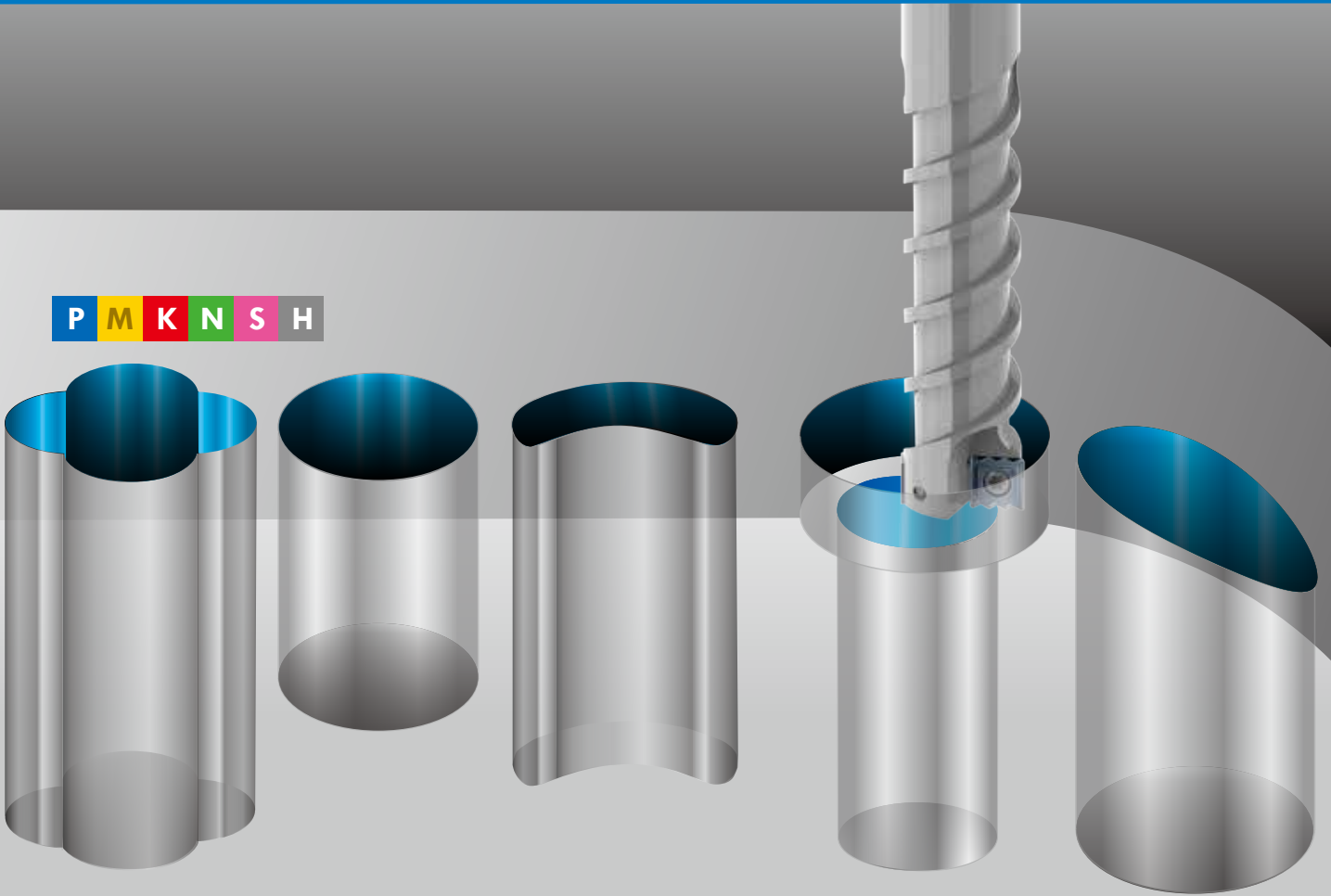


"One Tool" Performs Multiple Applications



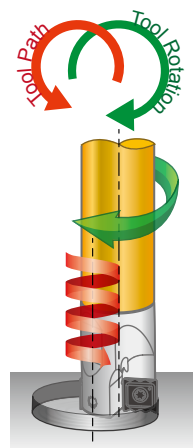
nine9.jic-tools.com.tw



NC Helix Drill Helical Interpolation



Cat. 05



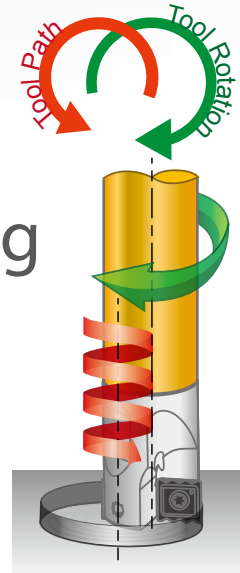
Principle



NC Helix Drill

Rough Milling, Drilling & Slotting

Cuts material by helical interpolation;
serrated cutting edge minimizes chip length.
Low spindle power is not a problem, good for drilling
material that generates long, soft chips.



20° Ramping Angle

Either linear or circular ramping.



Reduce Your Tool Inventory

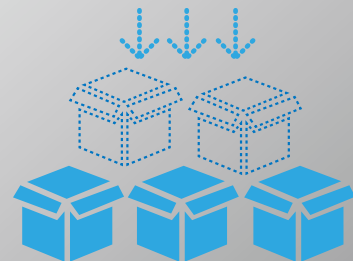
Just six tools can drill diameters from 13mm-65mm bores.

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.



Inventory





◀ **Cylindrical shank**
Apply external coolant

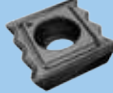
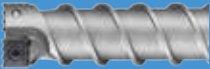

Screw fit type ▶
With center coolant hole
For 4xDc ~ 8xDc deep hole drilling

← Ti6Al4V, Titanium



Two types of shank

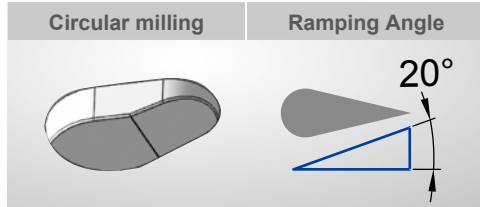
Contents

Insert		Page 03
Holder		Page 03
Technical Guide	P M K N S H	Page 05
Application		Page 10

01

Feature
<Page 11>

Lower spindle power consumption Easy to cut!

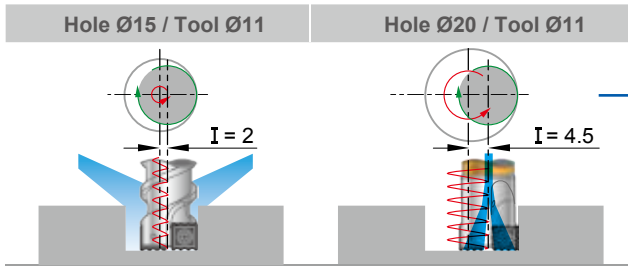


- Thanks to the small cutting load of the serrated cutting edge and helical interpolation lower power consumption. Work quicker, smarter and achieve better results.
- Circular ramping milling, maximum ramping angle is 20°.
For example: tool HD27 machining $\varnothing 50$ mm hole, 9 mm pitch for aluminum, 6 mm pitch for carbon steel.

02

Feature
<Page 11>

Just six tools for drilling $\varnothing 13 \sim \varnothing 65$ mm or larger

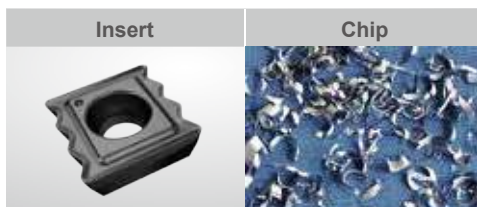


- Cuts by helical interpolation.
- Each holder can machine different diameters and hole depths.
- Enlarger hole is adaptable by using internal coolant cutter, please refer to Page 5.

03

Feature
<Page 10>

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.



