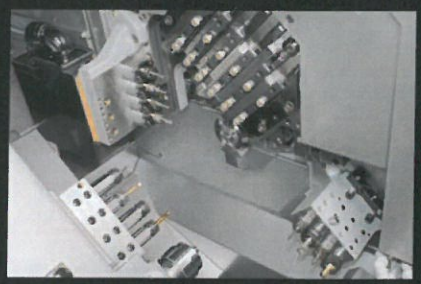
Improved productivity for complex machining

Cincom

Sliding Headstock Type CNC Automatic Lathe

K16



Cincom Technology, Support and Financing.

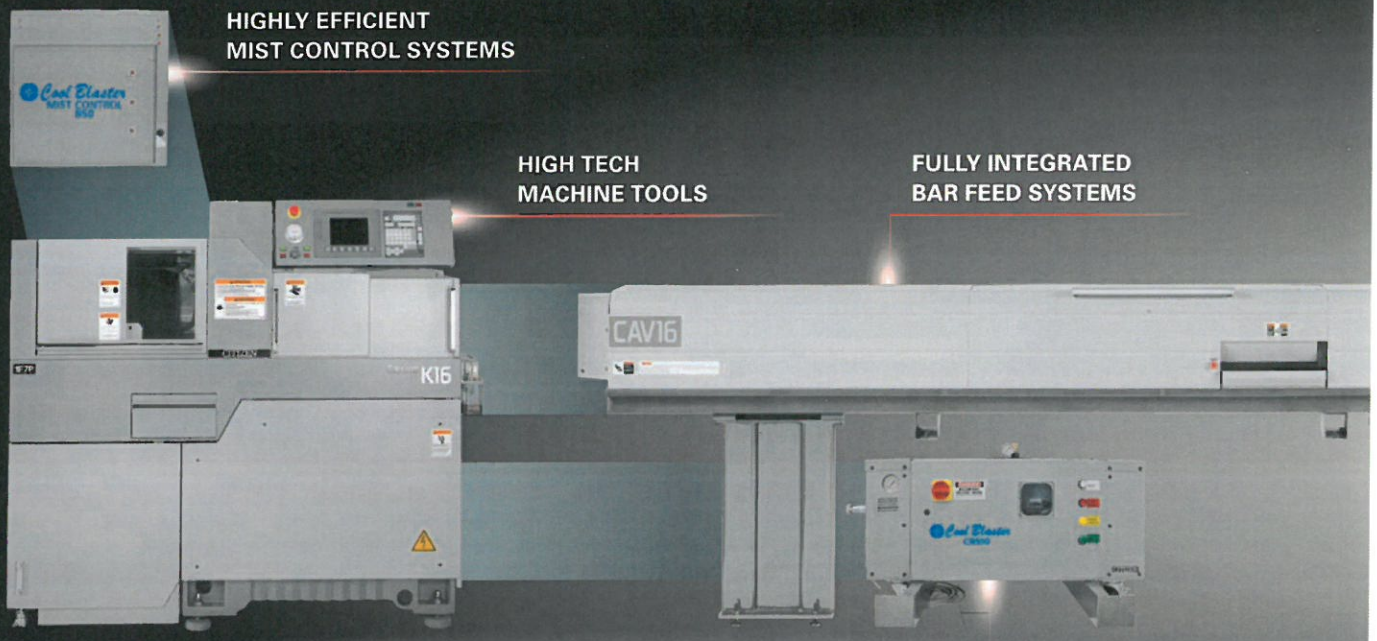
Marubeni Citizen-Cincom is your single source provider of Swiss type lathes and accessories.

SAVE TIME with the "CINCOM ADVANTAGE," an exceptional opportunity for US manufacturers to obtain a turning center with all related accessories from one contact:

- High tech Citizen Swiss turning machines
- CAV Integrated Bar Feed Systems
- Cool Blaster Multi Port High Pressure Coolant Systems
- Cool Blaster Mist Control 850 mist and smoke control system

And there's no need to let financing hold you back—we also offer a leasing program that's fast and easy.

Valuable production time can be wasted while you wait for financing or while trying to coordinate support for your machine and all its accessories. With the Cincom Advantage you only need one contact for all your requirements—from purchasing to financing to support!



CAV Bar Feeders

- Fully enclosed system
- Quick change separation system
- Space saving pusher design
- Automatic remnant retraction
- Integrated hydraulic tank, oil pump, oil-level indicator
- Shares same CNC controller and electrical system with Cincom machines

Cool Blaster High Pressure Coolant System

- Up to 10 independent high pressure output lines
- Heat exchanger (standard on 10 line system)
- System control monitoring
- Clogged filter alarm with auto drain
- 5 micron filter system
- Space saving low profile design

