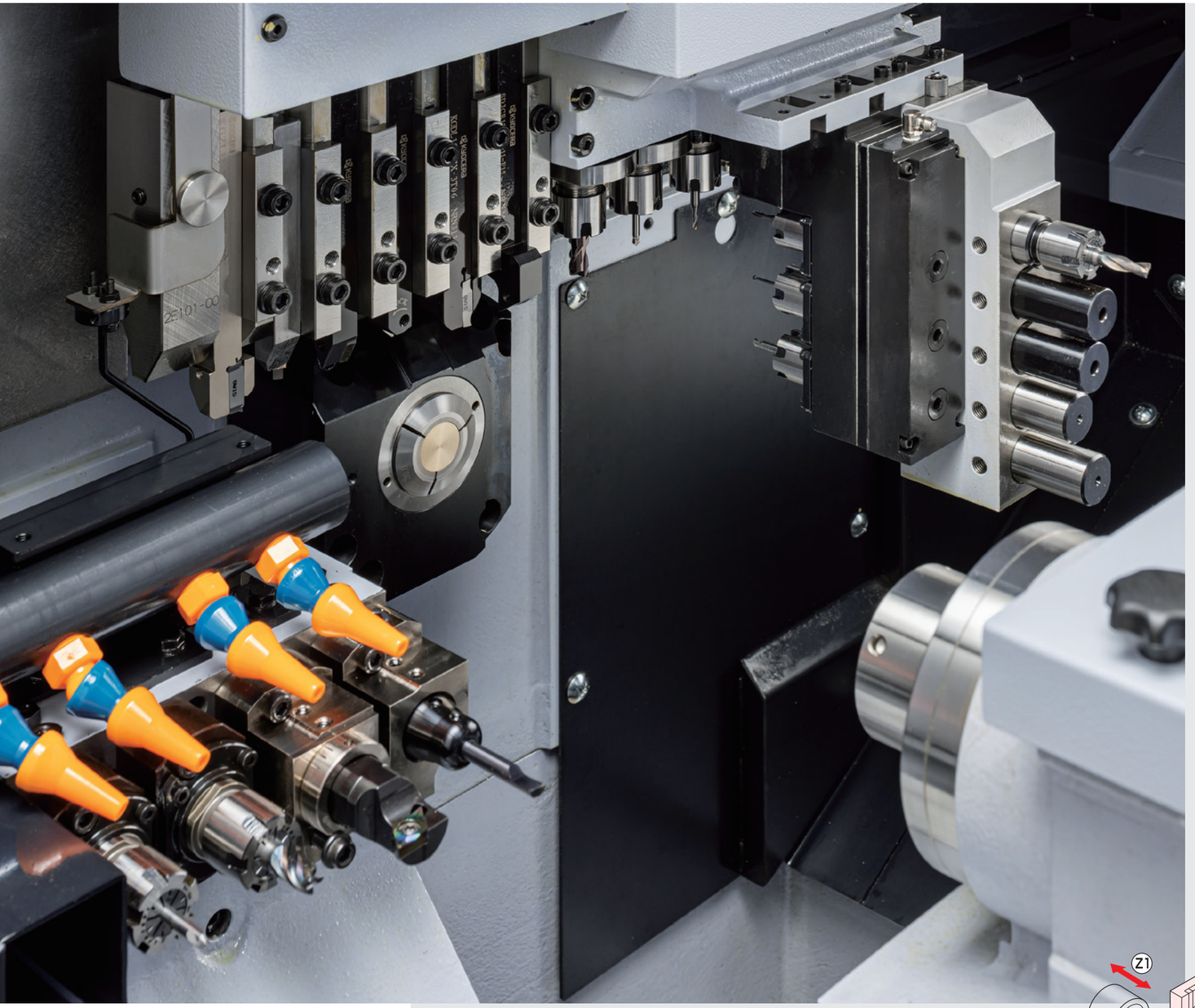
CNC SWISS TYPE AUTOMATIC LATHE

SB-20RII



ECO

STAR Environmental Standards Conformity models



The machine was created as a result of an obsession with evolution and choice, by focusing even more on the needs of the times. This is the latest SB-R model.
An even more “usable” Swiss-type automatic lathe that takes you into the future of parts machining.

