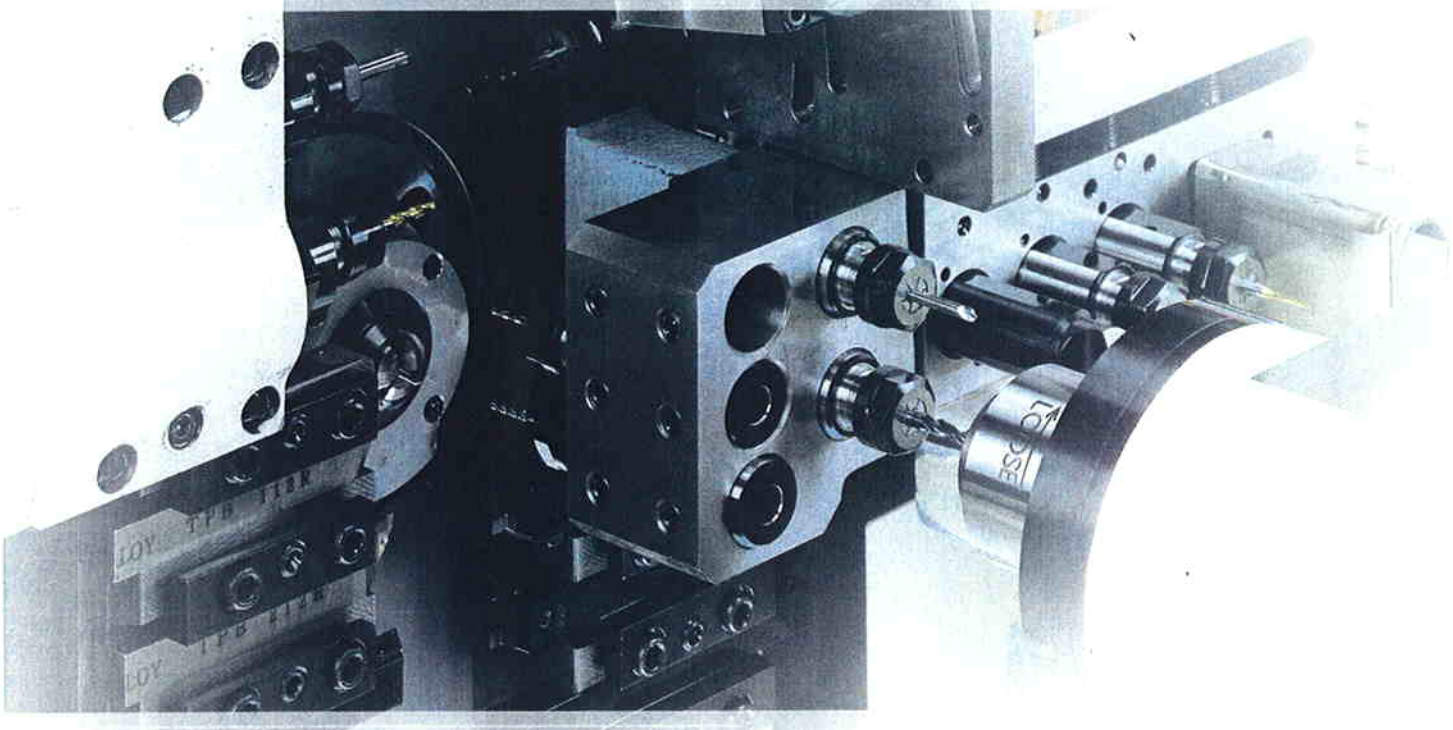
PRECISION TSUGAMI

CNC Precision Automatic Lathe

BW07/12/20-III

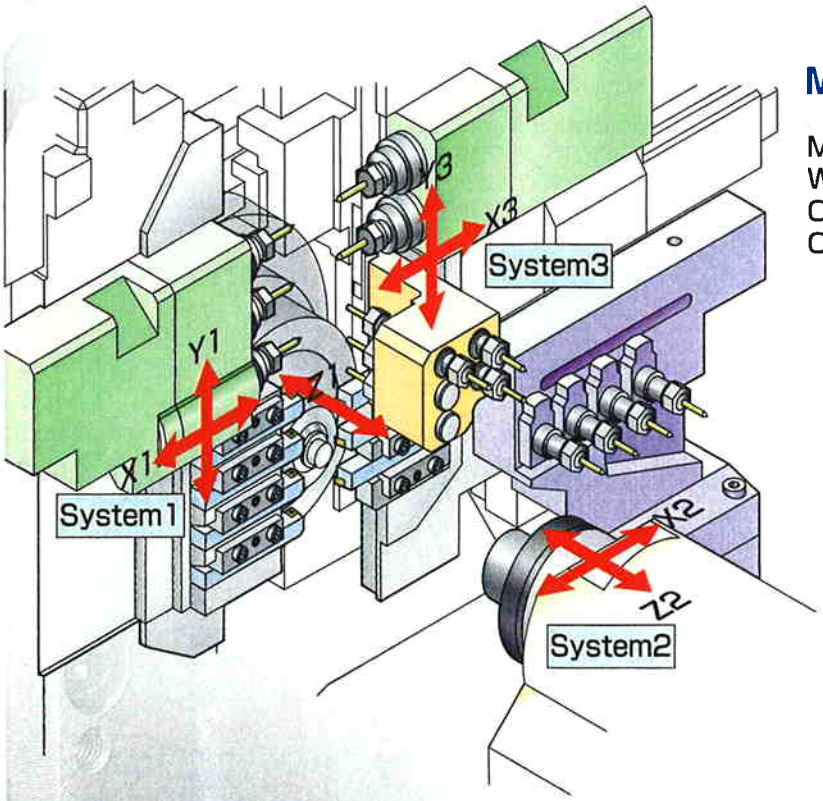


2 Spindles and 2 Independent
Slide Gang type Tool Posts
Next Generation Swiss-type
Automatic Lathes with Superior
Accuracy, Productivity,
and Multi-function Cpability

Dedicated Pursuit of Productivity

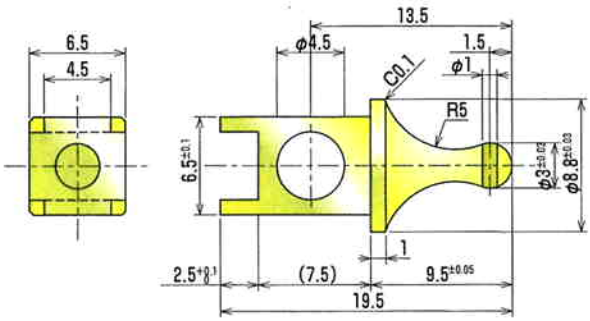
3-path system, 7-axis Control CNC Automatic Lathes
High Efficiency Machining of Complex Workpieces

- **Short Cycle Time**
  - Simultaneous 3-path system control
  - Overlapping simultaneous machining
- **Open Tooling Arrangement**

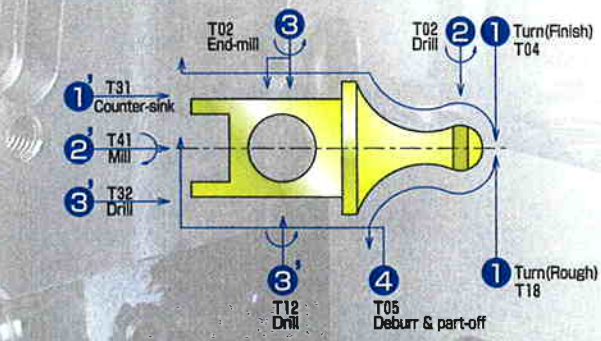


Machining Example

Material : Brass
Workpiece : Connector
Operating hours : 24 hours x 25 days
Operating rate : 95 %



Machining Process



Factors of Cycle Time Reduction

- Simultaneous rough and finish OD turning (Balanced OD turning by X1 axis and X3 axis)
- Simultaneous 2-face end-milling with cross rotary tools (Simultaneous machining by Y1 axis and Y3 axis)
- Simultaneous front side machining with front tool post and rear side machining with angular drilling unit on the rear tool post (Overlapped machining by X1-Z1 axes and X3-Z2 axes)
- Zero tool change time by 3-system control (Without any interruption of actual machining)

Cycle Time Comparison with Conventional Machine

Ultimate cycle time reduction from 58 seconds to 17 seconds on the same cutting conditions

