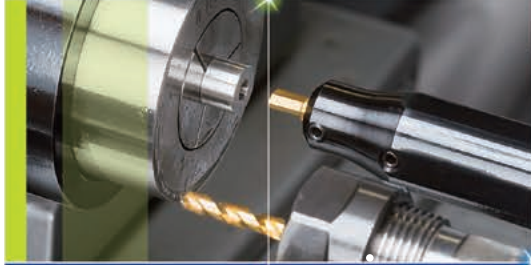
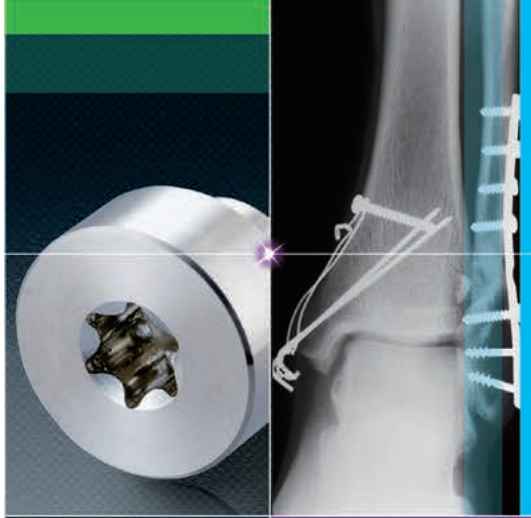


Hexalobular Socket



Square Socket



Hexagon Socket

NTK

CUTTING TOOLS

SHAPER DUO
for Socket Machining
Ver. 3



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

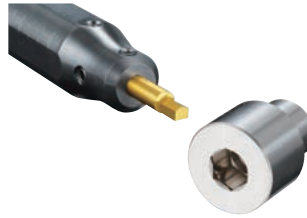
SHAPER DUO



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	<ul style="list-style-type: none"> ● No high speed spindle needed ● A lot less cycle time
End milling	○	×	△	Necessary	Complicated	<ul style="list-style-type: none"> ● 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.

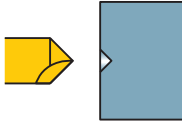
Comparison Chart of HEX Socket Machining

	Tool Pressure	Cycle Time	Flexibility	Tool Cost	
Shaper Duo 	◎	△ * Can be off-set by over-wrapping operation	○	◎	<ul style="list-style-type: none"> ● Less tool pressure-especially on small diameter parts ● One size can cover several socket sizes
Broach Tool	△	○	×	△	<ul style="list-style-type: none"> ● 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.

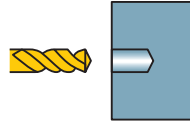
Process Chart

① Center drilling



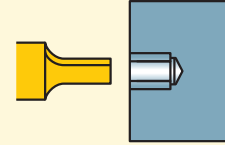
Make a center hole which is smaller than pilot hole drill.

② Drilling (Pilot hole)



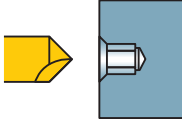
Select a drill with same or smaller (0~0.1mm) dia. as AF and machine a bit deeper because burrs may cause chipping on shaper insert

③ Shaper tool



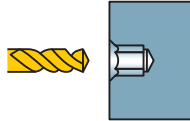
Machine socket rotating 60 degrees 6 times

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

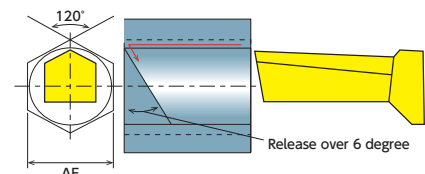
Feed : 3000 mm/min
DOC : 0.025 mm (Roughing), 0.005 mm (Finishing)