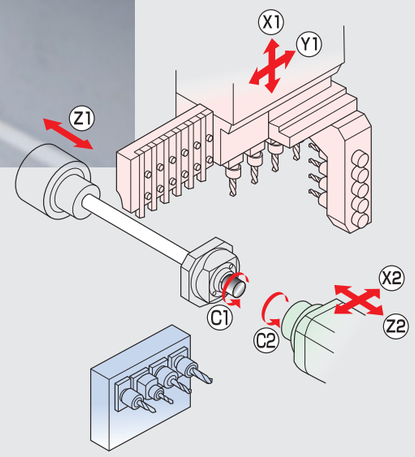
CNC SWISS TYPE AUTOMATIC LATHE

SB-20RII

For example, the cartridge-type 5-spindle cross-drilling unit realizes a wide variety of tooling. The optional sub spindle torque up specification allows for a wider range of machining. The latest SB was born in pursuit of the functionality and performance demanded today, based on the series' traditional high-rigidity structure, such as handling workpieces up to dia. 25.4 mm... that is the SB-20RII.
This is the evolution of a Long-running model that meets your expectations.

The latest SB-R model was born in pursuit of the functionality and performance needed today,
based on the series' traditional high-rigidity structure.







✻N.G.B.

TOOLING SYSTEM

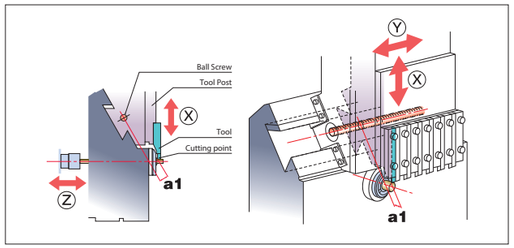
Gang type Tool post (Cartridge-type 5-spindle cross drilling unit)		
○ Tool holder	Turning tool	6 tools (12 mm)
		5 tools (16 mm)
○ Sleeve holder	Front-end stationary tool	4 tools (φ22×2, φ32×2)
		5 tools (φ22×5)
○ Power-driven tool	Tool dedicated to cross drilling	2-spindle (ER16)
	Cartridge type	3 pos.
Tool post dedicated to back working unit		
○ Back 4 spindle unit	Stationary/Power-driven	Max. 4 tools (OP:Max. 2 tools)

CONTROL SYSTEM

❶ FANUC Series 0i-TF Plus (10.4 inch color display)
❷ MITSUBISHI M80V (10.4 inch color touch panel display)

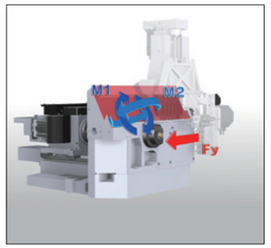
DESIGN POINT 1 High rigidity, high precise, and long-life

A rigid tool post with a slanted dovetail slideway structure



● The gang tool post is installed for front machining with a Slanted Dovetail Slideway Structure for high rigidity. In addition, both Y1 and X1 axes have a dovetail slideway to achieve higher machining rigidity of the sliding unit.

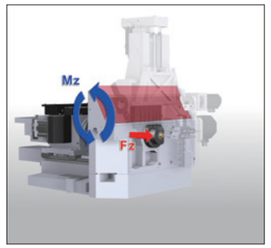
The slanted dovetail structure of the Y-axis slideway of the tool post allows the slideways of the X and Y axes to be radially configured close to the cutting point, increasing the machine rigidity. Since this also enables the cutting point to be located near the line through the center of the ball screw in parallel with the Y-axis slideway (a1), the moment load from the cutting resistance is reduced to improve tool post rigidity in the directions of the Y-axis and Z-axis, thus extending the tool life and assuring highly accurate machining.



