

# SHAPER DUO

Socket hole machining | CNC automatic lathes

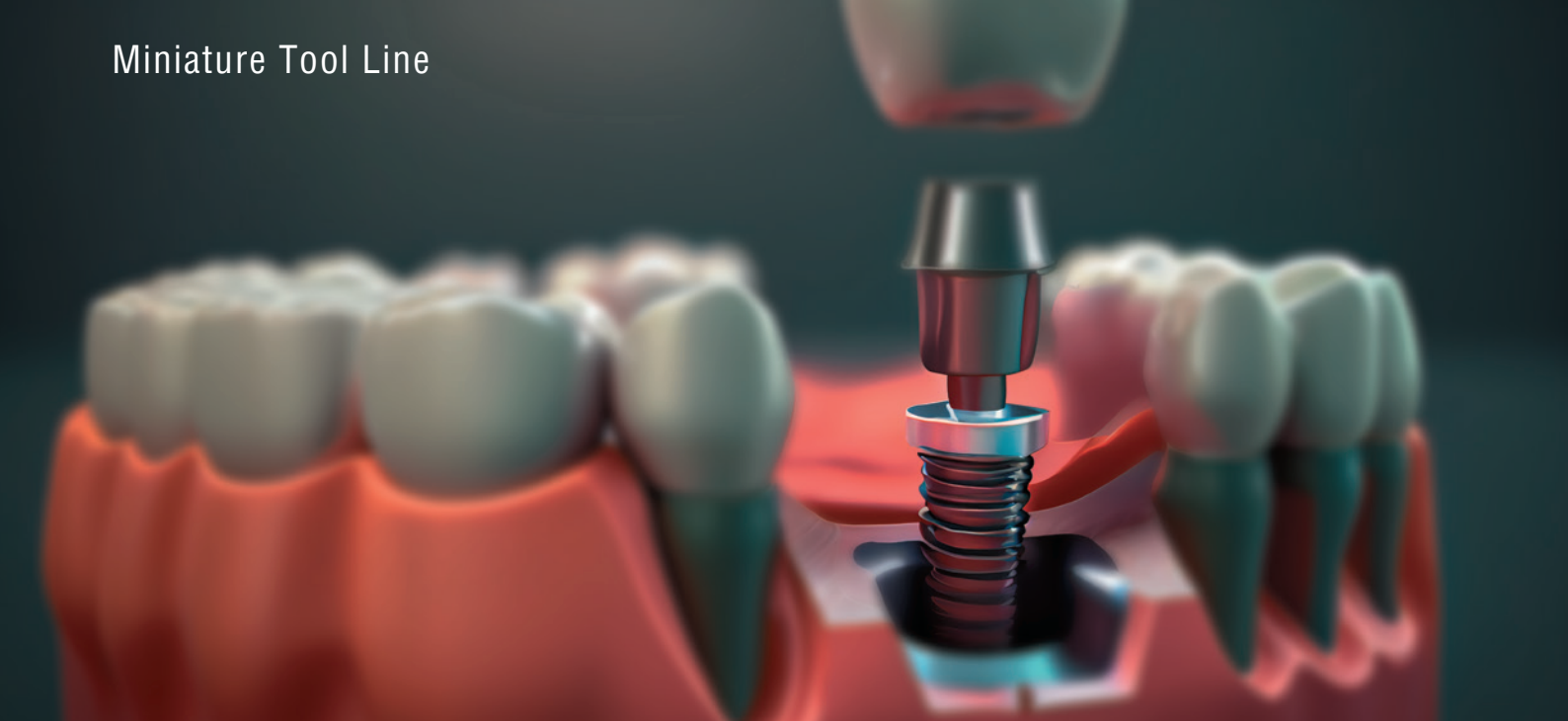


## New Line up

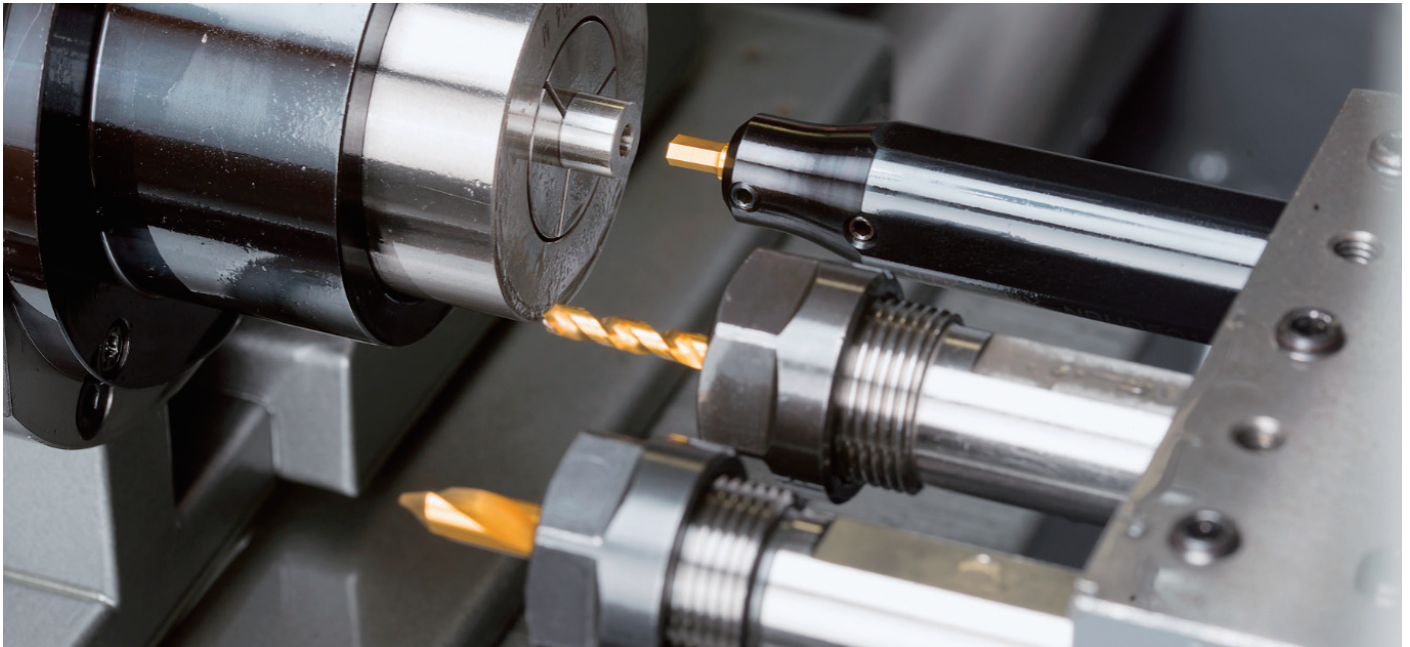
For medical parts (Abutment screws)  
Hexagon socket : AF 1,0mm - 1,4mm



Miniature Tool Line



# PROFITABLE SOCKET HOLE MACHINING



For socket hole machining on CNC automatic lathes

## SHAPER DUO



Hexagon, square and hexalobular socket machining can be achieved at a low cost and without any special equipment .

Wide range of socket styles and sizes can be machined by using the sub-spindle of automatic lathes.

### Features ①

- Machine square, hexagon, and hexalobular socket holes
- Less tool pressure than Rotary-Broaching. Ideal for machining small diameter work pieces
- Wide range of socket dimensions can be machined with one size of SHAPER DUO
- Special workpieces and small quantity part runs can be machined with less tool costs



### Features ②

#### Comparison Chart of Hexalobular Socket Machining

|            | Tool Pressure | Cycle Time | Tool Cost | High speed spindle | Programming |                                                                                                                   |
|------------|---------------|------------|-----------|--------------------|-------------|-------------------------------------------------------------------------------------------------------------------|
| Shaper Duo | ◎             | ◎          | ◎         | Not necessary      | Simple      | <ul style="list-style-type: none"> <li>• No high speed spindle needed</li> <li>• A lot less cycle time</li> </ul> |
| End mill   | ○             | ×          | △         | Necessary          | Complicated | <ul style="list-style-type: none"> <li>• Need high speed spindle</li> <li>• Time consuming process</li> </ul>     |

**\*Small diameter end mill driven by high-speed spindle is popular way to create Hexalobular(6-lobe) socket.**

**It has some flexibility but needs high speed spindle unit and it is a time consuming process.**

**\*SHAPER DUO can make Hexalobular(6-lobe) socket faster and simpler.**

#### Comparison Chart of HEX Socket Machining

|             | Tool Pressure | Cycle Time                                      | Flexibility | Tool Cost |                                                                                                                                                              |
|-------------|---------------|-------------------------------------------------|-------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shaper Duo  | ◎             | △<br>※Can be off-set by over-wrapping operation | ○           | ◎         | <ul style="list-style-type: none"> <li>• Less tool pressure-especially on small diameter parts</li> <li>• One size can cover several socket sizes</li> </ul> |
| Broach Tool | △             | ○                                               | ×           | △         | <ul style="list-style-type: none"> <li>• Need to have tools for each socket size</li> </ul>                                                                  |

**\*Rotary-broaching is an efficient way to machine a Hexagon socket.**

**But tool pressure is high and often times it pushes part too hard.**

**\*SHAPER DUO system enables less tool pressure and provides better tolerance with less cost.**

### Example of machining Hexagon socket

SHAPER DUO has better tool life compared to the competitor which has an immediate worn and rounded cutting edge.

