VCN-535C, VCN-700D

Mazak

VCN-535C
VCN-700D

[No.50 Vertical Machining Center]

Mazak

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SE

VCN-535C, VCN-700D 23.09.0 G 99J295923E0

VCN-535C, VCN-700D

Vertical machining center with high performance No.50 spindle

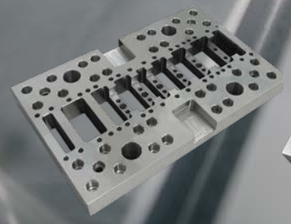
High rigidity and high accuracy machine performance

A wide range of automation support

- Spindle specifications to meet a wide variety of machining requirements from high-speed precision machining to powerful cutting.
- Roller guides utilized on all X, Y and Z-axis, standard ball screw core cooling and heat displacement control for stable continuous machining accuracy.
- Designed for ease of operation and maintenance.
- Wide range of available automation system, including 2-pallet changers.

Automotive component
motor case
[Aluminum]

Construction
machinery component
[Cast iron]



General industry
machinery component
[Carbon steel]

General industry
machinery component die
[Prehardened steel]

MAZATROL SmoothC
Shown with optional equipment

VCN-535C

MAZATROL SmoothG
Shown with optional equipment

VCN-700D

VCN SERIES

●: Standard ○: Option - : N/A

Machine model	Spindle				Table	Rapid traverse rate (X-, Y-, Z-axis)	Tool magazine		
	7000	8000	10000	18000 No.40			24 tools	48 tools	30 tools No.40
VCN-535C	—	●	○	—	1300 mm × 550 mm	42 m/min	●	○	—
VCN-700D	○	●	○	○	1740 mm × 700 mm	30 m/min	●	○	○

Higher Productivity

Largest table and machining area for this class of vertical machining center

The large table and axis strokes allow the loading of large fixtures and workpieces.

VCN-535C

Y-axis stroke:

530 mm

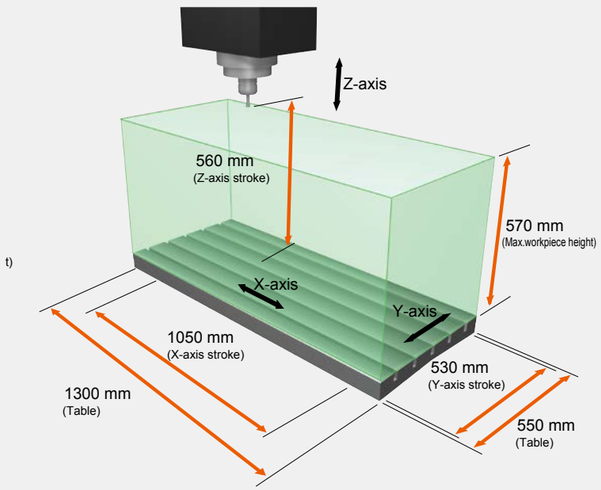
Max. workpiece dimension:

1300 mm length

550 mm width

570 / 770* mm height

*Max workpiece dimension for high column specifications.



*Max. workpiece dimension is limited when tool exchange is performed. Please refer to P20 for detail.

VCN-700D

Y-axis stroke:

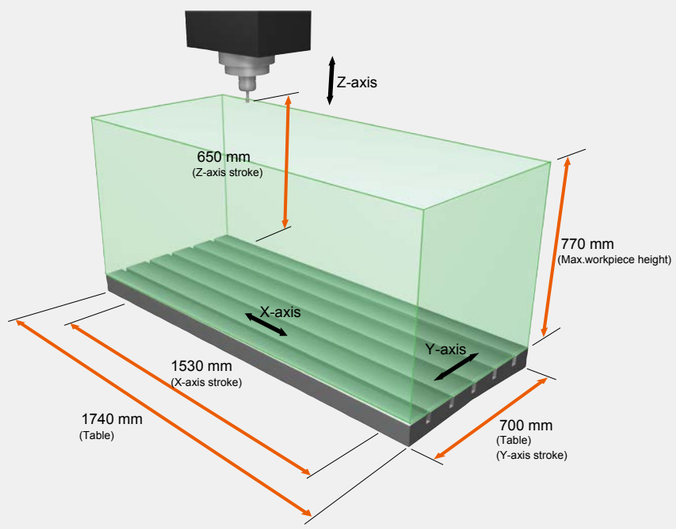
700 mm

Max. workpiece dimension:

1740 mm length

700 mm width

770 mm height



*Max. workpiece dimension is limited when tool exchange is performed. Please refer to P20 for detail.

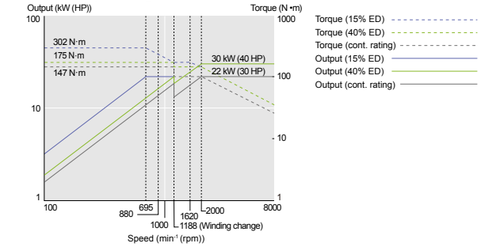
Powerful, high torque spindle for higher productivity

[VCN-535C, VCN-700D standard spindle]

The built-in motor spindle has a standard spindle speed range of 35 to 8000 min^{-1} (rpm) and can handle a variety of workpiece materials from aluminum to cast iron and steel, enabling a wide range of machining operations from high-speed machining to powerful cutting.
The spindle start-up speed of 1.4 sec. reduces non-cutting time.

