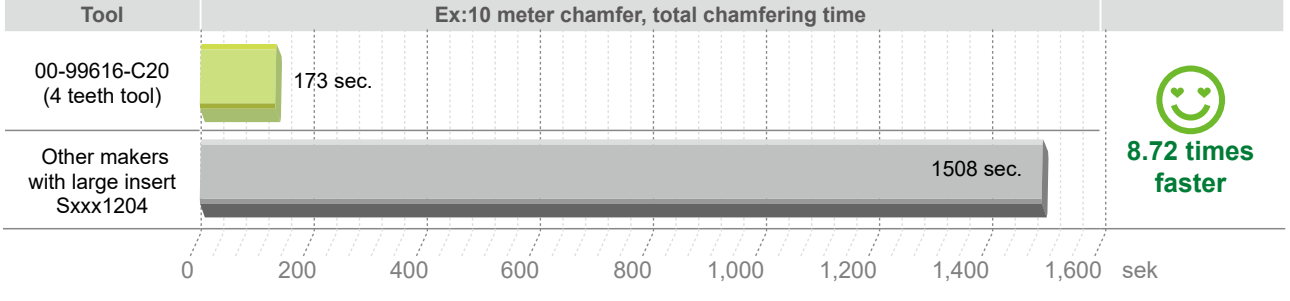
UP **Spindle Speed** = $\frac{\text{Cutting Speed x 1000}}{\pi \text{ x Cmin.}}$

Comparison >>

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

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





Cutting Data

99616-C02, C04, C06 Cutting Data >>

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

99616-C10~C52 Cutting Data >>

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

ER Indexable Cutter >>>

ERgo just say “ergo”.

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

P M N

3 Different Sizes Of Integrated ER Taper-Shank Cutter

- ER11 / ER16 / ER20



Concept >>>

An Integrated ER Taper-Shank Cutter, Eliminate Assembly Tolerance.

A Clamping Force Gained From The 3 Parts Including Ergo Nut, High Strength Ergo Pin And ER Taper.

Ergo Nut Drives The Pin To Push Ergo Holder Into ER Taper. It Is **“ A simple way to maximize clamping force ”**

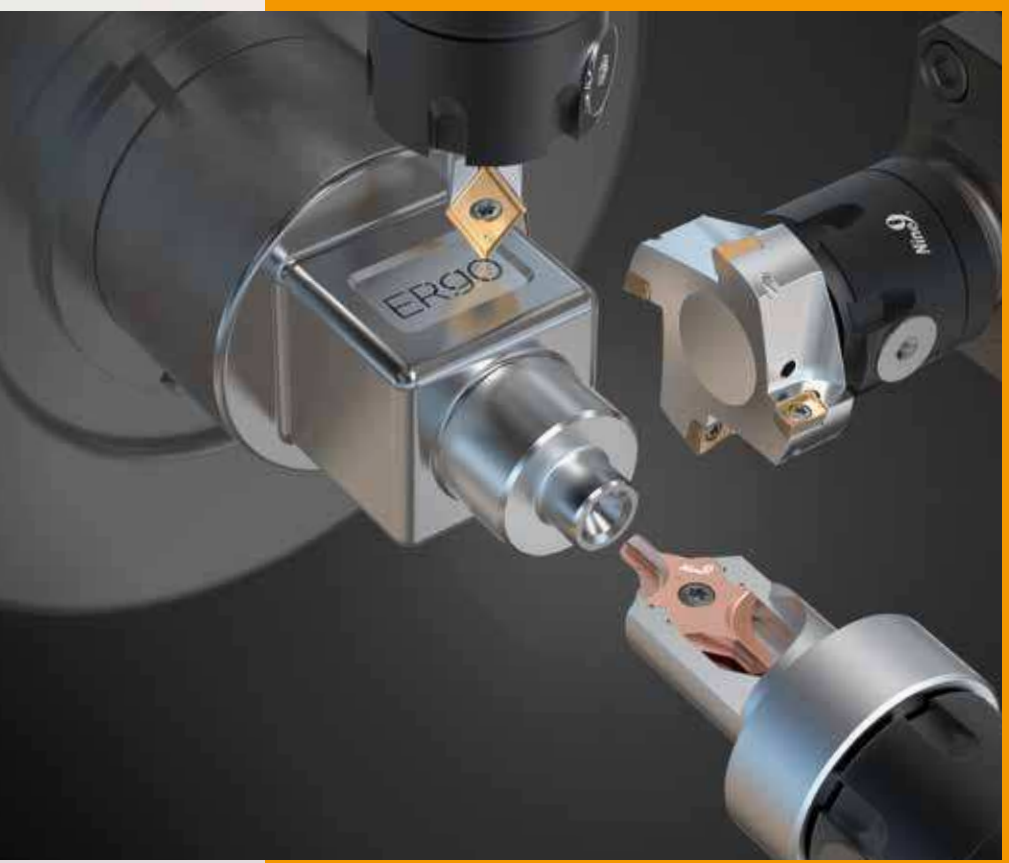
- Short tool length and quick change system for adapting on small working area.
- Ideal solution for BT30, driven tools, tapping and turning center.
- Increase tool life.
- Easy and simple assembly.

Ergo Provide Customized Tooling Service.

Applications

Quick Change, Saving Huge Machine Downtime.

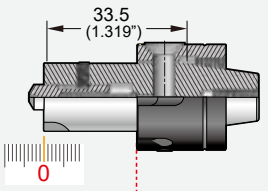
- The simplest way to get tools on the machine.
- 3 fixed tool length groups of Ergo system.
- No need to reset tool length while changing tools in the same group.



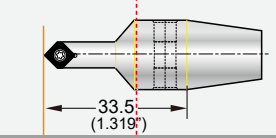
"The Ergo system includes milling cutter, spot drills, engraving tools, deburring tools, chamfering tools, and center drills."

OAL: 33.5mm (1.319") Group

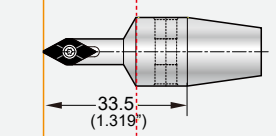
Tool Length Setter



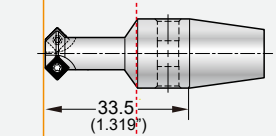
Multi-Functional Tool



Engraving & Deburring

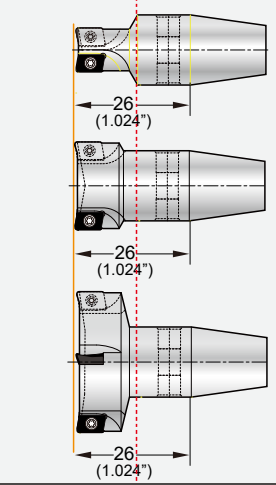


Chamfer Mill



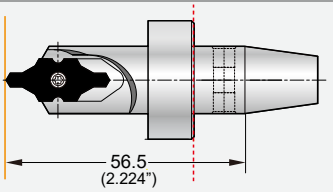
OAL: 26mm (1.024") Group

Power Mill Ø10 ~ Ø32mm (0.394" ~ 1.260")



OAL: 56.5 mm (2.224")

i-Center



ER16 — i-Center

Internal coolant

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

Centering: DIN 332 R, DIN 332 A+B

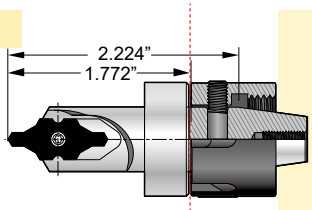
Spotting & Csink: 60°,90°& 120°

I9MT1003

R / A+B

Ø .039"~Ø .124"

60° 90° 120°



ER16 — X060

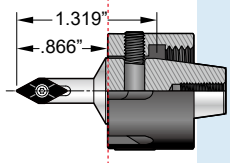
G4.0 20,000 r.p.m.

Spotting/Engraving 30° ~ 142°

Deburring 60° & 90°

X060

30° 45° 60° 90° 120° 142° 60° 90°



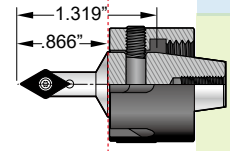
ER16 — Multi-Functional Tool

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

Spotting, Chamfering

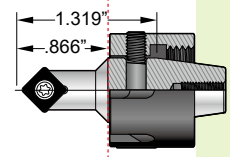
V060

60°



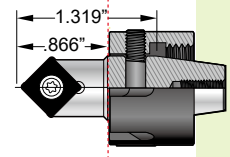
N9MT0802

90°



N9MT11T3

90°



ER16 — Chamfer Mill

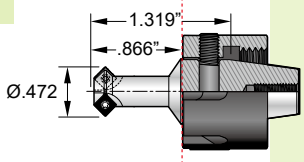
G6.3 10,000 r.p.m.

Front & Back Chamfering

Face Milling

N9GX04T002

45°



ER11 / ER16 / ER20 — Power Mill

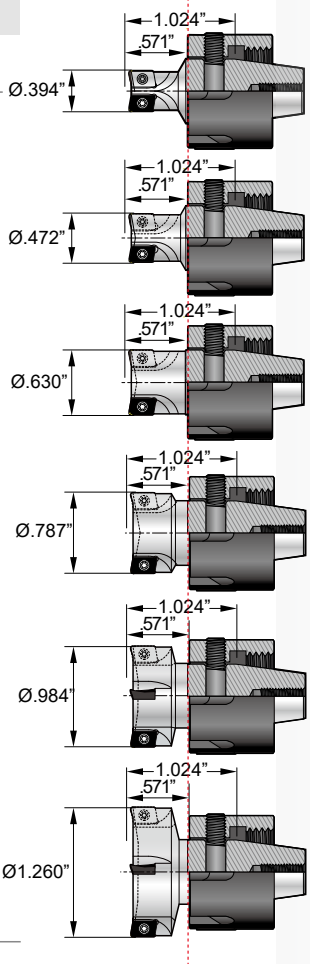
G6.3 10,000 r.p.m.

Ø .394" ~ Ø 1.260"

Smaller, sharper and more effective teeth.

A9GT0602

Re .004"
Re .008"
&
Re .020"



99816-IC10BH

99816-X060

99816-V060

99816-610

99816-614

99816-C10

99816-10A06

99816-12A06

99816-16A06

99816-20A06

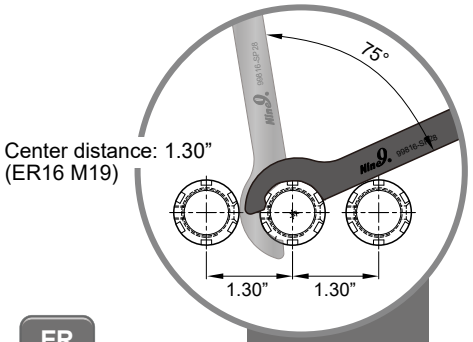
99816-25A06

99816-32A06

OAL
=
2.224”

OAL
=
1.319”

OAL
=
1.024”

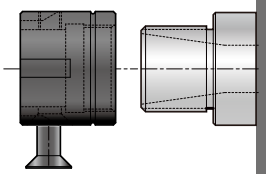


ER 11

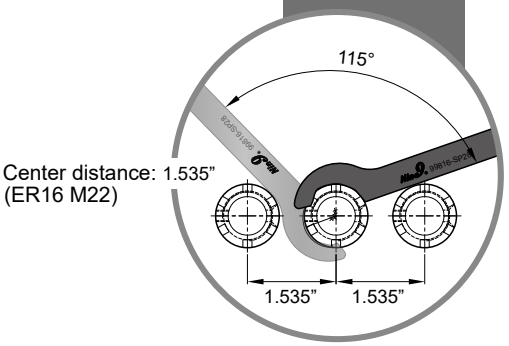
ER 16

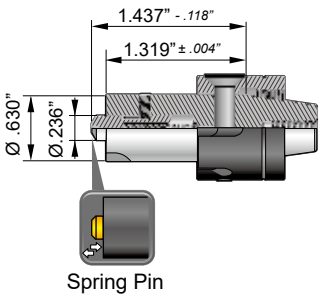
ER 20

Pin & Nut
are sold separately.



Pre-Balanced





Ergo Setter TP

99816-TP

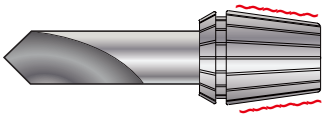
99811 99816 99820

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

Ergo's Features

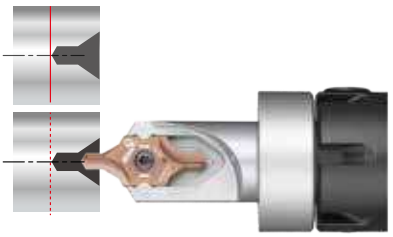
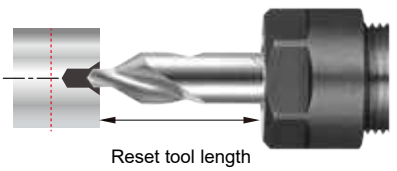
Optimize the rigidity >>

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

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

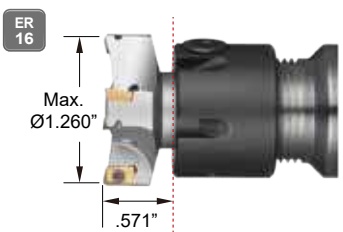
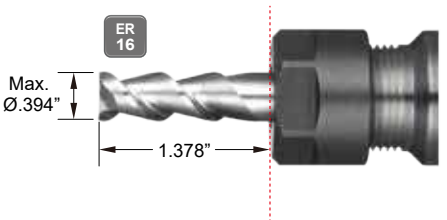
Excellent repeatability, saving set-up time >>

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

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

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

- Cover milling cutter range from Ø10 to Ø32mm (Ø .394"~ Ø1.260").
- More efficiency and the possibilities to cut bigger parts.
- The shorter tool length, the better run-out accuracy.

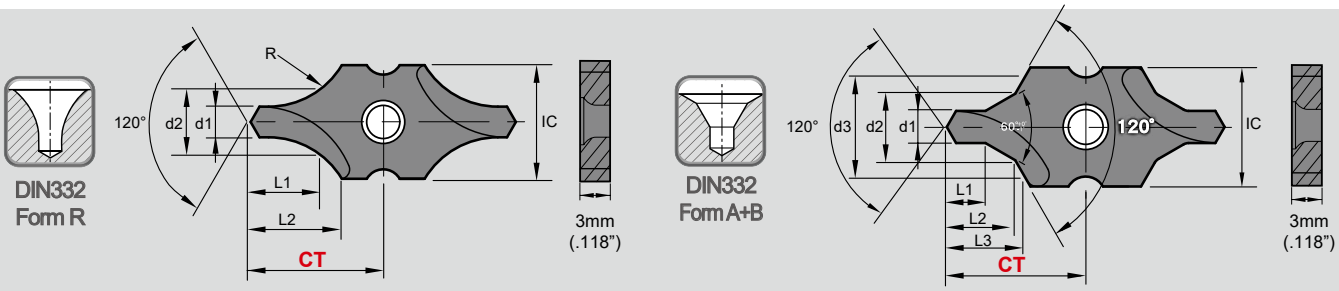
Ergo indexable cutter	Solid carbide end mill
	

Easy and simple assembly >>

- A simple Ergo cutter has minimal assemble parts, saving 50% your time.
- Thanks to ER taper, the repeatability of assemble tolerance is ±0.1mm (.0039") while changing same tool length of Ergo holder.

