

CITIZEN

Cincom

M16

Sliding Headstock Type CNC Automatic Lathe



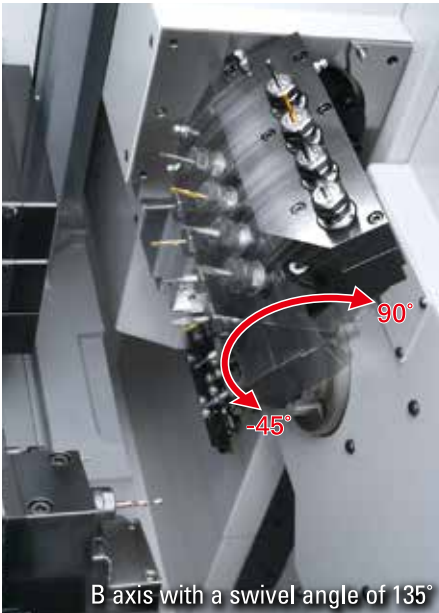
The M16: A high-end model covering $\phi 16$ mm.

The M16: A high-end model covering $\phi 16$ mm. The B axis function of rotary tools on the gang tool post and the back tool post Y axis function give the advantage with complex shapes and secondary machining.

The M16 type VIII features a B axis for rotary tools on the gang tool post. It can machine angled holes and complex shapes. The swivel angle of the B axis is 135° and it can be used in both front and back machining. The back tool post is equipped with a Y axis (types VII and VIII) and up to 9 tools can be carried in 3 rows. But we have not just upped the number of controlled axes and the number of mountable tools. In addition to upping the rapid feed rate to 32 m/min and running high-speed calculation with the latest NC unit,

the maximum rotational speeds of the front/back spindles and the rotary tools on the turret tool post have also been increased. By machining with the optimum conditions for small-diameter workpieces and small-diameter drills/end mills, high productivity can be achieved. The M16 brings advanced functions and raises the level of the basic functions. It permits greater versatility in workpiece shapes, and has the edge when machining the increasingly complex parts for the IT and medical fields.





B axis with a swivel angle of 135°

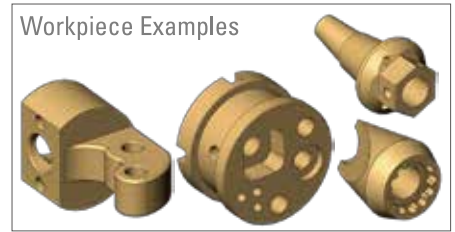
Rotary tools on the gang tool post equipped with B axis *Type VIII

On the M16 type VIII, the rotary tools on the gang tool post feature a B axis as standard, and four tools each can be mounted for back and front machining. The swivel angle has a range of 135°, from 90° to -45°, and the machine is capable of contouring using 4-axis control, with the B axis used even in back machining.



Yaxis incorporated in the turret tool post

Because the 10-station turret tool post incorporates a Y axis, a wide variety of secondary machining is possible. The tool post can be indexed without going back to the return position, shortening tool change times. Each tool station is driven and can carry multi-tool holder.



Yaxis incorporated in the back tool post *Types VII and VIII

The back tool post can accommodate nine tools in 3 rows of 3 tools. The specifications of the outer diameter milling spindle (MSC507), 3-drilling spindle (MSE607) and 3-sleeve holder (MDF107) are common to those used on the gang tool post and they can be used both on the gang tool post and the back tool post.

M16 VIII Tooling example



Faster. Achieving a higher level of stable operation

High speed and excellent maintainability linked to productivity improvements

Rapid feed rate of 32 m/min, and 20% reduction in idle time

The rapid feed rate of the major feed axes has been substantially increased to 32 m/min. The adoption of the latest NC unit with a high-speed CPU on board, in combination with Citizen's original control technology "Cincom Control", cuts idle time by 30%.

High-speed spindle and tool spindle

High-speed rotation has been achieved for the front/back spindles with their maximum speed of 12,000 min⁻¹, and for the gang tool spindle, turret tool spindle and back tool post tool spindle^{*} types VII and VIII with their maximum speed of 8,000 min⁻¹. This means that the optimum machining conditions can be used when machining small-diameter bar material and when using small diameter drills/end mills.

