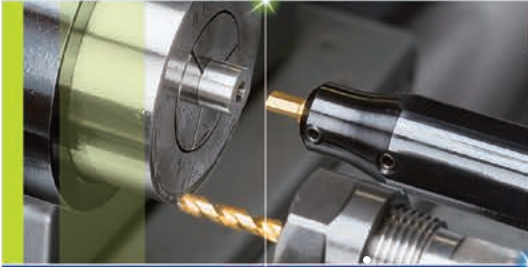
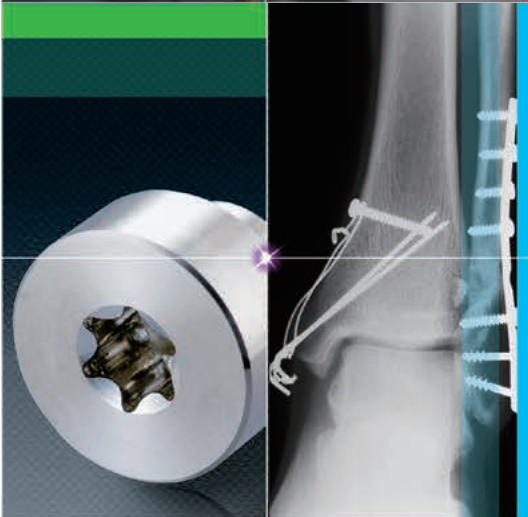


Hexalobular Socket



Square Socket



Hexagon Socket

NTK

CUTTING TOOLS

SHAPER DUO
for Socket Machining
Ver. 3



www.NTKCUTTINGTOOLS.com/us
youtube.com/NTKCUTTINGTOOLS

SHAPER DUO



Hexalobular Socket



Hexagon Socket



Square Socket



WATCH ON
YouTube

- Now available for Hexalobular(6-lobe) Socket
- Perfect fit for back spindle of Swiss machine
- Achieves good corner edge sharpness
- Less tool pressure than Rotary-Broaching
- Easy to adjust for correct dimension
- Economical double-ended insert bar (Except for Hexalobular)

Comparison Chart of Hexalobular Socket Machining

	Tool Pressure	Cycle Time	Tool Cost	High speed spindle	Program	
Shaper Duo 	◎	◎	◎	Not necessary	Simple	• No high speed spindle needed • A lot less cycle time
End milling	○	×	△	Necessary	Complicated	• Need high speed spindle • Time consuming process

- Small diameter endmill 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.

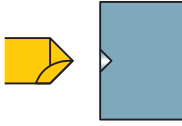
Comparison Chart of HEX Socket Machining

	Tool Pressure	Cycle Time	Flexibility	Tool Cost	
Shaper Duo 	◎	△ * Can be off-set by over-wrapping operation	○	◎	• Less tool pressure-especially on small diameter parts • One size can cover several socket sizes
Broach Tool	△	○	×	△	• Need to have tools for each socket size

- Rotary-broach is an efficient way for 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.

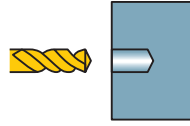
Process Chart

① Center drilling



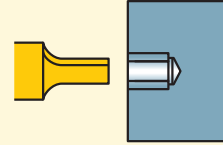
Make a center hole which is smaller than pilot hole drill.

② Drilling (Pilot hole)



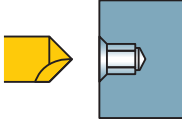
Select a drill with same or smaller (0~0.1mm) dia. as AF and machine a bit deeper because burrs may cause chipping on shaper insert

③ Shaper tool



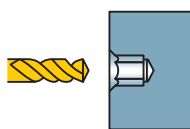
Machine socket rotating 60 degrees 6 times

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)	Number of passes			Estimated cycle time *		
				Final "X" position (mm)	Roughing pass 0.025mm	Finishing pass 0.005mm	ISO10664 Standard depth of Hexalobular hole (mm)	Whole process ①-⑤	Process④ Shaper
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	2.30	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 drill

* Shaper cutting conditions

Feed : 3000 mm/min
DOC : 0.025 mm (Roughing), 0.005 mm (Finishing)

SHAPER DUO Process Chart -Hexagonal-

HEX Standard	Tool	Pilot bore Dia. (mm)	Starting "X" position (mm)	Number of passes			Estimated cycle time *		
				Final "X" position (mm)	Roughing pass 0.025mm	Finishing pass 0.005mm	ISO 2936 standard depth of Hex hole (mm)	Whole process ①-⑤	Process④ Shaper
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

* Pilot bore diameter is same or smaller(0-0.1mm) as AF.
* Using Carbide drill

* Shaper cutting conditions

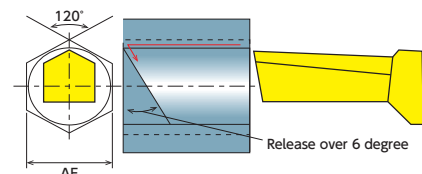
Feed : 3000 mm/min
DOC : 0.025 mm (Roughing), 0.005 mm (Finishing)

Recommended Cutting Conditions

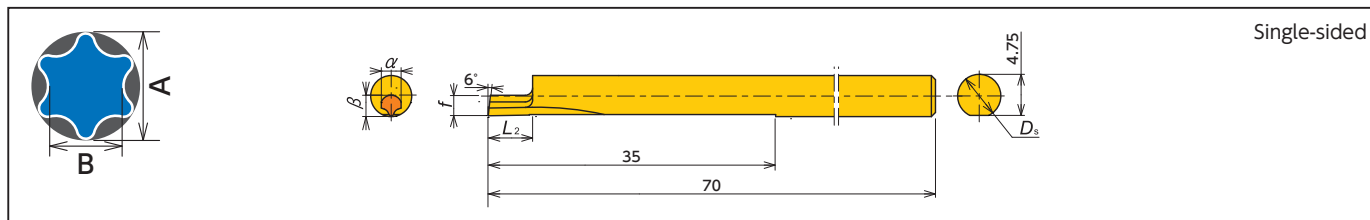
Feed : 3000 mm/min (120 IPM)
DOC : Roughing ... 0.025 mm (.0010") + Finishing ... 0.005 mm (.0002")

(Based on machining 303 stainless)