● 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 My. The My of the slant type is the smallest when compared to that of the vertical type and horizontal type.

Slant type ● My=1
Vertical type ● My=1.3
Horizontal type ● My=1.9



● Comparison of moment load by feed force

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

Slant type ● Mz=1
Vertical type ● Mz=1.3
Horizontal type ● Mz=1.5

DESIGN POINT 2 Optimization

You can choose the best specifications to fit the overall length of the workpiece.

● Equipped with G.B./N.G.B. switchover function

Can flexibly respond to your machining needs through selection of optimal specifications according to part length, such as workpiece deflection prevention in the G.B specification for long-length parts, and reducing remaining material length in the N.G.B. specification for short-length parts. Work procedure guidance is displayed on the operation screen, making switching operations easy.parts. Work procedure guidance is displayed on the operation screen, making switchover operations easy.

DESIGN POINT 3 High precision

The design embodies functions suitable for the required precision

● Employs built-in spindle drive for the main spindle. The belt-driven sub spindle is also equipped with a built-in sensor, realizing high precision.

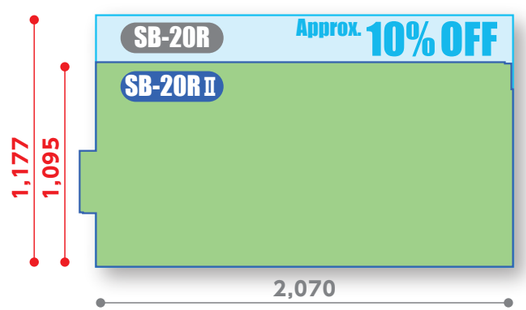
● The thermal sensors installed in various machine positions achieve highly precise and flexible thermal displacement correction.

● Oil mist cooling to the power-driven tool gearbox on the front tool post suppresses excessive heat generation and assures stable machining.

DESIGN POINT 4 Reduced floor space

Approximately 10% smaller footprint than SB-20R

● SB-20R：2,070 × 1,177 × 1,760 (W × D × H)
● SB-20R II：2,070 × 1,095 × 1,775 (W × D × H)



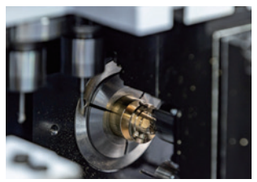
DESIGN POINT 5 High productivity

We pursue machining capabilities that satisfy the required functions

● For turning tools, you can select from 5-tool (16 mm)/6-tool (12 mm) specifications.
● For the sleeve holder for drilling, you can select from the 4-spindle type (φ22×2, φ32×2)/5-spindle type (φ22×5).
● Cartridge-type 5-spindle cross drilling unit come standard. The cartridge 3 pos. is equipped with a variety of tools that can do polygon machining, thread-whirling, and so on, realizing flexible tooling according to the parts being machined.
● The dedicated cross positions (2 pos.) of the cartridge-type 5-spindle cross drilling unit employ the ER16 to improve machining capability (*1).
● A 1.5/2.2 kW spindle motor is employed on the sub spindle to improve output (*2). Even the sub spindle realizes a maximum speed of 10000min^{-1}.
● The sub spindle torque up version is optional (*3). M8 tapping is possible on the sub spindle side.
● With oversize specifications, capable of machining up to φ25.4 mm with both the main and sub spindles.
● Equipped with back 4-spindle unit only for rear-end machining (can be equipped with stationary/power-driven tools). Realizes shorter cycle times with front-end/rear-end overlap machining.

