CNC SWISS TYPE AUTOMATIC LATHE **Type A**

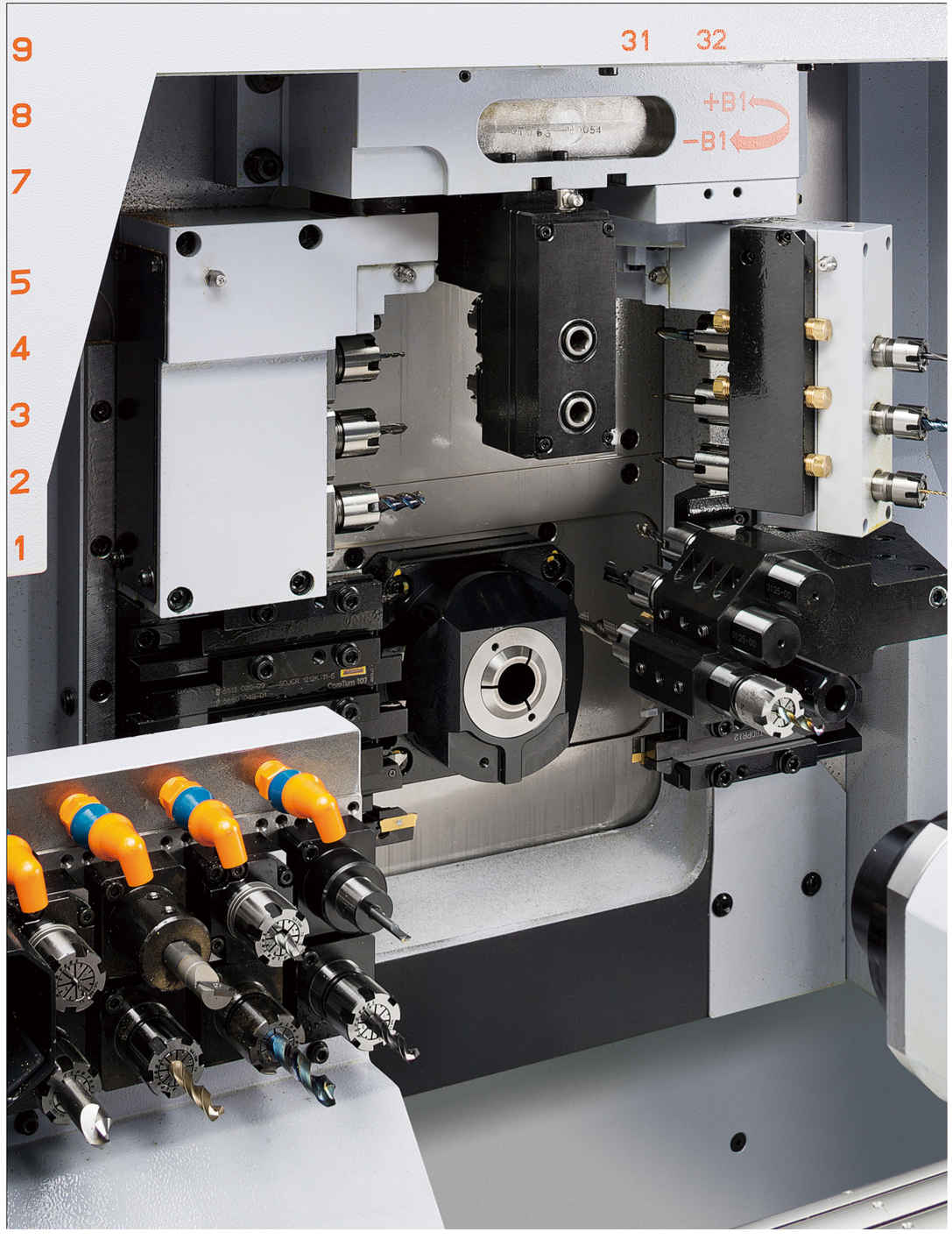
SWISS TYPE AUTOMATIC LATHE equipped with star motion control system **Type B**

SR-20RIV

ECO

STAR Environmental Standards Conformity models :

Impressive Complex Machining to Meet the Needs of Every Field.



A maximum of 41 tools to mount in the 27-position tool station ensures a flexible tooling layout and allows a variety of complex machining.