"One tool" performs multiple applications

04
Feature
<Page 12>



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

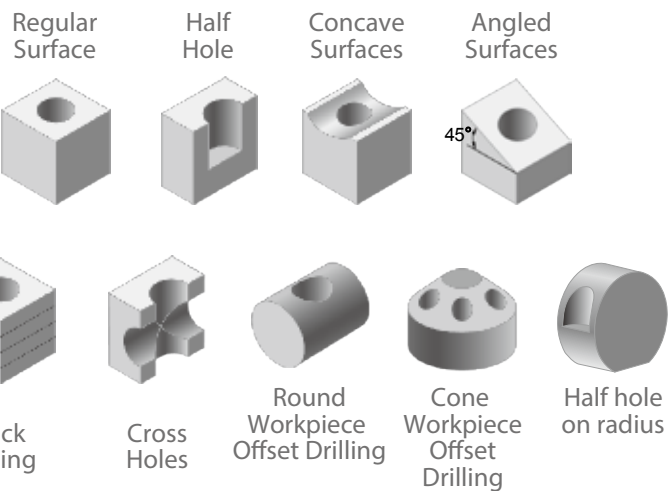
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NC Helix Drill

Functions in variable conditions

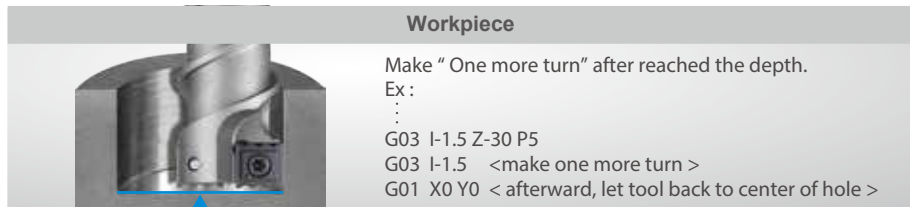
05
Feature
<Page 10>



Roughness Measuring

Feature **06**
<Page 5>

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

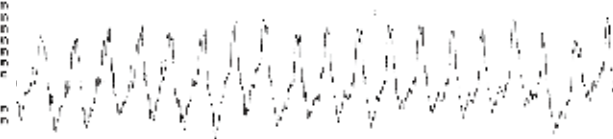


Workpiece

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

Flatness

```
Perthometer P1
Object
Name
#
Lt 0.520 mm
La Standard 0.20 mm
Lr 0.300 mm
Rr 1.270 mm
Rz 0.61 mm
Rmax 7.71 mm
RPa10.5,-0.21 40 %
R Profile
Lr 0.482 mm
VPr 0.52 mm
```

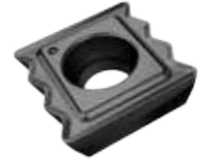


Strength
Opportunities
Extraordinary

ures

Specification

Insert



New NC5072 : P40, TiAlN coating.

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

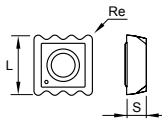
NC2032 : K20F, TiAlN coating.

Design for high performance cutting, special good for cast iron and hardened material <HRC50°.

● Best ◎ Suit ○ Possible

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

Ordering code	Grade	Coating		Dimensions			Screw	Key
				L	S	Re		
01-N9MX04T002	NC5072	P40	TiAlN	4.75	1.8	0.2	NS-18037 0.6Nm	NK-T6
	NC2032	K20F						
01-N9MX05T103	NC5072	P40	TiAlN	5.75	2.0	0.3	NS-20045 0.6Nm	NK-T6
	NC2032	K20F						
01-N9MX070204	NC5072	P40	TiAlN	7.5	2.4	0.4	NS-25045 0.9Nm	NK-T7
	NC2032	K20F						
01-N9MX100306	NC5072	P40	TiAlN	10.0	3.18	0.6	NS-30072 2.0Nm	NK-T9
	NC2032	K20F						
01-N9MX12T308	NC5072	P40	TiAlN	12.5	3.97	0.8	NS-35080 2.5Nm	NK-T15
	NC2032	K20F						

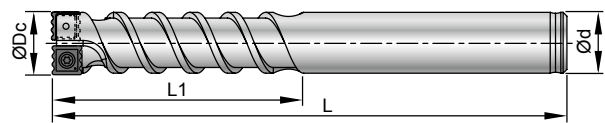


Holder

Cylindrical Shank (made from hardened high alloy steel)

► Helical chip-removing groove >>

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



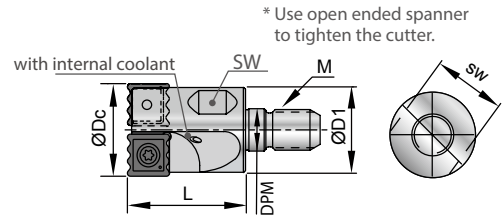
Ordering Code	Type	Capable of drill dia. mm		Ød	ØDc	L	L1	Max. Depth	Insert type	Max. ramping angle
		Dmin.	Dmax.							
00-99321-010-1320	BC10-HD11-1320	13	20	10	11	80	40	30	N9MX04T002	20°
00-99321-012-1525	BC12-HD13-1525	15	25	12	13	100	50	36	N9MX05T103	20°
00-99321-016-2030	BC16-HD17-2030	20	30	16	17	110	60	50	N9MX070204	20°
00-99321-020-2540	BC20-HD22-2540	25	40	20	22	125	70	60	N9MX100306	20°
00-99321-025-3050	BC25-HD27-3050	30	50	25	27	165	85	75	N9MX12T308	20°



Screw Fit Cutter

► With Internal Coolant

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

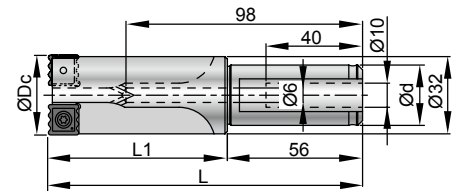


Ordering Code	Type	Capable of drill dia. mm		ØDc	ØD1	L	M	DPM	SW	Insert type	Max. ramping angle
		Dmin.	Dmax.								
00-99323-010-1320	M05-HD11-1320	13	20	11	10	20	M5	5.5	8	N9MX04T002	20°
00-99323-012-1525	M06-HD13-1525	15	25	13	12	25	M6	6.5	10	N9MX05T103	20°
00-99323-016-2030	M08-HD17-2030	20	30	17	16	25	M8	8.5	14	N9MX070204	20°
00-99323-020-2540	M10-HD22-2540	25	40	22	20	30	M10	10.5	18	N9MX100306	20°
00-99323-025-3050	M12-HD27-3050	30	50	27	25	35	M12	12.5	23	N9MX12T308	20°

Side Lock Shank

► With Internal Coolant

- Special size is available on request.

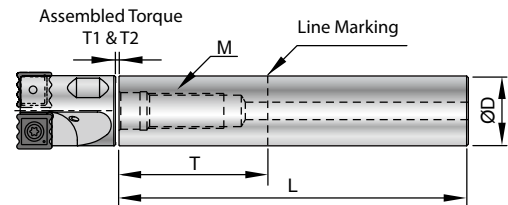


Ordering Code	Type	Capable of drill dia. mm		Ød	ØDc	L	L1	Max. Depth	Insert type	Max. ramping angle
		Dmin.	Dmax.							
00-99321-025-4265	SL25-HD33-4265	42	65	25	33	130	74	50	N9MX12T308	9°

Extension Bar

Steel Type

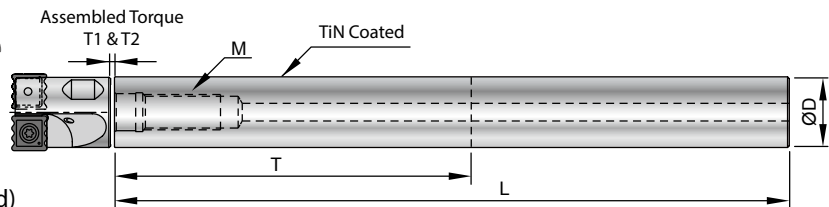
- T is the maximum overhang length.
- With internal coolant hole.



