



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

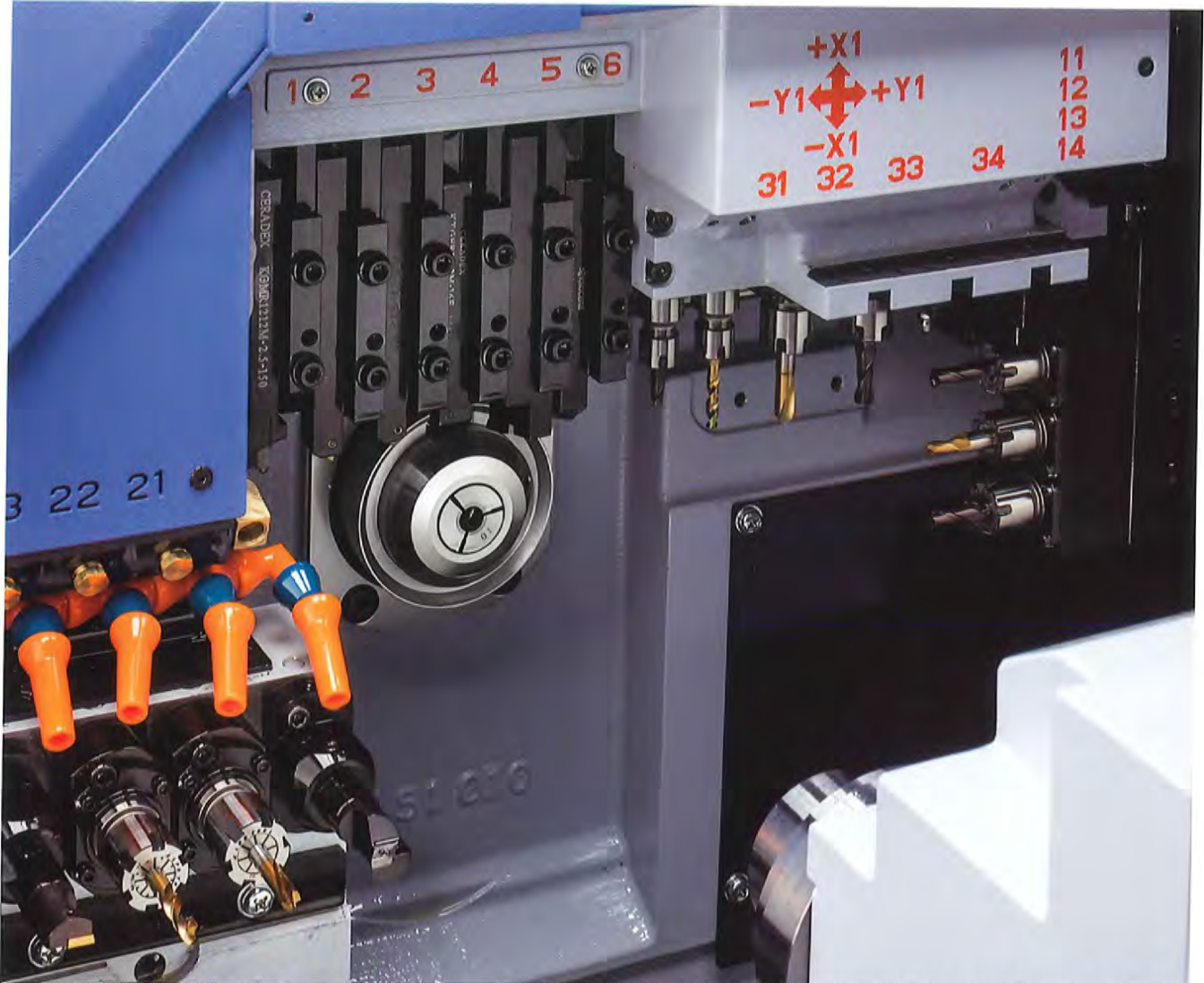


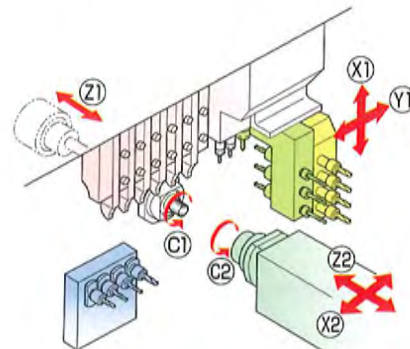
PHOTO : Cartridge type 5-spindle cross drilling unit (non-guide bush type)

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.