The most advanced and powerful model in the SR series with upgraded and enhanced functions.
The theme of development is “the next step for complex machining”. Star Micronics aims to be the industry leader by significantly increasing the machining range and decreasing the machining time. This machine has an innovative construction which combines a gantry-type tool post of a uniform load cross guide structure and a tool post especially designed for back-working equipped with a Y-axis control function. A maximum of 41 tools to mount in the 27-position tool station ensures a flexible tooling layout and allows a variety of complex machining

SR-20RIV

type A CNC SWISS TYPE AUTOMATIC LATHE

Control method : CNC control

Machine composition :
Main spindle
Sub spindle
Gantry type tool post (Angle adjustable power-driven tool)
Back 8-spindle unit especially designed (Y-axis control)

type B CNC SWISS TYPE AUTOMATIC LATHE equipped with Star motion control system

Control method : CNC control by Star motion control system

Machine composition :
Main spindle
Sub spindle
Gantry-type tool post (B-axis control power-driven tool unit)
8-spindle unit especially designed for back-working (with Y-axis control)

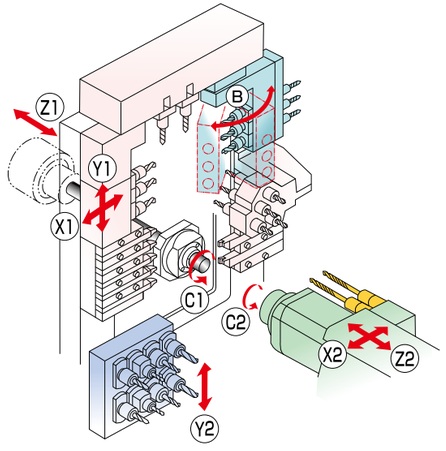


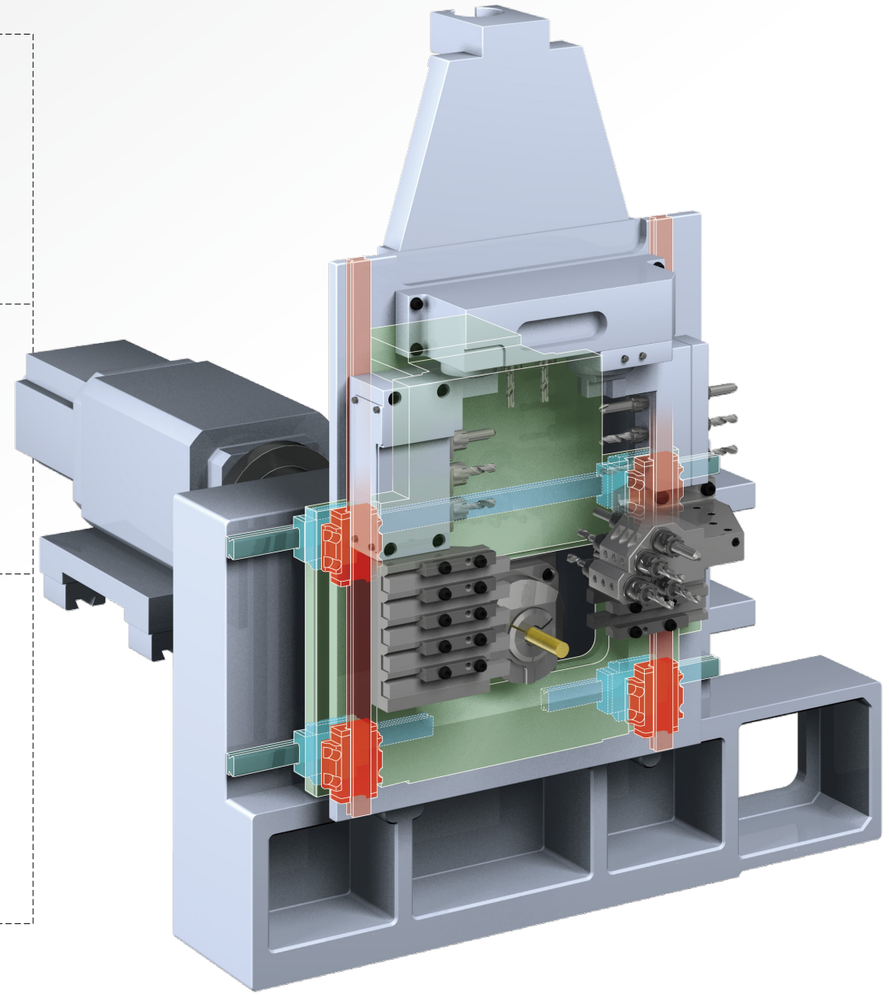
Illustration of tool post : type B

TOOLING SYSTEM

■ Tool holder	Turning tool	7 tools (5 tools on the front / 2 tools on the rear)
■ 4-spindle sleeve holder	Front-end stationary tool	4 tools
	Rear-end stationary tool	4 tools
■ Power-driven tool	Cross machining tool only	3 tools
	Cartridge type	2Pos
	Power-driven tool unit ※	1 Pos (front 3 tools / rear 3 tools)
■ 2-spindle front sleeve holder	Front-end stationary tool	2 tools
■ Back 8-spindle unit	Rear-end stationary tool	Max. 8 tools
	Rear-end power-driven tool	Max. 8 tools

※ type A : Angle adjustable power-driven tool / type B : B-axis control power-driven tool unit

Upgraded Design Features such as Machining Accuracy, Productivity and Environmental Friendliness.



