Mazak

# CV5-500

[ 5-axis vertical machining centre ]

# Advanced features of the MAZATROL Smooth CNC

Touch screen operation
— Operate similar to your smart phone / tablet

PC with Windows® 8 embedded OS

Fastest CNC in the world—Latest hardware and software for unprecedented speed and precision

Easy conversational programming of multiple surface machining

Smooth user graphical interface and support functions for unsurpassed ease of operation

MTConnect® - Convenient networking

Easily configure machine parameters for different workpiece materials and applications requirements



MAZATROL SMOOTH X






CV5-500

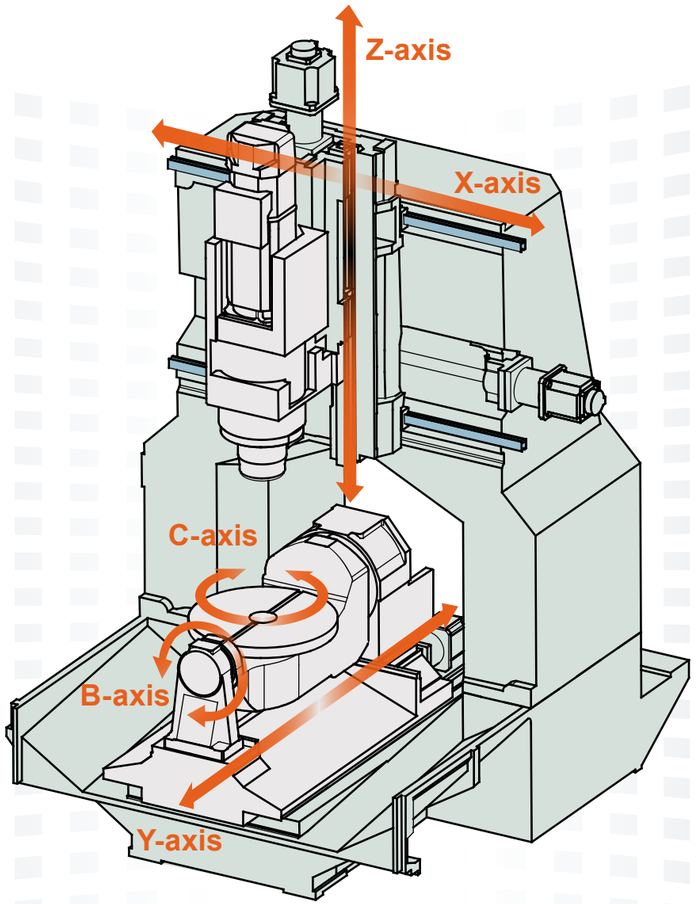
High accuracy compact 5-axis vertical machining center

# CV5-500

- Rigid trunnion table design supported on both sides for heavy duty machining.
- Simultaneous 5-axis interpolation of complex contours and 0.0001° precision indexing for multifaceted workpieces.
- Linear roller guides on linear axes and roller gear cams on the rotary table axes ensure stable machining accuracy over long periods of operation.
- Ease of operation thanks to excellent access to the table, tool magazine and maintenance area.

# Machine Design

Bridge construction 5-axis vertical machining center with fully supported trunnion table provides high-rigidity for high-accuracy machining




## High-rigidity table

Fully supported trunnion table incorporating roller gear cam technology on both B and C rotary axes provides high accuracy indexing and contouring for stable machining

## High performance spindle

Highly performance 12000 $min^{-1}$ / 18.5 kW / 119.4 Nm spindle designed to machine a wide range of materials whilst ensuring high reliability

## Linear roller guides utilised on the X-, Y- and Z-axes

Due to their high rigidity and low friction characteristics, the linear roller guides enable heavy duty cutting and high-speed machining with improved accuracy

## Thermal shield

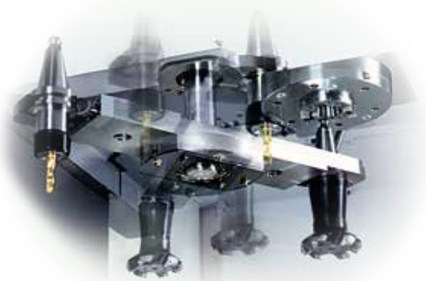
The THERMAL SHIELD is an automatic compensation system for room temperature changes, which realises enhanced continuous machining accuracy

## Tool magazine

The tool magazine has storage capacity for 30 tools as standard with an option for 48 tools.
The magazine door is equipped as standard to provide convenient access for the operator

## High speed automatic tool changer

The cam driven double arm automatic tool changer has a tool change time of 1.3 seconds tool-to-tool, reducing non-cutting time to a minimum