Ordering Code	Type	ØD	T	L	M	Assembled Torque	
						T1*	T2**
00-99801-10S	BC10-075M05S	10	25	75	M5	2.5 Nm	6.9 Nm
00-99801-12S	BC12-075M06S	12	25	75	M6	4 Nm	11.8 Nm
00-99801-16S	BC16-090M08S	16	35	90	M8	10 Nm	28.6 Nm
00-99801-20S	BC20-100M10S	20	40	100	M10	15 Nm	56.7 Nm
00-99801-25S	BC25-120M12S	25	50	120	M12	20 Nm	99 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)



Ordering Code	Type	ØD	T	L	M	Assembled Torque	
						T1*	T2**
00-99801-10W	BC10-100M05W	10	60	100	M5	2.5 Nm	6.9 Nm
00-99801-12W	BC12-100M06W	12	60	100	M6	4 Nm	11.8 Nm
00-99801-16W	BC16-150M08W	16	80	150	M8	10 Nm	28.6 Nm
00-99801-20W	BC20-200M10W	20	100	200	M10	15 Nm	56.7 Nm
00-99801-25W	BC25-200M12W	25	125	200	M12	20 Nm	99 Nm

* T1: Assembled torque until touch

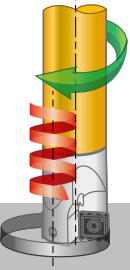
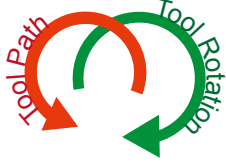
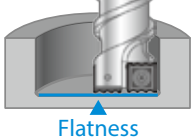
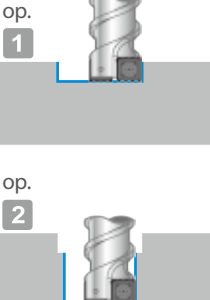


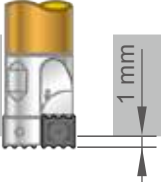
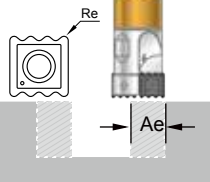

** T2: Assembled torque until secured lock



Technical Guide

Nine9

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

<p>1</p> <p>Programming</p> <p>All NC Helix Drills must be programmed using helical interpolation</p> 	<p>2</p> <p>Recommend of Direction</p> <p>Tool path of moving downward by CCW (G03), Tool Rotation by CW direction is recommended.</p> 	<p>3</p> <p>Flatness on blind hole bottom</p> <p>Make <u>one more turn</u> after reaching depth.</p> <p>Ex.: G03 I-1.5 Z-30 P5 G03 I-1.5 <make one more turn > G01 X0 Y0 < afterward return tool back to center of hole ></p> 	<p>4</p> <p>Step Hole</p> <p>From solid is more safe and reduce the cutting time.</p> 	<p>5</p> <p>External coolant</p> <p>Lower pressure higher volume is recommended. Minimum 5 bar. Aim nozzle toward the tool body, let the coolant effectively enter the hole.</p> 									
<p>6</p> <p>For Start</p> <table border="1"> <tr> <td>Vc Low Value</td> <td>f Middle Value</td> <td>Pitch High Value</td> </tr> </table> <p>Result adjusting</p> <table border="1"> <tr> <td>Upgrade</td> <td>Improve</td> </tr> <tr> <td>Vc ↑ adj. 1</td> <td>f ↓ adj. 1</td> </tr> <tr> <td>f ↑ adj. 2</td> <td>P ↓ adj. 2</td> </tr> </table>	Vc Low Value	f Middle Value	Pitch High Value	Upgrade	Improve	Vc ↑ adj. 1	f ↓ adj. 1	f ↑ adj. 2	P ↓ adj. 2	<p>7</p> <p>Through hole</p> <p>Reduce Vc 50% at last cycle.</p> 	<p>8</p> <p>Through hole Add 1mm to the required depth (Z)</p> <p>Failure to program beyond the through hole may result in insert breakage due to the force from circular interpolation.</p> 	<p>9</p> <p>Enlarge Hole</p> <p>Choosing a drill body with internal coolant. Max. Ae=Dc- (Rex2) for enlarging hole.</p> 	<p>10</p> <p>Internal coolant</p> <p>High pressure is recommended. Minimum 10 bar. Recommended for 3xDc ~6xDc Use.</p> 
Vc Low Value	f Middle Value	Pitch High Value											
Upgrade	Improve												
Vc ↑ adj. 1	f ↓ adj. 1												
f ↑ adj. 2	P ↓ adj. 2												

※ Choosing a suitable drill body.

- Required hole diameter is within the recommended range (**blue numbers**).
- Required hole diameters (more than one size), choose the drill can cover more different hole diameters.
- 3xDc~6xDc drilling, 99323 series is recommended.

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

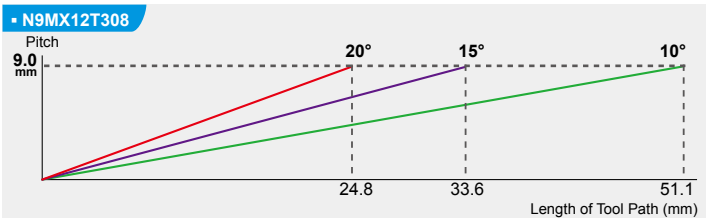
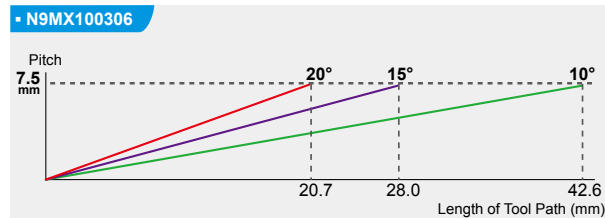
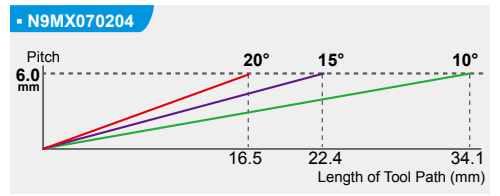
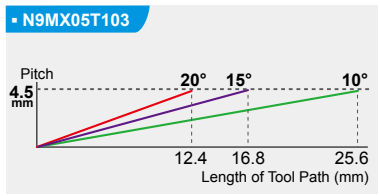
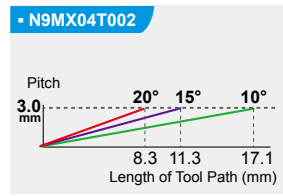


✘ The NC Helix Drill is programmed using "Helical interpolation" on CNC machine, CNC controller must have 3-axis simultaneously motion function.

NC Helix Drill	Cutting Parameters (S & F)	Formula
	$S = \frac{V_c \times 1000}{D_c \times \pi} \text{ r.p.m.}$	$D_c = \text{Dia. of Drill} \quad \text{mm}$
	$F = S \times f \quad \text{mm/min.}$	$D = \text{Dia. of Hole} \quad \text{mm}$
	$d = D - D_c \quad \text{mm}$	$L = \text{Depth of Drilling} \quad \text{mm}$
	$I = \frac{(D - D_c)}{2} \quad \text{mm}$	$V_c = \text{Cutting Speed} \quad \text{m/min.}$
	$T = \frac{\pi \times d \times L \times 60}{F \times P} \quad \text{sec.}$	$S = \text{Spindle Speed} \quad \text{r.p.m.}$
	Cutting time (T)	$I = \text{Circular radius} \quad \text{mm}$
		$f = \text{Feed rate} \quad \text{mm/rev.}$
		$F = \text{Table feed rate} \quad \text{mm/min.}$
		$d = \text{Circular diameter (D-Dc)} \quad \text{mm}$
	Chip removal Volume rate (Q)	$P = \text{Pitch of helical interpolation} \quad \text{mm}$
		$T = \text{Cutting time} \quad \text{sec.}$
		$Q = \text{Chip removal volume rate} \quad \text{cm}^3 / \text{min.}$
	$Q = \frac{\pi \times D^2 \times L \times 60}{4 \times 1000 \times T} \quad \text{cm}^3 / \text{min.}$	

Ramping Angle	
	<p>Circular ramping (α)</p> $\alpha = \tan^{-1} \frac{P}{(D - D_c) \times \pi} \text{ degree}$
	<p>Linear ramping (α)</p> $\alpha = \tan^{-1} \frac{ap}{L_m} \text{ degree}$ <p>Max. ap < 3/4 of insert length</p>

✘ Length of tool path for linear ramping.
 Length of tool path for Circular ramping = $(D - D_c) \times 3.14$



Cutting Data

- Boldface number is recommended for start.
- [Pitch is possible to increase 20%](#) while cutting conditions are all fine.

