CITIZEN

Cincom

A20

LFV technology

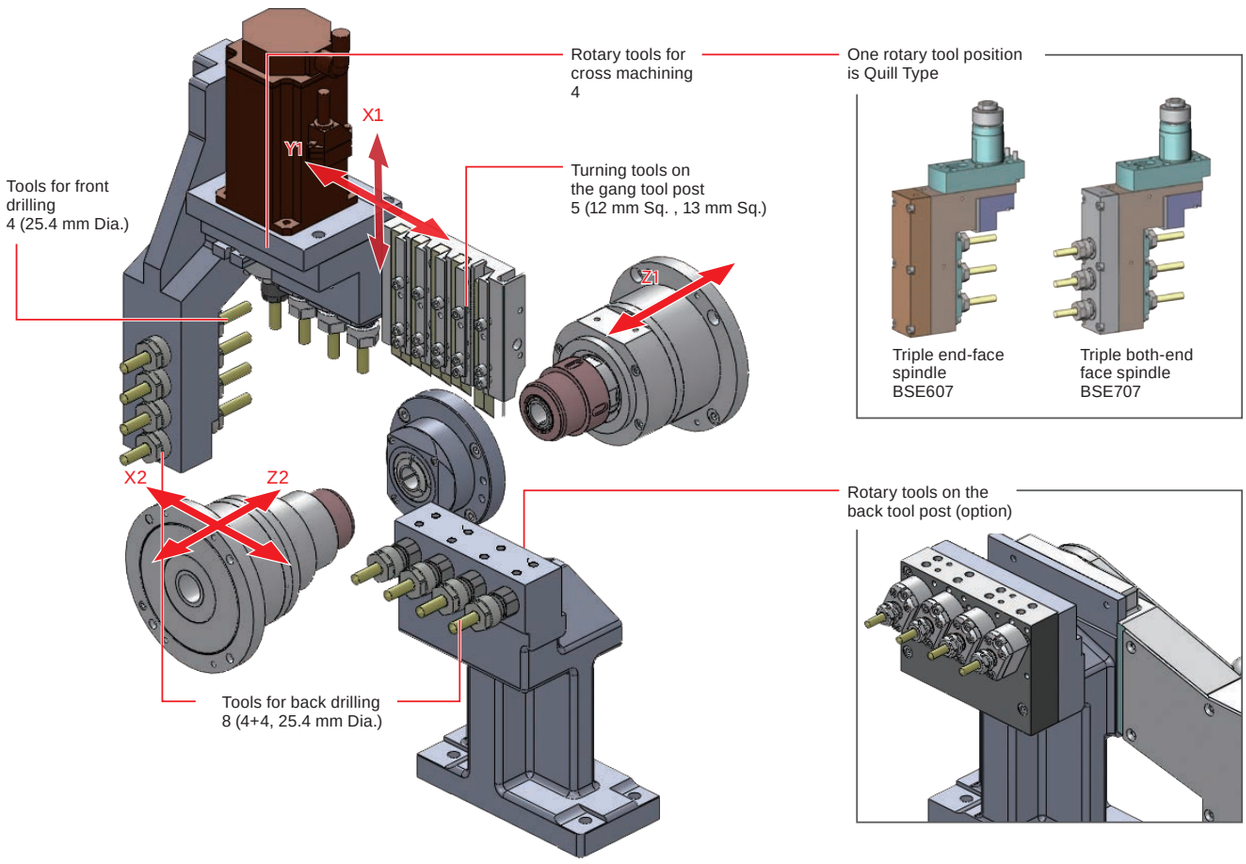
Sliding Headstock Type CNC Automatic Lathe

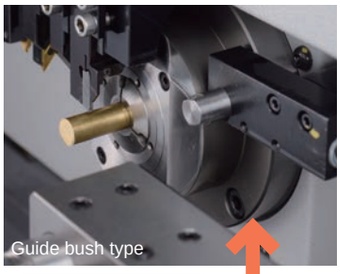
The Citizen A20, an evolving 5-Axis CNC sliding head machine, furthers the quest for cost and performance featuring the ability to switch between guide bush and non-guide bush types.