NTK's special grinding process and TM4 grade enable to:

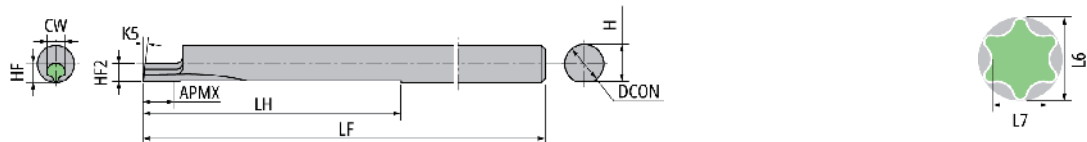
① Keep good corner edge sharpness and long tool life ② Provide better tolerance and accuracy ③ Provide better surface quality

|                   |                                       |  |                         |                          |
|-------------------|---------------------------------------|--|-------------------------|--------------------------|
| Work materials    | SUS303                                |  | <b>TM4 SSP030N1940H</b> | <b>10,000 pcs/corner</b> |
| Feed              | 2,000 mm/min                          |  |                         |                          |
| Depth of cut (ap) | Roughing 0.025mm<br>Finishing 0.005mm |  |                         |                          |
| Coolant           | WET                                   |  |                         |                          |
|                   |                                       |  | Competitor's carbide    | 300 pcs/corner           |

## Insert bar

### Hexalobular socket (6-LOBE hole)

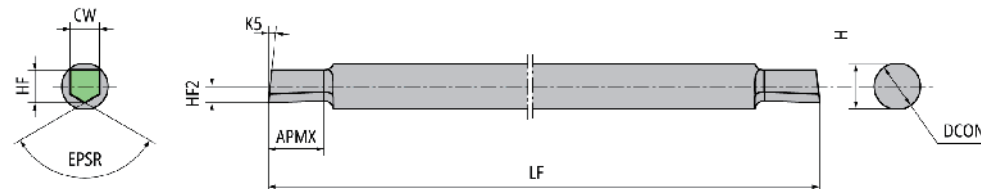
#### SSP-T



| Item Number  | Socket size | Socket number | L6 mm | L7 mm | Recommended Pilot bore Dia. mm | APMX mm | CW mm | DCON mm | H mm | HF mm | HF2 mm | K5 ° | LF mm | LH mm | Carbide PVD coating TM4 |
|--------------|-------------|---------------|-------|-------|--------------------------------|---------|-------|---------|------|-------|--------|------|-------|-------|-------------------------|
| SSP050N25T06 | T6          | 6             | 1.75  | 1.27  | 1.15                           | 2.5     | 1.2   | 5       | 4.75 | 1.09  | 2.4    | 6    | 70    | 35    | ●                       |
| SSP050N31T07 | T7          | -             | -     | -     | 1.38                           | 3.1     | 1.4   | 5       | 4.75 | 1.29  | 2.4    | 6    | 70    | 35    | ●                       |
| SSP050N36T08 | T8          | 8             | 2.4   | 1.75  | 1.62                           | 3.6     | 1.6   | 5       | 4.75 | 1.5   | 2.4    | 6    | 70    | 35    | ●                       |
| SSP050N41T10 | T10         | 10            | 2.8   | 2.05  | 1.92                           | 4.1     | 1.8   | 5       | 4.75 | 1.7   | 2.4    | 6    | 70    | 35    | ●                       |
| SSP050N43T15 | T15         | 15            | 3.35  | 2.4   | 2.3                            | 4.3     | 2.2   | 5       | 4.75 | 2.1   | 2.4    | 6    | 70    | 35    | ●                       |
| SSP050N46T20 | T20         | 20            | 3.95  | 2.85  | 2.71                           | 4.6     | 2.6   | 5       | 4.75 | 2.5   | 2.4    | 6    | 70    | 35    | ●                       |
| SSP050N50T25 | T25         | 25            | 4.5   | 3.25  | 3.13                           | 5       | 3     | 5       | 4.75 | 2.9   | 2.4    | 6    | 70    | 35    | ●                       |
| SSP050N55T27 | T27         | -             | -     | -     | 3.52                           | 5.5     | 3.4   | 5       | 4.75 | 3.3   | 2.4    | 6    | 70    | 35    | ●                       |
| SSP050N55T30 | T30         | 30            | 5.6   | 4.05  | 3.91                           | 5.5     | 3.8   | 5       | 4.75 | 3.7   | 2.4    | 6    | 70    | 35    | ●                       |

### Hexagon socket

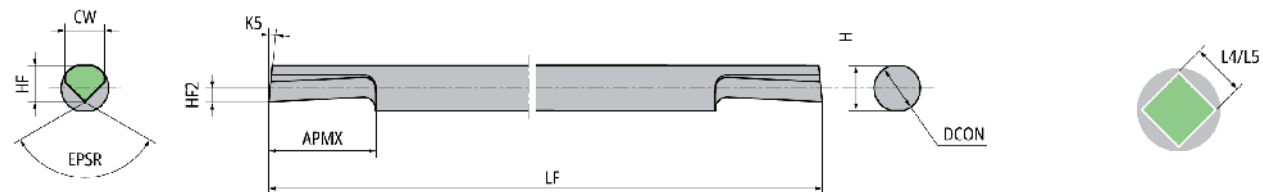
#### SSP-H



| Item Number   | Base AF L4 mm | AF range L5 mm | APMX mm | CW mm | DCON mm | EPSR ° | H mm | HF mm | HF2 mm | K5 ° | LF mm | Carbide PVD coating TM4 |
|---------------|---------------|----------------|---------|-------|---------|--------|------|-------|--------|------|-------|-------------------------|
| SSP020N06515H | 1             | 1-1.1          | 1.5     | 0.65  | 2       | 120    | 1.8  | 0.7   | 0.35   | 15   | 50    | ●                       |
| SSP020N07018H | 1.1           | 1.1-1.2        | 1.8     | 0.7   | 2       | 120    | 1.8  | 0.8   | 0.4    | 15   | 50    | ●                       |
| SSP020N07518H | 1.2           | 1.2-1.3        | 1.8     | 0.75  | 2       | 120    | 1.8  | 0.9   | 0.45   | 15   | 50    | ●                       |
| SSP020N08020H | 1.3           | 1.3-1.4        | 2       | 0.8   | 2       | 120    | 1.8  | 1     | 0.5    | 15   | 50    | ●                       |
| SSP020N1130H  | 1.5           | 1.4-1.9        | 3       | 1.1   | 2       | 120    | 1.8  | 0.9   | 0.45   | 6    | 50    | ●                       |
| SSP020N1430H  | 2             | 1.8-2.5        | 3       | 1.4   | 2       | 120    | 1.8  | 1.2   | 0.6    | 6    | 50    | ●                       |
| SSP030N1940H  | 3             | 2.3-3.5        | 4       | 1.9   | 3       | 120    | 2.8  | 1.5   | 0.75   | 6    | 50    | ●                       |
| SSP040N2450H  | 4             | 3.3-4.5        | 5       | 2.4   | 4       | 120    | 3.8  | 2.5   | 1.25   | 6    | 60    | ●                       |
| SSP050N3260H  | 5             | 4.3-6.1        | 6       | 3.2   | 5       | 120    | 4.8  | 3.3   | 1.65   | 6    | 70    | ●                       |
| SSP060N42120H | 6             | 5.3-8.1        | 12      | 4.2   | 6       | 120    | 5.6  | 4     | 2      | 6    | 80    | ●                       |
| SSP080N62160H | 8             | 7.3-12.1       | 16      | 6.2   | 8       | 120    | 7.6  | 4.9   | 2.45   | 6    | 80    | ●                       |

### Square Socket

#### SSP-S

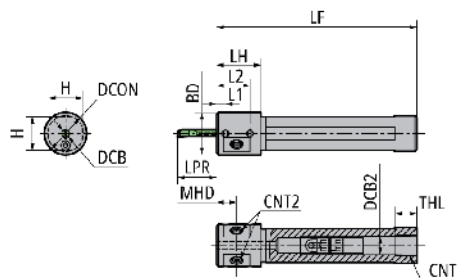


| Item Number   | Base AF L4 mm | AF range L5 mm | APMX mm | CW mm | DCON mm | EPSR ° | H mm | HF mm | HF2 mm | K5 ° | LF mm | Carbide PVD coating TM4 |
|---------------|---------------|----------------|---------|-------|---------|--------|------|-------|--------|------|-------|-------------------------|
| SSP020N1740S  | 2             | 2-2.3          | 4       | 1.7   | 2       | 90     | 1.8  | 1.6   | 0.7    | 6    | 50    | ●                       |
| SSP025N1940S  | 2.5           | 2.3-2.6        | 4       | 1.95  | 2.5     | 90     | 2.3  | 1.8   | 0.65   | 6    | 50    | ●                       |
| SSP030N2260S  | 3             | 2.6-3          | 6       | 2.2   | 3       | 90     | 2.8  | 2.05  | 0.65   | 6    | 50    | ●                       |
| SSP035N2760S  | 3.5           | 2.9-3.7        | 6       | 2.7   | 3.5     | 90     | 3.3  | 2.25  | 0.6    | 6    | 60    | ●                       |
| SSP040N3380S  | 4             | 3.7-4.5        | 8       | 3.35  | 4       | 90     | 3.8  | 3.05  | 1.15   | 6    | 60    | ●                       |
| SSP050N39100S | 5             | 4.5-5.3        | 10      | 3.9   | 5       | 90     | 4.8  | 3.95  | 1.55   | 6    | 70    | ●                       |
| SSP060N47120S | 6             | 5.3-6.5        | 12      | 4.75  | 8       | 90     | 5.6  | 4.5   | 1.7    | 6    | 80    | ●                       |
| SSP080N58160S | 8             | 6.5-8          | 16      | 5.8   | 8       | 90     | 7.6  | 5.5   | 1.7    | 6    | 80    | ●                       |

# STICK DUO SPLASH

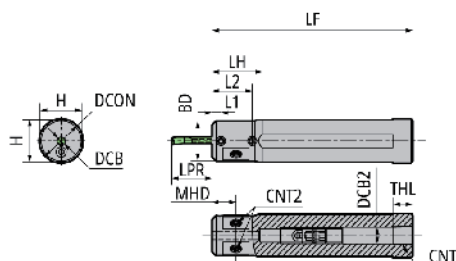
## Sleeve for Shaper Duo series (Adjustable overhang / Internal coolant system)

### HY-NBH-OH Shank diameter $\Phi 16$



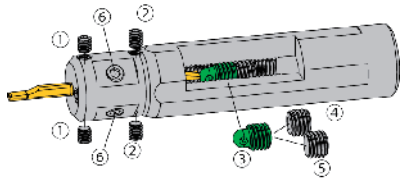
| EDP     | Item Number     | Stock | BD mm | CNT   | CNT2    | DCB mm | DCB2 mm | DCON mm | H mm | LF mm | LH mm | LPR mm   | L1 mm | L2 mm | MHD mm | THL mm | Applicable insert bar               |
|---------|-----------------|-------|-------|-------|---------|--------|---------|---------|------|-------|-------|----------|-------|-------|--------|--------|-------------------------------------|
| 5893011 | HY-NBH02016G-OH | ●     | 19    | Rc1/8 | M6×P1.0 | 2      | 8.2     | 16      | 15   | 90    | 19    | 5-18     | 4     | 15    | 9.5    | 10     | SBF../SHF.. SSP..                   |
| 5893029 | HY-NBH02516G-OH | ●     | 19    | Rc1/8 | M6×P1.0 | 2.5    | 8.2     | 16      | 15   | 90    | 19    | 6.3-19.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893037 | HY-NBH03016G-OH | ●     | 19    | Rc1/8 | M6×P1.0 | 3      | 8.2     | 16      | 15   | 90    | 19    | 7.5-21   | 4     | 15    | 9.5    | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893045 | HY-NBH03516G-OH | ●     | 19    | Rc1/8 | M6×P1.0 | 3.5    | 8.2     | 16      | 15   | 90    | 19    | 8.8-24.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893052 | HY-NBH04016G-OH | ●     | 19    | Rc1/8 | M6×P1.0 | 4      | 8.2     | 16      | 15   | 90    | 24    | 10-28    | 4     | 20    | 12     | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893060 | HY-NBH05016G-OH | ●     | 19    | Rc1/8 | M6×P1.0 | 5      | 8.2     | 16      | 15   | 90    | 24    | 12.5-35  | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SBT../SSP..       |

