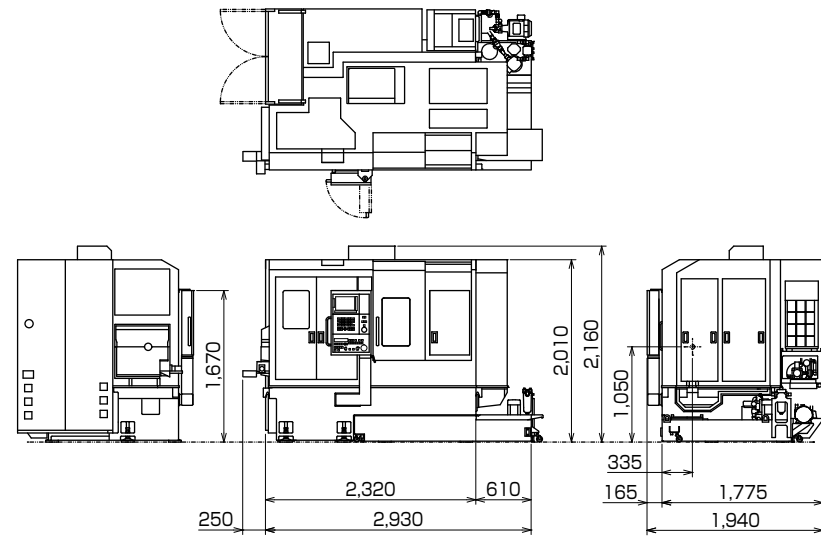
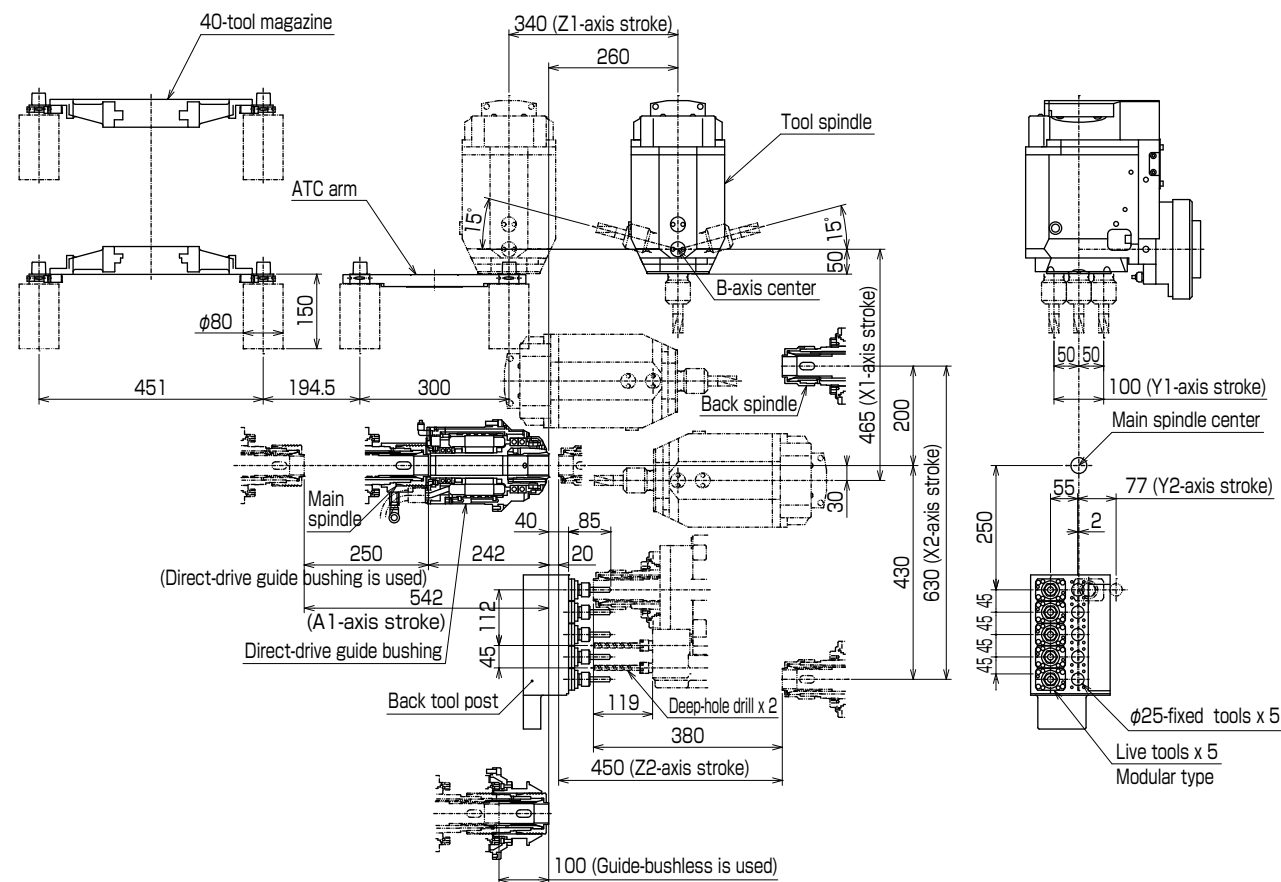


Layout



Tooling zone



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The specifications of this catalogue are subject to change without prior notice.