Air Seals

Air seals are used as a standard feature in the front spindle, guide bushing and rear spindle, and this restricts the entry of coolant and chips and guarantees stable operation for extended periods.

Central lubrication device

A central lubrication device is installed as standard. The automatic supply of lubricating oil to all ball screws eliminates the need for manual greasing and improves maintainability.

Oil supply to rotary tools on the gang tool post

The gang tool post rotary tool drive device is equipped with an automatic lubrication function as standard, limiting wear of the gears over the long term and assuring high reliability.

Cincom Control

"Cincom Control" is Citizen's unique control system specially developed to enable smooth motion at high speeds. It slashes idle time without adversely affecting cutting, achieving a remarkable reduction of cycle time.

Idling Stop

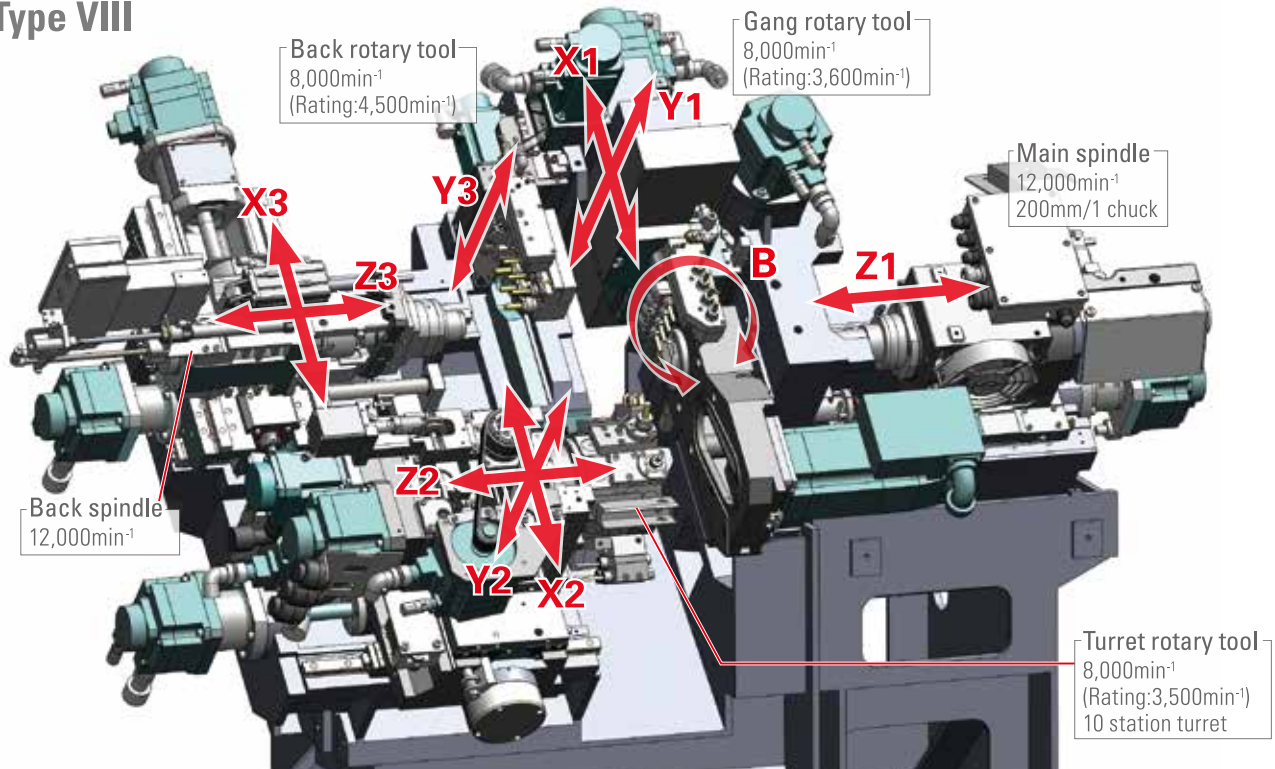
When the spindles and feed axes are stopped, for example during editing, the servo turns OFF and the amount of power in the standby status is reduced. Note that the cumulative reduction in the amount of power since installation can be checked on the Eco screen.