Ergo cutter	Solid carbide cutter
	

i-Center Indexable Center Drill



For DIN332 Form R Center Hole >>

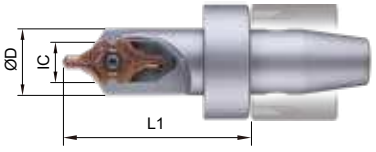
IC	Parts No.	Coating	Grade	d1		d2	L1	L2	R	CT ±0.025 (.001")
10 (.394")	I9MT1003R0100-NC2057	AlTiN+ TiSiN	P35	1.00 (.039")	+0.14 (.006") 0	2.12 (.083")	2.16 (.085")	4.72 (.186")	2.80 (.110")	12.35 (.486")
	I9MT1003R0125-NC2057			1.25 (.049")		2.65 (.104")	2.74 (.108")	5.22 (.206")	3.50 (.138")	
	I9MT1003R0150-NC2057			1.50 (.059")		3.60 (.142")	3.67 (.144")	6.14 (.242")	5.00 (.197")	
	I9MT1003R0160-NC2057			1.60 (.063")		3.35 (.132")	3.45 (.136")	5.32 (.210")	4.50 (.177")	
	I9MT1003R0200-NC2057			2.00 (.079")		4.25 (.167")	4.45 (.175")	6.50 (.256")	5.65 (.222")	
	I9MT1003R0250-NC2057			2.50 (.098")		5.30 (.209")	5.59 (.220")	7.66 (.302")	7.15 (.281")	
	I9MT1003R0300-NC2057			3.00 (.118")	+0.18 (.007") 0	5.70 (.224")	6.92 (.272")	9.50 (.374")	10.00 (.394")	
	I9MT1003R0315-NC2057			3.15 (.124")		6.70 (.264")	7.21 (.284")	8.93 (.352")	9.00 (.354")	

For DIN332 Form A+B Center Hole >>

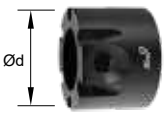
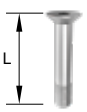
IC	Parts No.	Coating	Grade	d1		d2	d3	L1	L2	L3	CT ±0.025 (.001")
10 (.394")	I9MT1003B0100-NC2057	AlTiN+ TiSiN	P35	1.00 (.039")	+0.14 (.006") 0	2.12 (.083")	3.15 (.124")	1.3 (.051")	2.21 (.087")	2.51 (.099")	12.35 (.486")
	I9MT1003B0125-NC2057			1.25 (.049")		2.65 (.104")	4.00 (.157")	1.6 (.063")	2.75 (.108")	3.14 (.124")	
	I9MT1003B0150-NC2057			1.50 (.059")		3.18 (.125")	4.50 (.177")	2.0 (.079")	3.45 (.136")	3.84 (.151")	
	I9MT1003B0160-NC2057			1.60 (.063")		3.35 (.132")	5.00 (.197")	2.0 (.079")	3.46 (.136")	3.93 (.155")	
	I9MT1003B0200-NC2057			2.00 (.079")		4.25 (.167")	6.30 (.248")	2.5 (.098")	4.39 (.173")	4.98 (.196")	
	I9MT1003B0250-NC2057			2.50 (.098")		5.30 (.209")	8.00 (.315")	3.1 (.122")	5.53 (.218")	6.28 (.247")	
	I9MT1003B0300-NC2057			3.00 (.118")	+0.18 (.007") 0	6.46 (.254")	9.00 (.354")	4.1 (.161")	7.10 (.280")	7.83 (.308")	
	I9MT1003B0315-NC2057			3.15 (.124")		6.70 (.264")	10.0 (.394")	3.9 (.154")	6.90 (.272")	7.85 (.309")	

Basic Holder >>

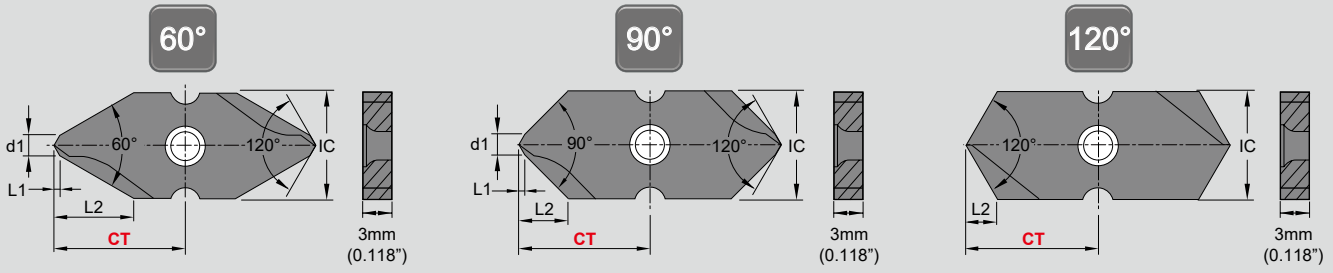
• G6.3 / 10,000 r.p.m. • With internal coolant.

IC	Parts No.	Basic Holder	L1	øD	Screw	Key
10 (.394")	99816-IC10BH		16 (.630")	45 (1.772")	NS-25060 0.9Nm	NK-T7

Accessories - Set & Spare >>

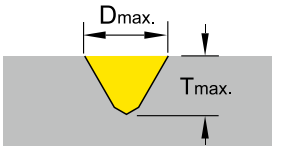
Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
 * Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	99816-M19S	99816-M19	25 (0.948")	M19xP1.0	30 Nm	NS-50025	25 (0.948")	5 Nm	NK-LW3	99816-SP28
	99816-M22S	99816-M22	28 (1.102")	M22xP1.5	30 Nm	NS-50028	28 (1.102")	5 Nm		

i-Center Spotting & Countersink



Insert >>

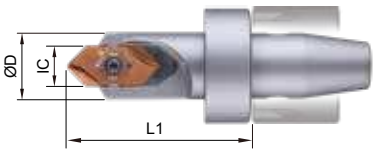
- Double-edged cutting, fully ground insert for improving machining stability.
- NC2057: Universal grade for all kind of steel.
- Each insert has 2 cutting edges.



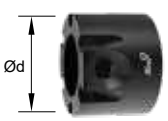
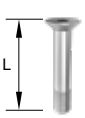
IC	Angle	Parts No.	Coating	Grade	Dimensions			Dmax.	Tmax.	CT ±0.025 (.001")
					d1	L1	L2			
10 (.394")	60°	I9MT1003CT060-NC2057	AlTiN+ TiSiN	P35	2 (.079")	0.58 (.023")	7.5 (.296")	10 (.394")	7.5 (.295")	12.35 (.486")
	90°	I9MT1003CT090-NC2057					4.6 (.181")	10 (.394")	4.6 (.181")	
	120°	I9MT1003CT120-NC2057			-	-	2.9 (.114")	10 (.394")	2.9 (.114")	

Basic Holder >>

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

IC	Parts No.	Basic Holder	L1	øD	Screw	Key
10 (.394")	99816-IC10BH		16 (.630")	45 (1.772")	NS-25060 0.9Nm	NK-T7

Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
 * Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	99816-M19S	99816-M19	25 (0.948")	M19xP1.0	30 Nm	NS-50025	25 (0.948")	5 Nm	NK-LW3	99816-SP28
	99816-M22S	99816-M22	28 (1.102")	M22xP1.5	30 Nm	NS-50028	28 (1.102")	5 Nm		

i-Center Cutting Data

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

Indexable Center Drill >>

Workpiece material			d1 (Pilot Diameter) Ø1 ~ Ø1.25mm (.039" ~ .049")	d1 (Pilot Diameter) Ø1.6 ~ Ø3.15 (.063" ~ .124")		
P	Carbon steel C<0.3%	SFM	21 ~ 125	30 ~ 255	●	○
		IPR inch/rev.	.0008 ~ .0020	.0012 ~ .0024		
	Carbon steel C>0.3%	SFM	21 ~115	30 ~ 230	●	○
		IPR inch/rev.	.0008 ~ .0020	.0012 ~ .0020		
	Low alloy steel C<0.3%	SFM	21 ~100	30 ~200	●	○
		IPR inch/rev.	.0004 ~ .0016	.0008 ~ .0020		
	High alloy steel	SFM	11 ~75	15 ~155	●	○
		IPR inch/rev.	.0004 ~ .0008	.0004 ~ .0016		
M	Stainless steel	SFM	11 ~ 35	15 ~75	● ≥ 5 bar	○
		IPR inch/rev.	.0001 ~ .0004	.0002 ~ .0008		
N	Non-ferrous metal	SFM	62 ~255	80 ~ 515	●	○
		IPR inch/rev.	.0004 ~ .0012	.0004 ~ .0016		

●Best ○Possible

Spotting & Countersink >>

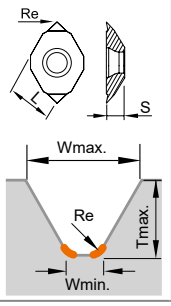
Workpiece Material		Spotting SFM	Spotting IPR (inch/rev.) 60°	Spotting IPR (inch/rev.) 90°	Spotting IPR (inch/rev.) 120°	Countersink SFM	Countersink IPR (inch/rev.)
P	Carbon steel C<0.3%	410 ~ 820	.0016” ~ .008”	.006” ~ .010”	.004” ~ .012”	410 ~ 820	.008” ~ .020”
	Carbon steel C>0.3%	330 ~ 730	.0016” ~ .008”	.004” ~ .002”	.004” ~ .012”	330 ~ 730	.008” ~ .016”
	Low alloy steel C<0.3%	330 ~ 660	.0012” ~ .006”	.003” ~ .008”	.004” ~ .010”	330 ~ 660	.006” ~ .016”
	High alloy steel	260 ~ 590	.0012” ~ .005”	.003” ~ .008”	.004” ~ .010”	260 ~ 590	.004” ~ .012”
M	Stainless steel	200 ~ 410	.0008” ~ .004”	.002” ~ .005”	.003” ~ .006”	200 ~ 410	.003” ~ .012”
N	Non-ferrous metal	500 ~ 1050	.0016” ~ .008”	.004” ~ .010”	.004” ~ .012”	500 ~ 1050	.008” ~ .020”

X060 Micro Spotting & Engraving



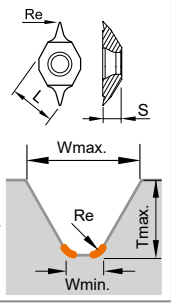
Micro Spotting >>

• Radius Angled Form

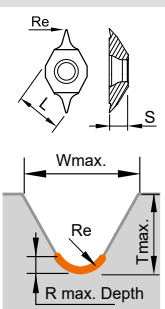
Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
90°	X060A90W010R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.02 (0.0008")	0.1 (0.004")	1.1 (0.043")	0.5 (0.020")
		XP9001	Uncoated								
120°	X060A120W010R	NC2032	TiAlN	K20F				0.02 (0.0008")	0.1 (0.004")	2.53 (0.100")	0.7 (0.028")
142°	X060A142W010R	NC2032	TiAlN	K20F				0.02 (0.0008")	0.1 (0.004")	2.42 (0.095")	0.4 (0.016")

Engraving >>

• Radius Angled Form

Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Wmin.	Wmax.	Tmax.
30°	X060A30W020R	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.04 (0.0015")	0.20 (0.008")	0.52 (0.020")	0.6 (0.024")
		XP9001	Uncoated								
45°	X060A45W020R	NC2032	TiAlN	K20F					0.20 (0.008")	0.86 (0.034")	0.8 (0.031")
		XP9001	Uncoated								
60°	X060A60W020R	NC2032	TiAlN	K20F					0.20 (0.008")	1.36 (0.054")	1.0 (0.039")
		XP9001	Uncoated								
90°	X060A90W020R	NC2032	TiAlN	K20F					0.20 (0.008")	2.20 (0.087")	1.0 (0.039")
		XP9001	Uncoated								

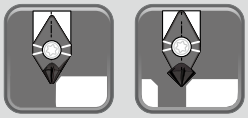
• Radius Form

Angle	Parts No.		Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	R max. Depth	Wmax.	Tmax.
30°	X060A30R020	NC2032	TiAlN	K20F		6 (0.236")	2.05 (0.081")	0.2 (0.008")	0.15 (0.006")	0.63 (0.025")	0.6 (0.024")
		XP9001	Uncoated								
45°	X060A45R020	NC2032	TiAlN	K20F					0.12 (0.005")	0.93 (0.037")	0.8 (0.031")
		XP9001	Uncoated								
60°	X060A60R020	NC2032	TiAlN	K20F					0.1 (0.004")	1.39 (0.055")	1.0 (0.039")
		XP9001	Uncoated								

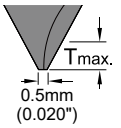
More & Cutting Data >>

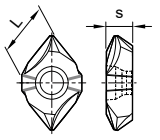
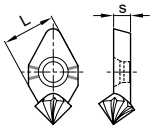
• For more micro spotting insert & cutting data, please refer to page 2-23.
For more engraving insert & cutting data, please refer from page 3-64~75.

X060 Deburring



Deburring >>



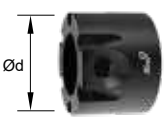
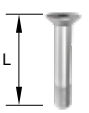
Angle	Part No.	Coating	Grade	Flutes		Dimensions L	Dimensions S	Tmin.	Tmax.
60°	X060A60T3-NC2032	TiAlN	K20F	3		6 (0.236")	2.8 (0.110")	0.1 (0.004")	0.9 (0.035")
	X060A60T3-XP9001	Uncoated							
90°	X060A90T3-NC2032	TiAlN							
	X060A90T3-XP9001	Uncoated							
60°	X060A60T6-NC2032	TiAlN	K20F	6		6 (0.236")	2.0 (0.079")	0.1 (0.004")	1.8 (0.071")
90°	X060A90T6-NC2032							0.5 (0.020")	1.5 (0.059")

Basic Holder >>

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

Parts No.	Basic Holder	L1	Screw	Key
99816-X060		22 (0.866")	NS-22044 0.9Nm	NK-T7

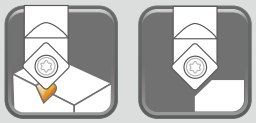
Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
 * Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	99816-M19S	99816-M19	25 (0.948")	M19xP1.0	30 Nm	NS-50025	25 (0.948")	5 Nm	NK-LW3	99816-SP28
	99816-M22S	99816-M22	28 (1.102")	M22xP1.5	30 Nm	NS-50028	28 (1.102")	5 Nm		

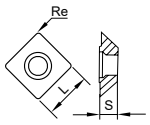
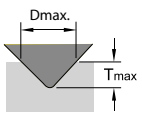
Cutting Data >>

- For Deburring, please refer to page 4-79.

Multi-Functional Tool Spotting & Chamfering

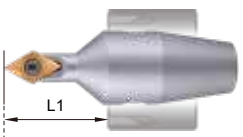


Inserts >>

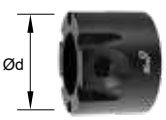
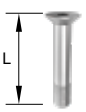
Angle	Parts No.	Coating	Grade		Dimensions L	Dimensions S	Dimensions Re	Dmax.	Tmax.
60°	V06006T1W06-NC2071	TiN	K20F		6.35 (0.250")	2.0 (0.079")	0.2 (0.008")	2.7 (0.106")	2.0 (0.079")
	V06006T1W06-NC2032	TiAlN							
	V06006T1W06-NC9031	TiN							
90°	N9MT080208CT-NC40	TiN	K20F		8.31 (0.327")	2.38 (0.094")	0.8 (0.031")	10 (0.394")	4.5 (0.177")
	N9MT080204CT-NC40	TiN					0.4 (0.016")	10 (0.394")	4.5 (0.177")
	N9MT080204CT-NC10	TiAlN							
90°	N9MT11T3CT-NC40	TiN	P35		11.11 (0.433")	3.97 (0.156")	0.8 (0.031")	14 (0.551")	7 (0.276")
	N9MT11T3CT-NC10	TiAlN	K10F				0.3 (0.012")		

Basic Holder >>

• G6.3 / 10,000 r.p.m.

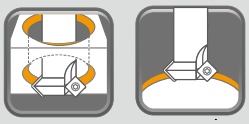
Parts No.	Basic Holder	Insert Type	L1	Screw	Key
99816-V060		V060...	22 (0.866")	NS-22044 0.9Nm	NK-T7
99816-610		N9MT0802...		NS-30055 2.0 Nm	NK-T8
99816-614		N9MT11T3...		NS-35080 2.5 Nm	NK-T15

Accessories - Set & Spare >>

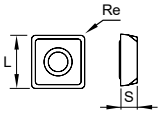
Set	Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
 * Nut, pin & L-key are included.									
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	99816-M19S	99816-M19	25 (0.948")	M19xP1.0	30 Nm	NS-50025	25 (0.948")	5 Nm	NK-LW3	99816-SP28
	99816-M22S	99816-M22	28 (1.102")	M22xP1.5	30 Nm	NS-50028	28 (1.102")	5 Nm		

Cutting Data >> please refer to page 3-76 for 60° insert, page 2-47 for 90° insert.

