



CNC SWISS TYPE AUTOMATIC LATHE Type C/G 
CNC AUTOMATIC LATHE [Non-Guide-Bush Type] Type N 

SB-R Series



Design in Pursuit of Optimal Efficiency The DNA of the Best-Selling Machine

SB Series, the Best-Selling Family Line

2002

Release of SB-16 type S/B

The rigid tool post with a slanted type sliding guide way wins strong support from the market because of capability and high rigidity in spite of superior cost performance.

2004

SB-16 type A/C Released

The main spindle C-axis control is additional as an optional function. The strengthened machining performance of the power-driven tools and back working attachments also contributes to the best-selling status.

2006

SB-16 type D Released

A new model, equipped with a tool post exclusively for back working to enable overlap machining on the front and rear-end, is added to the SB series which has been enjoying tremendous market success.

2007

SB-16 type E Released

The main and sub spindles are equipped with a C-axis control as a standard function. In addition, a phase synchronization control, on the sub spindle allowing rear end thread cutting and other sophisticated functions are enhance the machine.

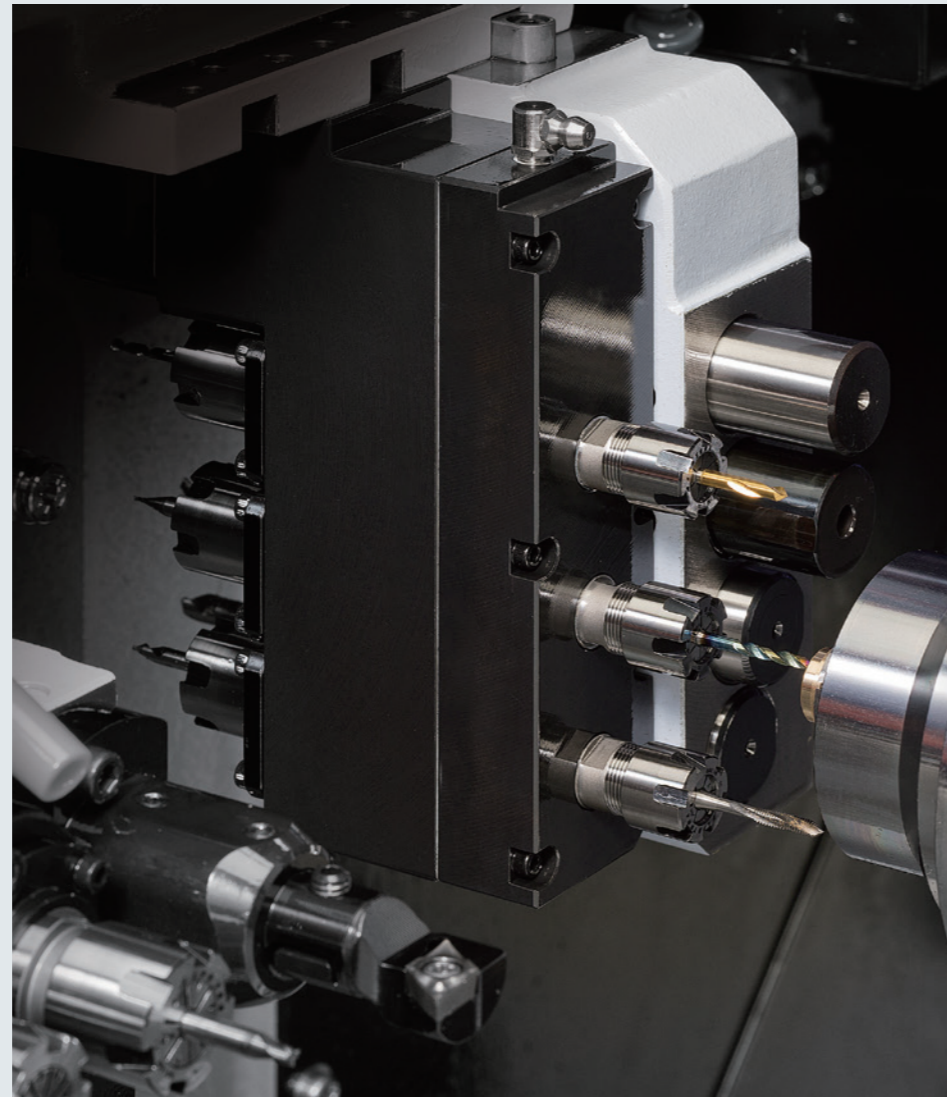
2011

SB-20A/C/E Released

Increased number of attachable tools, strengthened motor output, reduction of remnant bar length and more to meet user requests. The SB series has been reaching for the next level to be the best machines of the times.

2013~2014

Upgraded Machines to Get With the Tide



The latest SB series aims for optimization of machining to perform respective applications through "flexible selection". By fabricating an ideal tooling layout, a new ordering system has been established. A rigid structure to ensure high accuracy and many other functions, which traditionally accompany the SB series, enable response to detailed needs. You must be assured of satisfactory performance to justify the investment.

The latest version of the SB series - a design to realize the ideal form of machine tools as an eternal best-seller.

SB series

A Challenge to achieve
HIGH RIGIDITY and HIGH PRODUCTIVITY!

CNC SWISS TYPE AUTOMATIC LATHE

SB-12R/16R/20R type G

The SB-R Series Latest Model with
Guide Bush/Non-Guide Bush
Switching Function



* SB-12R type G : Max. machining diameter
** SB-16R type G : Max. machining diameter
*** SB-20R type G : Max. machining diameter
* SB-12R type G : Max. headstock stroke
** SB-16R/20R type G : Max. headstock stroke

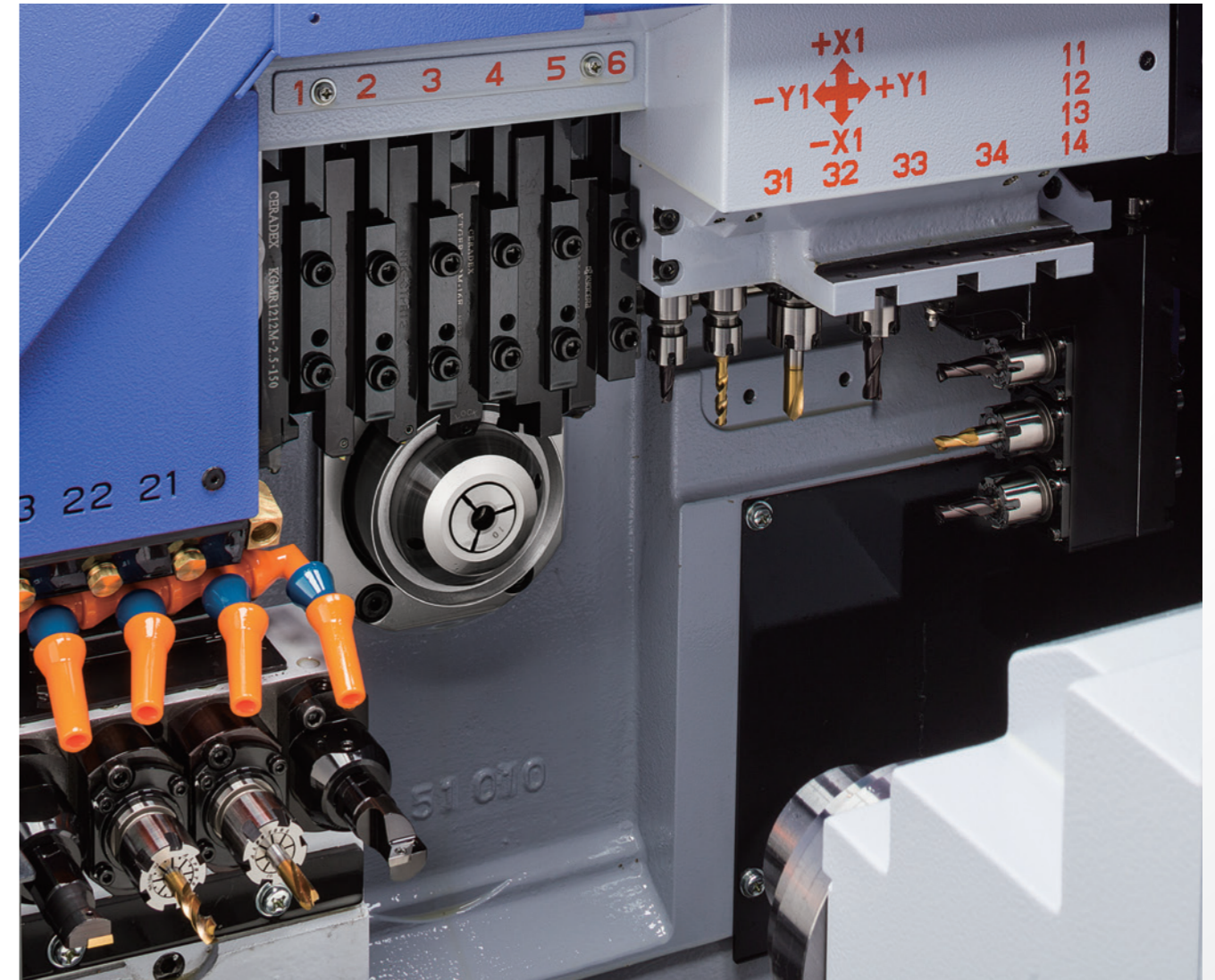
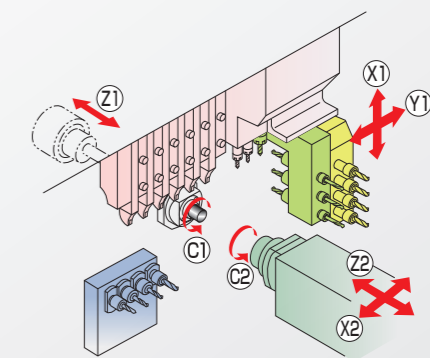