### HY-NBH-OH Shank diameter $\Phi 19.05 - \Phi 25.4$



| EDP     | Item Number       | Stock | BD mm | CNT   | CNT2    | DCB mm | DCB2 mm | DCON mm | H mm | LF mm | LH mm | LPR mm   | L1 mm | L2 mm | MHD mm | THL mm | Applicable insert bar               |
|---------|-------------------|-------|-------|-------|---------|--------|---------|---------|------|-------|-------|----------|-------|-------|--------|--------|-------------------------------------|
| 5893078 | HY-NBH02019J-OH   | ●     | 19.05 | Rc1/8 | M6×P1.0 | 2      | 8.2     | 19.05   | 18   | 110   | -     | 5-18     | 4     | 15    | 9.5    | 10     | SBF../SHF.. SSP..                   |
| 5893086 | HY-NBH02519J-OH   | ●     | 19.05 | Rc1/8 | M6×P1.0 | 2.5    | 8.2     | 19.05   | 18   | 110   | -     | 6.3-19.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893094 | HY-NBH03019J-OH   | ●     | 19.05 | Rc1/8 | M6×P1.0 | 3      | 8.2     | 19.05   | 18   | 110   | -     | 7.5-21   | 4     | 15    | 9.5    | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893102 | HY-NBH03519J-OH   | ●     | 19.05 | Rc1/8 | M6×P1.0 | 3.5    | 8.2     | 19.05   | 18   | 110   | -     | 8.8-24.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893136 | HY-NBH04019J-OH   | ●     | 19.05 | Rc1/8 | M6×P1.0 | 4      | 8.2     | 19.05   | 18   | 110   | -     | 10-28    | 4     | 20    | 12     | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893144 | HY-NBH05019J-OH   | ●     | 19.05 | Rc1/8 | M6×P1.0 | 5      | 8.2     | 19.05   | 18   | 110   | -     | 12.5-35  | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SBT../SSP..       |
| 5967922 | HY-NBH06019J-OH   | ●     | 19.05 | Rc1/8 | M6×P1.0 | 6      | 8.2     | 19.05   | 18   | 110   | -     | 15-42    | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SFG../SBT../SSP.. |
| 5893151 | HY-NBH02020J-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 2      | 8.2     | 20      | 19   | 110   | -     | 5-18     | 4     | 15    | 9.5    | 10     | SBF../SHF.. SSP..                   |
| 5893169 | HY-NBH02520J-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 2.5    | 8.2     | 20      | 19   | 110   | -     | 6.3-19.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893177 | HY-NBH03020J-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 3      | 8.2     | 20      | 19   | 110   | -     | 7.5-21   | 4     | 15    | 9.5    | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893185 | HY-NBH03520J-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 3.5    | 8.2     | 20      | 19   | 110   | -     | 8.8-24.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893193 | HY-NBH04020J-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 4      | 8.2     | 20      | 19   | 110   | -     | 10-28    | 4     | 20    | 12     | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893201 | HY-NBH05020J-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 5      | 8.2     | 20      | 19   | 110   | -     | 12.5-35  | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SBT../SSP..       |
| 5967930 | HY-NBH06020J-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 6      | 8.2     | 20      | 19   | 110   | -     | 15-42    | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SFG../SBT../SSP.. |
| 5893219 | HY-NBH02022X-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 2      | 8.2     | 22      | 21   | 120   | 25    | 5-18     | 4     | 15    | 9.5    | 10     | SBF../SHF.. SSP..                   |
| 5893227 | HY-NBH02522X-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 2.5    | 8.2     | 22      | 21   | 120   | 25    | 6.3-19.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893235 | HY-NBH03022X-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 3      | 8.2     | 22      | 21   | 120   | 25    | 7.5-21   | 4     | 15    | 9.5    | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893243 | HY-NBH03522X-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 3.5    | 8.2     | 22      | 21   | 120   | 25    | 8.8-24.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893250 | HY-NBH04022X-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 4      | 8.2     | 22      | 21   | 120   | 25    | 10-28    | 4     | 20    | 12     | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893268 | HY-NBH05022X-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 5      | 8.2     | 22      | 21   | 120   | 25    | 12.5-35  | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SBT../SSP..       |
| 5967948 | HY-NBH06022X-OH   | ●     | 20    | Rc1/8 | M6×P1.0 | 6      | 8.2     | 22      | 21   | 120   | 25    | 15-42    | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SFG../SBT../SSP.. |
| 5893276 | HY-NBH02025.0K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 2      | 8.2     | 25      | 24   | 125   | 25    | 5-18     | 4     | 15    | 9.5    | 10     | SBF../SHF.. SSP..                   |
| 5893284 | HY-NBH02525.0K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 2.5    | 8.2     | 25      | 24   | 125   | 25    | 6.3-19.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893292 | HY-NBH03025.0K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 3      | 8.2     | 25      | 24   | 125   | 25    | 7.5-21   | 4     | 15    | 9.5    | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893300 | HY-NBH03525.0K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 3.5    | 8.2     | 25      | 24   | 125   | 25    | 8.8-24.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893318 | HY-NBH04025.0K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 4      | 8.2     | 25      | 24   | 125   | 25    | 10-28    | 4     | 20    | 12     | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893326 | HY-NBH05025.0K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 5      | 8.2     | 25      | 24   | 125   | 25    | 12.5-35  | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SBT../SSP..       |
| 5967955 | HY-NBH06025.0K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 6      | 8.2     | 25      | 24   | 125   | 25    | 15-42    | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SFG../SBT../SSP.. |
| 5893334 | HY-NBH02025.4K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 2      | 8.2     | 25.4    | 24   | 125   | 25    | 5-18     | 4     | 15    | 9.5    | 10     | SBF../SHF.. SSP..                   |
| 5893367 | HY-NBH02525.4K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 2.5    | 8.2     | 25.4    | 24   | 125   | 25    | 6.3-19.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893375 | HY-NBH03025.4K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 3      | 8.2     | 25.4    | 24   | 125   | 25    | 7.5-21   | 4     | 15    | 9.5    | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893383 | HY-NBH03525.4K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 3.5    | 8.2     | 25.4    | 24   | 125   | 25    | 8.8-24.5 | 4     | 15    | 9.5    | 10     | SBF../SHF.. SBT../SSP..             |
| 5893391 | HY-NBH04025.4K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 4      | 8.2     | 25.4    | 24   | 125   | 25    | 10-28    | 4     | 20    | 12     | 10     | SBF../SHF../SBB.. SBG../SBT../SSP.. |
| 5893409 | HY-NBH05025.4K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 5      | 8.2     | 25.4    | 24   | 125   | 25    | 12.5-35  | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SBT../SSP..       |
| 5967963 | HY-NBH06025.4K-OH | ●     | 20    | Rc1/8 | M6×P1.0 | 6      | 8.2     | 25.4    | 24   | 125   | 25    | 15-42    | 4     | 20    | 12     | 10     | SBF../SHF.. SBG../SFG../SBT../SSP.. |

## Parts

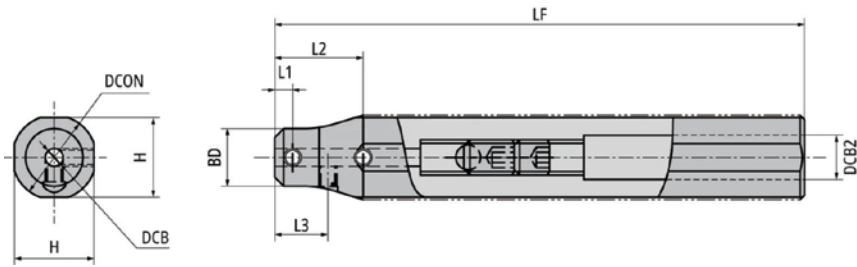


| Item Number       | Clamp Screw |         | Overhang Adjustment |            |         | M6 Screw | for①② | Wrench<br>for③④⑤ | for⑥ |
|-------------------|-------------|---------|---------------------|------------|---------|----------|-------|------------------|------|
|                   | ①           | ②       | ③                   | ④          | ⑤       |          |       |                  |      |
| HY-NBH02016G-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02516G-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03016G-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03516G-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH04016G-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH05016G-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02019J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02519J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03019J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03519J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH04019J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH05019J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH06019J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02020J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02520J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03020J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03520J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH04020J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH05020J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH06020J-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02022X-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02522X-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03022X-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03522X-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH04022X-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH05022X-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH06022X-OH   | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02025.0K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02525.0K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03025.0K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03525.0K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH04025.0K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH05025.0K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH06025.0K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02025.4K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH02525.4K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03025.4K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH03525.4K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH04025.4K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH05025.4K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |
| HY-NBH06025.4K-OH | SS04045FS   | SS0406F | SS0811R-OH          | SS0806F-OH | SS0806F | SS0605SC | LW-2  | LW-4*104         | LW-3 |

STICK DUO HYPER

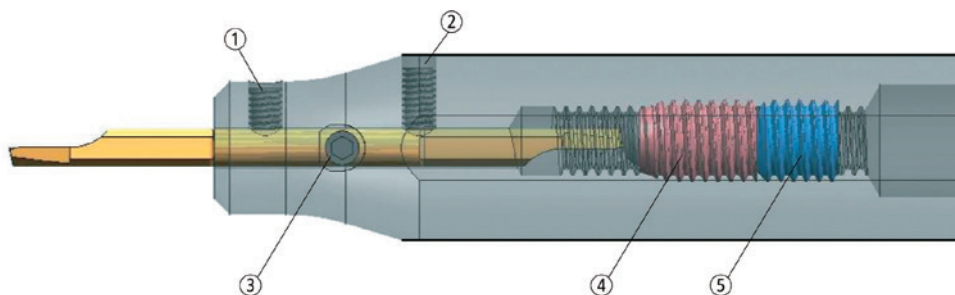
Sleeve for Shaper Duo series (Adjustable overhang)