Recommended Cutting Conditions

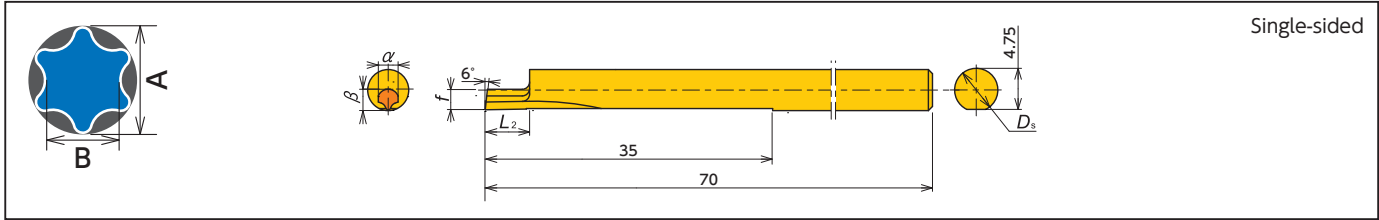
Feed : 3000 mm/min (120 IPM)
DOC : Roughing ... 0.025 mm (.0010") + Finishing ... 0.005 mm (.0002")

(Based on machining 303 stainless)

Program Example → 6 · 7



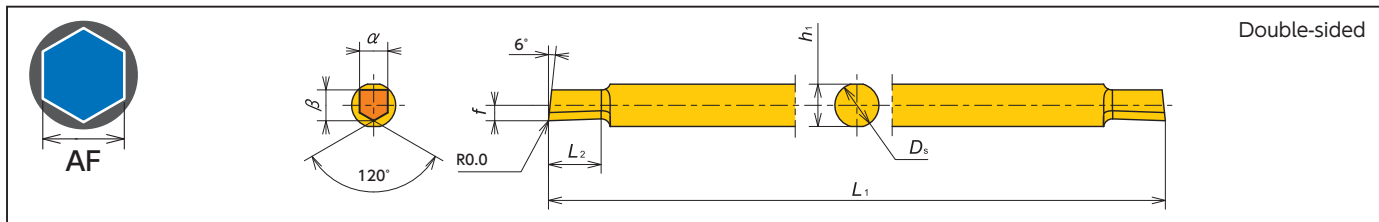
Insert Bar -Hexalobular-



Single-sided

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

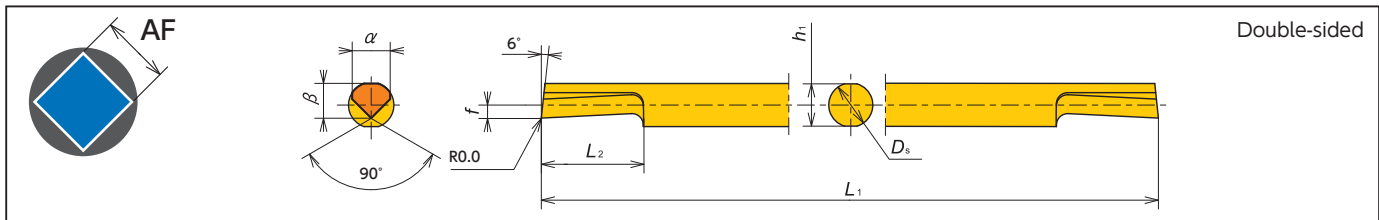
Insert Bar -Hexagon-



Double-sided

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-



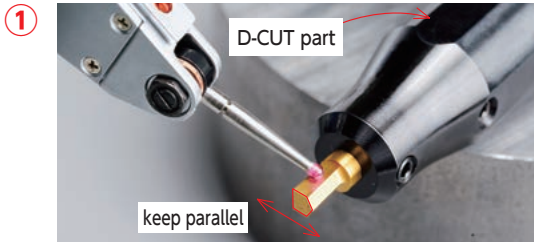
Double-sided

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

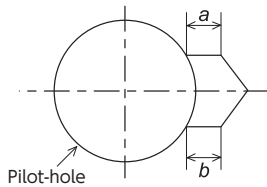
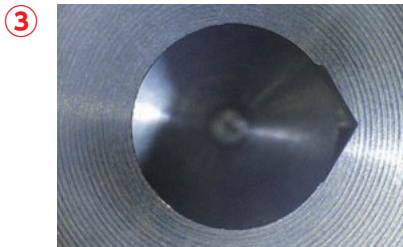


- Set the insert bar in the sleeve and check the parallelism of the flat portion of the sleeve and the insert bar.
- Minimize the overhang of the insert.

