VCN-460, VCN-600

Mazak

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SE

VCN-460, VCN-600 23.01.0 GH 99J293722E2

Mazak

VCN-460
VCN-600

[BT No.40 Vertical Machining Center]

VCN-460, VCN-600

- **Compact vertical machining center with BT No.40**
- **High rigidity construction ensures high accuracy machining**
- **Designed for unsurpassed ease of operation**
- **Improved environmental performance**

MAZATROL SmoothEz
Shown with optional equipment

VCN-460

MAZATROL SmoothG
Shown with optional equipment

VCN-600

MAZATROL SMOOTHEz

MAZATROL SMOOTHG

Shown with optional dual monitor

- New VCN series is now available with extended Y-axis stroke
- Enhanced cutting performance - [standard] 18.5 kW, 12000 min^{-1} (rpm) spindle, [option] 30 kW, 18000 min^{-1} (rpm) spindle
- High accuracy machining is ensured with heat displacement control and linear roller guides as standard equipment. Optional equipment is also available for higher accuracy.
- Optimum chip disposal for a wide range of applications
- Machine specifications with environmental considerations

VCN series range

● : Standard ○ : Option

Model	Spindle		Table	Rapid traverse rate X, Y, Z-axis	Tool magazine	
	12000 min^{-1}(rpm)	18000 min^{-1}(rpm)			30 tools	40 tools
VCN-460	●	○	900 mm × 460 mm	42 m/min	●	○
VCN-600	●	○	1300 mm × 600 mm	42 m/min	●	○

Main Features

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

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

VCN-460

Y-axis stroke

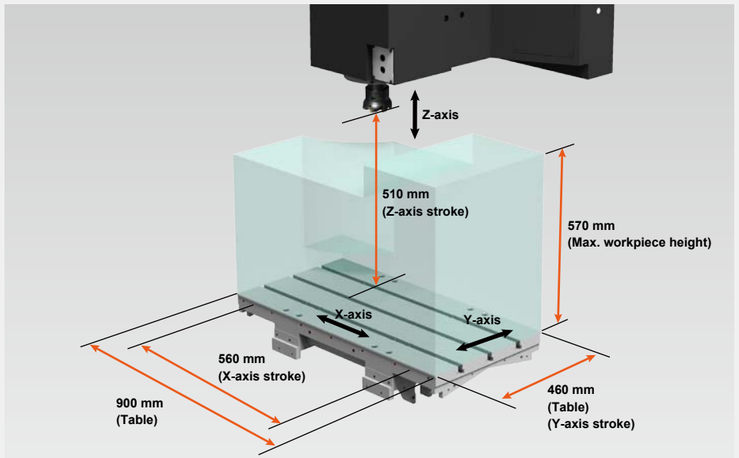
460 mm

Max. workpiece dimension

900 mm (Length)

460 mm (Width)

570 mm (Height)



VCN-600

Y-axis stroke

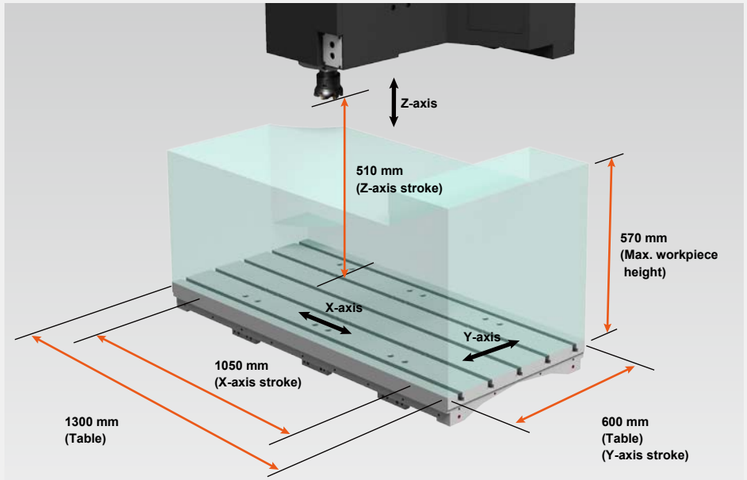
600 mm

Max. workpiece dimension

1300 mm (Length)

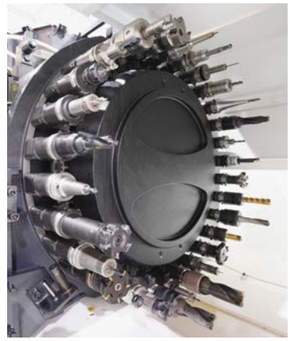
600 mm (Width)

570 mm (Height)



*Max. workpiece dimension is limited when tool exchange is performed. Please refer to p.20 for detail.

High-speed tool magazine



The standard tool magazine has a storage capacity of 30 tools. 40 tools are optionally available to minimize complicated tool setup for wide range of workpieces. The required floor space is the same for both 30 and 40 tool magazine specifications.