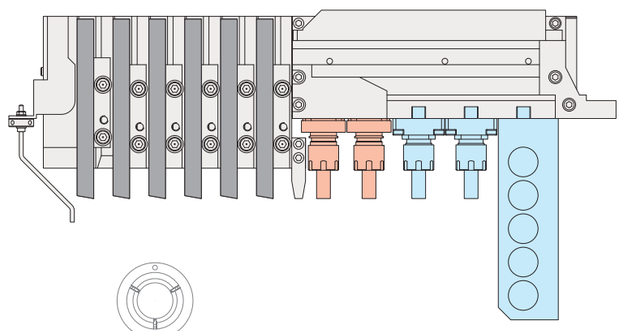
*1. The SB-20R employs ER11
*2. SB-20R: 0.55/1.1 kW, maximum speed 9000min^{-1}
*3. Sub spindle maximum speed when equipped with torque up version: 8000min^{-1}





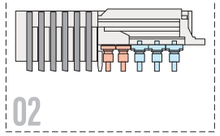

Tool post configuration and tooling variation (Example)

● Cartridge-type 5-spindle cross drilling unit

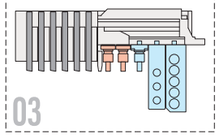


01 Milling unit (2 pos.)
Sleeve holder (1 pos.)

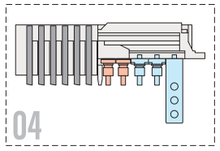
Tool (6pcs / 7 pcs)
For cross drilling only (power tool / 2 spindle)
Cartridge-type (3Pos.)



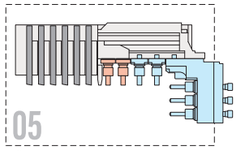
02
Milling unit (3 pos.)



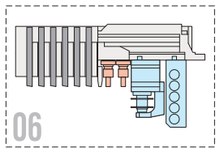
03
Milling unit (1 pos.)
3-spindle counter face drilling unit (1 pos.)
Sleeve holder (1 pos.)



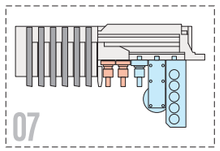
04
Milling unit (2 pos.)
3-spindle counter face drilling unit (1 pos.)



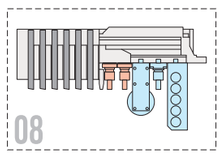
05
Milling unit (2 pos.)
3-spindle front drilling unit (1 pos.)



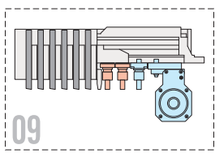
06
Slotting unit (1 pos.)
Sleeve holder (1 pos.)



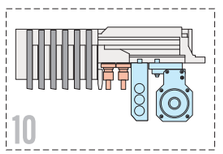
07
Milling unit (1 pos.)
Polygon machining unit (1 pos.)
Sleeve holder (1 pos.)



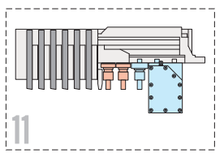
08
Polygon machining unit (1 pos.)
Milling unit (1 pos.)
Sleeve holder (1 pos.)



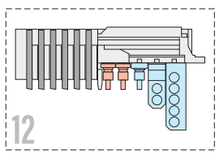
09
Milling unit (1 pos.)
Thread whirling unit (1 pos.)



10
Sleeve holder (1 pos.)
Thread whirling unit (1 pos.)



11
Milling unit (1 pos.)
High speed 4sp. Front drilling unit (1 Pos.)



12
Milling unit (1 pos.)
2-Spindle unit for deep holes (1 Pos.)
Sleeve holder (1 pos.)

※ Refer to specifications/instruction manual for tool restrictions

Two NC machines to choose from

Operator-friendly operation screen and our own various software



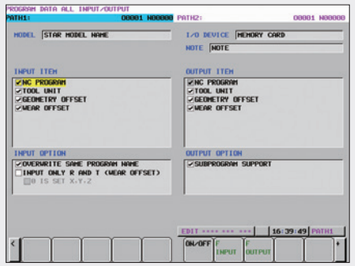
FANUC Series 0i-TF Plus

10.4 inch color LCD display

Program data batch input/output

Can manage and input/output programs, units and offset data at a time

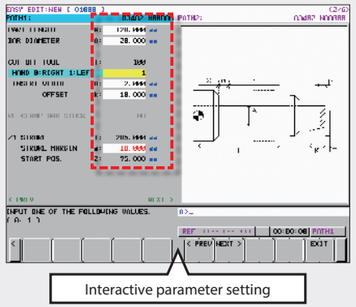
Batch input/output of all NC programs. The currently set offset data can be input/output in batches. The output NC programs can be edited in PU-Jr.