The moment load is applied to eight bearings uniformly at all times even when the X/Y axis moves because the guide bush is positioned in the guide bearing. (See figures ❶, ❷and❸)

Original Technology

Uniform Load Cross Guide Structure | High rigidity tool post

High Accuracy from High Rigidity Design

❶Newly Incorporated Uniform Load Cross Guide Structure

A newly employed tool post, which has eight direct-acting guide bearings uniformly arranged around a point (guide bush) to which a cutting load is applied, is featured. By distributing the load applied during cutting uniformly to eight guide bearings, the moment load applied to each guide bearing is minimized and the rigidity of the tool post is increased. Dynamic stability is also improved to allow long-term continuous operation with stable accuracy and long service life of direct-acting guide bearings.

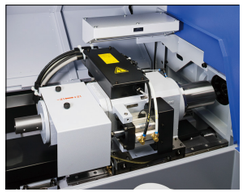
❷Built-in Motor and Sensor

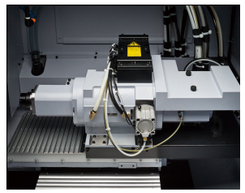
Indexing accuracy is improved by integrating a motor drive and a sensor in the spindle and sub spindle.

Improved Machining Capability by Increased Output Power

❶Rear-end working capability is increased by employing a built-in spindle motor with the same output power as that of the sub spindle and the main spindle.

❷Thanks to the increased power of motors for power-driven tools for cross machining and back-end working, the range of machining is widened for broader range of needs.


Main spindle (built-in type)

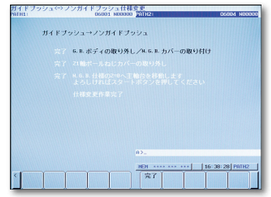

Sub spindle (built-in type)

Non-Guide Bush to Reduce Remnant Bar Length

With the non-guide bush type, the material is clamped close to the machining position so that the remnant bar length is reduced to about 1/3 compared to the Swiss-type lathe. By switching to the non-guide bush type where appropriate, the material cost is reduced.

＊Elimination of the guide bush makes machining of short bars easier and enables material to be used more effectively.

By proceeding with the job in accordance with the procedures displayed on the operation panel, switching from the guide bush type to non-guide bush type is easily accomplished.



Pursuing High Productivity

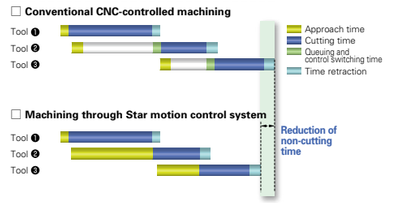
❶The latest CNC unit reduces program processing time significantly.
❷The higher model Type B is equipped with the Star original motion control system to minimize non-cutting time such as control system switching time and tool changing time.
❸High-speed feed at 35m/min (for other than the Y2 axis) is achieved.
❹Acceleration is also improved (1 – 1.2G).
❺A direct C-axis indexing function is provided to reduce the spindle indexing time. The above features are all for productivity enhancement from the aspect of both the mechanical and control systems.

Original Technology

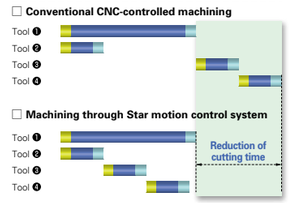
Significant Reduction of Non-Cutting Time | Star Motion Control System

This control system converts the NC program through "optimization" and finishes processing related to switching of the control system in order to enable "tool selection for the next process and approach during cutting" and "tool disengagement and next cutting at the same time".
By this control method, the non-cutting time, which is considered to be a disadvantage for NC-controlled machines, is largely reduced and contributes to improved productivity. - Furthermore, this control system moves each axis while taking the shortest way, utilizing the previous cutting process time to minimize excessive vibration caused by axis feed and contributes to the maintenance of stable machining accuracy.

❶ Concept of reduction of non-cutting time



❷ Concept of cutting time reduction



By the program optimization, the time required for the processes of [Disengagement], [Next tool selection] and [Approach] can be minimized to reduce the non-cutting time.

Pursuit of Environmental Performance

The remnant bar length has been reduced by 15.5mm from that of Version III, hydraulic-less structure for reducing waste oil and power consumption, adoption of powder coating, RoHS-compliant design, etc. are combined to contribute to the effective environmental performance in response to the people- and earth-friendly age.