Torque: 302 N·m [15% ED, low winding]
No.50, 8000 min^{-1} (rpm) spindle

Output / torque diagram

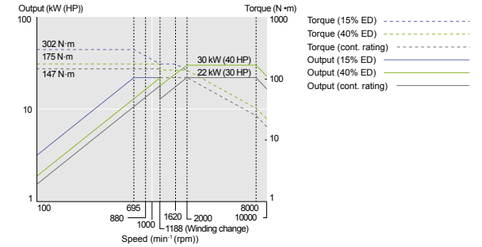


[VCN-535C, VCN-700D high-speed spindle] OPTION

The built-in motor spindle is capable of stable torque acceleration from low to high speed ranges and a maximum speed of up to 10000 min^{-1} (rpm). It is also optimal for high-efficiency machining of non-ferrous metals such as aluminum.

Torque: 302 N·m [15% ED, low winding]
No.50, 10000 min^{-1} (rpm) spindle

Output / torque diagram

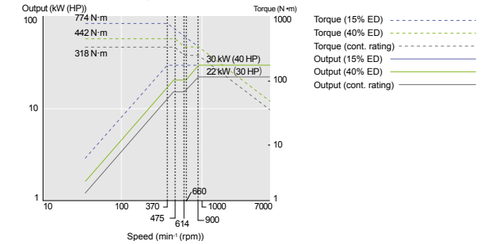


[VCN-700D high-torque spindle] OPTION

The high-torque built-in motor spindle is effective for rough machining of steel, cast iron, and other materials and for machining difficult-to-cut materials.

Torque: 774 N·m [15% ED, low winding]
No.50, 7000 min^{-1} (rpm) spindle

Output / torque diagram

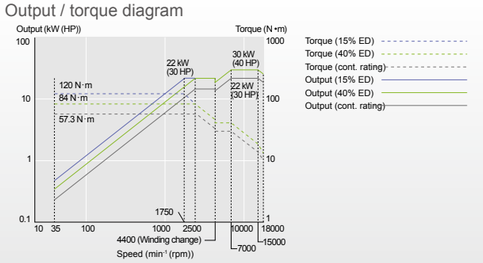


[VCN-700D high-speed spindle] OPTION

The high-speed spindle directly connected to the motor is optimal for aluminum machining, high accuracy die machining, and small-diameter drilling.

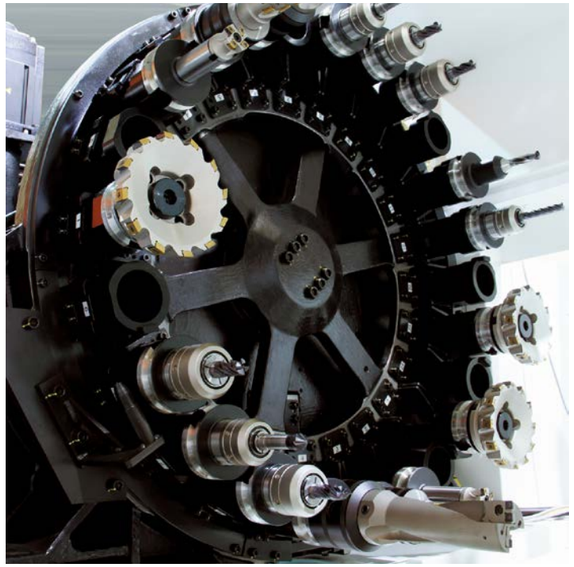
Spindle output: 30 kW / 22 kW
(40% ED / cont. rating)
No.40, 18000 min^{-1} (rpm) spindle

Output / torque diagram



Higher Productivity

Tool magazine



The standard tool magazine has a storage capacity of 24 tools - 48 tools are optionally available.

Machine model	535C	700D	
Tool shank	No. 50	No. 50	No. 40*
Max. tool length (from gauge line)	350 mm	400 mm	350 mm
Max. tool diameter (with adjacent tools)	105 mm*1	105 mm*1	80 mm
Max. tool diameter (with adjacent pockets empty)	210 mm*2	210 mm*2	125 mm
Max.tool weight	20 kg	20 kg	8 kg
Tool capacity	24, 48*	24, 48*	30

* Option
*1 48 tool-magazine is 125 mm
*2 48 tool-magazine is 240 mm

High speed automatic tool changer

The cam driven double arm system is designed for reliability and high-speed tool changes.

Tool change time (Chip-to-chip)

VCN-535C : 3.8 sec.

VCN-700D : 4.4 sec.

High Rigidity

Highly rigid machine construction with the best rigidity balance between spindle

Built-in low-vibration motor spindle with low heat generation

The integral spindle / motor provides high accuracy machining and minimum vibration during spindle acceleration as well as minimum heat generation.