Cool Blaster Mist Control 850

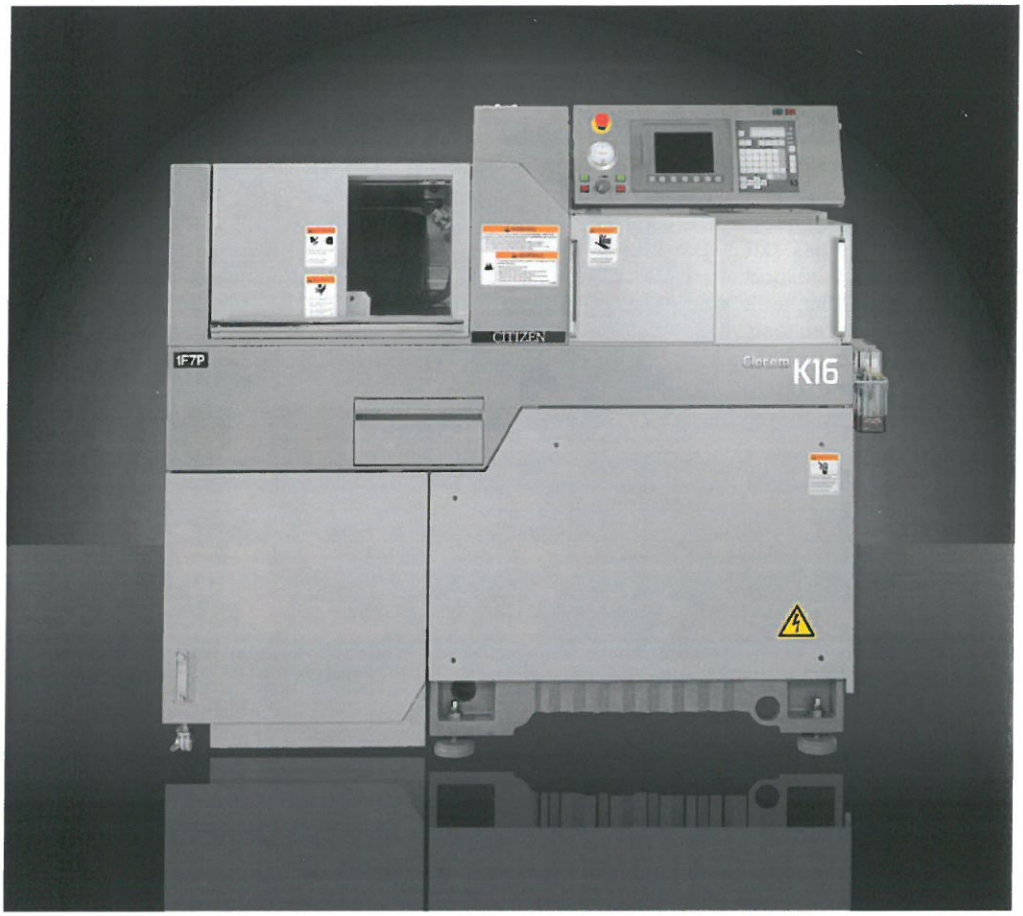
- Triple Pass ESP Filtration Technology
- Variable Speed Controller
- Fused overload protection
- E stop interlock system
- Mounting hardware

New-generation K-series CNC Automatic Lathes

Higher accuracy, cost reduction and quick delivery are important aspects for the efficient machining of precision parts. The K series new generation type CNC automatic lathe was developed to help satisfy such demands.

- Streamline Control drastically reduces cycle time
- Productivity is 1.5 times higher than conventional models
- Stable machining operation over longer periods of time
- Tool spindle for secondary machining improves performance of complex machining

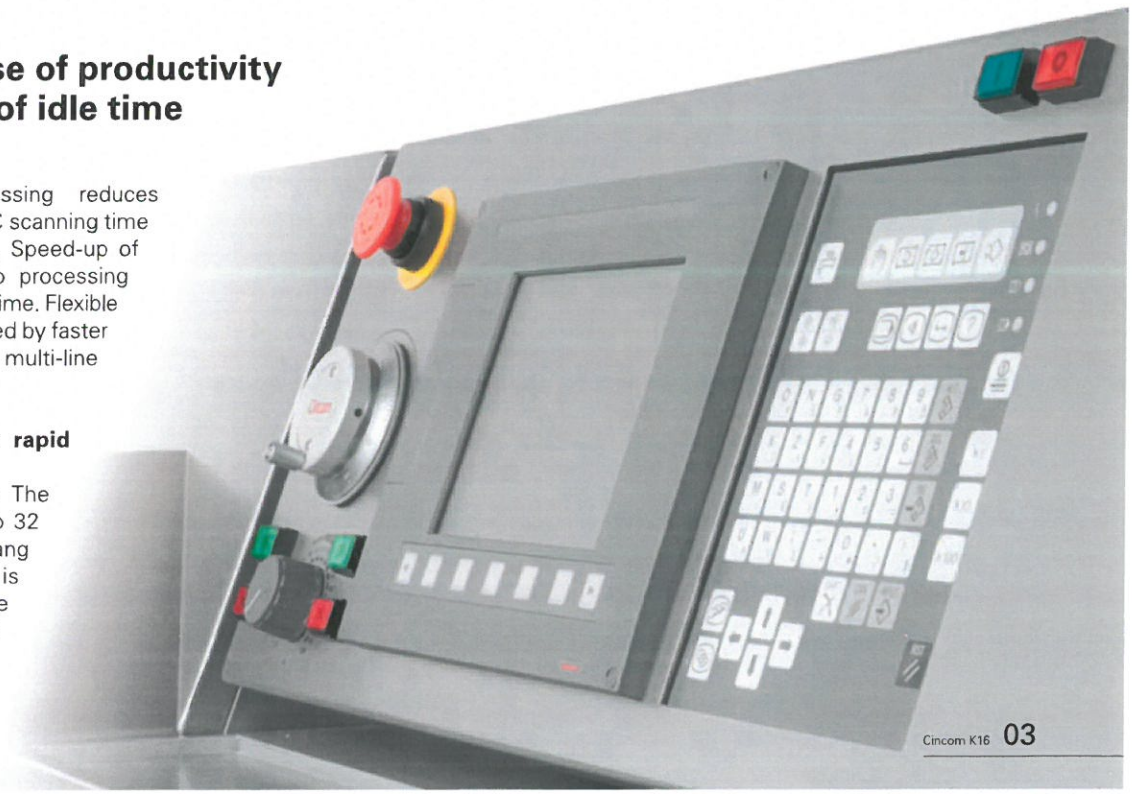
Although the machine is compact in size, it is equipped with up to four quill spindles or end-face drilling spindle (option) to support various types of complex machining. In addition, a variety of designs and devices have been adopted in the K16 for extended, stable machining operation and prolonging the life of the machine.



Significant increase of productivity Drastic reduction of idle time

Use of latest NC
Faster mathematical processing reduces interpolation period. Half of NC scanning time reduces NC processing time. Speed-up of ladder processing and macro processing reduces program manipulation time. Flexible and faster machining is achieved by faster calculation and multi-axes, multi-line control system.

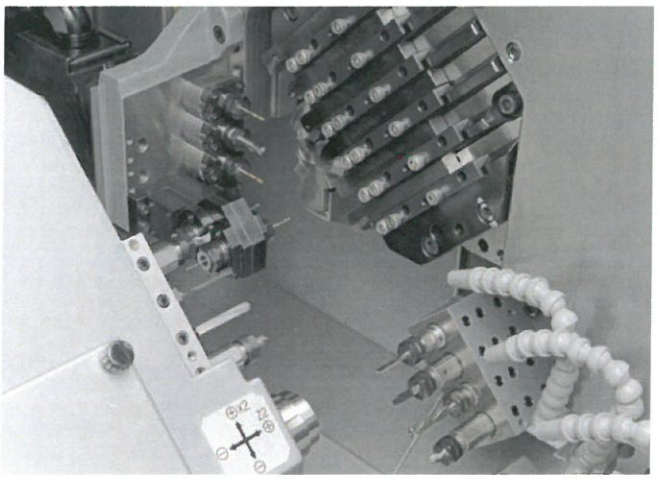
Significant increase of the rapid feed rate
Z1 axis, Z2 axis, and X2 axis: The rapid feed rate is increased to 32 m/min. X1 axis and Y1 axis (gang tool post): The rapid feed rate is increased to 34 m/min on the virtual axis. Increases of rapid feed rate and acceleration minimizes idle time.