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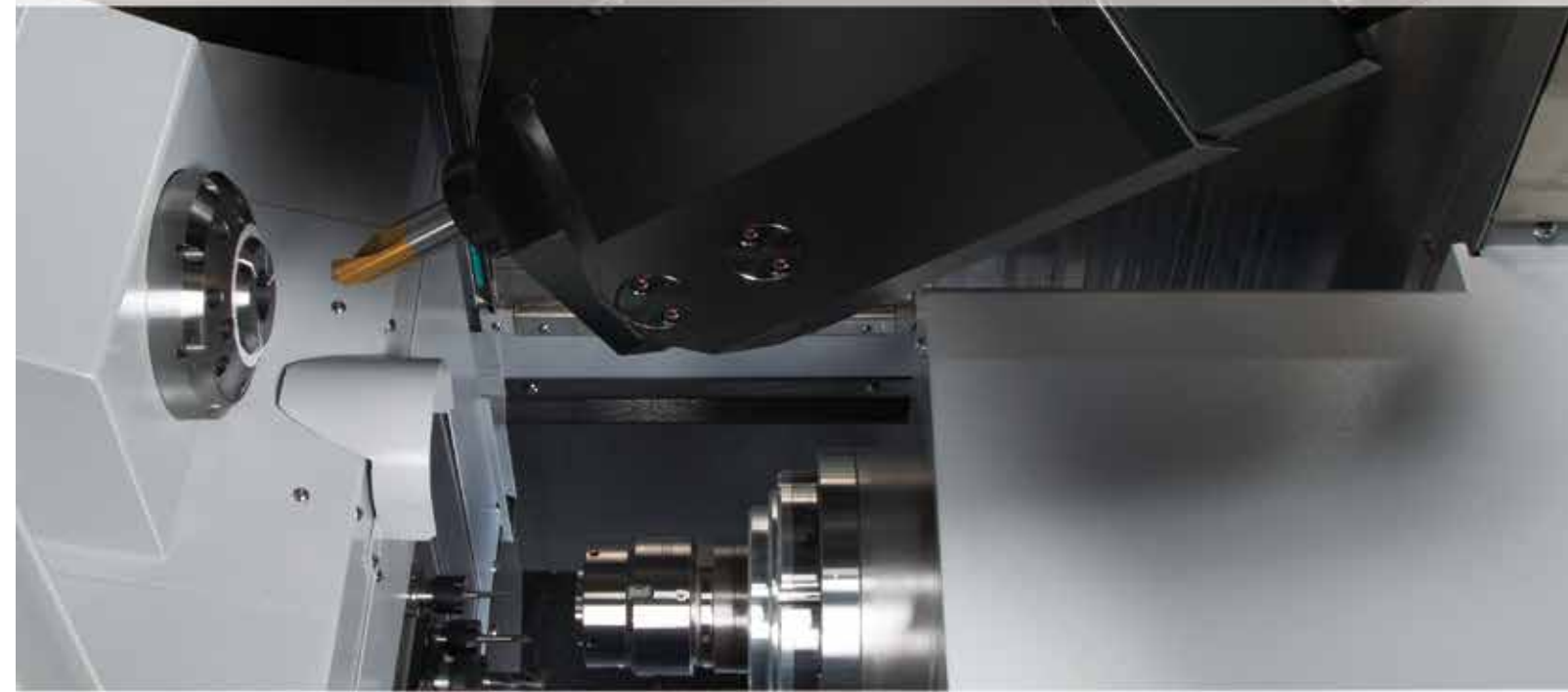
CAT.NO.E1 16724.AUG.2T(H)