Machine design

Using CAD FEA, the main machine components such as the bed and column are designed to withstand the forces generated by heavy duty cutting and high speed operation.

Ball screw core cooling

Temperature controlled cooling oil circulates through the ball screw cores to ensure stable machining accuracy over extended periods of high speed operation.

Linear roller guides utilized on the X-, Y- and Z-axis

The rigid linear roller guides utilized on all linear axis provide improved positioning accuracy with lower friction.

High Accuracy

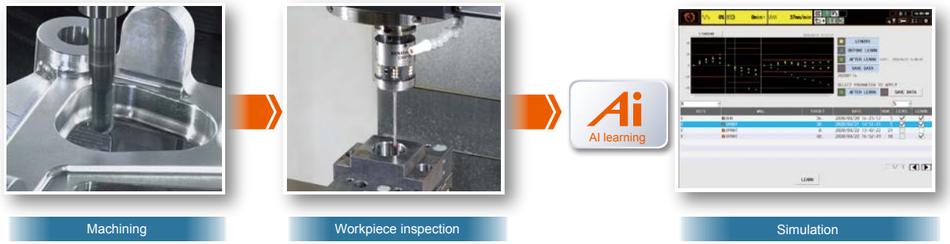
Standard equipment for high accuracy machining

Ai Thermal Shield

Reduce deformation of tool bit position caused by thermal displacement

MAZATROL SMOOTH G

New algorithms automatically determine the amount of compensation to be automatically applied according to changes in the temperature to ensure even higher machining accuracy.
Furthermore, by accumulating and learning data from post-processing measurements, optimal thermal displacement compensation can be optimized for the customer's processing environment, thus stabilizing processing accuracy. Accurate boring can be performed without using special tools or touch sensors for compensating measurement, resulting in cost reductions and improved productivity. It also improves accuracy stability during continuous machining with cold start.



*THERMAL SHIELD is available with the MAZATROL SmoothC.

Scale feedback — OPTION

Measures difference between the command value on the feed axis and the actual positioning, and compensation can be performed for stable machining accuracy over extended periods of time.

Coolant temperature control — OPTION

Maintains the coolant temperature to be same as the room temperature to prevent thermal displacement which can affect machining accuracy.

Tool length measurement — OPTION

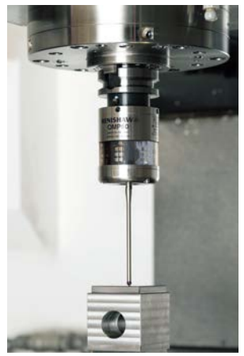
Tool length measurement & tool breakage detection

Tool length is automatically measured and registered in CNC system. Tool breakage can be detected during automatic operation. Small diameter tools which could not be measured by conventional measurement system can now be done to perform high speed, high accuracy tool measurement.

Contact force	2.5 N
Measurement accuracy	± 2 µm

Sensor body and base on the table can be easily mounted / dismounted. It can be stored in the upper corner of machining area when not in use for easy setup.

Coordinate value / workpiece measurement — OPTION



Touch sensor OMP60 (Mazak monitoring system B)

Coordinate values are automatically shifted according to the results of probing a workpiece by a touch sensor mounted in the machine spindle.

Smooth SET AND INSPECT*

Inspection programs can be easily made. Work coordinates and tool compensation can automatically be updated using measurement results.

*Only available for MAZATROL SmoothG.
Optional Mazak API is required.

Smooth OMM*

By manual operation, the touch probe can be moved to a measurement point and after the point is registered, a measurement program can be made. In addition to automatic update of work coordinates and tool compensation using measurement results, geometric tolerances of workpiece features can also be measured.

*Only available for MAZATROL SmoothG.
All functions are available for free for a 120-day trial period.

Automation

Automation and process integration improve operation rate

2-pallet changer

OPITON

The next workpiece can be loaded during the machining of the current workpiece for increased productivity. Max. load capacity and workpiece size for 2-pallet changer is the same as that of standard single table.

VCN-535C 2-pallet changer
(MAZATROL SmoothG)

	VCN-535C 2-pallet changer	VCN-700D 2-pallet changer
Table size	1300 mm × 550 mm	1740 mm × 700 mm
Max. load capacity	1200 kg	2000 kg
Table surface configuration	18 mm T slot × 5 100 mm pitch	18 mm T slot × 5 125 mm pitch
Pallet change time	17.0 sec.	22.0 sec.

Ez LOADER

OPITON

A compact automation system integrated with collaborative robot and logistics pallets, which is easily introduced, operated and setup.
* Only available for VCN-535C

MA (MILL ASSIST)

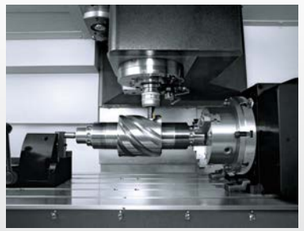
OPITON

High speed robot system comprised of a robot and stocker.
Suitable for mass production.
*Only available for VCN-535C with MAZATROL SmoothG

Additional control axis

OPITON

By adding a control axis to the CNC machine, the machining of four surfaces with an NC table is possible. This improves operating rates and reduces setup times.