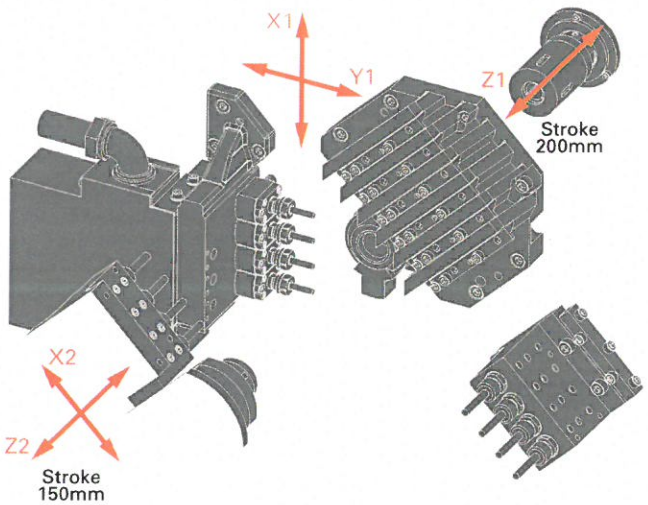


Efficient Machining—Longer Operation

K16 Type VII

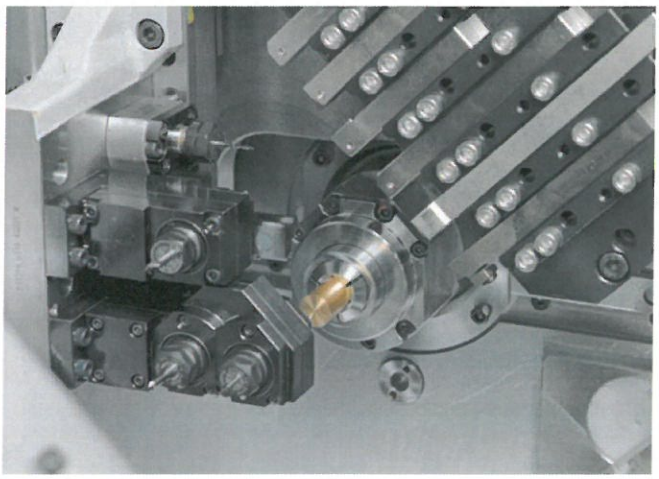
The high end K16 Type VII with X2-axis control module allows simultaneous front-back machining. The cycle time can be reduced by full use of streamline control.
Turning tools: 6 (□12) or 7 (□10)
Rotary gang tools: 4
Front drilling tools: 4
Back drilling tools: 4



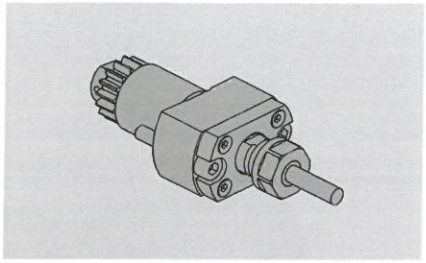


Non-Guide Bushing Model K16 VIIC

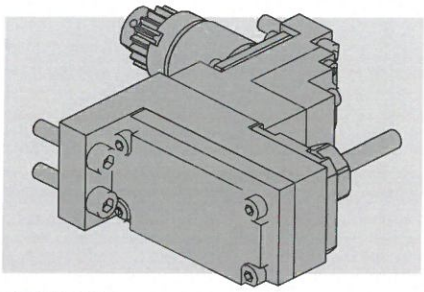
K series features, high productivity and multi-functionality are retained in the K16 non-guide bushing model. The pull-type chuck system that has been successful with the Cincom "BL series" (automatic fixed headstock type CNC lathe) is used in this model as well. Less waste helps save on material cost and the powerful chucking force enables heavy cutting, minimizes roughness and improves roundness.



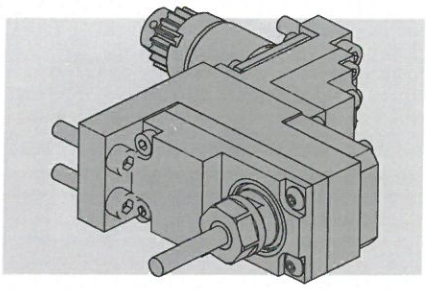
Wide Variety of Tool Layout for Various Needs



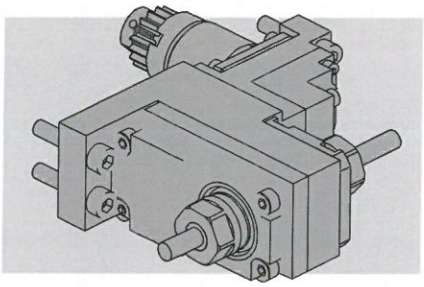
GSC807
Cross-drilling spindle
Used for cross drilling and D-cutting.
Up to 4 spindles can be mounted on T11 to T14 (standard).



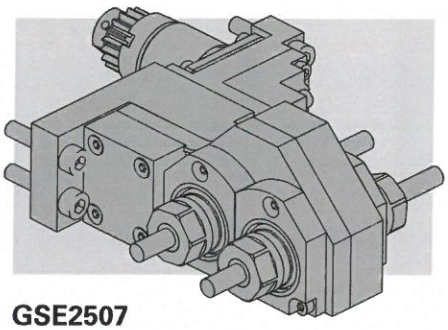
GSE2607
Front end-face drilling spindle
Used for eccentric face drilling. This spindle can be mounted on T12 to T14 every 2 stations.