PHOTO : Cartridge type 5-spindle cross drilling unit (non-guide bush type)

A Wide Variety of Machining through Tooling Variation Fabricated for All Application by Selecting Suitable Tool Post and Tools to Mount

- A guide bush type to achieve high accuracy by controlling bending of long workpieces and the non-guide bush type to cut down the material cost by reducing the remnant bar length of short workpieces.
- A tool post selectable from four types to be best suited to machining application.
- A tool rotation drive unit (optional) attachable on the four-spindle unit.
- The main spindle/sub spindle is equipped with a C-axis control function as standard.
- A built-in motor is incorporated in the main spindle for improvement of indexing accuracy.
- A movable operation panel to be used at the optimum position.



Tool post: Cartridge type 5-spindle cross drilling unit (guide bush type)

TOOLING SYSTEM

| | | |
|---------------------------|---|--|
| ■ Tool holder | Turning tool | 6 tools (□12mm) / 7 tools (□10mm) |
| ■ 4-spindle sleeve holder | Front-end stationary tool | 4 tools |
| | Rear-end stationary tool | 4 tools |
| ■ Power-driven tool | 4-spindle cross drilling unit | Cross machining tool 4 spindles (ER16) |
| | 5-spindle cross drilling unit | Cross machining tool 5 spindles (ER11) |
| | Cartridge-type 5-spindle cross drilling unit | Cross machining tool 2 spindles (ER11) |
| | Cartridge-type 5-spindle cross drilling unit | Cartridge type 3 Pos |
| | Cartridge-type 5-spindle high-speed cross drilling unit | Cross machining tool 2 spindles (ER11) Cartridge type 3 Pos |
| ■ Back 4-spindle unit | | 4 tools (Stationary tool/Power-driven tool) |