HY-NBH



| EDP     | Item Number      | Stock | BD<br>mm | DCB<br>mm | DCB2<br>mm | DCON<br>mm | H<br>mm | LF<br>mm | L1<br>mm | L2<br>mm | L3<br>mm | Applicable insert bar |                   |
|---------|------------------|-------|----------|-----------|------------|------------|---------|----------|----------|----------|----------|-----------------------|-------------------|
| 5709894 | HY-NBH02016H     | ●     | 11       | 2         | 10         | 16         | 15      | 100      | 4        | 15       | 9.5      | SBF../SHF..           | SSP..             |
| 5709902 | HY-NBH02516H     | ●     | 11.5     | 2.5       | 10         | 16         | 15      | 100      | 4        | 15       | 9.5      | SBF../SHF..           | SBT../SSP..       |
| 5709910 | HY-NBH03016H     | ●     | 12       | 3         | 10         | 16         | 15      | 100      | 4        | 15       | 9.5      | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5709936 | HY-NBH03516H     | ●     | 12.5     | 3.5       | 10         | 16         | 15      | 100      | 4        | 20       | 12       | SBF../SHF..           | SBT../SSP..       |
| 5709944 | HY-NBH04016H     | ●     | 13       | 4         | 10         | 16         | 15      | 100      | 4        | 20       | 12       | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5709951 | HY-NBH05016H     | ●     | 14       | 5         | 10         | 16         | 15      | 100      | 4        | 20       | 12       | SBF../SHF..           | SBG../SBT../SSP.. |
| 5709969 | HY-NBH02019K     | ●     | 11       | 2         | 10         | 19.05      | 18      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SSP..             |
| 5709977 | HY-NBH02519K     | ●     | 11.5     | 2.5       | 10         | 19.05      | 18      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SBT../SSP..       |
| 5709985 | HY-NBH03019K     | ●     | 12       | 3         | 10         | 19.05      | 18      | 125      | 4        | 15       | 9.5      | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5709993 | HY-NBH03519K     | ●     | 12.5     | 3.5       | 10         | 19.05      | 18      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBT../SSP..       |
| 5710009 | HY-NBH04019K     | ●     | 13       | 4         | 10         | 19.05      | 18      | 125      | 4        | 20       | 12       | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5710017 | HY-NBH05019K     | ●     | 14       | 5         | 10         | 19.05      | 18      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBG../SBT../SSP.. |
| 5712708 | HY-NBH02020K     | ●     | 11       | 2         | 10         | 20         | 19      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SSP..             |
| 5712716 | HY-NBH02520K     | ●     | 11.5     | 2.5       | 10         | 20         | 19      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SBT../SSP..       |
| 5712724 | HY-NBH03020K     | ●     | 12       | 3         | 10         | 20         | 19      | 125      | 4        | 15       | 9.5      | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5712740 | HY-NBH03520K     | ●     | 12.5     | 3.5       | 10         | 20         | 19      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBT../SSP..       |
| 5712757 | HY-NBH04020K     | ●     | 13       | 4         | 10         | 20         | 19      | 125      | 4        | 20       | 12       | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5712765 | HY-NBH05020K     | ●     | 14       | 5         | 10         | 20         | 19      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBG../SBT../SSP.. |
| 5712773 | HY-NBH02022K     | ●     | 11       | 2         | 10         | 22         | 21      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SSP..             |
| 5712799 | HY-NBH02522K     | ●     | 11.5     | 2.5       | 10         | 22         | 21      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SBT../SSP..       |
| 5712831 | HY-NBH03022K     | ●     | 12       | 3         | 10         | 22         | 21      | 125      | 4        | 15       | 9.5      | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5712856 | HY-NBH03522K     | ●     | 12.5     | 3.5       | 10         | 22         | 21      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBT../SSP..       |
| 5712872 | HY-NBH04022K     | ●     | 13       | 4         | 10         | 22         | 21      | 125      | 4        | 20       | 12       | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5712914 | HY-NBH05022K     | ●     | 14       | 5         | 10         | 22         | 21      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBG../SBT../SSP.. |
| 5712732 | HY-NBH02025K-MET | ●     | 11       | 2         | 10         | 25         | 24      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SSP..             |
| 5712823 | HY-NBH02525K-MET | ●     | 11.5     | 2.5       | 10         | 25         | 24      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SBT../SSP..       |
| 5712849 | HY-NBH03025K-MET | ●     | 12       | 3         | 10         | 25         | 24      | 125      | 4        | 15       | 9.5      | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5712864 | HY-NBH03525K-MET | ●     | 12.5     | 3.5       | 10         | 25         | 24      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBT../SSP..       |
| 5712898 | HY-NBH04025K-MET | ●     | 13       | 4         | 10         | 25         | 24      | 125      | 4        | 20       | 12       | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5712922 | HY-NBH05025K-MET | ●     | 14       | 5         | 10         | 25         | 24      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBG../SBT../SSP.. |
| 5713003 | HY-NBH02025K     | ●     | 11       | 2         | 10         | 25.4       | 24      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SSP..             |
| 5713029 | HY-NBH02525K     | ●     | 11.5     | 2.5       | 10         | 25.4       | 24      | 125      | 4        | 15       | 9.5      | SBF../SHF..           | SBT../SSP..       |
| 5713045 | HY-NBH03025K     | ●     | 12       | 3         | 10         | 25.4       | 24      | 125      | 4        | 15       | 9.5      | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5713060 | HY-NBH03525K     | ●     | 12.5     | 3.5       | 10         | 25.4       | 24      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBT../SSP..       |
| 5713086 | HY-NBH04025K     | ●     | 13       | 4         | 10         | 25.4       | 24      | 125      | 4        | 20       | 12       | SBF../SHF../SBB..     | SBG../SBT../SSP.. |
| 5713102 | HY-NBH05025K     | ●     | 14       | 5         | 10         | 25.4       | 24      | 125      | 4        | 20       | 12       | SBF../SHF..           | SBG../SBT../SSP.. |

## Parts

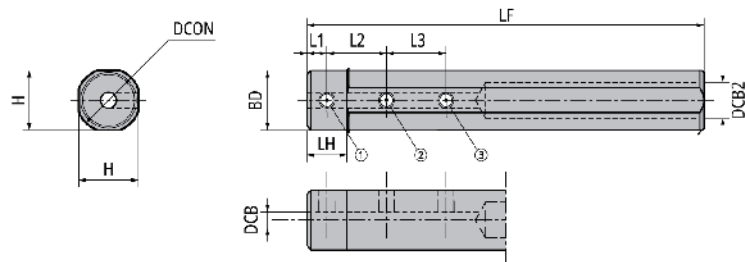


| Item Number      | Clamp Screw |         |         | Overhang Adjustment |         | Wrench  |          |
|------------------|-------------|---------|---------|---------------------|---------|---------|----------|
|                  | ①           | ②       | ③       | ④                   | ⑤       | for ①②③ | for ④⑤   |
| HY-NBH02016H     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02516H     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03016H     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03516H     | SS04045FS   | SS0404F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH04016H     | SS04045FS   | SS0404F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH05016H     | SS04045FS   | SS0404F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02019K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02519K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03019K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03519K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH04019K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH05019K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02020K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02520K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03020K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03520K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH04020K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH05020K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02022K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02522K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03022K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03522K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH04022K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH05022K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02025K-MET | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02525K-MET | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03025K-MET | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03525K-MET | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH04025K-MET | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH05025K-MET | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02025K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH02525K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03025K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH03525K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH04025K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |
| HY-NBH05025K     | SS04045FS   | SS0406F | SS0404F | SS0812R             | SS0808F | LW-2    | LW-4*104 |