Program Example ➡ 6 · 7

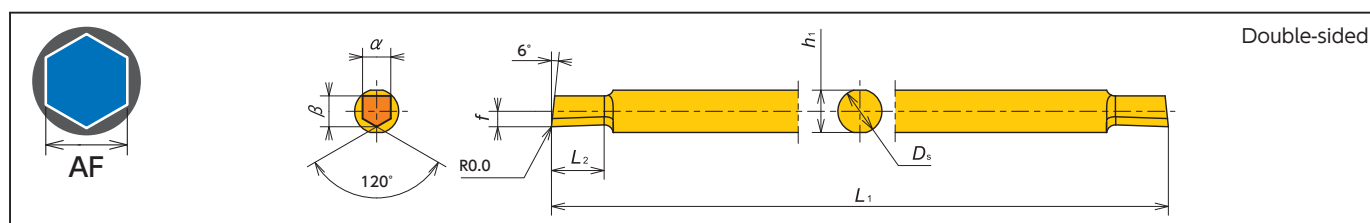


Insert Bar -Hexalobular-



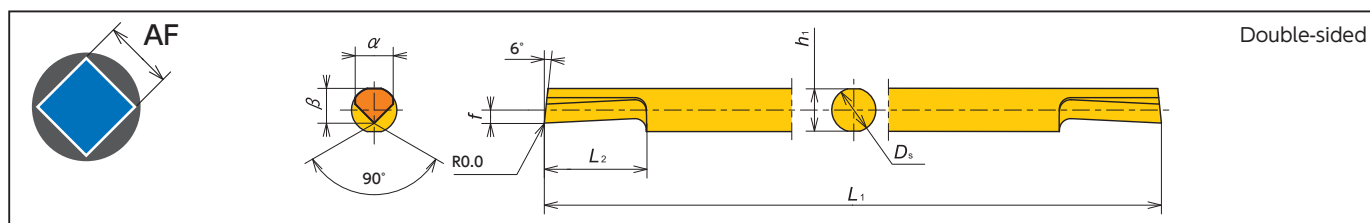
Item Number	Socket Size	Hexalobular Socket			D_s (mm)	L_2 (mm)	α (mm)	β (mm)	f (mm)	Pilot Bore Dia (mm)	Grade	EDP
		#	A (mm)	B (mm)							TM4	
SSP050N25T06	T6	6	1.75	1.27	$\phi 5$	2.5	1.08	1.09	2.4	$\phi 1.15$	●	5997101
SSP050N31T07	T7	–	–	–	$\phi 5$	3.1	1.27	1.29	2.4	$\phi 1.38$	●	5997119
SSP050N36T08	T8	8	2.4	1.75	$\phi 5$	3.6	1.48	1.50	2.4	$\phi 1.62$	●	5997127
SSP050N41T10	T10	10	2.8	2.05	$\phi 5$	4.1	1.67	1.70	2.4	$\phi 1.92$	●	5997135
SSP050N43T15	T15	15	3.35	2.4	$\phi 5$	4.3	2.04	2.10	2.4	$\phi 2.30$	●	5997143
SSP050N46T20	T20	20	3.95	2.85	$\phi 5$	4.6	2.41	2.50	2.4	$\phi 2.71$	●	5997168
SSP050N50T25	T25	25	4.5	3.25	$\phi 5$	5.0	2.78	2.90	2.4	$\phi 3.13$	●	5997176
SSP050N55T27	T27	–	–	–	$\phi 5$	5.5	3.15	3.30	2.4	$\phi 3.52$	●	5997184
SSP050N55T30	T30	30	5.6	4.05	$\phi 5$	5.5	3.52	3.70	2.4	$\phi 3.91$	●	5997192

Insert Bar -Hexagon-



Item Number	Base AF (mm)	HEX Standard size range (mm)	AF range		D_s (mm)	L_1 (mm)	L_2 (mm)	h_1 (mm)	α (mm)	β (mm)	f (mm)	Carbide Grade	EDP
			(Inch)	(mm)								TM4	
SSP020N1130H	HEX 1.5	HEX 1.5 - 2.0	.055 - .075	1.4 - 1.9	$\phi 2$	50	3.0	1.8	1.1	0.9	0.45	●	5885934
SSP020N1430H	HEX 2.0	HEX 2.0 - 2.5	.071 - .098	1.8 - 2.5	$\phi 2$	50	3.0	1.8	1.4	1.2	0.60	●	5885942
SSP030N1940H	HEX 3.0	HEX 2.5 - 3.5	.090 - .138	2.3 - 3.5	$\phi 3$	50	4.0	2.8	1.9	1.5	0.75	●	5885959
SSP040N2450H	HEX 4.0	HEX 3.5 - 4.5	.130 - .177	3.3 - 4.5	$\phi 4$	60	5.0	3.8	2.4	2.5	1.25	●	5885967
SSP050N3260H	HEX 5.0	HEX 4.5 - 6.0	.169 - .240	4.3 - 6.1	$\phi 5$	70	6.0	4.8	3.2	3.3	1.65	●	5885975
SSP060N42120H	HEX 6.0	HEX 6.0 - 8.0	.209 - .319	5.3 - 8.1	$\phi 6$	80	12.0	5.6	4.2	4.0	2.00	●	5873120
SSP080N62160H	HEX 8.0	HEX 8.0 - 12.0	.287 - .476	7.3 - 12.1	$\phi 8$	80	16.0	7.6	6.2	4.9	2.45	●	5885926
SSP080N75160H023	HEX 12.7	HEX 12.0 - 14.0	.433 - .551	11.9 - 14.2	$\phi 8$	80	16.0	7.6	8.0	7.12	3.56	●	5112875

Insert Bar -Square-



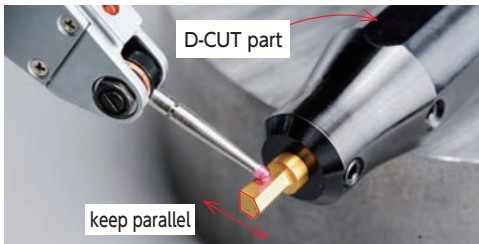
Item Number	Base AF (mm)	AF range		D_s (mm)	L_1 (mm)	L_2 (mm)	h_1 (mm)	α (mm)	β (mm)	f (mm)	Coated Carbide	EDP
		(Inch)	(mm)								TM4	
SSP020N1740S	2.0	.079 - .090	2.0 - 2.3	$\phi 2.0$	50	4.0	1.8	1.70	1.60	0.70	●	5920186
SSP025N1940S	2.5	.090 - .102	2.3 - 2.6	$\phi 2.5$	50	4.0	2.3	1.95	1.80	0.65	●	5920194
SSP030N2260S	3.0	.102 - .118	2.6 - 3.0	$\phi 3.0$	50	6.0	2.8	2.20	2.05	0.65	●	5920202
SSP035N2760S	3.5	.115 - .145	2.9 - 3.7	$\phi 3.5$	60	6.0	3.3	2.70	2.25	0.60	●	5920210
SSP040N3380S	4.0	.146 - .177	3.7 - 4.5	$\phi 4.0$	60	8.0	3.8	3.35	3.05	1.15	●	5929228
SSP050N39100S	5.0	.178 - .209	4.5 - 5.3	$\phi 5.0$	70	10.0	4.8	3.90	3.95	1.55	●	5929236
SSP060N47120S	6.0	.209 - .256	5.3 - 6.5	$\phi 6.0$	80	12.0	5.6	4.75	4.50	1.70	●	5929244
SSP080N58160S	8.0	.256 - .315	6.5 - 8.0	$\phi 8.0$	80	16.0	7.6	5.80	5.50	1.70	●	5920251

● : Stock ● : New Stock

SHAPER DUO Set-up Instructions - Hexagonal

Outside machine

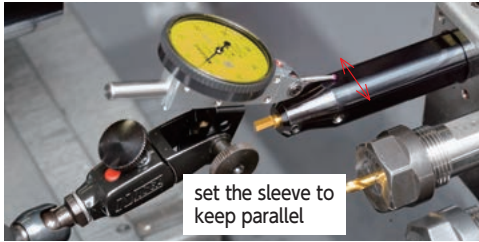
①



- 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.

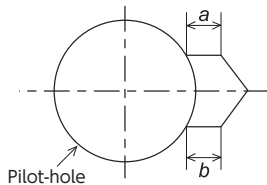
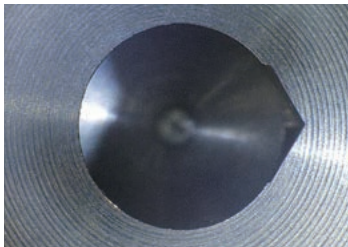
Inside machine

②



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

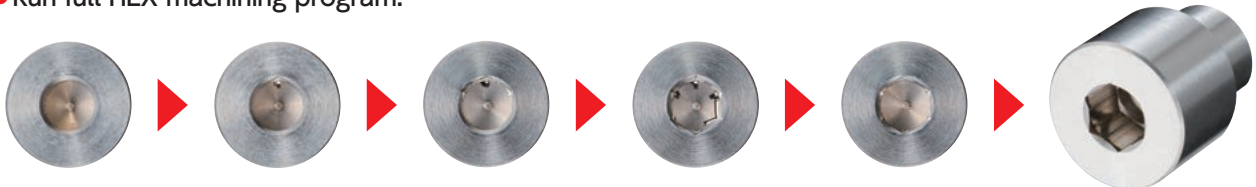
③



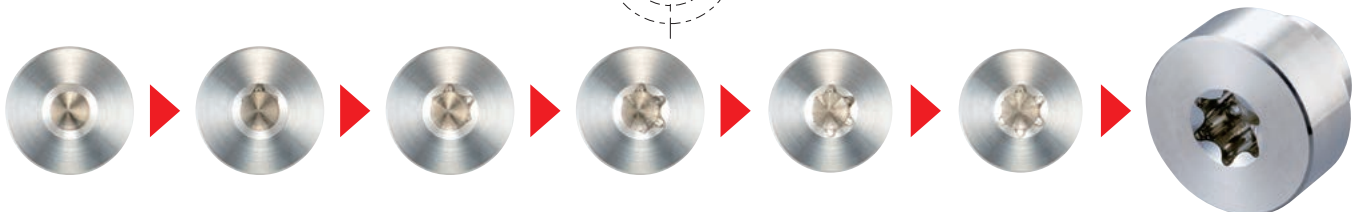
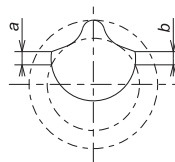
- Increase the number of machining passes with smaller depth of cut if the insert chips with large depth of cut. (0.025mm×5pass is recommended)
No chamfering process is required for measuring purpose.
- Measure the length of both [a] and [b] with comparator or magnifier.
- Adjust centerline height by rotating the sleeve until you get the same length for [a] and [b]. (The difference should be less than .0008")
*If the straight is not seen with increased passes, please 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.