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	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)



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



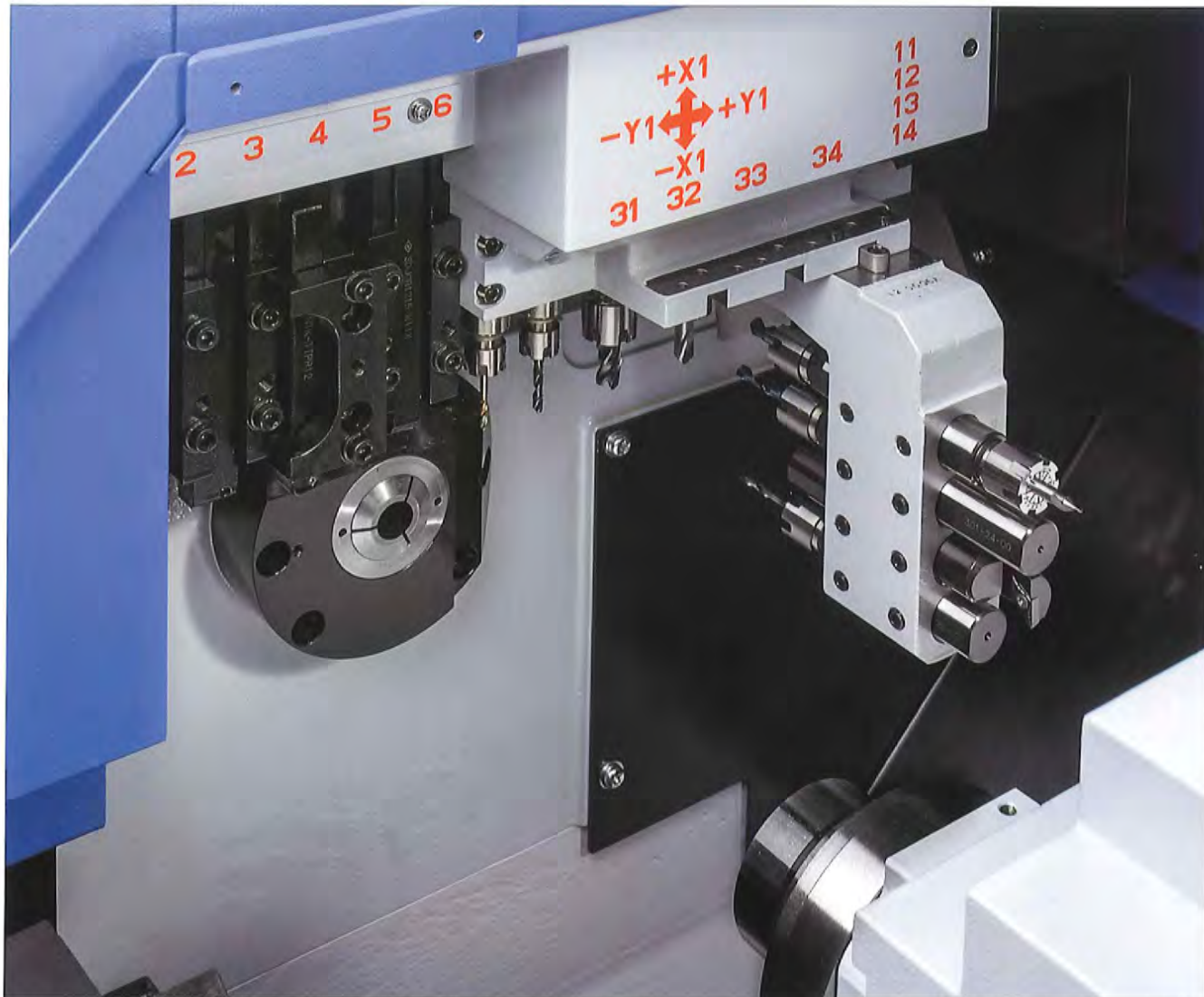
CNC SWISS TYPE AUTOMATIC LATHE

SB-16R/20R type C

Flexible Combination of Tool Posts
A Sign of True Performance



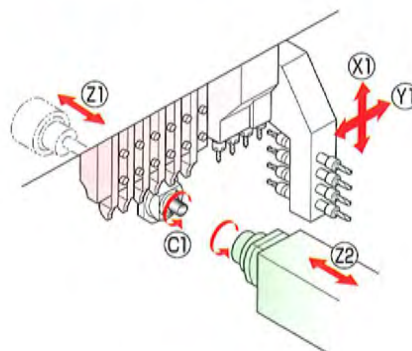
* SB-16R type C : Max. machining diameter
** SB-20R type C : Max. machining diameter



03

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.