EASY EDIT (OP)

For simpler and smoother programming and operation

A dedicated screen for NC program editing that simplifies complicated procedures such as inserting commands and cycle instructions, and greatly improves program creation efficiency.



Power management screen

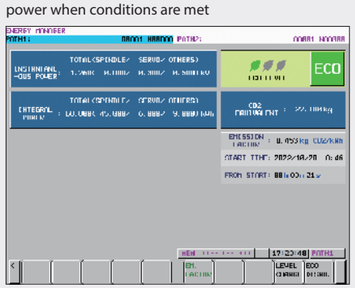
Visualization of power consumption on the power management screen
Reduces standby power in energy-saving mode

Benefit ❶ Visualization of power consumption (power management screen)

Can confirm power consumption for the whole machine, including peripheral devices, on the screen

Benefit ❷ Reduces power consumption (ECO mode)

Can switch on/off ECO mode, for shutting off standby power when conditions are met

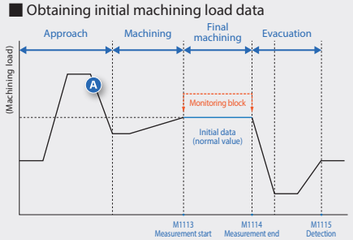


Machining load detection function (OP)

Monitoring the machining load realizes operation/shutdown according to the tool conditions

A function that determines the tool status (breakage, wear, usage limit) by monitoring the load on the motor during cutting.
It prevents machining defects and reduces tool costs.

■ Obtaining initial machining load data



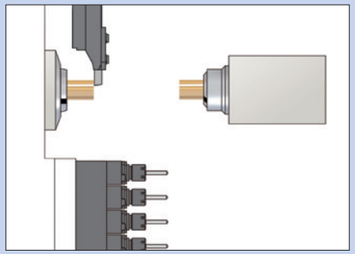
Ⓐ Programmed operation to acquire initial data

FANUC Series 0i-TF Plus/MITSUBISHI M80V common function

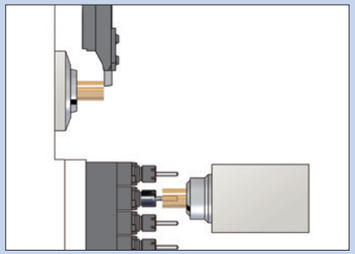
Last part completion mode

Automatic execution of the final workpiece machining without changing the machining program

When the back chuck grips the last one workpiece in a two-system machining cycle, this function stops the main side automatically and performs back machining only to complete the final part. This prevents semi-finished parts on the rear side.



∗Last part taken up by sub spindle

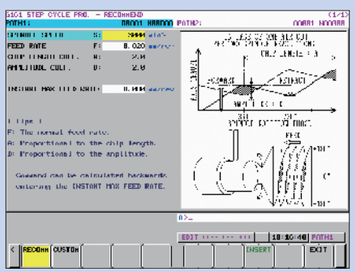


∗Main side stopped and machined only on the rear side

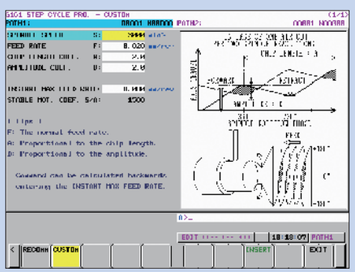
Step Cycle Pro (OP)

Dedicated screen for easy chip breaking.
Trials to assess the effectiveness are available before purchase.

The function is used to assess the breaking effect of cutting chips beforehand. Chips are broken into small pieces and ejected intermittently to prevent chips from tangling with the workpiece. This is a next-generation cutting technology that can handle a variety of machined shapes and materials and reduce issues during cutting.