For Hexalobular machining Basically same as Hexagonal socket



Hexagon Socket Programming Code Examples from Machine Builders in Metric

Hex socket size : Hex 3.0mm, AF(Final "X" position) 3.46mm, Depth 3.5mm
Pilot drill diameter : 3.0mm **Starting "X" position :** 2.95mm (see chart on W3)
Insert : SSP030N1940N TM4
Parameters : Feed 3000mm/min(120 IPM), DOC(Roughing) 0.025mm, (Finishing) 0.005mm

■ 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

■ CITIZEN

Main Program Sequence

```
M25
M78 S0 .....I
Shaper T****
G50 U1.5 .....II
G0 X2.95 Z-2.0 T** .....III
M98 P2100 L11 .....IV
M98 P2200 .....V
```

```
M78 S60 .....I
G0 X2.95 Z-2.0 .....I
M98 P2100 L11 .....I
M98 P2200 .....I
```

Repeat <a> program sequence 4 more times to complete the cuts at S120, S180, S240, S300 (represents 120°, 180°, 240°, 300°).

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

■ STAR

Main Program Sequence

```
M25
Shaper T****
G50 U1.5 .....II
M8
G0 X2.95 Z-2.0 C0 T** .....I, III
M98 P2100 L11 .....IV
M98 P2200 .....V
```

```
G0 C60.0 .....I
G0 X2.95 Z-2.0 .....I
M98 P2100 L11 .....I
M98 P2200 .....I
```

Repeat <a> program sequence 4 more times to complete the cuts at C120.0, C180.0, C240.0, C300.0 (represents 120°, 180°, 240°, 300°).

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

■ TSUGAMI

Main Program Sequence

```
M105
M150
G28 H0 .....I
M182
Shaper T****
G50 U1.5 .....II
G0 X2.95 Z-2.0 T** .....III
M98 P2100 L11 .....IV
M98 P2200 .....V
M183
```

```
G0 C60 .....I
M182
G0 X2.95 Z2.0 .....I
M98 P2100 L11 .....I
M98 P2200 .....I
M183
```

Repeat <a> program sequence 4 more times to complete the cuts at C120, C180, C240, C300 (represents 120°, 180°, 240°, 300°).

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

Sub-Program Sequence #1 for Roughing

```
N2100
G4 U0.02 .....A
G98 G1 Z3.5 F3000 .....B
G4 U0.02
U-0.2 W-0.018 .....C
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....D
M99
```

Sub-Program Sequence #1 for Roughing

```
O2100
G4 U0.02 .....A
G98 G1 Z3.5 F3000 .....B
G4 U0.02
U-0.2 W-0.018 .....C
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....D
M99
```

Sub-Program Sequence #1 for Roughing

```
O2100
G4 U0.02 .....A
G98 G1 Z-3.5 F3000 .....B
G4 U0.02
U-0.2 W0.018 .....C
G4 U0.02
G0 Z2.0
G4 U0.02
U0.25 .....D
M99
```

Sub-Program Sequence #2 for Finishing

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

Sub-Program Sequence #2 for Finishing

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

Sub-Program Sequence #2 for Finishing

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

- I. Index the sub-spindle 6 times in 60 degree increments.
- II. Specify the coordinate system shift command (in X axis direction) for the tool. [2 x f, where f is tool dimension located in catalog].
 - A positive direction shift is recommended for easier programming.
- III. 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.
- IV. 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.

- A. Specify dwell time. This allows the program and machine to stay synchronized.
- B. Cut into part 3.5mm. F3000 is recommended feed to be used for most materials; including Titanium Alloy and Stainless Steel.
- C. This code backs off the tool with an angle greater than 6 degrees (10 degrees used in example). See page W3.
- D. Return to the X position + 0.05mm (the DOC for diameter).
- V. Go to the Sub-Program #2, for finishing sequence.
- E. Finishing operation with 0.005mm DOC (X 3.46) is recommended for better surface finish.

NOTE: Programming code update **G50 in red**

Hexalobular Socket Programming Code Examples from Machine Builders in Metric

Hexalobular socket size : Hexalobular T15 (depth : 3.81mm)

Pilot drill diameter : 2.3mm

Insert : SSP050N43T15 TM4

Parameters : Feed 3000mm/min(120 IPM), DOC(Roughing) 0.025mm, (Finishing) 0.005mm

■ Programming tips

● Make a program considering final “X” position.

- #1 Final “X” position : 3.35mm(A)
- #2 Finishing position of roughing : $3.35 - 0.01$ (Finishing) = 3.34mm
- #3 Calculate total DOC for roughing : $3.34 - 2.3$ (Pilot hole) = 1.04mm
- #4 Determine number of cuts : $1.04 \div 0.05$ (DOC for Dia) = 20.8 + 2 (round down to whole number and add “2” for program adjustment)
→ Roughing sequence runs 22 times
- #5 Set starting point : $3.34 - (0.05 \times (22 - 1)) = 2.29$ mm : must subtract by “1” for program adjustment

■ CITIZEN

Main Program Sequence

```
M25
M78 S0 .....I
Shaper T****
G50 U4.8 .....II
G0 X2.29 Z-2.0 T** .....III
M98 P2100 L22 .....IV
M98 P2200 .....V
```

```
M78 S60 .....I
G0 X2.29 Z-2.0 .....I
M98 P2100 L22 .....I
M98 P2200 .....I
```

Repeat <a> program sequence 4 more times to complete the cuts at S120, S180, S240, S300 (represents 120°, 180°, 240°, 300°).

```
M20
G0 Z-2.0
G50 U-4.8
G0 U0 W0 T0
M1
```

■ STAR

Main Program Sequence

```
M25
Shaper T****
G50 U4.8 .....I
M8
G0 X2.29 Z-2.0 C0 T** .....I, III
M98 P2100 L22 .....IV
M98 P2200 .....V
```

```
G0 C60.0 .....I
G0 X2.29 Z-2.0 .....I
M98 P2100 L22 .....I
M98 P2200 .....I
```

Repeat <a> program sequence 4 more times to complete the cuts at C120.0, C180.0, C240.0, C300.0 (represents 120°, 180°, 240°, 300°).

```
G0 Z-2.0
G50 U-4.8
G0 T0
G28 W0
M1
```

■ TSUGAMI

Main Program Sequence

```
M105
M150
G28 H0 .....I
M182
Shaper T****
G50 U4.8 .....II
G0 X2.29 Z-2.0 T** .....III
M98 P2100 L22 .....IV
M98 P2200 .....V
M183
```

```
G0 C60 .....I
M182
G0 X2.29 Z-2.0 .....I
M98 P2100 L22 .....I
M98 P2200 .....I
M183
```

Repeat <a> program sequence 4 more times to complete the cuts at C120, C180, C240, C300 (represents 120°, 180°, 240°, 300°).

```
M151
G0 Z-2.0
G50 U-4.8
G0 U0 W0 T0
M1
```

Sub-Program Sequence #1 for Roughing

```
N2100
G4 U0.02 .....A
G98 G1 Z3.81 F3000 .....B
G4 U0.02
U-0.2 W-0.018 .....C
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....D
M99
```

Sub-Program Sequence #1 for Roughing

```
O2100
G4 U0.02 .....A
G98 G1 Z3.81 F3000 .....B
G4 U0.02
U-0.2 W-0.018 .....C
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....D
M99
```