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

Nine9



NC Helix Drill

Workpiece material	Vc m/min.		Ø13		Ø14		Ø16		Ø18		Ø20		
	99321	99323	f	Pitch	f	Pitch	f	Pitch	f	Pitch	f	Pitch	
			mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	
P Carbon steel	0.25%C	60 ~ 90 ~ 130	100 ~ 160 ~ 220	0.04 0.05 0.07	0.60 0.80 1.00	0.06 0.08 0.10	0.70 0.95 1.25	0.08 0.11 0.14	0.90 1.20 1.50	0.10 0.14 0.18	1.00 1.40 1.75	0.12 0.16 0.20	1.20 1.60 2.00
	0.45% C	60 ~ 90 ~ 120	100 ~ 150 ~ 200	0.04 0.05 0.07	0.60 0.80 1.00	0.06 0.08 0.10	0.70 0.95 1.25	0.08 0.11 0.14	0.90 1.20 1.50	0.10 0.14 0.18	1.00 1.40 1.75	0.12 0.16 0.20	1.20 1.60 2.00
	0.60%C	50 ~ 70 ~ 110	80 ~ 130 ~ 180	0.04 0.05 0.06	0.60 0.75 0.90	0.06 0.07 0.09	0.70 0.90 1.12	0.07 0.10 0.12	0.80 1.10 1.35	0.09 0.12 0.16	0.90 1.20 1.57	0.10 0.14 0.18	1.00 1.40 1.80
	Low alloy steel	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.03 0.04 0.05	0.50 0.65 0.80	0.05 0.06 0.08	0.60 0.80 1.00	0.07 0.10 0.12	0.70 0.95 1.20	0.08 0.11 0.15	0.80 1.10 1.40	0.09 0.12 0.16	1.00 1.30 1.60
	High alloy steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.03 0.04 0.05	0.50 0.65 0.80	0.05 0.06 0.08	0.60 0.80 1.00	0.07 0.10 0.12	0.70 0.95 1.20	0.08 0.11 0.15	0.80 1.10 1.40	0.09 0.12 0.16	1.00 1.30 1.60
M Stainless steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.03 0.04 0.05	0.50 0.65 0.80	0.05 0.06 0.08	0.60 0.80 1.00	0.07 0.10 0.12	0.70 0.95 1.20	0.08 0.11 0.15	0.80 1.10 1.40	0.09 0.12 0.16	1.00 1.30 1.60	
K Cast Iron	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.04 0.05 0.07	0.60 0.80 1.00	0.06 0.08 0.10	0.70 0.95 1.25	0.08 0.11 0.14	0.90 1.20 1.50	0.10 0.14 0.18	1.00 1.40 1.75	0.12 0.16 0.20	1.20 1.60 2.00	
N Al	80 ~ 130 ~ 180	120 ~ 210 ~ 300	0.04 0.05 0.07	0.90 1.20 1.50	0.06 0.08 0.10	1.10 1.50 1.87	0.08 0.11 0.14	1.30 1.80 2.25	0.10 0.14 0.18	1.50 2.10 2.62	0.12 0.16 0.20	1.80 2.40 3.00	
	Cu	60 ~ 105 ~ 150	100 ~ 170 ~ 240	0.04 0.05 0.07	0.70 0.95 1.20	0.06 0.08 0.10	0.90 1.20 1.50	0.08 0.11 0.14	1.00 1.40 1.80	0.10 0.14 0.18	1.20 1.70 2.10	0.12 0.16 0.20	1.40 1.90 2.40
S Ni-Alloy	10 ~ 20 ~ 30	15 ~ 28 ~ 40	0.01 0.02 0.03	0.50 0.65 0.80	0.01 0.02 0.04	0.60 0.80 1.00	0.02 0.03 0.05	0.70 0.95 1.20	0.03 0.05 0.07	0.80 1.10 1.40	0.04 0.06 0.08	0.90 1.30 1.60	
	Titanium	30 ~ 40 ~ 50	40 ~ 60 ~ 80	0.01 0.02 0.03	0.50 0.65 0.80	0.01 0.02 0.04	0.60 0.80 1.00	0.02 0.03 0.05	0.70 0.95 1.20	0.03 0.05 0.07	0.80 1.10 1.40	0.04 0.06 0.08	0.90 1.30 1.60
H Hardened	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.03 0.04 0.05	0.50 0.65 0.80	0.05 0.06 0.08	0.60 0.80 1.00	0.07 0.10 0.12	0.70 0.95 1.20	0.08 0.11 0.15	0.80 1.10 1.40	0.09 0.12 0.16	1.00 1.30 1.60	



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

Workpiece material	Vc m/min.		Ø15		Ø17		Ø20		Ø22		Ø25		
	99321	99323	f	Pitch	f	Pitch	f	Pitch	f	Pitch	f	Pitch	
			mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	
P Carbon steel	0.25%C	60 ~ 90 ~ 130	100 ~ 160 ~ 220	0.05 0.07 0.09	1.20 1.60 2.00	0.07 0.10 0.13	1.30 1.78 2.25	0.09 0.13 0.16	1.50 2.00 2.50	0.12 0.16 0.20	1.60 2.18 2.75	0.13 0.18 0.22	1.80 2.40 3.00
	0.45% C	60 ~ 90 ~ 120	100 ~ 150 ~ 200	0.05 0.07 0.09	1.20 1.60 2.00	0.07 0.10 0.13	1.30 1.78 2.25	0.09 0.13 0.16	1.50 2.00 2.50	0.12 0.16 0.20	1.60 2.18 2.75	0.13 0.18 0.22	1.80 2.40 3.00
	0.60%C	50 ~ 70 ~ 110	80 ~ 130 ~ 180	0.05 0.06 0.08	1.10 1.50 1.80	0.07 0.09 0.11	1.20 1.61 2.02	0.08 0.12 0.15	1.30 1.78 2.25	0.10 0.14 0.18	1.40 1.94 2.47	0.12 0.16 0.20	1.60 2.15 2.70
	Low alloy steel	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.04 0.05 0.07	1.00 1.30 1.60	0.06 0.08 0.10	1.00 1.40 1.80	0.07 0.10 0.13	1.20 1.60 2.00	0.09 0.13 0.16	1.30 1.80 2.20	0.10 0.14 0.17	1.40 1.90 2.40
	High alloy steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.04 0.05 0.07	1.00 1.30 1.60	0.06 0.08 0.10	1.00 1.40 1.80	0.07 0.10 0.13	1.20 1.60 2.00	0.09 0.13 0.16	1.30 1.80 2.20	0.10 0.14 0.17	1.40 1.90 2.40
M Stainless steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.04 0.05 0.07	1.00 1.30 1.60	0.06 0.08 0.10	1.00 1.40 1.80	0.07 0.10 0.13	1.20 1.60 2.00	0.09 0.13 0.16	1.30 1.80 2.20	0.10 0.14 0.17	1.40 1.90 2.40	
K Cast Iron	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.05 0.07 0.09	1.20 1.60 2.00	0.07 0.10 0.13	1.30 1.78 2.25	0.09 0.13 0.16	1.50 2.00 2.50	0.12 0.16 0.20	1.60 2.18 2.75	0.13 0.18 0.22	1.80 2.40 3.00	
N Al	80 ~ 130 ~ 180	120 ~ 210 ~ 300	0.05 0.07 0.09	1.80 2.40 3.00	0.07 0.10 0.13	2.00 2.69 3.37	0.09 0.13 0.16	2.20 2.98 3.75	0.12 0.16 0.20	2.40 3.26 4.12	0.13 0.18 0.22	2.70 3.60 4.50	
	Cu	60 ~ 105 ~ 150	100 ~ 170 ~ 240	0.05 0.07 0.09	1.40 1.90 2.40	0.07 0.10 0.13	1.60 2.15 2.70	0.09 0.13 0.16	1.80 2.40 3.00	0.12 0.16 0.20	2.00 2.65 3.30	0.13 0.18 0.22	2.10 2.85 3.60
S Ni-Alloy	10 ~ 20 ~ 30	15 ~ 28 ~ 40	0.02 0.025 0.03	1.00 1.30 1.60	0.03 0.04 0.05	1.00 1.40 1.80	0.03 0.045 0.06	1.20 1.60 2.00	0.04 0.06 0.08	1.30 1.80 2.20	0.04 0.06 0.08	1.40 1.90 2.40	
	Titanium	30 ~ 40 ~ 50	40 ~ 60 ~ 80	0.02 0.025 0.03	1.00 1.30 1.60	0.03 0.04 0.05	1.00 1.40 1.80	0.03 0.045 0.06	1.20 1.60 2.00	0.04 0.06 0.08	1.30 1.80 2.20	0.04 0.06 0.08	1.40 1.90 2.40
H Hardened	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.04 0.05 0.07	1.00 1.30 1.60	0.06 0.08 0.10	1.00 1.40 1.80	0.07 0.10 0.13	1.20 1.60 2.00	0.09 0.13 0.16	1.30 1.80 2.20	0.10 0.14 0.17	1.40 1.90 2.40	