Inside machine



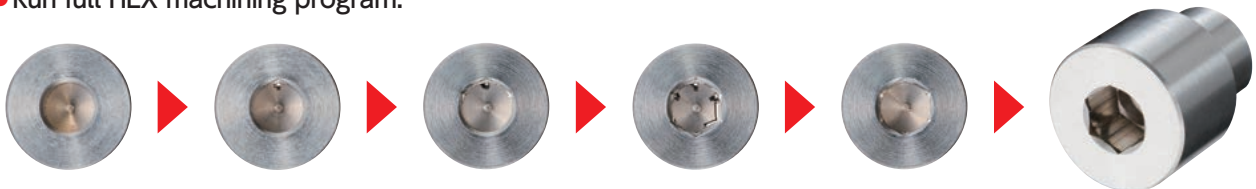
- Set the sleeve into the tool post and make sure the sleeve is set parallel.
- Minimize sleeve overhang.



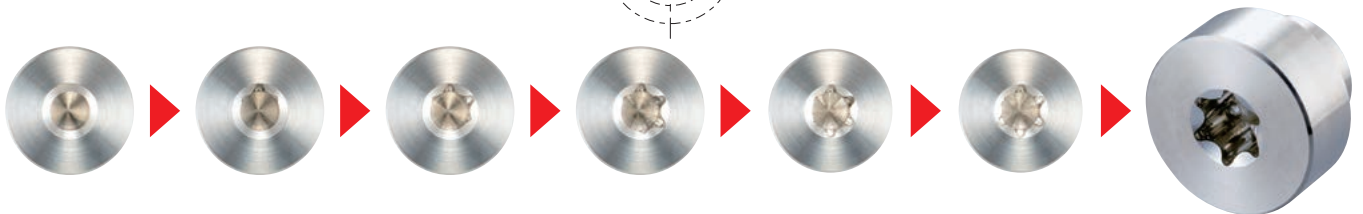
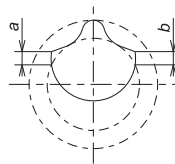
- Increase the number of machining passes with smaller depth of cut if the insert chips with large depth of cut. (0.025mm×5pass is recommended)
No chamfering process is required for measuring purpose.
- Measure the length of both [a] and [b] with comparator or magnifier.
- Adjust centerline height by rotating the sleeve until you get the same length for [a] and [b]. (The difference should be less than .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
M98 P2100 L11
M98 P2200 } <a>
```

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
M98 P2100 L11
M98 P2200 } <a>
```

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 Z2.0 T** .....III
M98 P2100 L11 .....IV
M98 P2200 .....V
M183
```

```
G0 C60 .....I
M182
G0 X2.95 Z2.0
M98 P2100 L11
M98 P2200
M183 } <a>
```

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.
- V. Go to the Sub-Program #2, for finishing sequence.
 - Specify dwell time. This allows the program and machine to stay synchronized.
 - Cut into part 3.5mm. F3000 is recommended feed to be used for most materials; including Titanium Alloy and Stainless Steel.
 - This code backs off the tool with an angle greater than 6 degrees (10 degrees used in example). See page W3.
 - Return to the X position + 0.05mm (the DOC for diameter).
 - 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 : $3.35\text{mm}(A)$
- #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 : $3.34 - (0.05 \times (22 - 1)) = 2.29\text{mm}$: 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
M98 P2100 L22
M98 P2200 } <a>
```