PRECISION TSUGAMI

TSUGAMI

CNC Precision automatic lathe

SS38MH
SS38MH-5AX

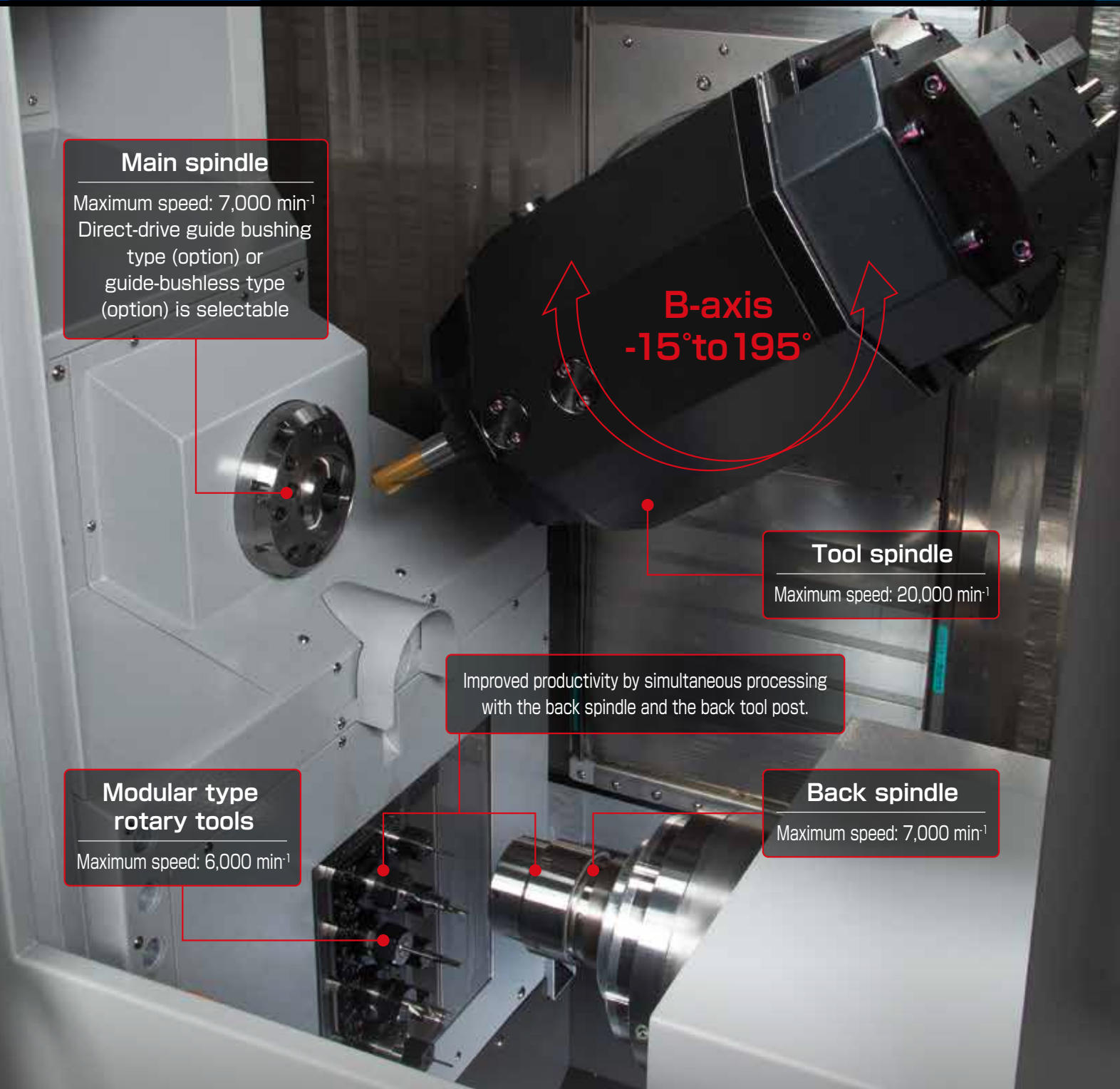


Productive combined machine by the integration of Swiss type automatic lathe (sliding headstock type) and machining center

Optimum for mass production of complex-shaped parts from bar stock

High-speed tool spindle (max. 20,000 min⁻¹) which realizes high-performance machining is provided as standard.





Main spindle

Maximum speed: 7,000 min⁻¹
Direct-drive guide bushing type (option) or guide-bushless type (option) is selectable

**B-axis
-15° to 195°**

Tool spindle

Maximum speed: 20,000 min⁻¹

Improved productivity by simultaneous processing with the back spindle and the back tool post.

Back spindle

Maximum speed: 7,000 min⁻¹

Modular type rotary tools

Maximum speed: 6,000 min⁻¹

SS38MH

High precision and high performance combined machine with linear scale

SS38MH-5AX

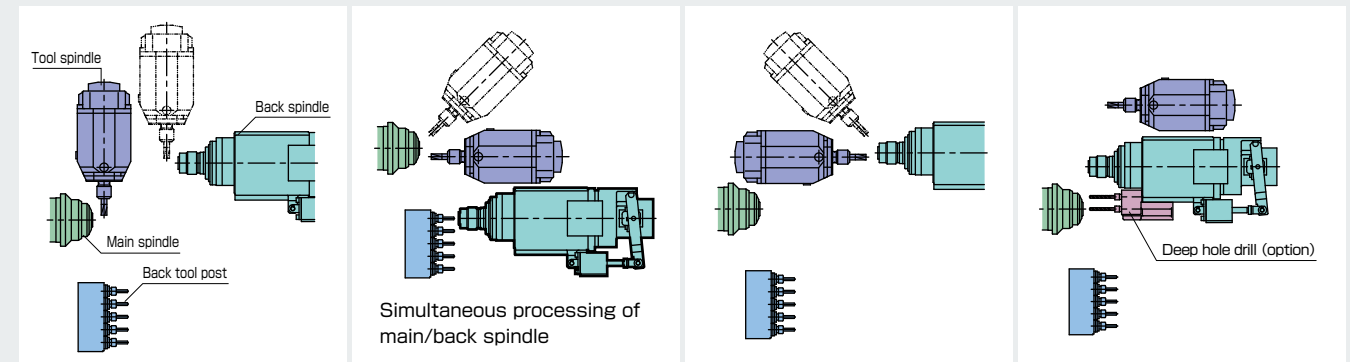
Fully- equipped machine with 5-axis simultaneously controlled machining for the complex-shaped parts



