

Taking CNC automatic lathes to its new heights

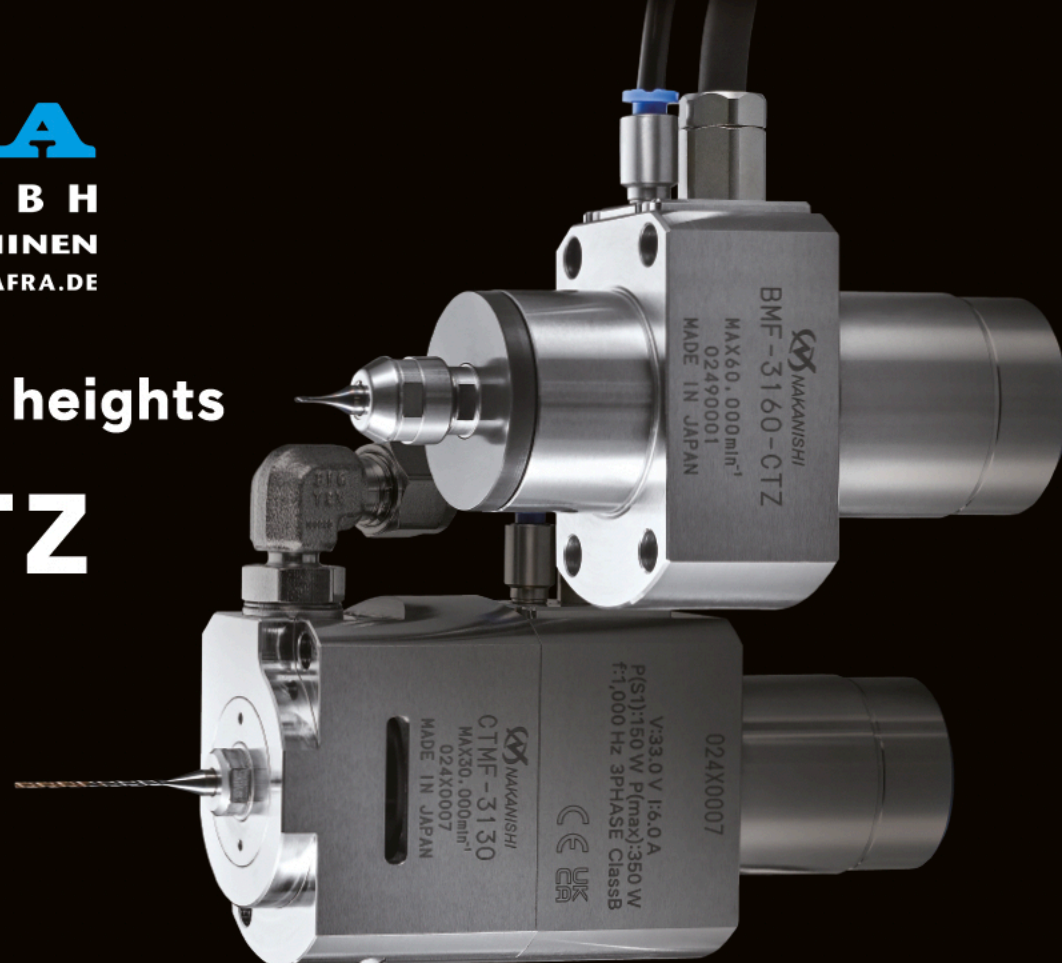
BMF-3160/3130-CTZ

Flange type motor spindle for CNC automatic lathe

Flange type torque motor spindle for CNC automatic lathe

CTMF-3130

Coolant through motor spindle for CNC automatic lathe



Case Study

[SUS304 $\phi 1.0 \times 20$ mm drilling]

CNC Automatic Lathe $\times 30,000 \text{ min}^{-1}$ Flange Type Spindle

- Spindle : CTMF-3130/BMF-3130-CTZ
- Machine : CNC automatic lathe (TSUGAMI CORPORATION / BW128ZJ-II)
- Hole depth : 20 mm (L/D = 20) through hole
- Guide hole : 2 mm depth
- Tool : MITSUBISHI DVAS0100X20S040 (blade diameter $\phi 1.0$ mm)
- Workpiece material : Stainless Steel (SUS304)

Check out
the video
for more details.



