

## Principle and Benefit

- The hole is cut by helical interpolation; just five sizes of cutter can cut $\varnothing 13$ to $\varnothing 50 \mathrm{~mm}$.
- Even long cutting chip material, such as low carbon steel, stainless steel and soft material can be drilled easily without any trouble of long spiral cutting chips.
- Thanks to the small cutting load of the serrated cutting edge and helical interpolation, low power consumption of the spindle is required.


## Two types of NC Helix drill for your options

- Cylindrical shank with helical groove is designed for CNC machines without internal coolant supply.
The rotation of helical groove generates the stream to flush out the cutting chips together with coolant.

- Screw fit type is applicable to fit into almost all extension bar in the market. It has internal coolant through center, the cutting chips can be flushed out from hole together with the coolant.
- Example:
$\varnothing 11$ NC Helix drill can drill $\varnothing 15$ and $\varnothing 20$, just programmed different circular radius $\mathrm{I}=2 \mathrm{~mm}$ and $\mathrm{I}=4.5 \mathrm{~mm}$.



## Insert

- Serrated cutting edge makes the cutting chips short and small, it is easily to be flushed out the drilled hole.

NC2032:

- K20F micro grain carbide insert, TiAIN Coated.
- One insert has 2 cutting edges.
- For almost all kind of materials, good for soft and long cutting chip materials!


| Ordering Code | Grade | Coating |  | Dimensions |  |  | Screw | Key |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | L | S | Re |  |  |  |
| 01-N9MX04T002-NC2032 | K20F | TiAIN |  | 4.75 | 1.8 | 0.2 | $\int \mathrm{NS}-18037 / 0.6 \mathrm{Nm}$ | 1 | NK-T6 |
| 01-N9MX05T103-NC2032 |  |  |  | 5.75 | 2.0 | 0.3 | $\int \mathrm{NS}-20045 / 0.8 \mathrm{Nm}$ | 1 | NK-T6 |
| 01-N9MX070204-NC2032 |  |  |  | 7.5 | 2.4 | 0.4 | $\int \mathrm{NS}-25045$ / 1.2Nm | 1 | NK-T7 |
| 01-N9MX100306-NC2032 |  |  |  | 10 | 3.18 | 0.6 | $\int \mathrm{NS}-30072$ / 2.0 Nm | 1 | NK-T9 |
| 01-N9MX12T308-NC2032 |  |  |  | 12.5 | 3.97 | 0.8 | $\int \mathrm{NS}-35080 / 2.5 \mathrm{Nm}$ | $\rho$ | NK-T15 |



## Holder

## - Cylindrical shank Helical chip-removing groove



- The holder is made by high alloy steel and hardened.
- Special designed helical groove generates coolant chip-removing-stream.
- The coolant is pull-up by the rotating of helical groove and flushes out the cutting chips together with the coolant.
- Designed for the CNC machines with external coolant only.

| Ordering Code | Type | Capable of drill dia. mm |  | Max. Depth | Ød | ØDc | L | L1 | Insert type |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Suit for | Possible |  |  |  |  |  |  |
| 00-99321-010-1320 | BC10-HD11-1320 | 13~15 | up to 20 | 30 | 10 | 11 | 80 | 40 | N9MX04T002 |
| 00-99321-012-1525 | BC12-HD13-1525 | 15~20 | up to 25 | 36 | 12 | 13 | 100 | 50 | N9MX05T103 |
| 00-99321-016-2030 | BC16-HD17-2030 | 20~25 | up to 30 | 50 | 16 | 17 | 135 | 65 | N9MX070204 |
| 00-99321-020-2540 | BC20-HD22-2540 | 25~30 | up to 40 | 60 | 20 | 22 | 170 | 80 | N9MX100306 |
| 00-99321-025-3050 | BC25-HD27-3050 | 30~40 | up to 50 | 75 | 25 | 27 | 220 | 100 | N9MX12T308 |

## ■ Screw fit cutter

## Center coolant

- The holder is made by high alloy steel and hardened, standard screw-fit cutter adapts to almost any kind of the screw-fit tool holder or extension bar in the market.
- Designed for the CNC machines with center coolant.