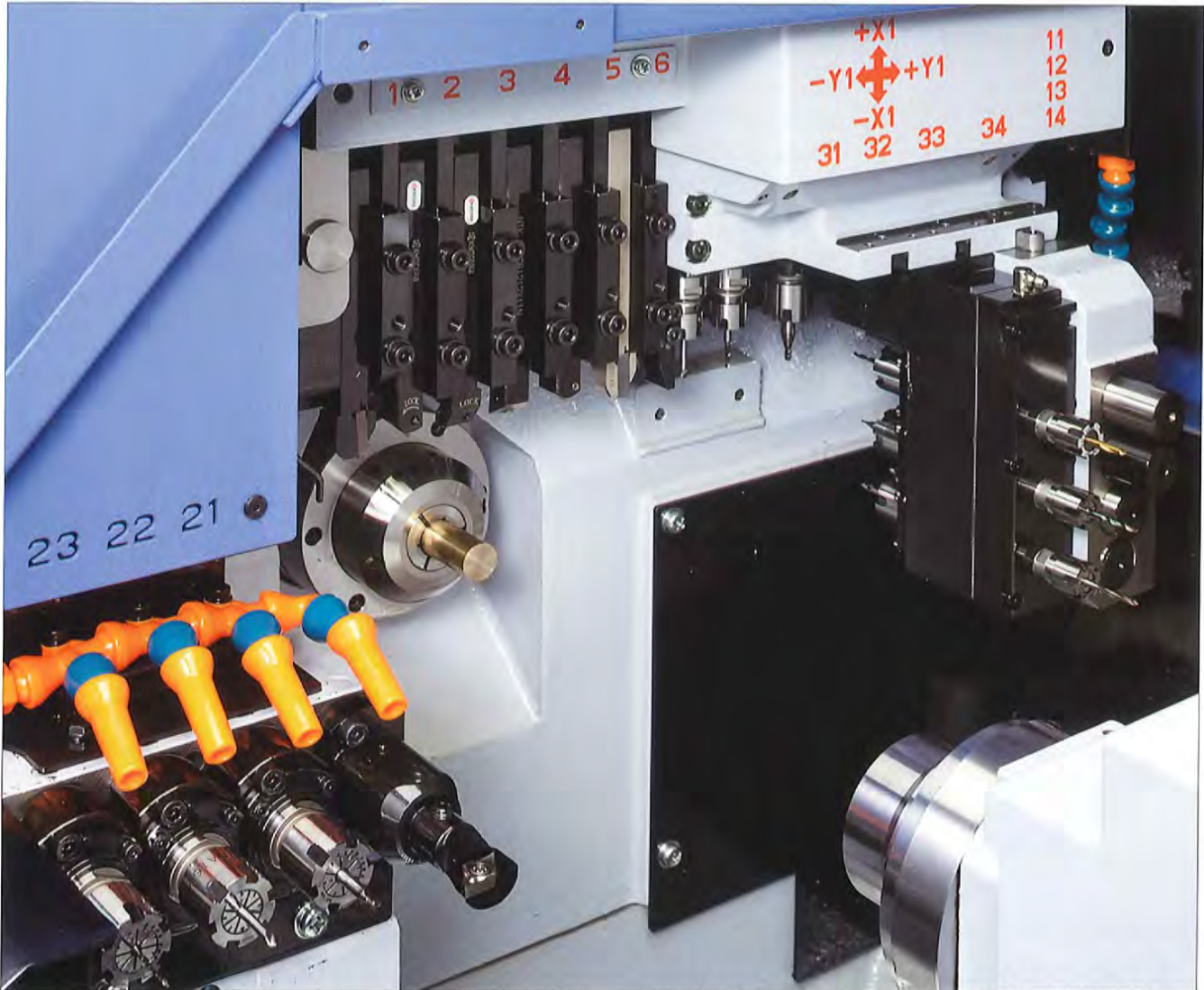


Tool post : 4-spindle cross drilling unit

TOOLING SYSTEM

■ 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)
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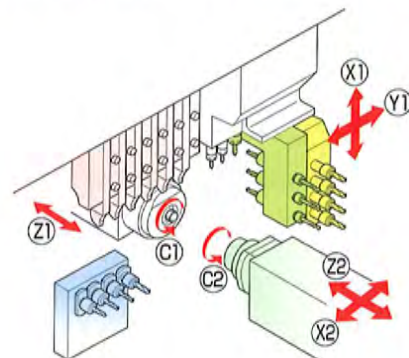
CNC AUTOMATIC LATHE [Non-Guide-Bush Type]

SB-20R type NExtended 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

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.



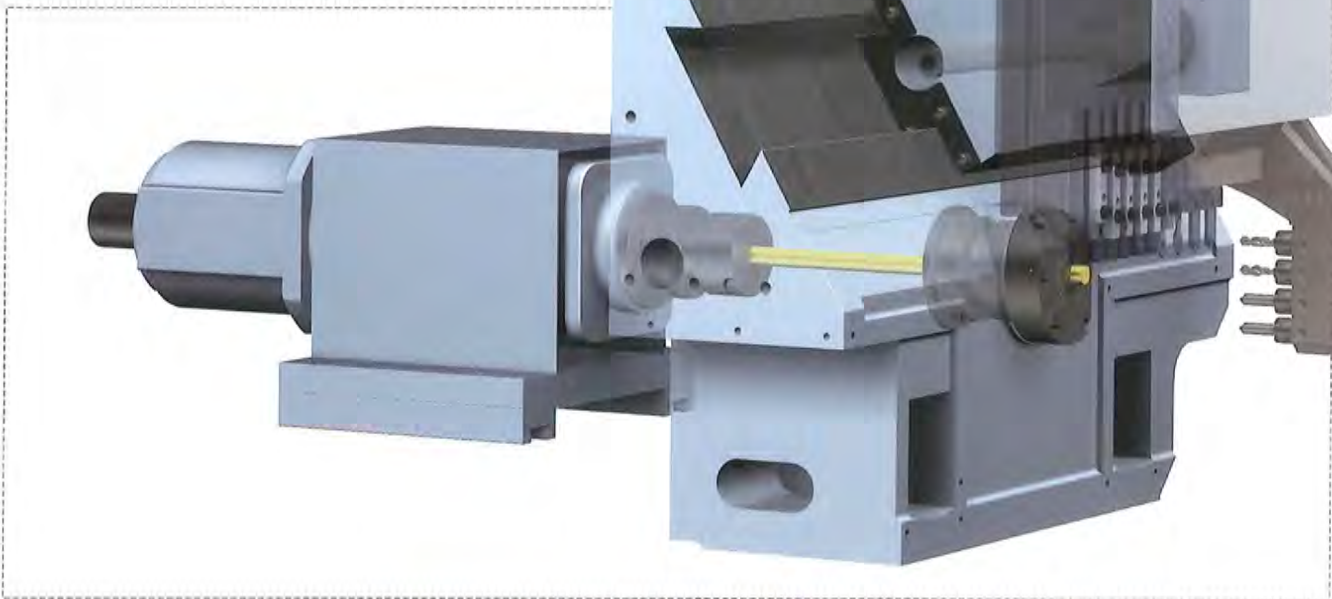
Tool post : Cartridge type 5-spindle cross drilling unit