**Mass-production type combined machine
High production of complex-shaped parts is realized by various machining patterns.**

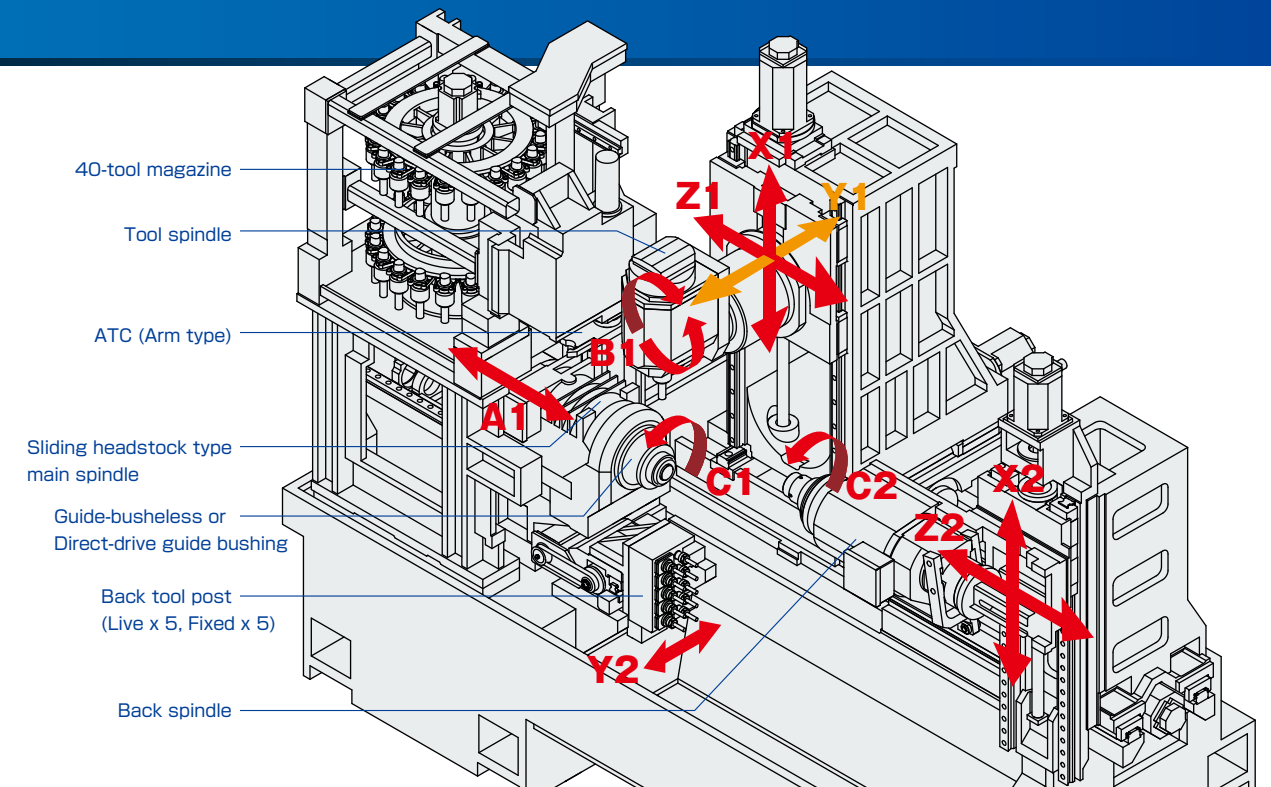
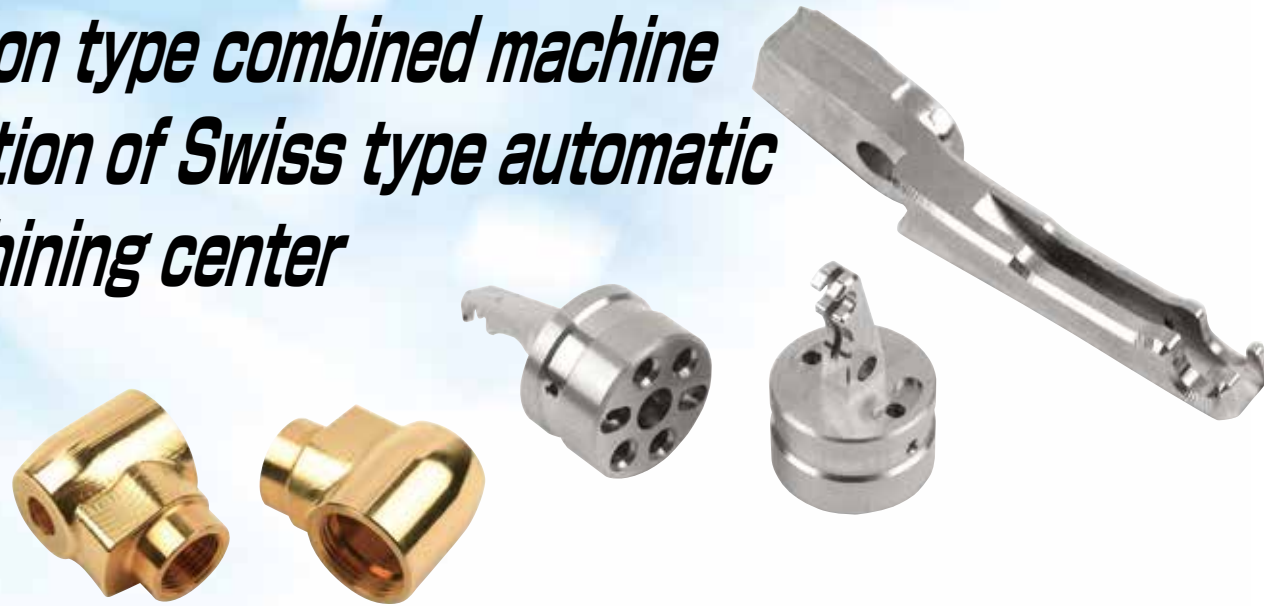
Processing patterns