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 .....II
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
M98 P2100 L22
M98 P2200 } <a>
```

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 Z2.0 T** .....III
M98 P2100 L22 .....IV
M98 P2200 .....V
M183
```

```
G0 C60 .....I
M182
G0 X2.29 Z2.0
M98 P2100 L22
M98 P2200
M183 } <a>
```

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-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 Z2.0
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 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 22 times. First cutting point X2.29 and final cutting point X3.34, with 0.05 DOC (for diameter) each time.
- V. Go to the Sub-Program #2, for finishing sequence.
 - Specify dwell time. This allows the program and machine to stay synchronized.
 - Cut into part 3.81mm. F3000 is recommended feed to be used for most materials; including Titanium Alloy and Stainless Steel.
 - This code backs off the tool with an angle greater than 6 degrees (10 degrees used in example). See page W3.
 - Return to the X position + 0.05mm (the DOC for diameter).
 - 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)

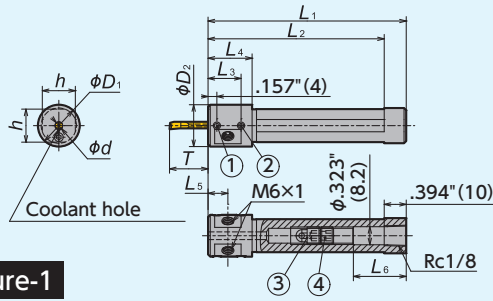


Figure-1

HY-NBH-OH (Coolant through)

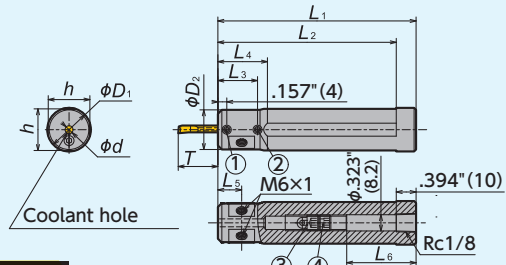


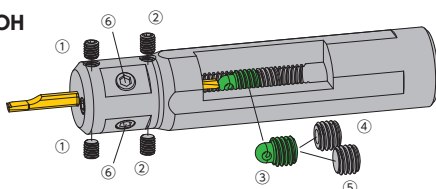
Figure-2

Item Number	Stock	Figure	φ d (Inch) (mm)	φ D ₁ (Inch) (mm)	φ D ₂ (mm)	h (mm)	L ₁ (mm)	L ₂ (mm)	L ₃ (mm)	L ₄ (mm)	L ₅ (mm)	L ₆ (mm)	Overhang Length of Bar T	
													Min. (Inch) (mm)	Max. (Inch) (mm)
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

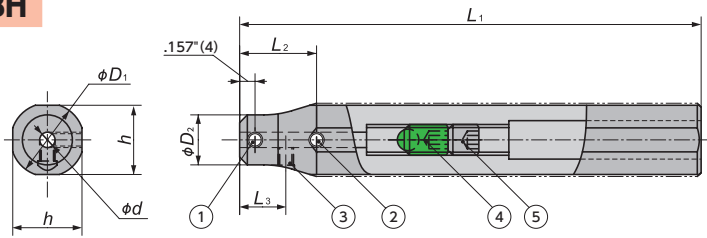
EDP - see page 14 -15

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)						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