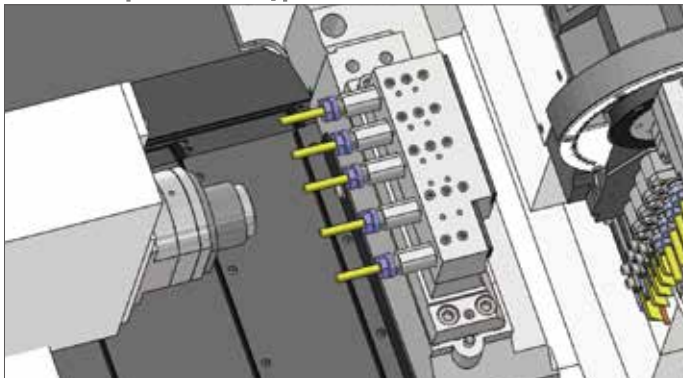
Operability fully considered too, with 3 types selectable to match the application

Type V for excellent cost performance, Type VII featuring a Y3 axis,
and Type VIII featuring a gang tool B axis

M16 Type VIII



Back tool post of the Type V M16



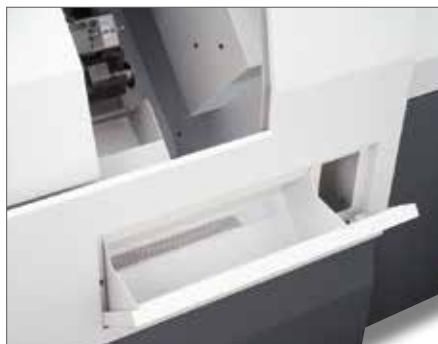
M16 configuration according to type

| | Type V | Type VII | Type VIII |
|---------------------------------------------|--------|----------|-----------|
| Y2 axis (turret Y axis) | ○ | ○ | ○ |
| Y3 axis (back tool post Y axis) | — | ○ | ○ |
| B axis (rotary tools on the gang tool post) | — | — | ○ |



Swing-out operation panel

The operation panel with high visibility color screen that pivots about two points, enabling it to be conveniently positioned for tasks such as editing and tool setting.



Product collection

Machined products are assigned to this receiver box through the turret-mounted basket. Products up to 125 mm in length can be collected. Optional accessories include workpiece conveyor and workpiece unloader.



Oil cooler fitted as standard for rotary tools

For rotary tools on the gang tool post and rotary tools on the back tool post, an oil cooler is installed as standard.

Intuitive screen display is easy to view and read

Screen designed from the operator's perspective, and comfortable to use



Equipped with high-speed NC

The machine is equipped with the latest NC model to drastically reduce the startup and screen switching time compared to conventional machines with advanced functions. This feature provides a stress-free operation environment.



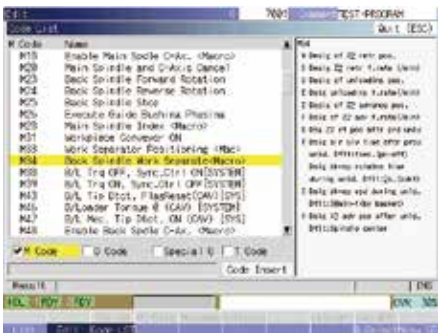
On-machine program check function

Using the manual pulse handle, an NC program can be run forward and backward so that the program can be edited by stopping the operation at a desired point and then resuming according to the edited program.



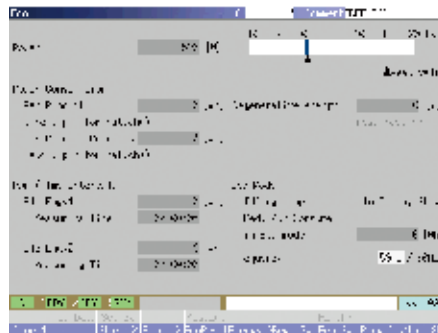
Display of easily understood illustrations

The corresponding illustration is displayed on the screen so that the operator can easily recognize the meaning of the associated data.