Cutting Data

- Boldface number is recommended for start.
- [Pitch is possible to increase 20%](#) while cutting conditions are all fine.

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

Workpiece material	Vc m/min.		Ø20		Ø22		Ø25		Ø27		Ø30		
	99321	99323	f	Pitch	f	Pitch	f	Pitch	f	Pitch	f	Pitch	
			mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	
P Carbon steel	0.25%C	60 ~ 90 ~ 130	100 ~ 160 ~ 220	0.06 0.08 0.10	1.80 2.40 3.00	0.09 0.12 0.15	1.90 2.56 3.25	0.12 0.16 0.20	2.10 2.80 3.50	0.14 0.19 0.24	2.20 2.96 3.75	0.15 0.21 0.26	2.40 3.20 4.00
	0.45% C	60 ~ 90 ~ 120	100 ~ 150 ~ 200	0.06 0.08 0.10	1.80 2.40 3.00	0.09 0.12 0.15	1.90 2.56 3.25	0.12 0.16 0.20	2.10 2.80 3.50	0.14 0.19 0.24	2.20 2.96 3.75	0.15 0.21 0.26	2.40 3.20 4.00
	0.60%C	50 ~ 70 ~ 110	80 ~ 130 ~ 180	0.05 0.07 0.09	1.60 2.15 2.70	0.08 0.11 0.13	1.70 2.30 2.90	0.10 0.14 0.18	1.90 2.55 3.20	0.13 0.18 0.22	2.00 2.70 3.40	0.13 0.18 0.23	2.10 2.85 3.60
	Low alloy steel	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.05 0.06 0.08	1.40 1.90 2.40	0.07 0.10 0.12	1.50 2.05 2.60	0.09 0.13 0.16	1.60 2.20 2.80	0.11 0.15 0.19	1.80 2.40 3.00	0.12 0.16 0.20	1.90 2.55 3.20
	High alloy steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.05 0.06 0.08	1.40 1.90 2.40	0.07 0.10 0.12	1.50 2.05 2.60	0.09 0.13 0.16	1.60 2.20 2.80	0.11 0.15 0.19	1.80 2.40 3.00	0.12 0.16 0.20	1.90 2.55 3.20
M Stainless steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.05 0.06 0.08	1.40 1.90 2.40	0.07 0.10 0.12	1.50 2.05 2.60	0.09 0.13 0.16	1.60 2.20 2.80	0.11 0.15 0.19	1.80 2.40 3.00	0.12 0.16 0.20	1.90 2.55 3.20	
K Cast Iron	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.06 0.08 0.10	1.80 2.40 3.00	0.09 0.12 0.15	1.90 2.58 3.25	0.12 0.16 0.20	2.10 2.80 3.50	0.14 0.19 0.24	2.20 2.98 3.75	0.15 0.21 0.26	2.40 3.20 4.00	
N Al	80 ~ 130 ~ 180	120 ~ 210 ~ 300	0.06 0.08 0.10	2.70 3.60 4.50	0.09 0.12 0.15	2.80 3.84 4.87	0.12 0.16 0.20	3.10 4.05 5.00	0.14 0.19 0.24	3.30 4.45 5.60	0.15 0.21 0.26	3.60 4.80 6.00	
	Cu	60 ~ 105 ~ 150	100 ~ 170 ~ 240	0.06 0.08 0.10	2.10 2.85 3.60	0.09 0.12 0.15	2.30 3.10 3.90	0.12 0.16 0.20	2.50 3.35 4.20	0.14 0.19 0.24	2.70 3.60 4.50	0.15 0.21 0.26	2.80 3.80 4.80
S Ni-Alloy	10 ~ 20 ~ 30	15 ~ 28 ~ 40	0.02 0.03 0.04	1.40 1.90 2.40	0.03 0.05 0.06	1.50 2.05 2.60	0.04 0.06 0.08	1.60 2.20 2.80	0.04 0.07 0.09	1.80 2.40 3.00	0.05 0.08 0.10	1.90 2.55 3.20	
	Titanium	30 ~ 40 ~ 50	40 ~ 60 ~ 80	0.02 0.03 0.04	1.40 1.90 2.40	0.03 0.05 0.06	1.50 2.05 2.60	0.04 0.06 0.08	1.60 2.20 2.80	0.04 0.07 0.09	1.80 2.40 3.00	0.05 0.08 0.10	1.90 2.55 3.20
H Hardened	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.05 0.06 0.08	1.40 1.90 2.40	0.07 0.10 0.12	1.50 2.05 2.60	0.09 0.13 0.16	1.60 2.20 2.80	0.11 0.15 0.19	1.80 2.40 3.00	0.12 0.16 0.20	1.90 2.55 3.20	