45° Chamfer Mill

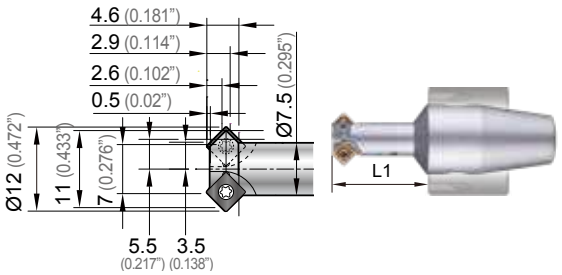


Inserts >>

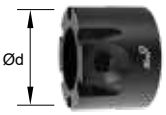
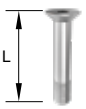
Parts No.		Coating	Grade		Dimensions		
					L	S	Re
N9GX04T002	NC2032	AlTiN	K20F		4.0 (0.157")	1.8 (0.070")	0.2 (0.008")
	NC9071	TiN					

Basic Holder >>

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

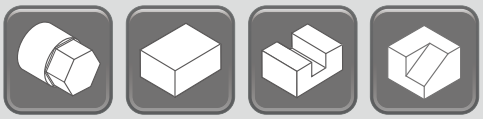
Parts No.	Basic Holder	L1	No. of teeth	Screw	Key
99816-C10		22 (0.866")	2	NS-18037 0.6Nm	NK-T6

Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
 * Nut, pin & L-key are included.										
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	99816-M19S	99816-M19	25 (0.948")	M19xP1.0	30 Nm	NS-50025	25 (0.948")	5 Nm	NK-LW3	99816-SP28
	99816-M22S	99816-M22	28 (1.102")	M22xP1.5	30 Nm	NS-50028	28 (1.102")	5 Nm		

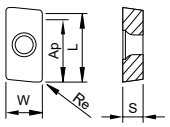
Cutting Data >> please refer to page 4-91.

Power Mill



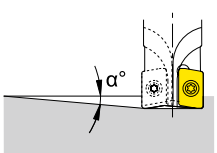
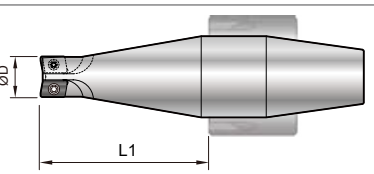
Inserts >>

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

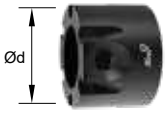
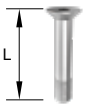
Parts No.		Coating	Grade	Insert	Dimensions				
					Re	Ap	L	W	S
A9GT060201H	NC2033	TiAlN	K20F		0.1 (0.004")	5 (0.197")	6.5 (0.259")	4 (0.157")	2.45 (0.096")
	NC9031	TiN							
A9GT060202H	NC2033	TiAlN	K20F		0.2 (0.008")				
	NC9031	TiN							
A9GT060205H	NC2033	TiAlN	K20F		0.5 (0.020")				
	NC9031	TiN							
A9GT060201U	NC2032	TiAlN	K20F		0.1 (0.004")				
A9GT060202U	NC2032	TiAlN	K20F		0.2 (0.008")				
A9GT060205U	NC2032	TiAlN	K20F		0.5 (0.020")				

Basic Holder >>

- G6.3 / 10,000 r.p.m.
- Customized cutter is available on request. Please refer to page 5-109.

ER Taper	Parts No.	ØD	Basic Holder	L1	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 (with internal coolant)	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	
ER16	99816-10A06-32L	10 (0.394")		32 (1.260")	2	5	
	99816-10A06-40L	10 (0.394")		40 (1.575")	2	5	
ER20	99820-10A06-40L	10 (0.394")			2	5	
	99820-12A06-40L	12 (0.472")			2	4	

Accessories - Set & Spare >>

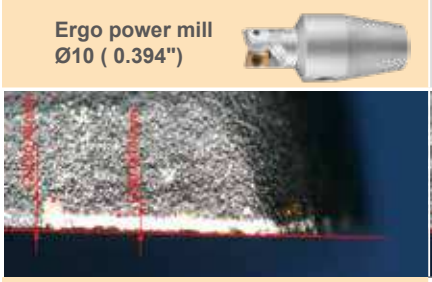
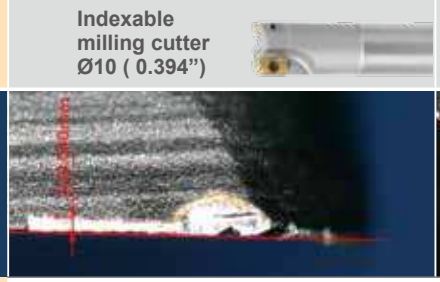
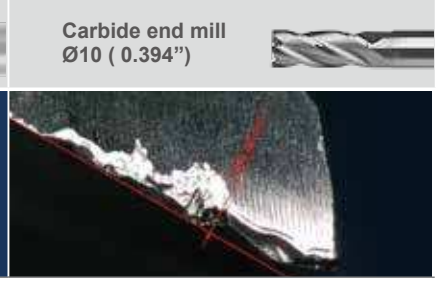
Set	Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
 * Nut, pin & L-key are included.	 Ød				 L				
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER11	99811-M13S	99811-M13	19 (0.748")	M13xP0.75	12 Nm	NS-40019	19 (0.748")	3 Nm	NK-LW25	99811-SP20
ER16	99816-M19S	99816-M19	25 (0.948")	M19xP1.0	30 Nm	NS-50025	25 (0.948")	5 Nm	NK-LW3	99816-SP28
	99816-M22S	99816-M22	28 (1.102")	M22xP1.5	30 Nm	NS-50028	28 (1.102")	5 Nm		
ER20	99820-M24S	99820-M24	34 (1.339")	M24xP1.0	45 Nm	NS-60033	33 (1.299")	6 Nm	NK-LW4	99820-SP36
	99820-M25S	99820-M25	34 (1.339")	M25xP1.5	45 Nm	NS-60033	33 (1.299")	6 Nm		

Cutting Data >>

Workpiece Material		SFM	fz (inch/tooth)	Ap(inch)	Ap(inch)	Ae(inch)	Grade of insert
P	Carbon steel	260 ~ 500	0.0012" ~ 0.0028"	0.059"	0.118"	0.039"	NC2033 NC2032
P	Low-alloy steel C < 0.3%						
P	High-alloy steel	200 ~ 410	0.0008" ~ 0.0024"	0.039"	0.098"	0.039"	NC2033 NC2032
M	Stainless steel	200 ~ 410	0.0004"~ 0.0020"	0.020"	0.079"	0.039"	NC9031 NC2033
N	Non-ferrous metal	660 ~ 1640	0.0008" ~ 0.0028"	0.079"	0.157"	0.079"	NC9031 NC2032

Performance >>

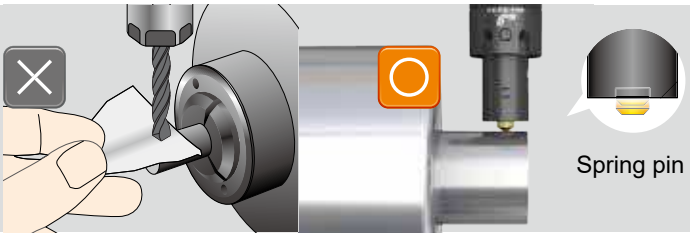
• Result - Surface Quality

Ergo power mill Ø10 (0.394")	Indexable milling cutter Ø10 (0.394")	Carbide end mill Ø10 (0.394")
		
VB=0.04 mm (0.0016") No chipping	VB=0.04 mm (0.0016") Partial chipping	VB=0.20 mm (0.0079") Extensive chipping

• Measure VB value (tool wearing) and chipping condition

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

Ergo Setter TP



Spring pin

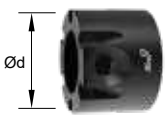
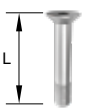
Quick and simple tool length setting >>

Tool length setter >>

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

Parts No.	Illustration	L-Key
99816-TP	 Focusing edge (For Tool Presetter)	NK-LW15 (2 Nm)

Accessories - Set & Spare >>

Set		Ergo Nut				High Strength Ergo Pin			L-Key	Ergo Spanner
 * Nut, pin & L-key are included.		 Ød				 L				
ER	Parts No.	Parts No.	Ød	Pitch	Torque	Parts No.	L	Torque	Parts No.	Parts No.
ER16	99816-M19S	99816-M19	25 (0.948")	M19xP1.0	30 Nm	NS-50025	25 (0.948")	5 Nm	NK-LW3	99816-SP28
	99816-M22S	99816-M22	28 (1.102")	M22xP1.5	30 Nm	NS-50028	28 (1.102")	5 Nm		

Setting process >>

- Step-1

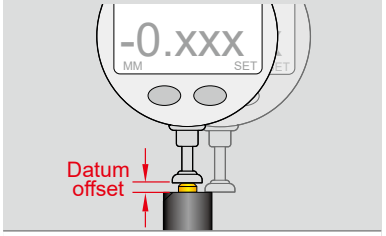
Set Temporary Position



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

- Step-2

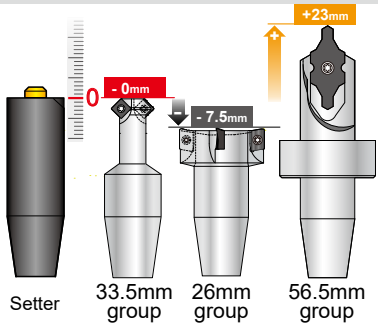
Get The Datum Position



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

- Step-3

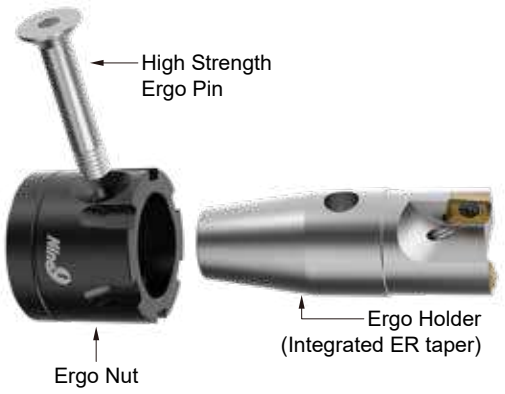
Input Tool Length Offset



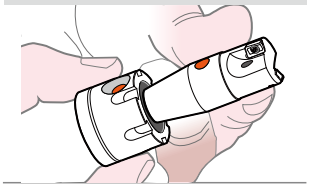
3-1: Choose an Ergo tool to install, and input the offset value to CNC controller directly.

Assembly Steps

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

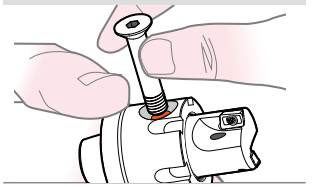


Step-1



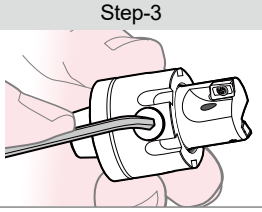
Place Ergo holder into Ergo nut and align to screw hole.

Step-2



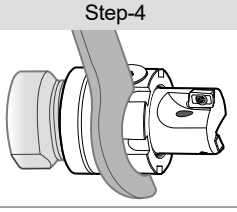
Put Ergo pin into screw hole.

Step-3



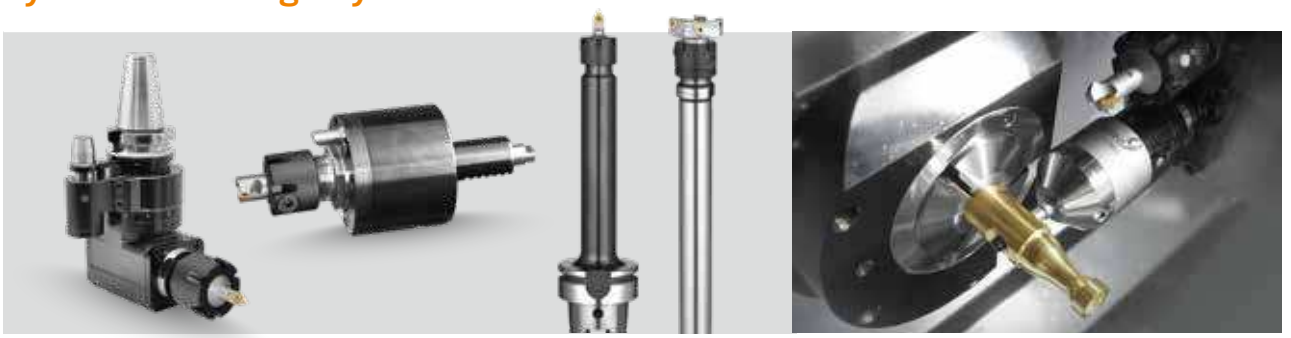
Lock Ergo pin screw.

Step-4



Tighten into ER holder or driven tool spindle.

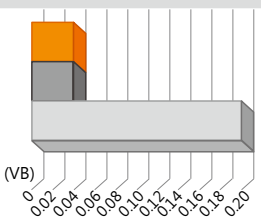
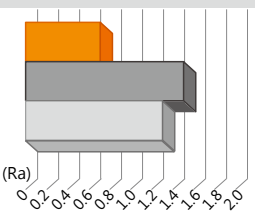
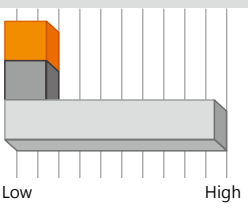
As long as it complies with ER11, 16, 20 and ER25 standard, you can use Ergo system. >>



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

Performance >>

Material	Testing length	Tool overhang	Machine: HAAS VM-3, BT40 / 22.5KW					
			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"

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

Ergo Sets For your first ordering

The insert is not included >>

Nut	Series	Parts No.	Contents
With ER16 Mini Nut (M19 x 1.0 P)	i-Center	99816-IC10BH-M19S	Ergo Holder x1 Ergo ER16 Mini Nut x1 High Strength Ergo pin x1 3mm L key x1 Insert Key x1  * The insert is not included.
	X060 - Micro Spotting, Engraving & Deburring	99816-X060-M19S	
	Multi-Functional Tool - Spotting & Chamfering	99816-V060-M19S	
		99816-610-M19S	
		99816-614-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	
	Tool Length Setter	99816-TP-M19S	
With ER16 Nut (M22 x 1.5 P)	i-Center	99816-IC10BH-M22S	Ergo Holder x1 Ergo ER16 Nut x1 High Strength Ergo pin x1 3mm L key x1 Insert Key x1  * The insert is not included.
	X060 - Micro Spotting, Engraving & Deburring	99816-X060-M22S	
	Multi-Functional Tool - Spotting & Chamfering	99816-V060-M22S	
		99816-610-M22S	
		99816-614-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	
	Tool Length Setter	99816-TP-M22S	

Enquiry Form

Company >>

Challenge or improvement >>

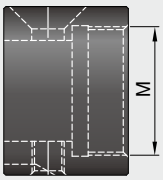
• The following information should be checked while discussing with customer.

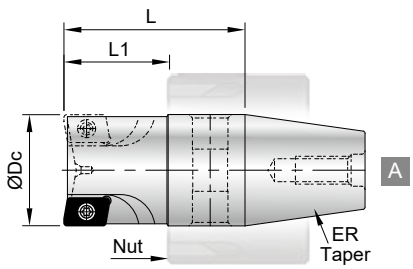
Machine		Current tool	
Machine Type		Cutting Speed	☐ HSS ☐ Solid Carbide
Spindle Speed	Max. r.p.m.		m/min. SFM
Power of Spindle motor	☐ KW ☐ HP	Others	
Coolant supply	☐ NO ☐ If yes, ☐ External ☐ Internal bar(psi)	Feed Rate	mm/rev. inch/rev.
Workpiece Material			

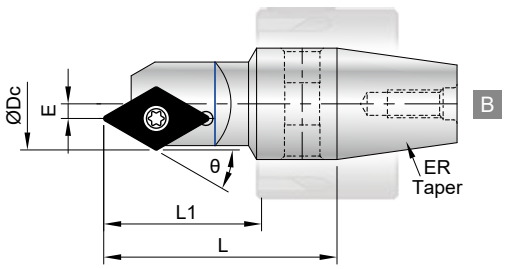
ER Taper-shank dimensions >>

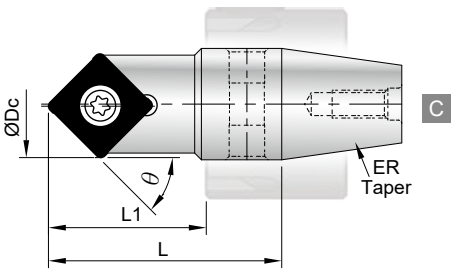
• MOQ: 2 pcs / Lead Time: 10 ~ 12 Weeks.