Thanks to the tool spindle, new processing patterns are realized which was not possible on the conventional automatic lathes. The processing of the complicated part exceeding the automatic lathe is thereby possible.



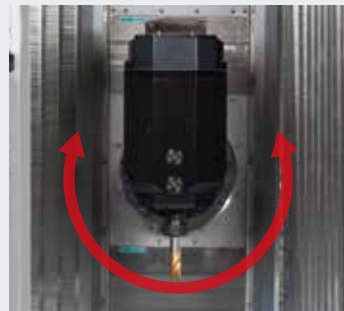
- Complete machining of complex-shaped parts from bar stock
- 5-axis simultaneously controlled processing (SS38MH-5AX)
 - 5-axis simultaneous control is adopted for machining complex shapes.
- Guide-bush type or guide-bushless type is selectable according to workpieces.
- Long workpiece machining is possible by sliding headstock. (Max. machining length: 300 mm)
- Complex machining by high-speed tool spindle with the maximum spindle speed of 20,000 min⁻¹
 - Thanks to the tool spindle and 40-tool magazine, corresponds to complex processing with milling which requires many tools.
- The linear scale on the X1-axis, Y1-axis and Z1-axis slide is provided as standard, and high accuracy machining is possible.
- Machines complex parts simultaneously on main and back spindles by adding Y-axis on back tool post.
- Total 52 tools including 40 tools in the tool magazine, 10 tools on back tool post and 2 tools on deep hole drill holder (option)
 - 5 modular type live tools on back tool post for optimum allocation of machining capability.
- Corresponds to heavy-duty cutting by dual contact holder (CAPTO C4).
- Abundant software (Standard)
 - Shortening cycle time
 - Tool life counter and periodic maintenance screen
 - Interference check function
 - Thermal displacement compensation

Mass-production type combined machine by the integration of Swiss type automatic lathe and machining center



■ Tool spindle with B-axis swiveling mechanism

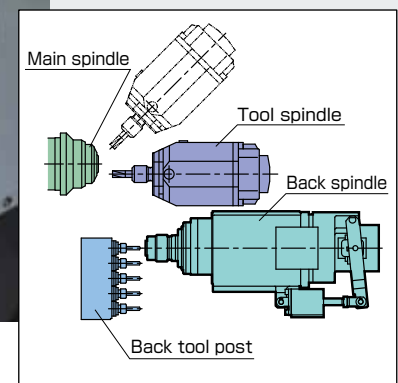
Single tool spindle structure that allows turning tools and milling tools to fit in the same tool spindle bore is adopted. B-axis swiveling mechanism with direct drive realizes high precision angular machining. The dual contact tool holder held by bore taper and end face of the tool spindle can perform powerful and high-accuracy machining. Employment of 11 kW powerful built-in motor performs milling as efficient as a machining center from low speed to the maximum speed of 20,000 min⁻¹.



Maximum speed: 20,000 min⁻¹
B-axis index angle: 0.001°
(Continuous control: SS38MH-5AX)
Swiveling angle: -15° to 195°

■ Back tool post

With the dedicated back tool post, back side processes can be overlapped with the main spindle processes. Even during the tool change of tool spindle, the back spindle side can processes with back tool post, and high productivity is secured. Tool capacity: Live x 5, Fixed x 5. Live tools on back tool post (5 tools) are modular type, and optimum tool allocation is possible.



■ Main spindle

Maximum speed: 7,000 min⁻¹
C-axis control (0.001° control)



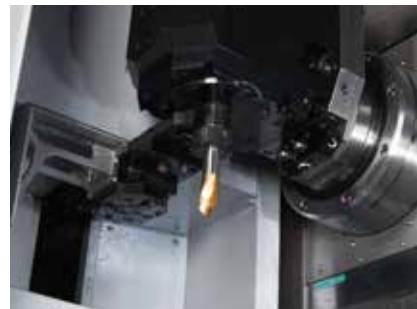
■ Back spindle

Maximum speed: 7,000 min⁻¹
Turning and milling on the workpiece rear side is possible.
C-axis control (0.001° control)



■ Equips high-speed tool change unit as standard

The cam driven tool change unit performs the tool-to-tool change at 0.8 sec.






