Super Power Drill >>>

Deep Hole Drilling Up To 12xD!

5xD & 10xD Ø19mm ~ Ø40mm

It is no doubt that deep hole drilling by indexable drill is always a challenge of the drill makers.
Nine9 “Super Power Drill”, featuring by patented indexable center pilot insert design, which is the first time in the world, helping to achieve the cost-effective and good performance, making deep hole drilling up to 12xD possible.

P M K N H

Features >>>

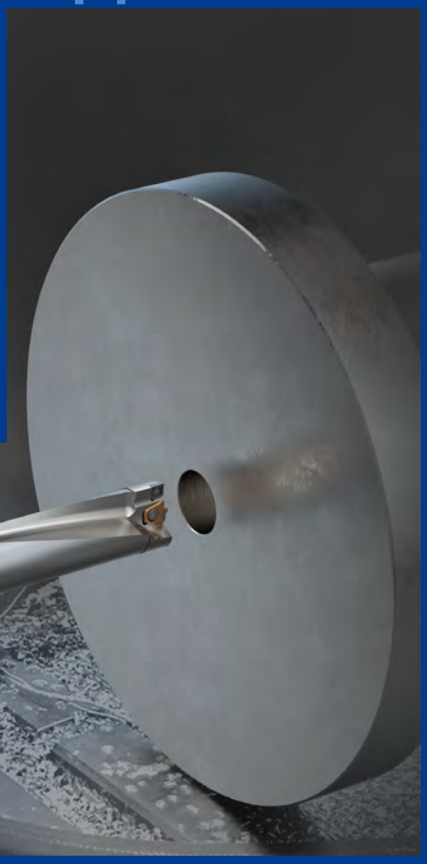
Indexable Drills With Carbide Center Pilot Insert

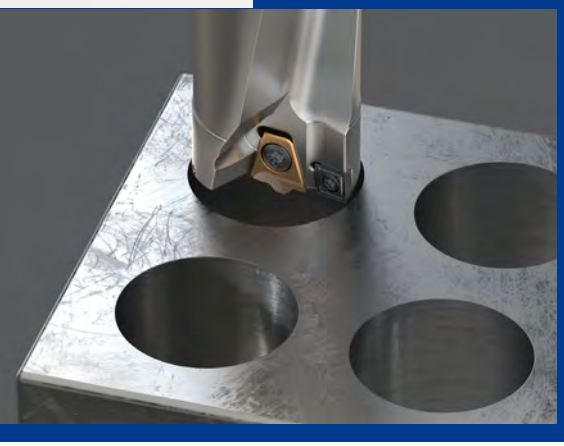
- Better surface finish.
- Better straightness.
- Better roundness.

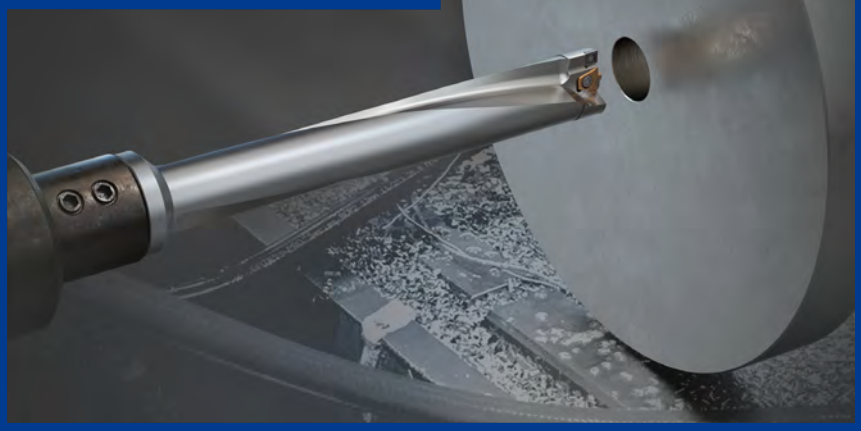
Patented Pocket Design

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

Applications







Performance

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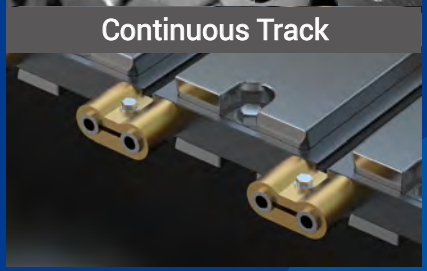
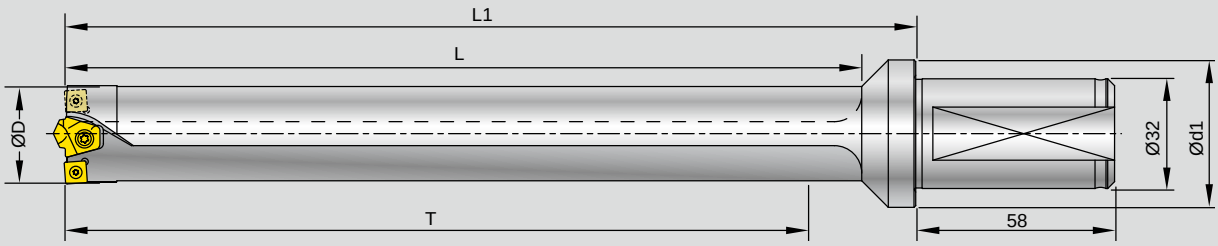


Holder 19mm~40mm



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

*Torque screwdriver is recommended.