Sub-Program Sequence #1 for Roughing

```
O2100
G4 U0.02 .....A
G98 G1 Z-3.81 F3000 .....B
G4 U0.02
U-0.2 W0.018 .....C
G4 U0.02
G0 Z-2.0
G4 U0.02
U0.25 .....D
M99
```

Sub-Program Sequence #2 for Finishing

```
N2200
G98 G1 X3.35 Z-2.0 F1000 .....E
G4 U0.02
Z3.81 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
```

Sub-Program Sequence #2 for Finishing

```
O2200
G98 G1 X3.35 Z-2.0 F1000 .....E
G4 U0.02
Z3.81 F3000
G4 U0.02
U-0.2 W-0.018
G4 U0.02
G0 Z-2.0
M99
```

Sub-Program Sequence #2 for Finishing

```
O2200
G98 G1 X3.35 Z2.0 F1000 .....E
G4 U0.02
Z-3.81 F3000
G4 U0.02
U-0.2 W0.018
G4 U0.02
G0 Z-2.0
M99
```

- I. Index the sub-spindle 6 times in 60 degree increments.
- II. Specify the coordinate system shift command (in X axis direction) for the tool. [2 x f, where f is tool dimension located in catalog].
 - A positive direction shift is recommended for easier programming.
- III. 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.
- IV. Go to the Sub-Program #1.
 - Sequence runs 22 times. First cutting point X2.29 and final cutting point X3.34, with 0.05 DOC (for diameter) each time.

- A. Specify dwell time. This allows the program and machine to stay synchronized.
- B. Cut into part 3.81mm. F3000 is recommended feed to be used for most materials; including Titanium Alloy and Stainless Steel.
- C. This code backs off the tool with an angle greater than 6 degrees (10 degrees used in example). See page W3.
- D. Return to the X position + 0.05mm (the DOC for diameter).
- V. Go to the Sub-Program #2, for finishing sequence.
- E. Finishing operation with 0.005mm DOC (X 3.35) is recommended for better surface finish.

STICK DUO SPLASH - Stick Duo Hyper with Coolant through -

HY-NBH-OH (Coolant through)

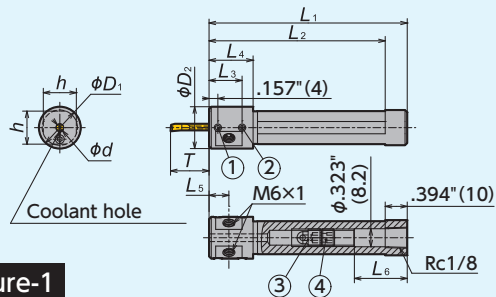


Figure-1

HY-NBH-OH (Coolant through)

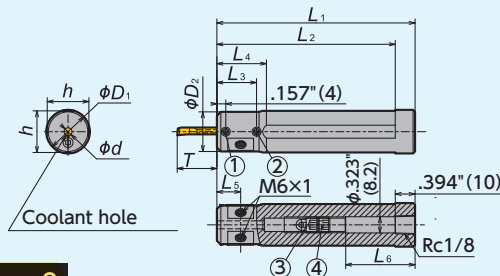


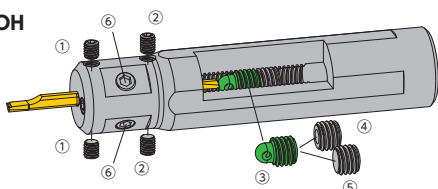
Figure-2

Item Number	Stock	Figure	ϕd		ϕD_1		ϕD_2	h	L_1	L_2	L_3	L_4	L_5	L_6	Overhang Length of Bar T			
			(Inch)	(mm)	(Inch)	(mm)									Min.		Max.	
HY-NBH02016G-OH	●	1	.079	2.0	.630	16.0	19	15	90	80	15	19	9.5	29	.197	5.0	.709	18.0
HY-NBH02516G-OH	●	1	.098	2.5	.630	16.0	19	15	90	80	15	19	9.5	30	.248	6.3	.768	19.5
HY-NBH03016G-OH	●	1	.118	3.0	.630	16.0	19	15	90	80	15	19	9.5	31	.295	7.5	.827	21.0
HY-NBH03516G-OH	●	1	.138	3.5	.630	16.0	19	15	90	80	15	19	9.5	23	.346	8.8	.965	24.5
HY-NBH04016G-OH	●	1	.157	4.0	.630	16.0	19	15	90	80	20	24	12	23	.394	10.0	1.102	28.0
HY-NBH05016G-OH	●	1	.197	5.0	.630	16.0	19	15	90	80	20	24	12	16	.492	12.5	1.378	35.0
HY-NBH02019J-OH	●	2	.079	2.0	3/4	19.05	19.05	18	110	100	15	—	9.5	49	.197	5.0	.709	18.0
HY-NBH02519J-OH	●	2	.098	2.5	3/4	19.05	19.05	18	110	100	15	—	9.5	50	.248	6.3	.768	19.5
HY-NBH03019J-OH	●	2	.118	3.0	3/4	19.05	19.05	18	110	100	15	—	9.5	51	.295	7.5	.827	21.0
HY-NBH03519J-OH	●	2	.138	3.5	3/4	19.05	19.05	18	110	100	15	—	9.5	43	.346	8.8	.965	24.5
HY-NBH04019J-OH	●	2	.157	4.0	3/4	19.05	19.05	18	110	100	20	—	12	43	.394	10.0	1.102	28.0
HY-NBH05019J-OH	●	2	.197	5.0	3/4	19.05	19.05	18	110	100	20	—	12	36	.492	12.5	1.378	35.0
HY-NBH06019J-OH	●	2	.236	6.0	3/4	19.05	19.05	18	110	100	20	—	12	28.5	.591	15.0	1.654	42.0
HY-NBH02020J-OH	●	2	.079	2.0	.787	20.0	20	19	110	100	15	—	9.5	49	.197	5.0	.709	18.0
HY-NBH02520J-OH	●	2	.098	2.5	.787	20.0	20	19	110	100	15	—	9.5	50	.248	6.3	.768	19.5
HY-NBH03020J-OH	●	2	.118	3.0	.787	20.0	20	19	110	100	15	—	9.5	51	.295	7.5	.827	21.0
HY-NBH03520J-OH	●	2	.138	3.5	.787	20.0	20	19	110	100	15	—	9.5	43	.346	8.8	.965	24.5
HY-NBH04020J-OH	●	2	.157	4.0	.787	20.0	20	19	110	100	20	—	12	43	.394	10.0	1.102	28.0
HY-NBH05020J-OH	●	2	.197	5.0	.787	20.0	20	19	110	100	20	—	12	36	.492	12.5	1.378	35.0
HY-NBH06020J-OH	●	2	.236	6.0	.787	20.0	20	19	110	100	20	—	12	28.5	.591	15.0	1.654	42.0
HY-NBH02022X-OH	●	2	.079	2.0	.866	22.0	20	21	120	110	15	25	9.5	59	.197	5.0	.709	18.0
HY-NBH02522X-OH	●	2	.098	2.5	.866	22.0	20	21	120	110	15	25	9.5	60	.248	6.3	.768	19.5
HY-NBH03022X-OH	●	2	.118	3.0	.866	22.0	20	21	120	110	15	25	9.5	61	.295	7.5	.827	21.0
HY-NBH03522X-OH	●	2	.138	3.5	.866	22.0	20	21	120	110	15	25	9.5	53	.346	8.8	.965	24.5
HY-NBH04022X-OH	●	2	.157	4.0	.866	22.0	20	21	120	110	20	25	12	53	.394	10.0	1.102	28.0
HY-NBH05022X-OH	●	2	.197	5.0	.866	22.0	20	21	120	110	20	25	12	46	.492	12.5	1.378	35.0
HY-NBH06022X-OH	●	2	.236	6.0	.866	22.0	20	21	120	110	20	25	12	28.5	.591	15.0	1.654	42.0
HY-NBH02025.0K-OH	●	2	.079	2.0	.984	25.0	20	24	125	115	15	25	9.5	64	.197	5.0	.709	18.0
HY-NBH02525.0K-OH	●	2	.098	2.5	.984	25.0	20	24	125	115	15	25	9.5	65	.248	6.3	.768	19.5
HY-NBH03025.0K-OH	●	2	.118	3.0	.984	25.0	20	24	125	115	15	25	9.5	66	.295	7.5	.827	21.0
HY-NBH03525.0K-OH	●	2	.138	3.5	.984	25.0	20	24	125	115	15	25	9.5	58	.346	8.8	.965	24.5
HY-NBH04025.0K-OH	●	2	.157	4.0	.984	25.0	20	24	125	115	20	25	12	58	.394	10.0	1.102	28.0
HY-NBH05025.0K-OH	●	2	.197	5.0	.984	25.0	20	24	125	115	20	25	12	51	.492	12.5	1.378	35.0
HY-NBH06025.0K-OH	●	2	.236	6.0	.984	25.0	20	24	125	115	20	25	12	28.5	.591	15.0	1.654	42.0
HY-NBH02025.4K-OH	●	2	.079	2.0	1.000	25.4	20	24	125	115	15	25	9.5	64	.197	5.0	.709	18.0
HY-NBH02525.4K-OH	●	2	.098	2.5	1.000	25.4	20	24	125	115	15	25	9.5	65	.248	6.3	.768	19.5
HY-NBH03025.4K-OH	●	2	.118	3.0	1.000	25.4	20	24	125	115	15	25	9.5	66	.295	7.5	.827	21.0
HY-NBH03525.4K-OH	●	2	.138	3.5	1.000	25.4	20	24	125	115	15	25	9.5	58	.346	8.8	.965	24.5
HY-NBH04025.4K-OH	●	2	.157	4.0	1.000	25.4	20	24	125	115	20	25	12	58	.394	10.0	1.102	28.0
HY-NBH05025.4K-OH	●	2	.197	5.0	1.000	25.4	20	24	125	115	20	25	12	51	.492	12.5	1.378	35.0
HY-NBH06025.4K-OH	●	2	.236	6.0	1.000	25.4	20	24	125	115	20	25	12	28.5	.591	15.0	1.654	42.0