Tool shank	BT No.40
Max. tool length (from gauge line)	350 mm
Max. tool diameter (with adjacent tools)	Φ80 mm
Max. tool diameter (with adjacent pockets empty)	Φ125 mm
Max. tool weight	8 kg
Tool capacity	30, 40*

*Option

High-speed automatic tool changer

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

Tool change time
(Tool-to-tool)

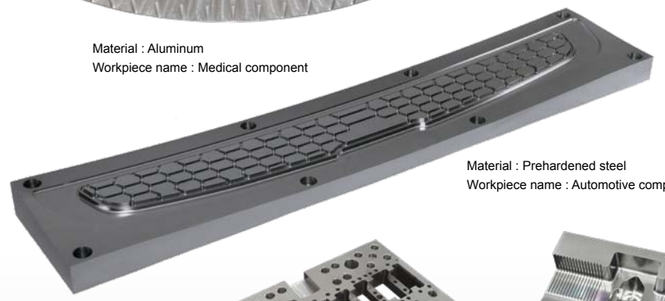
1.3 sec.

Extensive machining applications

Material : Aluminum
Workpiece name : Automotive component motor case

Material : Aluminum
Workpiece name : Medical component

Material : Carbon steel
Workpiece name :
General industry machinery component



Material : Prehardened steel
Workpiece name : Automotive component die

Material : Stainless steel
Workpiece name :
Metal processing machinery component

Material : Cast iron
Workpiece name :
Construction machinery component

Material : Carbon steel
Workpiece name :
General industry machinery component

Material : Prehardened steel
Workpiece name :
General industry machinery component die

High Rigidity

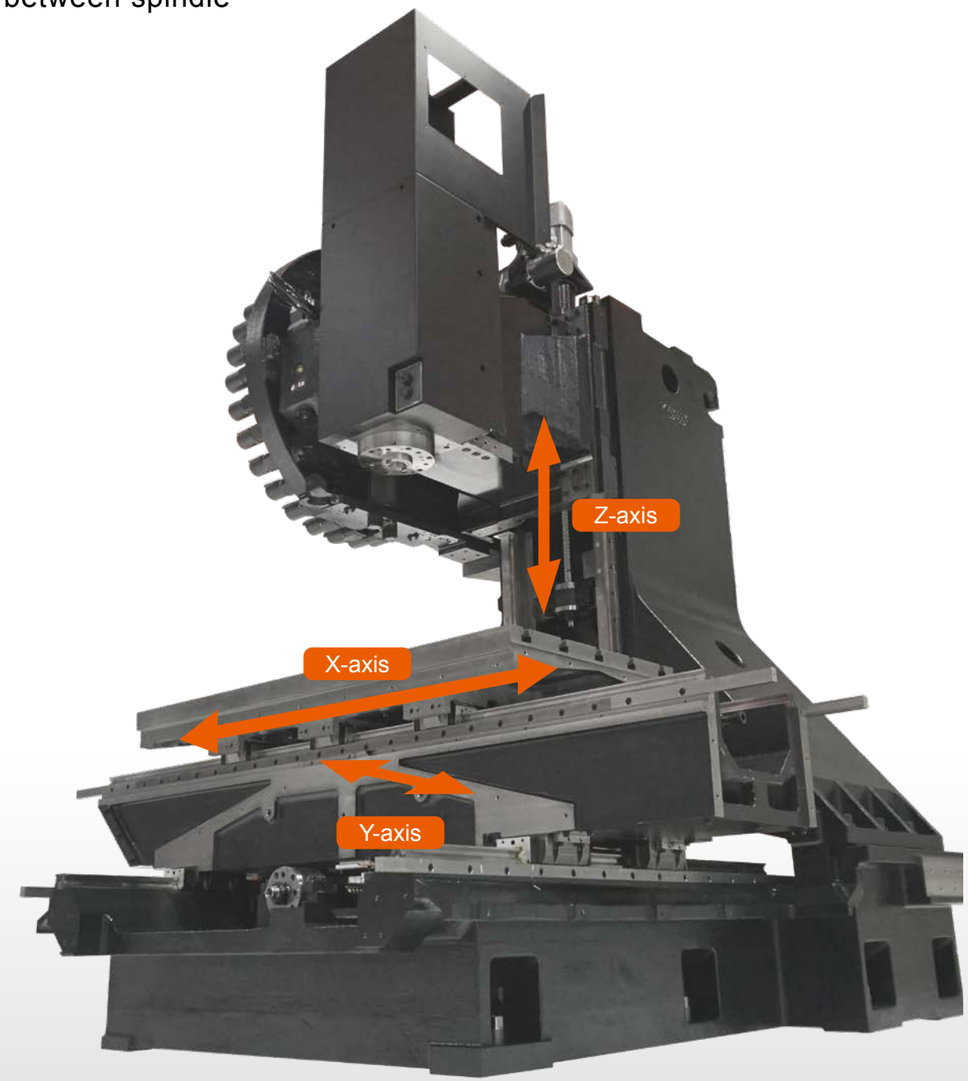
Machine design

Using CAD FEA, the main machine components such as the bed and column are designed to minimize distortion. Compared to the conventional model, distortion on the column caused by heat displacement has been improved by 40%.