CTMF-3130

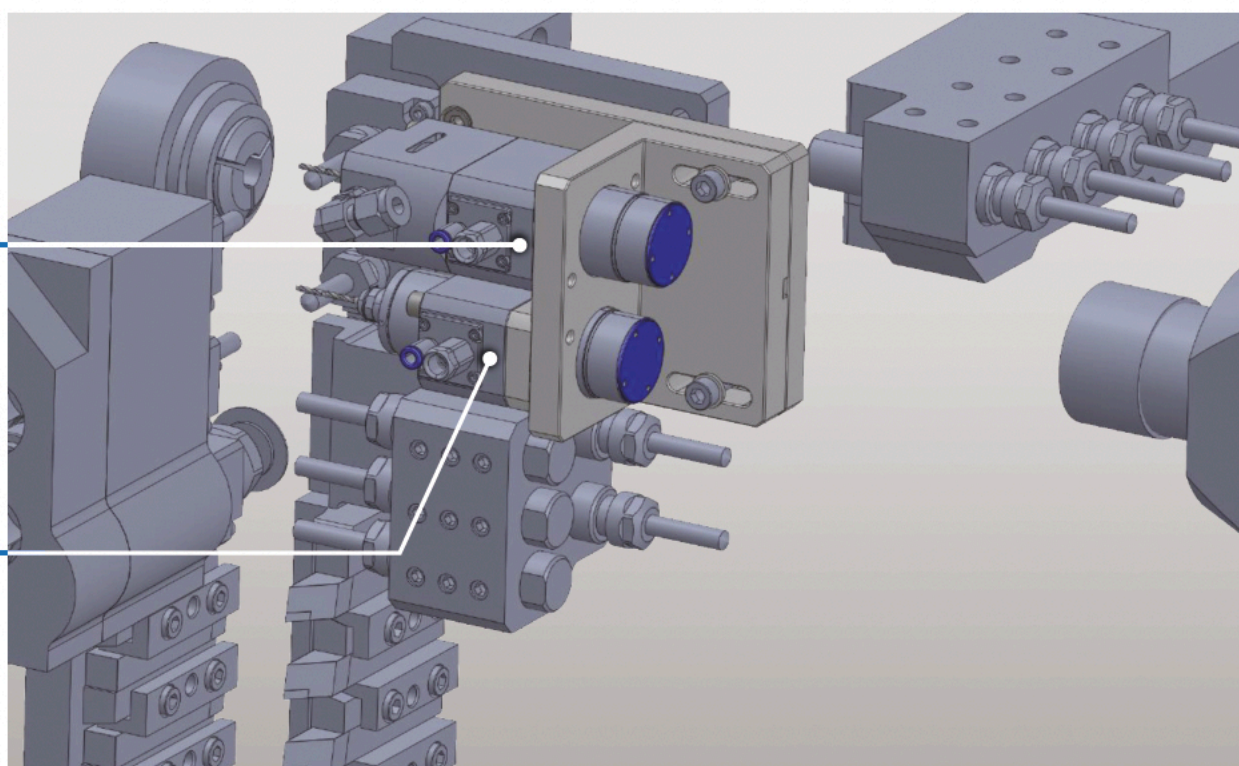
Nakanishi $30,000 \text{ min}^{-1}$

Coolant through spindle

BMF-3130-CTZ

Nakanishi $30,000 \text{ min}^{-1}$

Flange type torque spindle



*Mounted on TSUGAMI BW128ZJ-II

	Conventional conditions (Standard rotary tool)	Nakanishi's proposed conditions
Cutting speed [m/min]	31	60
Motor speed [min^{-1}]	10,000	19,000
Feed per revolution [mm/rev]	0.01	0.02
Feed rate [mm/min]	100	350
Peck drilling cycle	0.25mm/step	No pecking
Coolant	External lubrication Non-water-soluble coolant	Internal lubrication (20 MPa) Non-water-soluble coolant
Processing time	85 sec	3.4 sec

96%
reduction
in processing
time

Machining conditions : BMF-3160 / 3130-CTZ

Drilling : A5052 (aluminum alloy)