TOOLING SYSTEM

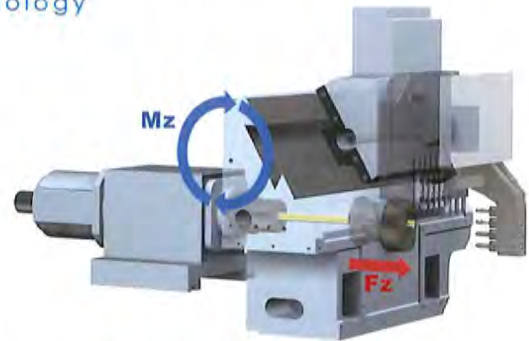
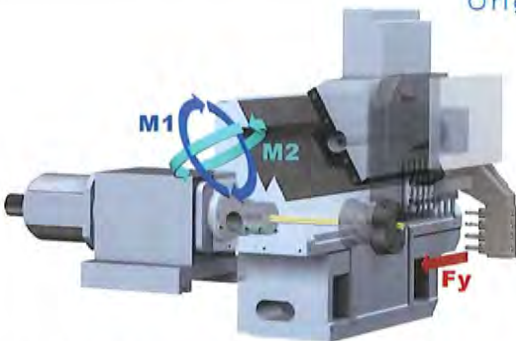
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■ 4-spindle sleeve holder	Front-end stationary tool	4 tools
	Rear-end stationary tool	4 tools
■ Power-driven tool	4-spindle cross drilling unit	Cross machining tool 4 spindles (ER16)
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Cartridge type	3 Pos	
■ Back 4-spindle unit		4 tools (Stationary tool/Power-driven tool)

Traditional High Accuracy Machining by Rigid Design from this Series

Slanted slide guideway structure
High rigidity tool post



Original Technology



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.

- Slant type ● $M_y=1$
- Vertical type ● $M_y=1.3$
- Horizontal type ● $M_y=1.9$

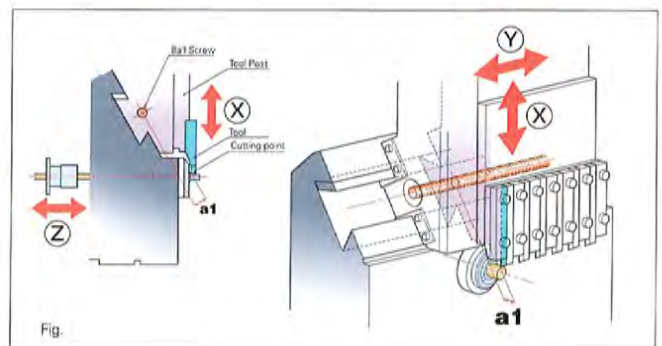
* $M_y (M1+M2)$

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.

- Slant type ● $M_z=1$
- Vertical type ● $M_z=1.3$
- Horizontal type ● $M_z=1.5$

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.

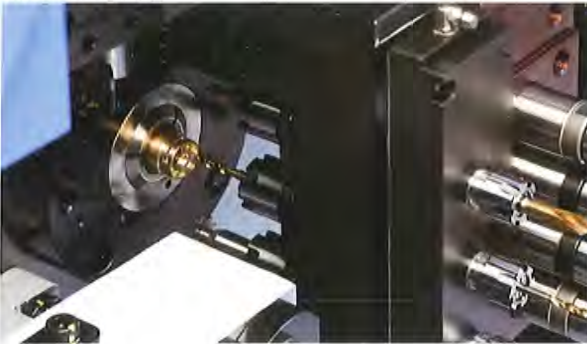


High Power, High Function and High Accuracy

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.

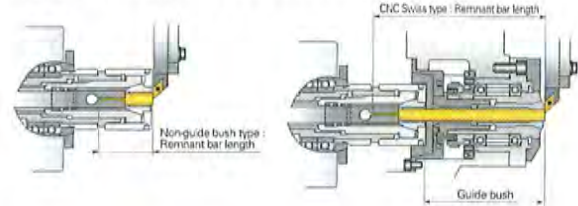
Front eccentric drilling



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.

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



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.

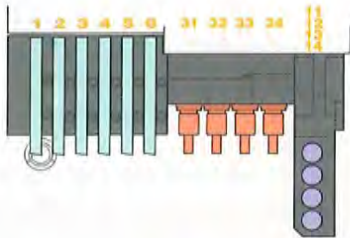
Movable operation panel



List of Tool Post Configurations A combination of 4 types of tool posts and

4-spindle cross drilling unit

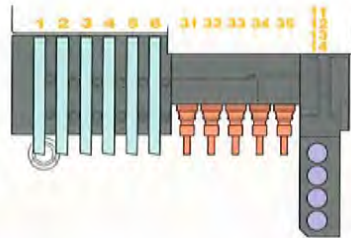
Standard



- Tool (6 pcs / 7 pcs)
- For cross drilling only (power tool / 4 spindle)
- Sleeve holder (4 pcs.)

