

SWISS TYPE AUTOMATIC LATHE equipped with star motion control system 

# SW-20





Rapid and flexible machining of complex components, achievable by the SW-20

# Complicated part machining



SWISS TYPE AUTOMATIC LATHE  
equipped with star motion control system

# SW-20

The Swiss-type automatic lathe SW-20, equipped with the Star Motion Control System strives for reduced idle time for complex parts from the aspect of both the mechanical and control systems. With the fastest speed ever realized, this machine meets the needs of the manufacturing industry where high added value and high productivity are required.

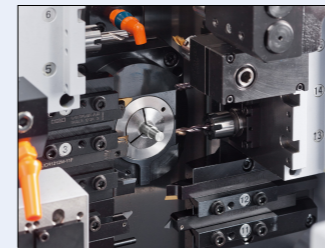
Mechanical and control design to minimize machining time  
and maximize efficiency

## Ultra-high production machine background ①

The combination of the opposing gang-type tool post and back-working tool post with Y-axis control function ensures optimal process operations.

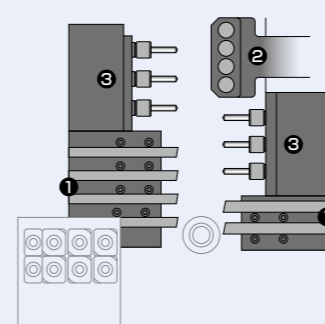
Simultaneous machining by independent control dramatically reduces cutting time. . . .

### Opposing gang-type tool post



An opposing gang-type tool post with rapid tool selection function is arranged for front working. (2-axis control on the front and 3-axis control on the rear side) Each tool post is independently controlled for simultaneous machining (turning, drilling, milling, etc.) in order to reduce machining time.

Front side Rear side



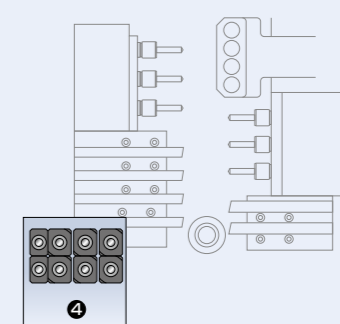
- TOOLING system**
- ① Turning tool 6 pcs.
  - ② Front-end stationary tool 4 pcs.
  - Rear-end stationary tool 2 pcs. (max. 4 pcs.)
  - ③ Power-drive tool 6 pcs.
- CONTROL axis**
- Front side : X1, Y1
  - Rear side : X3, Y3, Z3

Enhanced front/rear simultaneous machining capabilities. . . .

### Back 8-Spindle unit



The tool post exclusively designed for back working is equipped with Y-axis controlled 8-spindle unit. A variety of tooling including a maximum of 8 stationary tools and 6 power-driven tools, can perform extended complex machining on the rear side. These features effectively divide the process into the front-end and rear-end.



- TOOLING system**
- ④ Stationary tool Max. 8 tools
  - Power-driven tool Max. 6 tools
- CONTROL axis**
- Y2 axis

## Ultra-high production machine background ②

The unique Star Motion Control System dramatically reduces idle time.

Control system changeovers, tool changes and arithmetic processing time are shortened by the original Star Motion Control System. This also facilitates optimized timing for M codes and S codes and minimizes non-cutting time. Under the CNC control, the machining process advances from "tool selection" to "approach", "cutting", "retracting", "next tool selection", "approach" and "next cutting" and non-cutting time greatly influence the cycle time. The Star Motion Control System has been developed to reduce this non-cutting time.

### ① Optimized queuing

Queuing in multi-spindle/multi-system machining is optimized so that the idle time for spindle change, weight change, cycle change, etc. is dramatically reduced.

### ② Pre-analysis of NC codes

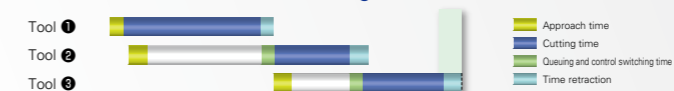
Through optimization, NC codes (buffering, nose R calculation, coordinate system setting, etc.) can be previously analyzed, which contributes to the reduction of arithmetic processing time.