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

Workpiece material	Vc m/min.		Ø25		Ø28		Ø32		Ø36		Ø40		
	99321	99323	f	Pitch	f	Pitch	f	Pitch	f	Pitch	f	Pitch	
			mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	mm/rev.	mm	
P Carbon steel	0.25%C	60 ~ 90 ~ 130	100 ~ 160 ~ 220	0.07 0.10 0.12	1.80 2.40 3.00	0.10 0.14 0.17	2.10 2.80 3.50	0.14 0.19 0.23	2.40 3.20 4.00	0.17 0.23 0.28	2.70 3.60 4.50	0.18 0.24 0.30	3.00 4.00 5.00
	0.45% C	60 ~ 90 ~ 120	100 ~ 150 ~ 200	0.07 0.10 0.12	1.80 2.40 3.00	0.10 0.14 0.17	2.10 2.80 3.50	0.14 0.19 0.23	2.40 3.20 4.00	0.17 0.23 0.28	2.70 3.60 4.50	0.18 0.24 0.30	3.00 4.00 5.00
	0.60%C	50 ~ 70 ~ 110	80 ~ 130 ~ 180	0.06 0.08 0.10	1.60 2.15 2.70	0.09 0.13 0.16	1.90 2.55 3.20	0.12 0.16 0.20	2.20 2.90 3.60	0.15 0.20 0.25	2.40 3.20 4.00	0.16 0.22 0.27	2.70 3.60 4.50
	Low alloy steel	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.05 0.07 0.09	1.40 1.90 2.40	0.08 0.11 0.14	1.70 2.25 2.80	0.10 0.14 0.18	1.90 2.55 3.20	0.13 0.18 0.22	2.20 2.90 3.60	0.14 0.19 0.24	2.40 3.20 4.00
	High alloy steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.05 0.07 0.09	1.40 1.90 2.40	0.08 0.11 0.14	1.70 2.25 2.80	0.10 0.14 0.18	1.90 2.55 3.20	0.13 0.18 0.22	2.20 2.90 3.60	0.14 0.19 0.24	2.40 3.20 4.00
M Stainless steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.05 0.07 0.09	1.40 1.90 2.40	0.08 0.11 0.14	1.70 2.25 2.80	0.10 0.14 0.18	1.90 2.55 3.20	0.13 0.18 0.22	2.20 2.90 3.60	0.14 0.19 0.24	2.40 3.20 4.00	
K Cast Iron	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.07 0.10 0.12	1.80 2.40 3.00	0.10 0.14 0.17	2.10 2.80 3.50	0.14 0.19 0.23	2.40 3.20 4.00	0.17 0.23 0.28	2.70 3.60 4.50	0.18 0.24 0.30	3.00 4.00 5.00	
N Al	80 ~ 130 ~ 180	120 ~ 210 ~ 300	0.07 0.10 0.12	2.70 3.60 4.50	0.10 0.14 0.17	3.10 4.15 5.20	0.14 0.19 0.23	3.60 4.80 6.00	0.17 0.23 0.28	4.00 5.35 6.70	0.18 0.24 0.30	4.50 6.00 7.50	
	Cu	60 ~ 105 ~ 150	100 ~ 170 ~ 240	0.07 0.10 0.12	2.10 2.85 3.60	0.10 0.14 0.17	2.50 3.35 4.20	0.14 0.19 0.23	2.90 3.85 4.80	0.17 0.23 0.28	3.20 4.30 5.40	0.18 0.24 0.30	3.60 4.80 6.00
S Ni-Alloy	10 ~ 20 ~ 30	15 ~ 28 ~ 40	0.02 0.04 0.05	1.40 1.90 2.40	0.03 0.05 0.07	1.70 2.25 2.80	0.04 0.07 0.09	1.90 2.55 3.20	0.05 0.08 0.10	2.20 2.90 3.60	0.06 0.09 0.12	2.40 3.20 4.00	
	Titanium	30 ~ 40 ~ 50	40 ~ 60 ~ 80	0.02 0.04 0.05	1.40 1.90 2.40	0.03 0.05 0.07	1.70 2.25 2.80	0.04 0.07 0.09	1.90 2.55 3.20	0.05 0.08 0.10	2.20 2.90 3.60	0.06 0.09 0.12	2.40 3.20 4.00
H Hardened	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.05 0.07 0.09	1.40 1.90 2.40	0.08 0.11 0.14	1.70 2.25 2.80	0.10 0.14 0.18	1.90 2.55 3.20	0.13 0.18 0.22	2.20 2.90 3.60	0.14 0.19 0.24	2.40 3.20 4.00	



Cutting Data


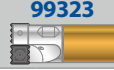
- Boldface number is recommended for start.
- [Pitch is possible to increase 20%](#) while cutting conditions are all fine.

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


Nine9



NC Helix Drill

Workpiece material	Vc m/min.		Ø30		Ø35		Ø40		Ø45		Ø50		
	 99321	 99323	f mm/rev.	Pitch mm	f mm/rev.	Pitch mm	f mm/rev.	Pitch mm	f mm/rev.	Pitch mm	f mm/rev.	Pitch mm	
P Carbon steel	0.25%C	60 ~ 90 ~ 130	100 ~ 160 ~ 220	0.08 0.11 0.13	2.40 3.20 4.00	0.12 0.16 0.20	2.70 3.60 4.50	0.17 0.23 0.28	3.00 4.00 5.00	0.19 0.26 0.32	3.30 4.40 5.50	0.20 0.27 0.34	3.60 4.80 6.00
	0.45% C	60 ~ 90 ~ 120	100 ~ 150 ~ 200	0.08 0.11 0.13	2.40 3.20 4.00	0.12 0.16 0.20	2.70 3.60 4.50	0.17 0.23 0.28	3.00 4.00 5.00	0.19 0.26 0.32	3.30 4.40 5.50	0.20 0.27 0.34	3.60 4.80 6.00
	0.60%C	50 ~ 70 ~ 110	80 ~ 130 ~ 180	0.07 0.10 0.12	2.20 2.90 3.60	0.10 0.14 0.18	2.40 3.20 4.00	0.15 0.20 0.25	2.70 3.60 4.50	0.17 0.23 0.28	3.00 4.00 5.00	0.18 0.24 0.30	3.20 4.30 5.40
	Low alloy steel	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.06 0.08 0.10	1.90 2.55 3.20	0.09 0.13 0.16	2.20 2.90 3.60	0.13 0.18 0.22	2.40 3.20 4.00	0.15 0.20 0.25	2.60 3.50 4.40	0.16 0.22 0.27	2.90 3.85 4.80
	High alloy steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.06 0.08 0.10	1.90 2.55 3.20	0.09 0.13 0.16	2.20 2.90 3.60	0.13 0.18 0.22	2.40 3.20 4.00	0.15 0.20 0.25	2.60 3.50 4.40	0.16 0.22 0.27	2.90 3.85 4.80
M Stainless steel	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.06 0.08 0.10	1.90 2.55 3.20	0.09 0.13 0.16	2.20 2.90 3.60	0.13 0.18 0.22	2.40 3.20 4.00	0.15 0.20 0.25	2.60 3.50 4.40	0.16 0.22 0.27	2.90 3.85 4.80	
K Cast Iron	40 ~ 70 ~ 100	80 ~ 120 ~ 160	0.08 0.11 0.13	2.40 3.20 4.00	0.12 0.16 0.20	2.70 3.60 4.50	0.17 0.23 0.28	3.00 4.00 5.00	0.19 0.26 0.32	3.30 4.40 5.50	0.20 0.27 0.34	3.60 4.80 6.00	
N Al	80 ~ 130 ~ 180	120 ~ 210 ~ 300	0.08 0.11 0.13	3.60 4.80 6.00	0.12 0.16 0.20	4.00 5.35 6.70	0.17 0.23 0.28	4.50 6.00 7.50	0.19 0.26 0.32	4.90 6.55 8.20	0.20 0.27 0.34	5.40 7.20 9.00	
	Cu	60 ~ 105 ~ 150	100 ~ 170 ~ 240	0.08 0.11 0.13	2.90 3.85 4.80	0.12 0.16 0.20	3.20 4.30 5.40	0.17 0.23 0.28	3.60 4.80 6.00	0.19 0.26 0.32	4.00 5.30 6.60	0.20 0.27 0.34	4.30 5.75 7.20
S Ni-Alloy	10 ~ 20 ~ 30	15 ~ 28 ~ 40	0.02 0.04 0.05	1.90 2.55 3.20	0.04 0.06 0.08	2.20 2.90 3.60	0.06 0.09 0.12	2.40 3.20 4.00	0.06 0.09 0.12	2.60 3.50 4.40	0.07 0.11 0.14	2.90 3.85 4.80	
	Titanium	30 ~ 40 ~ 50	40 ~ 60 ~ 80	0.02 0.04 0.05	1.90 2.55 3.20	0.04 0.06 0.08	2.20 2.90 3.60	0.06 0.09 0.12	2.40 3.20 4.00	0.06 0.09 0.12	2.60 3.50 4.40	0.07 0.11 0.14	2.90 3.85 4.80
H Hardened	40 ~ 60 ~ 80	60 ~ 90 ~ 120	0.06 0.08 0.10	1.90 2.55 3.20	0.09 0.13 0.16	2.20 2.90 3.60	0.13 0.18 0.22	2.40 3.20 4.00	0.15 0.20 0.25	2.60 3.50 4.40	0.16 0.22 0.27	2.90 3.85 4.80	