Style		
☐ A	☐ B	☐ C

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







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

NC Helix Drill >>>

The Expert Of Swarfs Control

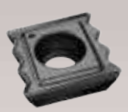
P M K N S H

Two Types Of Shank, Drilling Depth Up To 8xDc

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



Features >>>



Serrated Cutting Edge.

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

Only Six Tools For Making Ø.512”~Ø2.559” (Ø13~Ø65mm) Holes From Solid.

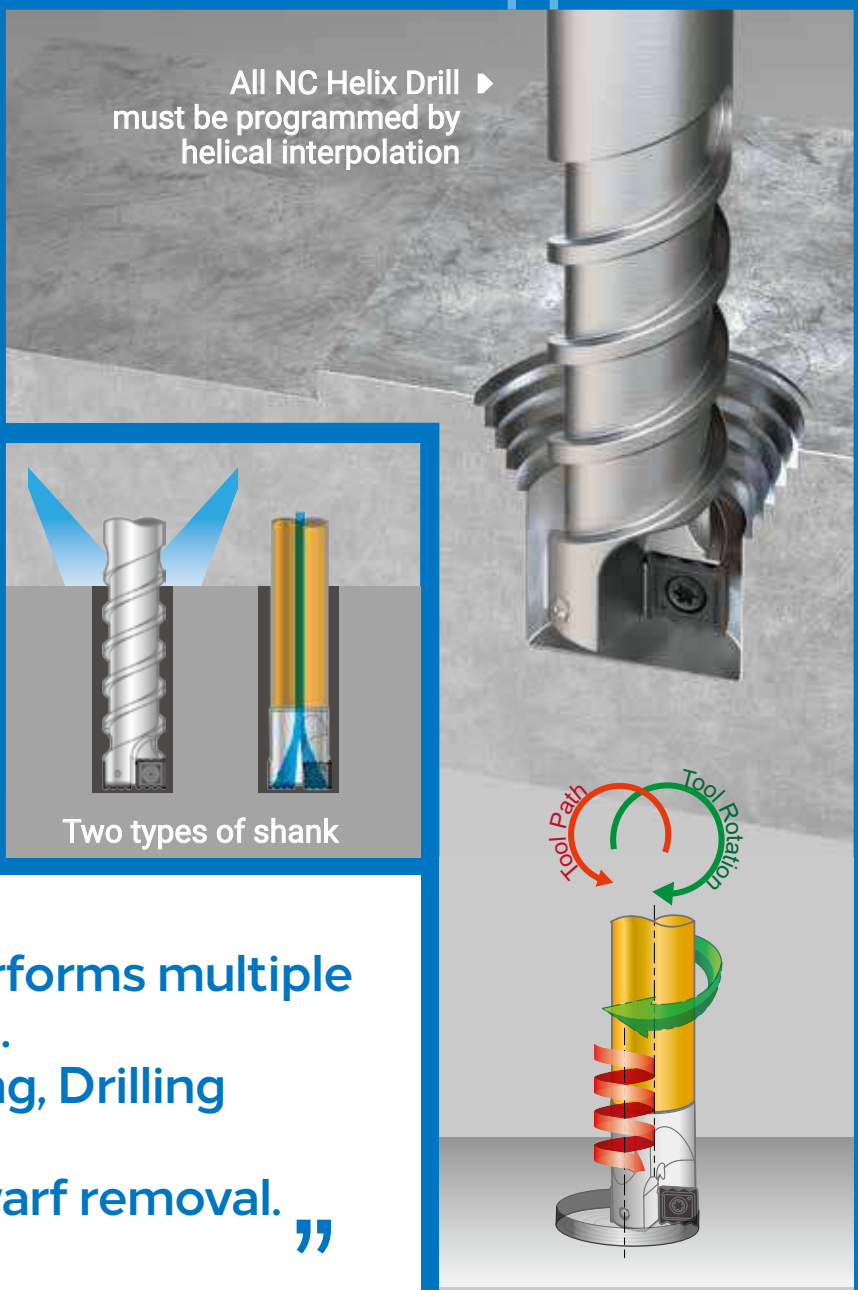
- Saving your tool inventory and cost!
- No need to peck drill or dwell in operation even machine without internal coolant.

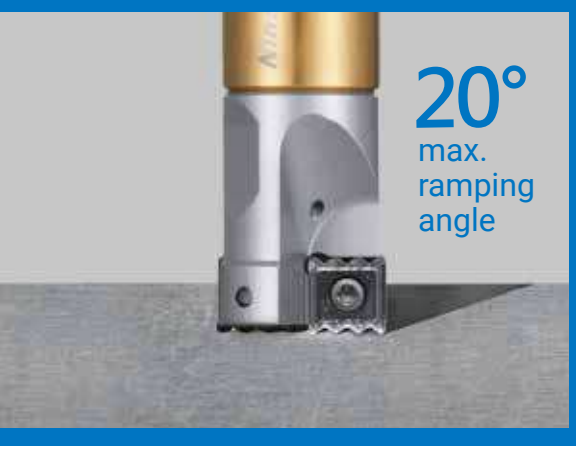
20° Ramping Angle, Either Linear Or Circular Ramping.

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

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

Applications





Two types of shank

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


Short & small chips

NC Helix Drill Features

Reduce your tool inventory >> Low Cost! Economy!

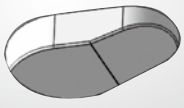
- Each holder can machine different diameters and hole depths, saving your tool inventory and cost!
- No need to peck drill or dwell in operation even machine without internal coolant.

Reduce Inventory	Large Inventory
	

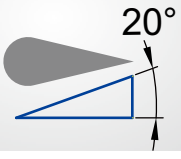
Lower spindle power consumption >> Easy to cut!

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

Circular milling

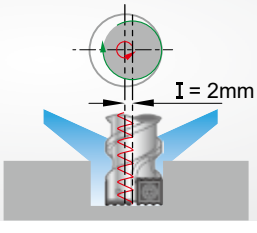
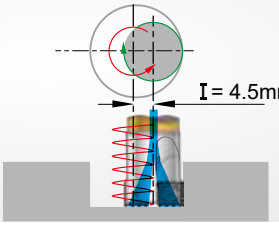


Ramping Angle



Just six tools for drilling Ø.512''~Ø2.559''(Ø13~Ø65mm) or larger >>

Example

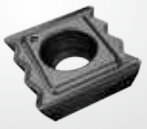
Hole Ø15mm (Ø.590") / Tool Ø11mm (Ø.433")	Hole Ø20mm (Ø .787") / Tool Ø11mm (Ø.433")
	

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

Special insert geometry >> exceptional swarfs control.

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

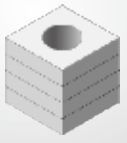
Insert



Chip



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

Regular Surfaces	Half Hole	Concave Surfaces	Angled Surfaces	Stack Drilling
				

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

Roughness Measuring >>

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

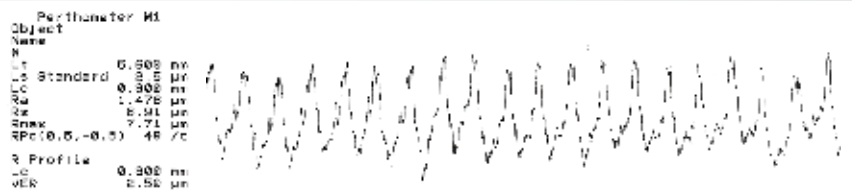
Workpiece Application



Flatness

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

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

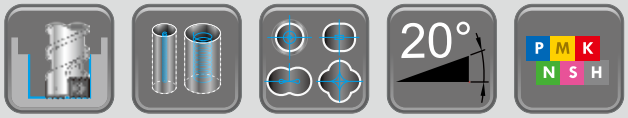


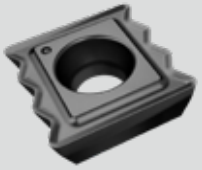
One tool performs multiple applications >>

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



NC Helix Drill



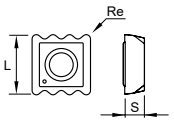


Inserts >>

NEW NC5075 : • Good for steel with heat treatment up to HRC50.
• Reduce heat and tool wear.
• Long tool life.

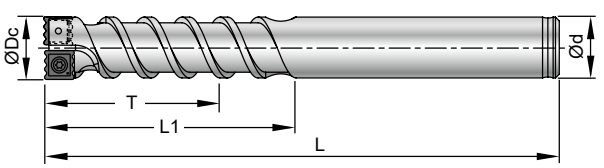
NC5072 : • General purpose,suitable for almost all kind of steel, stainless steel and Titanium.

NC2032 : • High performance cutting.
• Special good for cast iron and hardened material < HRC50.

Parts No.		Grade	Coating		Dimensions L	Dimensions S	Dimensions Re	Screw	Key
N9MX04T002	NC5075	P40	TiAlN+ALDURA		4.75 (0.187")	1.8 (0.071")	0.2 (0.008")	NS-18037 0.6Nm (5.31 in.-lb.)	NK-T6
	NC5072	P40	TiAlN						
	NC2032	K20F							
N9MX05T103	NC5075	P40	TiAlN+ALDURA		5.75 (0.226")	2.0 (0.079")	0.3 (0.012")	NS-20045 0.6Nm (5.31 in.-lb.)	NK-T6
	NC5072	P40	TiAlN						
	NC2032	K20F							
N9MX070204	NC5075	P40	TiAlN+ALDURA		7.5 (0.295")	2.4 (0.094")	0.4 (0.016")	NS-25045 0.9Nm (7.97 in.-lb.)	NK-T7
	NC5072	P40	TiAlN						
	NC2032	K20F							
N9MX100306	NC5075	P40	TiAlN+ALDURA		10.0 (0.394")	3.18 (0.125")	0.6 (0.024")	NS-30072 2.0Nm (17.7 in.-lb.)	NK-T9
	NC5072	P40	TiAlN						
	NC2032	K20F							
N9MX12T308	NC5075	P40	TiAlN+ALDURA		12.5 (0.492")	3.97 (0.156")	0.8 (0.031")	NS-35080 2.5Nm (22.13 in.-lb.)	NK-T15
	NC5072	P40	TiAlN						
	NC2032	K20F							

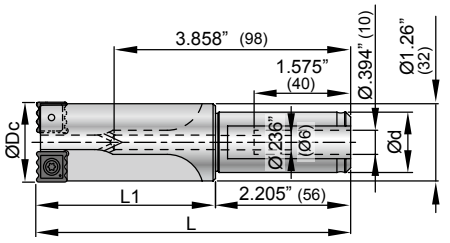
Cylindrical Shank >>

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



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

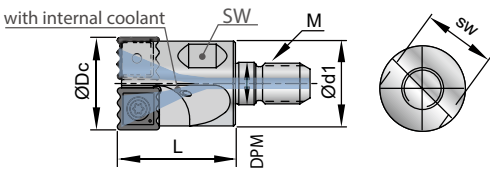
- Special size is available on request.

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 >>

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

* Use open ended spanner to tighten the cutter.



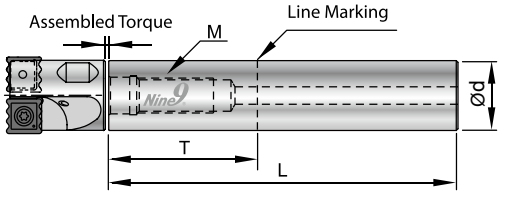
Parts No.	Type	Capable of drill dia.		ØDc	L	M	DPM	Ød1	SW	Insert type	Max. ramping angle
		Dmin.	Dmax.								
99323-010-1320	M05-HD11-1320	13 (0.512")	20 (0.787")	11 (0.433")	20 (0.787")	M5	5.5 (0.217")	10 (0.394")	8 (0.315")	N9MX04T002	20°
99323-012-1525	M06-HD13-1525	15 (0.591")	25 (0.984")	13 (0.512")	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°

* Special size is available by request.

Extension Bar

Steel Type >>

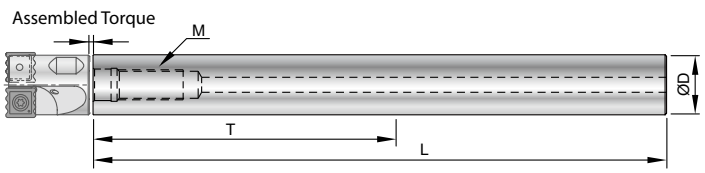
- T is the maximum overhang length.
- With internal coolant hole.



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)

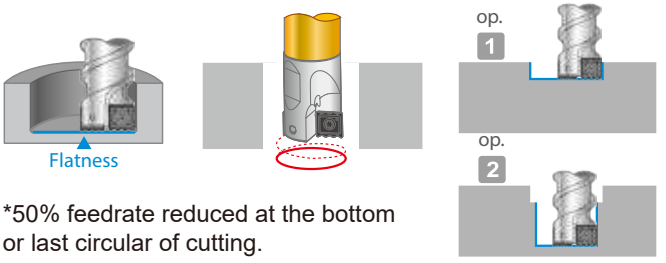


Parts No.	Type	ØD	T	L	M	Assembled Torque
99801-10W	BC10-100M05W	10 (0.394")	60 (2.362")	100 (3.937")	M5xP0.8	6.5 Nm
99801-12W	BC12-100M06W	12 (0.472")	60 (2.362")	100 (3.937")	M6xP1.0	11.0 Nm
99801-16W	BC16-150M08W	16 (0.630")	80 (3.150")	150 (5.906")	M8xP1.25	25.0 Nm
99801-20W	BC20-200M10W	20 (0.787")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

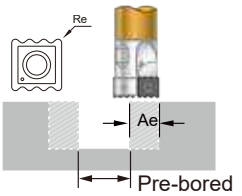
Programming conditions

Blind Hole* **Through Hole*** **Step Hole**



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

Pre-bored work piece



External coolant Min. 73 psi (5 bar)

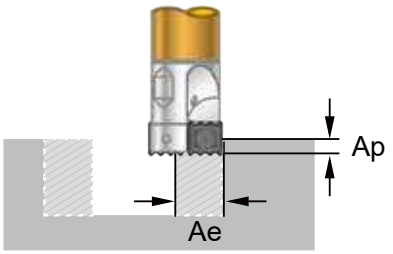


Internal coolant Min.145 psi (10 bar)



For enlarge hole

Minimum and Maximum Ae for programming a pre-bored hole

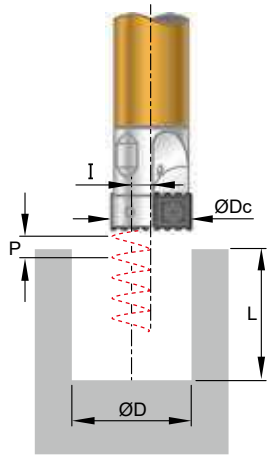


Max. Ae = Dc- (Rex2)
Min. Ae = 1/3 insert length (L)
Max. ap < 3/4 of insert length

Insert type	Re	Min. Ae	Max. Ae	Max. Ap
N9MX04T002	0.008”	0.062”	0.417”	0.138”
N9MX05T103	0.012”	0.076”	0.488”	0.169”
N9MX070204	0.016”	0.098”	0.638”	0.220”
N9MX100306	0.024”	0.130”	0.819”	0.295”
N9MX12T308	0.031”	0.164”	1.000”	0.354”
N9MX12T308*	0.031”	0.164”	1.236”*	0.354”

(* for 99321-025-4265)

NC Helix Drill



Cutting Parameters (S & F)

$$S = \frac{3.82 \times SFM}{Dc} \text{ r.p.m.}$$

$$F = S \times IPR \text{ IPM}$$

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

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

Cutting time (T)

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

Chip removal Volume rate (Q)

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

Formula

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	

Spindle power

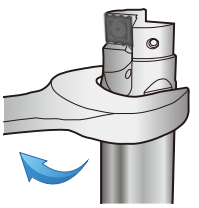
The Feed rate(Fc) may be adjusted by the power factor(PF) of below:

Fc= FxPF (mm/min.)