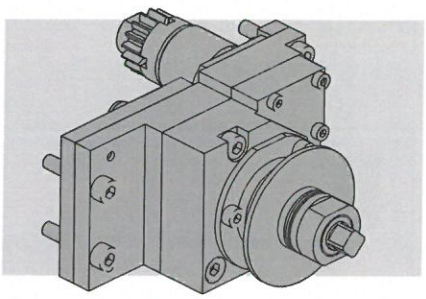
GSE2707
Back end-face drilling spindle
Used for eccentric face drilling. This spindle can be mounted on T12 to T14 every 2 stations.



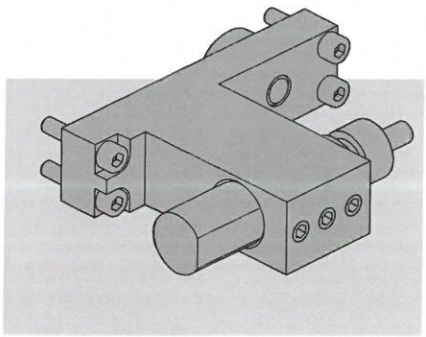
GSE2807
Both-end drilling spindle
Used for eccentric face drilling. This spindle can be mounted on T12 to T14 every 2 stations.



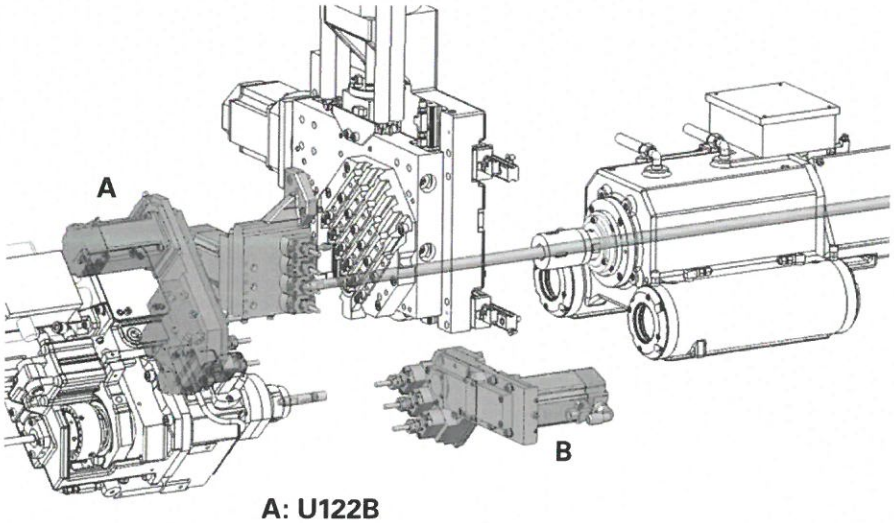
GSE2507
Double both-end spindle
Used for eccentric face drilling. This spindle can be mounted on T14 only.



GSS950/1050
Slitting Spindle
Used for slitting. This spindle can be mounted on T13 only. Maximum cutter size is 50 mm in diameter.



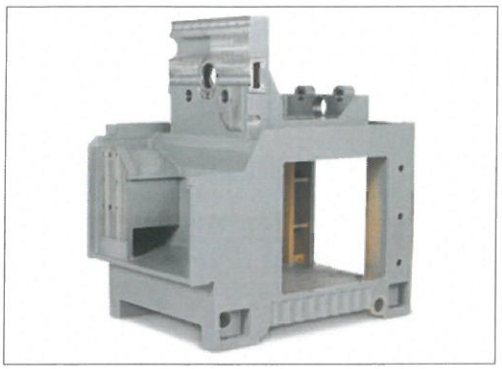
BDF103/104
Stationary single sleeve holder
Used for drilling with stationary drill sleeve. This holder can be mounted on T12 to T14.
BDF103 (mm)/BDF104 (inch)



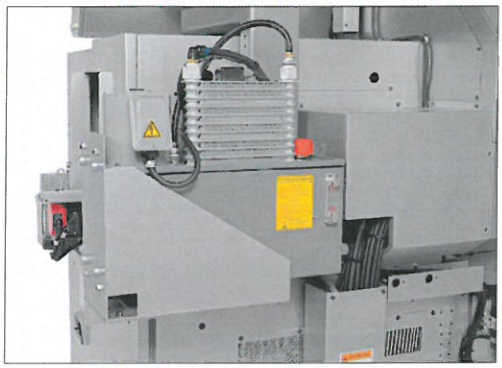
A: U122B
Front face rotary tool driving device

B: U152B
Back face rotary tool driving device

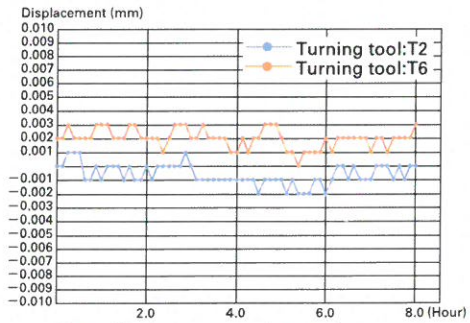
High Rigidity, High Precision and Long Life



Use of the highly rigid bed
The bed is twice as thick and 1.8 times heavier than the conventional model, thereby improving heavy cutting and machining accuracy.



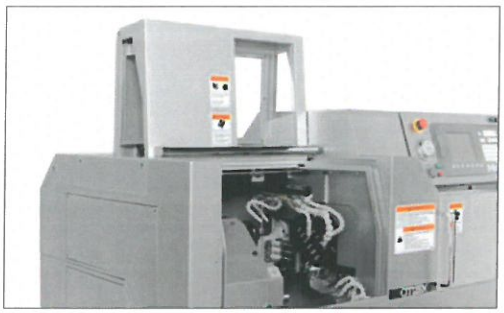
Measures against heat generation
The main spindle is equipped with an oil cooling system that effectively cools the spindle.



Heat displacement of test piece

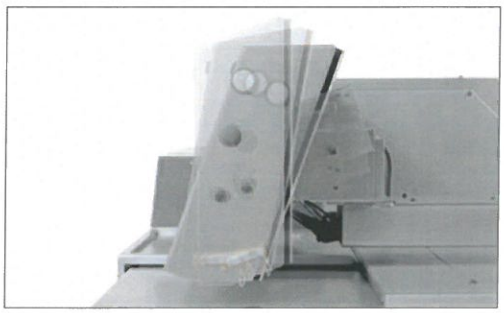
Long-life ball screws and centralized lubrication system
The centralized lubrication system for all the ball screw shafts ensures a long period of maintenance-free operation.