Motor spindle	Tool diameter [mm]	Hole depth [mm]	Cutting speed [m/min]	Motor speed [min ⁻¹]	Feed/rev. [mm/rev]	Feed rate [mm/min]	Load meter
BMF-3160-CTZ	NACHI-FUJIKOSHI CORP. DLCDR2.5	7.5 No pecking	196	25,000	0.040	1,000	Yellow1
BMF-3130-CTZ	NACHI-FUJIKOSHI CORP. DLCDR3.0	9 No pecking	198	21,000	0.050	1,050	Yellow1

Drilling : S50C (carbon steel)

Motor spindle	Tool diameter [mm]	Hole depth [mm]	Cutting speed [m/min]	Motor speed [min ⁻¹]	Feed/rev. [mm/rev]	Feed rate [mm/min]	Load meter
BMF-3160-CTZ	MISUMI Group Inc. TAC-ESDBA2.0	6 1mm/step	126	20,000	0.010	200	Red
BMF-3130-CTZ	MISUMI Group Inc. TAC-ESDBA2.5	7.5 2.5mm/step	126	16,000	0.020	320	Yellow1

End mill : A5052 (aluminum alloy)

Motor spindle	Tool diameter [mm]	Cutting speed [m/min]	Motor speed [min ⁻¹]	Feed per blade [mm/tooth]	Feed rate [mm/min]	Cutting depth ap x ae [mm]	Load meter
BMF-3160-CTZ	Mitsubishi Materials Corporation MS2ES φ3	565	60,000	0.02	2,400	0.3×2.7	Blue 1
BMF-3130-CTZ	Mitsubishi Materials Corporation MS2ES φ3.5	330	30,000	0.05	3,000	0.35×3.15	Blue 1

End mill : S50C (carbon steel)

Motor spindle	Tool diameter [mm]	Cutting speed [m/min]	Motor speed [min ⁻¹]	Feed per blade [mm/tooth]	Feed rate [mm/min]	Cutting depth ap x ae [mm]	Load meter
BMF-3160-CTZ	Mitsubishi Materials Corporation MS2ES φ2.5	149	19,000	0.02	570	0.25×2.25	Blue 1
BMF-3130-CTZ	Mitsubishi Materials Corporation MS2ES φ3.0	151	16,000	0.02	640	0.3×2.7	Blue 1

Machining conditions : CTMF-3130

φ2.0 drilling on electromagnetic soft iron Comparison between conventional drilling and coolant through drilling

92%
reduced

Drilling method	Work material	Tool diameter [mm]	Hole depth [mm]	L/D	Cutting speed [m/min]	Motor speed [min ⁻¹]	Feed/rev. [mm/rev]	Feed rate [mm/min]	Coolant	Peck drilling cycle	Processing time [sec]
Conventional drilling (Automatic lathe rotation tool)	ELCH2 (Electro-magnetic soft iron)	2.0	19	10	40	6,400	0.03	192	External	Front 3.5 mm×2 times Back 4.0 mm×3 times	13.0
Coolant through drilling (CTMF-3130)			20		188	30,000	0.04	1,200	Internal	No pecking	1.0

Drilling on other work materials Common conditions : No pecking, coolant pressure 20 MPa, coolant viscosity VG 7

Work material	Tool diameter [mm]	Hole depth [mm]	L/D	Cutting speed [m/min]	Motor speed [min ⁻¹]	Feed/rev. [mm/rev]	Feed rate [mm/min]	Processing time [sec]
A6061 (aluminum)	1.0	20	20	94	30,000	0.07	2,100	0.6
	1.5		13	141	30,000	0.06	1,800	0.7
	2.0		10	188	30,000	0.04	1,200	1.0
C2801 (brass)	1.0	20	20	94	30,000	0.03	900	1.3
	1.5		13	141	30,000	0.02	700	1.7
	2.0		10	188	30,000	0.02	700	1.7
S50C・SCM440 (carbon steel/alloy steel) 	1.0	20	20	94	30,000	0.03	900	1.3
	1.5		13	118	25,000	0.03	850	1.4
	2.0		10	119	19,000	0.03	570	2.1
SUS304 (stainless) 	1.0	20	20	60	19,000	0.02	350	3.4
	1.5		13	75	16,000	0.03	400	3.0
	2.0		10	94	15,000	0.03	400	3.0

*Drilling conditions depend on various factors such as work material, drill length, coolant, and others.



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*Specifications and design are subject to change without notice.

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