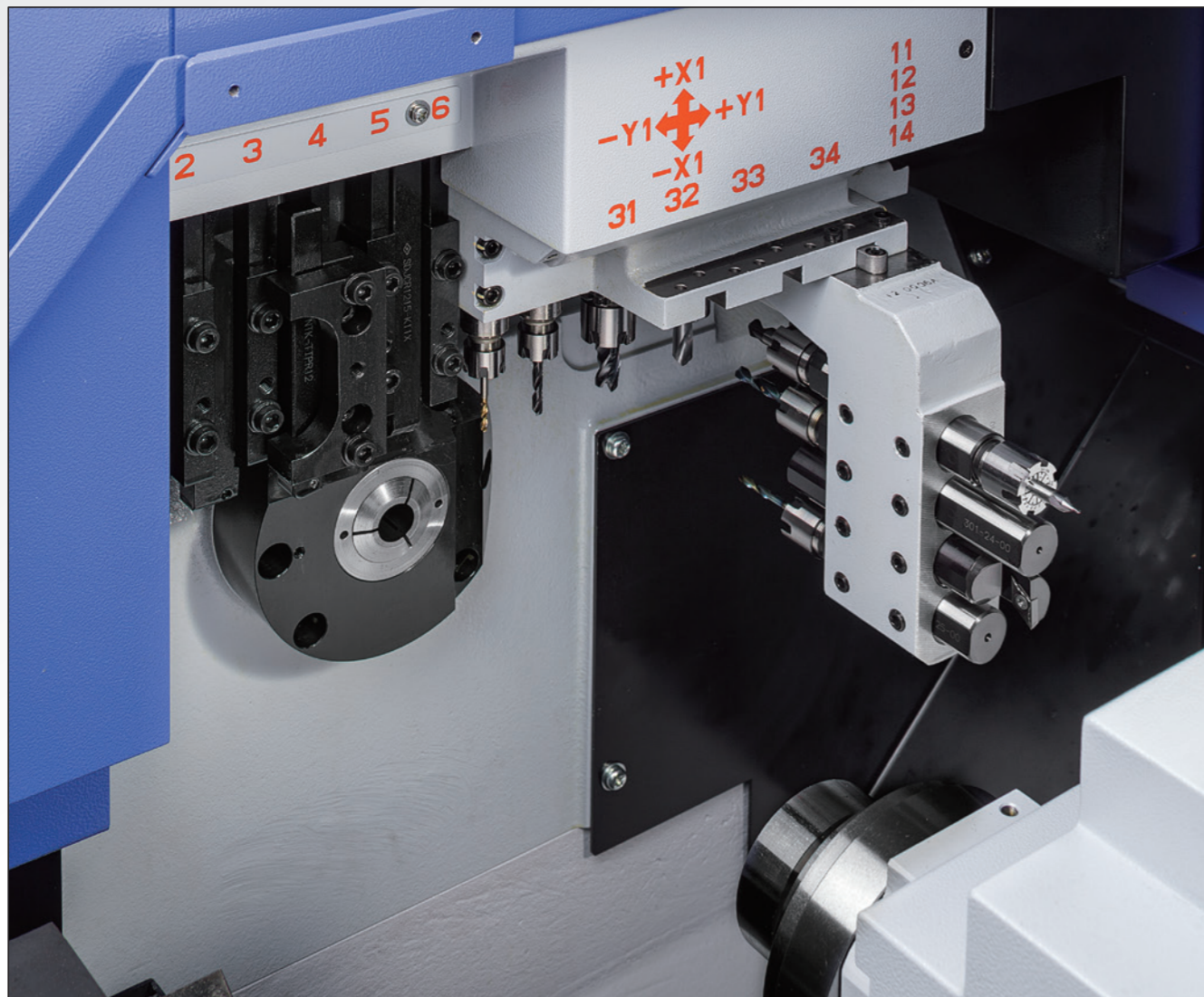
CNC SWISS TYPE AUTOMATIC LATHE

SB-16R/20R type C

Flexible Combination of Tool Posts
A Sign of True Performance



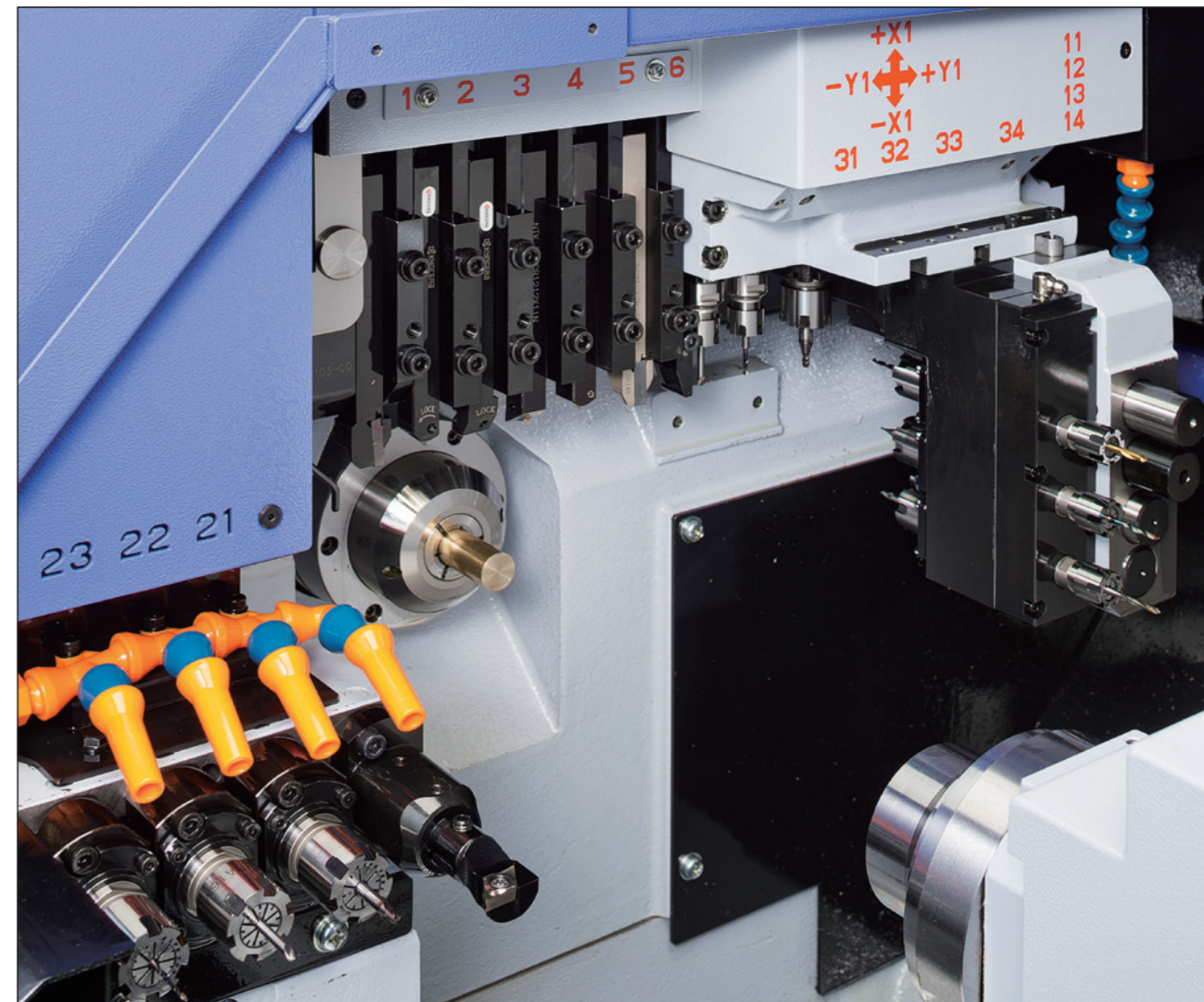
* SB-16R type C : Max. machining diameter
** SB-20R type C : Max. machining diameter



CNC AUTOMATIC LATHE [Non-Guide-Bush Type]

SB-20R type N

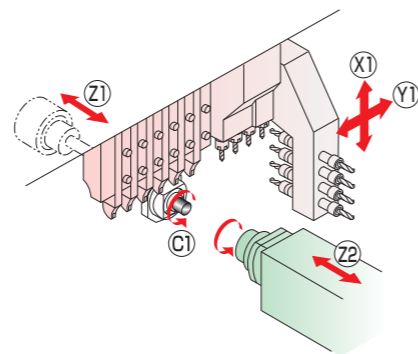
Extended Complex Machining Aimed
at Higher Dimensional Non-Guide Bush Models



* When a cartridge-type 5-spindle/5-spindle high-speed cross drilling unit is optionally selected

Four Types of Tool Posts and Various Tool Units Selectable Combination to Achieve Versatile Complex Machining on Front End

- The cartridge-type 5-spindle cross drilling unit (optional), when equipped with various power tool units and 4 spindle sleeve holder, allows a variety of complex machining.
- A built-in motor is incorporated in the main spindle for improvement of indexing accuracy.
- The main spindle/sub spindle is equipped with a C-axis control function as standard.
- The movable operation panel and various help functions improve both operability and workability.



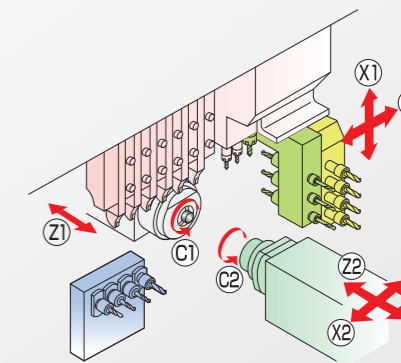
Tool post : 4-spindle cross drilling unit

TOOLING SYSTEM

| | | |
|---------------------------|---|--|
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| | Cartridge-type 5-spindle cross drilling unit | Cross machining tool 2 spindles (ER11) |
| | Cartridge type | 3 Pos |
| | Cartridge-type 5-spindle high-speed cross drilling unit | Cross machining tool 2 spindles (ER11) |
| Cartridge type | 3 Pos | |

With a maximum of 30* tools for complex machining, non-guide bush type for reduction of material cost. Type N meets the needs of the times.

- At remnant bar length of minimum 31mm significantly contributes to the reduction of material cost.
- The cartridge-type 5-spindle cross drilling unit (optional), when equipped with various power tool units and 4 spindle sleeve holder, allows a variety of complex machining.
- A 4-spindle backworking unit designed for rear-end working is attached with a tool rotation drive unit to improve machining capability on the rear end.
- A built-in motor is incorporated in the main spindle for improvement of indexing accuracy.
- The main spindle/sub spindle is equipped with a C-axis control function as standard.
- The movable operation panel and various help functions improve both operability and workability.