ECO™
STAR Environmental Standards Conformity models :

STAR Environmental Standards Conformity models

Star Micronics defines machine tools conforming to the following environmental standards as "Star Environmentally Compatible Machines".

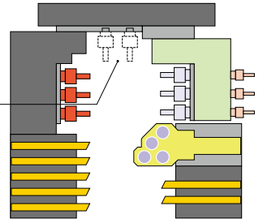
Adaptation Criterion
- Powder-coated external cover
- RoHS compliance part ratio: 99% or more

TOOLING SYSTEM | Gantry-Type Tool Post

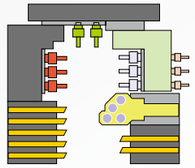
A Wide Variety of Tooling Layouts.

TOOLING SYSTEM | 8-spindle backworking unit

Basic type

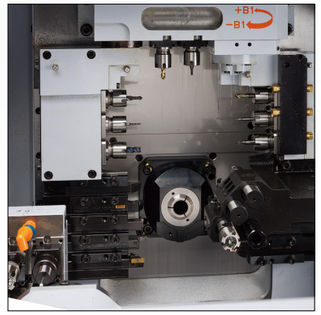


Tool ..... (7 tools)
For cross drilling ..... Power tool (3 spindles)
Sleeve holder ..... Front / rear working stationary tool (4 tools)
B axis controled power-driven tool unit (1 pos.) ..... Front power tool (3 tools) Rear power tool (3 tools)

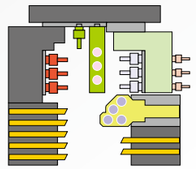


VARIATION **01**

Cartridge (2 pos.)

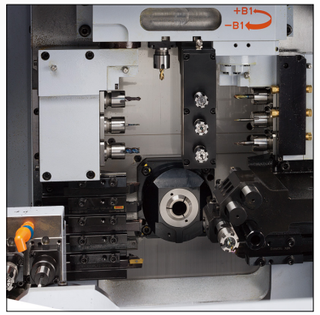


■ Milling unit
■ Milling unit



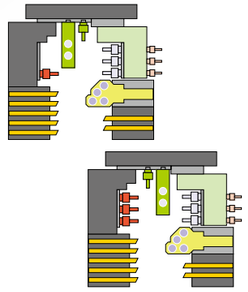
VARIATION **02**

Cartridge (2 pos.)



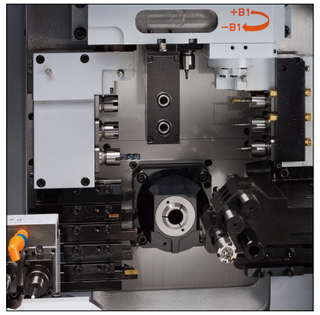
■ Milling unit
■ 3-spindle front drill unit

■ Milling unit
■ 3-spindle opposing type front drill unit



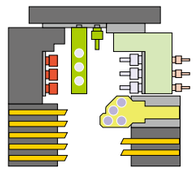
VARIATION **03**

Cartridge (2 pos.)



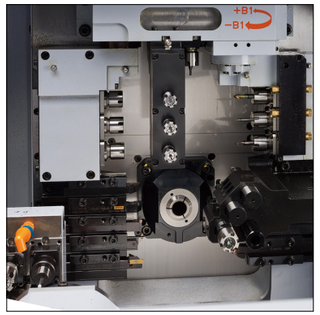
■ 2-spindle front drill unit
■ Milling unit

■ Milling unit
■ 2-spindle front drill unit



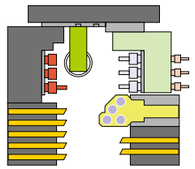
VARIATION **04**

Cartridge (2 pos.)



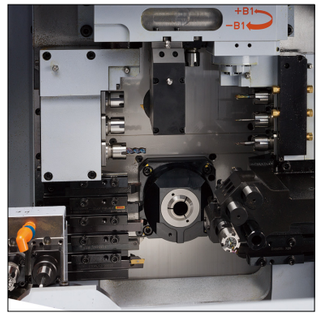
■ 3-spindle front drill unit
■ Milling unit

■ 3-spindle opposing type front drill unit
■ Milling unit

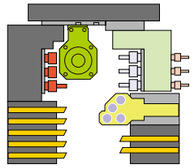


VARIATION **05**

Cartridge (1 pos.)