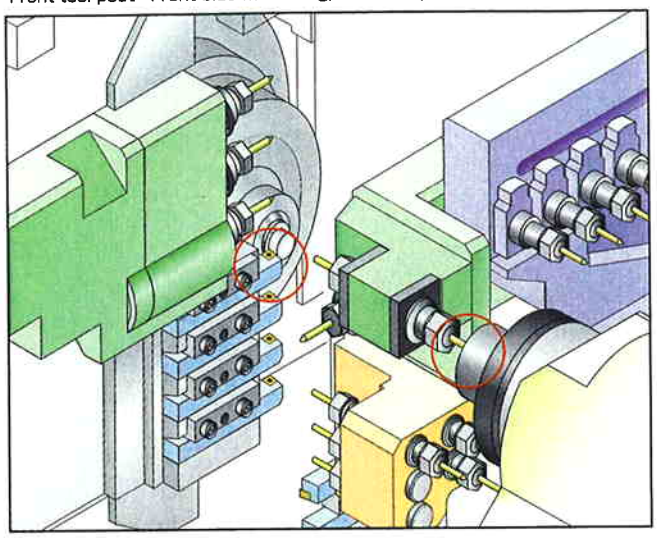
Monthly production estimate

Conventional	35,340 pieces
BW07	120,707 pieces

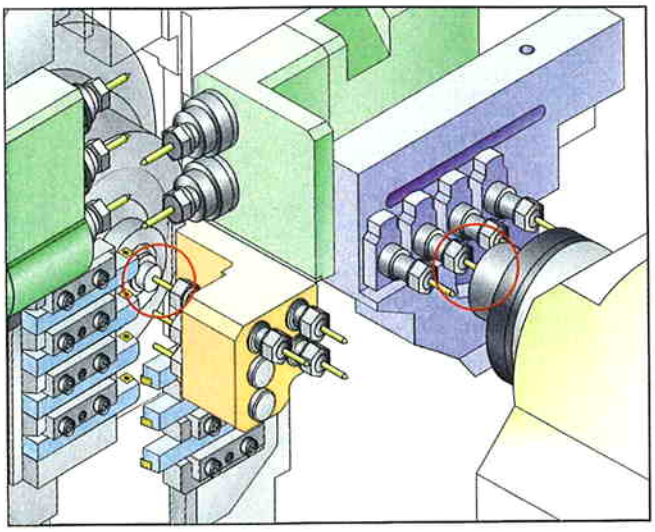
Variety of Overlapping Machining by 3-path System, 7-axis Control The Ultimate in Cycle Time Reduction

2 gang type tool posts on independent slides and separated construction for front ID tools and back spindle

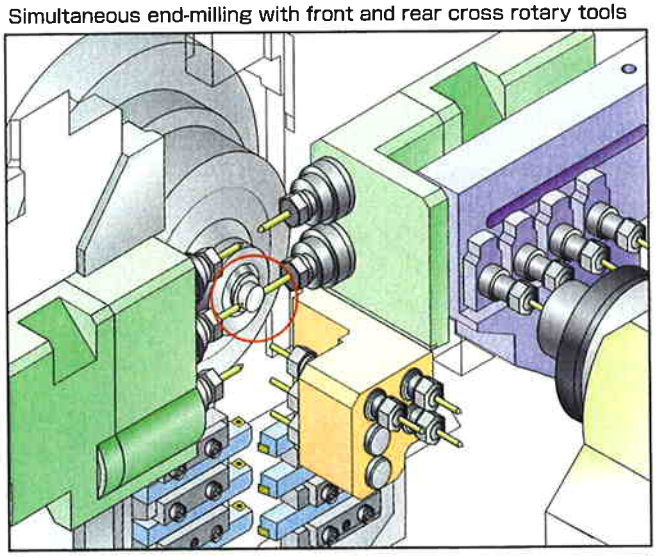
Front tool post - Front side machining, Rear tool post - Back side machining