High performance spindle

Temperature controlled cooling oil is circulated around the spindle headstock to minimize any thermal change to the spindle. Machined surface can be improved utilizing lightweight ceramic ball spindle bearings with low thermal expansion.

Highly rigid machine construction with the best rigidity balance between spindle



Powerful, high torque spindle for higher productivity

Spindle output : 18.5 kW / 11 kW
(10% ED / cont.rating)

BT No.40, 12000 min^{-1} (rpm) spindle

The 12000 min^{-1} (rpm) spindle can perform heavy duty machining of steel as well as high speed machining of aluminum with small diameter tools for reduced cutting time. High accuracy machining can be performed with minimum heat generation by the spindle with ceramic ball spindle bearings.

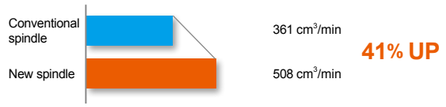
Spindle output : 30 kW / 22 kW
(40% ED / cont.rating)

BT No.40, 18000 min^{-1} (rpm) spindle OPTION

Due to the integral spindle / motor design, vibration is minimized during high-speed operation. Designed for efficient machining of dies and molds and aluminium with minimized vibration.

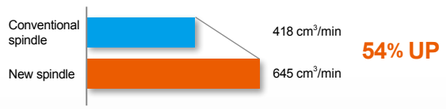
Heavy duty machining by standard spindle with high output and torque Material : C45

■ Φ80 mm facemill



Spindle speed min^{-1} (rpm)	Feedrate mm/rev	Cutting width mm	Depth of cut mm	Material removal rate cm^3/min
1393	1.5	54	4.5	508

■ Φ50 mm endmill



Spindle speed min^{-1} (rpm)	Feedrate mm/rev	Cutting width mm	Depth of cut mm	Material removal rate cm^3/min
1592	1.5	45	6	645

■ Φ50 mm indexable insert drill

Spindle speed min^{-1} (rpm)	Feedrate mm/rev	Material removal rate cm^3/min
1592	0.18	563

■ M30 × P3.5 tapping

Spindle speed min^{-1} (rpm)	Feedrate mm/rev	Cutting speed mm/min
255	3.50	891

Watch the video from here

Higher Accuracy

Standard equipment for high accuracy machining

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

The rigid linear roller guides utilized on all linear axes provide improved positioning accuracy compared to slideways. Stable machining accuracy is ensured over extend periods of time.

Ai Thermal Shield

New algorithms automatically determine the amount of compensation to be automatically applied according to changes in the temperature to ensure even higher machining accuracy. Ai Thermal Shield is available with the MAZATROL SmoothG CNC control.

A wide variety of options ensure higher accuracy machining

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.

Ball screw core cooling

OPTION

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

Coolant temperature control

OPTION

Prevents heat displacement by controlling coolant temperature for higher machining accuracy.

Tool length measurement

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.

Tool length measurement & tool breakage detection

OPTION

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.

	Conventional type	New type
Contact force	30 N	2.5 N
Measurement accuracy	±10 μm	±1 μm

Coordinate value / workpiece measurement

Touch sensor RMP60

(Mazak monitoring system B)

OPTION

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

Smooth OMM*

OPTION

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.

Smooth SET AND INSPECT*

OPTION

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

Smooth OMM

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

Smooth SET AND INSPECT

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

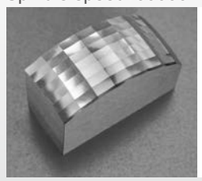
High-precision finishing for die and mold machining

ULTRA SPINDLE

OPTION

Enables high-precision finishing with small diameter tools required for die and mold machining. Mirror machining can be performed by attaching compact electric motor spindle that can be changed tools automatically to a standard spindle.

Spindle speed : 60000 min^{-1} (rpm) / 80000 min^{-1} (rpm)



Work size	35 mm × 31.5 mm × 20 mm	Spindle speed	60000 min^{-1} (rpm)
Material	STAVAX (52HRC)	Surface roughness	Ra 0.05 μm (Average of measurements at 3 locations)
Tool	Φ2 mm ball endmill	Machining time	7 h 38 min

Standard and Optional Equipment

Coolant / chip disposal

Flood coolant

Coolant is discharged from nozzles on the spindle housing.

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

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

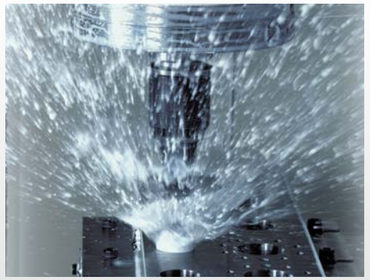
Coolant through spindle system OPTION

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 OPTION

The SUPERFLOW coolant system features improved chip control and lubrication as well as lower tool tip temperatures.

