

Ultra high speed machining via innovative *grinding technology*

Air turbine spindle for machining centers

HTS1500ZZ-M2040

Tool shank diameter $\phi 0.5 - \phi 4.0$ mm

The high speed rotation enables outstanding performance in ball end milling of R0.5 mm or less, where a high peripheral speed is required. Low heat generation due to air-driven cooling effect, which stabilizes Z-axis displacement (axial expansion) in 1 minute. Static torque, radial rigidity, and axial rigidity have been improved compared to the previous model HTS1501S.



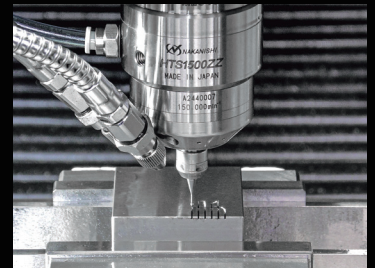
Max.
rotation speed
150,000
min⁻¹

Spindle accuracy
1 Within
 μm

Z-axis
displacement
stabilized in
1
minute

Machining data

Rib machining with R0.3 mm CBN ball end mill



Spindle HTS1500ZZ-M2040

Processing machine Machining center
Sodick MC430L

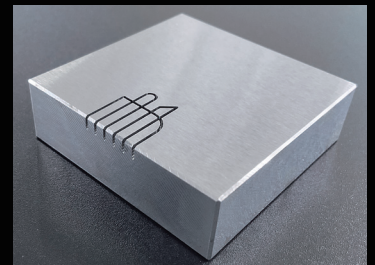
Workpiece material Plastic mold steel
STAVAX (HRC 52)

Tool 2-flute CBN ball end mill
R0.3 $\times$ 5
(NS TOOL/SSBL200)

Processing Groove milling

	Conventional conditions (machining center spindle)	Nakanishi's proposed conditions
Cutting speed [m/min]	57	283
Rotation speed [min ⁻¹]	30,000	150,000
Feed speed [mm/min]	800	2,000
Feed [mm/tooth]	0.011	0.007
Cutting depth Ap [mm]	0.005	0.005
Processing time	1h 26 min 18 sec	37 min 56 sec

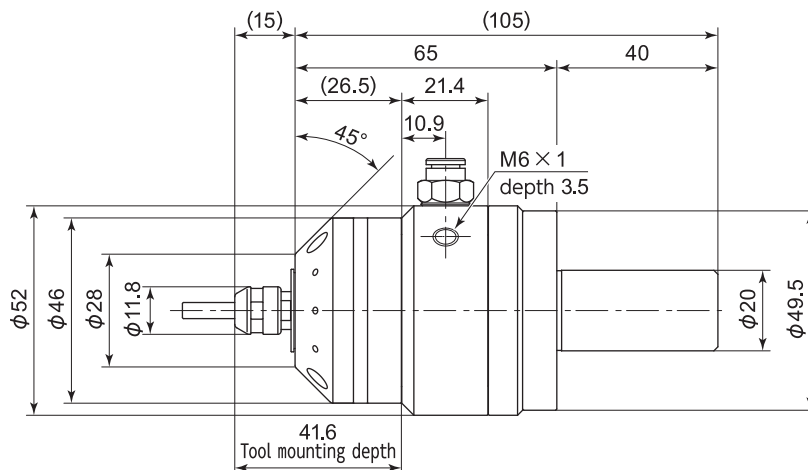
56%
reduction



Specifications

Code No.: 7919

Model: HTS1500ZZ-M2040



Max. power	Max. rotation speed	Spindle accuracy	Air consumption	Net weight	Corresponding tool		
54 W	150,000 min ⁻¹	Within 1 μm	175 NL/min	860 g	Square end mill φ1.0 mm or less	Ball end mill R0.5 mm or less	Grindstone φ4.0 mm or less
Standard equipment and accessories		Collet φ4.0 mm (CHA-4.0) / Collet nut (CHN-AA) / Wrench (8 × 5), (9 × 11): 1 pc. each Hose φ6 mm × 4 m (K-247) with Filter joint (FJ-01)					

Combination example

Collet	Spindle	Air line kit
 CHA φ0.5-φ4.0mm	 HTS1500ZZ-M2040	 AL-M1202 or  AL-M1201BL *Supply clean, regulated, and lubricated air

Milling example

High feed and low depth milling with R0.1 mm CBN ball end mill

- Workpiece material: cold die steel DC53 (HRC 60)
- Tool: 2-flute CBN ball end mill R0.1 × 0.6 (NS TOOL/SSBL200)

	Tool manufacturer's recommended conditions	Nakanishi's proposed conditions
Cutting speed [m/min]	31	94
Rotation speed [min ⁻¹]	50,000	150,000
Feed speed [mm/min]	380	2,250
Feed [mm/tooth]	0.0038	0.0075
Cutting depth Ap × Ae [mm]	0.005 × 0.005	0.05 × 0.01
Processing time	-	3 h 20 min

Productivity
5.9
times



NAKANISHI INC.

700 Shimohinata, Kanuma, Tochigi 322-8666, Japan
TEL: +81 289 64 3520 FAX: +81 289 62 1135



en.nakanishi-spindle.com
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