Acclaimed for its excellent cost to performance ratio, the A20 has evolved as a 5-axis machine for 20mm diameter applications with the advantage that it can be used with or without a guide bush. It can be used as a regular guide bush automatic lathe when machining long slender workpieces, and without a guide bush for shorter parts with minimal bar end remnants. The guide bush can be quickly and simply mounted and removed.

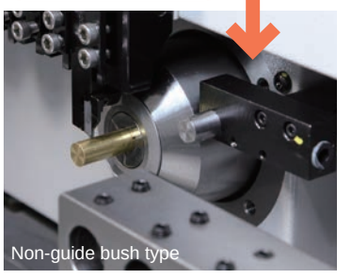
The performance of the machine has been improved too. The high speed 10,000rpm spindle enables optimised machining operations on smaller diameter bar material. The machining length per chucking is now extended to 200mm enabling the number of re-chuckings and therefore cycle times to be reduced when machining long workpieces. As an option, bar material of up to 25mm diameter can also be machined extending the range of workpieces.

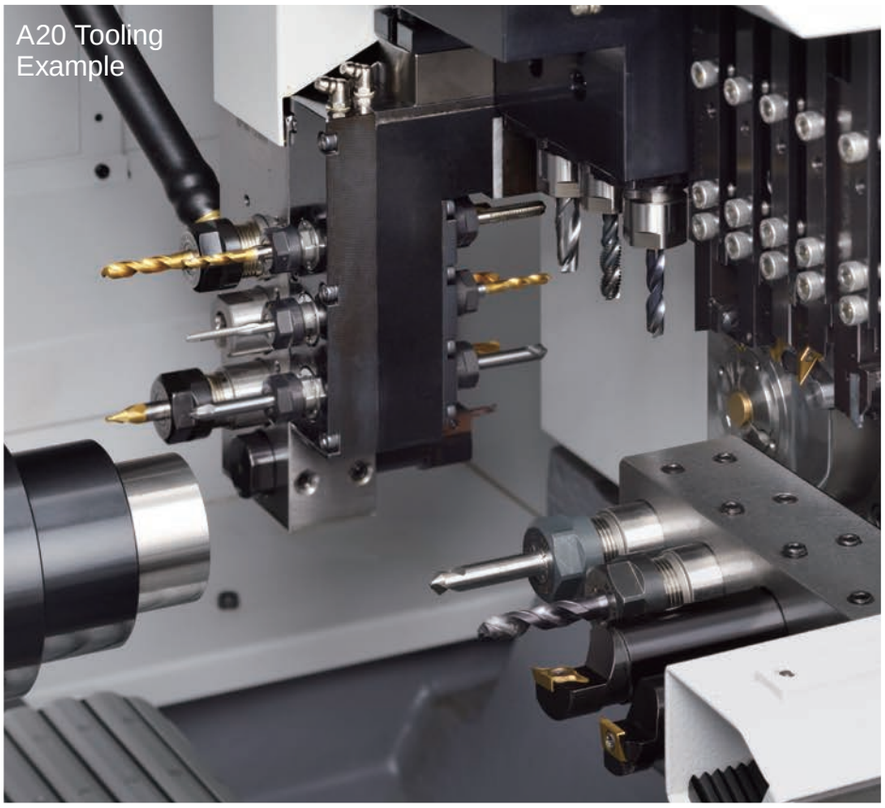
Tooling System





Switchable



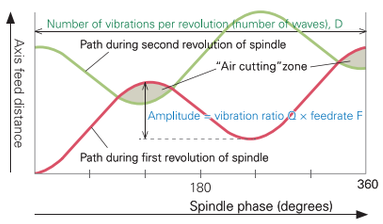


LFV technology

LFV* is a technology for performing machining while vibrating the X and Z servo axes in the cutting direction in synchrony with the rotation of the spindle. It lessens the various problems caused by chips entangling with the product or tool, and is effective for small-diameter deep hole machining and the machining of difficult-to-cut materials.

*LFV is a registered trademark of Citizen Watch Co., Ltd. *Only LFV mode 1 available for A20.