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

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

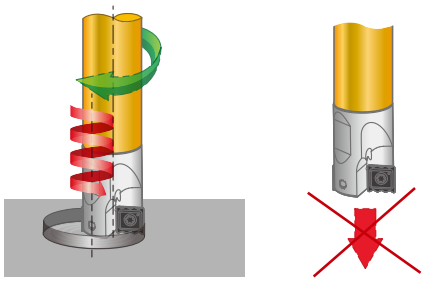
99323 screw fit cutter assembly



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

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

Apply only helical interpolation or ramping down feed only!

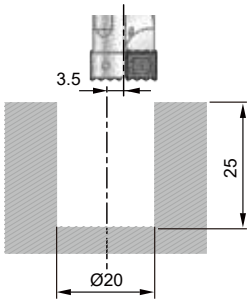


Step 1: Choose Cutting speed(Vc), feed rate(f) and Pitch(P) on the cutting data tables (page 6-118~120).
The feed rate and Pitch can be adjusted depend on the spindle power, please see page 6-116.
Step 2: Decide circular radius I (I= (D-Dc)/2)
For enlarge hole, decided Ae as page 6-116.
Step 3: Programming helical interpolation program according to CNC controller.
Step 4: Make the first hole and measure diameter as D', if D' is too small, please adjust "I" as I'=I+(D-D')/2 and try again, this value I' is possible to be adjusted to get correct D.

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

Example

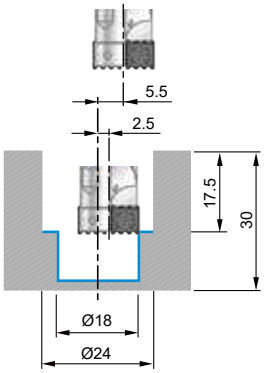
1 Programming a blind hole



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

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

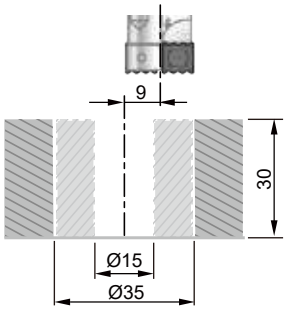
2 Programming a step hole



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

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

3 Programming a pre-bore hole



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

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

Cutting Data

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

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

Workpiece material		SFM		Ø .512"				Ø .630"				Ø .787"				Grade of Insert
		99321	99323	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			
P	Carbon steel C < 0.3%	394	656	.0010	.0236	.0315	.0394	.0022	.0354	.0472	.0591	.0031	.0472	.0630	.0787	NC2032
P	Carbon steel C > 0.3%	328	492	.0010	.0236	.0295	.0354	.0020	.0315	.0433	.0531	.0028	.0394	.0551	.0709	NC5075
P	Low alloy steel C < 0.3%	230	394	.0008	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0024	.0394	.0512	.0630	NC5072
P	High alloy steel	197	295	.0008	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0024	.0394	.0512	.0630	NC5075
M	Stainless steel	197	295	.0008	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0024	.0394	.0512	.0630	NC5072
K	Cast iron	230	394	.0010	.0236	.0315	.0394	.0022	.0354	.0472	.0591	.0031	.0472	.0630	.0787	NC2032
N	Al, Al-alloys	1150	1638	.0010	.0354	.0472	.0591	.0022	.0512	.0709	.0886	.0031	.0709	.0945	.1181	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	656	1310	.0010	.0276	.0374	.0472	.0022	.0394	.0551	.0709	.0031	.0551	.0748	.0945	NC2032
S	Heat resistant alloy	66	92	.0004	.0197	.0256	.0315	.0006	.0276	.0374	.0472	.0012	.0354	.0512	.0630	NC5075
S	Ti, Ti-alloy	131	197	.0004	.0197	.0256	.0315	.0006	.0276	.0374	.0472	.0012	.0354	.0512	.0630	NC5072
H	Hardened steel < HRC50	197	295	.0008	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0024	.0394	.0512	.0630	NC5075

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

Workpiece material		SFM		Ø .590"				Ø .787"				Ø .984"				Grade of Insert
		99321	99323	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			
P	Carbon steel C < 0.3%	394	656	.0014	.0472	.0630	.0787	.0026	.0591	.0787	.0984	.0035	.0709	.0945	.1181	NC2032
P	Carbon steel C > 0.3%	328	492	.0012	.0433	.0591	.0709	.0024	.0512	.0701	.0886	.0031	.0630	.0846	.1063	NC5075
P	Low alloy steel C < 0.3%	230	394	.0010	.0394	.0512	.0630	.0020	.0472	.0630	.0787	.0028	.0551	.0748	.0945	NC5072
P	High alloy steel	197	295	.0010	.0394	.0512	.0630	.0020	.0472	.0630	.0787	.0028	.0551	.0748	.0945	NC5075
M	Stainless steel	197	295	.0010	.0394	.0512	.0630	.0020	.0472	.0630	.0787	.0028	.0551	.0748	.0945	NC5072
K	Cast iron	230	394	.0014	.0472	.0630	.0787	.0026	.0512	.0748	.0984	.0035	.0709	.0945	.1181	NC2032
N	Al, Al-alloys	1150	1638	.0014	.0709	.0945	.1181	.0026	.0866	.1173	.1476	.0035	.1063	.1417	.1772	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	656	1310	.0014	.0551	.0748	.0945	.0026	.0709	.0945	.1181	.0035	.0827	.1122	.1417	NC2032
S	Heat resistant alloy	66	92	.0005	.0394	.0512	.0630	.0009	.0472	.0630	.0787	.0012	.0551	.0748	.0945	NC5075
S	Ti, Ti-alloy	131	197	.0005	.0394	.0512	.0630	.0009	.0472	.0630	.0787	.0012	.0551	.0748	.0945	NC5072
H	Hardened steel < HRC50	197	295	.0010	.0197	.0256	.0315	.0020	.0276	.0374	.0472	.0028	.0394	.0512	.0630	NC5075

Cutting Data

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

▸99321-016-2030 / 99323-016-2030 >>

	Workpiece material	SFM		Ø .787"				Ø .984"				Ø1.181"				Grade of Insert
		99321	99323	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			
P	Carbon steel C < 0.3%	394	656	.0016	.0709	.0945	.1181	.0031	.0827	.1102	.1378	.0041	.0945	.1260	.1575	NC2032
P	Carbon steel C > 0.3%	328	492	.0014	.0630	.0846	.1063	.0028	.0748	.1004	.1260	.0035	.0827	.1122	.1417	NC5075
P	Low alloy steel C < 0.3%	230	394	.0012	.0551	.0748	.0945	.0026	.0630	.0866	.1102	.0031	.0748	.1004	.1260	NC5072
P	High alloy steel	197	295	.0012	.0551	.0748	.0945	.0026	.0630	.0866	.1102	.0031	.0748	.1004	.1260	NC5075
M	Stainless steel	197	295	.0012	.0551	.0748	.0945	.0026	.0630	.0866	.1102	.0031	.0748	.1004	.1260	NC5072
K	Cast iron	230	394	.0016	.0709	.0945	.1181	.0031	.0827	.1102	.1378	.0041	.0945	.1260	.1575	NC2032
N	Al, Al-alloys	1150	1638	.0016	.1063	.1417	.1772	.0031	.1220	.1594	.1969	.0041	.1417	.1890	.2362	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	656	1310	.0016	.0827	.1122	.1417	.0031	.0984	.1319	.1654	.0041	.1102	.1496	.1890	NC2032
S	Heat resistant alloy	66	92	.0006	.0551	.0748	.0945	.0012	.0630	.0866	.1102	.0016	.0748	.1004	.1260	NC5075
S	Ti, Ti-alloy	131	197	.0006	.0551	.0748	.0945	.0012	.0630	.0866	.1102	.0016	.0748	.1004	.1260	NC5072
H	Hardened steel < HRC50	197	295	.0012	.0551	.0748	.0945	.0026	.0630	.0866	.1102	.0031	.0748	.1004	.1260	NC5075

▸99321-020-2540 / 99323-020-2540 >>

	Workpiece material	SFM		Ø .984"				Ø1.260"				Ø1.575"				Grade of Insert
		99321	99323	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			
P	Carbon steel C < 0.3%	394	656	.0020	.0709	.0945	.1181	.0037	.0945	.1260	.1575	.0047	.1181	.1575	.1969	NC2032
P	Carbon steel C > 0.3%	328	492	.0016	.0630	.0846	.1063	.0031	.0866	.1142	.1417	.0043	.1063	.1417	.1772	NC5075
P	Low alloy steel C < 0.3%	230	394	.0014	.0551	.0748	.0945	.0028	.0748	.1004	.1260	.0037	.0945	.1260	.1575	NC5072
P	High alloy steel	197	295	.0014	.0551	.0748	.0945	.0028	.0748	.1004	.1260	.0037	.0945	.1260	.1575	NC5075
M	Stainless steel	262	295	.0014	.0551	.0748	.0945	.0028	.0748	.1004	.1260	.0037	.0945	.1260	.1575	NC5072
K	Cast iron	230	394	.0020	.0709	.0945	.1181	.0037	.0945	.1260	.1575	.0047	.1181	.1575	.1969	NC2032
N	Al, Al-alloys	1150	1638	.0020	.1063	.1417	.1772	.0037	.1417	.1890	.2362	.0047	.1772	.2362	.2953	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	656	1310	.0020	.0827	.1122	.1417	.0037	.1142	.1516	.1890	.0047	.1417	.1890	.2362	NC2032
S	Heat resistant alloy	131	164	.0008	.0551	.0748	.0945	.0014	.0748	.1004	.1260	.0018	.0945	.1260	.1575	NC5075
S	Ti, Ti-alloy	262	295	.0008	.0551	.0748	.0945	.0014	.0748	.1004	.1260	.0018	.0945	.1260	.1575	NC5072
H	Hardened steel < HRC50	262	295	.0014	.0551	.0748	.0945	.0028	.0748	.1004	.1260	.0037	.0945	.1260	.1575	NC5075

Cutting Data

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

▸99321-025-3050 / 99323-025-3050 >>

Workpiece material		SFM		Ø1.181"				Ø1.575"				Ø1.969"				Grade of Insert
		99321	99323	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			
P	Carbon steel C < 0.3%	394	656	.0022	.0945	.1260	.1575	.0047	.1181	.1575	.1969	.0053	.1417	.1890	.2362	NC2032
P	Carbon steel C > 0.3%	328	492	.0020	.0866	.1142	.1417	.0039	.1063	.1417	.1772	.0047	.1260	.1693	.2126	NC5075
P	Low alloy steel C < 0.3%	230	394	.0016	.0748	.1004	.1260	.0035	.0945	.1260	.1575	.0043	.1142	.1516	.1890	NC5072
P	High alloy steel	197	295	.0016	.0748	.1004	.1260	.0035	.0945	.1260	.1575	.0043	.1142	.1516	.1890	NC5075
M	Stainless steel	197	295	.0016	.0748	.1004	.1260	.0035	.0945	.1260	.1575	.0043	.1142	.1516	.1890	NC5072
K	Cast iron	230	394	.0022	.0945	.1260	.1575	.0045	.1181	.1575	.1969	.0053	.1417	.1890	.2362	NC2032
N	Al, Al-alloys	1150	1638	.0022	.1417	.1890	.2362	.0045	.1772	.2362	.2953	.0053	.2126	.2835	.3543	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	656	1310	.0022	.1142	.1516	.1890	.0045	.1417	.1890	.2362	.0053	.1693	.2264	.2835	NC2032
S	Heat resistant alloy	66	92	.0008	.0748	.1004	.1260	.0018	.0945	.1260	.1575	.0022	.1142	.1516	.1890	NC5075
S	Ti, Ti-alloy	131	197	.0008	.0748	.1004	.1260	.0018	.0945	.1260	.1575	.0022	.1142	.1516	.1890	NC5072
H	Hardened steel < HRC50	197	295	.0016	.0748	.1004	.1260	.0035	.0945	.1260	.1575	.0043	.1142	.1516	.1890	NC5075

▸99321-025-4265 >>

Workpiece material		SFM	Ø1.654"				Ø2.165"				Ø2.559"				Grade of Insert
		99321	fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			fz Inch/tooth	Pitch Inch			
P	Carbon steel C < 0.3%	656	.0031	.1181	.1575	.1969	.0047	.1299	.1732	.2165	.0053	.1417	.1890	.2362	NC2032
P	Carbon steel C > 0.3%	428	.0030	.1063	.1417	.1772	.0043	.1181	.1575	.1969	.0047	.1260	.1693	.2126	NC5075
P	Low alloy steel C < 0.3%	394	.0026	.0945	.1260	.1575	.0037	.1024	.1378	.1732	.0043	.1142	.1516	.1890	NC5072
P	High alloy steel	295	.0026	.0945	.1260	.1575	.0037	.1024	.1378	.1732	.0043	.1142	.1516	.1890	NC5075
M	Stainless steel	295	.0026	.0945	.1260	.1575	.0037	.1024	.1378	.1732	.0043	.1142	.1516	.1890	NC5072
K	Cast iron	394	.0031	.1181	.1575	.1969	.0047	.1299	.1732	.2165	.0053	.1417	.1890	.2362	NC2032
N	Al, Al-alloys	1638	.0031	.1772	.2362	.2953	.0047	.1929	.2579	.3228	.0053	.2126	.2835	.3543	NC2032
N	Cu, Cu-alloy, casting Cu-alloy	656	.0031	.1417	.1890	.2362	.0047	.1575	.2087	.2598	.0053	.1693	.2264	.2835	NC2032
S	Heat resistant alloy	92	.0012	.0945	.1260	.1575	.0018	.1024	.1378	.1732	.0022	.1142	.1516	.1890	NC5075
S	Ti, Ti-alloy	295	.0012	.0945	.1260	.1575	.0018	.1024	.1378	.1732	.0022	.1142	.1516	.1890	NC5072
H	Hardened steel < HRC50	295	.0026	.0945	.1260	.1575	.0037	.1024	.1378	.1732	.0043	.1142	1516	.1890	NC5075

Application Example

▸Special insert geometry is able to cut different materials>>

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



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

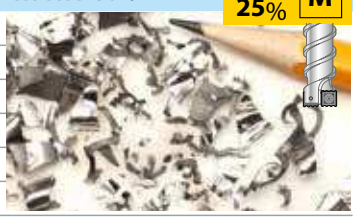
Material: SAE8620 — load 28% P

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.



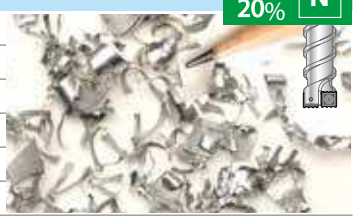
Material: C1100 — load 25% N

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



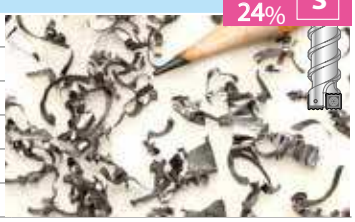
Material: AL6061T6 — load 20% N

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

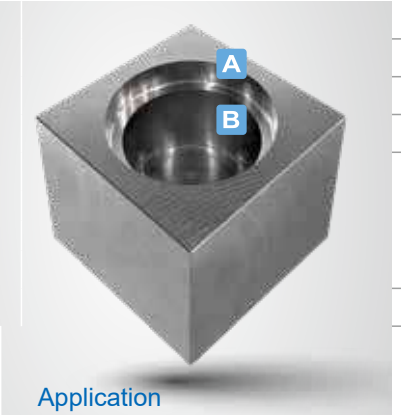
Vc	=	131.2	SFM
S	=	750	r.p.m.
fz	=	.0118	IPR
F	=	8.85	IPM
P	=	.079	Inch
T	=	100	sec.