5-spindle cross drilling unit

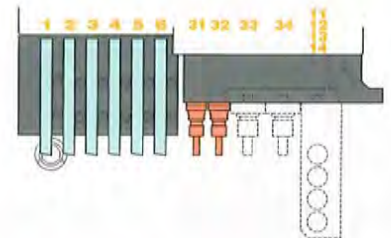
Option



- Tool (6 pcs / 7 pcs)
- For cross drilling only (power tool / 5 spindle)
- Sleeve holder (4 pcs.)

Cartridge-type cross drilling unit
5-spindle type / 5-spindle high-speed type

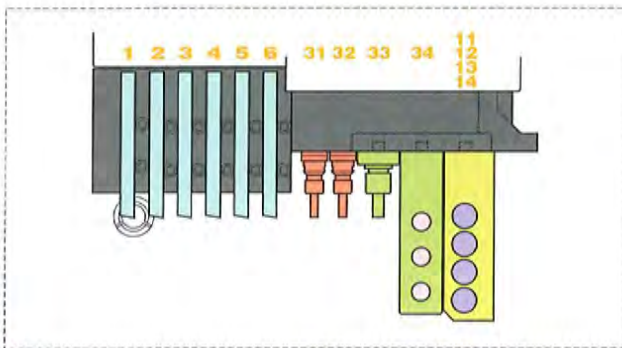
Option



- Tool (6 pcs / 7 pcs)
- For cross drilling only (power tool / 2 spindle)
- Cartridge-type (3Pos.)

Cartridge-type 5-spindle cross drilling unit
VARIATION

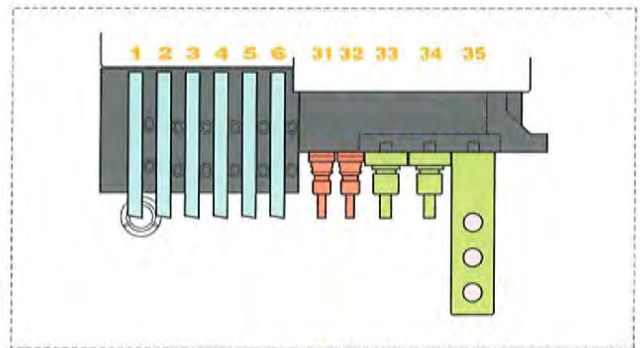
03



- Tool (6 pcs / 7 pcs)
- For cross drilling only (power tool / 2 spindle)
- Milling unit (1 pos.)
- 3-spindle opposing type front drill unit (1 pos.)
- Sleeve holder (1 pos.)

Cartridge-type 5-spindle cross drilling unit
VARIATION

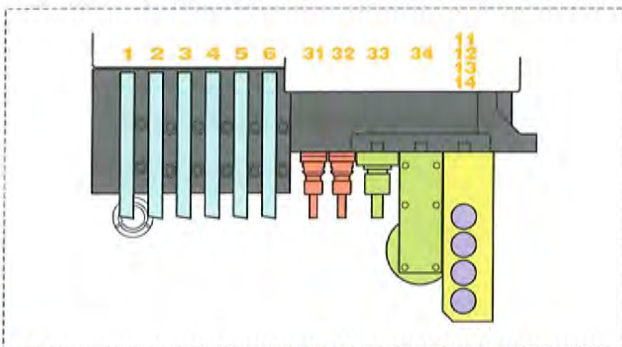
04



- Tool (6 pcs / 7 pcs)
- For cross drilling only (power tool / 2 spindle)
- Milling unit (2 pos.)
- 3-spindle opposing type front drill unit (1 pos.)

Cartridge-type 5-spindle cross drilling unit
VARIATION

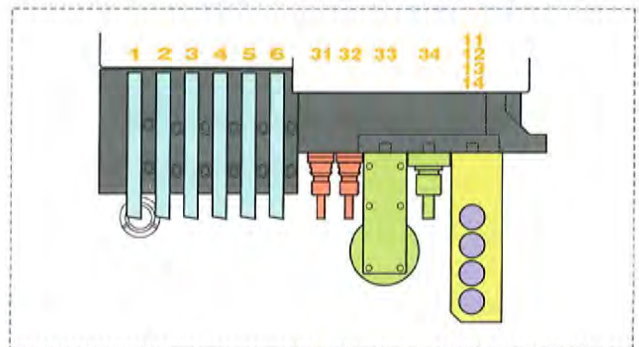
07



- Tool (6 pcs / 7 pcs)
- For cross drilling only (power tool / 2 spindle)
- Milling unit (1 pos.)
- Polygon processing unit (1 pos.)
- Sleeve holder (1 pos.)