Vibration mode

Item	LFV mode 1
Operation	Multiple vibrations per spindle revolution
Specification	The axes execute multiple vibrations during one spindle revolution, reliably breaking chips up into small pieces.
Application	Ideal for outer/inner diameter machining and groove machining
Waveform	

Comparison of chips

Material: SUS304 Weight: 14.3 g (same scale)

Chips generated by cutting using LFV

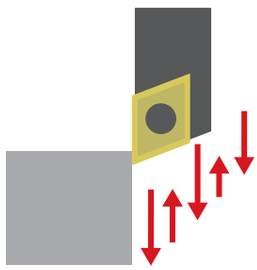
Chips generated by customary cutting

Variety of Machinable Geometries

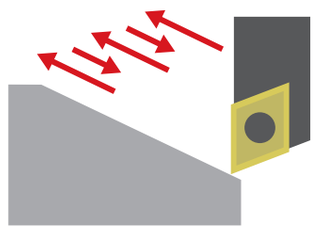
Vibration cutting can handle a variety of types of machining in addition to linear machining on faces, including tapers, arcs, and drilling. Vibration cutting can be turned ON and OFF just by inserting G codes into a program, giving relief from chip entanglement and problems with the tool nose, depending on the material being machined.

Horizontal face

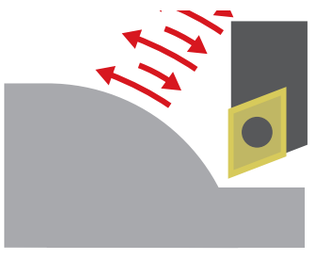
Vertical face



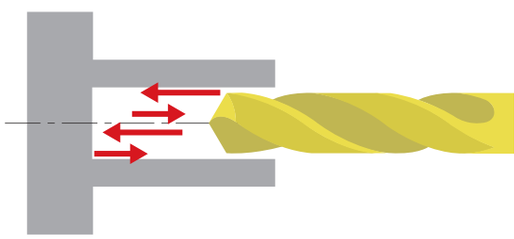
Taper



Arc



Drilling



Along with machine performance, usability has also been upgraded. More speed, more stroke, more capacity = improved productivity.

The A20 features a new capability to switch between guide bush and non-guide bush operating modes. The machine's performance, including spindle speed and machining length per chucking, has been increased. It is designed for ease of use and convenience with good chip clearance for fast set-ups.

Maximum spindle speed of 10,000 rpm.

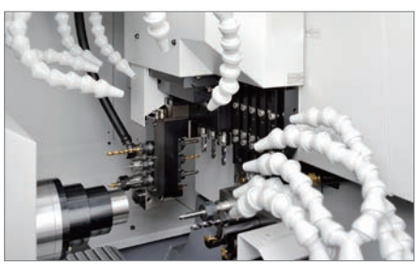
The maximum speed of the front spindle is high at 10,000 rpm enabling optimized machining conditions on small diameter bar material or using small diameter cutting tools.

200 mm/ 1 chucking

A longer 200mm machining stroke reduces the need for re-chucking workpieces hence reducing cycle time.

Support for stock material up to 25 mm diameter (option)

With its spindle through hole diameter of 26 mm, the A20 is capable of machining bar stock up to 25 mm dia. by installing the optional 25 mm size chuck device - enabling a wider range of workpieces to be produced over the standard 20mm machine.



Coolant nozzle

Coolant nozzles are provided at the appropriate locations to ensure that sufficient coolant can be supplied to the point of machining.

Parts collection

The large collection box reduces the frequency of emptying. The optional workpiece conveyor discharges to the left front of the machine.

Work light

Low energy illumination is provided as standard in the machining area giving an environment that is bright with ideal visibility.

Coolant tank/chip collection box

A 150-litre coolant tank is standard, enabling extended periods of operation. The chip outlet port has been increased to improve chip removal. Optional chip conveyors are available to suit the type of chip material.

Adjustable operation panel

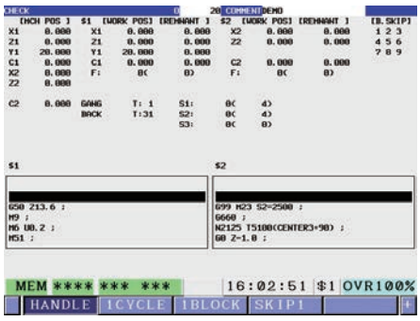
The pivoting operation panel enables easy operation whilst simultaneously viewing the machining process.

USB/PC card slot

NC programs can be input and output using the USB slot or PC card slot on the front face of the control panel.