Coolant / chip disposal

Enhanced coolant / chip disposal

Coolant system

Coolant is discharged from nozzles located at the bottom of the spindle headstock.

Flood coolant

0.45 MPa (4.5 kgf/cm^2), 30 L/min

OPITON

High pressure coolant is extremely effective for tool cooling and extending tool life.

Coolant through spindle system

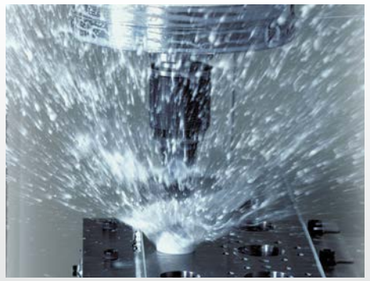
OPITON

Coolant is fed to the tool tip by passages through the tool holder and tool. 2 pump pressure specifications are available : 0.5 MPa (5 kgf/cm^2), 1.5 MPa (15 kgf/cm^2).

SUPERFLOW coolant system

OPITON

The SUPERFLOW coolant system features improved chip control and lubrication as well as lower tool tip temperatures.
·Max. 7.0 MPa (70 kgf/cm^2) coolant pressure
·Adjustable coolant pressure
·High performance cyclone filter with minimum maintenance requirements to reduce running cost



Mist collector

OPITON

Coolant mist generated by machining is removed from the machining area in order to maintain a safe and clean working environment.

Cover coolant

OPITON

Additional coolant nozzles used to flush machined chips from the sides of the coolant cover.

Niagara coolant system

OPITON

Large volume of coolant is discharged from the nozzles mounted on the machine top cover to flush chips from the workpiece to conveyors on both sides of the table.

Magnetic separator

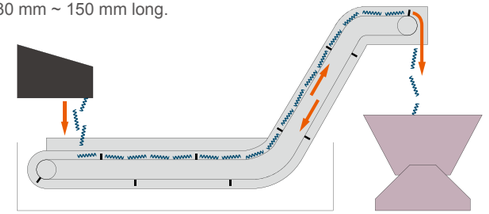
OPITON

Magnetic separator which is inside the coolant tank separates ferrous chips from the coolant.

Chip conveyor (hinge)

OPITON

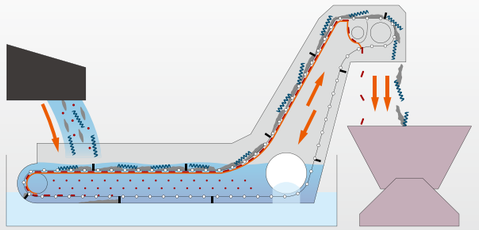
Chips are removed by hinge-plate belt and discharged from the side of machine. Very suitable for curly shaped steel chips from 30 mm ~ 150 mm long.



Chip conveyor (ConSep 2000 II WS)

OPITON

Chip conveyor with internal coolant filtration that is effective for removing small chips as well as long, curly chips generated by machining of steel, aluminium and cast iron.



Ergonomic

Assist functions

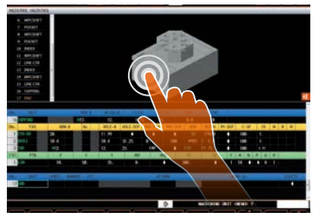
MAZATROL conversational programming

QUICK MAZATROL*

MAZATROL SMOOTH G

Programs can be easily created and checked by displaying the 3D model of the workpiece. Can reduce input errors and time for program checking.

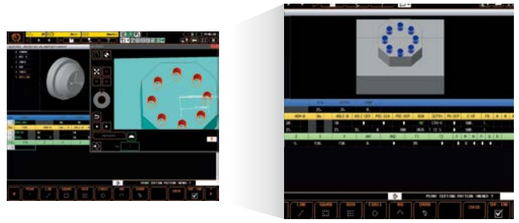
Easily edit a program by touching the display



3D ASSIST*

MAZATROL SMOOTH G

Workpiece and coordinates data can be imported from 3D CAD data to a MAZATROL program.



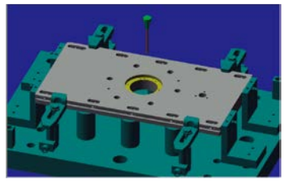
*MAZATROL SmoothC can only be used with the optional Smooth CAM Ai.

Advanced machining simulation

Virtual machining*

MAZATROL SMOOTH G

High-speed machining simulation with 3D models performed on the CNC display to check programs and interference accurately.



Machining optimization

Cutting Adviser*

MAZATROL SMOOTH G

Optimize machining conditions through simulation and visualization of machining processes from accumulated machining results.

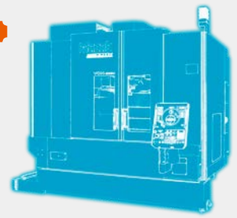
*MAZATROL SmoothC can only be used with the optional Smooth CAM Ai.

Digital set-up

Installing Smooth CAM Ai, virtual machines in your office accurately duplicate the operation of machines on your factory floor. Programs can be made and edited, as well as performing simulation and analysis in your office.