Cartridge-type 5-spindle cross drilling unit
VARIATION

08



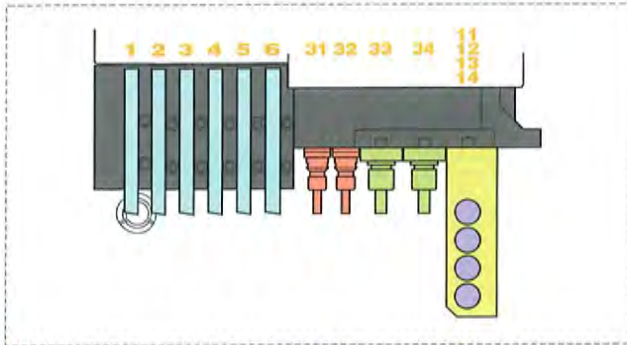
- Tool (6 pcs / 7 pcs)
- For cross drilling only (power tool / 2 spindle)
- Polygon processing unit (1 pos.)
- Milling unit (1 pos.)
- Sleeve holder (1 pos.)

※The material diameter for T1200 front machining must be below $\phi 18\text{mm}$ to avoid interference with the polygon cutter.

※T3400 requires an idler shaft. ※It is not usable together with the 3-spindle rear-end drill unit (OE151).

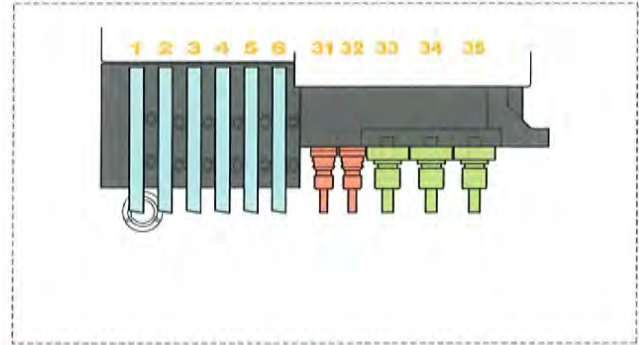
us tool units ensures the optimum tooling layout.

Cartridge-type 5-spindle cross drilling unit
VARIATION **01**



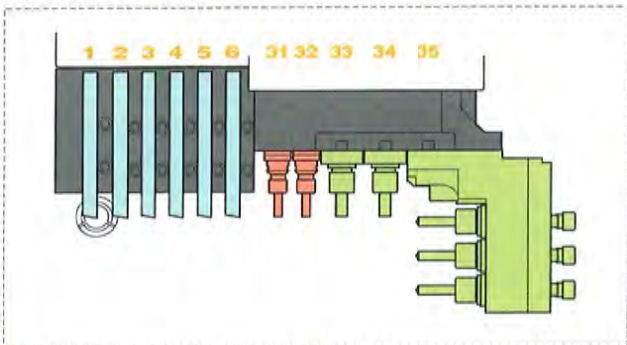
- Tool (6 pcs / 7 pcs)
- Milling unit (2 pos.)
- For cross drilling only (power tool / 2 spindle)
- Sleeve holder (1 pos.)

Cartridge-type 5-spindle cross drilling unit
VARIATION **02**



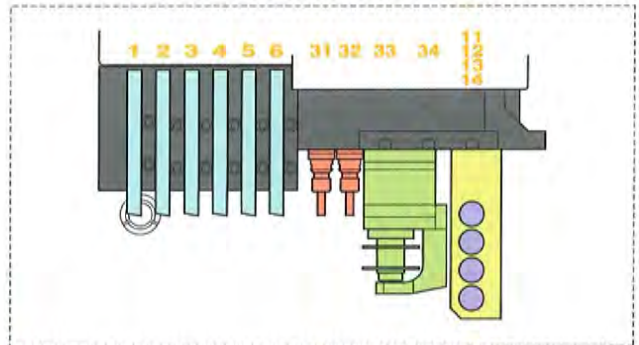
- Tool (6 pcs / 7 pcs)
- Milling unit (3 pos.)
- For cross drilling only (power tool / 2 spindle)

Cartridge-type 5-spindle cross drilling unit
VARIATION **05**



- Tool (6 pcs / 7 pcs)
- Milling unit (2 pos.)
- For cross drilling only (power tool / 2 spindle)
- 3-spindle front drill unit (1 pos.)

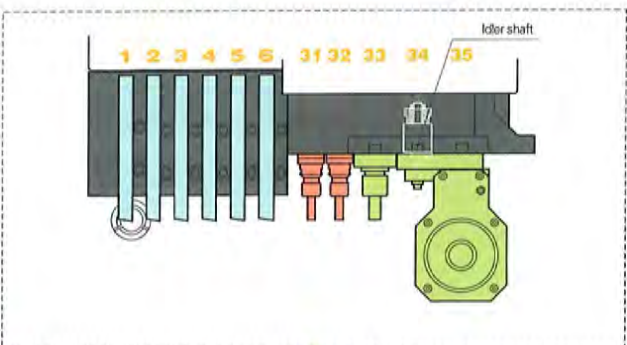
Cartridge-type 5-spindle cross drilling unit
VARIATION **06**



- Tool (6 pcs / 7 pcs)
- Milling unit (1 pos.)
- For cross drilling only (power tool / 2 spindle)
- Slotting unit (1 pos.)
- Sleeve holder (1 pos.)