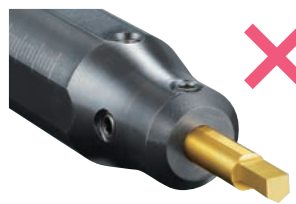


Hexagon

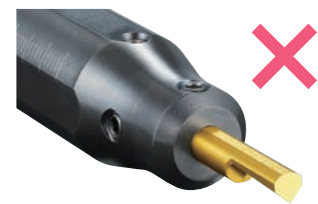


Square

● 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

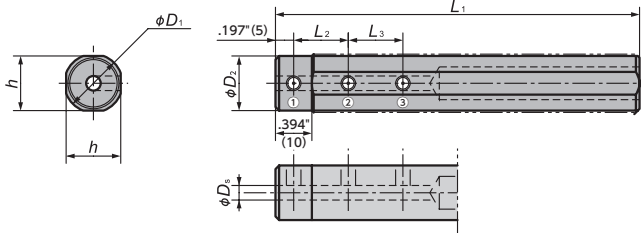


Figure-1

NBH

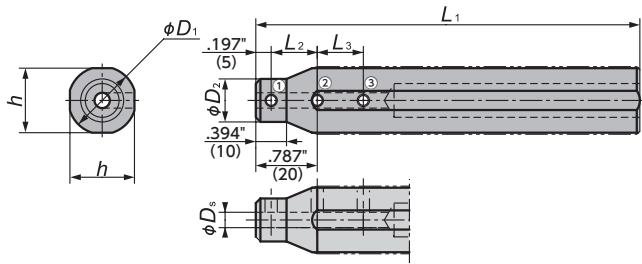


Figure-2

Item number	Figure	Stock	ϕD_s		ϕD_1		ϕD_2	h	L_1	L_2	L_3	Clamp screw			Wrench
			(Inch)	(mm)	(Inch)	(mm)						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

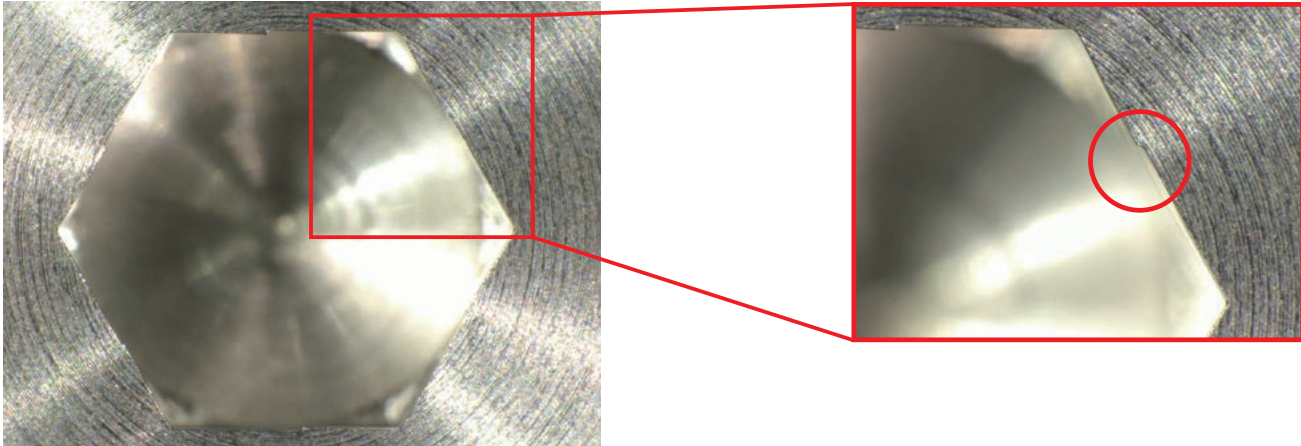
Item number	Figure	Stock	ϕD_s		ϕD_1		ϕD_2	h_1	L_1	L_2	L_3	Clamp screw			Wrench
			(Inch)	(mm)	(Inch)	(mm)						①	②	③	
NBH02022K	2	○	.079	2.0	.866	22.0	11	21	125	10	—	SS0404F	SS0406F	—	LW-2
NBH02522K	2	○	.098	2.5	.866	22.0	11	21	125	10	—	SS0404F	SS0406F	—	LW-2
NBH03022K	2	○	.118	3.0	.866	22.0	12	21	125	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
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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