STICK DUO

Sleeve for Shaper Duo series

■ NBH Shank diameter  $\Phi 15.875 - \Phi 19.05$



| EDP     | Item Number | Stock | BD<br>mm | DCB<br>mm | DCB2<br>mm | DCON<br>mm | H<br>mm | LF<br>mm | LH<br>mm | L1<br>mm | L2<br>mm | L3<br>mm | Applicable insert bar |                         |
|---------|-------------|-------|----------|-----------|------------|------------|---------|----------|----------|----------|----------|----------|-----------------------|-------------------------|
| 5631403 | NBH02015H   | ●     | 15       | 2         | 9          | 15.875     | 15      | 100      | 10       | 5        | 10       | -        | SBF../SHF..           | SSP..                   |
| 5702915 | NBH02515H   | ●     | 15       | 2.5       | 9          | 15.875     | 15      | 100      | 10       | 5        | 10       | -        | SBF../SHF..           | SBT../SSP..             |
| 5631411 | NBH03015H   | ●     | 15       | 3         | 9          | 15.875     | 15      | 100      | 10       | 5        | 10       | 10       | SBF../SHF../SBB..     | SBG../SBT../SSP..       |
| 5586110 | NBH03515H   | ●     | 15       | 3.5       | 9          | 15.875     | 15      | 100      | 10       | 5        | 10       | 10       | SBF../SHF..           | SBT../SSP..             |
| 5586128 | NBH04015H   | ●     | 15       | 4         | 9          | 15.875     | 15      | 100      | 10       | 5        | 15       | 15       | SBF../SHF../SBB..     | SBG../SBT../SSP..       |
| 5585997 | NBH04515H   | ●     | 15       | 4.5       | 9          | 15.875     | 15      | 100      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5585989 | NBH05015H   | ●     | 15       | 5         | 9          | 15.875     | 15      | 100      | 10       | 5        | 15       | 15       | SBF../SHF..           | SBG../SBT../SSP..       |
| 5585971 | NBH06015H   | ●     | 15       | 6         | 9          | 15.875     | 15      | 100      | 10       | 5        | 20       | 20       | SBF../SHF..           | SBG../SFG../SBT../SSP.. |
| 5585963 | NBH08015H   | ●     | 15       | 8         | 9          | 15.875     | 15      | 100      | 10       | 5        | 20       | 20       | SBF../SHF..           | SBG../SFG../SSP..       |
| 5631429 | NBH02016H   | ●     | 15       | 2         | 9          | 16         | 15      | 100      | 10       | 5        | 10       | -        | SBF../SHF..           | SSP..                   |
| 5702899 | NBH02516H   | ●     | 15       | 2.5       | 9          | 16         | 15      | 100      | 10       | 5        | 10       | -        | SBF../SHF..           | SBT../SSP..             |
| 5631437 | NBH03016H   | ●     | 15       | 3         | 9          | 16         | 15      | 100      | 10       | 5        | 10       | 10       | SBF../SHF../SBB..     | SBG../SBT../SSP..       |
| 5586102 | NBH03516H   | ●     | 15       | 3.5       | 9          | 16         | 15      | 100      | 10       | 5        | 10       | 10       | SBF../SHF..           | SBT../SSP..             |
| 5586094 | NBH04016H   | ●     | 15       | 4         | 9          | 16         | 15      | 100      | 10       | 5        | 15       | 15       | SBF../SHF../SBB..     | SBG../SBT../SSP..       |
| 5586086 | NBH04516H   | ●     | 15       | 4.5       | 9          | 16         | 15      | 100      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5586078 | NBH05016H   | ●     | 15       | 5         | 9          | 16         | 15      | 100      | 10       | 5        | 15       | 15       | SBF../SHF..           | SBG../SBT../SSP..       |
| 5586060 | NBH06016H   | ●     | 15       | 6         | 9          | 16         | 15      | 100      | 10       | 5        | 20       | 20       | SBF../SHF..           | SBG../SFG../SBT../SSP.. |
| 5774195 | NBH07016H   | ●     | 15       | 7         | 9          | 16         | 15      | 100      | 10       | 5        | 20       | 20       | SBF../SHF..           | -                       |
| 5586052 | NBH08016H   | ●     | 15       | 8         | 9          | 16         | 15      | 100      | 10       | 5        | 20       | 20       | SBF../SHF..           | SBG../SFG../SSP..       |
| 5631445 | NBH02019K   | ●     | 18       | 2         | 11         | 19.05      | 18      | 125      | 10       | 5        | 10       | -        | SBF../SHF..           | SSP..                   |
| 5702907 | NBH02519K   | ●     | 18       | 2.5       | 11         | 19.05      | 18      | 125      | 10       | 5        | 10       | -        | SBF../SHF..           | SBT../SSP..             |
| 5631452 | NBH03019K   | ●     | 18       | 3         | 11         | 19.05      | 18      | 125      | 10       | 5        | 10       | 10       | SBF../SHF../SBB..     | SBG../SBT../SSP..       |
| 5586045 | NBH03519K   | ●     | 18       | 3.5       | 11         | 19.05      | 18      | 125      | 10       | 5        | 10       | 10       | SBF../SHF..           | SBT../SSP..             |
| 5586037 | NBH04019K   | ●     | 18       | 4         | 11         | 19.05      | 18      | 125      | 10       | 5        | 15       | 15       | SBF../SHF../SBB..     | SBG../SBT../SSP..       |
| 5586029 | NBH04519K   | ●     | 18       | 4.5       | 11         | 19.05      | 18      | 125      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5586011 | NBH05019K   | ●     | 18       | 5         | 11         | 19.05      | 18      | 125      | 10       | 5        | 15       | 15       | SBF../SHF..           | SBG../SBT../SSP..       |
| 5586003 | NBH06019K   | ●     | 18       | 6         | 11         | 19.05      | 18      | 125      | 10       | 5        | 20       | 20       | SBF../SHF..           | SBG../SFG../SBT../SSP.. |
| 5774203 | NBH07019K   | ●     | 18       | 7         | 11         | 19.05      | 18      | 125      | 10       | 5        | 20       | 20       | SBF../SHF..           | -                       |
| 5586227 | NBH08019K   | ●     | 18       | 8         | 11         | 19.05      | 18      | 125      | 10       | 5        | 20       | 20       | SBF../SHF..           | SBG../SFG../SSP..       |
| 5586219 | NBH10019K   | ●     | 18       | 10        | 11         | 19.05      | 18      | 125      | 10       | 5        | 20       | 20       | -                     | -                       |

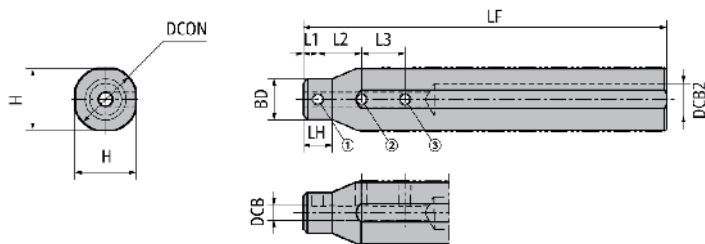
## Parts

| Item Number | Clamp Screw |         |         | Wrench<br>for①②③ |
|-------------|-------------|---------|---------|------------------|
|             | ①           | ②       | ③       |                  |
| NBH02015H   | SS0406F     | SS0406F | –       | LW-2             |
| NBH02515H   | SS0406F     | SS0406F | –       | LW-2             |
| NBH03015H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH03515H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH04015H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH04515H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH05015H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH06015H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH08015H   | SS0403F     | SS0403F | SS0403F | LW-2             |
| NBH02016H   | SS0406F     | SS0406F | –       | LW-2             |
| NBH02516H   | SS0406F     | SS0406F | –       | LW-2             |
| NBH03016H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH03516H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH04016H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH04516H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH05016H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH06016H   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH07016H   | SS0403F     | SS0404F | SS0404F | LW-2             |
| NBH08016H   | SS0403F     | SS0403F | SS0403F | LW-2             |
| NBH02019K   | SS0408F     | SS0408F | –       | LW-2             |
| NBH02519K   | SS0408F     | SS0408F | –       | LW-2             |
| NBH03019K   | SS0406F     | SS0406F | SS0406F | LW-2             |
| NBH03519K   | SS0406F     | SS0406F | SS0406F | LW-2             |
| NBH04019K   | SS0406F     | SS0406F | SS0406F | LW-2             |
| NBH04519K   | SS0406F     | SS0406F | SS0406F | LW-2             |
| NBH05019K   | SS0406F     | SS0406F | SS0406F | LW-2             |
| NBH06019K   | SS0406F     | SS0406F | SS0406F | LW-2             |
| NBH07019K   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH08019K   | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH10019K   | SS0403F     | SS0404F | SS0404F | LW-2             |

# STICK DUO

## Sleeve for Shaper Duo series

**NBH** Shank diameter **Φ20 - Φ32**



| EDP     | Item Number   | Stock | BD<br>mm | DCB<br>mm | DCB2<br>mm | DCON<br>mm | H<br>mm | LF<br>mm | LH<br>mm | L1<br>mm | L2<br>mm | L3<br>mm | Applicable insert bar |                         |
|---------|---------------|-------|----------|-----------|------------|------------|---------|----------|----------|----------|----------|----------|-----------------------|-------------------------|
| 5631460 | NBH02020K     | ●     | 11       | 2         | 11         | 20         | 19      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SSP..                   |
| 5702881 | NBH02520K     | ●     | 11       | 2.5       | 11         | 20         | 19      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SBT../SSP..             |
| 5631478 | NBH03020K     | ●     | 12       | 3         | 11         | 20         | 19      | 125      | 10       | 5        | 10       | 10       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5586201 | NBH03520K     | ●     | 12       | 3.5       | 11         | 20         | 19      | 125      | 10       | 5        | 10       | 10       | SBF./SHF..            | SBT../SSP..             |
| 5586185 | NBH04020K     | ●     | 13       | 4         | 11         | 20         | 19      | 125      | 10       | 5        | 15       | 15       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5586177 | NBH04520K     | ●     | 13       | 4.5       | 11         | 20         | 19      | 125      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5586169 | NBH05020K     | ●     | 14       | 5         | 11         | 20         | 19      | 125      | 10       | 5        | 15       | 15       | SBF./SHF..            | SBG../SBT../SSP..       |
| 5586151 | NBH06020K     | ●     | 15       | 6         | 11         | 20         | 19      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SBT../SSP.. |
| 5774211 | NBH07020K     | ●     | 16       | 7         | 11         | 20         | 19      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | -                       |
| 5586144 | NBH08020K     | ●     | 17       | 8         | 11         | 20         | 19      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SSP..       |
| 5586136 | NBH10020K     | ●     | 19       | 10        | 11         | 20         | 19      | 125      | 10       | 5        | 20       | 20       | -                     | -                       |
| 5914742 | NBH12020K     | ●     | 19       | 12        | 14         | 20         | 19      | 125      | 10       | 5        | 25       | 25       | -                     | -                       |
| 5631486 | NBH02022K     | ●     | 11       | 2         | 11         | 22         | 21      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SSP..                   |
| 5702873 | NBH02522K     | ●     | 11       | 2.5       | 11         | 22         | 21      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SBT../SSP..             |
| 5631494 | NBH03022K     | ●     | 12       | 3         | 11         | 22         | 21      | 125      | 10       | 5        | 10       | 10       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5586326 | NBH03522K     | ●     | 12       | 3.5       | 11         | 22         | 21      | 125      | 10       | 5        | 10       | 10       | SBF./SHF..            | SBT../SSP..             |
| 5586318 | NBH04022K     | ●     | 13       | 4         | 11         | 22         | 21      | 125      | 10       | 5        | 15       | 15       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5586300 | NBH04522K     | ●     | 13       | 4.5       | 11         | 22         | 21      | 125      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5586292 | NBH05022K     | ●     | 14       | 5         | 11         | 22         | 21      | 125      | 10       | 5        | 15       | 15       | SBF./SHF..            | SBG../SBT../SSP..       |
| 5586284 | NBH06022K     | ●     | 15       | 6         | 11         | 22         | 21      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SBT../SSP.. |
| 5774229 | NBH07022K     | ●     | 16       | 7         | 11         | 22         | 21      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | -                       |
| 5586276 | NBH08022K     | ●     | 17       | 8         | 11         | 22         | 21      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SSP..       |
| 5586268 | NBH10022K     | ●     | 19       | 10        | 11         | 22         | 21      | 125      | 10       | 5        | 20       | 20       | -                     | -                       |
| 5631502 | NBH12022K     | ●     | 21       | 12        | 14         | 22         | 21      | 125      | 10       | 5        | 25       | 25       | -                     | -                       |
| 5631510 | NBH02023K     | ●     | 11       | 2         | 11         | 23         | 21      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SSP..                   |
| 5702857 | NBH02523K     | ●     | 11       | 2.5       | 11         | 23         | 21      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SBT../SSP..             |
| 5631528 | NBH03023K     | ●     | 12       | 3         | 11         | 23         | 21      | 125      | 10       | 5        | 10       | 10       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5586250 | NBH03523K     | ●     | 12       | 3.5       | 11         | 23         | 21      | 125      | 10       | 5        | 10       | 10       | SBF./SHF..            | SBT../SSP..             |
| 5651336 | NBH04023K     | ●     | 13       | 4         | 11         | 23         | 21      | 125      | 10       | 5        | 15       | 15       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5586243 | NBH04523K     | ●     | 13       | 4.5       | 11         | 23         | 21      | 125      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5631536 | NBH05023K     | ●     | 14       | 5         | 11         | 23         | 21      | 125      | 10       | 5        | 15       | 15       | SBF./SHF..            | SBG../SBT../SSP..       |
| 5631544 | NBH06023K     | ●     | 15       | 6         | 11         | 23         | 21      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SBT../SSP.. |
| 5631551 | NBH08023K     | ●     | 17       | 8         | 11         | 23         | 21      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SSP..       |
| 5631569 | NBH10023K     | ●     | 19       | 10        | 11         | 23         | 21      | 125      | 10       | 5        | 20       | 20       | -                     | -                       |
| 5631577 | NBH12023K     | ●     | 21       | 12        | 14         | 23         | 21      | 125      | 10       | 5        | 25       | 25       | -                     | -                       |
| 5631585 | NBH02025K-MET | ●     | 11       | 2         | 11         | 25         | 24      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SSP..                   |
| 5704283 | NBH02525K-MET | ●     | 11       | 2.5       | 11         | 25         | 24      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SBT../SSP..             |
| 5631593 | NBH03025K-MET | ●     | 12       | 3         | 11         | 25         | 24      | 125      | 10       | 5        | 10       | 10       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5631601 | NBH03525K-MET | ●     | 12       | 3.5       | 11         | 25         | 24      | 125      | 10       | 5        | 10       | 10       | SBF./SHF..            | SBT../SSP..             |
| 5651328 | NBH04025K-MET | ●     | 13       | 4         | 11         | 25         | 24      | 125      | 10       | 5        | 15       | 15       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5631619 | NBH04525K-MET | ●     | 13       | 4.5       | 11         | 25         | 24      | 125      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5631627 | NBH05025K-MET | ●     | 14       | 5         | 11         | 25         | 24      | 125      | 10       | 5        | 15       | 15       | SBF./SHF..            | SBG../SBT../SSP..       |
| 5631635 | NBH06025K-MET | ●     | 15       | 6         | 11         | 25         | 24      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SBT../SSP.. |
| 5774252 | NBH07025K-MET | ●     | 16       | 7         | 11         | 25         | 24      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | -                       |
| 5631643 | NBH08025K-MET | ●     | 17       | 8         | 11         | 25         | 24      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SSP..       |
| 5631650 | NBH10025K-MET | ●     | 19       | 10        | 11         | 25         | 24      | 125      | 10       | 5        | 20       | 20       | -                     | -                       |
| 5631668 | NBH12025K-MET | ●     | 21       | 12        | 14         | 25         | 24      | 125      | 10       | 5        | 25       | 25       | -                     | -                       |
| 5631676 | NBH02025K     | ●     | 11       | 2         | 11         | 25.4       | 24      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SSP..                   |
| 5702865 | NBH02525K     | ●     | 11       | 2.5       | 11         | 25.4       | 24      | 125      | 10       | 5        | 10       | -        | SBF./SHF..            | SBT../SSP..             |
| 5631684 | NBH03025K     | ●     | 12       | 3         | 11         | 25.4       | 24      | 125      | 10       | 5        | 10       | 10       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5586235 | NBH03525K     | ●     | 12       | 3.5       | 11         | 25.4       | 24      | 125      | 10       | 5        | 10       | 10       | SBF./SHF..            | SBT../SSP..             |
| 5586383 | NBH04025K     | ●     | 13       | 4         | 11         | 25.4       | 24      | 125      | 10       | 5        | 15       | 15       | SBF./SHF../SBB..      | SBG../SBT../SSP..       |
| 5586375 | NBH04525K     | ●     | 13       | 4.5       | 11         | 25.4       | 24      | 125      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5586367 | NBH05025K     | ●     | 14       | 5         | 11         | 25.4       | 24      | 125      | 10       | 5        | 15       | 15       | SBF./SHF..            | SBG../SBT../SSP..       |
| 5586359 | NBH06025K     | ●     | 15       | 6         | 11         | 25.4       | 24      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SBT../SSP.. |
| 5774260 | NBH07025K     | ●     | 16       | 7         | 11         | 25.4       | 24      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | -                       |
| 5586342 | NBH08025K     | ●     | 17       | 8         | 11         | 25.4       | 24      | 125      | 10       | 5        | 20       | 20       | SBF./SHF..            | SBG../SFG../SSP..       |
| 5586334 | NBH10025K     | ●     | 19       | 10        | 11         | 25.4       | 24      | 125      | 10       | 5        | 20       | 20       | -                     | -                       |