| Ordering Code | Type | Capable of drill dia. mm |  | $\varnothing \mathrm{Dc}$ | ØD1 | L | M | Insert type |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Suit for | Possible |  |  |  |  |  |
| 00-99323-010-1320 | M05-HD11-1320 | 13~15 | up to 20 | 11 | 10 | 20 | M5xP0.8 | N9MX04T002 |
| 00-99323-012-1525 | M06-HD13-1525 | 15~20 | up to 25 | 13 | 12 | 25 | M6xP1.0 | N9MX05T103 |
| 00-99323-016-2030 | M08-HD17-2030 | 20~25 | up to 30 | 17 | 16 | 25 | M8xP1.25 | N9MX070204 |
| 00-99323-020-2540 | M10-HD22-2540 | 25~30 | up to 40 | 22 | 20 | 30 | M10xP1.5 | N9MX100306 |
| 00-99323-025-3050 | M12-HD27-3050 | 30~40 | up to 50 | 27 | 25 | 35 | M12xP1.75 | N9MX12T308 |

## ■ Extension Bar - Steel Made

- TiN coated range is the maximum overhang length.
- With internal coolant hole.

■ Extension Bar - Solid Carbide Made

- TiN coated range is the maximum overhang length.
- With internal coolant hole.


| Ordering Code | Type | $\varnothing D$ | $T$ | $L$ | $M$ |
| :---: | :---: | :---: | :---: | :---: | :--- |
| $00-99801-12 S$ | BC12-075M06S | 12 | 25 | 75 | M6xP1.0 |
| $00-99801-16 S$ | BC16-090M08S | 16 | 35 | 90 | M8xP1.25 |
| $00-99801-20 S$ | BC20-100M10S | 20 | 40 | 100 | M10xP1.5 |
| $00-99801-25 S$ | BC25-120M12S | 25 | 50 | 120 | M12xP1.75 |


| Ordering Code | Type | $\varnothing D$ | $T$ | $L$ | $M$ |
| :---: | :---: | :---: | :---: | :---: | :--- |
| $00-99801-10 \mathrm{~W}$ | BC10-100M05W | 10 | 60 | 100 | M5xP0.8 |
| 00-99801-12W | BC12-100M06W | 12 | 60 | 100 | M6xP1.0 |
| 00-99801-16W | BC16-150M08W | 16 | 80 | 150 | M8xP1.25 |
| 00-99801-20W | BC20-200M10W | 20 | 100 | 200 | M10xP1.5 |
| 00-99801-25W | BC25-200M12W | 25 | 125 | 200 | M12xP1.75 |

## Application Example

Work Material: Ti6AI4V
Tool holder: 00-99323-016 M08-HD17 Insert: N9MX070204-NC2032


Machine: HAAS VM-3, BT40, 22.5KW

| Fig. | D | L | Vc | S | fz | P | Remarks |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :--- |
| A | $\varnothing 30.5$ | 20 | 60 | 1200 | 0.05 | 2 | Counter sink for M20 bolt |
| B | $\varnothing 20.5$ | 20 | 60 | 1200 | 0.03 | 1 | For M20 bolt hole |
| C | $\varnothing 20$ | 50 | 60 | 1200 | 0.03 | 1 | Cross hole |
| D | $\varnothing 20$ | 20 | 60 | 1200 | 0.05 | 2 | Half hole on radius |



The NC Helix Drill is programing with "Helical interpolation" on CNC machine, the CNC controller must have 3-axis simultaneously motion function.

| $\mathrm{Vc}=$ Cutting Speed | $\mathrm{m} / \mathrm{min}$. |  |
| :--- | :--- | :--- |
| $\mathrm{fz}=$ Feed rate | $\mathrm{mm} / \mathrm{tooth}$ |  |
| $\mathrm{P}=$ Pitch of helical interpolation | mm |  |
| $\mathrm{Dc}=$ Dia. of Drill | mm |  |
| $\mathrm{L}=$ Depth of Drilling | mm |  |
| $\mathrm{S}=$ Spindle Speed | $\mathrm{r} . \mathrm{p} . \mathrm{m}$. |  |
| $\mathrm{F}=$ Table feed rate | $\mathrm{mm} / \mathrm{min}$. |  |
| $\mathrm{I}=$ Circular radius | mm |  |
| D | $=$ Drilling diameter | mm |

## Formula:

$$
S=\frac{V c \times 1000}{D c X \pi} \quad I=\frac{(D-D c)}{2} \quad F=S \times f
$$



## ■ Possible in Different Conditions



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