⚠T3500 is not usable together with the 3-spindle rear-end drill unit (OE141)

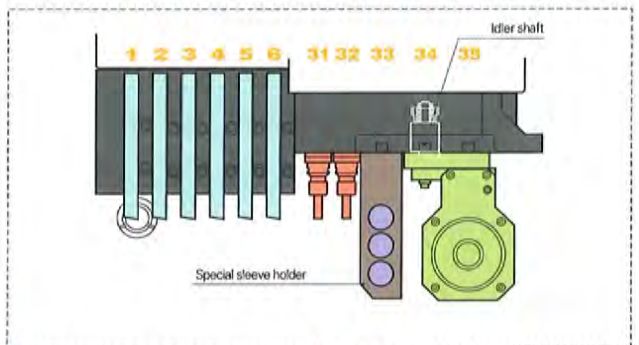
Cartridge-type 5-spindle cross drilling unit
VARIATION **09**



- Tool (6 pcs / 7 pcs)
- Milling unit (1 pos.)
- For cross drilling only (power tool / 2 spindle)
- Thread whirling unit (1 pos.)

⚠T3400 requires an idler shaft.

Cartridge-type 5-spindle cross drilling unit
VARIATION **10**



- Tool (6 pcs / 7 pcs)
- Milling unit (1 pos.)
- For cross drilling only (power tool / 2 spindle)
- Thread whirling unit (1 pos.)
- Special sleeve holder (1 pos.)

⚠T3400 requires an idler shaft. ⚠It is not usable together with the 3-spindle rear-end drill unit (OE151).

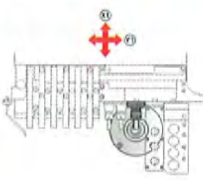


※ Type G/N only

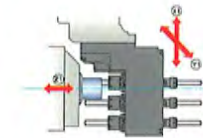
Front-end working



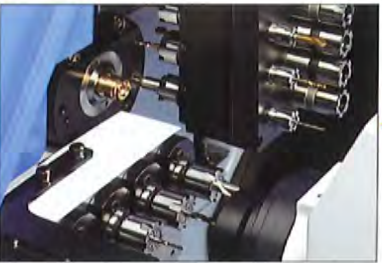
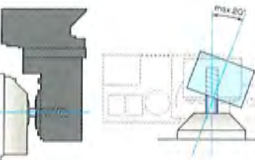
Cross drilling



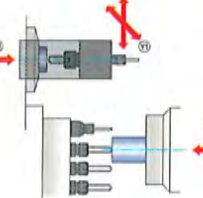
Front-end eccentric drilling



Thread whirling machining

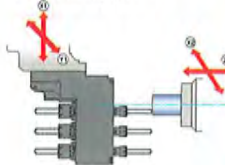


Front / rear-end simultaneous drilling

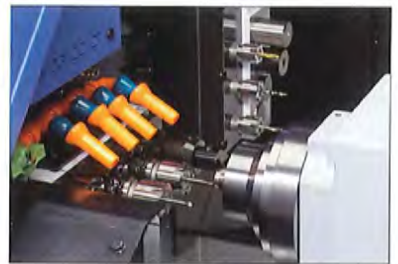
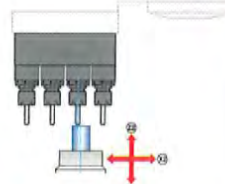


Rear-end working

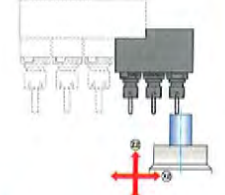
Back eccentric drilling by 3-spindle opposing type front drilling unit



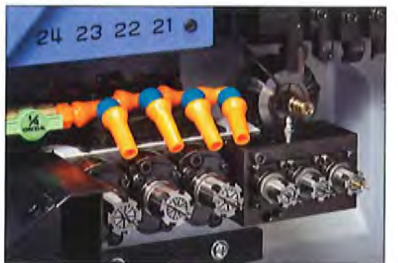
Back eccentric drilling by back 4-spindle unit



Back drilling by 3-spindle back drilling unit



Wearing of the 3-spindle back drilling unit



09

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

Tool Unit (back)

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

□ Standard Machine Specifications

1. CNC unit FANUC 0i-TD
2. Operation panel 8.4-inch color LCD display
3. Pneumatic unit
4. Automatic centralized lubrication unit
5. Coolant level detector
6. Door interlock system
7. Broken cutoff tool detector
8. Parts ejection detector
9. Drive unit for revolving guide bush ※
10. Revolving guide bush unit ※
11. Main/Sub collet
12. C-axis control (Main/Sub) ※
13. Spindle clamp unit (Main/Sub)
14. Tool holder
15. 4-spindle cross drilling unit
16. 4-spindle sleeve holder
17. Back 4-Spindle unit ※
18. Air purge for revolving guide bush ※
19. Air purge for main spindle ※※
20. Sub spindle air purge unit
21. Sub spindle air blow unit
22. Work light
23. Leakage breaker