- Max. 7.0 MPa (70 kgf/cm²) coolant pressure
- Adjustable coolant pressure
- High performance cyclone filter with minimum maintenance requirements to reduce running cost



Mist collector OPTION

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

Cover coolant OPTION

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

Double line filter OPTION

By switching between the two line filters even during automatic operation, filters can be cleaned without stopping the machine. Double line filter is included with coolant through spindle system.

Chip bucket pulled out separately on the left and right side

The standard specification comes with chip buckets on the left and right at the bottom front of the machine.

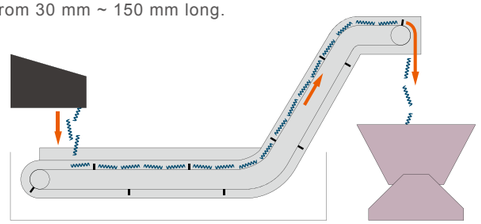
Chip bucket (rear discharge) OPTION

Rear discharge chip bucket can be installed according to customer's production line. Optional cover coolant is recommend.

The type of optional chip conveyor to be selected is based on the type of machined chips to be produced. Spiral conveyors on both sides of the machine table smoothly remove machined chips. ConSep with a drum filter is recommended to remove small chips.

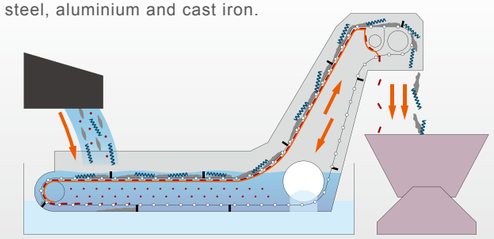
Chip conveyor (hinge) OPTION

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) OPTION

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.



Box filter OPTION

Increased capacity of the box-type filter inside the coolant tank keeps the coolant clean by filtering small chips and sludge from the chip conveyor. Box filter is included with the chip conveyor (hinge type).

Magnetic separator OPTION

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

Carbon package OPTION

Designed to prevents dust generated during carbon processing.

Package includes;

- Control panel: air purge, dual fan filter
- Feed axis : oil & air lubrication, double wiper, ball screw support bearing with seal
- Tank for dry milling (without pump)
- Spindle air purge for 12000 min^{-1} (rpm) spindle only

Automation

MA (MILL ASSIST) OPTION

Automation system for machining center comprised of a robot and stocker

MA is comprised of a robot and stocker.
The stocker can be flexibly arranged in response to changing workpiece shape and can stack multiple levels of material. By inputting workpiece dimension, stocker and jaw instruction are displayed on the CNC display.

Smooth MILL ASSIST (system software)

Only available for MAZATROL SmoothG CNC.

Environmentally Friendly

Designed with environmental considerations

Yamazaki Mazak has positioned "environmental" initiatives as one of its important management issues. We are promoting an activity aimed at reducing CO_2 emissions throughout the product life cycle. This is shown by the fact that all factories in Japan where Mazak machine tools are produced are ISO 14001 certified, an international standard confirming that the operation of our production facilities does not adversely affect air, water or land.

Energy Dashboard for saving energy

MAZATROL SMOOTH G OPTION

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.
(Optional electrical power monitor required)

Energy consumption displayed on graph

Display approximate CO_2 emission and electrical power cost

Energy consumption by workpieces

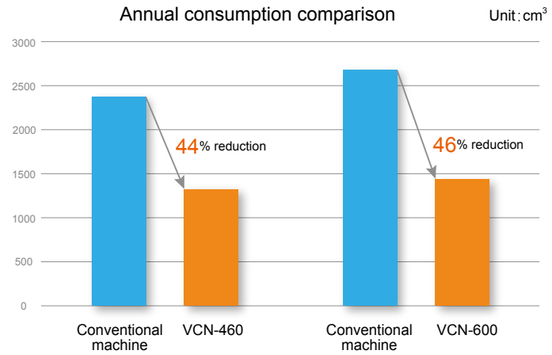
Energy consumption on process screen display

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

Reduced consumption of grease lubrication

A high-performance grease-lubricated LHL centralized lubrication system is used for the X, Y, and Z-axis to minimize the consumption of lubricating fluid, resulting in saving up to annual 46%.

Consumption :
Up to **46** % reduction

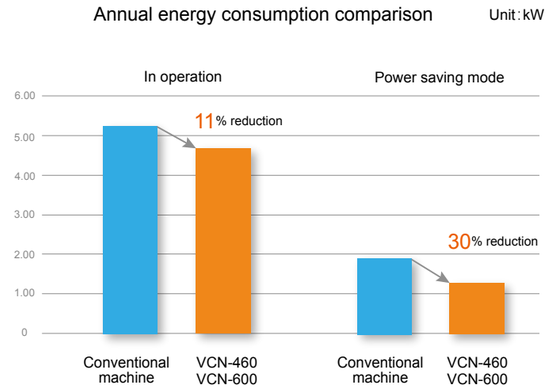


This is the amount of consumption when the daily operating time is 10 hours for 300 days.