■ Corresponds to high accuracy machining by equipping linear scale (Standard)

Linear scales are equipped on X1, Y1 and Z1 axes as standard.

■ Abundant software (Standard)

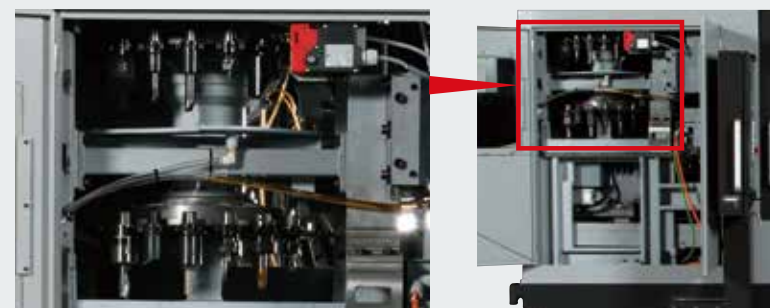
- Shortening cycle time
M code output during movement (Operations such as coolant discharge during axis movement can be executed.) Axis start command during movement (Axis movement command can be executed during other axis movement, and overlapped operation is possible without interference.)
- Tool life counter and periodic maintenance screen
Tools and maintenance parts can be checked on the screen, and the messages of times for replacement or maintenance are displayed.
- Realizes high-accuracy machining by the thermal displacement compensation
- Interference check function
Prevents the interference between each component and the spindle during program debugging.
- Touch panel
Touch panel type display improves operatability by displaying objective screen instantly
- Tool monitor adopted (automatic operation function)

■ Options

- Direct-drive rotary guide bushing, Guide-bushless
Optional guide-bush type or guide-bushless type is selectable according to workpieces. 
- Work conveyor
The workpiece ejected from the back spindle is carried out with the conveyor to outside of the machine. 
- Chip conveyor
Hinge type chip conveyor and scraper type chip conveyor are prepared. 

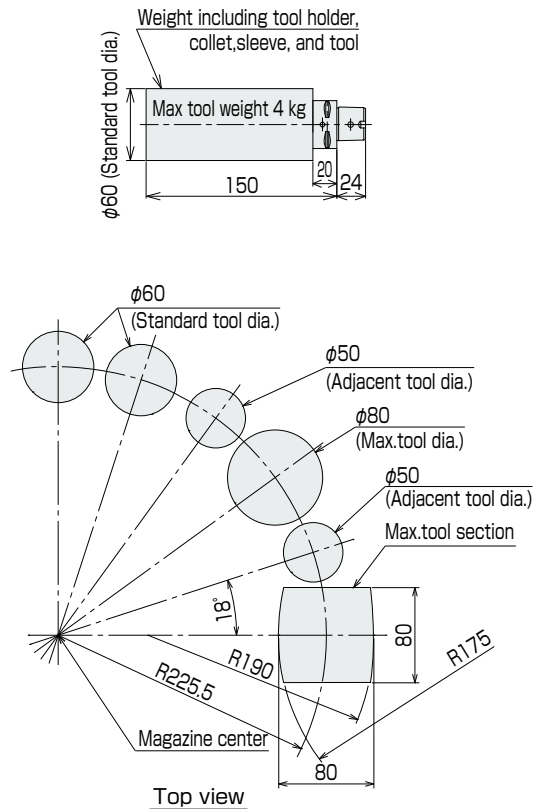
■ Tool magazine accessible from the machine front 40-tool ATC magazine is equipped as standard (Tool shank: CAPTO C4)

Direct magazine indexing in nearest direction with the AC servo motor. Easy changing and maintenance of tool holder by locating the magazine on the machine front side.