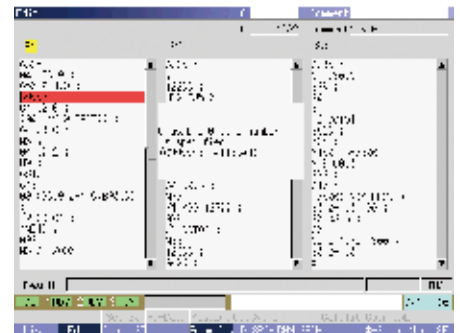
Display of code list

The function displays the list of G and M codes including explanations of the arguments to support programming.



Eco screen

The current power consumption is shown on the screen, along with the maximum power consumption value, the power consumption record, the cumulative power consumption, and the power regeneration (generation) status. Data can be output, too.



Grammar check function

The customer can check whether there are any syntax errors in the program before running it. And if an alarm occurs, the relevant block is highlighted.

Fast, safe and accurate collection of workpieces

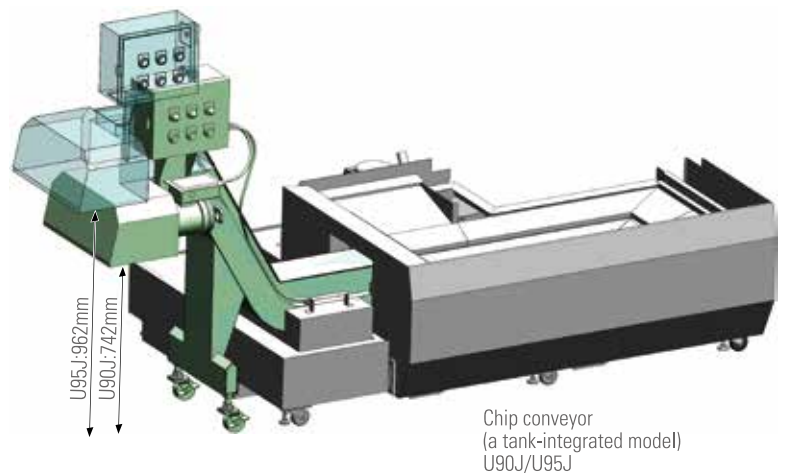
Product Unloader

By installing a product unloader, the collection time with the turret can be reduced, helping to shorten cycle times. The unloader can collect products with lengths from 125 to 400 mm, and can also be used in combination with the long workpiece unit that draws the products out from the rear of the back spindle with a work hand.



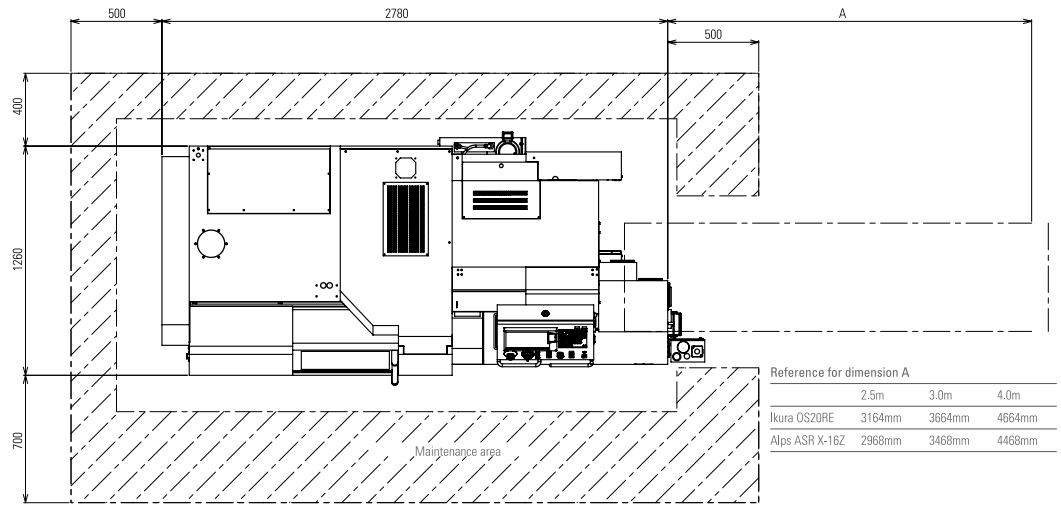
Chip conveyor

Two models of chip conveyor are available: the U90J, a tank-integrated model that can be used with the long workpiece device, and the U95J, which allows easy chip collection with a chip track.