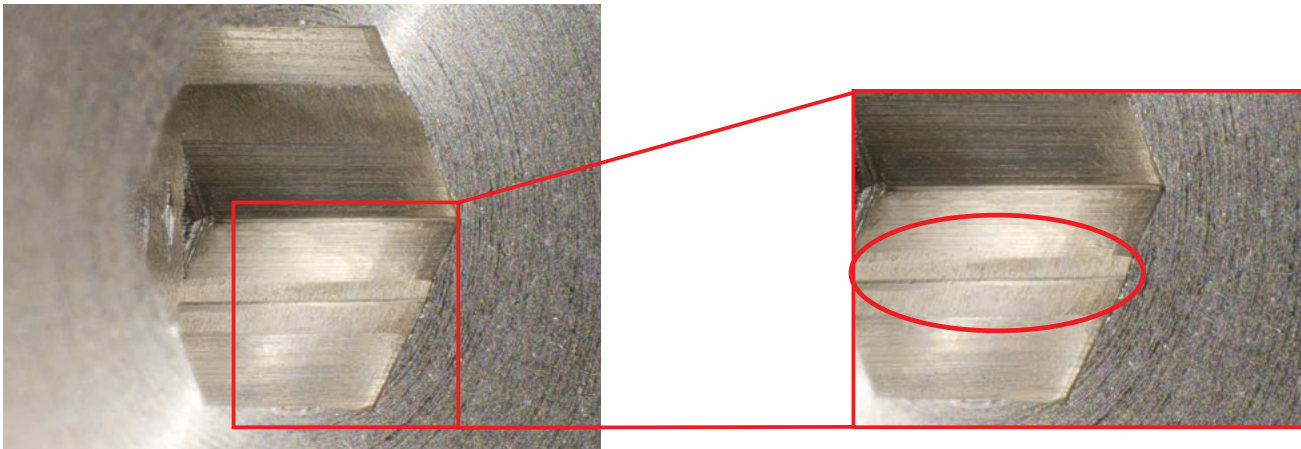
■ Problem: Step on sides



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
	Machine: Citizen L20
Original Process	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
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SPARE PART	EDP
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SS04045FS	5715842
SS0404F	5696828
SS0406F	5696836
SS0408F	5696844

Item Number	EDP
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HY-NBH03016H	5709910
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HY-NBH04016H	5709944
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SPARE PART	EDP
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SS0812R	5715859

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NBH12032K	5939467
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NBH16032K	5939442

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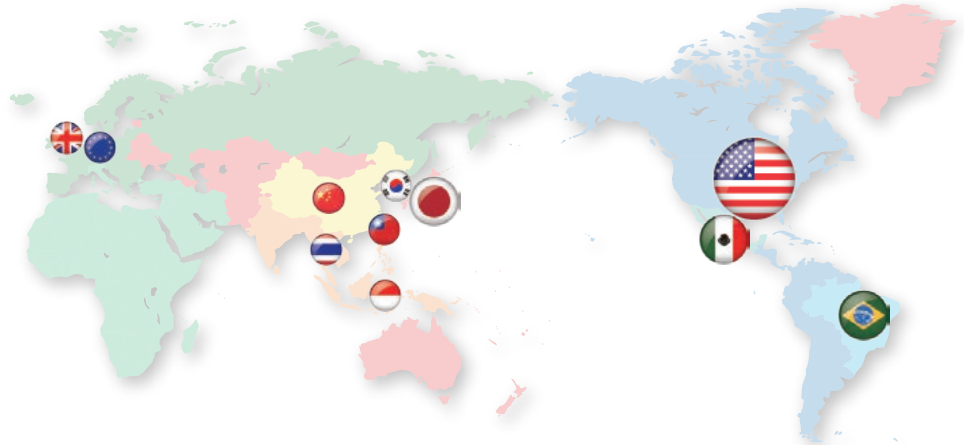
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