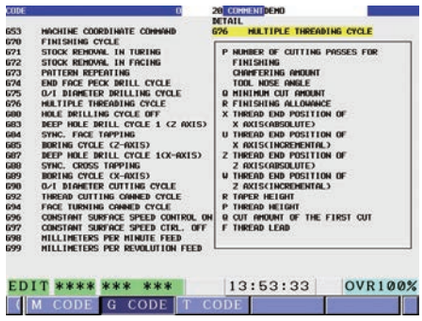
Clear for Anyone

Screen Display is Easy to View and Read



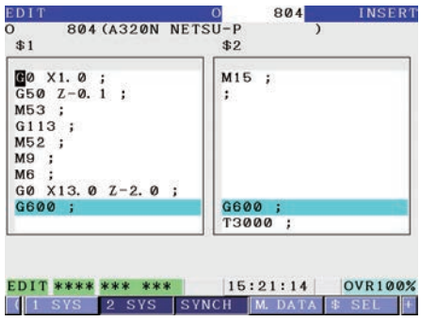
On-machine program check function

Using manual hand feed, operations can be run in the forward or reverse directions, can be paused to edit the program, and restart.



Display of code list

The function displays the list of G, M, and T codes including explanations-useful aid to programming.

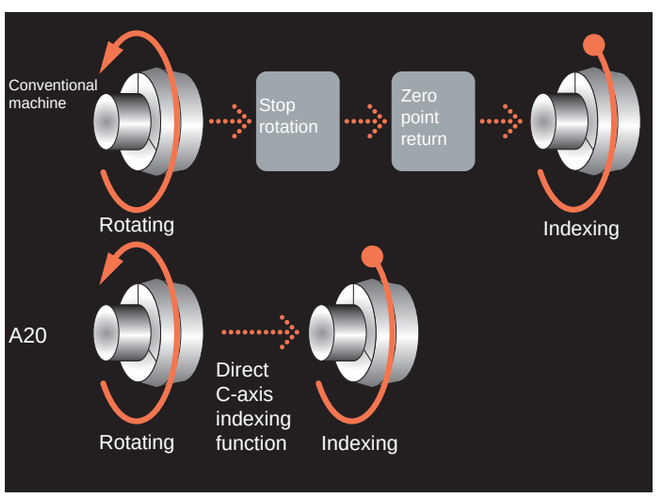


Easy viewing with text size change

Two text size settings can be applied to each screen (large text display illustrated).

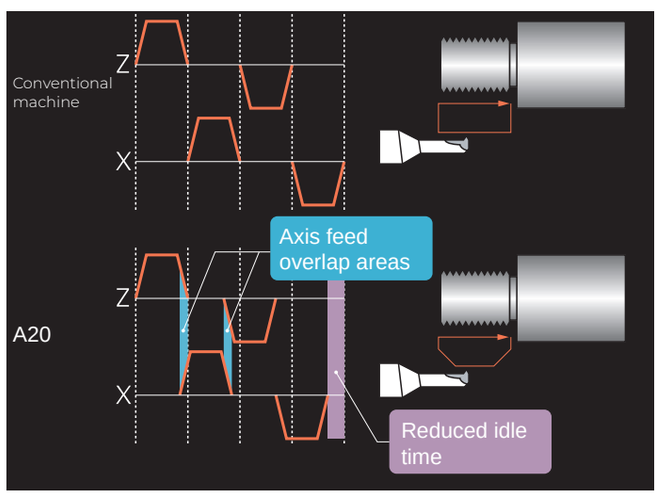
Productivity Improvements

Idle time is slashed using the pre-processing function in the 'Cincom Control' that analyses the machining program before it is run to minimise processing and calculation times.



Direct C-axis indexing function

Direct C-axis indexing enables deceleration direct to chosen index position eliminating the wasted time of performing zero return.