High efficiency chiller unit with inverter control

The VCN series is equipped with a chiller unit that has a high energy saving rate due to inverter control.

Energy consumption :
Up to **30** % reduction



Auto power off for lower energy consumption

Reduce energy consumption by automatically turning off the CNC screen, LED lighting, chip conveyor and cover coolant as well as chiller unit.

CO_2 emissions :
0.2 ton reduction per year

Ease of Operation

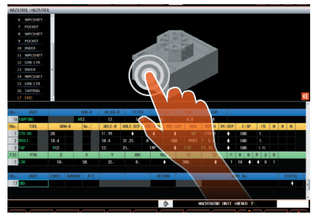
Assist functions

MAZATROL conversational programming

QUICK MAZATROL MAZATROL SMOOTH Ez MAZATROL SMOOTH G

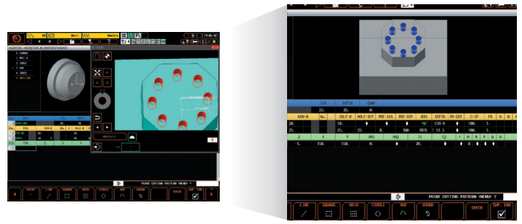
Programs can be easily created and checked by displaying the 3D model of the workpiece. Can reduce input errors and time for program checking.

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.



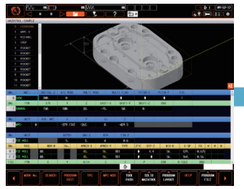
Digital set-up

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.

OPTION Create virtual machines on your office PC by importing machine data in your factory floor, enabling optimizing machining programs.

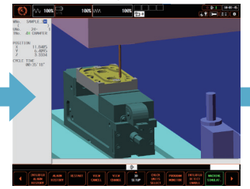
SMOOTH CAM Ai

Automatic / conversational programming



Solid MAZATROL

Machining simulation



Virtual Machining

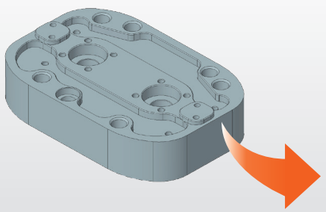
Machining analysis / optimization

Cutting Adviser*1

*1 Available with MAZATROL SmoothG.

Solid MAZATROL*2

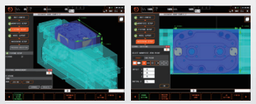
A program is automatically generated from 3D CAD data in a short time. The shape of fixtures can also be set, so that programs can be generated with the consideration of interference with the fixtures.



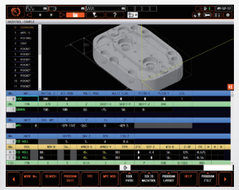
3D CAD model

Import 3D CAD model

Required time for programming 10 min



Set fixtures and machining process



MAZATROL programming completed

*2 This function is available with optional Smooth CAM Ai. When using a fixture for mounting a workpiece, the setting is limited to a machine vise.

Ergonomic design for convenient operation

MAZATROL SMOOTH G

Movable, adjustable CNC touch panel

Operation touch panel can be tilted to the optimum position for any operator's height to ensure ease of operation.

Convenient tool clamp / unclamp

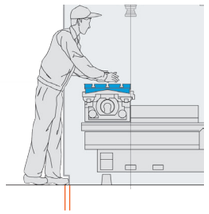
The tool clamp / unclamp switch next to the spindle allows tools to be easily removed for changing inserts during operation.

Maintenance area

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

Accessibility to table / spindle

A recess on the machine base for the operator's feet provides increased ease of access to the machine table.



Large door opening

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

Excellent accessibility to tool magazine

OPTION

Tool can be easily loaded / unloaded from the magazine door at the rear of the machine.

CNC System

Standard model CNC control

MAZATROL SMOOTH Ez

Ez Operation　Ease of operation

- Equipped with "Quick Mazatrol" for enhanced Mazatrol programming
- Intuitive operation with 15" touch screen
- Ease of use has been enhanced with screen design and simple layout customization

Ez Machining　High-speed, high-accuracy machining

- Heat Displacement Control equipped with Thermal Shield
- Smooth Machining Configuration can adjust machining features for various machining requirements

Ez Setup　Digital Setup

Data on a machine in the factory can be accessed from a PC in the office by optional Smooth CAM Ai software. Digital setup ensures higher operational efficiency.