∗Recommended screen



∗Custom screen

MITSUBISHI M80V

10.4 inch color touch panel display

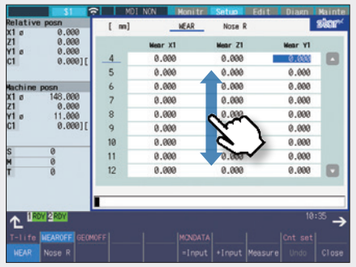


A high-performance CPU realizes high-speed calculations

High-speed processing of G/M code, macros, and PLCs reduces program execution time.
In addition, high-speed calculations in the drive unit and optimal servo adjustments realize agile spindle motion.

Smart operation touch panel

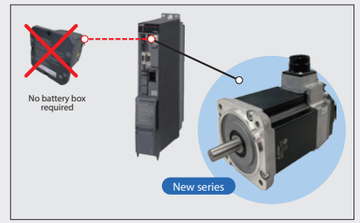
Scrolling and multi-touch functions enable intuitive operation with fewer actions



❶ Smooth navigation to desired screen by swiping the menu display ❷ Simple and quick program editing with scroll and touch operations

Employs latest motor

Greatly improved motor efficiency and maintainability with an encoder without battery



Email notifications

Notifications such as “alarm occurred” and “counter reached” can be sent to smartphone from the NC unit

☐ Built-in wireless LAN comes standard (no need to connect cable to LAN onsite)
☐ Star has proprietary mobile app for using wireless LAN

Download from Google Play Store (Google Play is a trademark of Google LLC.)

Alarm function

Receives and displays alarms from the machine when they occur, and gives instructions on how to deal with them

Displays messages for alarms, history (up to 512 items), analysis (occurrence ratio). In addition, by tapping the alarm number, display the applicable location of the alarm-specific manual (HTML version).

Machining program management

You can input/output ∗ and display programs from the machine.
You can manage images, videos and PDF files by linking with the program name.

∗Program transfer is only when MEMORY INPUT: ON

View of instruction manual

The PDF version of the SB-20RII (MITSUBISHI M80V version) instruction manual can easily be viewed from your smartphone screen using an app.



Standard Machine Specifications

Item		SB-20R Ⅱ
Max. machining diameter		φ20mm(25/32in) OP : φ25.4mm(1in)
Max. headstock stroke	G.B. type	205mm(8in) MR25 : 196mm(7-15/16in)
	N.G.B. type	Bar diameter ×2.5(Max.50mm)(Max.1-31/32in)
Tool		6 tools (□12mm) ／5 tools (□16mm)
sleeve holder	Number of tools 4-tools type	φ22mm ×2 tools 、φ32mm ×2 tools
	Number of tools 5-tools type	φ22mm ×5 tools
	Max. drilling capability	φ12mm
	Max. tapping capability	M10 ×P1.5
Power driven attachment	Number of tools	Cross drilling : 2 spindle (ER16) 、cartridge type : 3 pos. (ER16)
	Max. drilling capability	φ7mm
	Max. tapping capability	M6 ×P1.0
	Maximum speed	Max.8,000min $^{-1}$
	Drive motor	1.2kW
Rapid feed rate		35m ／min (X1, Y1, Z1, X2, Z2)
Main spindle indexing angle		C-axis control
Main spindle speed		Max.10,000min $^{-1}$ (OP : Max.8,000min $^{-1}$)
Main spindle motor		2.2kW (CONT.) ／3.7kW (10min ／25%ED)
Coolant tank capability		180 ℓ
Dimensions(W ×D ×H)		2,070 ×1,095 ×1,775mm
Center height		1,060mm
Weight		Approx. 2,000kg
Power consumption		4.2 kVA
A-weighted sound pressure : note-1		75dB