SMOOTH CAM Ai OPITON

Make and edit programs, and perform simulation and analysis, on Smooth CAM Ai for multiple machines. Send this data to machines in the factory for fast and accurate setups.



Office PC

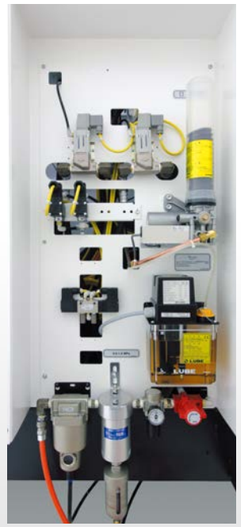
Factory

Ergonomic design for convenient operation

Large door opening

Thanks to its large door opening, workpieces can easily be loaded / unloaded by using an overhead crane.

Maintenance area



Items requiring frequent access for machine maintenance are arranged in one central location.

Excellent accessibility to tool magazine

Stepped platform with handrail for convenient access to tool magazine is standard equipment.

VCN-535C shown with 48 tool magazine

4-axis simultaneous CNC

MAZATROL SmoothC

Fastest CNC in the world

- Latest hardware and software for unprecedented speed and precision
  Same servos as MAZATROL SmoothG

Essential functions for increased ease of programming

Ease of operation

Simplified display and key input operation

Following traditional conversational MAZATROL programming, this new system is designed for ease of operation by simplified key operation.

- Menu keys under the display can be pressed to go to other pages for program data input and editing
- Home screen key goes to the home screen from any display
- USB interface
  Transfer program and tool data
- SD card slot
  Transfer program and tool data
- Compact keypad with unique design for ease of input

Home screen

The home screen displays overall process status in an easy to understand manner.

Comprehensive status display on one screen

- **Machining**
  Displays axis in operation and load on motors.
- **Programming**
  Displays the simulation time and machining time.
- **Tool data**
  Displays status of tool layout.
- **Set up**
  Displays status of workpiece coordinate setting.
- **Maintenance**
  Overview of the status of items requiring maintenance.

MAZATROL conversational programming

MAZATROL interactive programming uses conversational language and automatically determines cutting conditions, M codes and G codes. Even a beginner operator can quickly make programs.

3D machine model

A 3D machine model is available to perform program interference checks with other CAD / CAM simulation software. (MAZATROL SmoothG, MAZATROL SmoothC)

4-axis simultaneous CNC

MAZATROL SMOOTH G

Fastest CNC in the world

- Latest hardware and software for unprecedented speed and precision

Smooth graphical user interface

MAZATROL Smooth graphical user interface for unsurpassed ease of operation
Touch screen operation - operates similar to your smart phone / tablet

Ease of operation

Designed for unsurpassed ease of operation with advanced Intelligent Functions

Dual Monitor (option)

Process home screens

Five different home process screens - each home screen displays the appropriate data in an easy-to-understand manner.
Icons can be touched in each process display for additional screen displays.

Programming

Tool data

Set up

Machining

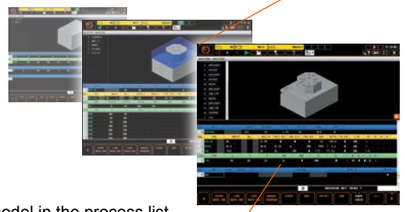
Maintenance

Programming screen links tool path, workpiece shape and programming to reduce programming time

QUICK MAZATROL

MAZATROL program, unit list and 3D workpiece shape are linked to each other. After defining a machining unit in a MAZATROL program, the 3D shape is immediately displayed to easily and quickly check for any programming error.

Quickly move to the corresponding section in the MAZATROL program by touching a feature in the 3D model



3D model in the process list is displayed with updated programming in real time

3D ASSIST

Workpiece and coordinates data can be imported from 3D CAD data to a MAZATROL program.
No coordinate value inputs are required. Can reduce input errors and time for program checking.

Automatically input to MAZATROL program

Shape selection

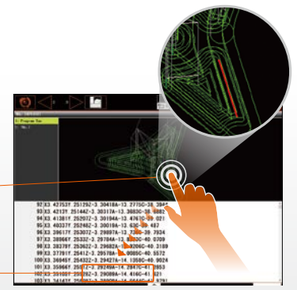
CAD model importing

QUICK EIA

Program, process list and 3D tool path display are linked to each other. Visible search on touch screen can reduce the time for program checking.

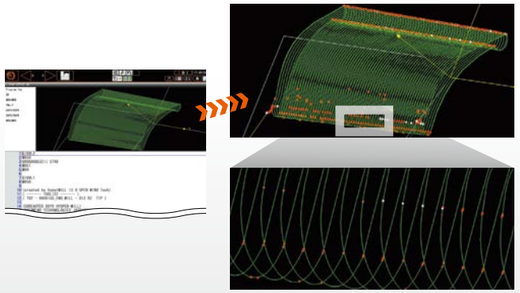
Selecting tool path by touching the screen

Moving to the corresponding EIA program line



VIEW SURF

By analyzing tool path, any predictable failure on the finished surface can be visualized. Program modification can be done before machining to minimize the time for test cutting.