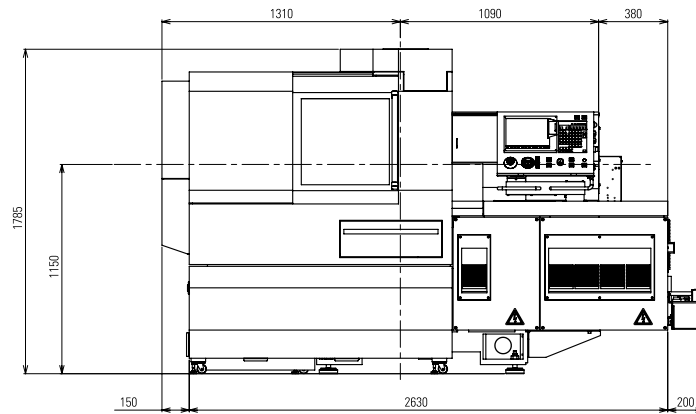
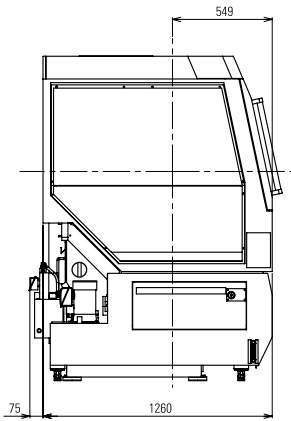
Machine Layout

M16 Standard Machine Layout



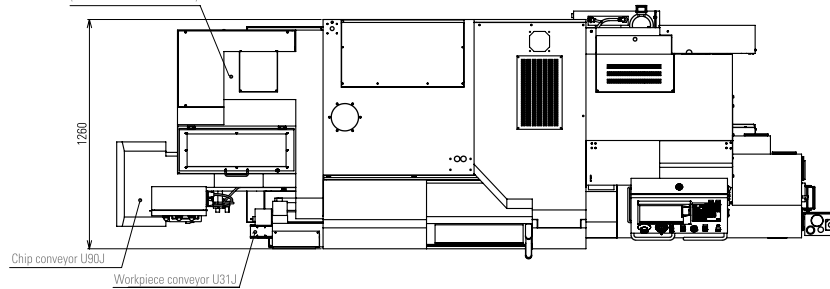
Reference for dimension A

| | 2.5m | 3.0m | 4.0m |
|----------------|--------|--------|--------|
| Ikura OS20RE | 3164mm | 3664mm | 4664mm |
| Alps ASR X-16Z | 2968mm | 3468mm | 4468mm |



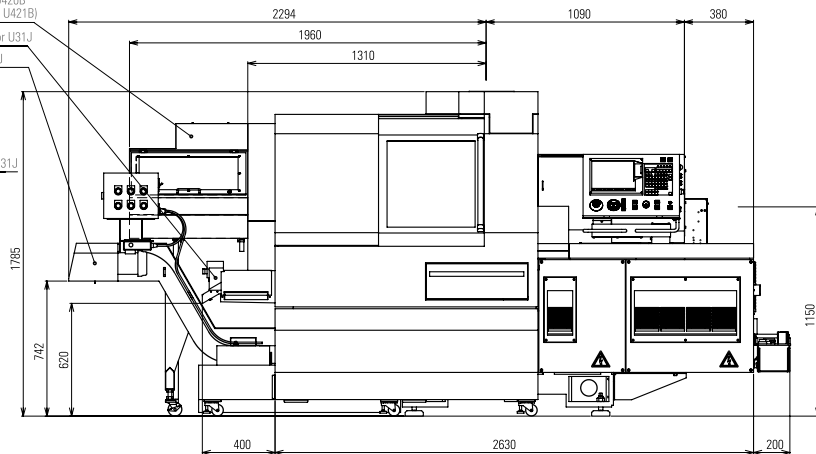
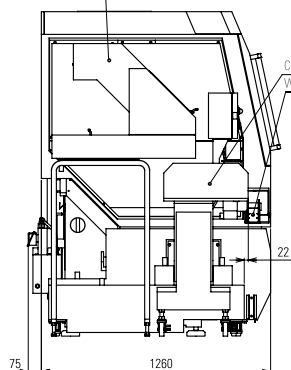
M16 Option-installed Machine Layout