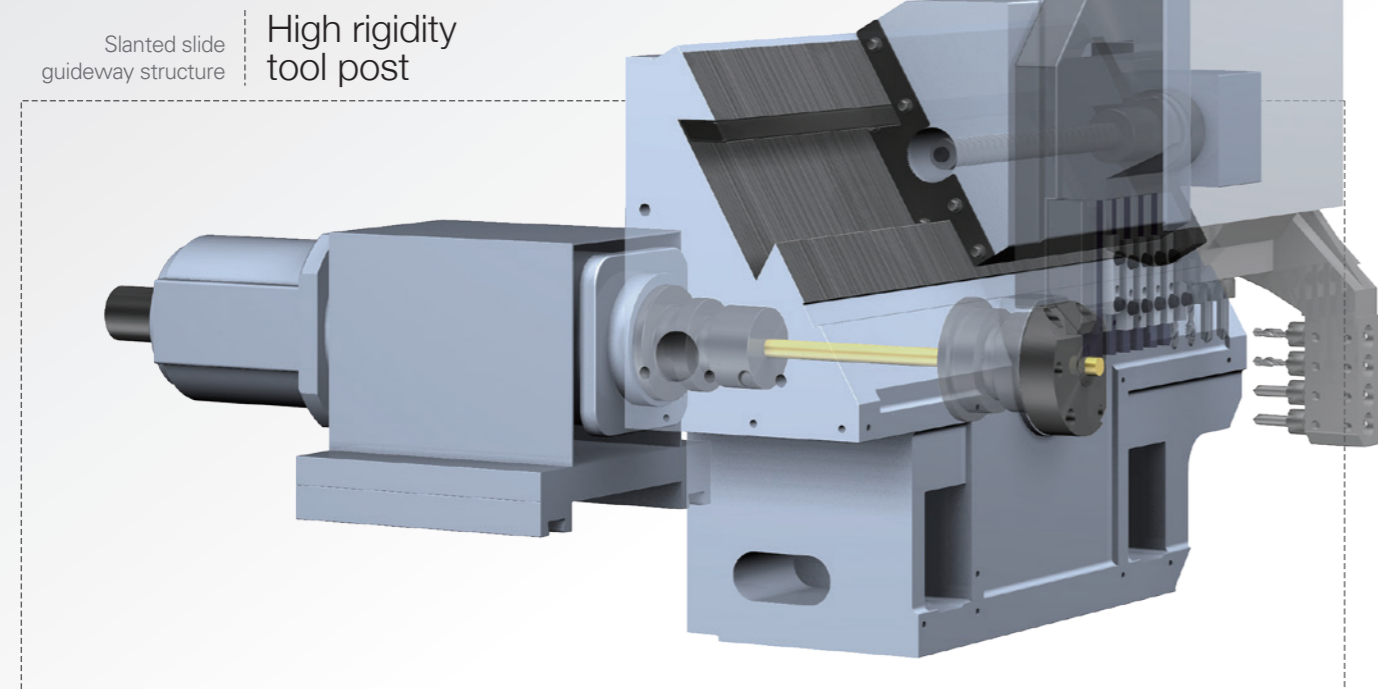


Tool post : Cartridge type 5-spindle cross drilling unit

TOOLING SYSTEM

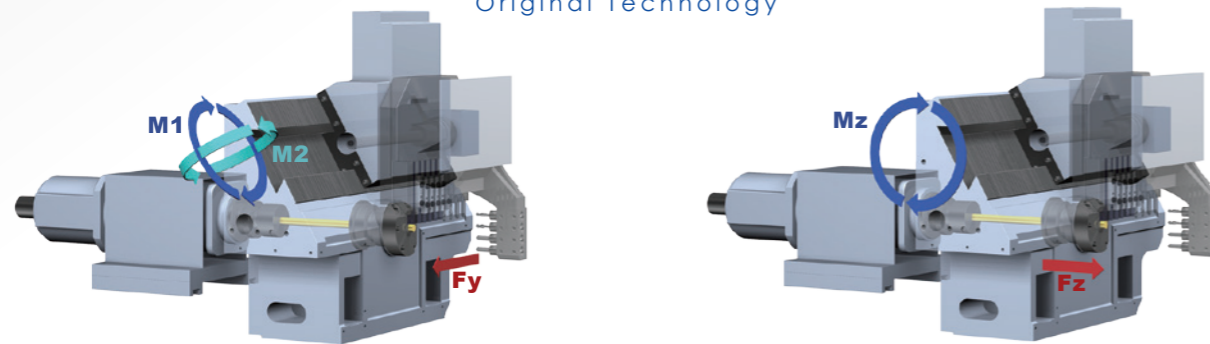
| | | |
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| ■ Back 4-spindle unit | | 4 tools (Stationary tool/Power-driven tool) |

Traditional High Accuracy Machining by Rigid Design from this Series



Original Technology

05



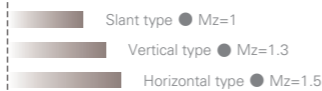
Comparison of moment load by cutting force

The moment load applied to the guideway surface by cutting force is the combined radial and axial load M_y . The M_y of the slant type is the smallest when compared to that of the vertical type and horizontal type.

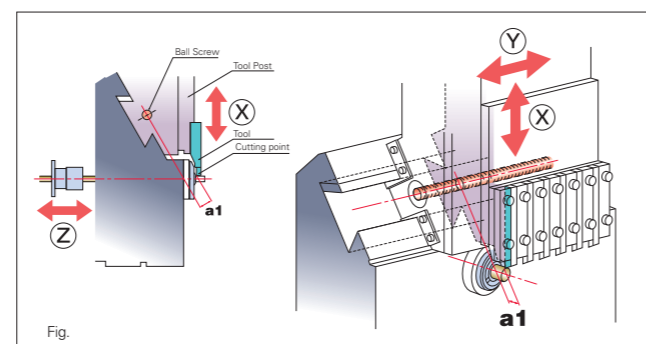


Comparison of moment load by feed force

As for the feed force F_z , the moment load M_z of the slant type is the smallest when compared to that of the vertical type and horizontal type.



The SB series tool post employs a slant-type slide guideway structure. This enables the construction of the X and Y axes guideways radially around the cutting point to improve machine rigidity. The construction also allows a linear line which passes the ball screw center and forms to be close to the cutting point (Fig. a1 on the right), and reduces the moment load by cutting resistance improves the tool post rigidity in the Y and Z axes directions. The Star original rigid tool post structure allows for an extended tool life and stable accuracy even in continuous machining over time.

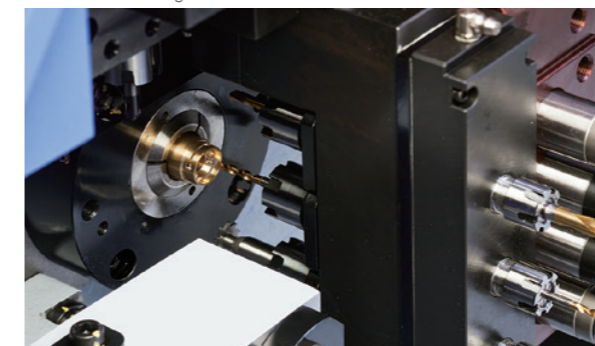


High Power, High Function and High Accuracy

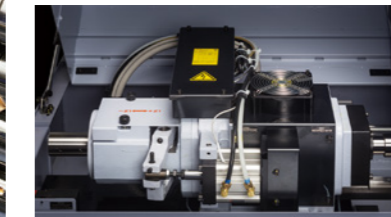
Machining Performance Suited to the Up-to-date Models

- As for the tool post, a total of four types are available, including a 5-spindle cross drilling unit, a cartridge-type 5-spindle cross drilling unit, and a 5-spindle high speed cross unit in addition to a standard-type 4-spindle cross drilling unit. This allows the most appropriate tooling layout according to the required machining applications.
- The 1.0kw (continuous) high-output power tool motor enables M6 tapping.
- The main spindle/sub spindle is equipped with a C-axis control function as standard (*1) to enlarge the machining range.
- The main spindle employs a built-in motor for improved indexing accuracy.
- The 5-spindle high-speed cross drilling unit (max. 10,000min-1) can be optionally set for small-diameter micro machining.
- The 5-spindle cartridge-type cross drilling unit with 3 cartridge positions is available for use, which can accommodate a variety of tool units for polygon machining, thread whirling and so on.

Front eccentric drilling



Built-in motor [for main spindle]



- *1 : Sub spindle C axis control: type G/N
- *2 : When the forward discharge type bar feeder is used
- *3 : type G/N
- *4 : X2 or type G/N

For Both Cutting & Non-Cutting Times

To Achieve Improved Productivity

- The 4-spindle backworking unit equipped with a tool rotation drive (*3) strengthens complex machining to allow rear-end eccentric hole drilling and front end/rear end overlap machining.
- High-speed feed at 35m/min (X1, X2, Y1, Z1, Z2) (*4) reduces the idle time.
- Attachment of a large-volume tip pan and a coolant tank enables continuous operation for a long period of time.