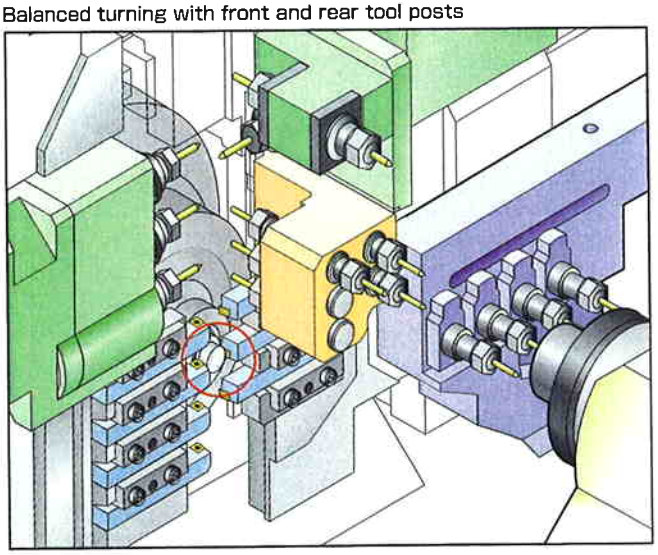
Independent back side machining



Simultaneous end-milling with front and rear cross rotary tools



Balanced turning with front and rear tool posts

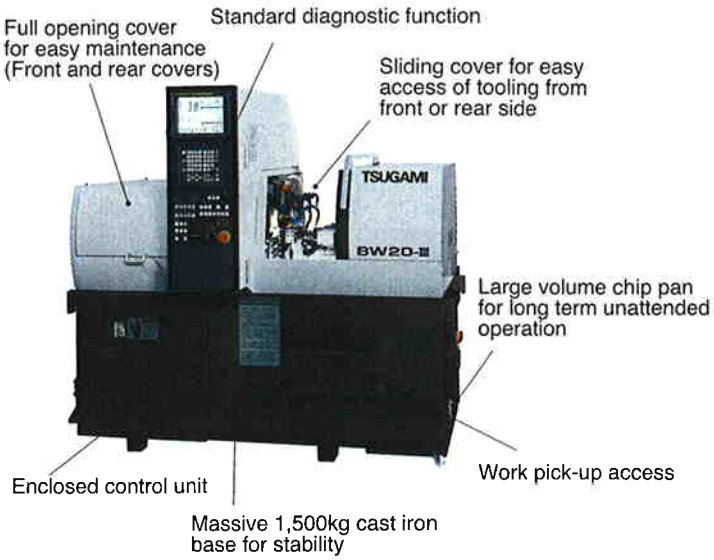


24m/min Rapid Traverse Rate

High speed tool posts traverse for near instant tool selection

Intelligent High Speed Spindle
(For small dia. tools)

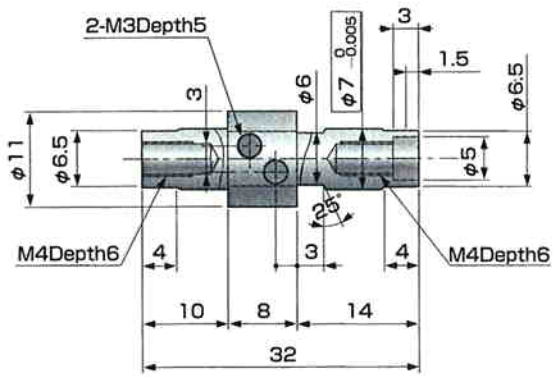
Detect drill breakage by monitoring motor load
Conventional mechanical breakage detector is not required
Max. speed : 30,000min-1
Max. torque : 5Ncm
Spindle OD/Length : φ30/145mm



Improved Operability and Maintenance Ease

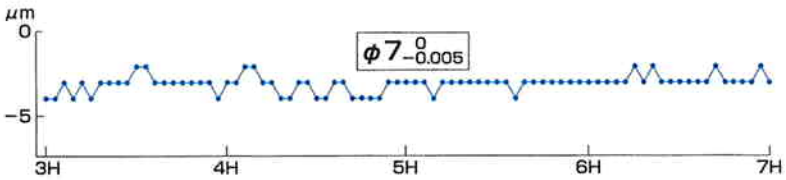
Wide tooling zone and diagnostic function for trouble-shooting