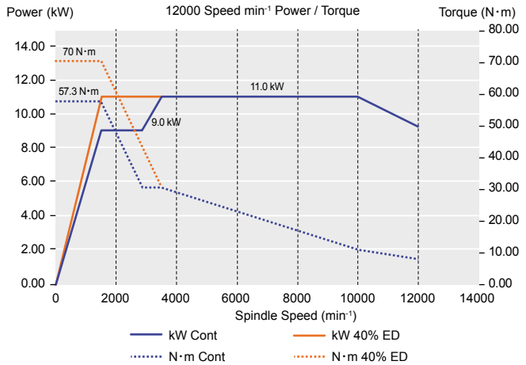


# Higher Productivity

## Spindle

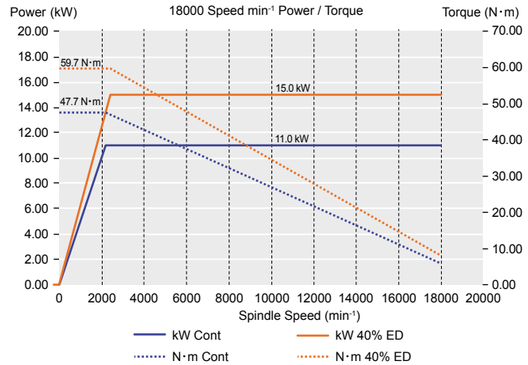
### 12000 min$^{-1}$ 11 kW (40% ED)
### #40 taper spindle

| | |
|---|---|
| Max. spindle speed | 12000 min$^{-1}$ |
| Spindle output | 18.5 / 11/ 11 kW<br>(10% ED / 40% ED / Continuous) |
| Max. torque | 119.4 / 70.0 / 57.3 N·m<br>(10% ED / 40% ED / Continuous) |



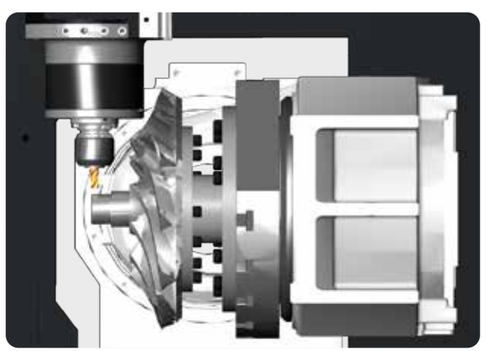

### 18000 min$^{-1}$ 15kW (40% ED)
### #40 taper spindle

| | |
|---|---|
| Max. spindle speed | 18000 min$^{-1}$ |
| Spindle output | 15 / 11 kW<br>(40% ED / Continuous) |
| Max. torque | 59.74 / 47.7 N·m<br>(40% ED / Continuous) |




### Compact spindle nose minimizes workpiece interference

Large machining area and compact spindle nose allows short tools to be used for high-accuracy machining.



### 18000 min$^{-1}$ spindle includes ball screw core cooling (X-, Y- and Z-axes)

Temperature controlled cooling circulates through the ball screw cores to ensure stable machining accuracy over extended periods of high speed operation (included with optional 18000 min$^{-1}$ spindle).

## Table

### High rigidity table

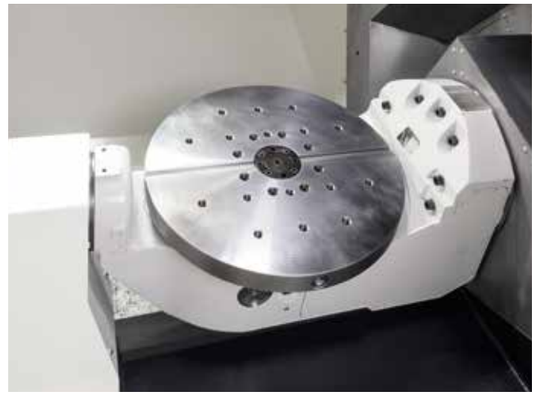
The B-axis features a fully supported trunnion table to provide high rigidity for high accuracy machining. Both the B- and C-rotary axes are driven by roller gear cam. The unique rolling motion delivers enhanced torque whilst also eliminating backlash, resulting in high performance and high accuracy contouring.

### Tilting rotary table for 5-axis machining

The titling rotary table can contour or index to 0.0001° increments for 5-axis simultaneous machining and multifaceted workpieces.