### ③ Automatic creation of command data during multiple operations

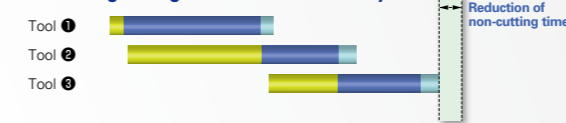
Data for commanding multiple operations can be automatically created by optimized operation. The next operation can be started without waiting for signal processing or checking for operation completion.

### Concept of reduction of non-cutting time

#### Conventional CNC-controlled machining

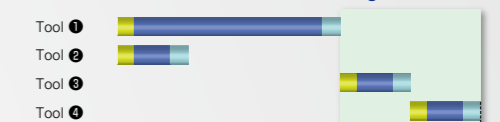


#### Machining through Star motion control system

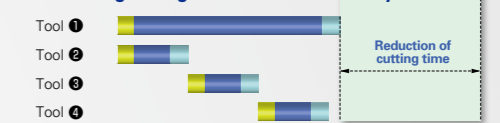


### Concept of cutting time reduction

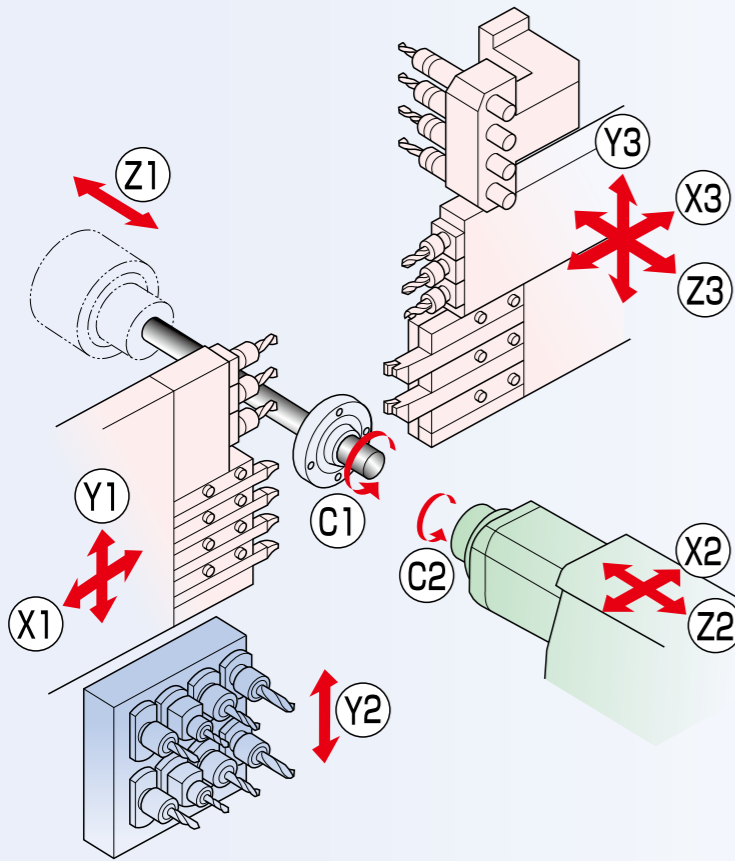
#### Conventional CNC-controlled machining



#### Machining through Star motion control system







### High productivity

#### ● Opposing gang-type tool post

Thanks to simultaneous machining (turning + drilling) by independently controlled opposing gang-type tool posts, machining time drastically reduced.

#### ● Back working tool post (with Y-axis control) exclusively designed for 8-spindle capability

The machine employs a tool post (with Y-axis control) which is exclusively designed for 8-spindle back working. It enables efficient separation division through enhanced simultaneous machining on both the front and rear sides.

#### ● Star Motion Control System

The unique control technology known as the Star Motion Control System achieves a smooth and uninterrupted tool path and achieves shortened non-cutting time.

#### ● Electric Drives

By eliminating hydraulically driven equipment and introducing electrically-driven equipment, idle time between each axis operation is reduced and energy saving is achieved.