Product receiver shelf of long workpiece device U420B (Used with U35J or U421B)



Product receiver shelf of long workpiece device U420B (Used with U35J or U421B)

Product receiver shelf of long workpiece device U420B (Used with U35J or U421B)
Workpiece conveyor U31J
Chip conveyor U90J



Status with M416, U420B, U31J, U90J fitted

Machine Specification

| Item | M16 | | |
|------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------|---------------------|
| | Type V (M16-4M5) | Type VII (M16-4M7) | Type VIII (M16-4M8) |
| Max. machining diameter (D) | 6mm | | |
| Max. machining length (L) | 200mm/1 chucking | | |
| Max. front drilling diameter | φ 10mm | | |
| Max. front tapping diameter (tap, die) | M8 (tap), M6 (die) | | |
| Spindle through-hole diameter | φ 20mm | | |
| Main spindle speed | Max.12,000min ⁻¹ | | |
| Max. chuck diameter of the back spindle | φ 16mm | | |
| Max. protrusion length | 125mm | | |
| Max. protrusion length of the back spindle workpiece | 30mm | | |
| Max. drilling diameter for the back spindle | φ 8mm | | |
| Max. tapping diameter for the back spindle | M6 | | |
| Back spindle speed | Max.12,000min ⁻¹ | | |
| Gang rotary tool | | | |
| Max. drilling diameter | φ 5mm | | |
| Max. tapping diameter | M5 | | |
| Spindle speed | Max.12,000min ⁻¹ (Rating 3,600min ⁻¹) | | |
| Turret rotary tool | | | |
| Max. drilling diameter | φ 5mm | | |
| Max. tapping diameter | M5 | | |
| Spindle speed | Max.12,000min ⁻¹ (Rating 3,500min ⁻¹) | | |
| Back tool post rotary tool | | | |
| Max. drilling diameter | — | φ 5mm | |
| Max. tapping diameter | — | M5 | |
| Spindle speed | — | Max.8,000min ⁻¹ (Rating 4,500min ⁻¹) | |
| Number of tools to be mounted | 32+α | 36+α | |
| Gang turning tool | 5 | | |
| Gang rotary tool | 5~12 (including back 4 tools) | | |
| Turret | 10+α | | |
| Back tool post | 5 | 9 | |
| Tool size | | | |
| Tool (turning tool) | □10mm | | |
| Sleeve | φ 19.05mm | | |
| Main spindle collet chuck | FC261-M | | |
| Guide bushing | FC261-M-K | | |
| Back spindle collet chuck | WFG660-M | | |
| Rapid feed rate | | | |
| All axes (except X2, Y2, Y3 & B axes) | 32m/min | | |
| X2 axis | 16m/min | | |
| Y2 axis | 8m/min | | |
| Y3 axis | — | 32m/min | |
| Motors | | | |
| Spindle drive | 2.2/3.7kW | | |
| Gang tool post rotary tool drive | 0.69kW | | |
| Turret rotary tool drive | 0.69kW | | |
| Back spindle drive | 0.75/1.5kW | | |
| Back tool post rotary tool drive | — | 0.75kW | |
| Coolant oil | 0.4kW | | |
| Center height | 1,150mm | | |
| Rated power consumption | 7.9kVA | | |
| Full-load current | 28A | | |
| Main breaker capacity | 40A | | |
| Air pressure and air flow rate for pneumatic devices | 0.5MPa, 84NL/min (normal) / 220NL/min (blow) | | |
| Weight | 2,900kg | 2,950kg | |