Parts for STICK DUO SPLASH

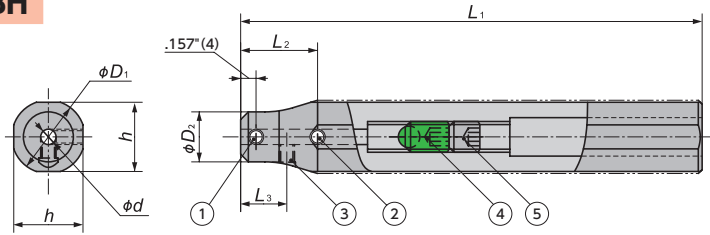
EDP - see page 14 -15

Item Number	Clamp Screw		Overhang Adjustment		
	①	②	③	④	⑤
HY-NBH ... -OH	SS04045FS	SS0406F	SS0811R-OH	SS0806F-OH (Through hole)	SS0806F
	M6 Screw		Wrench		
	⑥		for ①②	for ③④⑤	for ⑥
	SS0605SC		LW-2	LW-4×104	LW-3



STICK DUO HYPER

HY-NBH



Spare Parts

Item Number	Overhang Adjustment		Wrench	
	④	⑤	for ①②③	for ④⑤
HY-NBH ... K	SS0812R	SS0808F	LW-2	LW-4×104

Please refer to ϕd to find correct-size inserts (bars)

Item Number	Stock	ϕd		ϕD_1		ϕD_2	h	L_1	L_2	L_3	Clamp Screws		
		(Inch)	(mm)	(Inch)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	①	②	③
HY-NBH02016H	○	.079	2.0	.630	16.0	11	15	100	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH02516H	○	.098	2.5	.630	16.0	11.5	15	100	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03016H	○	.118	3.0	.630	16.0	12	15	100	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03516H	○	.138	3.5	.630	16.0	12.5	15	100	20	12	SS04045FS	SS0404F	SS0404F
HY-NBH04016H	○	.157	4.0	.630	16.0	13	15	100	20	12	SS04045FS	SS0404F	SS0404F
HY-NBH05016H	○	.197	5.0	.630	16.0	14	15	100	20	12	SS04045FS	SS0404F	SS0404F
HY-NBH02019K	●	.079	2.0	3/4	19.05	11	18	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH02519K	●	.098	2.5	3/4	19.05	11.5	18	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03019K	●	.118	3.0	3/4	19.05	12	18	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03519K	●	.138	3.5	3/4	19.05	12.5	18	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH04019K	●	.157	4.0	3/4	19.05	13	18	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH05019K	●	.197	5.0	3/4	19.05	14	18	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH02020K	○	.079	2.0	.787	20.0	11	19	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH02520K	○	.098	2.5	.787	20.0	11.5	19	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03020K	○	.118	3.0	.787	20.0	12	19	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03520K	○	.138	3.5	.787	20.0	12.5	19	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH04020K	○	.157	4.0	.787	20.0	13	19	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH05020K	○	.197	5.0	.787	20.0	14	19	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH02022K	●	.079	2.0	.866	22.0	11	21	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH02522K	●	.098	2.5	.866	22.0	11.5	21	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03022K	●	.118	3.0	.866	22.0	12	21	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03522K	●	.138	3.5	.866	22.0	12.5	21	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH04022K	●	.157	4.0	.866	22.0	13	21	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH05022K	●	.197	5.0	.866	22.0	14	21	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH02025K-MET	○	.079	2.0	.984	25.0	11	24	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH02525K-MET	○	.098	2.5	.984	25.0	11.5	24	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03025K-MET	○	.118	3.0	.984	25.0	12	24	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03525K-MET	○	.138	3.5	.984	25.0	12.5	24	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH04025K-MET	○	.157	4.0	.984	25.0	13	24	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH05025K-MET	○	.197	5.0	.984	25.0	14	24	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH02025K	●	.079	2.0	1.000	25.4	11	24	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH02525K	●	.098	2.5	1.000	25.4	11.5	24	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03025K	●	.118	3.0	1.000	25.4	12	24	125	15	9.5	SS04045FS	SS0406F	SS0404F
HY-NBH03525K	●	.138	3.5	1.000	25.4	12.5	24	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH04025K	●	.157	4.0	1.000	25.4	13	24	125	20	12	SS04045FS	SS0406F	SS0404F
HY-NBH05025K	●	.197	5.0	1.000	25.4	14	24	125	20	12	SS04045FS	SS0406F	SS0404F