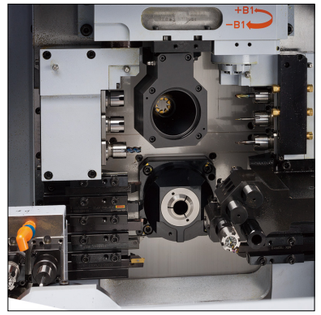


■ Special machining unit mounted (polygon)

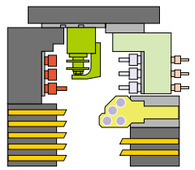


VARIATION **06**

Cartridge (1 pos.)

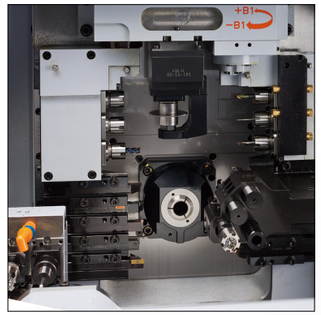


■ Special machining unit mounted (thread whirling)



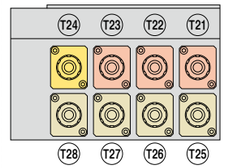
VARIATION **07**

Cartridge (1 pos.)



■ Special machining unit mounted (slotting)

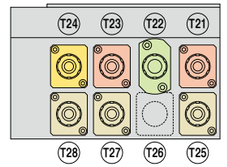
A maximum of 41 tools can be mounted in the 27-position tool station. A full line of tool units includes milling tools, thread whirling tools, slotting tools, polygon turning tools. Therefore, the most suitable tooling pattern can be selected from a wide range of tooling layouts, from a basic type through a front-end power-driven tool oriented type. A 2-spindle drill sleeve holder for deep-hole drilling is also mounted to cover a maximum of 100mm-diameter machining to expand the number of possible machining variations.



- T21 – 23 for all tool units
- T24 for all tool units excluding slotting unit
- T25–T28 for OR1/OT1 type tool units

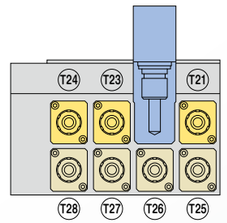
OR1/OT1 type tool unit
Tool units excluding slotting unit
All tool units
541/571/671 type tool unit
Tool units excluding cross drill/slotting units

541/571/671 type unit mounting conditions



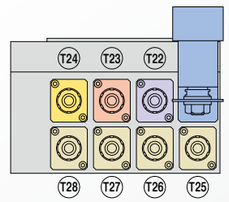
- When the 541/571/671 type tool unit is mounted, other tool units cannot be mounted on the lower position.

Cross drill unit/slotting unit mounting conditions



- **When the cross drill unit is mounted**

The slotting unit cannot be mounted on the neighboring positions.

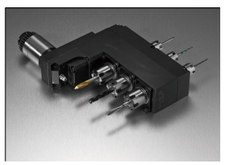


- **When the slotting unit is mounted**

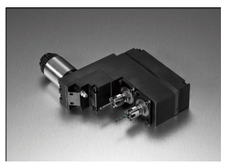
The cross drill unit/slotting unit cannot be mounted on the neighboring positions.

Tool unit (main side)

33150 Milling unit



67161 3-spindle opposing front drill unit



54151 2-spindle face drill unit

68172 Thread whirling unit

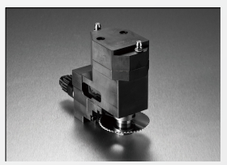
OT191 Polygon machining unit

54153 Slotting unit

Tool unit (back side)

OR161 Milling unit

OR151 Cross drill unit

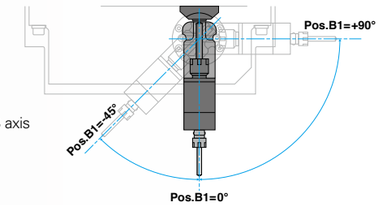


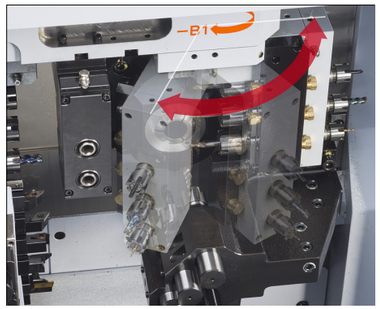
OR165 Slotting unit

A Broad Range of Machining Variations, Using the 27-Position Tool Station.

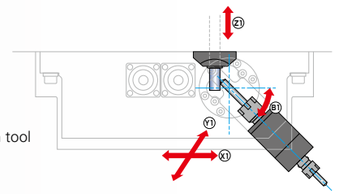
■ The 27-position tool station can accommodate a maximum of 41 tools to allow a variety of tooling layouts. ■ A B-axis control power-driven tool unit or angle adjustable power-driven tool unit are available. ■ Various tool units mainly for polygon turning and thread whirling are also available. ■ A 2-spindle sleeve holder for deep-hole drilling is mounted to allow a maximum of 100mm-deep hole machining. ■ 8-spindle backworking unit with Y axis allows many different types of complex machining on the rear side.