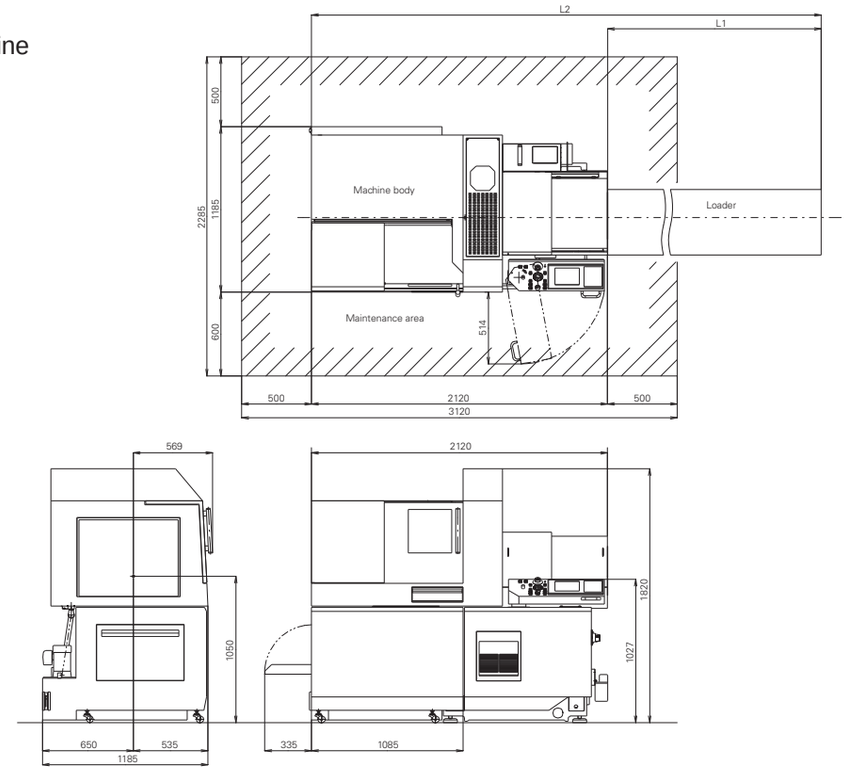


Axis feed overlap function

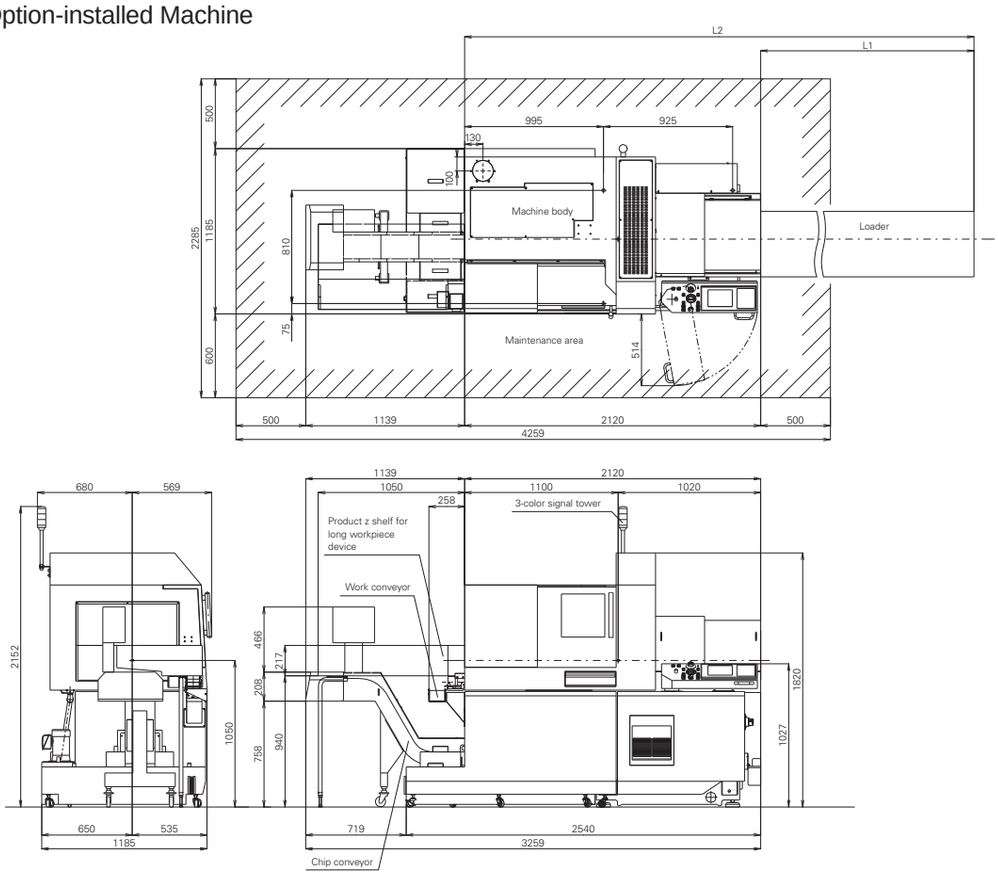
The next axis feed motion starts without waiting for completion of the current motion of another axis. This cuts out wasteful idle time and also suppresses unwanted vibration.