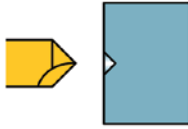
| EDP     | Item Number | Stock | BD<br>mm | DCB<br>mm | DCB2<br>mm | DCON<br>mm | H<br>mm | LF<br>mm | LH<br>mm | L1<br>mm | L2<br>mm | L3<br>mm | Applicable insert bar |                         |
|---------|-------------|-------|----------|-----------|------------|------------|---------|----------|----------|----------|----------|----------|-----------------------|-------------------------|
| 5631692 | NBH12025K   | ●     | 21       | 12        | 14         | 25.4       | 24      | 125      | 10       | 5        | 25       | 25       | -                     | -                       |
| 5939475 | NBH04532K   | ●     | 13       | 4.5       | 11         | 32         | 30      | 125      | 10       | 5        | 15       | 15       | -                     | -                       |
| 5939483 | NBH05032K   | ●     | 14       | 5         | 11         | 32         | 30      | 125      | 10       | 5        | 15       | 15       | SBF../SHF..           | SBG../SBT../SSP..       |
| 5939491 | NBH06032K   | ●     | 15       | 6         | 11         | 32         | 30      | 125      | 10       | 5        | 20       | 20       | SBF../SHF..           | SBG../SFG../SBT../SSP.. |
| 5939509 | NBH07032K   | ●     | 16       | 7         | 11         | 32         | 30      | 125      | 10       | 5        | 20       | 20       | SBF../SHF..           | -                       |
| 5939525 | NBH08032K   | ●     | 17       | 8         | 11         | 32         | 30      | 125      | 10       | 5        | 20       | 20       | SBF../SHF..           | SBG../SFG../SSP..       |
| 5939533 | NBH10032K   | ●     | 19       | 10        | 11         | 32         | 30      | 125      | 10       | 5        | 20       | 20       | -                     | -                       |
| 5939467 | NBH12032K   | ●     | 21       | 12        | 14         | 32         | 30      | 125      | 10       | 5        | 25       | 25       | -                     | -                       |
| 5939459 | NBH14032K   | ●     | 23       | 14        | 16         | 32         | 30      | 125      | 10       | 5        | 25       | 25       | -                     | -                       |
| 5939442 | NBH16032K   | ●     | 25       | 16        | 18         | 32         | 30      | 125      | 10       | 5        | 25       | 25       | -                     | -                       |

Parts

| Item Number   | Clamp Screw |         |         | Wrench<br>for①②③ |
|---------------|-------------|---------|---------|------------------|
|               | ①           | ②       | ③       |                  |
| NBH02020K     | SS0404F     | SS0404F | –       | LW-2             |
| NBH02520K     | SS0404F     | SS0404F | –       | LW-2             |
| NBH03020K     | SS0404F     | SS0404F | SS0406F | LW-2             |
| NBH03520K     | SS0404F     | SS0404F | SS0406F | LW-2             |
| NBH04020K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH04520K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH05020K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH06020K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH07020K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH08020K     | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH10020K     | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH12020K     | SS0403F     | SS0403F | SS0403F | LW-2             |
| NBH02022K     | SS0404F     | SS0406F | –       | LW-2             |
| NBH02522K     | SS0404F     | SS0406F | –       | LW-2             |
| NBH03022K     | SS0404F     | SS0406F | SS0408F | LW-2             |
| NBH03522K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH04022K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH04522K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH05022K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH06022K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH07022K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH08022K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH10022K     | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH12022K     | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH02023K     | SS0404F     | SS0406F | –       | LW-2             |
| NBH02523K     | SS0404F     | SS0406F | –       | LW-2             |
| NBH03023K     | SS0404F     | SS0406F | SS0408F | LW-2             |
| NBH03523K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH04023K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH04523K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH05023K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH06023K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH08023K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH10023K     | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH12023K     | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH02025K-MET | SS0404F     | SS0406F | –       | LW-2             |
| NBH02525K-MET | SS0404F     | SS0406F | –       | LW-2             |
| NBH03025K-MET | SS0404F     | SS0406F | SS0408F | LW-2             |
| NBH03525K-MET | SS0404F     | SS0406F | SS0408F | LW-2             |
| NBH04025K-MET | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH04525K-MET | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH05025K-MET | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH06025K-MET | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH07025K-MET | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH08025K-MET | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH10025K-MET | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH12025K-MET | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH02025K     | SS0404F     | SS0406F | –       | LW-2             |
| NBH02525K     | SS0404F     | SS0406F | –       | LW-2             |
| NBH03025K     | SS0404F     | SS0406F | SS0408F | LW-2             |
| NBH03525K     | SS0404F     | SS0406F | SS0408F | LW-2             |
| NBH04025K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH04525K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH05025K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH06025K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH07025K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH08025K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH10025K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH12025K     | SS0404F     | SS0404F | SS0404F | LW-2             |
| NBH04532K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH05032K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH06032K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH07032K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH08032K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH10032K     | SS0404F     | SS0408F | SS0408F | LW-2             |
| NBH12032K     | SS0404F     | SS0406F | SS0406F | LW-2             |
| NBH14032K     | SS0504      | SS0506  | SS0506  | LW-2             |
| NBH16032K     | SS0504      | SS0506  | SS0506  | LW-2             |

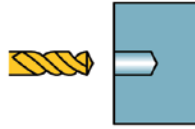
# Machining Procedure

## ① Center drilling



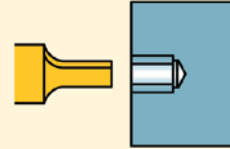
Make a center hole which is smaller than pilot hole drill.