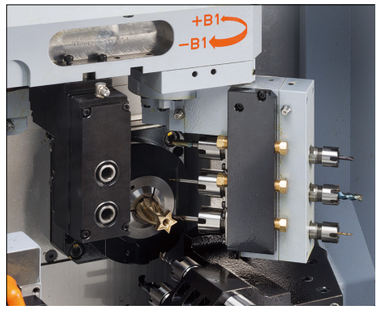
VARIATION 01
Front-end working
B axis swing of power driven-tool with B axis
*type B only



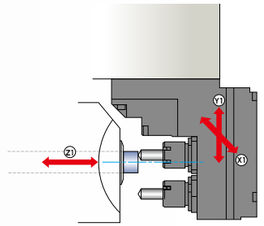


VARIATION 02
Front-end working
Diagonal machining by power-driven tool
with B axis/angle adjustable power-driven tool

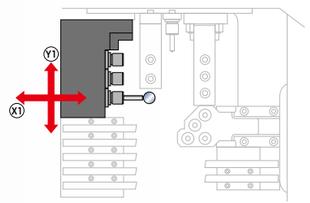


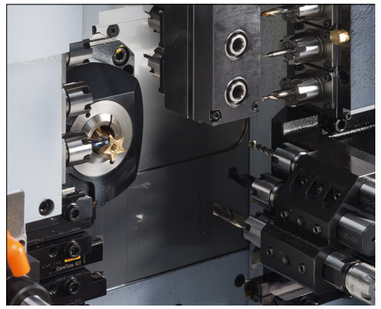


VARIATION 03
Front-end working
Front off-center drilling

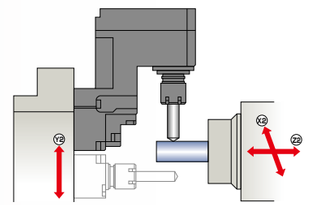


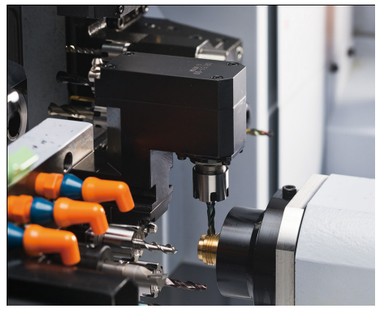
VARIATION 04444
Front-end working
Cross drilling



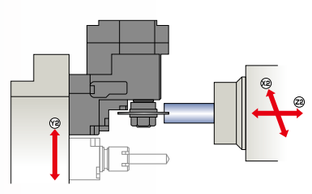


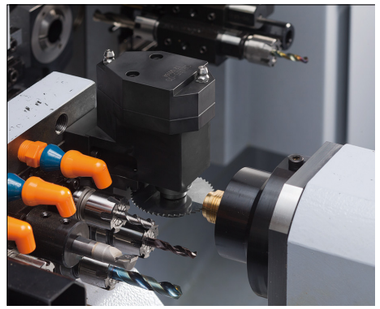
VARIATION 05
Rear-end working
Back cross drilling



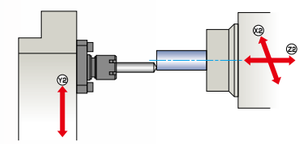


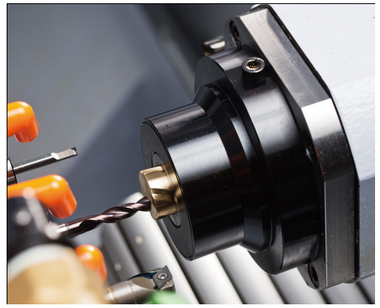
VARIATION 06
Rear-end working
Back slotting



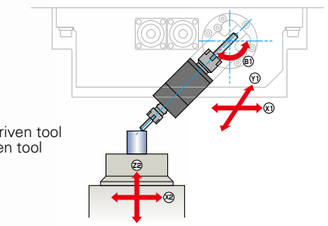


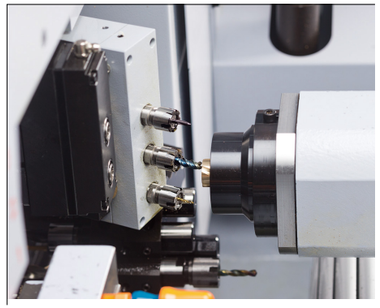
VARIATION 07
Rear-end working
Back off-center drilling