User Friendly Operation



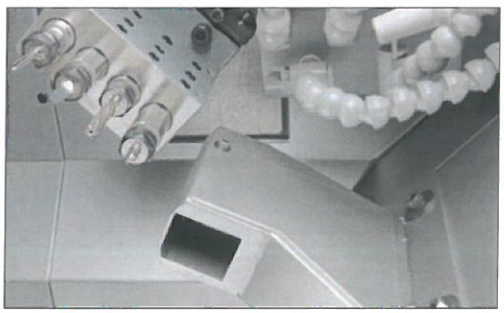
Folding-type cover
The folding-type cover creates a wider opening thus making the cutting area more accessible.

Toolbox
A toolbox is mounted on the spindle slide cover.

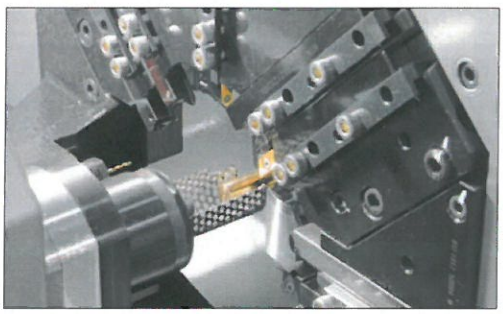


Adjustable operation panel
Operation panel can be adjusted in three angles for optimum visibility.

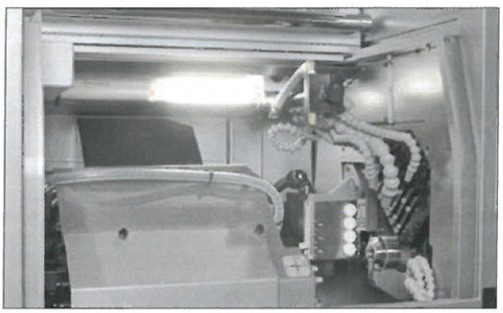
PC card slot
You can input or output the NC program by using the PC card slot in the front of the operation panel.



Parts collection chute
The parts collection chute provides fast and efficient ejection of parts.



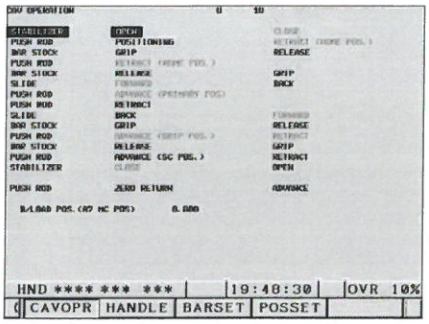
Cut-off and product separation (option)
Instead of being picked off by the back spindle, the workpiece can be cut-off and collected in the basket mounted on the back spindle.



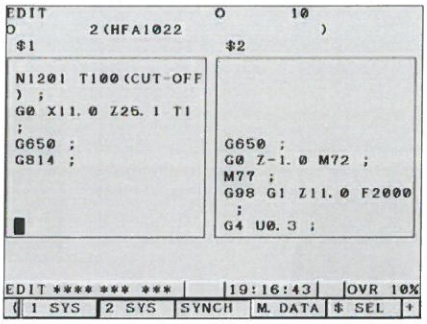
Lamps (option)
Either a fluorescent lamp or a halogen lamp can be selected for in-machine illumination. (The photograph shows a fluorescent lamp).

Precise and Logical Operation

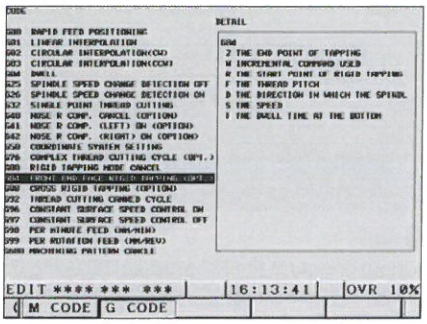
Dedicated software
The original software can bring out the best capabilities of the K series.



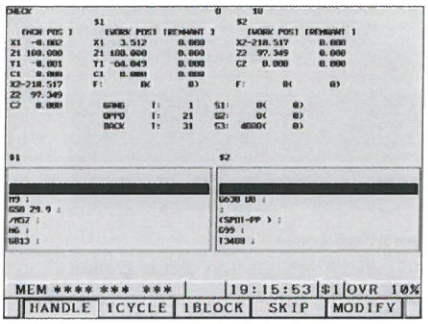
Dedicated bar loader
K-series supports the dedicated CAV series bar loader that can be operated from the machine controller.



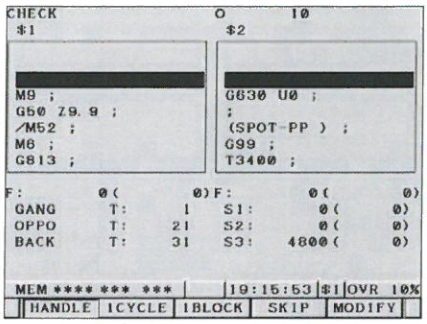
Program editing
Comprehensive program editing is possible by a two line synchronous display.



Code list
The screen displays the available M and G codes and their arguments (useful for programming).



On-screen character size (small)
Two kinds of character size can be selected for each screen.

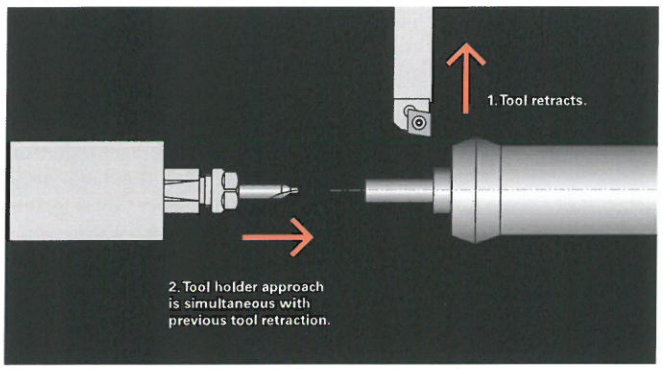


On-screen character size (large)
The screen shows on-machine program check screen with large character size.