| Standard accessories | |
|---------------------------------------------------|------------------------------------------------|
| Main spindle chucking unit | Air-driven knock-out device for back machining |
| Rotary guide bushing unit | Workpiece separator |
| Back spindle chucking unit | Machine relocation detector |
| Gang rotary tool driving unit | Door lock |
| Coolant unit (with level detector) | Lighting |
| Lubricating oil supply unit (with level detector) | |

| Special accessories | |
|------------------------------------------|--------------------------------------------------|
| Cut-off tool breakage detector | Motor-driven knock-out device for back machining |
| Knock-out jig for through-hole workpiece | Workpiece conveyor |
| Long workpiece unit | Chip conveyor |
| Product unloader | Signal lamp |
| Coolant flow rate detector | 3-color signal tower |
| Medium-pressure coolant unit | |

| Standard NC functions | |
|-----------------------------------------------|---------------------------------------|
| NC unit dedicated to the L12 (M730LPC-4VS) | Automatic power-off function |
| 10.4 inch color liquid crystal display (LCD) | On-machine program check function |
| Program storage capacity : 40 m (approx.16KB) | Nose radius compensation |
| Tool offset pairs : 40 | Chamfering, corner R |
| Product counter indication (up to 8 digits) | Format check function |
| Operating time display function | Alarm block display function |
| Spindle speed change detector | Eco display |
| Constant surface speed control function | Machine operation information display |
| Spindle C-axis function | |

| Special NC functions | |
|-----------------------------------------|--------------------------------------------------|
| Variable lead thread cutting | Program storage capacity : 1200 m (approx.480KB) |
| Arc threading function | Tool offset pairs : 80 |
| Geometric function | Tool life management I |
| Spindle synchronized function | Tool life management II |
| Milling interpolation | External memory program driving |
| Back spindle 1° indexing function | Network I/O function |
| Back spindle C-axis function | Submicron commands |
| Back spindle chasing function | User macros |
| Canned cycle drilling | Helical interpolation function |
| Rigid tapping function | Inclined helical interpolation function |
| High speed Rigid tapping function | Hob function |
| Rigid tapping phase adjustment function | Polygon function |
| Differential speed rotary tool function | Inch command |
| Optional block skip (9 sets) | Sub inch command |
| Back machining program skip function | 3D camfering function |

Environmental Information

| Basic Information | Energy usage | Power supply voltage | |
|---------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| | | Electrical power requirement | AC200V |
| Environmental Performance Information | Power consumption | Required pneumatic pressure | 7.9kVA |
| | | Standby power *1 | 0.5MPa |
| | | Power consumption with model workpiece *2 | 0.448kW |
| | Power consumption value above converted to a CO ₂ value *3 | 0.013kWh/cycle | |
| | Air consumption | Required air flow rate | 6.15g/cycle |
| Approach to Environmental Issues | Lubricant consumption | At power ON | 84NL/min (max. 220 NL/min., during air blow) |
| | Noise level | Value measured based on JIS | 2.5cc/30min |
| | Environmental load reduction | RoHS Directive / REACH regulations | 80dB |
| | Recycling | Indication of the material names of plastic parts | Compliant |
| Environmental management | | Covered in the instruction manual *4 | |
| | | We are ISO14001 accredited. | |
| | | We pursue "Green Procurement", whereby we make our purchases while prioritizing goods and services that show consideration for the environment. | |

*1 : This is the standby power in the idle stop mode (a function that turns servomotor excitation off when it is not necessary, for example during program editing).

*2 : This is the power consumption in program operation (when not cutting) for one of our standard test pieces, shown for the purpose of comparing the environmental performance with that of existing models.

*3 : This is the value converted in accordance with the CHUBU Electric Power CO₂ emissions coefficient for 2009 as published by the Ministry of the Environment.

*4 : If polyvinyl chloride (PVC) and fluorine resin are not processed correctly they can generate harmful gases. When recycling these materials, commission a contractor that is capable of processing them appropriately.

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CITIZEN

| | | | |
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