▸Suggested insert grades for best result >>

Diameter (mm)		25 (0.984")		
Depth (mm)		50 (1.97")		
Tool (Dc=17mm)		00-99321-016-2030 (external coolant)		
Material		P Carbon Steel	M Stainless Steel	H Tool Steel
	DIN	C45E	X5CrNi18-10	X40CrMoV5 1
	SAE	1045	304	H13
	JIS	S45C	SUS304	SKD61 (HRC50°)
Insert Grade		**NC5072** (P40, TiAlN)	**NC5072** (P40, TiAlN)	**NC2032** (K20F, TiAlN)
No. of Edges		2	2	2
Vc = SFM		579.3	288.4	386.2
S = r.p.m.		2250	1120	1500
fz = IPR		0.0039	0.0025	0.0019
F = IPM		17.717	5.748	5.906
Pitch = (inch)		0.220	0.118	0.118
Machine Load = % (BT40, 22.5KW)		35%	20%	20%
Tool Life (hole)		150	108	18
Chip Removal Volume (cm^3/min.)		52.66	8.55	8.77

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



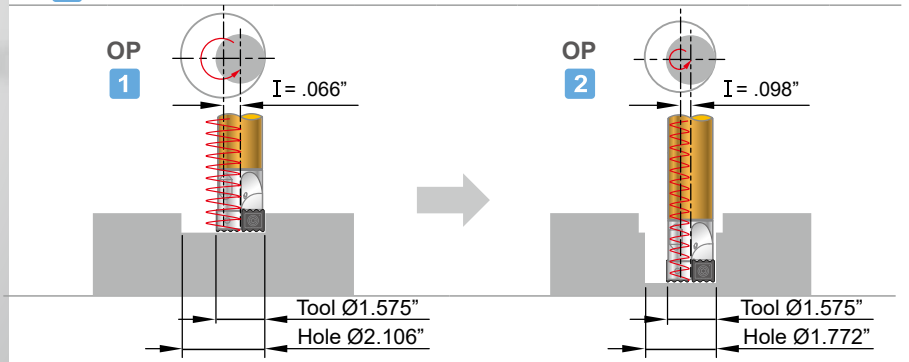
Application

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



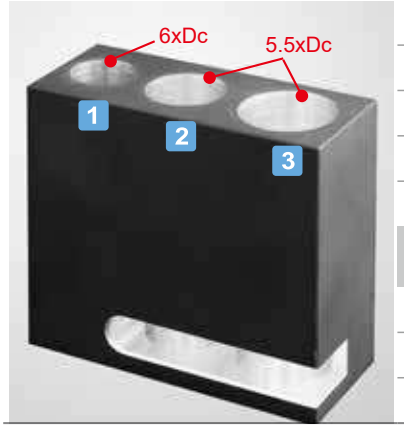
Material	S50C (JIS). High carbon steel
Tool	99323-LS32-HD40 (Non-standard size)
Insert	N9MX12T308-NC2032
Machine	BT40, 22.5 KW
Coolant	Internal

Hole	Dc Inch	D Inch	L Inch	Vc SFM	S r.p.m	fz IPR	F IPM	l Inch	P Inch	T sec.
A	Ø1.575	Ø2.106	.394	989	2400	.0059	14.96	.266	.197	13.3
B		Ø1.772	1.260	989	2400	.0059	14.96	.098	.079	39.48



Just one “NC Helix Drill” can machine different diameters and hole depths.

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



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

Fig.	Dc Inch	D Inch	l Inch	L Inch	Vc SFM	S r.p.m	fz IPR	fcut IPR	F IPM	P Inch	α deg
1	Ø .669	Ø .787	.059	3.937	394	2250	.0016	.0023	42.9	.118	17.67
2		Ø .984	.157	3.740	328	1900	.0031	.0041	76.0	.177	10.16
3		Ø 1.181	.256	3.740	197	1200	.0041	.0052	96.5	.236	7.81

One tool performs multiple patterns >>





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	22.44	.157	67
2		656	3800	.0030	22.44	.157	95
3		656	3800	.0030	22.44	.157	80

Widening a deep hole (6xD) in stainless steel by NC Helix Drill. Predrilled 0.591" enlarge to 1.142". >>

0.591” hole 1.142” hole



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

Dc Inch	D Inch	L Inch	S r.p.m.	fz IPR	F IPM	P Inch
Ø .669	Ø1.142	4.134”	1685	.0020	6.61	.059

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

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

Maximum drilling capacity of the 5.5 kw spindle is Ø.630”



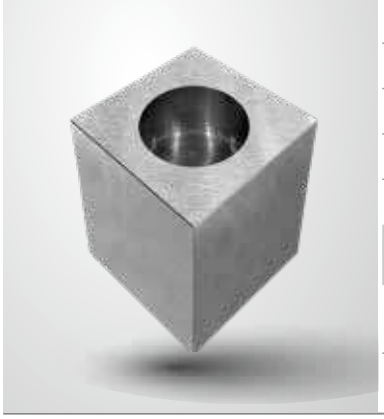
Material	S50C (JIS), High carbon steel
Tool	99321-020-2540 / BC20-HD22-2540
Insert	N9MX100306-NC2032
Machine	***BT30, 5.5 KW***
Coolant	External coolant

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	23.62	.157	.110	62

* 3000 r.p.m. is used.

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

Maximum drilling capacity of the 18 kw spindle is Ø50 mm



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

Dc Inch	D Inch	L Inch	Vc SFM	S r.p.m.	fz IPR	fcut IPR	F IPM	I Inch	P Inch	T sec.
Ø1.063	Ø1.969	3.150	390.32	1400	.0059	.0065	16.55	.453	.118	275

15% Spindle load only!

Super Drill >>>

Ø10mm ~ Ø30mm

Smallest indexable drill from 10mm.

4 cutting edges per insert, same insert for outer and inner insert.

P M K H





Features >>>

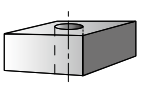
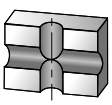
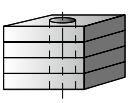
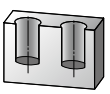
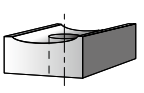
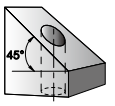
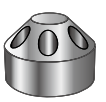
Smaller Cutting Chip

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

Better Surface Finish And Better Diameter Accuracy

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

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								

Applications

Refe. Metric catalog for whole range

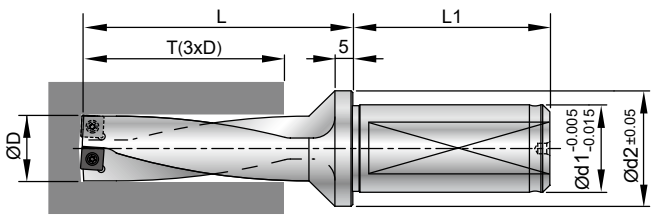






Angled Surfaces

- Possible to drill into angled surfaces without pre-drilling





Cutting Data

Parts No.	ØD	T	L	d1	d2	L1	Insert Screw / Key	Radial Adjustment	D max.
99313-10	10.0 (0.394")	30.0 (1.18")	49 (1.93")	20 (0.787")	27 (1.06")	49 (1.93")		0.25 (0.010")	10.5 (0.413")
99313-10.3	10.3 (0.406")	30.9 (1.22")	52 (2.05")	20 (0.787")	27 (1.06")	49 (1.93")		0.25 (0.010")	10.8 (0.425")
99313-10.5	10.5 (0.413")	31.5 (1.24")	52 (2.05")	20 (0.787")	27 (1.06")	49 (1.93")	N9GX04T002	0.25 (0.010")	11.0 (0.433")
99313-11	11.0 (0.433")	33.0 (1.30")	52 (2.05")	20 (0.787")	27 (1.06")	49 (1.93")	NS-18037 0.6Nm	0.20 (0.008")	11.4 (0.449")
99313-11.5	11.5 (0.453")	34.5 (1.36")	55 (2.17")	20 (0.787")	27 (1.06")	49 (1.93")	NK-T6	0.20 (0.008")	11.9 (0.469")
99313-12	12.0 (0.472")	36.0 (1.42")	55 (2.17")	20 (0.787")	27 (1.06")	49 (1.93")		0.15 (0.006")	12.3 (0.484")
99313-12.5	12.5 (0.492")	37.5 (1.48")	58 (2.28")	20 (0.787")	27 (1.06")	49 (1.93")		0.15 (0.006")	12.8 (0.504")

Work Material		SFM	IPR (inch/rev.)
P	Carbon steel	200~985	.0010 ~ .0030
M	Stainless steel	200~500	.0010 ~ .0020
K	Cast iron	265~400	.0020 ~ .0030
H	Hardened steel <HRC50	200~330	.0010 ~ .0020

* Adjust speed and feed percentage by applications.

NineBore >>>

Cycle Time
Roughness
Position Accuracy
True Roundness

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

P M K N H

- Easy Adjustment!
- No Backlash!





Features >>>

Easy Handling

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

High Speed.

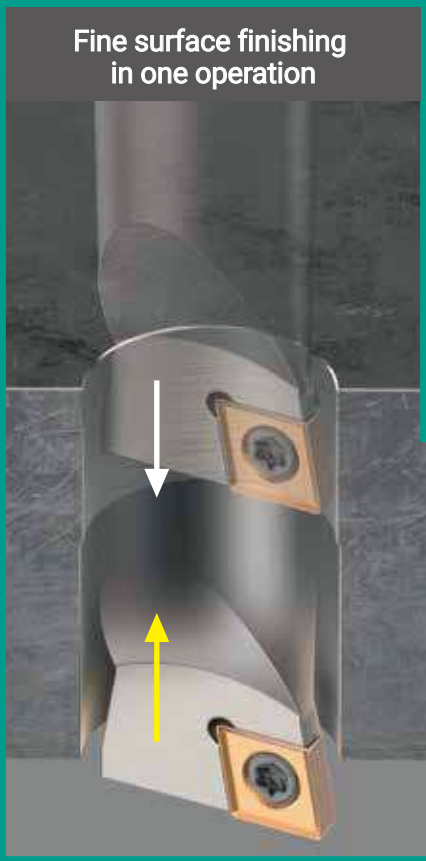
- Good for fine boring operation on milling machines, machining centers and special purpose machines.
- Replace solid carbide reamers.

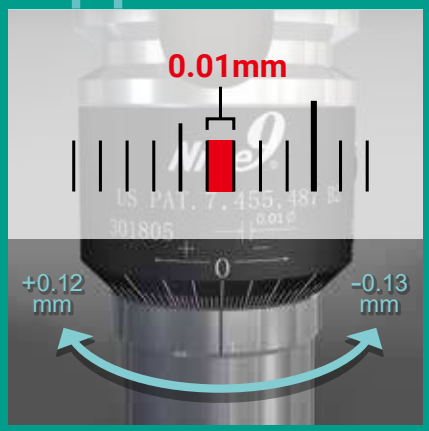
99146 Series Is Ideal For Casting Aluminum With Uncertain Pre-Hole Dimensions And Deviations In Hole Spacing.

Applications

Refe. Metric catalog for whole range

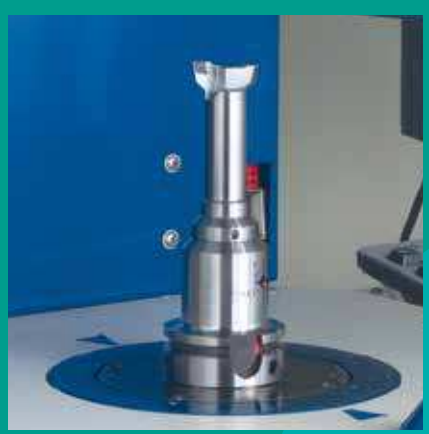






"Ø5~Ø50mm(0.197"~1.967") boring bars are interchangeable, balanced grade is G6.3 10000 r.p.m., all sizes are guaranteed."

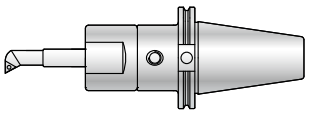




NineBore Features

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

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

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

Application >>

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

High Speed >>

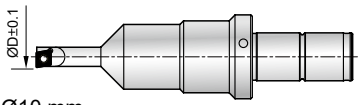
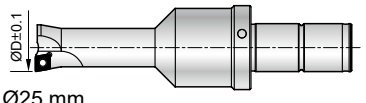
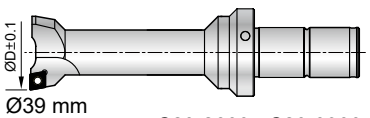
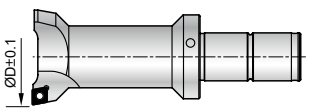
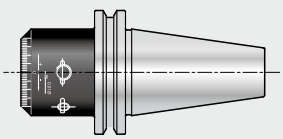
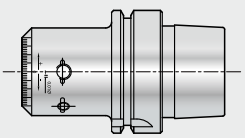
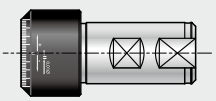
• Boring bar design ensures accurate high speed boring.
Balanced grade is G6.3 10000 r.p.m., all sizes are guaranteed.
• Combination bore / chamfer / facing / multi-task tools can be ordered on request.

Economic >>

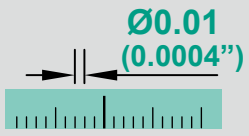
• Low cost micro adjustable boring heads.
• It can replace end mill and brazed tool bits.
• This simple boring tool has minimal components. In minutes, the boring bar can be changed and the boring dimension set on the tool presetter.

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

NineBore System

Series	Adjustment range	ØD range	Insert	Boring Bars	Head Shank
G6.3 10000 r.p.m **99146** Each Division 0.01 mm/div.	+0.12mm ≀ -0.13mm	Ø 4.87 mm ≀ 50.12 mm	CCGT030102 CCGT040102 CCGH060204	 Ø5 ~ Ø10 mm (0.197" ~ 0.394") C20-0500...C20-1000  Ø11 ~ Ø25 mm (0.433" ~ 0.984") C20-1025...C20-2550  Ø26 ~ Ø39 mm (1.02" ~ 1.54") C20-2600...C20-3900  Ø40 ~ Ø50 mm (1.57" ~ 1.97") C20-4000...C20-5000	 BT30-146-51 BT40-146-56 BT50-146-77 CAT40-146-56
4~6XD **99151** Each Division 0.01 mm/div.	+0.12mm ≀ -0.13mm	Ø 4.87 mm ≀ 20.12 mm	CCGT030102 CCGT040102 CCGH060204	 Ø4.87 ~ Ø6.87 mm (0.192" ~ 0.270") Ø6 C06...  Ø6.87 ~ Ø8.87 mm (0.270" ~ 0.349") Ø8 C08...  Ø8.87 ~ Ø11.12 mm (0.349" ~ 0.438") Ø10 C10... Adapter Ø C20-ID06...15.5  Ø11.87 ~ Ø14.12 mm (0.467" ~ 0.556") Ø11 C11...  Ø14.87 ~ Ø20.12 mm (0.585" ~ 0.792") Ø15.5 C15.5...	 HSK63A-146-72  SB32-146-31

99146 Quick Change High Speed EMB Boring Bar



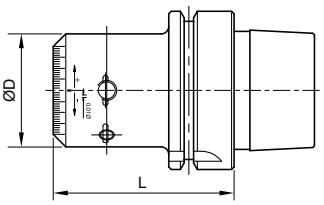




Boring Head Shank >>

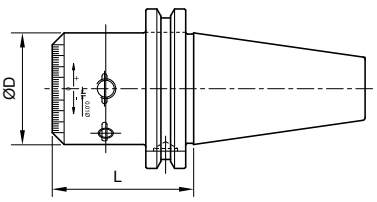
- HSK63





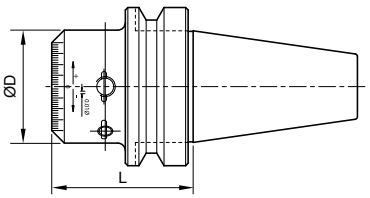
- CAT40





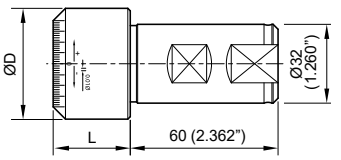
- BT



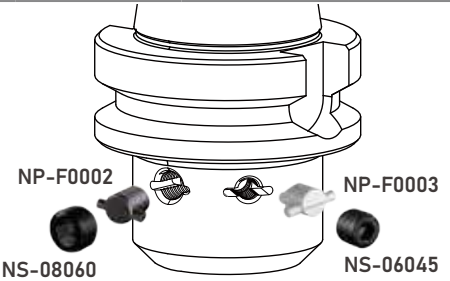


- SB32





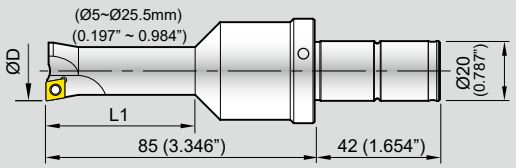
Part No.	ØD	L	M8 Screw		M6 Screw	
			Spring Fingers	Locking Screw	Spring Fingers	Pre-load Screw
HSK63A-146-72	45 (1.772")	72.0 (2.835")	NP-F0002	NS-08060 8.0 Nm	NP-F0003	NS-06045 0.9 Nm
CAT40-146-56	45 (1.772")	56.3 (2.217")				
BT30-146-51	45 (1.772")	51.3 (2.020")				
BT40-146-56	45 (1.772")	56.3 (2.217")				
BT50-146-77	45 (1.772")	77.3 (3.043")				
SB32-146-31	45 (1.772")	31.3 (1.232")				



99146 Quick Change High Speed EMB Boring Bar

Boring Bar Ø5~Ø25mm (0.197” ~ 0.984”) >>

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





* H type with internal coolant can be ordered on request from Dia. 10mm (0.394").
Ordering example: C20-0800-16LH.
* Other sizes are available on request.