## ② Drilling (Pilot hole)



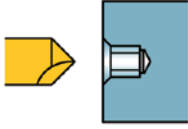
Select a drill with same or smaller (0~0.1mm) dia. as AF and machine a bit deeper because burrs may cause chipping on shaper insert

## ③ Shaper tool



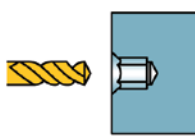
Machine socket rotating 60 degrees 6 times

## ④ Chamfering



Chamfer with the same pilot hole drill as ①

## ⑤ Deburring



Finish and deburr with the same drill as in process②  
☆Reduce cutting conditions due to heavy interruption

## SHAPER DUO Process Chart -Hexalobular-

| Socket Size | Tool         | Pilot bore Dia. (mm) | Starting" X" position (mm) | Final" X" position (mm) | Number of passes      |                        | Estimated cycle time*                            |                   |                  |
|-------------|--------------|----------------------|----------------------------|-------------------------|-----------------------|------------------------|--------------------------------------------------|-------------------|------------------|
|             |              |                      |                            |                         | Roughing pass 0.025mm | Finishing pass 0.005mm | ISO10664 Standard depth of Hexalobular hole (mm) | Whole process ①-⑤ | Shaper process ③ |
| T6          | SSP050N25T06 | 1.15                 | 1.14                       | 1.75                    | 13                    | 1                      | 1.82                                             | 51 sec            | 23.2 sec         |
| T7          | SSP050N31T07 | 1.38                 | 1.35                       | 2.06                    | 15                    | 1                      | 2.44                                             | 59 sec            | 28.2 sec         |
| T8          | SSP050N36T08 | 1.62                 | 1.59                       | 2.40                    | 17                    | 1                      | 3.05                                             | 67 sec            | 33.8 sec         |
| T10         | SSP050N41T10 | 1.92                 | 1.89                       | 2.80                    | 19                    | 1                      | 3.56                                             | 75 sec            | 39.5 sec         |
| T15         | SSP050N43T15 | 2.3                  | 2.29                       | 3.35                    | 22                    | 1                      | 3.81                                             | 84 sec            | 46.2 sec         |
| T20         | SSP050N46T20 | 2.71                 | 2.69                       | 3.95                    | 26                    | 1                      | 4.07                                             | 94 sec            | 55.4 sec         |
| T25         | SSP050N50T25 | 3.13                 | 3.09                       | 4.50                    | 29                    | 1                      | 4.45                                             | 105 sec           | 63.8 sec         |
| T27         | SSP050N55T27 | 3.52                 | 3.51                       | 5.07                    | 32                    | 1                      | 4.70                                             | 115 sec           | 71.8 sec         |
| T30         | SSP050N55T30 | 3.91                 | 3.89                       | 5.60                    | 35                    | 1                      | 4.95                                             | 125 sec           | 80.2 sec         |

\*Using carbide drills

\*Shaper cutting conditions

Feed: 3000mm/min

Depth of cut : Roughing 0.025mm / Finishing 0.005mm

## SHAPER DUO Process Chart -Hexagonal-

| HEX Standard | Tool          | Pilot bore Dia. (mm) | Starting" X" position (mm) | Final" X" position (mm) | Number of passes      |                        | Estimated cycle time*                    |                   |                  |
|--------------|---------------|----------------------|----------------------------|-------------------------|-----------------------|------------------------|------------------------------------------|-------------------|------------------|
|              |               |                      |                            |                         | Roughing pass 0.025mm | Finishing pass 0.005mm | ISO 2936 standard depth of Hex hole (mm) | Whole process ①-⑤ | Shaper process ③ |
| HEX 1.5      | SSP020N1130H  | 1.5                  | 1.47                       | 1.73                    | 6                     | 1                      | 2                                        | 39 sec            | 14 sec           |
| HEX 2.0      | SSP020N1430H  | 2.0                  | 1.95                       | 2.31                    | 8                     | 1                      | 2.5                                      | 44 sec            | 16 sec           |
| HEX 2.5      | SSP030N1940H  | 2.5                  | 2.48                       | 2.89                    | 9                     | 1                      | 3                                        | 50 sec            | 20 sec           |
| HEX 3.0      | SSP030N1940H  | 3.0                  | 2.95                       | 3.46                    | 11                    | 1                      | 3.5                                      | 55 sec            | 23 sec           |
| HEX 4.0      | SSP040N2450H  | 4.0                  | 3.96                       | 4.62                    | 14                    | 1                      | 5                                        | 73 sec            | 33 sec           |
| HEX 5.0      | SSP050N3260H  | 5.0                  | 4.96                       | 5.77                    | 17                    | 1                      | 6                                        | 90 sec            | 46 sec           |
| HEX 6.0      | SSP060N42120H | 6.0                  | 5.97                       | 6.93                    | 20                    | 1                      | 8                                        | 117 sec           | 63 sec           |
| HEX 8.0      | SSP080N62160H | 8.0                  | 7.98                       | 9.24                    | 26                    | 1                      | 10                                       | 155 sec           | 92 sec           |

\*Using carbide drills

\*Shaper cutting conditions

Feed: 3000mm/min

Depth of cut : Roughing 0.025mm / Finishing 0.005mm

## Recommended cutting conditions

Feed : F1000 - F4000 mm/min

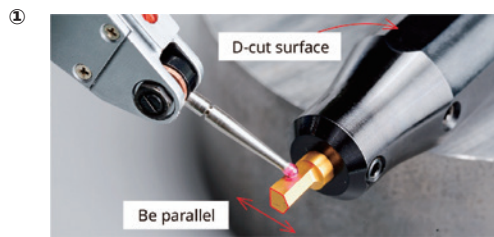
Depth of Cut : Roughing 0.025mm / Finishing 0.005mm

## Precautions when replacing the insert bar

The tool nose position dimensions (HF2) vary. Check the dimensions of the cutting tool after changing tools or indexing insert bar.

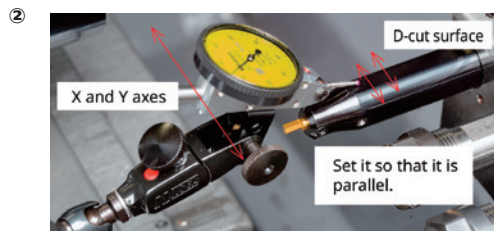
# SHAPER DUO Set-up Instructions -Hexagonal

## Outside machine



- Set the insert bar in the sleeve and check the parallelism of the flat portion of the sleeve and the insert bar.
- Minimize the overhang of the insert.

## Inside machine



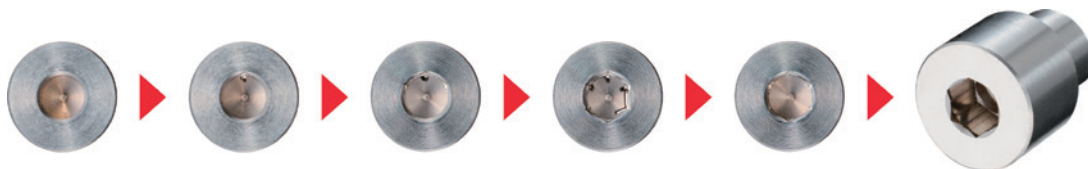
- Set the sleeve into the tool post and make sure the sleeve is set parallel.
- Minimize sleeve overhang.



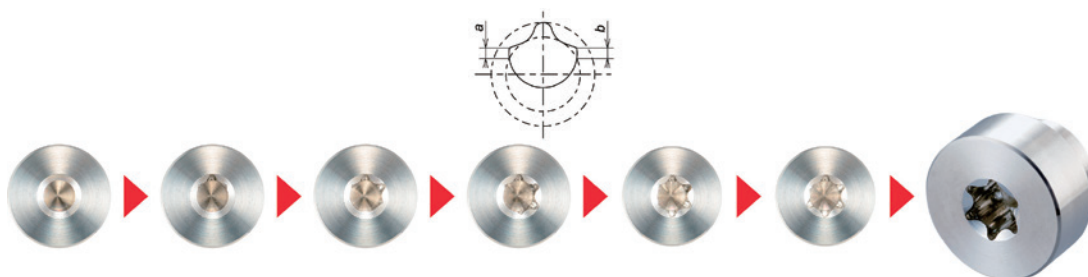
- Increase the number of machining passes with smaller depth of cut if the insert chips with large depth of cut.  
(0.025mm×5pass is recommended)  
No chamfering process is required for measuring purpose.
- Measure the length of both [a] and [b] with comparator or magnifier.
- Adjust centerline height by rotating the sleeve until you get the same length for [a] and [b].(The difference should be less than 0.02mm)  
\*If the straight is not seen with increased passes, you need to reset the insert and the sleeve.Please make sure both the insert and the sleeve are set up correctly.

## ④ Machine Hexagonal shape

\*Run full HEX machining program.

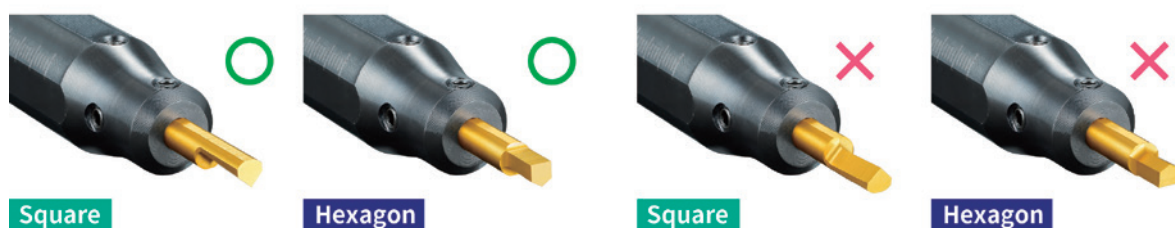


## Machining hexalobular shape is basically the same as hexagon socket



## Important Note for Insert Set-up

When using the STICK DUO HYPER series, it is important that the insert is installed and oriented so the bar flat is lined up with the clamp screws. If installed in the wrong position, insert edge chipping may occur due to interference with the positioning and clamping screws. See diagram below.



# Machining Program Code Explanation

Important: The programming codes and values will depend on the machine brands. For details, please contact the machine manufacturer.

Example machining piece : Hexagon socket dimensions

: AF 3.0mm, Diagonal 3.46mm, Socket depth 3.5mm, Pilot drill diameter  $\phi$ 3.0mm

DOC : Roughing 0.025mm / Finishing 0.005mm

Insert bar : TM4 SSP030N1940H

## ■ Programming tips

- Make a program considering final "X" position.