Environmentally Friendly

Mazak Go GREEN

Decarbonization-related technology for Mazak products

We are committed to developing technology for decarbonization through productivity improvements. Mazak promotes the three comprehensive approaches to the reduction of our environmental impact in support of achieving a sustainable society.

Energy efficient

Reduction of lubricant consumption

Extended coolant service life

Auto-power off

When the machine is not operated for a pre-registered period of time, the machine worklights and the CNC backlight are turned off automatically. They are automatically turned on when the motion sensor detects the return of the operator.

Chip conveyor stop

After the passing of a pre-registered period of time after automatic machine operation stops, the chip conveyor automatically stops to reduce electrical power consumption. (Chip conveyor is optional equipment)

Grease lubrication

The linear roller guides and ball screws are lubricated by grease which eliminates tramp oil in the coolant resulting in a much longer service life for the coolant.

Energy Dashboard supports energy saving MAZATROL SMOOTH G OPITON

The Energy Dashboard provides a convenient visual monitoring of energy consumption and analysis.
Energy consumption and electrical power cost as well as CO_2 emission are displayed.

Energy consumption displayed on graph

Display approximate CO_2 emission and electrical power cost

Energy consumption by workpiece

Energy consumption on process screen display

· Total energy consumption (of workpiece in operation)
· Current energy consumption

Standard and Optional Equipment

● : Standard ○ : Option - : N/A

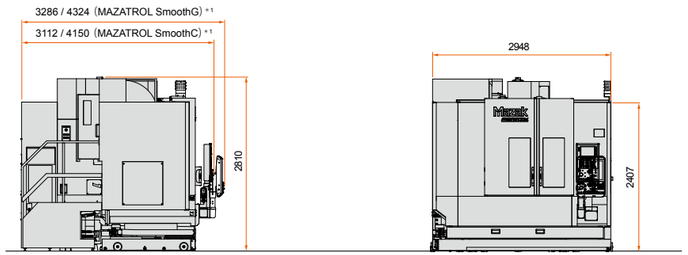
		VCN-535C		VCN-700D	
		MAZATROL SmoothG	MAZATROL SmoothC	MAZATROL SmoothG	MAZATROL SmoothC
Machine	8000 min^{-1} (rpm) spindle (No. 50)	●	●	●	●
	10000 min^{-1} (rpm) spindle (No. 50)	○	○	○	○
	18000 min^{-1} (rpm) spindle (No.40)	—	—	○	○
	7000 min^{-1} (rpm) High torque spindle (No. 50)	—	—	○	○
	24 tool magazine	●	●	●	●
	48 tool magazine	○	○	○	○
	30 tool magazine (No. 40)	—	—	○	○
	200 mm raised column (not available for 2-pallet changer)	○	○	—	—
	Spindle BIG-Plus (with enclosed top cover)	○	○	○	○
	Multiple spindle orient (M code / 1 degree)	○	○	○	○
	Oil and air lubrication on linear axis (linear guide, ball screw)	○	○	○	○
	Remote manual pulse generator	●	●	●	●
	Status light (3 colors)	○	○	○	○
	Work light (LED)	●	●	●	●
Automation	2-pallet changer	○	○	○	○
	Preparation for MA	○	—	—	—
	Preparation for Ez LOADER	○	○	—	—
	Automatic power ON / OFF + warm-up operation	●	○	●	○
	Automatic tool length measurement & tool breakage detection	○	○	○	○
	Magazine operation panel for tool ID (touch panel)	○	—	○	—
	Mazak monitoring system B (OMP60)	○	○	○	○
	Preparation for Mazak monitoring system B (OMP60)	○	○	○	○
	Preparation for hydraulic fixtures	○	○	○	○
	Preparation for pneumatic fixtures	○	○	○	○
	Automatic front door with 2 hand switch	○	○	○	○
	Operation end buzzer	○	○	○	○
	One additional axis	○	○	○	○
Safety equipment	Operator door interlock	●	●	●	●
Coolant / chip disposal	Fully enclosed top cover	○	○	○	○
	Splash guard	●	●	●	●
	Coolant system	●	●	●	●
	Flood coolant 0.45 MPa (4.5 kgf/cm^2) 30 L/min	○	○	○	○
	Air through spindle	○	○	○	○
	Coolant through spindle 0.5 MPa (5 kgf/cm^2)	○	○	○	○
	High pressure coolant through spindle 1.5 MPa (15 kgf/cm^2)	○	○	○	○
	SUPERFLOW coolant system	○	○	○	○
	Cover coolant	○	○	○	○
	Niagara coolant	○	○	○	○
	Magnetic separator	○	○	○	○
	Coolant temperature control	○	○	○	○
	Hand held coolant nozzle	○	○	○	○
	Workpiece air blast	○	○	○	○
	Oil skimmer	○	○	○	○
	Oil mist coolant	○	○	○	○
	Mist collector	○	○	○	○
	Chip conveyor (side discharge / hinge)	○	○	○	○
	Chip conveyor (side discharge / ConSep)	○	○	○	○
	Chip bucket (swing type)	○	○	○	○
	Chip bucket (fixed type)	○	○	○	○
High accuracy	Absolute position detection	●	●	●	●
	Scale feedback system	○	○	○	○
	Ball screw core cooling (X-, Y-, Z-axis)	●	●	●	●
Table	Sub-table*1	○	○	○	○
Maintenance	Smooth Ai Spindle	○	—	○	—