CNC control equipped with a PC for high-accuracy, high-speed machining

MAZATROL SMOOTH G

Ease of operation

Designed for unsurpassed ease of operation

Fastest CNC in the world

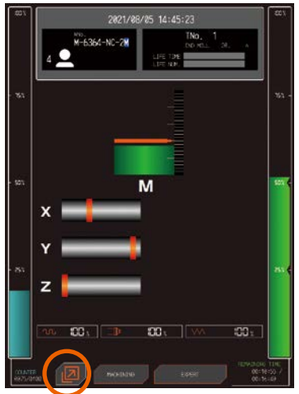
Latest hardware and software for unprecedented speed and precision

Smooth graphical user interface

MAZATROL Smooth graphical user interface for unsurpassed ease of operation
19" touch screen operation - operate similar to your smartphone / tablet

Shown with optional dual monitor

Flexibly changeable screen display



Screen icons arranged for each operation allows quick screen transition.

Home screen

Operation status, program number in use, as well as tool data are displayed to assist operation.
Efficient setup can be done with screen icons for each operation that enable quick screen transition.

Customized display
- Tool data
- Coordinate values
- Work offset
- Macro variable

Custom display

Displayed data position on the CNC screen can be changed to the optimum position for any operator's height for ease of operation.

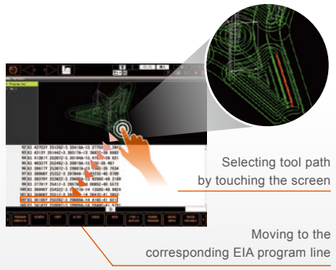
Data can be checked and set with minimum screen transition by customizing the display according to operation process.

EIA / ISO programming

QUICK EIA

EIA program visualization

By touching the tool path on the screen, it is possible to move to the corresponding EIA program, and check the program details.



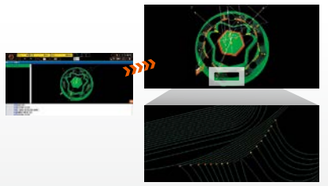
Selecting tool path by touching the screen

Moving to the corresponding EIA program line

VIEW SURF

Analyzing EIA programs

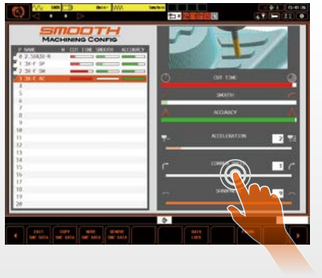
By analyzing tool path, any predictable failure on the finished surface can be visualized. Program modification can be done before machining to minimize the time for test cutting.



High-speed, high-accuracy machining

SMOOTH MACHINING CONFIGURATION

Machining features including cycle time, finished surface, and machining shape can be adjusted by slider switches on the display according to material requirements and machining methods. This is especially effective for complex workpiece contours defined in small program increments.



Standard and Optional Equipment

● : Standard ○ : Option — : Not available

		VCN-460		VCN-600	
		MAZATROL SmoothEz	MAZATROL SmoothG	MAZATROL SmoothEz	MAZATROL SmoothG
Machine	12000 min^{-1} (rpm) spindle	●	●	●	●
	18000 min^{-1} (rpm) spindle	○	○	○	○
	Spindle BT No.40	●	●	●	●
	Spindle BBT40 (dual contact), BIG-PLUS	○	○	○	○
	30 tool magazine	●	●	●	●
	40 tool magazine	○	○	○	○
	Foundation kit (dry pit / plates)	●	●	●	●
	Mazak standard color	●	●	●	●
	Special color order	○	○	○	○
	Dual monitor	—	○	—	○
	Angle tool block (regular type)	○	○	○	○
High accuracy	Ball screw core cooling (X-, Y-, Z-axes)	○	○	○	○
	Scale feedback system (X-, Y-, Z-axes)	○	○	○	○
	Coolant temperature control	○	○	○	○
	Tool length measurement & tool breakage detection	○	○	○	○
	Touch sensor RMP60 (Mazak monitoring system B)	○	○	○	○
	Measurement software (Smooth OMM)	—	○	—	○
	Measurement software (Smooth SET AND INSPECT)	—	○	—	○
	Mazak API	○	○	○	○
	Multiple spindle orient (M code / 1 degree)	○	○	○	○
Chip disposal	Chip pan (front side discharge)	●	●	●	●
	Chip conveyor (left-side discharge, hinge)	○	○	○	○
	Chip conveyor (left-side discharge, ConSep)	○	○	○	○
	Chip conveyor (left-side discharge, scraper type)	○	○	○	○
	Chip conveyor (rear discharge, hinge)	○	○	○	○
	Chip disposal (rear discharge)	○	○	○	○
	Chip bucket (swing / fixed)	○	○	○	○
	Cover coolant (required option with chip conveyor)	○	○	○	○
	Hand held coolant nozzle	○	○	○	○
	Magnet plate	○	○	○	○
	Magnetic separator for ferrous chip	○	○	○	○
	Oil skimmer (RB-200)	○	○	○	○
	Carbon package	○	○	○	○
Coolant	Coolant system	●	●	●	●
	Workpiece air blast	○	○	○	○
	Flood coolant 0.45 MPa (4.5 kgf/cm^2) 30 L / min	○	○	○	○
	Air through spindle (can be used with spindle rotating)	○	○	○	○
	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 1.0 ～ 7.0MPa (10 ～ 70 kgf/cm^2)	○	○	○	○
	Mist collector (GX1000)	○	○	○	○
Peripheral equipment	Work light	●	●	●	●
	Additional work light (inside the machine, LED)	○	○	○	○
	Manual pulse generator (wired)	○	○	●	●
	Status light (3 colors)	○	○	○	○
	Operation end buzzer	○	○	○	○
	Automatic power ON / OFF + warm-up operation	○	●	○	●
	Air filter for removing water droplets	○	○	○	○
Purchase peripheral equipment	Grease cartridge	○	○	○	○
	Pullstad bolt	○	○	○	○
	Additional manuals	○	○	○	○
CNC option	Smooth machining package	●	●	●	●
	SAFETY SHIELD (manual mode)	—	●	—	●
	SAFETY SHIELD (automatic mode)	—	○	—	○
	Smooth CAM Ai M Basic package	○	○	○	○
	Smooth Project Manager	○	○	○	○
	Synchronous tapping	○	○	○	○