Backworking Attachment Specifications

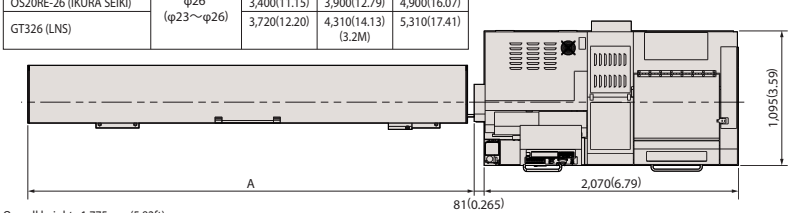
Item		SB-20R Ⅱ
Max. chucking diameter		φ20mm(25/32in) OP : φ25.4mm(1in)
Max. length for front ejection		105mm(4-9/64in)
Max. parts projection length		30mm(1-3/16in)
4-spindle backworking unit	Number of tools	4 tools (Stationary tool ／Power driven tool)
	Max. drilling capability	Stationary tool : φ8mm(φ5/16in) OP : 10mm(25/64in)
		Power driven tool : φ6mm(15/64in)
	Max. tapping capability	Stationary tool : M6 ×P1.0 (OP : M8 ×P1.25)
		Power driven tool : M5 ×P0.8
Sub spindle indexing angle		C-axis control
Sub spindle speed		Max.10,000min $^{-1}$ (OP : Max.8,000min $^{-1}$)
Sub spindle speed control		AC servo drive
Sub spindle motor		1.5kW (CONT.) ／2.2kW （15min ／60%ED）

External Dimensions and Floor Space

unit : mm(ft)

●Bar Feeder

Type \ Length	Max.Bar dia	Amm(ft) 2.5M	3.0M	4.0M
CELSUS 26 (ALPS TOOL)	φ26 (φ23～φ26)	3,180(10.43)	3,680(12.07)	4,680(15.35)
OS20RE-26 (IKURA SEIKI)		3,400(11.15)	3,900(12.79)	4,900(16.07)
GT326 (LNS)		3,720(12.20)	4,310(14.13) (3.2M)	5,310(17.41)



Overall height : 1,775mm (5.82ft)

Standard Accessories and Functions

1. CNC unit FANUC Series 0i-TF Plus
   10.4 inch color LCD display
   CNC unit MITSUBISHI M80V
   10.4 inch color touch panel display
2. Pneumatic unit
3. Water separator
4. Coolant level detector
5. Automatic centralized lubrication unit
6. Door interlock system
7. Broken cut-off tool detector
8. Cs contour control（Main/Sub）
9. Spindle clamp unit（Main/Sub）
10. Drive unit for revolving guide bush
11. Revolving guide bush unit
12. Air purge unit for revolving guide bush
13. Main/Sub collet sleeve
14. Tool holder
15. Sleeve holder
16. Cartridge-type 5-spindle cross drilling unit
17. Sub spindle air purge unit
18. Sub spindle air blow unit
19. Back 4-Spindle unit
20. Work light
21. Earth leakage breaker

Optional Accessories and Functions

1. Beacon
2. Beacon interface
3. Oil mist filter
4. Sub spindle torque up version
5. Drive unit for power driven tool type B
6. Oil air specification of X2 axis
7. Main spindle inner tube
8. Automatic bar feeder interface
9. Steady Rest for Feed Rod
10. Pneumatic unit for rotary magic guide bushes
11. Non-Guide Bush Version
12. Parts ejection detector
13. Parts ejector with Spring
14. Parts ejector with air cylinder
15. Parts ejector with guide tube
16. Parts stopper unit
17. Parts conveyor
18. Parts separator type A
19. Coolant flow detector
20. Coolant unit（0.7MPa/2.5MPa/6.9MPa）
21. Coolant unit signal valve
22. Coolant unit power cable
23. Coolant valve（2.5MPa/6.9MPa）
24. Coolant unit piping
25. Tool holder for coolant thru
26. Expanded I/O module unit
27. Terminal base
28. Chip conveyor hinge type
29. Chip conveyor hinge type long-length
30. Mist collector mounting adaptor
31. LAN/RS232C interface specification

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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