Part No.	ØD	L1	Insert Screw / Key
C20-0500-10L	4.87~5.12 (0.192”~0.202”)	10.00 (0.394”)	CC...030102 NS-16030 0.4Nm / NK-T6
C20-0600-12L	5.87~6.12 (0.231”~0.241”)	12.00 (0.472”)	
C20-0700-14L	6.87~7.12 (0.270”~0.280”)	14.00 (0.551”)	CC...040102 NS-20036, 0.6Nm / NK-T6
C20-0800-16L	7.87~8.12 (0.310”~0.320”)	16.00 (0.630”)	
C20-0900-18L	8.87~9.12 (0.349”~0.359”)	18.00 (0.709”)	CC...0602... NS-25045 0.9Nm / NK-T7
C20-1000-25L	9.87~10.12 (0.389”~0.398”)	25.00 (0.984”)	
C20-1025-25L	10.12~10.37 (0.398”~0.408”)		
C20-1050-26L	10.37~10.62 (0.408”~0.418”)	26.25 (1.03”)	
C20-1075-26L	10.62~10.87 (0.418”~0.428”)		
C20-1100-27L	10.87~11.12 (0.428”~0.438”)	27.50 (1.08”)	
C20-1125-27L	11.12~11.37 (0.438”~0.448”)		
C20-1150-28L	11.37~11.62 (0.448”~0.457”)	28.75 (1.13”)	
C20-1175-28L	11.62~11.87 (0.457”~0.467”)		
C20-1200-30L	11.87~12.12 (0.467”~0.477”)	30.00 (1.18”)	
C20-1225-30L	12.12~12.37 (0.477”~0.487”)		
C20-1250-31L	12.37~12.62 (0.487”~0.497”)	31.25 (1.23”)	
C20-1275-31L	12.62~12.87 (0.497”~0.507”)		
C20-1300-32L	12.87~13.12 (0.507”~0.517”)	32.50 (1.28”)	
C20-1325-32L	13.12~13.37 (0.517”~0.526”)		
C20-1350-33L	13.37~13.62 (0.526”~0.536”)	33.75 (1.33”)	
C20-1375-33L	13.62~13.87 (0.536”~0.546”)		
C20-1400-35L	13.87~14.12 (0.546”~0.556”)	35.00 (1.38”)	
C20-1425-35L	14.12~14.37 (0.556”~0.566”)		
C20-1450-36L	14.37~14.62 (0.566”~0.576”)	36.25 (1.43”)	
C20-1475-36L	14.62~14.87 (0.576”~0.585”)		
C20-1500-37L	14.87~15.12 (0.585”~0.595”)	37.50 (1.48”)	
C20-1525-37L	15.12~15.37 (0.595”~0.605”)		
C20-1550-38L	15.37~15.62 (0.605”~0.615”)	38.75 (1.53”)	
C20-1575-38L	15.62~15.87 (0.615”~0.625”)		
C20-1600-40L	15.87~16.12 (0.625”~0.635”)	40.00 (1.57”)	CC...0602... NS-25060 0.9Nm / NK-T7
C20-1625-40L	16.12~16.37 (0.635”~0.644”)		
C20-1650-41L	16.37~16.62 (0.644”~0.654”)	41.25 (1.62”)	
C20-1675-41L	16.62~16.87 (0.654”~0.664”)		
C20-1700-42L	16.87~17.12 (0.654”~0.674”)	42.50 (1.67”)	

Part No.	ØD	L1	Insert Screw / Key
C20-1725-42L	17.12~17.37 (0.674”~0.684”)	42.50 (1.67”)	CC...0602... NS-25060 0.9Nm / NK-T7
C20-1750-43L	17.37~17.62 (0.684”~0.694”)	43.75 (1.72”)	
C20-1775-43L	17.62~17.87 (0.684”~0.704”)		
C20-1800-45L	17.87~18.12 (0.704”~0.713”)	45.00 (1.77”)	
C20-1825-45L	18.12~18.37 (0.713”~0.723”)		
C20-1850-46L	18.37~18.62 (0.723”~0.733”)	46.25 (1.82”)	
C20-1875-46L	18.62~18.87 (0.733”~0.743”)		
C20-1900-47L	18.87~19.12 (0.743”~0.753”)	47.50 (1.87”)	
C20-1925-47L	19.12~19.37 (0.753”~0.763”)		
C20-1950-48L	19.37~19.62 (0.763”~0.772”)	48.75 (1.92”)	
C20-1975-48L	19.62~19.87 (0.772”~0.782”)		
C20-2000-50L	19.87~20.12 (0.782”~0.792”)	50.00 (1.97”)	
C20-2025-50L	20.12~20.37 (0.792”~0.802”)		
C20-2050-50L	20.37~20.62 (0.802”~0.812”)		
C20-2075-50L	20.62~20.87 (0.812”~0.822”)		
C20-2100-50L	20.87~21.12 (0.822”~0.831”)		
C20-2125-50L	21.12~21.37 (0.831”~0.841”)		
C20-2150-50L	21.37~21.62 (0.841”~0.851”)		
C20-2175-50L	21.62~21.87 (0.851”~0.861”)		
C20-2200-50L	21.87~22.12 (0.861”~0.871”)		
C20-2225-50L	22.12~22.37 (0.871”~0.881”)		
C20-2250-50L	22.37~22.62 (0.881”~0.891”)		
C20-2275-50L	22.62~22.87 (0.891”~0.900”)		
C20-2300-50L	22.87~23.12 (0.900”~0.910”)		
C20-2325-50L	23.12~23.37 (0.910”~0.920”)		
C20-2350-50L	23.37~23.62 (0.920”~0.930”)		
C20-2375-50L	23.62~23.87 (0.930”~0.940”)		
C20-2400-50L	23.87~24.12 (0.940”~0.950”)		
C20-2425-50L	24.12~24.37 (0.950”~0.959”)		
C20-2450-50L	24.37~24.62 (0.959”~0.969”)		
C20-2475-50L	24.62~24.87 (0.969”~0.979”)		
C20-2500-50L	24.87~25.12 (0.979”~0.989”)		
C20-2525-50L	25.12~25.37 (0.989”~0.999”)		
C20-2550-50L	25.37~25.62 (0.999”~1.01”)		

99146 Quick Change High Speed EMB Boring Bar

Boring Bar Ø26~Ø50mm (1.024" ~ 1.969")

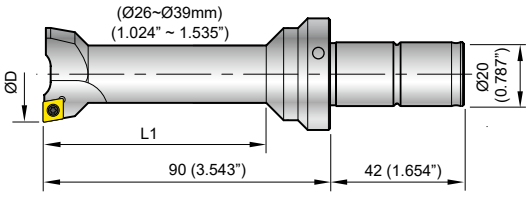
- Alloy Steel Shank
- Boring Depth : L1, 2~3xD

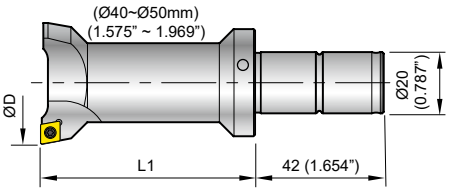
Ø26~Ø39mm
(1.024”~1.535”)



Ø40~Ø50mm
(1.574”~1.969”)







Ø26~Ø39mm (1.024"~1.535")

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

Part No.	ØD	L1	Insert Screw / Key
C20-2600-50L	25.87~26.12 (1.019”~1.028”)	50 (1.969”)	CC...0602... NS-25060 0.9Nm NK-T7
C20-2700-50L	26.87~27.12 (1.058”~1.068”)		
C20-2800-50L	27.87~28.12 (1.097”~1.107”)		
C20-2900-50L	28.87~29.12 (1.137”~1.146”)		
C20-3000-50L	29.87~30.12 (1.176”~1.186”)		
C20-3100-70L	30.87~31.12 (1.215”~1.225”)	70 (2.756”)	
C20-3200-70L	31.87~32.12 (1.255”~1.265”)		
C20-3300-70L	32.87~33.12 (1.294”~1.304”)		
C20-3400-70L	33.87~34.12 (1.333”~1.343”)		
C20-3500-70L	34.87~35.12 (1.373”~1.383”)		
C20-3600-70L	35.87~36.12 (1.412”~1.422”)		
C20-3700-70L	36.87~37.12 (1.452”~1.461”)		
C20-3800-70L	37.87~38.12 (1.491”~1.501”)		
C20-3900-70L	38.87~39.12 (1.530”~1.540”)		

Ø40~Ø50mm (1.574"~1.969")

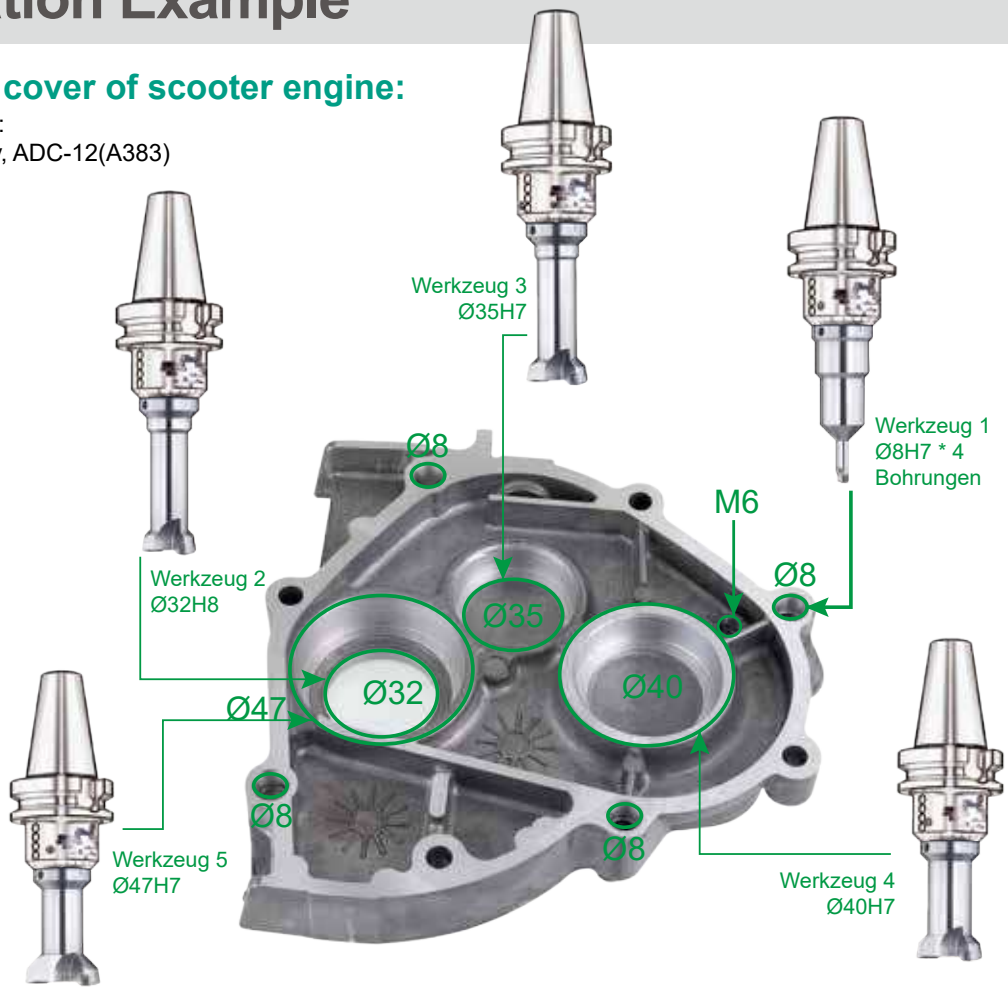
* H type with internal coolant can be ordered on request.
Ordering example: C20-4700-70LH.

Part No.	ØD	L1	Insert Screw / Key
C20-4000-70L	39.87-40.12 (1.570”~1.580”)	70 (2.756”)	CC...0602... NS-25060 0.9Nm NK-T7
C20-4100-70L	40.87-41.12 (1.609”~1.619”)		
C20-4200-70L	41.87-42.12 (1.648”~1.658”)		
C20-4300-70L	42.87-43.12 (1.688”~1.700”)		
C20-4400-70L	43.87-44.12 (1.727”~1.737”)		
C20-4500-70L	44.87-45.12 (1.767”~1.776”)		
C20-4600-70L	45.87-46.12 (1.806”~1.816”)		
C20-4700-70L	46.87-47.12 (1.845”~1.855”)		
C20-4800-70L	47.87-48.12 (1.885”~1.894”)		
C20-4900-70L	48.87-49.12 (1.924”~1.934”)		
C20-5000-70L	49.87-50.12 (1.963”~1.973”)		

Application Example

Machining a cover of scooter engine:

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



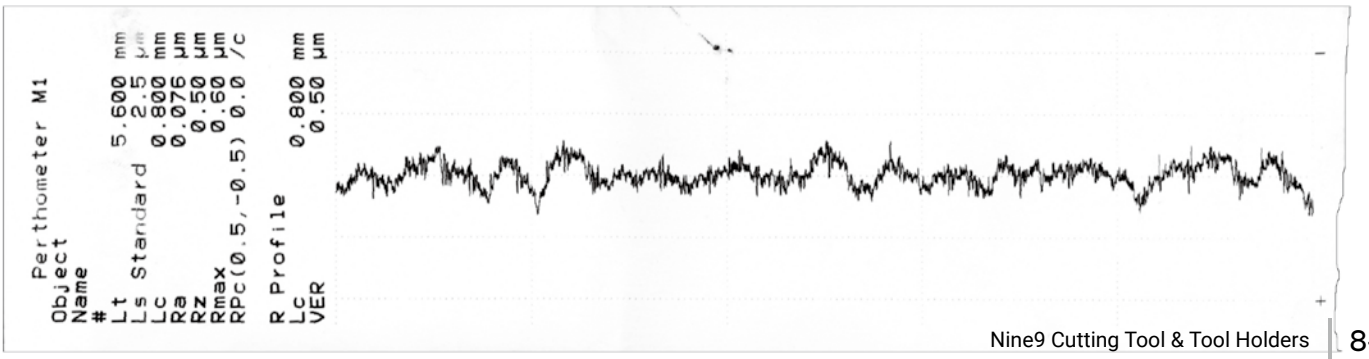
TOOL LIST by Nine9 Boring Bar 99146-series :

No.	Boring Bar	Grade of insert	Dia. mm	Depth	r.p.m.	F = mm/min.	Machining time
1	C20-146-0824	CCGT040102 NC30	Ø8H7	8 mm	8000	400	1.2 sec.
2	C20-3200-70L	CCFT060204HP 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.