High Accuracy Machining Example



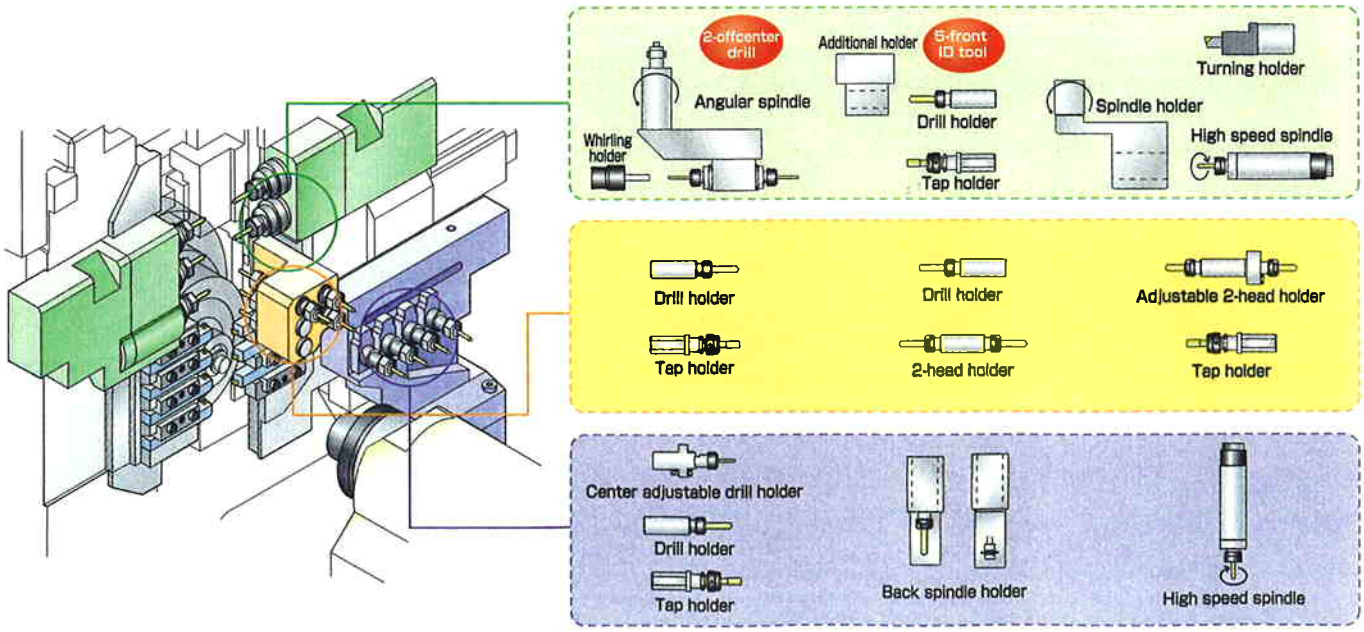
Material : 303 stainless steel
Bar stock dia. : φ12
Cycle time : 118sec.

	Deviation	6σ	CP
$\phi 7^{0}_{-0.005}$	2.0	3.0	1.67



Open Tooling Arrangement

Depending on the tooling layout desired, rotary tool can be replaced by OD tool, off-center drill, or front ID tool for the ultimate in flexibility



Interactive Automatic Programming System "Tsugami BW Abile" for Optimum Utilization (Option)

Program can be created easily with optimum tooling and cycle time for multi-system, multi-axis, complex workpieces.
Matching of machine, tooling, and software are preferentially considered and Tsugami's machining know how is automatically applied.
Create high quality standardized programs for complex, high accuracy workpieces

■Simplified Input

Input work shape and tool data to create the machining process and NC program automatically

■ Simple Operation

Work shape data is input by a fill-in-the-blanks process (No CAD system required), minimum tool data input required