Precaution for Shaper duo with STICK DUO HYPER sleeve

● Set insert in this position



Hexagon

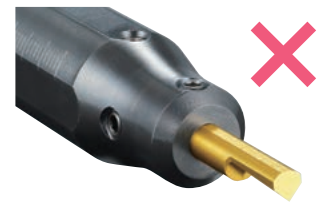


Square

● To avoid insert chipping don't set insert in this position



Hexagon



Square

● : Stock

○ : 1-2 week delivery

● : Coolant through

■ EDP - see page 14 - 15

STICK DUO - Sleeves for ID machining -

NBH

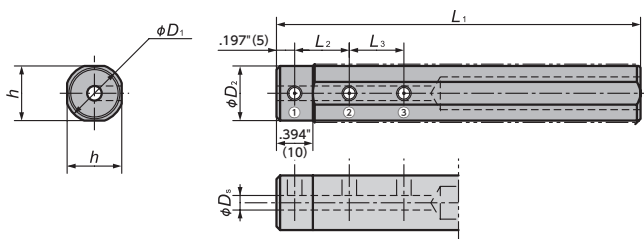


Figure-1

NBH

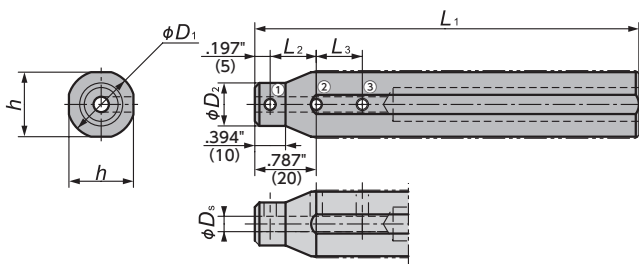


Figure-2

Item number	Figure	Stock	ϕD_s		ϕD_1		ϕD_2	h	L_1	L_2	L_3	Clamp screw			Wrench
			(Inch)	(mm)	(Inch)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	①	②	③	
NBH02015H	1	○	.079	2.0	5/8	15.875	15	15	100	10	—	SS0406F	SS0406F	—	LW-2
NBH02515H	1	○	.098	2.5	5/8	15.875	15	15	100	10	—	SS0406F	SS0406F	—	LW-2
NBH03015H	1	○	.118	3.0	5/8	15.875	15	15	100	10	10	SS0404F	SS0404F	SS0404F	LW-2
NBH03515H	1	○	.138	3.5	5/8	15.875	15	15	100	10	10	SS0404F	SS0404F	SS0404F	LW-2
NBH04015H	1	○	.157	4.0	5/8	15.875	15	15	100	15	15	SS0404F	SS0404F	SS0404F	LW-2
NBH04515H	1	○	.177	4.5	5/8	15.875	15	15	100	15	15	SS0404F	SS0404F	SS0404F	LW-2
NBH05015H	1	○	.197	5.0	5/8	15.875	15	15	100	15	15	SS0404F	SS0404F	SS0404F	LW-2
NBH06015H	1	○	.236	6.0	5/8	15.875	15	15	100	20	20	SS0404F	SS0404F	SS0404F	LW-2
NBH08015H	1	○	.315	8.0	5/8	15.875	15	15	100	20	20	SS0403F	SS0403F	SS0403F	LW-2
NBH02016H	1	○	.079	2.0	.630	16.0	15	15	100	10	—	SS0406F	SS0406F	—	LW-2
NBH02516H	1	○	.098	2.5	.630	16.0	15	15	100	10	—	SS0406F	SS0406F	—	LW-2
NBH03016H	1	○	.118	3.0	.630	16.0	15	15	100	10	10	SS0404F	SS0404F	SS0404F	LW-2
NBH03516H	1	○	.138	3.5	.630	16.0	15	15	100	10	10	SS0404F	SS0404F	SS0404F	LW-2
NBH04016H	1	○	.157	4.0	.630	16.0	15	15	100	15	15	SS0404F	SS0404F	SS0404F	LW-2
NBH04516H	1	○	.177	4.5	.630	16.0	15	15	100	15	15	SS0404F	SS0404F	SS0404F	LW-2
NBH05016H	1	○	.197	5.0	.630	16.0	15	15	100	15	15	SS0404F	SS0404F	SS0404F	LW-2
NBH06016H	1	●	.236	6.0	.630	16.0	15	15	100	20	20	SS0404F	SS0404F	SS0404F	LW-2
NBH07016H	1	○	.276	7.0	.630	16.0	15	15	100	20	20	SS0403F	SS0404F	SS0404F	LW-2
NBH08016H	1	●	.315	8.0	.630	16.0	15	15	100	20	20	SS0403F	SS0403F	SS0403F	LW-2
NBH02019K	1	○	.079	2.0	3/4	19.05	18	18	125	10	—	SS0408F	SS0408F	—	LW-2
NBH02519K	1	○	.098	2.5	3/4	19.05	18	18	125	10	—	SS0408F	SS0408F	—	LW-2
NBH03019K	1	○	.118	3.0	3/4	19.05	18	18	125	10	10	SS0406F	SS0406F	SS0406F	LW-2
NBH03519K	1	○	.138	3.5	3/4	19.05	18	18	125	10	10	SS0406F	SS0406F	SS0406F	LW-2
NBH04019K	1	○	.157	4.0	3/4	19.05	18	18	125	15	15	SS0406F	SS0406F	SS0406F	LW-2
NBH04519K	1	○	.177	4.5	3/4	19.05	18	18	125	15	15	SS0406F	SS0406F	SS0406F	LW-2
NBH05019K	1	○	.197	5.0	3/4	19.05	18	18	125	15	15	SS0406F	SS0406F	SS0406F	LW-2
NBH06019K	1	●	.236	6.0	3/4	19.05	18	18	125	20	20	SS0406F	SS0406F	SS0406F	LW-2
NBH07019K	1	○	.276	7.0	3/4	19.05	18	18	125	20	20	SS0404F	SS0404F	SS0404F	LW-2
NBH08019K	1	●	.315	8.0	3/4	19.05	18	18	125	20	20	SS0404F	SS0404F	SS0404F	LW-2
NBH10019K	1	○	.394	10.0	3/4	19.05	18	18	125	20	20	SS0403F	SS0404F	SS0404F	LW-2
NBH02020K	2	○	.079	2.0	.787	20.0	11	19	125	10	—	SS0404F	SS0404F	—	LW-2
NBH02520K	2	○	.098	2.5	.787	20.0	11	19	125	10	—	SS0404F	SS0404F	—	LW-2
NBH03020K	2	○	.118	3.0	.787	20.0	12	19	125	10	10	SS0404F	SS0404F	SS0406F	LW-2
NBH03520K	2	○	.138	3.5	.787	20.0	12	19	125	10	10	SS0404F	SS0404F	SS0406F	LW-2
NBH04020K	2	○	.157	4.0	.787	20.0	13	19	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH04520K	2	○	.177	4.5	.787	20.0	13	19	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH05020K	2	○	.197	5.0	.787	20.0	14	19	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH06020K	2	●	.236	6.0	.787	20.0	15	19	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH07020K	2	○	.276	7.0	.787	20.0	16	19	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH08020K	2	●	.315	8.0	.787	20.0	17	19	125	20	20	SS0404F	SS0404F	SS0404F	LW-2
NBH10020K	2	○	.394	10.0	.787	20.0	19	19	125	20	20	SS0404F	SS0404F	SS0404F	LW-2