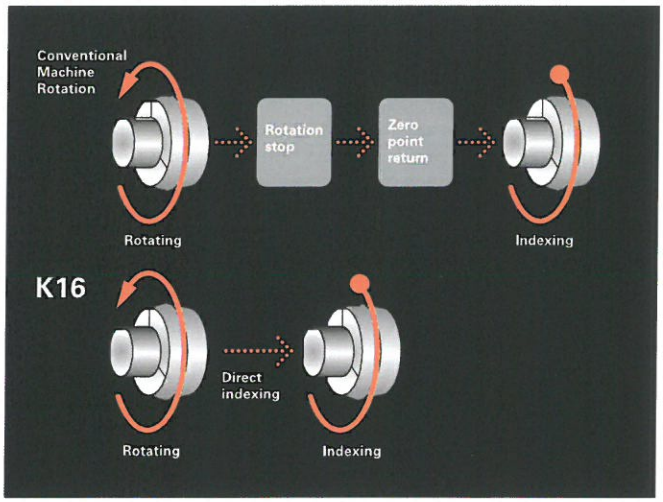
Technology for Drastic Reduction of Cycle Time

Streamline Control
Streamline Control is a control system unique to Citizen that produces fast and smooth movements. It reduces idle time without any affect on cutting, and achieves substantial reductions in cycle time.

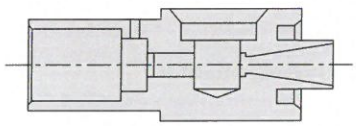
Tool posts overlap function
While two independent tool posts are in operation, this function allows a tool post to start preparing for machining without waiting until the other has finished retracting. This function helps to completely eliminate idle time.



Direct spindle indexing function
The direct spindle indexing function significantly reduces spindle indexing time. The spindle decelerates directly into the required index position, eliminating the time it takes to stop, reference and index.



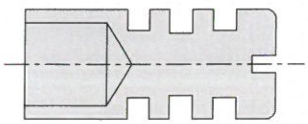
Comparison Sample A



Conventional machine: Cycle time: 43.3 sec — Idle time: 19.5 sec
K16: Cycle time: 34.2 sec — Idle time: 10.4 sec

Idle reduction: **46.7%**

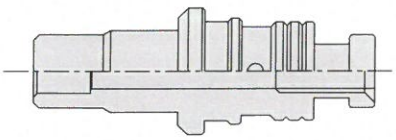
Comparison Sample B



Conventional machine: Cycle time: 62.0 sec — Idle time: 19.0 sec
K16: Cycle time: 53.4 sec — Idle time: 10.4 sec

Idle reduction: **45.3%**

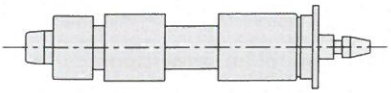
Comparison Sample C



Conventional machine: Cycle time: 83.5 sec — Idle time: 26.0 sec
K16: Cycle time: 69.5 sec — Idle time: 12.1 sec

Idle reduction: **53.5%**

Comparison Sample D



Conventional machine: Cycle time: 23.0 sec — Idle time: 13.0 sec
K16: Cycle time: 14.9 sec — Idle time: 4.9 sec

Idle reduction: **62.3%**

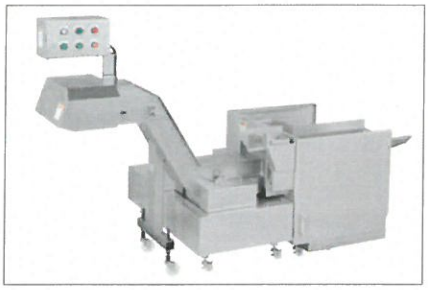
Wide Variety of Features and Options

Mechanical Options

Back long workpiece device
Use this device to machine a long workpiece which turns out a product longer than 80 mm. The device is equipped with a support pipe and unloads workpieces from the left side of the machine. A workpiece of up to 400 mm length can be machined.

Knock-out jig for through-hole workpiece
This jig prevents chips from going into the back spindle through workpiece. The workpiece is ejected onto the front side of the back spindle.

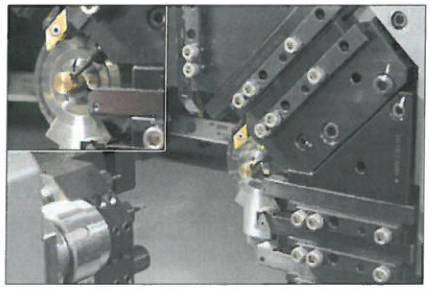
Workpiece conveyor
Unloads workpiece (collected by the workpiece separator) to the left side of the machine.



Chip conveyor
This device carries out chips to outside the machine. Two types of conveyor are provided. Integrated tank (245 liters) is used as a replacement of the standard coolant tank (130 liters). Separate type tank is used in connection with the standard coolant tank. The tank capacity is 210 liters in total.

Signal lamp
A signal lamp is mounted on the top of the machine. The lamp works in linkage with an alarm indicator on the operation panel of the machine.

3-color signal lamp tower
3 -color (green, yellow, and red) signal lamp is mounted on the top of the machine. Green as running, yellow as cycle-stop and red as alarm.



Cut-off tool breakage detector
This detector checks if a workpiece is cut off normally after cut-off process. If a workpiece remains, due to a cut-off tool breakage, the machine stops automatically.

Coolant flow rate detector
This detector monitors the discharge from the coolant nozzle. The machine stops automatically when the flow rate is getting lower than the preset value.

NC Features

Front spindle indexing function (1°)
This function indexes the front spindle at 1°.

Back spindle indexing function (1°)
This function indexes the back spindle at 1°.

Corner chamfering/rounding function
This function simplifies the specification of corner chamfering and corner rounding by using the "C" and "R" commands.

Nose R compensation function
This function makes compensation for the radius of a tool nose by using the G code command.

Tool spindle rigid tapping
Enables rigid tapping with the tool spindle by synchronizing revolution and feed.

Main spindle rigid tapping
Enables rigid tapping with the main spindle by synchronizing revolution and feed.

Back spindle rigid tapping
Enables rigid tapping with the back spindle by synchronizing revolution and feed.