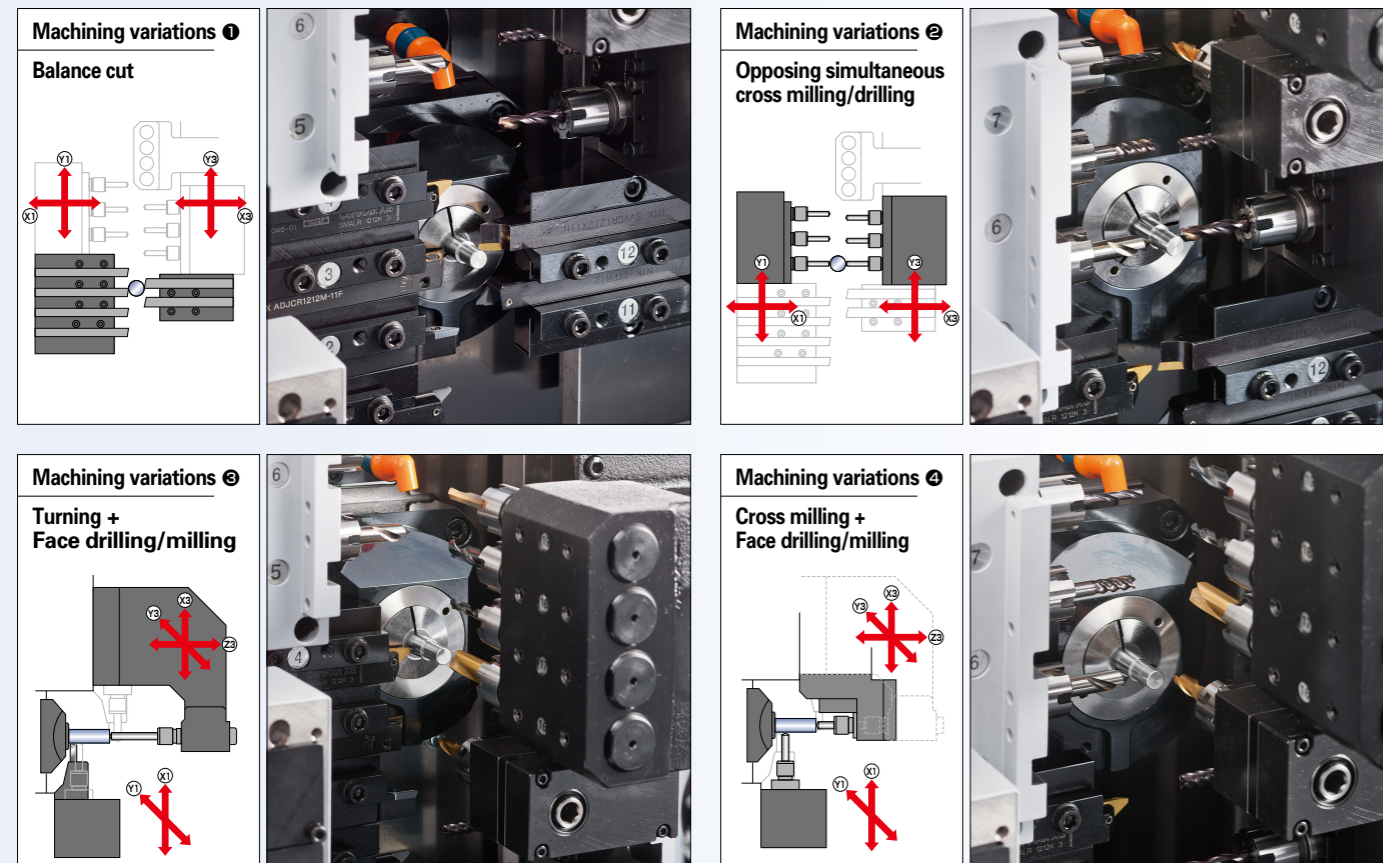
#### ● Chucking unit

The collet can be opened/closed without decreasing the spindle rotation speed, thus reducing the non-cutting time at the time of spindle acceleration/deceleration.



### Verification of ultra-high production machine Machining variations

With an independently controlled, opposing gang-type tool post, "versatile simultaneous machining" is achieved and machining time is vastly reduced!



### Strengthened machining capability

#### ● A tool post (with Y-axis control) exclusively designed for 8-spindle back working

The tool post designed for back working can accommodate a maximum of 6 power-driven tools to allow versatile complex machining (cross milling, slotting, etc.) on the rear side.

#### ● High-power sub spindle

The sub spindle employs a spindle motor with the same power as the main spindle. This improves the machining capability on the back side and accommodates the machining of a range of difficult materials.