▶ 00-99321-025-4265 >>

Workpiece material	Vc m/min.	Ø42		Ø50		Ø55		Ø60		Ø65		
	 99321	f mm/rev.	Pitch mm	f mm/rev.	Pitch mm	f mm/rev.	Pitch mm	f mm/rev.	Pitch mm	f mm/rev.	Pitch mm	
P Carbon steel	0.25%C	100 ~ 160 ~ 220	0.12 0.16 0.20	3.00 4.00 5.00	0.15 0.20 0.24	3.10 4.15 5.20	0.18 0.24 0.30	3.30 4.40 5.50	0.19 0.26 0.32	3.40 4.55 5.70	0.20 0.27 0.34	3.60 4.80 6.00
	0.45% C	100 ~ 150 ~ 200	0.12 0.16 0.20	3.00 4.00 5.00	0.15 0.20 0.24	3.10 4.15 5.20	0.18 0.24 0.30	3.30 4.40 5.50	0.19 0.26 0.32	3.40 4.55 5.70	0.20 0.27 0.34	3.60 4.80 6.00
	0.60%C	80 ~ 130 ~ 180	0.11 0.15 0.18	2.70 3.60 4.50	0.13 0.18 0.22	2.80 3.75 4.70	0.16 0.22 0.27	3.00 4.00 5.00	0.17 0.23 0.29	3.00 4.05 5.10	0.18 0.24 0.30	3.20 4.30 5.40
	Low alloy steel	80 ~ 120 ~ 160	0.10 0.13 0.16	2.40 3.20 4.00	0.11 0.15 0.19	2.50 3.35 4.20	0.14 0.19 0.24	2.60 3.50 4.40	0.15 0.20 0.25	2.80 3.70 4.60	0.16 0.22 0.27	2.90 3.85 4.80
	High alloy steel	60 ~ 90 ~ 120	0.10 0.13 0.16	2.40 3.20 4.00	0.11 0.15 0.19	2.50 3.35 4.20	0.14 0.19 0.24	2.60 3.50 4.40	0.15 0.20 0.25	2.80 3.70 4.60	0.16 0.22 0.27	2.90 3.85 4.80
M Stainless steel	60 ~ 90 ~ 120	0.10 0.13 0.16	2.40 3.20 4.00	0.11 0.15 0.19	2.50 3.35 4.20	0.14 0.19 0.24	2.60 3.50 4.40	0.15 0.20 0.25	2.80 3.70 4.60	0.16 0.22 0.27	2.90 3.85 4.80	
K Cast Iron	80 ~ 120 ~ 160	0.12 0.16 0.20	3.00 4.00 5.00	0.15 0.20 0.24	3.10 4.15 5.20	0.18 0.24 0.30	3.30 4.40 5.50	0.19 0.26 0.32	3.40 4.55 5.70	0.20 0.27 0.34	3.60 4.80 6.00	
N Al	120 ~ 210 ~ 300	0.12 0.16 0.20	4.50 6.00 7.50	0.15 0.20 0.24	4.70 6.25 7.80	0.18 0.24 0.30	4.90 6.55 8.20	0.19 0.26 0.32	5.20 6.90 8.60	0.20 0.27 0.34	5.40 7.20 9.00	
	Cu	100 ~ 170 ~ 240	0.12 0.16 0.20	3.60 4.80 6.00	0.15 0.20 0.24	3.80 5.05 6.30	0.18 0.24 0.30	4.00 5.30 6.60	0.19 0.26 0.32	4.10 5.50 6.90	0.20 0.27 0.34	4.30 5.75 7.20
S Ni-Alloy	15 ~ 28 ~ 40	0.04 0.06 0.08	2.40 3.20 4.00	0.05 0.08 0.10	2.50 3.35 4.20	0.06 0.09 0.12	2.60 3.50 4.40	0.06 0.10 0.13	2.80 3.70 4.60	0.07 0.11 0.14	2.90 3.85 4.80	
	Titanium	40 ~ 60 ~ 80	0.04 0.06 0.08	2.40 3.20 4.00	0.05 0.08 0.10	2.50 3.35 4.20	0.06 0.09 0.12	2.60 3.50 4.40	0.06 0.10 0.13	2.80 3.70 4.60	0.07 0.11 0.14	2.90 3.85 4.80
H Hardened	60 ~ 90 ~ 120	0.10 0.13 0.16	2.40 3.20 4.00	0.11 0.15 0.19	2.50 3.35 4.20	0.14 0.19 0.24	2.60 3.50 4.40	0.15 0.20 0.25	2.80 3.70 4.60	0.16 0.22 0.27	2.90 3.85 4.80	

Application Example

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

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



Material: SAE8620		Load 28% P
Vc	= 80 m/min.	
S	= 1500 r.p.m.	
f	= 0.15 mm/rev.	
F	= 225 mm/min	
P	= 6.0 mm	
T	= 63 sec.	

Material: SUS304 (Stainless steel 304)		Load 25% M
Vc	= 80 m/min.	
S	= 1500 r.p.m.	
f	= 0.08 mm/rev.	
F	= 120 mm/min	
P	= 6.0 mm	
T	= 118 sec.	

Material: C1100		Load 25% N
Vc	= 120 m/min.	
S	= 2250 r.p.m.	
f	= 0.10 mm/rev.	
F	= 225 mm/min	
P	= 6.0 mm	
T	= 63 sec.	

Material: AL6061T6		Load 20% N
Vc	= 180 m/min.	
S	= 3370 r.p.m.	
f	= 0.20 mm/rev.	
F	= 674 mm/min	
P	= 6.0 mm	
T	= 21 sec.	

Material: TiAl6V4		Load 24% S
Vc	= 80 m/min.	
S	= 1500 r.p.m.	
f	= 0.08 mm/rev.	
F	= 120 mm/min	
P	= 6.0 mm	
T	= 118 sec.	

Material: Inconel 718 (Drill with internal coolant)		Load 24% S
Vc	= 40 m/min.	
S	= 750 r.p.m.	
f	= 0.3 mm/rev.	
F	= 225 mm/min	
P	= 2.0 mm	
T	= 100 sec.	

► Suggested insert grades for best result >>

		00-99321-016-2030 (external coolant)			
		P Carbon Steel	M Stainless Steel	H Tool Steel	
Example 2	Diameter (mm)	25			
	Depth (mm)	50			
	Tool (Dc=17mm)	00-99321-016-2030 (external coolant)			
	Material	DIN	C45E	X5CrNi18-10	X40CrMoV5 1
		SAE	1045	304	H13
		JIS	S45C	SUS304	SKD61 (HRC50°)
	Insert Grade	N9MX070204- NC5072	N9MX070204- NC5072	N9MX070204- NC2032	
	No. of Edges	2	2	2	
	Vc = (m/min.)	120	40	80	
	S = r.p.m.	2250	750	1500	
f = (mm/rev.)	0.2	0.13	0.1		
F = (mm/min.)	450	97.5	150		
Pitch = (mm)	6	3	3		
Machine Load = % (BT40, VMC)	35%	20%	20%		
Tool Life (hole)	150	108	18		
Chip Removal Volume (cm ³)	3682	2651	441.78		



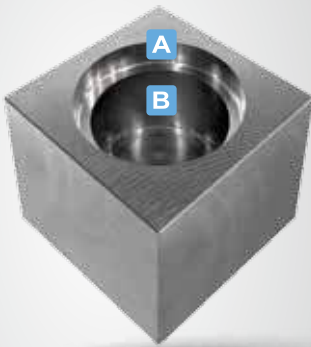
► To produce step hole Ø53.5 & Ø45 by one tool >>