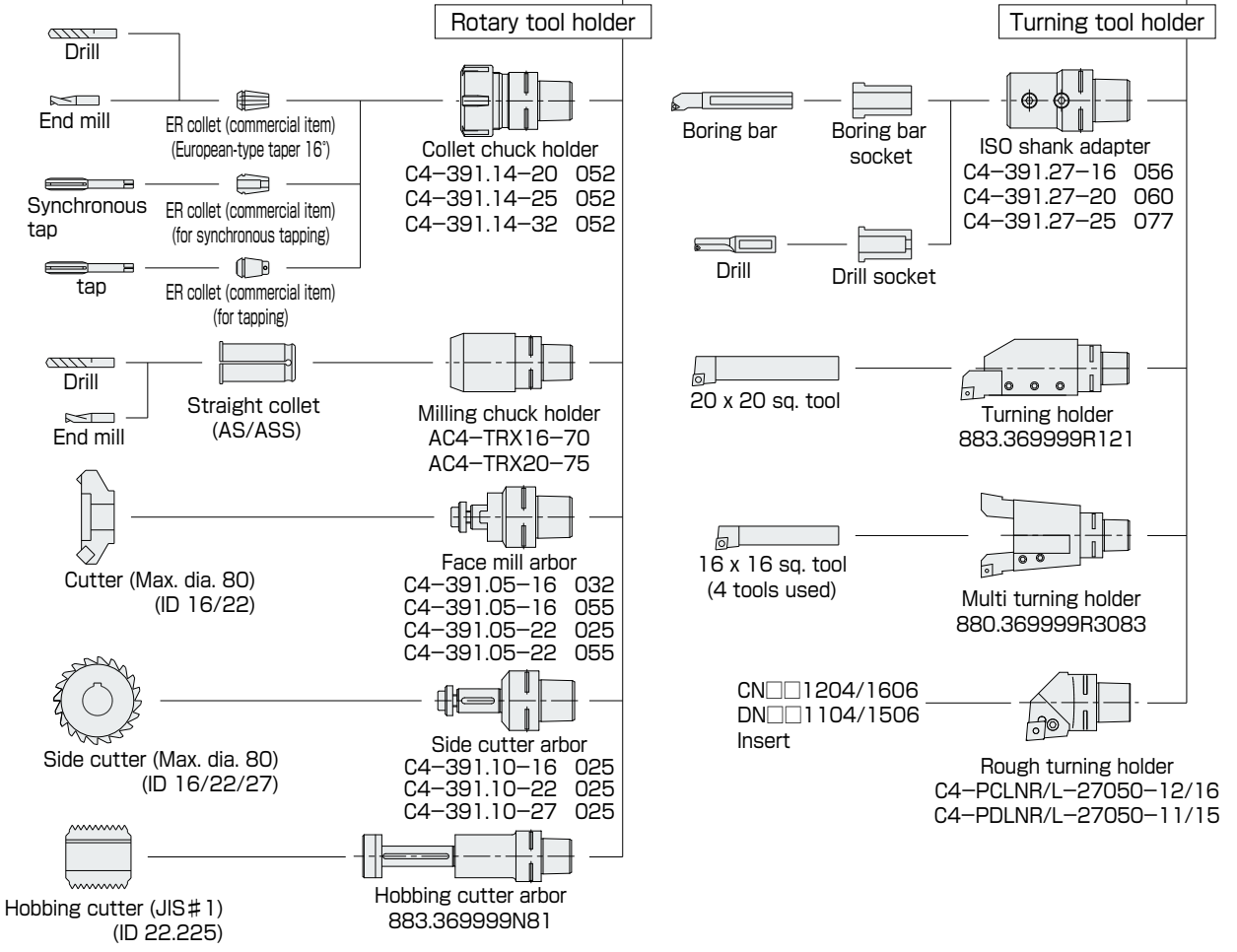
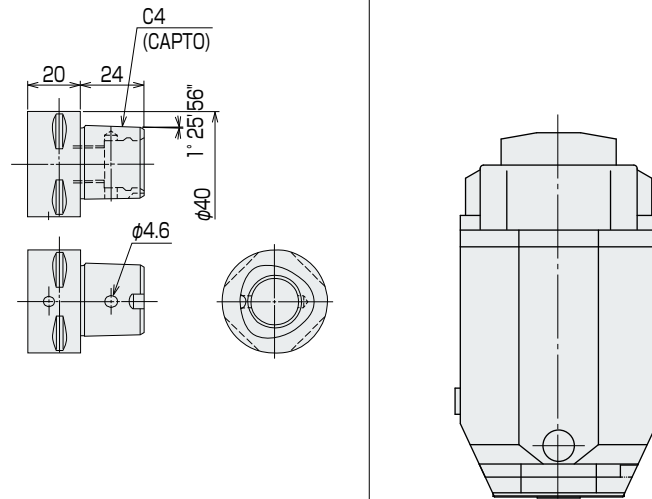