Spindle synchronization control function
This function synchronizes the front spindle with the back spindle.

Front spindle C axis/Back spindle C axis indexing function
This function controls the profile positioning of the spindle at an arbitrary angle by using the spindle motor as the C axis control servo motor. The spindle holds the position without any mechanical lock.*

User Macro
Enables the use of macro programs.

Multiple repetitive cycles for turning
This function enables the use of several types of canned cycles.

Canned drilling cycle
Enables use of canned cycles such as deep hole drilling cycles and boring cycles.

Milling interpolation function
This function performs contour control toward the end face of a workpiece by using a linear axis and rotary axis (C axis).

Sub-micron command
This command specifies the least input increment with 0.0001 mm.

Tool life management I
This function stops the machine when a tool has reached its life, and reports the tool number.

Tool life management II
This function automatically selects a spare tool when a tool has reached its life.

Hobbing/polygon machining function
This function enables hob machining (gear cutting) and polygon machining (cutting shape consisting of multiple sides) with a gang tool spindle device.

Helical interpolation function
This function enables helical interpolation (instruction to other axis synchronizing with the circular interpolation) with a gang tool spindle device.

NC Options

Back spindle indexing function (15°)
This function fixes the back spindle by mechanical lock after indexing. Least indexing angle is 15°.

Program Memory Capacity 120m

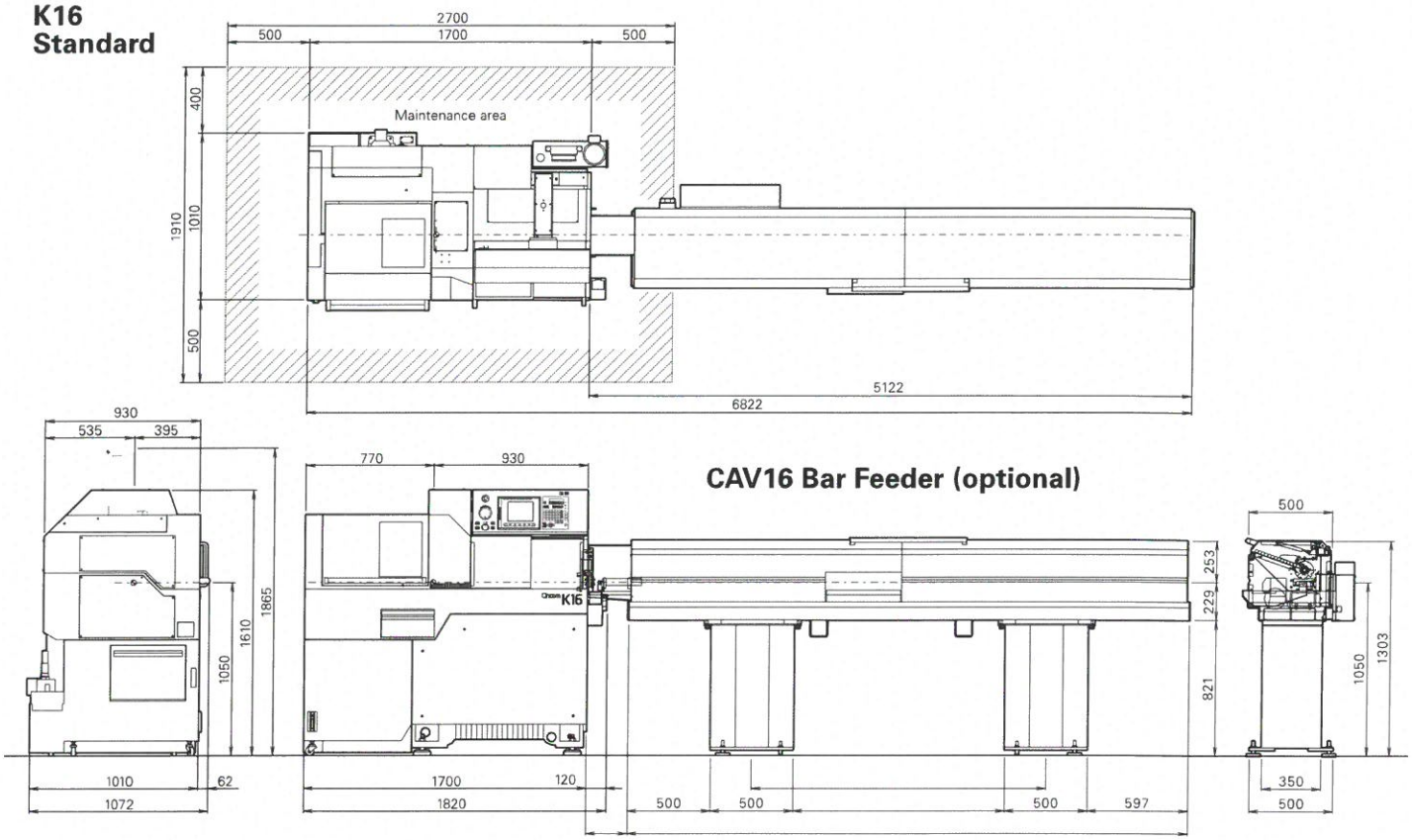
Conical/Spiral Interpolation

Custom Macro Variables

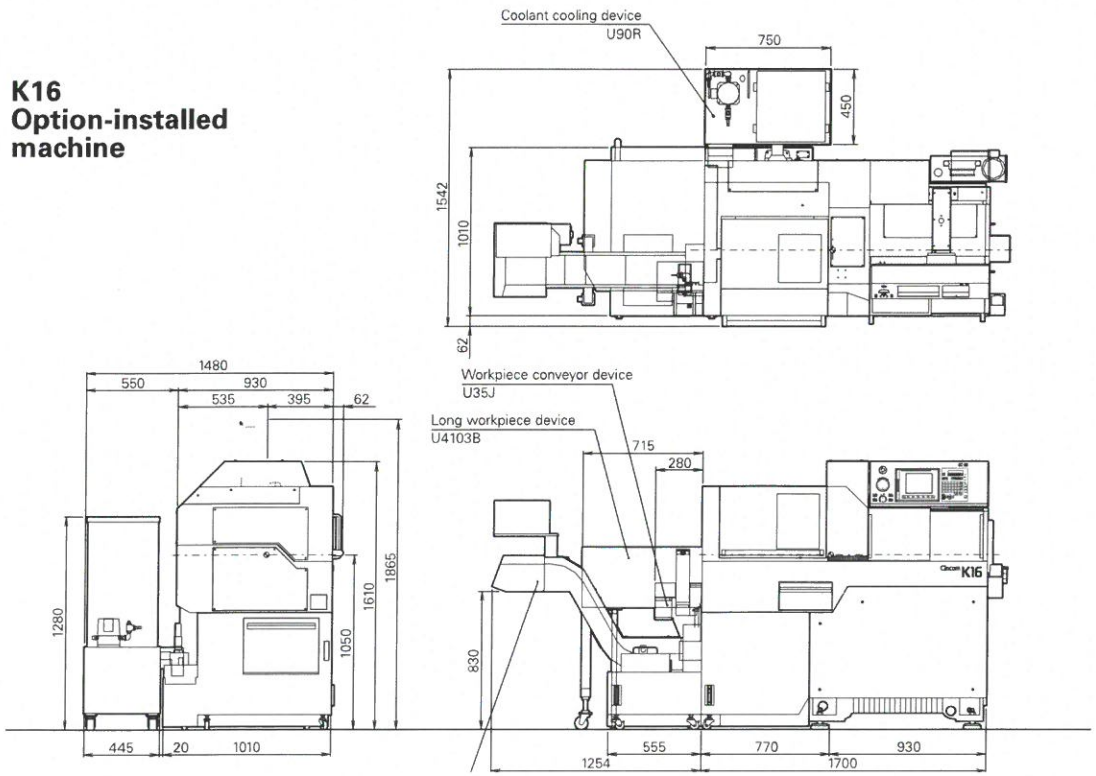
* For back spindle 1° indexing function and back spindle C axis function, specifications are limited.

Machine Layout

K16 Standard



K16 Option-installed machine



Machine Specifications

Item	K16 VII	K16 VIIC (non-guide bushing)
Max. machining diameter	ϕ16 mm (.63")	ϕ16 mm (.63")
Max. machining length	200 mm (7.87")	L=2.5 D mm (Z1 Axis stroke 50 mm)
Max. front drilling diameter	ϕ10 mm (.39")	ϕ10 mm (.39")
Max. front tapping size (with tap and die)	M8	M8
Spindle through-hole diameter	ϕ20 mm (.79")	ϕ20 mm (.79")
Main spindle speed	15,000 rpm	12,000 rpm
Max. drilling diameter in the rotary gang tool machining process	ϕ5 mm (.2")	ϕ5 mm (.2")
Max. tapping diameter in the rotary gang tool machining process	M4	M4
Rotary spindle speed	6,000 rpm	6,000 rpm
Max. chuck diameter of the back spindle	ϕ16 mm (.63")	ϕ16 mm (.63")
Max. workpiece length for the front side collection from the back spindle	40 mm (1.57")/Maximum taking-out length of the product: 80mm (3.15")	40 mm (1.57")
Max. drilling diameter in the back machining process	ϕ6 mm (.24")	ϕ6 mm (.24")
Max. tapping diameter in the back machining process	M5	M5