*1 Special order for machines with 2-pallet changer

Machine Dimensions

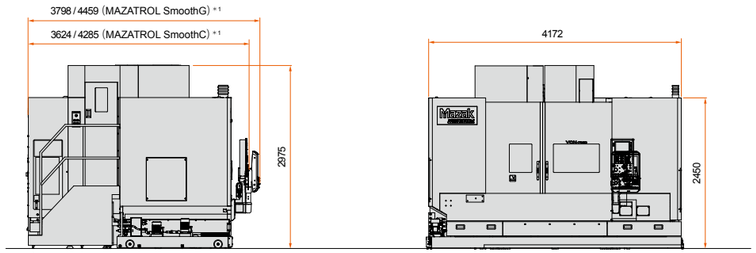
Unit : mm

VCN-535C



*1 Dimensions of 24 / 48 tool magazine

VCN-700D



*1 Dimensions of 24 / 48 tool magazine

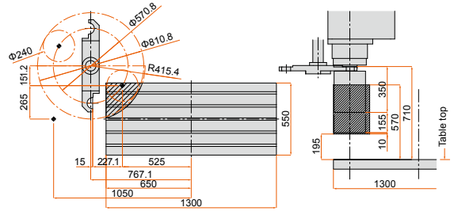
*Machine dimensions are based on standard specifications. Dimensions may change depending on options.

Interference Between Tool and Workpiece During ATC operation

Unit : mm

VCN-535C

X : -1050, Y : 0



VCN-700D

X : -1530, Y : 0

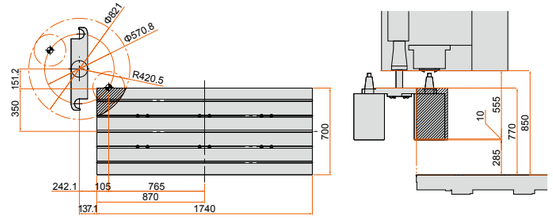
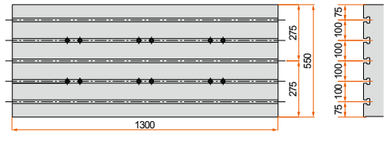


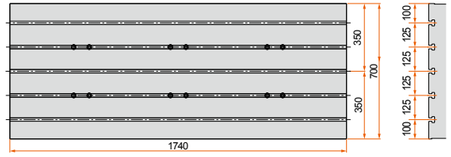
Table Dimensions

Unit : mm

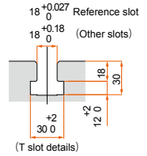
VCN-535C



VCN-700D



T slot



Standard Machine Specifications

		VCN-535C	VCN-700D
Stroke	X-axis stroke (table right / left)	1050 mm	1530 mm
	Y-axis stroke (saddle back / forth)	530 mm	700 mm
	Z-axis stroke (spindle up / down)	560 mm	650 mm
	Distance from table top to spindle nose	150 ～ 710 mm	200 ～ 850 mm
	Distance from column surface to spindle center	571 mm	722 mm
Table	Table size	1300 mm × 550 mm	1740 mm × 700 mm
	Max. load capacity (evenly distributed)	1200 kg	2000 kg
	Table surface configuration	18 mm T slot × 5 , 100 mm pitch	18 mm T slot × 5 , 125 mm pitch
Spindle	Max. spindle speed	8000 min^{-1} (rpm)	
	Spindle speed range	2-step (electric)	
	Spindle taper	No. 50	
Feedrate	Rapid traverse rate (X-, Y-, Z-axis) *1	42000 mm/min	30000 mm/min
	Cutting feedrate (X-, Y-, Z-axis)	1 ～ 8000 mm/min	
	Shape compensation	1 ～ 42000 mm/min	1 ～ 30000 mm/min
Automatic tool changer	Tool shank	No.50	
	Tool storage capacity	24	
	Max. tool diameter / length (from gauge line) / weight	Φ105 mm / 350 mm / 20 kg	Φ105 mm / 400 mm / 20 kg
	Max. tool diameter with adjacent tool pockets empty	Φ210 mm	
	Max. tool diameter with tools next to adjacent tool pockets empty	Φ240 mm	Φ250 mm
	Tool selection method	MAZATROL random memory (random pocket assignment)	
	Tool change time (tool-to-tool)	2.0 sec	
Motor	Spindle motor (30 min. rating)	30 kW (40 HP)	
	Spindle motor (cont. rating)	22 kW (30 HP)	
Power requirement	Electrical power requirement (30 min. rating)	53.6 kVA	55.1 kVA
	Electrical power requirement (cont. rating)	41.8 kVA	43.3 kVA
	Air supply (pressure / flow rate)	0.5 MPa (5 kgf/cm^2) ～ 0.9 MPa (9 kgf/cm^2) / 320 L/min (ANR)	
Coolant	Coolant tank capacity	200 L	380 L
Machine size	Machine height (from floor)	2810 mm	2975 mm
	Machine width	2948 mm	4172 mm
	Machine length (MAZATROL SmoothG)	3286 mm	3798 mm
	Machine length (MAZATROL SmoothC)	3112 mm	3624 mm
	Machine weight (without coolant tank)	7830 kg	11500 kg