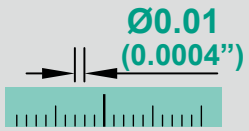
Example >>



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

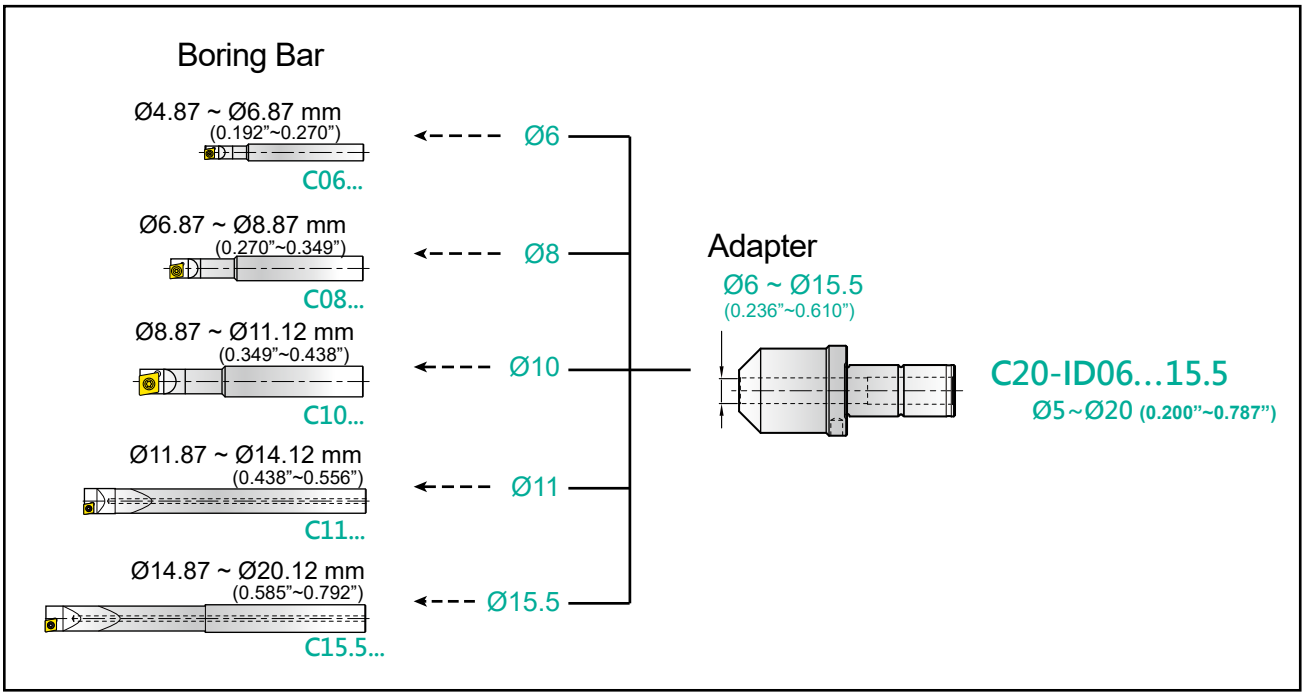


99151 Deep hole boring 4~6XD





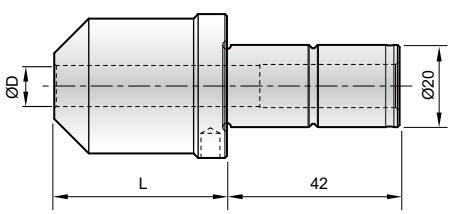
99151 System >>



Adapter >>

- Economical solution of small dia. boring bar.



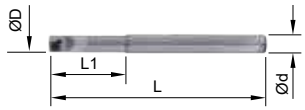
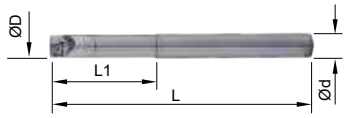
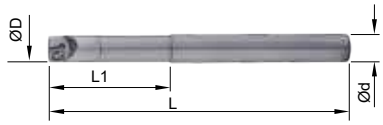
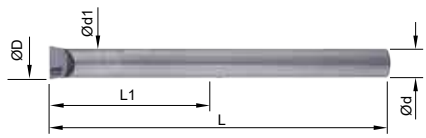
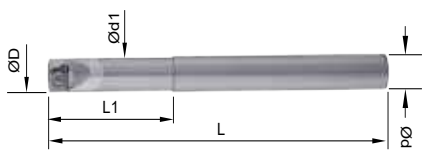
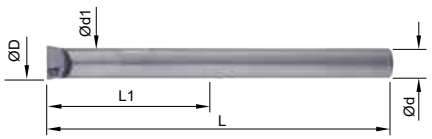


Part No.	ØD	L
C20-ID06	6 (0.236")	52 (2.047")
C20-ID08	8 (0.315")	49 (1.929")
C20-ID10	10 (0.394")	42 (1.654")
C20-ID11	11 (0.433")	21.5 (0.846")
C20-ID15.5	15.5 (0.610")	21.5 (0.846")

99151 Deep hole boring 4~6XD

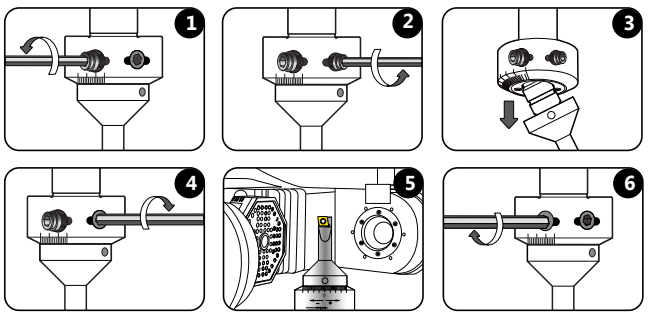
Boring Bar Ø5~Ø20mm (0.197” ~ 0.984”) >>

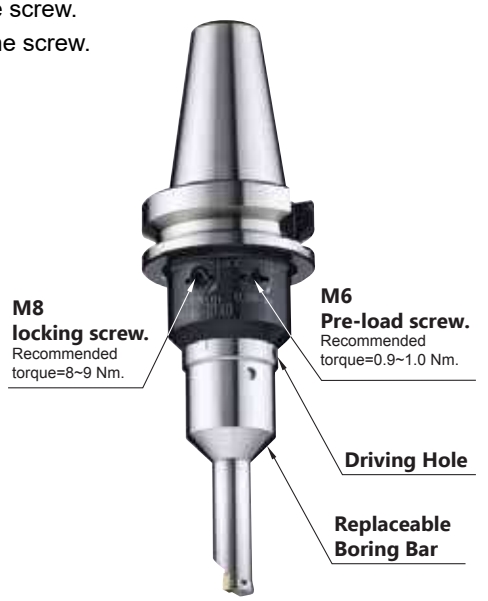
- Solid Carbide Shank
- Boring Depth : L1, 4~6xD

Type	ØD	Ød	Ød1	L1	L	Insert Screw / Key	Fig.
C06-0500-20L	4.87~5.12 (.192”~.202”)	6 (0.236”)	-	20 (0.787)	70 (2.756”)	CCGT030102 NS-16030 0.4Nm / NK-T6	
C06-0525-20L	5.12~5.37 (.202”~.211”)		-				
C06-0550-22L	5.37~5.62 (.211”~.221”)		-	22 (0.866”)			
C06-0575-22L	5.62~5.87 (.221”~.231”)		-				
C06-0600-24L	5.87~6.12 (.231”~.241”)		-	24 (0.945”)			
C06-0625-24L	6.12~6.37 (.241”~.251”)		-				
C06-0650-26L	6.37~6.62 (.251”~.261”)		-	26 (1.024”)			
C06-0675-26L	6.62~6.87 (.261”~.270”)		-				
C08-0700-28L	6.87~7.12 (.270”~.280”)	8 (0.315”)	-	28 (1.102”)	85 (3.346”)	CCGT040102 NS-20036 0.6Nm / NK-T6	
C08-0725-28L	7.12~7.37 (.280”~.290”)		-				
C08-0750-30L	7.37~7.62 (.290”~.300”)		-	30 (1.181”)			
C08-0775-30L	7.62~7.87 (.300”~.310”)		-				
C08-0800-32L	7.87~8.12 (.310”~.320”)		-	32 (1.260”)			
C08-0825-32L	8.12~8.37 (.320”~.330”)		-				
C08-0850-34L	8.37~8.62 (.330”~.339”)		-	34 (1.339”)			
C08-0875-34L	8.62~8.87 (.339”~.349”)		-				
C10-0900-36L	8.87~9.12 (.349”~.359”)	10 (0.394”)	-	36 (1.417”)	110 (4.331”)	CC...0602... NS-25045 0.9Nm / NK-T7	
C10-0925-36L	9.12~9.37 (.359”~.369”)		-				
C10-0950-38L	9.37~9.62 (.369”~.379”)		-	38 (1.496”)			
C10-0975-38L	9.62~9.87 (.379”~.389”)		-				
C10-1000-40L	9.87~10.12 (.389”~.398”)		-	40 (1.575”)			
C10-1025-40L	10.12~10.37 (3.98”~.408”)		-				
C10-1050-42L	10.37~10.62 (.408”~.418”)		-	42 (1.654”)			
C10-1075-42L	10.62~10.87 (.418”~.428”)		-				
C10-1100-44L	10.87~11.12 (.428”~.438”)		-	44 (1.732”)			
C11-1200-120L	11.87~12.12 (.467”~.477”)	11 (0.433”)	11 (.433”)	70 (2.756”)	120 (4.724”)	CC...0602... NS-25045 0.9Nm / NK-T7	
C11-1300-120L	12.87~13.12 (.507”~.517”)		-				
C11-1400-120L	13.87~14.12 (.546”~.556”)		-				
C15.5-1500-180L	14.87~15.12 (.585”~.595”)	15.5 (0.610”)	14 (.551)	90 (3.543”)	180 (7.087”)		
C15.5-1600-180L	15.87~16.12 (.625”~.635”)	15.5 (0.610”)	15 (.591)	90 (3.543”)	180 (7.087”)	CC...0602... NS-25060 0.9Nm / NK-T7	
C15.5-1700-180L	16.87~17.12 (.664”~.674”)		-	100 (3.937”)			
C15.5-1800-180L	17.87~18.12 (.704”~.713”)		-				
C15.5-1900-180L	18.87~19.12 (.743”~.753”)		-				
C15.5-2000-180L	19.87~20.12 (.782”~.792”)		-				

Procedures For Assembly

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





Procedures For Adjustment

On Tool Presetter

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

(Step 1)



(Step 2)



(Step 3)



(Step 4)



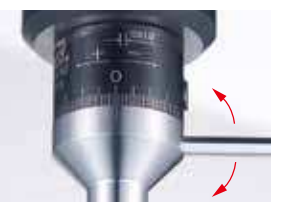
To Increase Diameter

To Reduce Diameter

On Milling Machine and Machining Centers

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

(Step 1)



(Step 2)



To Increase Diameter

(Step 3)



(Step 4)



To Reduce Diameter

Precisely Ground Inserts

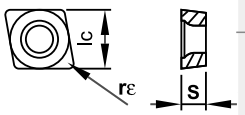
NC30 : • Universal grade for casting iron, carbon steel, alloy steel, stainless steel.

NC2032 : • For high speed cutting of casting iron.

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

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

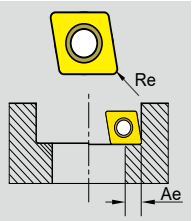
U-XP9001 : • Super finishing insert with special specified cutting width 0.15mm radius for high feed rate.
• Good for Al, Al-alloy and non-ferrous metal.

Parts No.		Coating	Grade		Dimensions			Screw	Key
					Ic	S	Re		
CCGT030102	NC30	TiAlN	K20F		3.5 (.138")	1.4 (.055")	0.2 (.008")	NS-16030 0.4Nm	NK-T6
	NC9036	DLC							
CCGT040102	NC30	TiAlN	K20F		4.3 (.169")	1.8 (.071"	0.2 (.008")	NS-20036 0.6Nm	NK-T6
	NC9036	DLC							
CCGH0602U	U-XP9001	Uncoated	K20F				-		
CCFT060204	NC2033	TiAlN	K20F		6.35 (.25")	2.38 (.094")	0.4 (.016")	NS-25045 0.9Nm	NK-T7
	NC9036	DLC							
CCFW060204	NC2032	AlTiN	K20F				0.4 (.016")		

Cutting Data

$$RPM = \frac{SFM \times 3.82}{D}$$

IPM = RPM x IPR



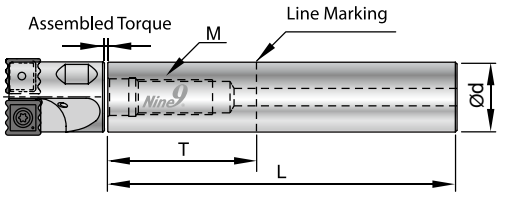
	Workpiece Meterial	Cutting conditions or surface finishes	SFM (ft./min.)	IPR (inch/rev.)	Re0.2	Re0.4	Grade of Insert	
					Ae (inch)			
P	Carbon steel	Regular cutting	394-656	0.002 - 0.004	0.002	0.004	NC2033	
		Interrupted cutting	328-459	0.002 - 0.003	0.002	0.004	NC30	
	Alloy steel	Regular cutting	328-459	0.002 - 0.004	0.002	0.004	NC2033	
		Interrupted cutting	262-394	0.002 - 0.003	0.002	0.004	NC30	
M	Stainless steel	Regular cutting	262-394	0.002 - 0.004	0.002	0.004	NC2033	
		Interrupted cutting	230-328	0.002 - 0.004	0.002	0.004	NC30	
K	Cast iron	Regular cutting	262-394	0.002 - 0.004	0.002	0.004	NC2032	NC30
N	Non-ferrous metal	Regular cutting	492-984	0.002 - 0.004	0.002	0.004	U-XP9001	
		Super mirror finish	492-984	0.006 - 0.010	0.006		NC9036	
H	Hardened steel <HRC 50	Regular cutting	262-394	0.002 - 0.003	0.002	0.004	NC30	

Extension Bar

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

Steel Type >>

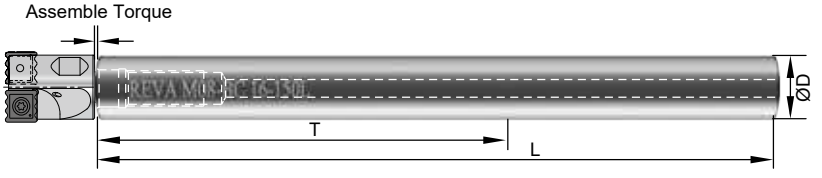
- T is the maximum overhang length.
- With internal coolant hole.



Part No.	Type	Ød	T	L	M	Assemble Torque
99801-08S	BC08-060M04S	8 (0.315")	10 (0.394")	60 (2.362")	M4xP0.7	3.5 Nm
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
99801-14S	BC14-090M08S	14 (0.551")	30 (1.18")	90 (3.543")	M8xP1.25	25.0 Nm
99801-16S	BC16-090M08S	16 (0.630")	35 (1.38")	90 (3.543")	M8xP1.25	25.0 Nm
99801-18S	BC18-100M10S	18 (0.709")	40 (1.57")	100 (3.937")	M10xP1.5	50.0 Nm
99801-20S	BC20-100M10S	20 (0.787")	40 (1.57")	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 >>

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



Part No.	Type	Ød	T	L	M	Assemble Torque
99801-08W	BC08-075M04W	8 (0.315")	25 (0.984")	75 (2.953")	M4xP0.7	3.5 Nm
99801-10W	BC10-100M05W	10 (0.394")	50 (1.969")	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

Notes

No Need To Choose
Nine9 Does It All

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