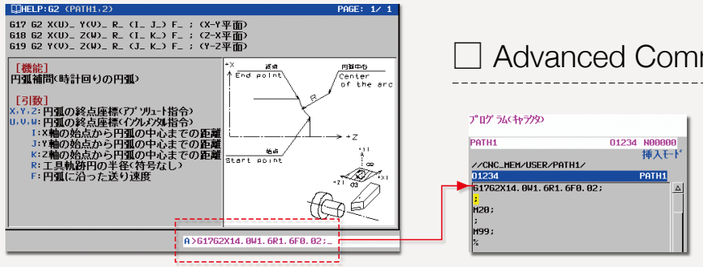


VARIATION 08
Rear-end working
Back diagonal machining using power-driven tool
with B axis/angle adjustable power-driven tool





The NC System Continues to Evolve to be Friendly to Every Operator.



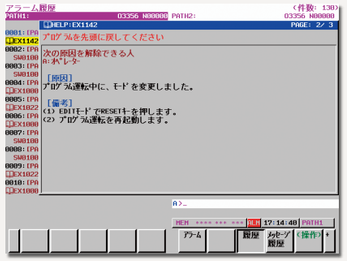
☐ Advanced Command Help Screen

Graphics display on the command help screen eases the monitor of check command details on the screen. This enables understand the help contents more instinctively than the conventional method. By inputting codes while displaying the help contents, insertion into the currently edited program is also possible.

☐ A count arrival forecast function is newly added to the tool life management.

Tool life can be managed for each tool number. The count arrival forecast function also gives warning through the count arrival forecast time display, tool counter red display and operator message (No. 2047) display if any tool life is expected to expire within 24 hours. With this function, the operator can prepare a replacement tool before the machine stops and reduce the non-running time.

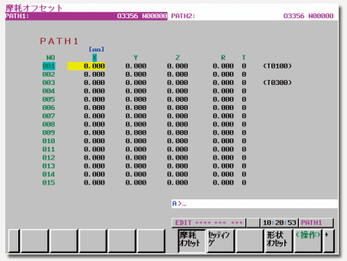
☐ Convenient Alarm Help Function



The Star original alarm help screen is added
When [Help] is selected from the bookmark, the pop-up screen is displayed and alarm details can be checked even if there is no instruction manual. Together with the troubleshooting information, a list of personnel who can remove the alarm is also displayed to clear the problem smoothly.

☐ Convenient Tool Selection Function

A tool selected on the screen can be positioned while the door of the machining chamber is opened. Two buttons need to be pressed at the same time to take safety into consideration during the work.



☐ Convenient Wear Offset Screen

The tool wear offset number which is used is displayed on the right end of the screen during execution of the machining program. This enables to check the applicable offset number easily when changing the offset value.

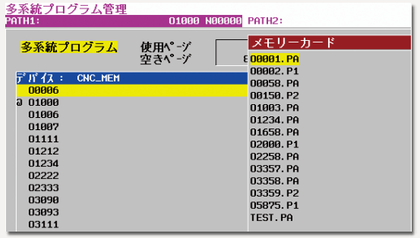
☐ Convenient Undo Function

In case of the wrong input, simply press the [Undo] key to revert back to the previous value.
*The undo function is usable on the wear offset screen and geometry offset screen.

☐ Multi-System Program Control

Program input/output between the NC unit and the memory card can be done by a single operation for all systems. Programs for all systems can be compiled in one file (with extension ".AP"). Copy, delete and new creation can also be done by one operation.

*Files with an extension ".PA" are supported by Star program control software "PU-Jr." Non-compliant models will gradually changed to be compliant in the future.



☐ Simple Spindle Phase Synchronization Function

The spindle phase synchronization for machining profile bars required complicated procedures with conventional models, but this procedure is partially automated by this function. Simple button operation following the instructions displayed on the screen enables smooth adjustment.

☐ Insulation Deterioration Detecting Function Added

nsulation deterioration associated with the servo motor, spindle motor and their power lines is automatically detected. Therefore, potentially hazardous sections can be located before the machine is stopped to enable maintenance and replacement of parts ahead of time.