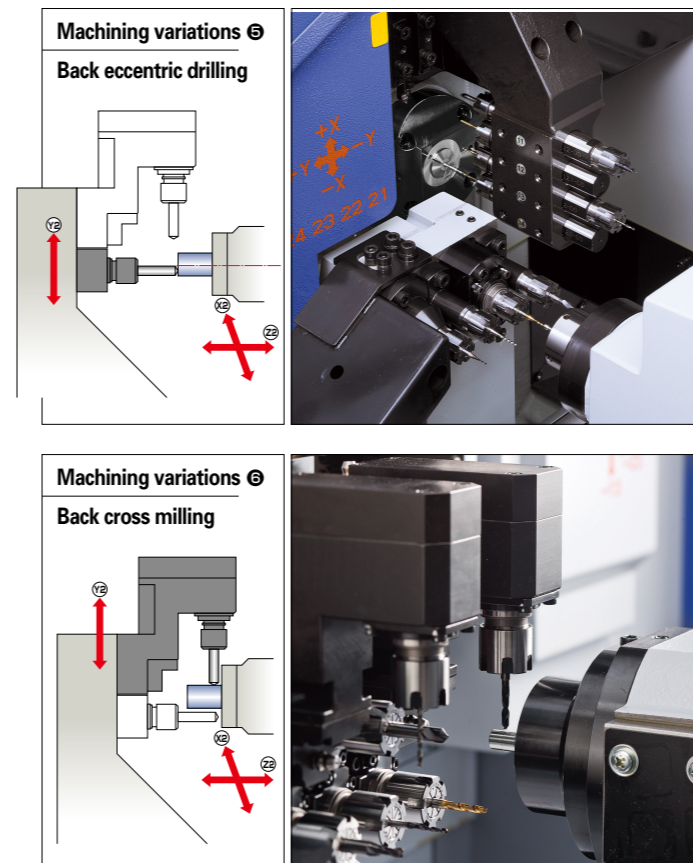
#### ● Machining of demanding materials

In combination with a high-pressure coolant unit (optional), this model is suited to the machining of a range of exotic materials.



### Verification of ultra-high production machine Machining variations

With a tool post (with Y-axis control) exclusively designed for 8-spindle back working, "versatile back working" is achieved for optimal machining process.



### Improved operability and workability

Thanks to the latest NC unit, a range of new functions are available to improve both operability and workability.

#### [ Major new functions ]

##### Alarm help function

- Contents of alarms can be checked on the NC screen.

##### Program check function

- Contents of created programs can be checked in advance.

##### Code help function

- Contents of codes can be checked on the NC screen.

##### Manual handle retrace function

- A program can be checked, using the actual machine, through operation with manual pulse generator (in forward/reverse directions).

##### Key operation protective function

- By using a timer to set a time to depress each key, the machine can be prevented from malfunctioning.

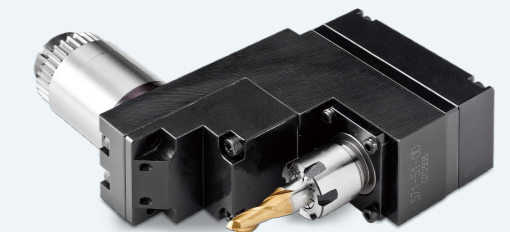
##### Product counter screen display function

- Estimated time to count-up is displayed.

### Examples of SW-20 machining unit

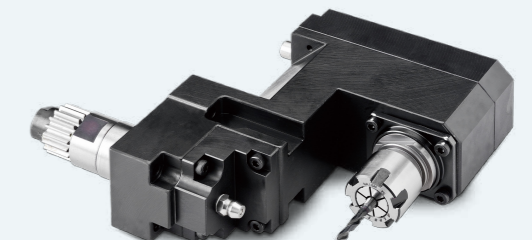
#### Front drilling unit

Refer to the machining variation 4.



#### Back cross milling unit

Refer to the machining variation 6.