Nine9



NC Helix Drill

Example 3

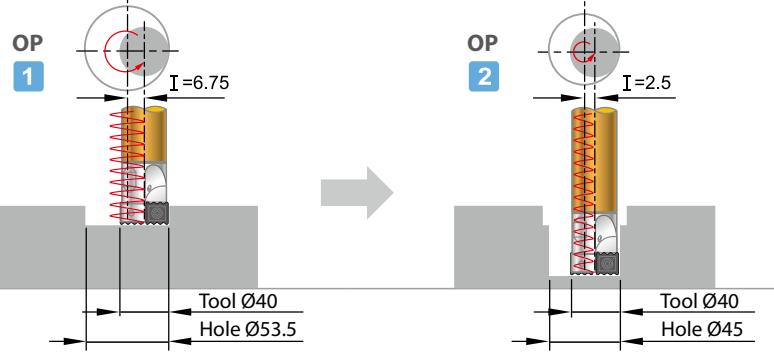


Application

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



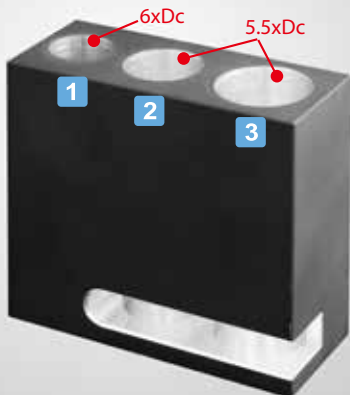
Material	S50C (JIS), High carbon steel									
Tool	99323-LS32-HD40 (Non-standard size)									
Insert	N9MX12T308-NC2032									
Machine	BT40, 22.5 Kw									
Coolant	Internal									
Hole	Dc mm	D mm	L mm	Vc m/min.	S r.p.m	f mm/rev.	F mm/min.	I mm	P mm	T sec.
A	Ø40	Ø53.5	10	300	2400	0.15	360	6.75	5.0	14
B		Ø45.0	32	300	2400	0.15	360	2.5	2.0	42



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

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

Example 4



Material	AL6061T6								
Tool	00-99323-016-2030								
Insert	N9MX070204-NC5072								
Machine	HAAS VM-3, BT40, 22.5KW								
Coolant	Internal coolant								
Fig.	Dc mm	D mm	L mm	Vc m/min.	S r.p.m	f mm/rev.	F mm/min.	P mm	
1		20	100	120	2250	0.1	225	3	
2	Ø17	25	95	100	1900	0.18	342	4.5	
3		30	95	60	1200	0.25	300	6	

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

Example 5

Maximum drilling capacity of the 5.5 kw spindle is Ø16 mm





Material	S50C (JIS), High carbon steel									
Tool	00-99321-020-2540 / BC20-HD22-2540									
Insert	N9MX100306-NC2032									
Machine	BT30, 5.5 Kw									
Coolant	External coolant									
Dc mm	D mm	L mm	Vc m/min.	S r.p.m	f mm/rev.	F mm/min.	I mm	P mm	T sec.	
Ø22	Ø30	70	200	* 2893	0.2	600	4	2.8	62	

* 3000 r.p.m. is used.

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

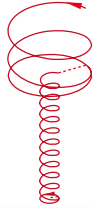
▶ One tool performs multiple patterns >>

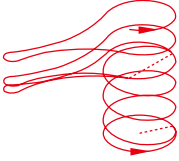
Example 6

Material	AL6061T6						
Tool	00-99323-016-2030 M08-HD17-2030						
Insert	N9MX070204-NC5072						
Machine	HAAS VM-3, BT40, 22.5KW						
Coolant	Internal						
Fig.	Dc mm	Vc m/min.	S r.p.m.	f mm/rev.	F mm/min.	P mm	T sec.
1		200	3800	0.15	570	4	67
2	Ø17	200	3800	0.15	570	4	95
3		200	3800	0.15	570	4	80

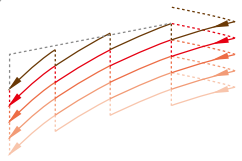
Tool Path 1



2



3



%

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

%

%

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

N1000
G01 X35.757 Y-55.924 Z#13 F#4
G03 X35.757 Y-46.076 R-6.5 Z#14 F#5

%

%

G02 X15.537 Y-49.599 R20. Z#15
G03 X15.537 Y-52.401 R-1.5
Z#16
G02 X35.757 Y-55.924 R20. Z#17

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

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

%

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

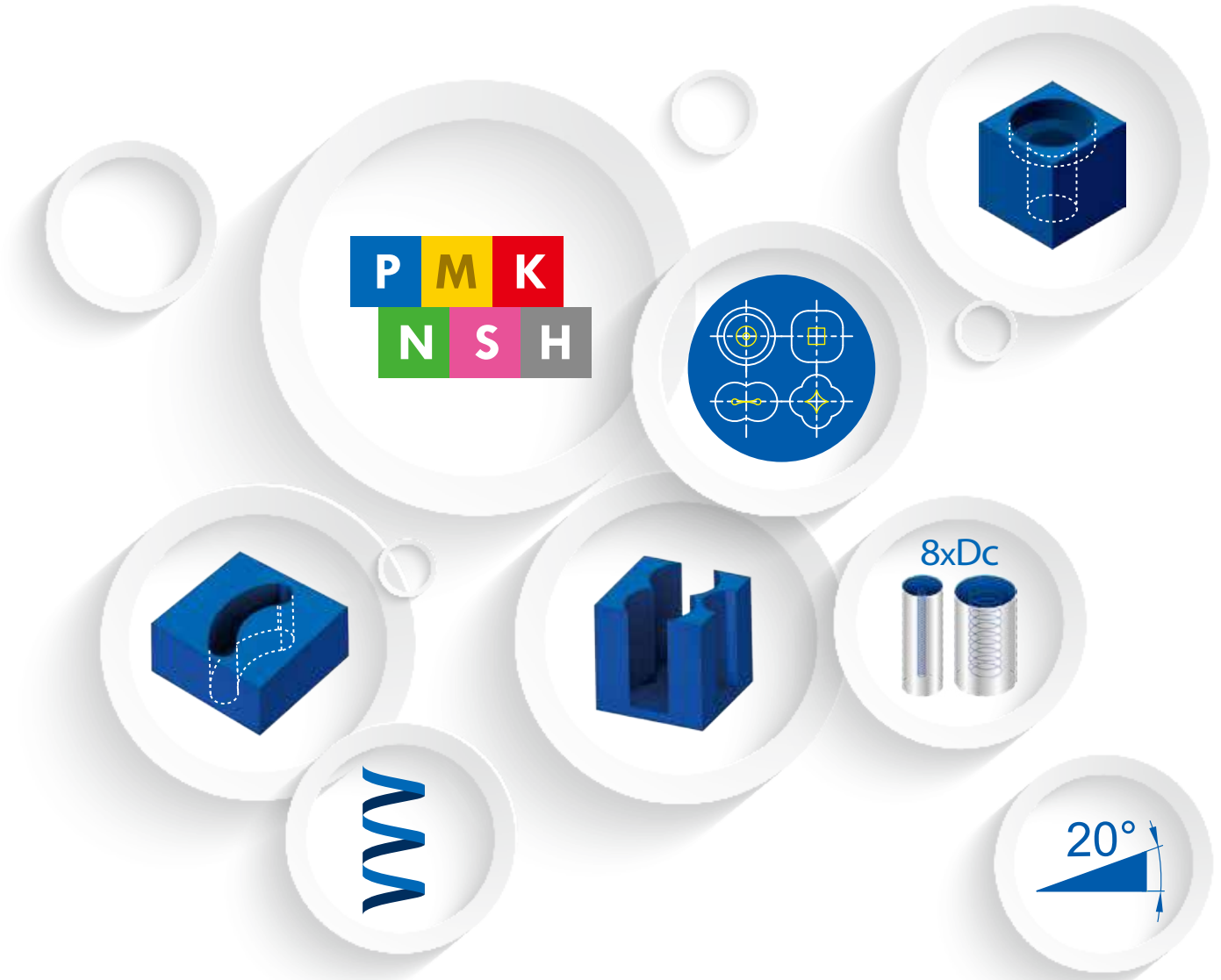
N1000

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

%



No Need To Choose Nine9 Does It All



JIMMORE International Corp.



Distributor