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

Insert

Featuring by patented indexable center pilot insert design

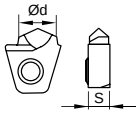
- High precision fully ground and edge honing to increase tool life and surface finish.
- Special geometry design delivers the benefits of the center drill in guiding position and eliminates the defects caused by the chip flow from the gap between the center drill and insert.

Center Pilot Insert >>

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

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

NC2032 NC40

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

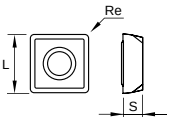
Periphery Insert >>

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

NC2032 NC40

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

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

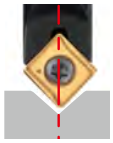
Parts No.		Coating	Grade		Dimensions			Screw	Key
					L	S	re		
N9GX04T002	NC2032	AlTiN	K20F		4.07	1.8	0.2	*NS-18037 0.6Nm	NK-T6
N9GX05T103	NC2032	AlTiN	K20F		5.07	2.0	0.3	*NS-20045 0.6Nm	
N9GX060204	NC2032	AlTiN	K20F		6.35	2.38	0.4	*NS-22062 0.9Nm	NK-T7
N9GX06020431	NC40	TiN	P35		6.35	2.38	0.4		
N9GX090308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

*Torque screwdriver is recommended.

Performance

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

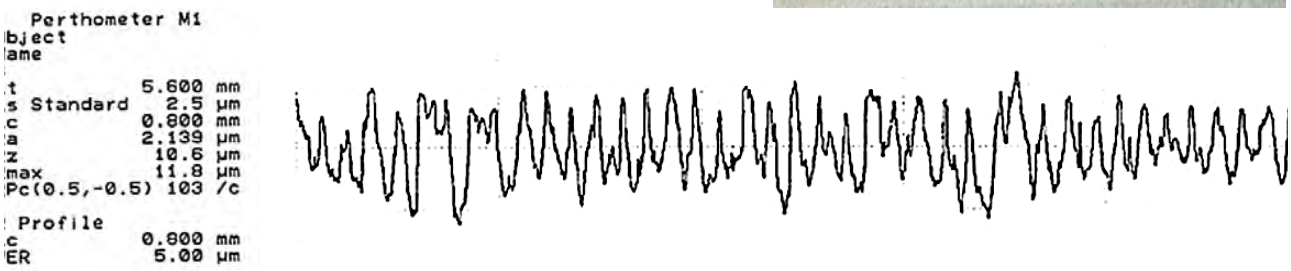
To get better position accuracy and diameter tolerance first, and make sure the size of the spot according to following.

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

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

Good surface finish >>

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



Technical Guide

Machining Power Requirement for Drilling

Material Classifiction for Calculation

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

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

Formulas for Calculation

feed force(KN) Ff

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

Drilling torque (Md) torque=(Nm)

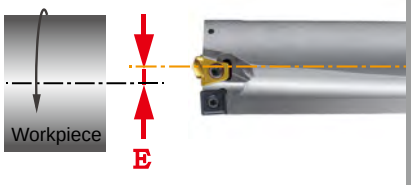
$$Md = \frac{f \times \pi \times D^2 \times Kc}{4000} Nm$$

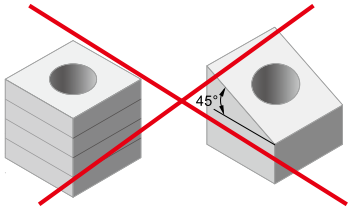
f =	feed rate	mm/rev.
Vc =	cutting speed	m/min.
D =	drill diameter	mm
Kc =	specified cutting force	N/mm^2

Technical Guide

Please pay attention to following conditions before you start.

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





- Recommand to make a spot hole first by spot drill. See page 7-127 for detail.
- The cutting speed relates to the periphery inserts, The feed rate depends on the load of the center pilot insert.
- The best condition will create short cutting chips. The feed rate can be applied ± 25% of the recommended value depended on the shape of the cutting chips.
- Be careful to monitor the spindle power consumption !
  When the spindle load is 15% higher than starting power consumption, please change the periphery insert to next new cutting edge and change a new center pilot insert.
- Increase 20% of the cutting speed and the feed rate for horizontal spindle machine.

Cutting Data

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