Tooling system

Tool size



Shank size



Machine specifications

| Item | SS38MH | SS38MH-5AX |
|--|--|---------------------|
| Chucking barstock dia. | φ8 to φ38 mm | |
| Max. machining length | 100 mm (Guide-busheless), 300 mm (Direct-drive guide bushing) | |
| Max. back spindle chucking dia. | φ38 mm | |
| Max. main spindle drilling diameter | φ16 mm | |
| Max. main spindle tapping diameter | M12 | |
| Max. back spindle drilling diameter | φ12 mm | |
| Max. back spindle tapping diameter | M12 | |
| Max. tool spindle drilling diameter | φ12 mm | |
| Max. tool spindle tapping diameter | M12 | |
| Max. back tool post drilling diameter | φ10 mm | |
| Max. back tool post tapping diameter | M8 | |
| Max. back tool spindle drilling diameter | φ8 mm | |
| Max. back tool spindle tapping diameter | M6 | |
| Main spindle speed | 200 to 7,000 min ⁻¹ | |
| Back spindle speed | 200 to 7,000 min ⁻¹ | |
| Tool spindle speed | 200 to 20,000 min ⁻¹ | |
| Least increment of B-axis index angle | 0.001° | 0.001° (continuous) |
| B-axis index angle | -15° to 195° | |
| Main spindle/ back spindle index angle | 0.001° (continuous) | |
| Back tool post (Modular type live tool) | Maximum speed: 6,000 min ⁻¹ /5 tools | |
| Back tool post (Fixed tool) | φ25 mm/5 tools | |
| Rapid traverse rate | 32 m/min | |
| Tool selection | Specified address, random indexing | |
| Tool storage capacity (Tool magazine) | 40 tools | |
| Tool interface | CAPTO C4 | |
| Main spindle | 5.5/3.7 kW | |
| Back spindle | 5.5/3.7 kW | |
| Tool spindle | 1.1/5.5 kW | |
| X1 | 2.7 kW | |
| Y1,X2,Z2 | 2.5 kW | |
| Z1 | 3.0 kW | |
| Back rotary tool | 1.0 kW | |
| Y2 axis, Tool magazine, ATC, Transfer | 0.5 kW | |
| A1 | 0.75 kW | |
| Weight | 7,100 kg | |
| Compressed air requirement | 0.4 MPa or above | |
| Air discharge rate | 280 NL/min | |
| Coolant tank capacity | 180 L | |
| Width x Depth x Height | 2,930 x 1,940 x 2,160 mm | |

NC standard specifications

| Item | SS38MH | SS38MH-5AX |
|------------------------------|---|--------------|
| NC unit | FANUC Oi-TF | FANUC 31i-B5 |
| Axis name | X1, Y1, Z1, A1, X2, Y2, Z2, B1*, C1, C2 | |
| Least input increment | 0.001 mm (X1/X2 axis in diameter) | |
| Least command increment | X1 axis, X2 axis: 0.0005 mm B1*, C1, C2 axes: 0.001° Other axes: 0.001 mm | |
| Maximum commandable value | ±8 digits | |
| Interpolation method | Linear/Circular | |
| Rapid traverse rate function | 32 m/min | |
| Cutting feedrate | 1 to 6,000 mm/min | |
| Feedrate override | 0 to 150 %, 10 % step | |
| Dwell | G04 0 to 99999.99 | |
| Absolute/incremental command | X, Z, Y, A, C, B: Absolute U, W, V, H: Incremental | |
| No. of tool offsets | Main: 64 Back: 64 | |
| LCD/MDI | 10.4" color LCD | |
| Display language | English | |
| Part program storage size | 1 Mbyte (Total of all paths) | |
| Auxiliary function | M5 digits | |
| Tool function | T5 digits | |
| Spindle function | S5 digits | |

*Note: In case of SS38MH, B1 is the indexing axis. Interpolation with the other axes is impossible.

Machine standard accessories

| | |
|--|--|
| Main spindle adapter | Transit clamps |
| Back spindle adapter | Main/back spindle C axis |
| Door interlock (Tooling zone side door/Main spindle side door) | Main spindle air purge/Back spindle air purge/Tool spindle air purge |
| Coolant flow switch | Periodic maintenance screen |
| Spindle cooling unit | Automatic power shut off |
| Standard tools | |

NC standard accessory

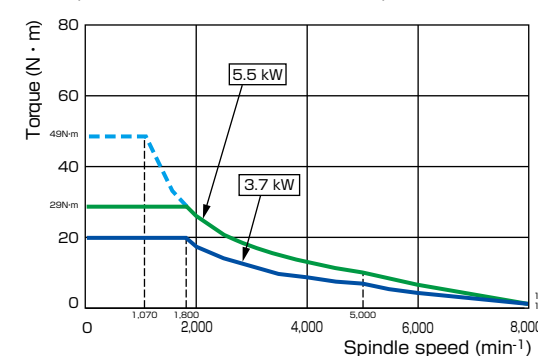
| | |
|---|--|
| Chasing function | Programmable data input |
| Continuous threading | Chamfering corner R |
| Manual pulse generator | Tool nose radius compensation |
| Memory card interface | Multiple repetitive cycle |
| Back ground editing | Expanded program editing |
| Run time and parts number display | Canned cycle for drilling |
| Custom macro | Rigid tap (Main spindle, Back spindle, Tool spindle) |
| Constant surface speed control | Cut-off detection (differential) |
| Synchronization control (rotation, phase) | Spindle speed fluctuation detection |
| Tool geometry / wear offset | Three-dimensional coordinate conversion |

Options

| | | | | |
|--------------------------|--|--|--|---|
| Guide bushing | Guide-bushing-less Direct-drive guide bushing | Work discharge system | Work conveyor Front discharge Rear discharge | Rigid tap (for Back live tool) RS232C interface |
| Live tools & holders | Tool spindle Drill holder Deep hole drill holder | Machine maintenance and monitoring functions | Signal indicator Tool checker | NC functions Abnormal load detection Manual pulse generator with program check function |
| Advanced function system | 0.1 μm specification Bar feeder interface | Coolant system | Chip conveyor Oil-mist separator Spindle-through coolant | Safety and other Automatic fire extinguisher |

Torque characteristics

■ Torque characteristics of main/back spindle



■ Torque characteristics of tool spindle