Back spindle speed	10,000 rpm	10,000 rpm
Number of tools to be mounted	18	18
Turning tools on the gang tool post	6	6
Rotary tools on the gang tool post	4	4
Tools for front spindle	4	4
Tools for back spindle	4	4
Tool size		
Gang tool post (tool)	ϕ13 mm (.51")	ϕ13 mm (.51")
Sleeve	ϕ19.05 mm (.75")	ϕ19.05 mm (.75")
Rapid feed rate		
X1,Y1 axis	34 m/min (111.55 ft/min)	34 m/min (111.55 ft/min)
Z1,Z2 axis	32 m/min (104.99 ft/min)	32 m/min (104.99 ft/min)
X2 axis	32 m/min (104.99 ft/min)	32 m/min (104.99 ft/min)
Motor		
Main spindle drive	2.2/3.7 KW	2.2/3.7 KW
Tool spindle drive	0.4 KW	0.4 KW
Back spindle drive	0.55/1.1 KW	0.55/1.1 KW
Cutting oil	0.25 KW	0.25 KW
Center height	1,050 mm (41.34")	1,050 mm (41.34")
Input power capacity	8 KVA	8 KVA
Air pressure and air flow rate for air-driven equipment	0.4 MPa · 50 Nl/min	0.4 MPa · 50 Nl/min
Weight	2,100 Kg (4,629.7 lbs)	2,100 Kg (4,629.7 lbs)

Main standard accessories
Main spindle chucking device
Rotary guide bushing drive device
Rotary guide bushing device
Headstock cooling device
Coolant device (with level sensor)
Door switch/door lock
Workpiece separator
Lubrication device (with level sensor)
Air seal pneumatic device
Back spindle chucking device
Rotary tool spindle drive unit for gang tool

Optional accessories
Fixed guide bushing device
Long workpiece device
Dedicated hydraulic magazine bar
Cut-off tool breakage detector
Workpiece conveyor
Chip conveyor
Coolant flow-rate detecting device
Signal lamp
Work light

Standard NC functions
NC unit dedicated to CINCOM K series
7.2-inch monochrome liquid crystal display
Operation time display
Preparation function
Three-dimensional interference check function
Product counter display: Up to 8 digits
Automatic power-off function
Thread cutting canned cycle
Main spindle speed change detection function
Back spindle speed change detection function
Simplified cut-off tool breakage
On-machine program check function
Main spindle constant surface speed control function
Back spindle constant surface speed control function
Main spindle 1 degree indexing function
Back spindle 1 degree indexing function
Continuous threading cycle
Spindle synchronization control function
User macro
Main spindle C axis function

Standard NC functions cont'd.
Back spindle C axis function
Corner chamfering/rounding function
Nose R compensation function
Canned cycle for drilling
Multiple repetitive cycle
Program storage capacity 80 m
Tool spindle rigid tapping function
Main spindle rigid tapping function
Back spindle rigid tapping function
Milling interpolation function
Hobbing and polygon machining function
Helical interpolation function
Tool life control I
Tool life control II
Sub-inch command

Optional NC functions
Back spindle 15 degree indexing device (Lock type)
Program storage capacity 120 m
Conical/spiral interpolation
Custom macro variables

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