*1 Limited feedrate with continuous axis movement

MAZATROL SmoothC Specifications

	MAZATROL	EIA
Number of controlled axis	Simultaneous 2 ～ 4 axis	
Least input increment	0.0001 mm, 0.00001 inch, 0.0001 deg	
High speed, high precision control	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation, High-speed machining mode, High-speed smoothing control
Interpolation	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Synchronous tapping*
Feedrate	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Variable acceleration control, G0 slope constant*	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Time constant changing for G1, Variable acceleration control, G0 slope constant*
Program registration	Number of programs : 256 (Standard) / 960 (Max.), Program memory : 2 MB, Program memory expansion : 8 MB*, Program memory expansion : 32 MB*	
Control display	Display : 10.4" touch panel, Resolution : VGA	
Spindle functions	S code output, Spindle speed limitation, Spindle speed override, Spindle speed reaching detection, Multiple position orient, Constant surface speed, Spindle speed command with decimal digits, Synchronized spindle control, Spindle speed range setting	
Tool functions	Number of tool offset : 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)	Number of tool offset : 4000, T code output for tool number, T code output for group number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)
Miscellaneous functions	M code output, Simultaneous output of multiple M codes	
Tool offset functions	Tool position offset, Tool length offset, Tool diameter / tool nose R offset, Tool wear offset	
Coordinate system	Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set)	
Machine functions	–	Shaping function*, Dynamic compensation II*
Machine compensation	Backlash compensation, Pitch error compensation	
Protection functions	Emergency stop, Interlock, Pre-move stroke check	
Automatic operation mode	Memory operation	Memory operation, Tape operation, MDI operation, SD card operation, EtherNet operation*
Automatic operation control	Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Machine lock	Optional block skip, Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Restart2, Collation stop, Machine lock
Manual measuring functions	Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine	Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, Measurement on machine
Automatic measuring functions	WPC coordinate measurement, Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*	Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*
MDI measurement	Semi automatic tool length measurement, Full automatic tool length measurement, Coordinate measurement	
Interface	PROFIBUS-DP*, EtherNet/IP*, CC-Link*	
Card interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

*Option

*1 Simultaneous 4-axis control

MAZATROL SmoothG Specifications

	MAZATROL	EIA
Number of controlled axis	Simultaneous 2 ～ 4 axis	
Least input increment	0.0001 mm, 0.00001 inch, 0.0001 deg	
High speed, high precision control	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation, High-speed machining mode, High-speed smoothing control
Interpolation	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Synchronous tapping*
Feedrate	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Variable acceleration control, G0 slope constant*	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Time constant changing for G1, Variable acceleration control, G0 slope constant*
Program registration	Number of programs : 256 (Standard) / 960 (Max.), Program memory : 2 MB, Program memory expansion : 8 MB*, Program memory expansion : 32 MB*	
Control display	Display : 19" touch panel, Resolution : SXGA	
Spindle functions	S code output, Spindle speed limitation, Spindle speed override, Spindle speed reaching detection, Multiple position orient, Constant surface speed, Spindle speed command with decimal digits, Synchronized spindle control, Spindle speed range setting	
Tool functions	Number of tool offset : 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)	Number of tool offset : 4000, T code output for tool number, T code output for group number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)
Miscellaneous functions	M code output, Simultaneous output of multiple M codes	
Tool offset functions	Tool position offset, Tool length offset, Tool diameter / tool nose R offset, Tool wear offset	
Coordinate system	Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set)	
Machine functions	-	Tilted working plane*1, Shaping function*, Dynamic compensation II*, Tool center point control**1, Workpiece positioning error compensation**1
Machine compensation	Backlash compensation, Pitch error compensation, Ai Thermal shield	
Protection functions	Emergency stop, Interlock, Pre-move stroke check, SAFETY SHIELD (manual mode), SAFETY SHIELD (automatic mode)*, VOICE ADVISER	
Automatic operation mode	Memory operation	Memory operation, Tape operation, MDI operation, EtherNet operation*
Automatic operation control	Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Machine lock, Single process	Optional block skip, Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Restart2, Collation stop, Machine lock
Manual measuring functions	Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine	Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, Measurement on machine
Automatic measuring functions	WPC coordinate measurement, Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*	Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*
MDI measurement	Semi automatic tool length measurement, Full automatic tool length measurement, Coordinate measurement	
Interface	PROFIBUS-DP*, EtherNet/IP*, CC-Link*, CC-Link IE Field Basic	
Card interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	
Security	Security software*	

*Option

*1 Simultaneous 4-axis control