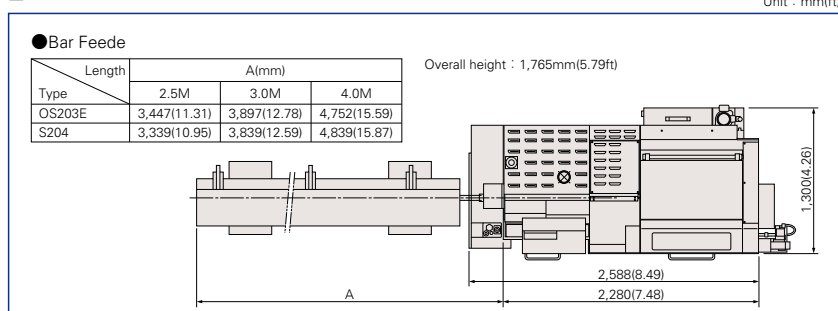
## □ Standard Machine Specifications

Item		Specifications
Max. machining diameter		φ20mm(25/32in)
Max. headstock stroke	Standard	205mm(8in)
	With R.M.G.B.	175mm(6-57/64in)
Tool post configuration	Front	Turning tool + Power-driven tool
	Rear	Turning tool+4-spindle sleeve holder+Power-driven tool
Number of tools	Front	4 tools
	Rear	2 tools
Tool shank		□12mm / □16mm
4-spindle sleeve holder	Number of tools	Front 4 tools Rear 4 tools
	Max. drilling capability	φ10mm(25/64in)
	Max. tapping capability	M8×P1.25
Power driven att.	Number of tools	Front 3 tools Rear 3 tools
	Max. drilling capability	φ8mm(5/16in)
	Max. tapping capability	M6×P1.0
	Spindle speed	Max.8,000min <sup>-1</sup>
	Drive motor	1.0kW(continuous)/1.2kW(5min./30%ED)
Rapid feed rate		35m/min(X2,Z1,Z2,Y1,Y3)、20m/min(X1,Y2,X3,Z3)
Main spindle indexing angle		C-axis control
Main spindle speed		Max.10,000min <sup>-1</sup>
Main spindle motor		2.2kW(continuous)/3.7kW(10min./25%ED)
Coolant tank capacity		150ℓ
Dimensions (WxDxH)		2,588×1,300×1,765mm
Center height		1,040mm(3.41ft)
Weight		3,400kg
Power consumption		4.8kVA
A-weighted sound pressure : note-1		Max.70dB (A)

## □ 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 Max.8 tools Power driven tool Max.6 tools
	Max. drilling capability	Stationary tool φ10mm(25/64in) Power driven tool φ8mm(5/16in)
	Max. tapping capability	Stationary tool M8×P1.25 Power driven tool M6×P1.0
	Power-driven att. spindle speed	Max.8,000min <sup>-1</sup>
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 <sup>-1</sup>
Sub spindle motor		2.2kW(continuous)/3.7kW(10min./25%ED)

## □ External Dimensions



## □ Standard Accessories and Functions

- CNC unit FANUC 31i-B5
- Operation panel 10.4-inch color LCD display
- Pneumatic unit
- Automatic centralized lubrication unit
- Coolant level detector (lower limit)
- Door interlock system
- Broken cutoff tool detector
- Drive unit for revolving guide bush
- C-axis control unit (Main/Sub)
- Spindle clamp unit (Main/Sub)
- Drive system for power-driven tool (for the tool posts 1 and 2)
- 4-Spindle sleeve holder
- Back 8-Spindle unit
- Drive unit for power-driven attachment B
- Parts ejector (Spring type)
- Air purge for revolving guide bush
- Sub spindle air purge unit
- Sub spindle air blow unit
- Parts separator
- Automatic bar feeder interface
- Work light
- Leakage breaker

## □ Optional Accessories and Functions

- Revolving guide bush
- Rotary magic guide bush unit
- Collet (Main/Sub)
- 2-station tool holder (□12mm/□16mm)
- 4-station tool holder (□12mm/□16mm)
- Parts conveyor
- Parts ejector
- Parts ejector (Spring type rotary ver.)
- Parts separator unit A
- Barstock gripping unit
- Parts ejector with guide tube
- Parts stopper unit
- Main spindle inner tube
- Coolant unit 2.5MPa
- Coolant unit 6.9MPa
- Coolant unit 0.7MPa
- Coolant pipings
- Coolant flow detector
- Parts ejection detector
- Warning light
- Water separator
- Compliant with the RS-232C interface
- Transformer
- Transformer CE marking version
- 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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