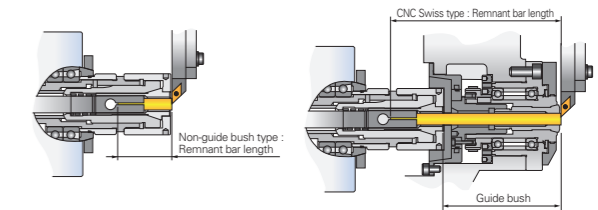
Overlap machining on the front and rear ends



Material and Maintenance Costs

Contribution to the Reduction of Production Cost

- With the aim of reduced remnant bar length, the non-guide bush type particularly achieves the minimum length of 31mm (*2) to significantly contribute to the reduction of material cost.



- Guide bush/non-guide bush switching function (type G) Guidance for switching between the G.B type and the N.G.B type is displayed on the operation screen. The G.B type is for preventing long workpieces from bending and the N.G.B type is for reducing the remnant length of short workpieces. This function responds flexibly to the diversified needs of parts machining.
- The centralized lubrication system for lubrication to all ball screw shafts and the headstock with sealed belt are both designed higher durability in order to reduce the maintenance cost.

06

For High Operability and Workability

For High Operability and Workability

User-Friendly Machine Design

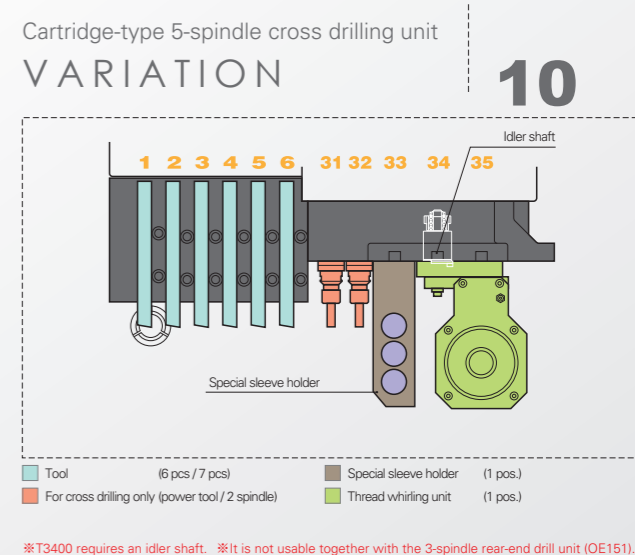
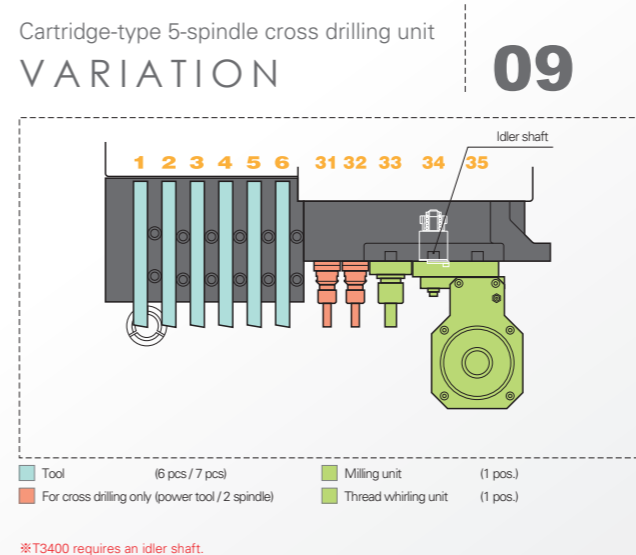
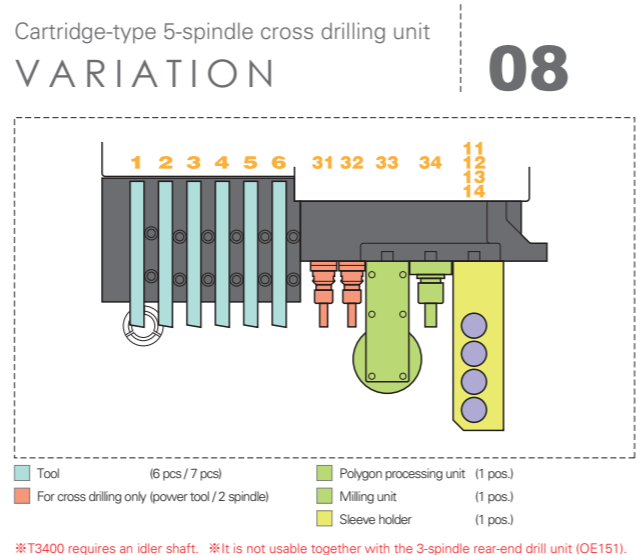
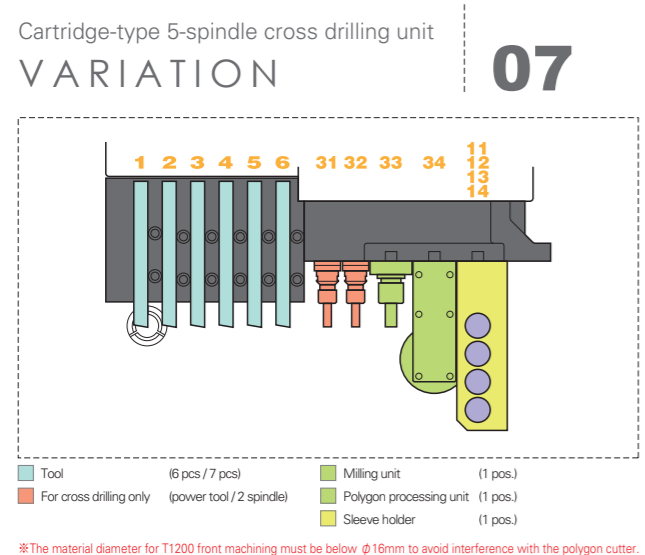
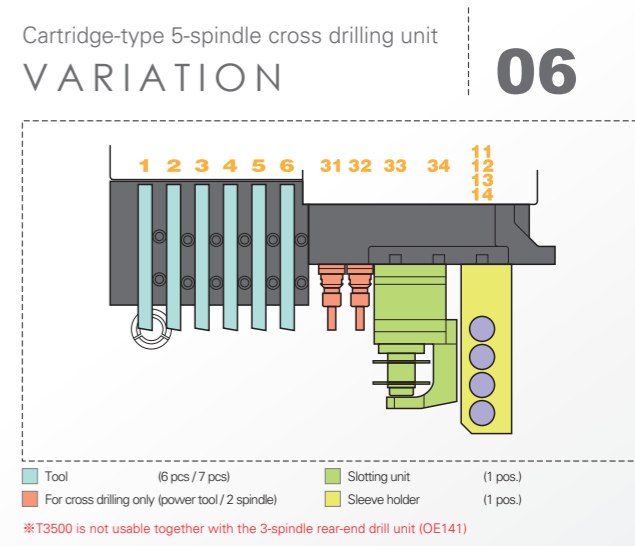
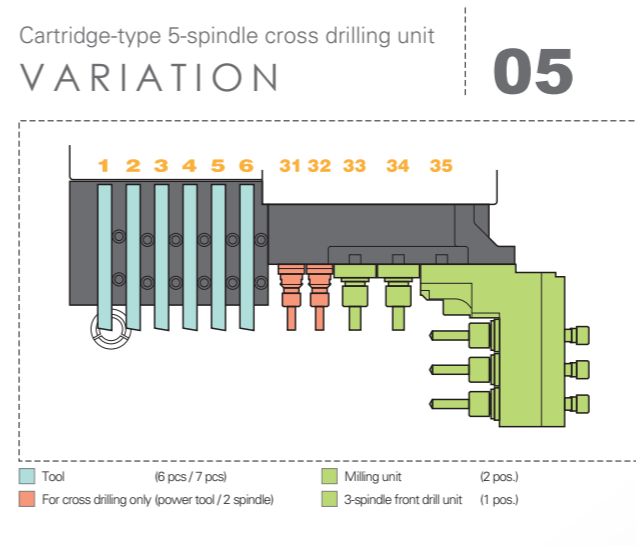
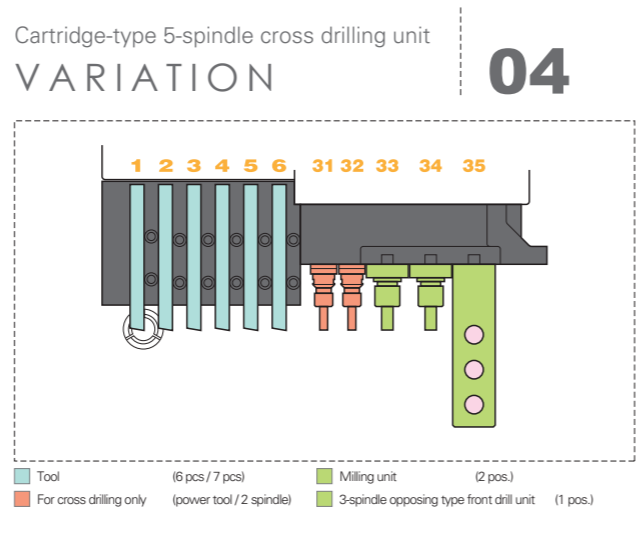
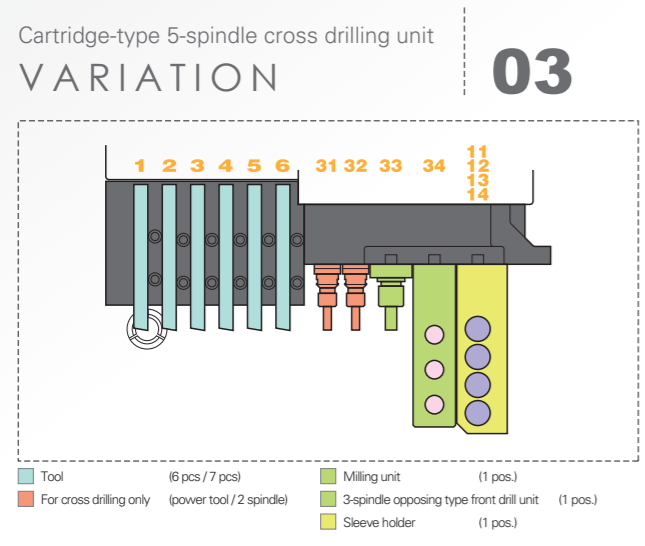
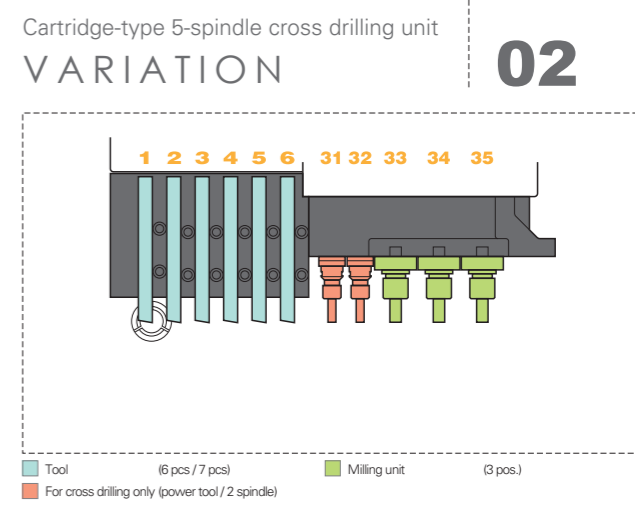
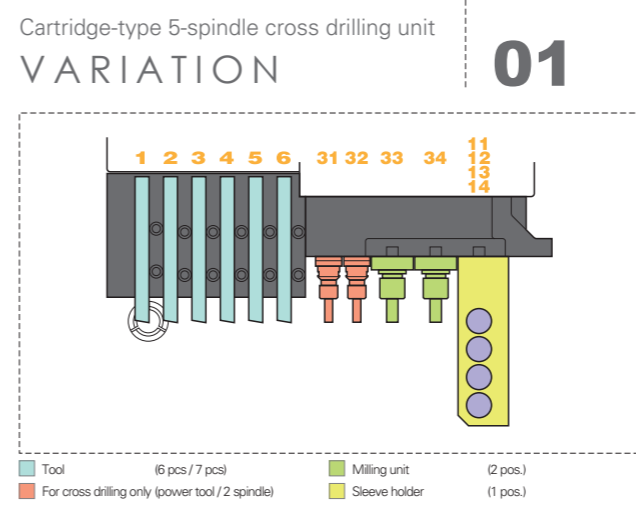
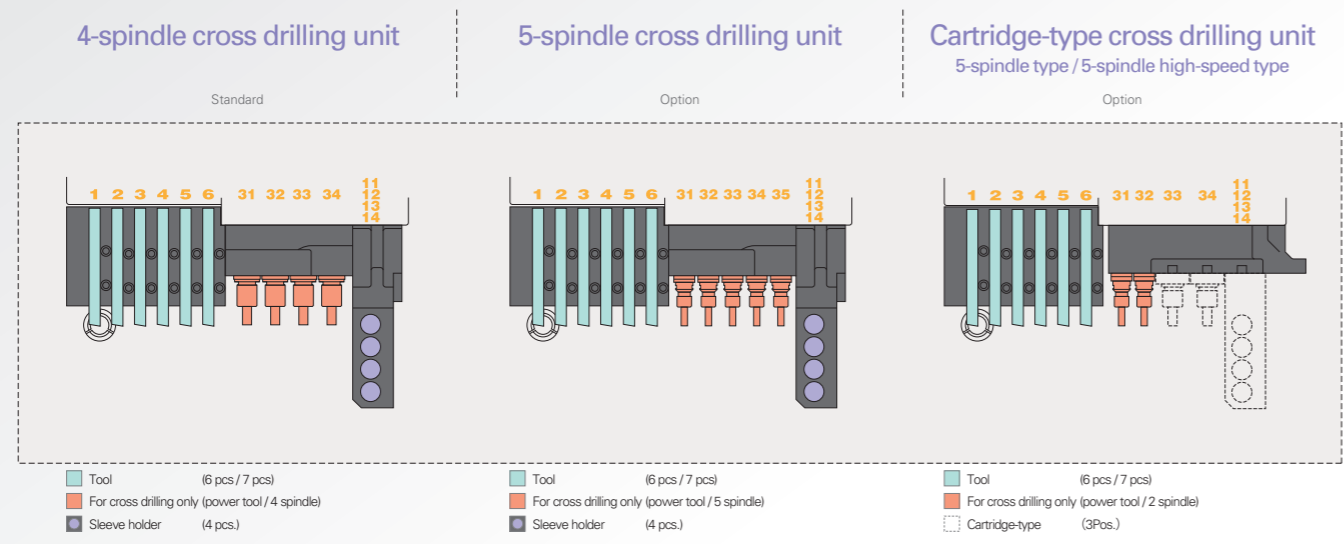
- The movable operation panel and various help functions improve both operability and workability.
- The latest control unit and 8.4"-color LCD unit are combined to improve visibility.
- A manual pulse generator also helps the machine to be more user-friendly.

Movable operation panel



List of Tool Post Configurations

A combination of 4 types of tool posts and various tool units ensures the optimum tooling layout.