● : Standard ○ : Option — : Not available

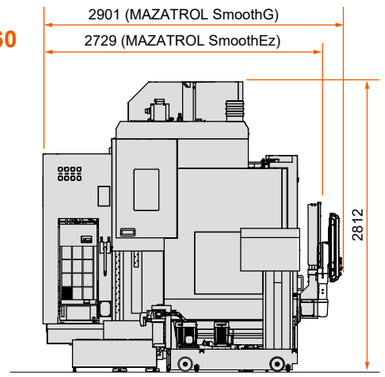
		VCN-460		VCN-600	
		MAZATROL SmoothEz	MAZATROL SmoothG	MAZATROL SmoothEz	MAZATROL SmoothG
Installation	Run off (without workpiece)	○	○	○	○
	Additional run-off (additional ISO machining and inspection)	○	○	○	○
Automation	Port for pneumatic power supply	○	○	○	○
	Port for hydraulic power supply	○	○	○	○
	Pneumatic 1 port for seating detection of fixture	○	○	○	○
	Robot interface	○	○	○	○
	Automatic front door	○	○	○	○
	200 mm raised column	○	○	○	○
	NC rotary table	○	○	○	○
	One additional axis	○	○	○	○
	Cylindrical interpolation	○	○	○	○
Maintenance	Smooth Ai Spindle	—	○	—	○

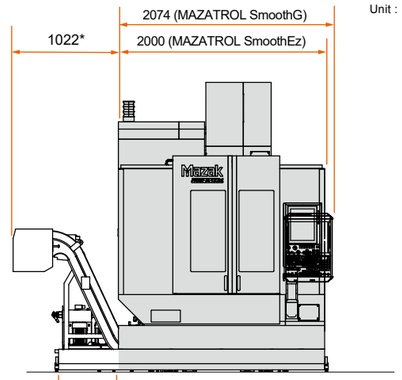
Please contact your nearest Mazak office for further enquiries.

Machine Dimensions

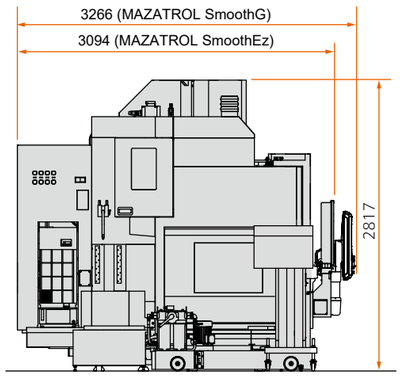
Unit : mm

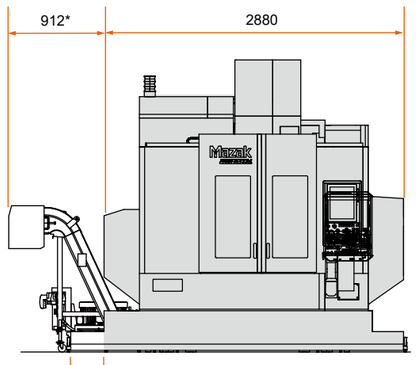
VCN-460





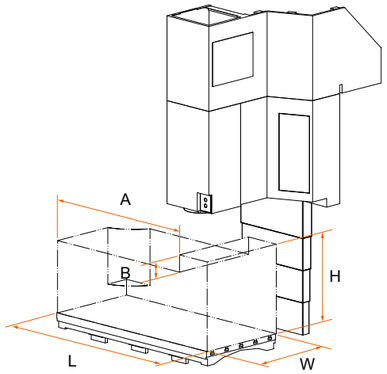
VCN-600





*Machine dimensions do not include accessories such as line filters.