■ Short Programming Time

Simple and fast programming by answering questions

■ Automatic Cycle Time Calculation

Cutting & idle time data available for help in shortening cycle times

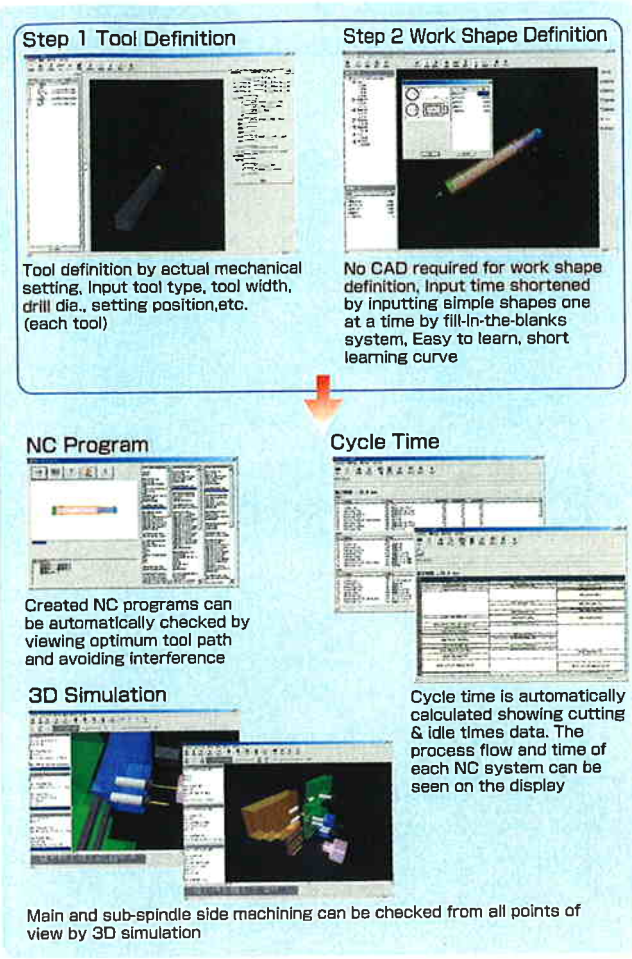
■ 3D Simulation for Motion Check

Machining motion can be checked from all points of view by 3D simulation

■ Optimum Tool Path/Automatic Interference Evaluation

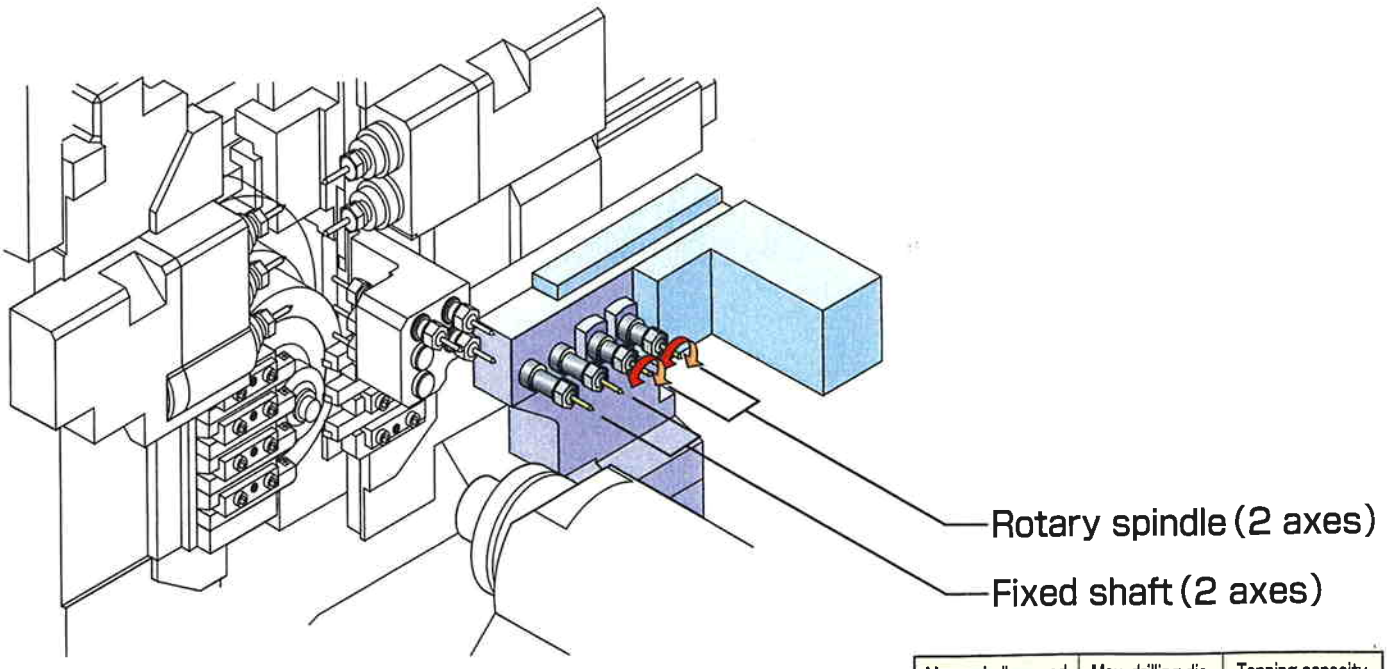
Created NC programs can be automatically checked for optimum tool path and interference avoidance

Item	Specifications
Available models	BW07- Ⅲ /BW12- Ⅲ /BW20- Ⅲ
OS	Windows95 (OSR2) or more
PC	PC/AT compatible
Working conditions	CPU PentiumⅢ 600MHz or faster HDD 100MB or more available. Graphic Open GL Display 16.77 million collar display



Back Off-center Drilling by Back Rotary Tool

The back rotary tool enables complete overlapping openration of front machining and off-center drilling on the cut-off endface.



Max. spindle speed (min-1)	Max. drilling dia. (S45C)	Tapping capacity (Rigid tap)
8000	φ8	M6