Machine Layout

A20 Standard Machine



A20 Option-installed Machine



Machine Specification

Item	A20VII (A20-3F7)
Max. machining diameter (D)	20 mm Dia. (25 mm Dia.^{0P})
Max. machining length (L)	GB:200mm/1 chucking (188mm:25mm Dia. spec.) GBL:2.5D.
Max. front drilling diameter	10 mm Dia.
Max. front tapping diameter (tap, die)	M8
Spindle through-hole diameter	26 mm Dia.
Main spindle speed	Max.10,000min^{-1}
Max. drilling diameter for the gang rotary tool	7mm Dia.
Max. tapping diameter for the gang rotary tool	M6
Spindle speed of the gang rotary tool	Max.6,000 min^{-1} (Rating 4,500 min^{-1})
Max. chuck diameter of back spindle	20 mm Dia. (25 mm Dia.0P)
Max. protrusion length of the back spindle workpiece	50 mm
Max. drilling diameter in back machining process	8 mm Dia.
Max. tapping diameter in back machining process	M6
Back spindle speed	Max.8,000 min^{-1}
Max. protrusion length	100 mm
Number of tools to be mounted	21
Tool size	
Tool (gang tool post)	12 mm Sq.x120 mm (13mm Sq.^{0P})
Sleeve	25.4 mm Sq.
Chuck and bushing	
Main spindle collet chuck	TF25, (TF30 for 25mm OPT.)
Back spindle collet chuck	TF25, (TF30 for 25mm OPT.)
Rotary tool collet chuck	ER11, ER16
Chuck for drill sleeves	ER11, ER16
Guide bushing	T223 (T227 25mm OPT.)
Rapid feed rate	
All axes (except X1)	32 m/ min
X1 axis	18 m/ min
Motors	
Spindle drive	2.2/ 3.7 kW
Tool spindle drive	0.75 kW
Back spindle drive	1.1/1.5 kW
Coolant oil	0.4 kW
Lubricating oil	0.003 kW
Centre height	1,050 mm
Rated power consumption	7.1 kVA
Full-load current	20.2 A
Main breaker capacity	30 A
Air pressure and air flow rate for pneumatic devices	0.5 M pa, 47 NL
Weight	2,200 kg

Standard accessories	
Main spindle chucking device	Coolant unit (with level detector)
Back spindle chucking device	Lubricating oil supply unit (with level detector)
Cut-off tool breakage detection	Door lock
Work light (LED)	Pneumatic device for air sealing
Workpiece separator	Machine relocation detector
Rotary guide bushing device	Workpiece conveyor
Knock-out jig for through-hole workpiece	Coolant flow rate detector
3-colour signal tower	Signal lamp

Special accessories	
Fixed guide Bush	Chip conveyor
Product receiver shelf for long workpiece device	Medium-pressure coolant unit
LFV	

Standard NC functions	
NC unit dedicated to the A20	Spindle 1º indexing function
8.4 inch colour LCD	Program storage capacity : 40m(approx.16KB)
On-machine program check function	Tool offset pairs : 32
Operating time display function	Product counter indication (up to 8 digits)
Preparation function	Main spindle indexing at 15° intervals
Spindle speed change detector function	Automatic power-off function
Nose radius compensation	Continuous thread cutting function
Constant surface speed control	Program prior analysis function
Spindle synchronised function	Back spindle 1º indexing function
Rigid tapping function	Back spindle 1º indexing function
Chamfering, corner R	Front/Back spindle C-axis function
Canned cycle drilling	Multiple repetitive cycle for turning
Y-axis offset	

Optional NC functions	
Program storage capacity 2560m (approx.1 MB)	High speed rigid tapping function
Tool offset pairs : 49	Hob/polygon function B
Submicron commands	Tool life management I
Drawing dimension direct input	Tool life management II
User macros	Optional block skip (9 sets)
Inch command	External memory program driving
Sub/inch Command	Network I/0 function

CITIZEN

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