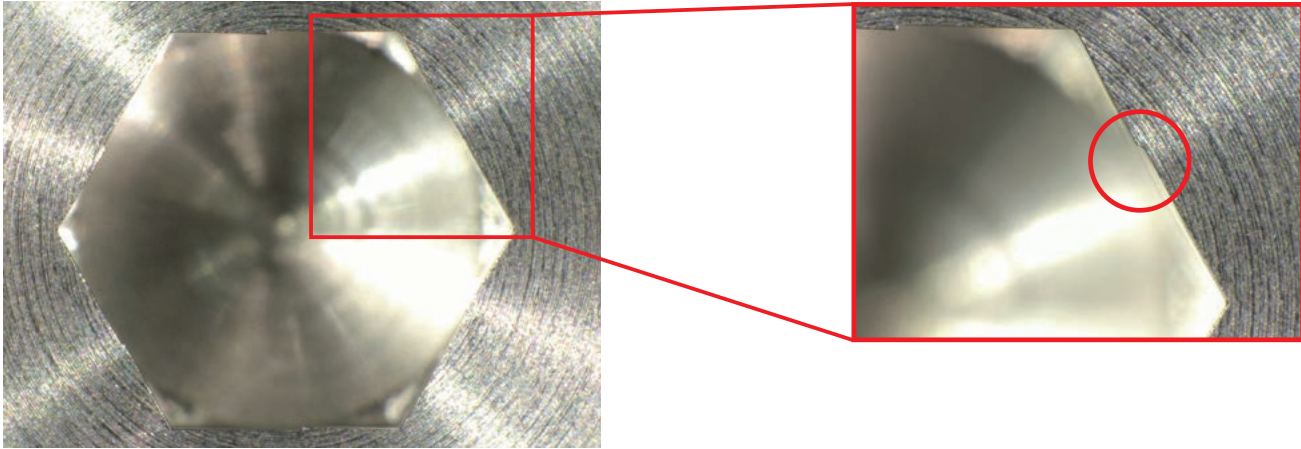
Item number	Figure	Stock	ϕD_s		ϕD_1		ϕD_2	h_1	L_1	L_2	L_3	Clamp screw			Wrench
			(Inch)	(mm)	(Inch)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	①	②	③	
NBH02022K	2	○	.079	2.0	.866	22.0	11	21	125	10	—	SS0404F	SS0406F	—	LW-2
NBH02522K	2	○	.098	2.5	.866	22.0	11	21	125	10	—	SS0404F	SS0406F	—	LW-2
NBH03022K	2	○	.118	3.0	.866	22.0	12	21	125	10	10	SS0404F	SS0406F	SS0408F	LW-2
NBH03522K	2	○	.138	3.5	.866	22.0	12	21	125	10	10	SS0404F	SS0406F	SS0406F	LW-2
NBH04022K	2	○	.157	4.0	.866	22.0	13	21	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH04522K	2	○	.177	4.5	.866	22.0	13	21	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH05022K	2	○	.197	5.0	.866	22.0	14	21	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH06022K	2	●	.236	6.0	.866	22.0	15	21	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH07022K	2	○	.276	7.0	.866	22.0	16	21	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH08022K	2	●	.315	8.0	.866	22.0	17	21	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH10022K	2	○	.394	10.0	.866	22.0	19	21	125	20	20	SS0404F	SS0404F	SS0404F	LW-2
NBH12022K	2	○	.472	12.0	.866	22.0	21	21	125	25	25	SS0404F	SS0404F	SS0404F	LW-2
NBH02023K	2	○	.079	2.0	.906	23.0	11	21	125	10	—	SS0404F	SS0406F	—	LW-2
NBH02523K	2	○	.098	2.5	.906	23.0	11	21	125	10	—	SS0404F	SS0406F	—	LW-2
NBH03023K	2	○	.118	3.0	.906	23.0	12	21	125	10	10	SS0404F	SS0406F	SS0408F	LW-2
NBH03523K	2	○	.138	3.5	.906	23.0	12	21	125	10	10	SS0404F	SS0406F	SS0406F	LW-2
NBH04023K	2	○	.157	4.0	.906	23.0	13	21	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH04523K	2	○	.177	4.5	.906	23.0	13	21	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH05023K	2	○	.197	5.0	.906	23.0	14	21	125	15	15	SS0404F	SS0406F	SS0406F	LW-2
NBH06023K	2	○	.236	6.0	.906	23.0	15	21	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH08023K	2	○	.315	8.0	.906	23.0	17	21	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH10023K	2	○	.394	10.0	.906	23.0	19	21	125	20	20	SS0404F	SS0404F	SS0404F	LW-2
NBH12023K	2	○	.472	12.0	.906	23.0	21	21	125	25	25	SS0404F	SS0404F	SS0404F	LW-2
NBH02025K-MET	2	○	.079	2.0	.984	25.0	11	24	125	10	—	SS0404F	SS0406F	—	LW-2
NBH02525K-MET	2	○	.098	2.5	.984	25.0	11	24	125	10	—	SS0404F	SS0406F	—	LW-2
NBH03025K-MET	2	○	.118	3.0	.984	25.0	12	24	125	10	10	SS0404F	SS0406F	SS0408F	LW-2
NBH03525K-MET	2	○	.138	3.5	.984	25.0	12	24	125	10	10	SS0404F	SS0406F	SS0408F	LW-2
NBH04025K-MET	2	○	.157	4.0	.984	25.0	13	24	125	15	15	SS0404F	SS0408F	SS0408F	LW-2
NBH04525K-MET	2	○	.177	4.5	.984	25.0	13	24	125	15	15	SS0404F	SS0408F	SS0408F	LW-2
NBH05025K-MET	2	○	.197	5.0	.984	25.0	14	24	125	15	15	SS0404F	SS0408F	SS0408F	LW-2
NBH06025K-MET	2	●	.236	6.0	.984	25.0	15	24	125	20	20	SS0404F	SS0408F	SS0408F	LW-2
NBH07025K-MET	2	○	.276	7.0	.984	25.0	16	24	125	20	20	SS0404F	SS0408F	SS0408F	LW-2
NBH08025K-MET	2	●	.315	8.0	.984	25.0	17	24	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH10025K-MET	2	○	.394	10.0	.984	25.0	19	24	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH12025K-MET	2	○	.472	12.0	.984	25.0	21	24	125	25	25	SS0404F	SS0404F	SS0404F	LW-2
NBH02025K	2	○	.079	2.0	1.000	25.4	11	24	125	10	—	SS0404F	SS0406F	—	LW-2
NBH02525K	2	○	.098	2.5	1.000	25.4	11	24	125	10	—	SS0404F	SS0406F	—	LW-2
NBH03025K	2	○	.118	3.0	1.000	25.4	12	24	125	10	10	SS0404F	SS0406F	SS0408F	LW-2
NBH03525K	2	○	.138	3.5	1.000	25.4	12	24	125	10	10	SS0404F	SS0406F	SS0408F	LW-2
NBH04025K	2	○	.157	4.0	1.000	25.4	13	24	125	15	15	SS0404F	SS0408F	SS0408F	LW-2
NBH04525K	2	○	.177	4.5	1.000	25.4	13	24	125	15	15	SS0404F	SS0408F	SS0408F	LW-2
NBH05025K	2	○	.197	5.0	1.000	25.4	14	24	125	15	15	SS0404F	SS0408F	SS0408F	LW-2
NBH06025K	2	●	.236	6.0	1.000	25.4	15	24	125	20	20	SS0404F	SS0408F	SS0408F	LW-2
NBH07025K	2	○	.276	7.0	1.000	25.4	16	24	125	20	20	SS0404F	SS0408F	SS0408F	LW-2
NBH08025K	2	●	.315	8.0	1.000	25.4	17	24	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH10025K	2	○	.394	10.0	1.000	25.4	19	24	125	20	20	SS0404F	SS0406F	SS0406F	LW-2
NBH12025K	2	○	.472	12.0	1.000	25.4	21	24	125	25	25	SS0404F	SS0404F	SS0404F	LW-2
NBH04532K	2	○	.177	4.5	1.260	32.0	13	30	125	15	15	SS0404F	SS0408F	SS0408F	LW-2
NBH05032K	2	○	.197	5.0	1.260	32.0	14	30	125	15	15	SS0404F	SS0408F	SS0408F	LW-2
NBH06032K	2	○	.236	6.0	1.260	32.0	15	30	125	20	20	SS0404F	SS0408F	SS0408F	LW-2
NBH07032K	2	○	.276	7.0	1.260	32.0	16	30	125	20	20	SS0404F	SS0408F	SS0408F	LW-2
NBH08032K	2	○	.315	8.0	1.260	32.0	17	30	125	20	20	SS0404F	SS0408F	SS0408F	LW-2
NBH10032K	2	○	.394	10.0	1.260	32.0	19	30	125	20	20	SS0404F	SS0408F	SS0408F	LW-2
NBH12032K	2	○	.472	12.0	1.260	32.0	21	30	125	25	25	SS0404F	SS0406F	SS0406F	LW-2
NBH14032K	2	○	.551	14.0	1.260	32.0	23	30	125	25	25	SS0504	SS0506	SS0506	LW-2.5
NBH16032K	2	○	.630	16.0	1.260	32.0	25	30	125	25	25	SS0504	SS0506	SS0506	LW-2.5

● : Stock ○ : 1-2 week delivery

EDP - see page 14 - 15

SHAPER DUO Troubleshooting

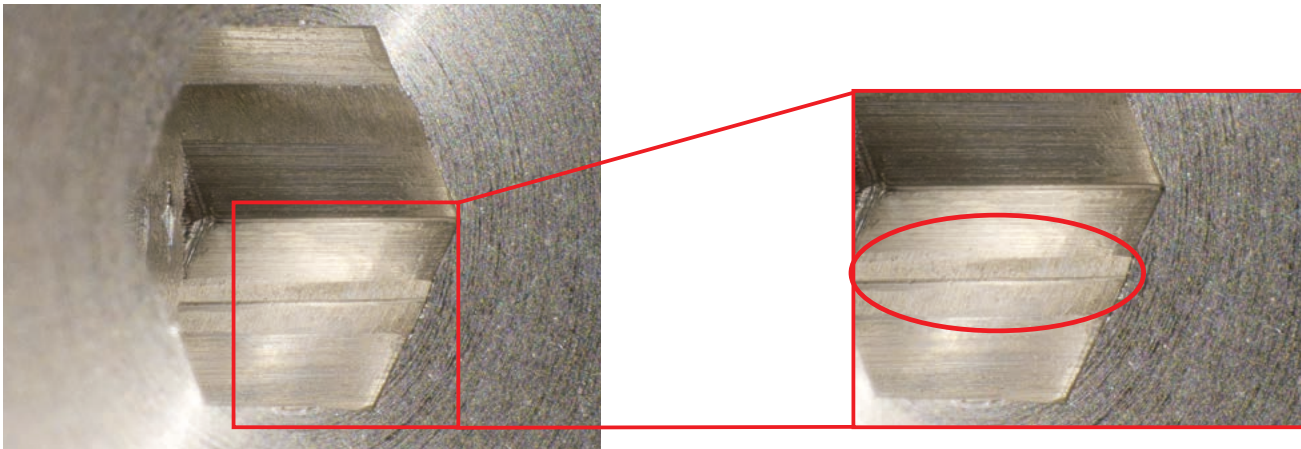
■ Problem: Step on sides



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 (120 IPM) feed rate
● Smaller depth of cut

- 3000 mm/min (120 IPM) 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.