Max. Workpiece Dimensions

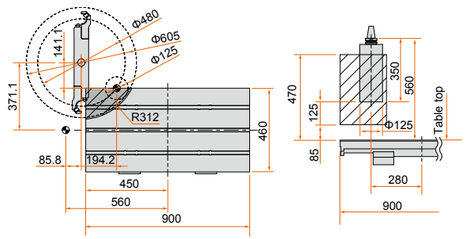


	VCN-460	VCN-600
Max. workpiece length (L)	900 mm	1300 mm
Max. workpiece width (W)	460 mm	600 mm
Max. workpiece height (H)	570 mm	
Interference area (A)	606 mm	1060 mm
Interference area (B)	100 mm	110 mm
Max. load	500 kg	1200 kg

Interference Between Tool and Workpiece During ATC operation

Unit : mm

VCN-460



VCN-600

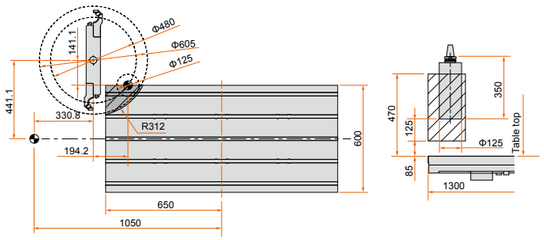
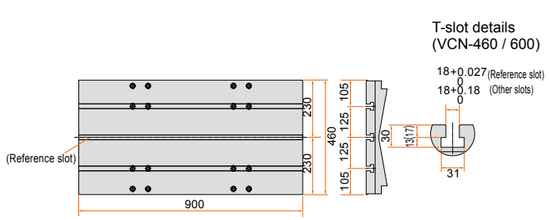


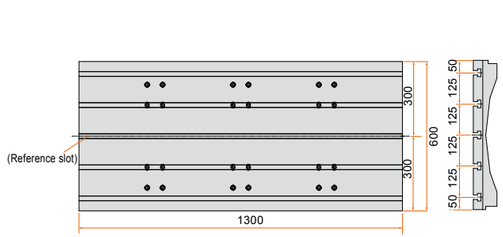
Table Dimensions

Unit : mm

VCN-460



VCN-600



Standard Machine Specifications

		VCN-460	VCN-600
Stroke	X-axis stroke (table right / left)	560 mm	1050 mm
	Y-axis stroke (table back / forth)	460 mm	600 mm
	Z-axis stroke (spindle up / down)	510 mm	
	Distance from table top to spindle nose	150 ~ 660 mm	
	Distance from column surface to spindle center	504 mm	616 mm
Table	Table size	900 mm × 460 mm	1300 mm × 600 mm
	Max. load capacity (evenly distributed)	500 kg	1200 kg
	Table surface configuration	18 mm T slot × 3 , 125 mm pitch	18 mm T slot × 5 , 125 mm pitch
Spindle	Max. spindle speed	12000 min^{-1} (rpm)	
	Spindle speed range	2-steps (Electric)	
	Spindle taper	7/24 taper No.40	
Feedrate	Rapid traverse rate (X-, Y-, Z-axes)	42000 mm/min	
	Cutting feedrate (X-, Y-, Z-axes)	1 ~ 8000 mm/min	
	Shape compensation	1 ~ 42000 mm/min	
Automatic tool changer	Tool shank	MAS BT40	
	Tool storage capacity	30	
	Max. tool diameter / length (from gauge line) / weight	Φ80 mm / 350 mm / 8 kg	
	Max. tool diameter with adjacent tool pockets empty	Φ125 mm	
	Tool selection method	MAZATROL random memory (random pocket assignment)	
	Tool change time (tool-to-tool)	1.3 sec	
Motor	Spindle motor (10% ED / cont.rating)	18.5 kW (25 HP) / 11 kW (15 HP)	
Power requirement	Electrical power requirement (10% ED / cont.rating)	26.4 kVA / 23.6 kVA	26.7 kVA / 23.8 kVA
	Air supply (pressure / flow rate)	0.5 MPa ～ 1.0 MPa (5 kgf/cm^2 ~ 10 kgf/cm^2) / 100 L/min (ANR)	
Coolant	Coolant tank capacity	220 L	300 L
Machine size	Machine height (from floor)	2812 mm	2817 mm
	Machine width (MAZATROL SmoothEz)	2000 mm	2880 mm
	Machine width (MAZATROL SmoothG)	2074 mm	2880 mm
	Machine length (MAZATROL SmoothEz)	2729 mm	3094 mm
	Machine length (MAZATROL SmoothG)	2901 mm	3266 mm
	Machine weight (without coolant tank)	4800 kg	6800 kg

MAZATROL SmoothEz Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 2 ~ 4 axes	
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*, Involute 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 : 15" touch panel, Resolution : XGA	
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, Thermal shield	
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*
Peripheral network	PROFIBUS-DP*, EtherNet/IP*, CC-Link*	
Interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

*Option

MAZATROL SmoothG Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 2 ~ 4 axes	
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, Restart 2, 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	
Peripheral network	PROFIBUS-DP*, EtherNet/IP*, CC-Link*, CC-Link IE Field Basic	
Interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	
Security function	Security software*	

* Option
*1 Simultaneous 4-axis control