Standard Machine Specifications

Item		Specifications
Max. machining diameter		φ20mm(25/32in)
Max. headstock stroke	Standard	205mm(8in)
	With R.M.G.B. unit	160mm(6-19/64in)
	Non-guide bush type	Bar diameter×2.5(Max.50mm)(Max.1-31/32in)
Tool		5 tools on the front + 2 tools on the rear (□12mm)
4-Spindle sleeve holder	Number of tools	Front 4 tools
		Rear 4 tools
	Max. drilling capability	φ12mm(1/2in)
	Max. tapping capability	M10×P1.5
2-spindle front sleeve holder	Number of tools(sleeve)	2 tools
	Max. drilling capability	φ10mm(25/64in)
	Max. depth of hole	100mm (3-15/16in)
Power driven attachment	Number of tools	Cross milling : 3 tools
		Cartridge type : At 2 position
	Number of tools (type A)	Angle adjustable power-driven tool : At 1 position (Front 3 tools+Rear 3 tools)
	Number of tools (type B)	B-axis controlled power-driven tool unit : At 1 position (Front 3 tools+Rear 3 tools)
	Max. drilling capability	φ10mm(25/64in)
	Max. tapping capability	M8×P1.25
	Spindle speed	Max.8,000min^{-1}
	Drive motor	2.2kw
Rapid feed rate		35m/min(X1,X2,Y1,Z1,Z2)、15m/min(Y2)
Main spindle indexing angle		C-axis control
Main spindle speed		Max.10,000min^{-1}
Main spindle motor		2.2kw(continuous)／3.7kw(10min./25%ED)
Coolant tank capability		170ℓ
Dimensions (W×D×H)		2,334×1,200×1,700mm
Weight		2,600kg
Power consumption		4.7KVA
A-weighted sound pressure : note-1		Max. 74.5dB

Backworking Attachment Specifications

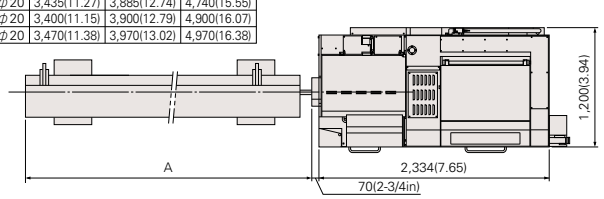
Item			Specifications
Max. chucking diameter			φ20mm(25/32in)
Max. length for front ejection			80mm(3-5/32in)
Max. parts projection length			30mm(1-3/16in)
Back 8-Spindle unit	Number of tools	Stationary tool	8 tools
		Power driven tool	8 tools
	Max. drilling capability	Stationary tool	φ12mm(1/2in)
		Power driven tool	φ6mm(15/64in)
	Max. tapping capability	Stationary tool	M10×P1.5
		Power driven tool	M5×P0.8
Power-driven att. spindle speed			Max.8,000min^{-1}
Power-driven att. drive motor			1.0kw(continuous)/1.2kw(5min./30%ED)
Sub spindle indexing angle			C-axis control
Sub spindle speed			Max.10,000min^{-1}
Sub spindle motor			Built-in motor drive 2.2kw(continuous)／3.7kw(10min./25%ED)

External Dimensions and Floor Space

unit : mm(ft)

●Bar Feede

Type \ Length	Max. dia.	Amm(ft) 2.5M	3.0M	4.0M
ASR X-20P	φ20	3,851(12.63)	4,351(14.27)	5,351(17.55)
OS20S	φ20	3,340(10.95)	3,840(12.59)	—
OS203E	φ20	3,435(11.27)	3,885(12.74)	4,740(15.55)
OS20RE	φ20	3,400(11.15)	3,900(12.79)	4,900(16.07)
S204	φ20	3,470(11.38)	3,970(13.02)	4,970(16.38)



Overall height : 1,700mm(5.58ft)

Standard Accessories and Functions

1. CNC unit FANUC 31i-B (typeA)
   CNC unit FANUC 31i-B5 (typeB)
2. Operation panel 10.4-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. 5-station tool holder □12mm
15. 2-station tool holder □12mm
16. Main tool post tool rotation drive unit
17. Cross milling tool unit (3-tool type)
18. Angle adjustable power-driven tool unit (Type A)
19. B-axis controlled power-driven tool unit (Type B)
20. 4-spindle sleeve holder
21. Back 8-spindle unit
22. Drive unit for power-driven attachment B
23. Y-axis control for back-working tool post
24. Parts ejector (Spring type)
25. Parts conveyor
26. Air purge for revolving guide bush
27. Sub spindle air purge unit
28. Sub spindle air blow unit
29. Work light
30. Leakage breake

Optional Accessories and Functions

1. Coolant flow detector
2. Water removal unit
3. Beacon
4. Parts receptacle in the machine
5. Parts separator unit A
6. Main spindle inner tube
7. Parts ejector (Air cylinder type)
8. Rotary magic guide bush unit
9. Parts ejector with guide tube
10. Parts stopper unit
11. Coolant unit 2.5MPa
12. Coolant unit 6.9MPa
13. Coolant pipings
14. Oil-hole drill type
15. Automatic bar feeder interface
16. Compliant with the RS-232C interface
17. Transformer
18. Safety relay module version
19. Transformer CE marking version
20. Transformer CE marking specifications

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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