Case Studies

Medical Instrument Screw Titanium	
Holder: HY-NBH05019K	Insert: SSP050N3260H TM4
0.178" Hexagonal socket	
	110 IPM
	Wet
	2800 pcs / edge
	Good chip control & Edge in good condition
	Cycle time: 90 seconds
Original Process	Machine: Citizen L20
	2 flute endmill - carbide
	Cycle time - over 2 minutes

Medical Instrument Screw 316L Stainless	
Insert: SSP050N3260H TM4	
	120 IPM
	3500 pcs/ corner
	Good chip control & Edge in good condition
	7x the tool life
	Machine: Citizen L20
Original Process	Wobble Broach – 1 corner
	500 pcs / corner

Bow Fishing Reel Tube 6061 Aluminum	
Holder: NBH08015H	Insert: SSP080N62160H TM4
	100 IPM
	700 pcs/ corner
	Good chip control
	Edge in good condition
	Shortened cycle time
	Machine: Nomura XD38
	Customer confident to complete 1200pc production run



Video Link



Holder & Spare Part EDP's

Item Number	EDP
HY-NBH02016G-OH	5893011
HY-NBH02516G-OH	5893029
HY-NBH03016G-OH	5893037
HY-NBH03516G-OH	5893045
HY-NBH04016G-OH	5893052
HY-NBH05016G-OH	5893060
HY-NBH02019J-OH	5893078
HY-NBH02519J-OH	5893086
HY-NBH03019J-OH	5893094
HY-NBH03519J-OH	5893102
HY-NBH04019J-OH	5893136
HY-NBH05019J-OH	5893144
HY-NBH06019J-OH	5967922
HY-NBH02020J-OH	5893151
HY-NBH02520J-OH	5893169
HY-NBH03020J-OH	5893177
HY-NBH03520J-OH	5893185
HY-NBH04020J-OH	5893193
HY-NBH05020J-OH	5893201
HY-NBH06020J-OH	5967930
HY-NBH02022X-OH	5893219
HY-NBH02522X-OH	5893227
HY-NBH03022X-OH	5893235
HY-NBH03522X-OH	5893243
HY-NBH04022X-OH	5893250
HY-NBH05022X-OH	5893268
HY-NBH06022X-OH	5967948
HY-NBH02025.0K-OH	5893276
HY-NBH02525.0K-OH	5893284
HY-NBH03025.0K-OH	5893292
HY-NBH03525.0K-OH	5893300
HY-NBH04025.0K-OH	5893318
HY-NBH05025.0K-OH	5893326
HY-NBH06025.0K-OH	5967955
HY-NBH02025.4K-OH	5893334
HY-NBH02525.4K-OH	5893367
HY-NBH03025.4K-OH	5893375
HY-NBH03525.4K-OH	5893383
HY-NBH04025.4K-OH	5893391
HY-NBH05025.4K-OH	5893409
HY-NBH06025.4K-OH	5967963

SPARE PART	EDP
SS0403F	5696810
SS04045FS	5715842
SS0404F	5696828
SS0406F	5696836
SS0408F	5696844

Item Number	EDP
HY-NBH02016H	5709894
HY-NBH02516H	5709902
HY-NBH03016H	5709910
HY-NBH03516H	5709936
HY-NBH04016H	5709944
HY-NBH05016H	5709951
HY-NBH02019K	5709969
HY-NBH02519K	5709977
HY-NBH03019K	5709985
HY-NBH03519K	5709993
HY-NBH04019K	5710009
HY-NBH05019K	5710017
HY-NBH02020K	5712708
HY-NBH02520K	5712716
HY-NBH03020K	5712724
HY-NBH03520K	5712740
HY-NBH04020K	5712757
HY-NBH05020K	5712765
HY-NBH02022K	5712773
HY-NBH02522K	5712799
HY-NBH03022K	5712831
HY-NBH03522K	5712856
HY-NBH04022K	5712872
HY-NBH05022K	5712914
HY-NBH02025K-MET	5712732
HY-NBH02525K-MET	5712823
HY-NBH03025K-MET	5712849
HY-NBH03525K-MET	5712864
HY-NBH04025K-MET	5712898
HY-NBH05025K-MET	5712922
HY-NBH02025K	5713003
HY-NBH02525K	5713029
HY-NBH03025K	5713045
HY-NBH03525K	5713060
HY-NBH04025K	5713086
HY-NBH05025K	5713102

SPARE PART	EDP
SS0605SC	5913058
SS0806F	5912530
SS0806F-OH	5912548
SS0808F	5715867
SS0811R-OH	5912522
SS0812R	5715859

Item Number	EDP
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NBH02515H	5702915
NBH03015H	5631411
NBH03515H	5586110
NBH04015H	5586128
NBH04515H	5585997
NBH05015H	5585989
NBH06015H	5585971
NBH08015H	5585963
NBH02016H	5631429
NBH02516H	5702899
NBH03016H	5631437
NBH03516H	5586102
NBH04016H	5586094
NBH04516H	5586086
NBH05016H	5586078
NBH06016H	5586060
NBH07016H	5774195
NBH08016H	5586052
NBH02019K	5631445
NBH02519K	5702907
NBH03019K	5631452
NBH03519K	5586045
NBH04019K	5586037
NBH04519K	5586029
NBH05019K	5586011
NBH06019K	5586003
NBH07019K	5774203
NBH08019K	5586227
NBH10019K	5586219
NBH02020K	5631460
NBH02520K	5702881
NBH03020K	5631478
NBH03520K	5586201
NBH04020K	5586185
NBH04520K	5586177
NBH05020K	5586169
NBH06020K	5586151
NBH07020K	5774211
NBH08020K	5586144
NBH10020K	5586136
NBH02022K	5631486
NBH02522K	5702873
NBH03022K	5631494
NBH03522K	5586326
NBH04022K	5586318
NBH04522K	5586300
NBH05022K	5586292
NBH06022K	5586284

Item Number	EDP
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NBH08022K	5586276
NBH10022K	5586268
NBH12022K	5631502
NBH02023K	5631510
NBH02523K	5702857
NBH03023K	5631528
NBH03523K	5586250
NBH04023K	5651336
NBH04523K	5586243
NBH05023K	5631536
NBH06023K	5631544
NBH08023K	5631551
NBH10023K	5631569
NBH12023K	5631577
NBH02025K-MET	5631585
NBH02525K-MET	5704283
NBH03025K-MET	5631593
NBH03525K-MET	5631601
NBH04025K-MET	5651328
NBH04525K-MET	5631619
NBH05025K-MET	5631627
NBH06025K-MET	5631635
NBH07025K-MET	5774252
NBH08025K-MET	5631643
NBH10025K-MET	5631650
NBH12025K-MET	5631668
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NBH02525K	5702865
NBH03025K	5631684
NBH03525K	5586235
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NBH04525K	5586375
NBH05025K	5586367
NBH06025K	5586359
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NBH10025K	5586334
NBH12025K	5631692
NBH04532K	5939475
NBH05032K	5939483
NBH06032K	5939491
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NBH08032K	5939525
NBH10032K	5939533
NBH12032K	5939467
NBH14032K	5939459
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