※ Type G/N only ※ SWISS type only ※※ Type N only

□ Optional Accessories and Functions

1. Coolant flow detector
2. Water removal unit
3. Beacon
4. Parts conveyor
5. Parts receptacle in the machine
6. Parts separator unit A
7. Main spindle inner tube
8. 5-spindle cross drilling unit
9. Cartridge-type 5-spindle cross drilling unit
10. Cartridge-type 5-spindle high-speed cross drilling unit
11. Drive unit for power-driven attachment B ※
(Type N : Standard)
12. Parts ejector (Air cylinder type)
13. Parts ejector (Spring type)
14. Parts ejector with guide tube ※
15. Parts stopper unit ※
16. Coolant unit (6.9MPa / 2.5MPa)
17. Coolant unit signal cable
18. Coolant unit power cable
19. Coolant valve
20. Coolant pipings
21. Automatic bar feeder interface
22. Compliant with the RS-232C interface
23. Transformer
24. Safety relay version
25. Transformer CE marking version
26. Transformer CE marking specifications



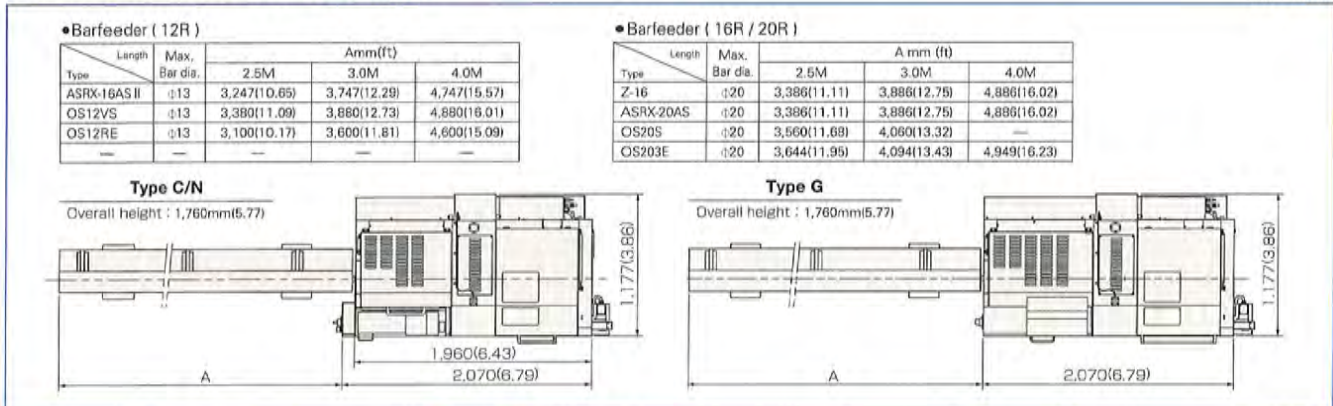
□ Parts conveyor



□ Coolant unit 2.5MPa

□ External Dimensions and Floor Space

unit : mm(ft)



54153 Slotting unit



OM191 Polygon machining unit



OM171 Thread whirling unit



OM111 4-spindle sleeve holder



57161 Milling unit ER16



OR161 Milling unit ER16



OE151 3-spindle back drilling unit



69165 Slotting unit

□ Standard Machine Specifications

Item	4-Spindle Cross drilling unit			5-Spindle Cross drilling unit			Cartridge-type cross drilling unit							
	12R	16R	20R	12R	16R	20R	5-Spindle			5-Spindle high-speed				
							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)		
Type C	205mm (8in)													
Max. headstock stroke	G.B.type		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)											
Number of turning tools	6 tools (□12mm) / 7 tools (□10mm)													
4-Spindle sleeve holder	Number of tools													
	Front 4 tools													
	Rear 4 tools													
Max. drilling capability	12R : φ10mm (25/64in)			16R/20R : φ12mm (1/2in)										
Max. tapping capability	M10×P1.5													
Power driven att.	Cross power driven att. 4 tools (ER16)			Cross power driven att. 5 tools (ER11)			Cross power driven att. 2 tools (ER11)							
	Cartridge type: 3Pos													
	Max. drilling capability	ER16	φ7mm(9/32in)	—			φ7mm (9/32in)							
		ER11	—	φ5mm (3/16in)			φ6mm			φ5mm				
	Max. tapping capability	ER16	M6×P1.0	—			M6×P1.0							
		ER11	—	—			M5×P0.8			—				
Spindle speed	ER16	max.6,000min ⁻¹	—			max.8,000min ⁻¹			max.6,000min ⁻¹					
	ER11	—	Max.10,000min ⁻¹			Max.8,000min ⁻¹			Max.10,000min ⁻¹					
Drive motor	1.0kW (continuous) / 1.2kW (5min./30%ED)													
Rapid feed rate	35m/min (X1,Y1,Z1,X2,Z2) ※X2 : Except for Type C													
Main spindle indexing angle	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)													
Coolant tank capability	180 ℓ													
Dimensions (W×D×H)	2,070×1,177×1,760mm													
Center height	1,060mm													
Weight	1,650kg (Type C) 1,700kg (Type N) 1,750kg (Type G)													
Power consumption	12R : 4.5kVA			16R/20R : 3.7kVA										
A-weighted sound pressure : note-1	Type G : 78dB			Type C/N : 74dB										

※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)			
Number of tools	—		4 tools			
Back 4-Spindle unit	Max. drilling capability	Stationary tool	φ8mm (5/16in)			
		Power driven tool	φ6mm (15/64in)			
	Max. tapping capability	Stationary tool	M6×P1.0			
		Power driven tool	M5×P0.8			
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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