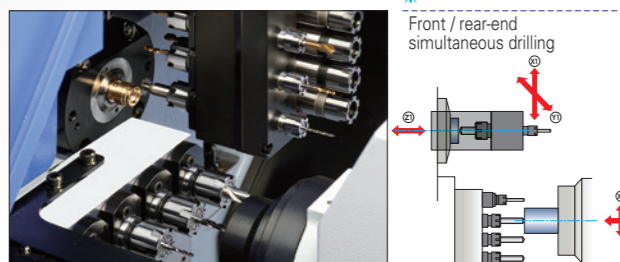
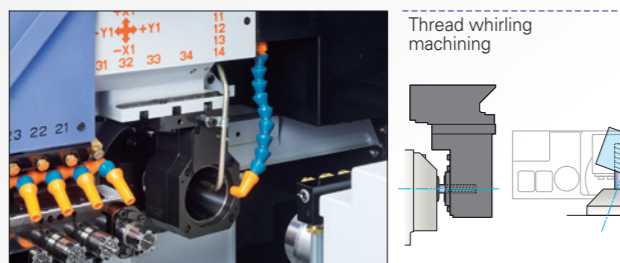
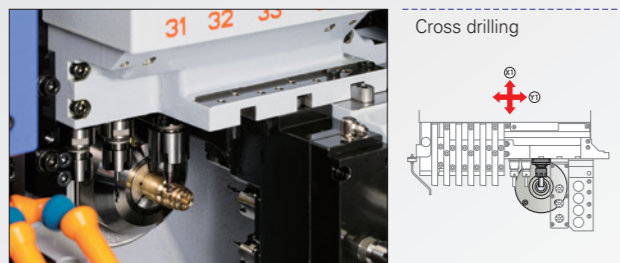


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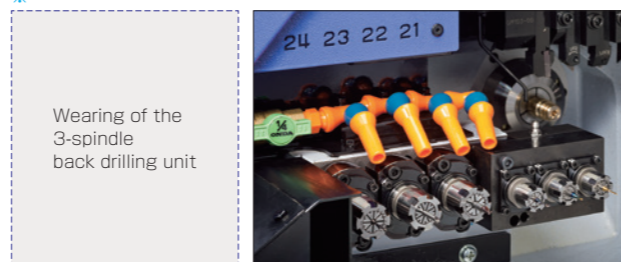
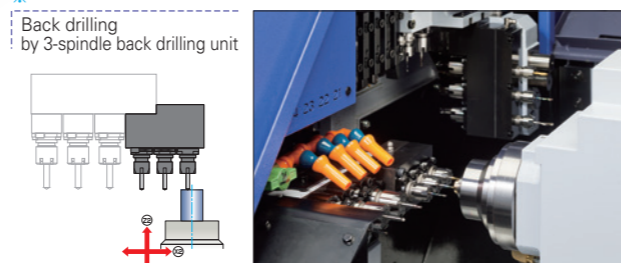
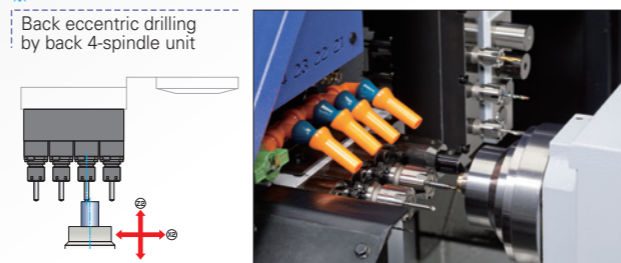
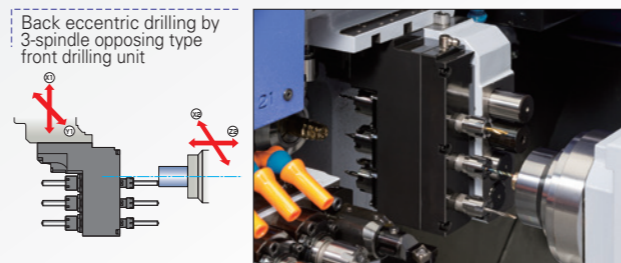
08

* Type G/N only

Front-end working



Rear-end working



Standard Machine Specifications

- CNC unit FANUC 0i-TD
- Operation panel 8.4-inch color LCD display
- Pneumatic unit
- Automatic centralized lubrication unit
- Coolant level detector
- Door interlock system
- Broken cutoff tool detector
- Parts ejection detector
- Drive unit for revolving guide bush *
- Revolving guide bush unit *
- Main/Sub collet
- C-axis control (Main/Sub) *
- Spindle clamp unit (Main/Sub)
- Tool holder
- 4-spindle cross drilling unit
- 4-spindle sleeve holder
- Back 4-Spindle unit *
- Air purge for revolving guide bush *
- Air purge for main spindle **
- Sub spindle air purge unit
- Sub spindle air blow unit
- Work light
- Leakage breaker

* Type G/N only ** SWISS type only *** Type N only

Optional Accessories and Functions

- Coolant flow detector
- Water removal unit
- Beacon
- Parts conveyor
- Parts receptacle in the machine
- Parts separator unit A
- Main spindle inner tube
- 5-spindle cross drilling unit
- Cartridge-type 5-spindle cross drilling unit
- Cartridge-type 5-spindle high-speed cross drilling unit
- Drive unit for power-driven attachment B *
- Parts ejector (Air cylinder type)
- Parts ejector (Spring type)
- Parts ejector with guide tube **
- Parts stopper unit **
- Coolant unit (6.9MPa / 2.5MPa)
- Coolant unit signal cable
- Coolant unit power cable
- Coolant valve
- Coolant pipings
- Automatic bar feeder interface
- Compliant with the RS-232C interface
- Transformer
- Safety relay version
- Transformer CE marking version
- Transformer CE marking specifications



Parts conveyor



Coolant unit 2.5MPa

External Dimensions and Floor Space

unit : mm(ft)

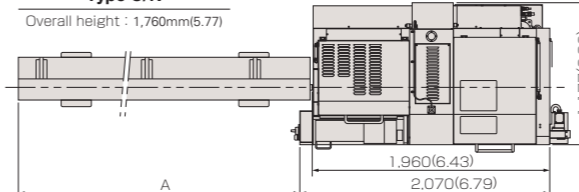
Barfeeder (12R)

| Type | Length | Max. Bar dia. | A mm(ft) | | |
|--------------|--------|---------------|--------------|--------------|--------------|
| | | | 2.5M | 3.0M | 4.0M |
| ASRX-16AS II | φ13 | | 3,247(10.65) | 3,747(12.29) | 4,747(15.57) |
| OS12VS | φ13 | | 3,380(11.09) | 3,880(12.73) | 4,880(16.01) |
| OS12RE | φ13 | | 3,100(10.17) | 3,600(11.81) | 4,600(15.09) |

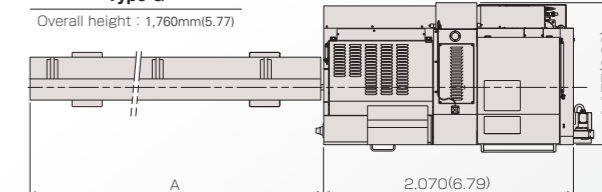
Barfeeder (16R / 20R)

| Type | Length | Max. Bar dia. | A mm (ft) | | |
|-----------|--------|---------------|--------------|--------------|--------------|
| | | | 2.5M | 3.0M | 4.0M |
| Z-16 | φ20 | | 3,386(11.11) | 3,886(12.75) | 4,886(16.02) |
| ASRX-20AS | φ20 | | 3,386(11.11) | 3,886(12.75) | 4,886(16.02) |
| OS20S | φ20 | | 3,560(11.68) | 4,060(13.32) | — |
| OS203E | φ20 | | 3,644(11.95) | 4,094(13.43) | 4,949(16.23) |

Type C/N



Type G



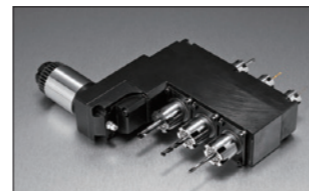
Use of up to 30* tools ensures optimal machining capability.