- #1 Final "X" position : 3.46mm (AF)
- #2 Finishing position of roughing :  $3.46 - 0.01$  (Finishing) = 3.45mm
- #3 Calculate total DOC for roughing :  $3.45 - 3.0$  (Pilot hole) = 0.45mm
- #4 Determine number of cuts :  $0.45 \div 0.05$  (DOC for Dia.) = 9.0 + 2 (round down to whole number and add "2" for program adjustment)  
→ Roughing sequence runs 11 times
- #5 Set starting point :  $3.45 - (0.05 \times (11 - 1)) = 2.95\text{mm}$  : must subtract by "1" for program adjustment

### Main program

```

☆:Rear spindle rotation stop
☆:Back spindle indexing 0° .....①
T○○○○(Shaper)
G50 U-1.5 .....②
G0 X2.95 Z-2.0 T○○ .....③
☆:Sub-program call (○○○①) Repeat 11 times .....④
☆:Sub-program call (○○○②) .....⑤

☆:Back spindle indexing 60° .....①
G0 X2.95 Z-2.0
☆:Sub-program call (○○○①) Repeat 11 times .....④
☆:Sub-program call (○○○②) .....⑤

☆:Back spindle indexing 120° .....①
G0 X2.95 Z-2.0
☆:Sub-program call (○○○①) Repeat 11 times .....④
☆:Sub-program call (○○○②) .....⑤

☆:Back spindle indexing 180° .....①
G0 X2.95 Z-2.0
☆:Sub-program call (○○○①) Repeat 11 times .....④
☆:Sub-program call (○○○②) .....⑤

☆:Back spindle indexing 240° .....①
G0 X2.95 Z-2.0
☆:Sub-program call (○○○①) Repeat 11 times .....④
☆:Sub-program call (○○○②) .....⑤

☆:Back spindle indexing 300° .....①
G0 X2.95 Z-2.0
☆:Sub-program call (○○○①) Repeat 11 times .....④
☆:Sub-program call (○○○②) .....⑤

☆:Spindle indexing release
G0 Z-2.0
G50 U-1.5
G0 U0 W0 T0
M1
    
```

### Sub-program ①

```

N○○○① (Roughing)
G4 U0.02 .....⑥
G98 G1 Z3.5 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

### Sub-program ②

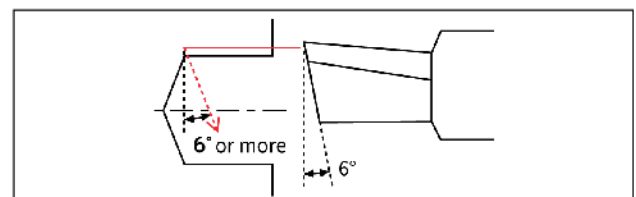
```

N○○○② (Finishing)
G98 G1 X3.46 Z-2.0 F1000
G4 U0.02
Z3.5 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
    
```

- ④=Go to the Sub-Program #1.
  - Sequence runs 11 times. First cutting point X2.95 and final cutting point X3.45, with 0.05 DOC (for diameter) each time.
- ⑤=Go to the Sub-Program #2, for finishing sequence.
  - Finishing operation with 0.005mm DOC (X 3.46) is recommended for better surface finish.
- ⑥=Specify dwell time. This allows the program and machine to stay synchronized.
- ⑦=Cut into part 3.5mm. F3000 is recommended feed to be used for most materials; including Titanium Alloy and Stainless Steel.
- ⑧=This code backs off the tool with an angle greater than K5 degrees (10 degrees used in example). See page 3.

☆:Enter the program corresponding to your machine.

- ①=Index the sub-spindle 6 times in 60 degree increments.
- ②=Specify the coordinate system shift command (in X axis direction) for the tool.  
[2 x HF2 ; where HF2 is tool dimension located in the catalog].  
\* A positive direction shift is recommended for easier programming.
- ③=Execute the positioning of the tool.
  - X position should be smaller than pilot drill diameter.
  - Z position should be offset 2.0 mm from material to achieve program feed rate.



- ⑨=Return to the X position + 0.05mm (the DOC for diameter).

# Hexagon Socket Programming Code Examples from Machine Builders in Metric

Important: The programming codes and values will depend on the machine brands. For details, please contact to the machine manufactures.

Example machining piece : Hexagon socket dimensions

: AF 3.0mm, Diagonal 3.46mm, Socket depth 3.5mm, Pilot drill diameter  $\phi$ 3.0mm

DOC : Roughing 0.025mm / Finishing 0.005mm

Insert bar : TM4 SSP030N1940H

## ■ CITIZEN

```

Main program

M25
M78 S0 .....①
T○○○○(Shaper)
G50 U-1.5 .....②
G0 X2.95 Z-2.0 T○○ .....③
M98 P2100 L11 .....④
M98 P2200 .....⑤

M78 S60 .....①
G0 X2.95 Z-2.0
M98 P2100 L11
M98 P2200
} 《A》

Repeat 《A》 at S120, S180, S240, S300
with indexing at 60° increments

M20
G0 Z-2.0
G50 U-1.5
G0 U0 W0 T0
M1
    
```

## ■ STAR

```

Main program

M25
T○○○○ (Shaper)
G50 U-1.5 .....②
M8
G0 X2.95 Z-2.0 C0 T○○ .....①③
M98 P2100 L11 .....④
M98 P2200 .....⑤

G0 C60.0 .....①
G0 X2.95 Z-2.0
M98 P2100 L11
M98 P2200
} 《A》

Repeat 《A》 at C120, C180, C240, C300
with indexing at 60° increments

G0 Z-2.0
G50 U-1.5
G0 T0
G28 W0
M1
    
```

## ■ TSUGAMI

```

Main program

M105
M150
G28 H0 .....①
M182
T○○○○ (Shaper)
G50 U-1.5 .....②
G0 X2.95 Z2.0 T○○ .....③
M98 P2100 L11 .....④
M98 P2200 .....⑤
M183

G0 C60 .....①
M182
G0 X2.95 Z2.0
M98 P2100 L11
M98 P2200
M183
} 《A》

Repeat 《A》 at C120, C180, C240, C300
with indexing at 60° increments

M151
G0 Z2.0
G50 U-1.5
G0 U0 W0 T0
M1
    
```

```

Sub-program①

N2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z3.5 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

```

Sub-program①

O2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z3.5 F3000 .....⑦
G4 U0.02
U-0.2 W-0.018 .....⑧
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

```

Sub-program①

O2100 (Roughing)
G4 U0.02 .....⑥
G98 G1 Z-3.5 F3000 .....⑦
G4 U0.02
U-0.2 W0.018 .....⑧
G4 U0.02
G0 Z2.0
G4 U0.02
U0.25 .....⑨
M99
    
```

```

Sub-program②

N2200 (Finishing)
G98 G1 X3.46 Z-2.0 F1000
G4 U0.02
Z3.5 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
    
```

```

Sub-program②

O2200 (Finishing)
G98 G1 X3.46 Z-2.0 F1000
G4 U0.02
Z3.5 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
    
```

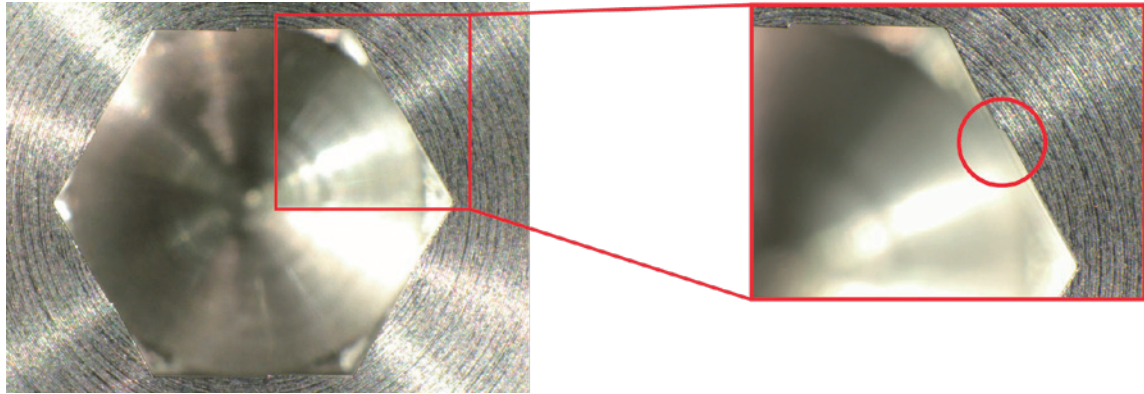
```

Sub-program②

O2200 (Finishing)
G98 G1 X3.46 Z2.0 F1000
G4 U0.02
Z-3.5 F3000
G4 U0.02
U-0.2 W0.018
G4 U0.02
G0 Z2.0
M99
    
```

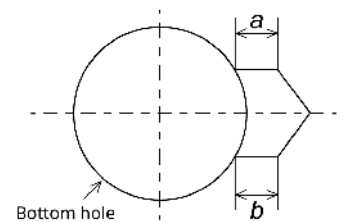
# Troubleshooting

## ■ Problem: Step on sides

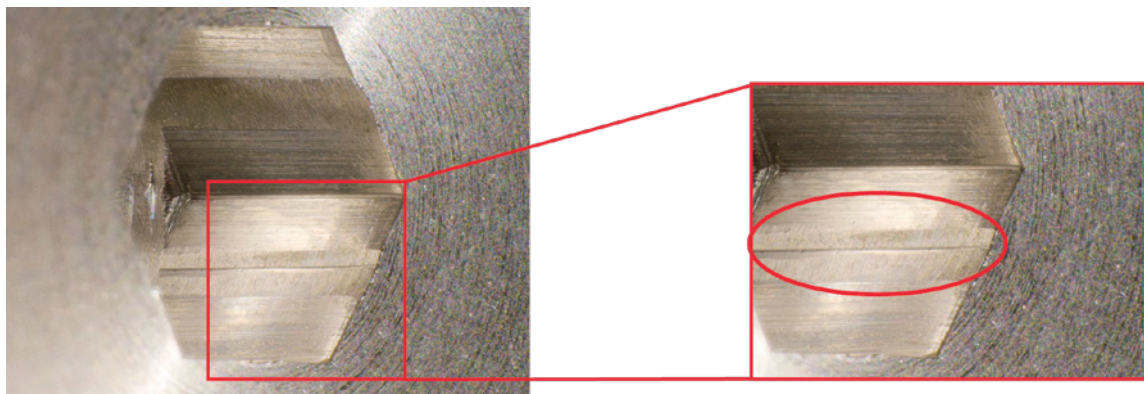


**Cause:** Incorrect tool set-up (Center-line shift)

**Solution:** Machine one angle and make sure both [a] and [b] lengths are identical, rotating the sleeve if necessary



## ■ Problem: Wall dented



**Cause:** Pilot hole remaining

**Solution:** Need pilot hole tool's offset

## ■ Problem: Wall tapered

**Solution:**

- Smaller depth of cut
- Less tool overhang

## ■ Problem: Chuck is slipping / Insert chipped

**Solution:**

- Run at 3000 mm/min feed rate
- Smaller depth of cut

- 
- 3000 mm/min feed rate can cover most materials including Titanium alloy and Stainless steel.
  - Too slow or too fast of a feed rate may cause excessive tool pressure for the workpiece and tool.

# MEMO



**NTK CUTTING TOOLS JAPAN**

2808 Iwazaki, Komaki, Aichi 485-8510, Japan



[www.ntkcuttingtools.com/global/contact/](http://www.ntkcuttingtools.com/global/contact/)