Tool Unit (main)



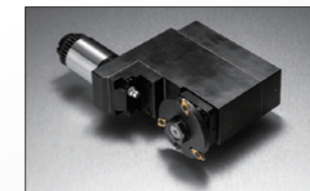
33150 Milling unit ER16



OM155 3-spindle opposing type front drilling unit



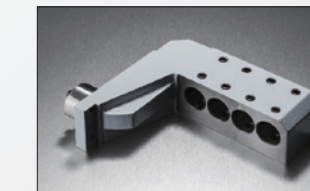
54153 Slotting unit



OM191 Polygon machining unit



OM171 Thread whirling unit



OM111 4-spindle sleeve holder

Tool Unit (back)



57161 Milling unit ER16



OR161 Milling unit ER16



OE151 3-spindle back drilling unit



69165 Slotting unit

* When a cartridge-type 5-spindle/5-spindle high-speed cross drilling unit is optionally selected . . . Type G/N only

□ Standard Machine Specifications

| Item | 4-Spindle Cross drilling unit | | | 5-Spindle Cross drilling unit | | | Cartridge-type cross drilling unit | | | | | |
|------------------------------------|-------------------------------|--------------|----------------|--|--------------|--|---|--------------|-----------------------------|--|--------------|----------------|
| | | | | | | | 5-Spindle | | | 5-Spindle high-speed | | |
| | 12R | 16R | 20R | 12R | 16R | 20R | 12R | 16R | 20R | 12R | 16R | 20R |
| Max. machining diameter | φ13mm(33/64in) | φ16mm(5/8in) | φ20mm(25/32in) | φ13mm(33/64in) | φ16mm(5/8in) | φ20mm(25/32in) | φ13mm(33/64in) | φ16mm(5/8in) | φ20mm(25/32in) | φ13mm(33/64in) | φ16mm(5/8in) | φ20mm(25/32in) |
| Max. headstock stroke | Type C | | | 205mm (8in) | | | 205mm (8in) | | | | | |
| | Type G | | | 205mm (8in) | | | 205mm (8in) | | | | | |
| | G.B. type | | | 205mm (8in) | | | 205mm (8in) | | | | | |
| | N.G.B. type | | | 12R : Bar diameter×2.5 (max.30mm) (max.1-3/16in) | | | 16R/20R : Bar diameter×2.5 (max.50mm) (max.1-31/32in) | | | | | |
| | Type N | | | Bar diameter×2.5 (max.55mm) (max.2-11/64in) | | | Bar diameter×2.5 (max.55mm) (max.2-11/64in) | | | | | |
| Number of turning tools | | | | 6 tools (□12mm) / 7 tools (□10mm) | | | 6 tools (□12mm) / 7 tools (□10mm) | | | | | |
| 4-Spindle sleeve holder | Number of tools | | | Front 4 tools | | | Front 4 tools | | | | | |
| | Max. drilling capability | | | Rear 4 tools | | | Rear 4 tools | | | | | |
| | Max. tapping capability | | | 12R : φ10mm (25/64in) | | | 16R/20R : φ12mm (1/2in) | | | | | |
| Power driven att. | Number of tools | | | Cross power driven att. | | | Cross power driven att. | | | Cross power driven att. 2 tools (ER11) | | |
| | 4 tools (ER16) | | | 5 tools (ER11) | | | Cartridge type: 3Pos | | | φ7mm (9/32in) | | |
| | Max. drilling capability | | | ER16 | | | φ7mm(9/32in) | | | — | | |
| | ER11 | | | — | | | φ5mm (3/16in) | | | φ6mm | | |
| | Max. tapping capability | | | ER16 | | | M6×P1.0 | | | M6×P1.0 | | |
| | ER11 | | | — | | | M5×P0.8 | | | — | | |
| | Spindle speed | | | ER16 | | | max.6,000min ⁻¹ | | | max.6,000min ⁻¹ | | |
| ER11 | | | — | | | Max.10,000min ⁻¹ | | | Max.8,000min ⁻¹ | | | |
| Drive motor | | | | | | 1.0kW (continuous) / 1.2kW (5min./30%ED) | | | Max.10,000min ⁻¹ | | | |
| Rapid feed rate | | | | 35m/min (X1,Y1,Z1,X2,Z2) ※X2 : Except for Type C | | | 35m/min (X1,Y1,Z1,X2,Z2) ※X2 : Except for Type C | | | | | |
| Main spindle indexing angle | | | | C-axis control | | | C-axis control | | | | | |
| Main spindle speed | | | | 12R : Max.15,000min ⁻¹ | | | 16R/20R : Max.10,000min ⁻¹ | | | | | |
| Main spindle motor | | | | 2.2kW (continuous) / 3.7kW (10min./25%ED) | | | 2.2kW (continuous) / 3.7kW (10min./25%ED) | | | | | |
| Coolant tank capability | | | | 180 ℓ | | | 180 ℓ | | | | | |
| Dimensions (W×D×H) | | | | 2,070×1,177×1,760mm | | | 2,070×1,177×1,760mm | | | | | |
| Center height | | | | 1,060mm | | | 1,060mm | | | | | |
| Weight | | | | 1,650kg (Type C) | | | 1,700kg (Type N) | | | 1,750kg (Type G) | | |
| Power consumption | | | | 12R : 4.5kVA | | | 16R/20R : 3.7kVA | | | 12R : 4.5kVA | | |
| A-weighted sound pressure : note-1 | | | | Type G : 78dB | | | Type C/N : 74dB | | | Type G : 78dB | | |

※12R only | Type G |
※Type N only | 20R |

□ Backworking Attachment Specifications

| Item | Type C | | Type G | | | Type N |
|---------------------------------|----------------------------|----------------|--|--------------|----------------------------|----------------|
| | 16R | 20R | 12R | 16R | 20R | 20R |
| Max. chucking diameter | φ16mm(5/8in) | φ20mm(25/32in) | φ13mm(33/64in) | φ16mm(5/8in) | φ20mm(25/32in) | φ20mm(25/32in) |
| Max. length for front ejection | 80mm (3-5/32in) | | 80mm (3-5/32in) | | | |
| Max. parts projection length | 30mm (1-3/16in) | | 30mm (1-3/16in) | | | |
| Back 4-Spindle unit | Number of tools | | 4 tools | | | |
| | Max. drilling capability | | Stationary tool | | | |
| | Power driven tool | | φ8mm (5/16in) | | | |
| | Max. tapping capability | | Stationary tool | | | |
| | Power driven tool | | φ6mm (15/64in) | | | |
| Power-driven att. spindle speed | — | | max.8,000min ⁻¹ | | | |
| Power-driven att. drive motor | — | | 0.75kW | | | |
| Sub spindle indexing angle | — | | C-axis control | | | |
| Sub spindle speed | max.8,000min ⁻¹ | | max.12,000min ⁻¹ | | max.9,000min ⁻¹ | |
| Sub spindle speed control | AC servo drive | | AC spindle drive | | | |
| Sub spindle motor | 1.0kW | | 0.55kW (continuous) / 1.1kW (15min./40%ED) | | | |

Note)
The machining capacities apply to SUS303 material.
The machining capacities may differ from listed values depending on the machining conditions, such as the material to be machined or the tools to be used.

note-1 : ● Measures conforming to ISO standard.
● A-weighted sound pressure is a general assessment standard characteristic that corrected the sound level to human acoustic sense.

※Design features, specifications and technical execution are subject to change without prior notice.

※This product is an export control item subject to the foreign exchange and foreign trade laws. Thus, before exporting this product, or taking it overseas, contact your STAR MICRONICS dealer.

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