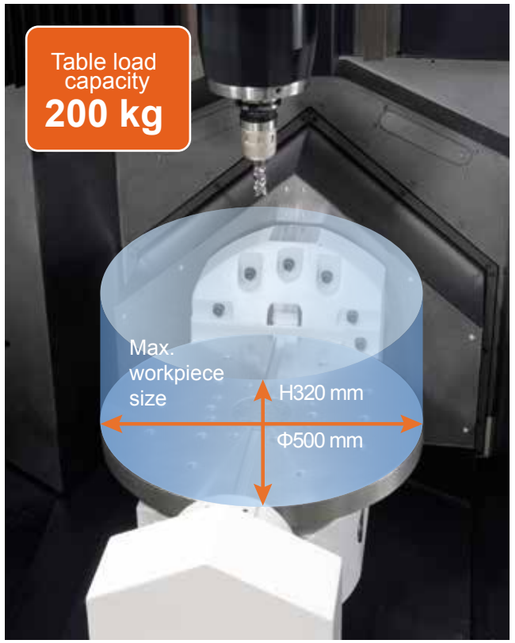
### Change tools without returning table to home position

Since it is not necessary to return the table to the home position to change tools, the machining cycle lime is reduced.



Tapped pallet standard. (T-slot pallet optionally available)

## Large, heavy workpiece capacity



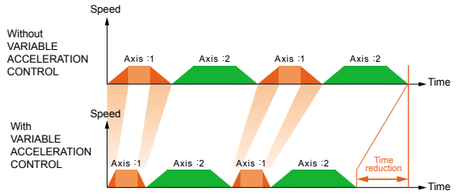
# Higher Productivity

## SMOOTH MACHINING CONFIGURATION

Machining time, finished surface smoothness and machining shape can be adjusted for improved productivity.

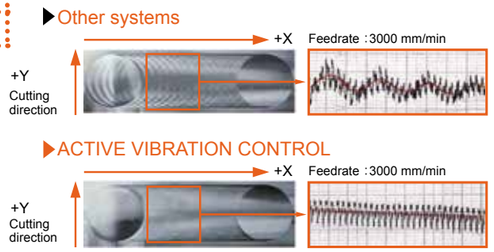

### VARIABLE ACCELERATION CONTROL

Variable acceleration control is a new function which permits the faster acceleration capability of linear axes to be used whenever possible. The slower acceleration of the rotary axes is not used for all program commands, resulting in faster machining cycle times.




### ACTIVE VIBRATION CONTROL

Minimized vibration function for high-speed, high-accuracy machining and longer tool life



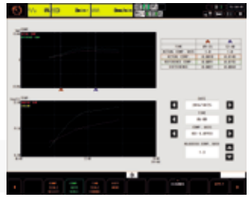

### SMOOTH CORNER CONTROL

Improved finished surfaces and reduced cycle times by optimized acceleration / deceleration when machining corners.


## Heat Displacement Control – THERMAL SHIELD

The THERMAL SHIELD is an automatic compensation for room temperature changes, which realizes enhanced continuous machining accuracy. Mazak has performed extensive testing in a variety of environments in a temperature controlled room and hasused the results to develop a control system that automatically compensates for temperature changes in the machining area. Changes in the room temperature and compensation data are shown visually.

Temperature and compensation is displayed on screen.
Operator can adjust compensation by looking at the data.



# Ease of Maintenance

## High-Accuracy 5-Axis Calibration – MAZA-CHECK

Position misalignment and incline of the rotary axes can automatically be measured and compensated to realise high-accuracy 5-axis machining. The centers of rotation of both the C and B axes can be automatically measured and compensated.

▼Measurement item selection

▼Measurement information setting

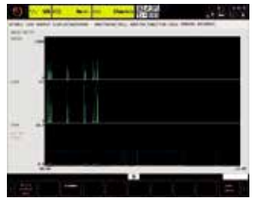
▼Automatic measurement program generation

Convenient screen display assists measurement operation.

## Comprehensive Spindle Monitoring – PERFORMANCE SPINDLE

The PERFORMANCE SPINDLE monitors a variety of properties such as temperature with sensors housed in the spindle and provides useful information to the operator. Thanks to this monitoring, production loss due to machine down time can be minimized.

▲ Condition check
Temperature as well as the motor load can be displayed.



▲ Running recorder
Operation status of milling spindle (rpm, % motor load and temperature) can be recorded up to one year.

## Convenient maintenance

### Centralized location

All the items that require frequent access, such as valves and lubrication inlets are at the same location to make daily maintenance easier.

### Comprehensive Maintenance Monitor – MAINTENANCE SUPPORT

Useful information for improved preventative maintenance to prevent unexpected machine downtime.

# Automation

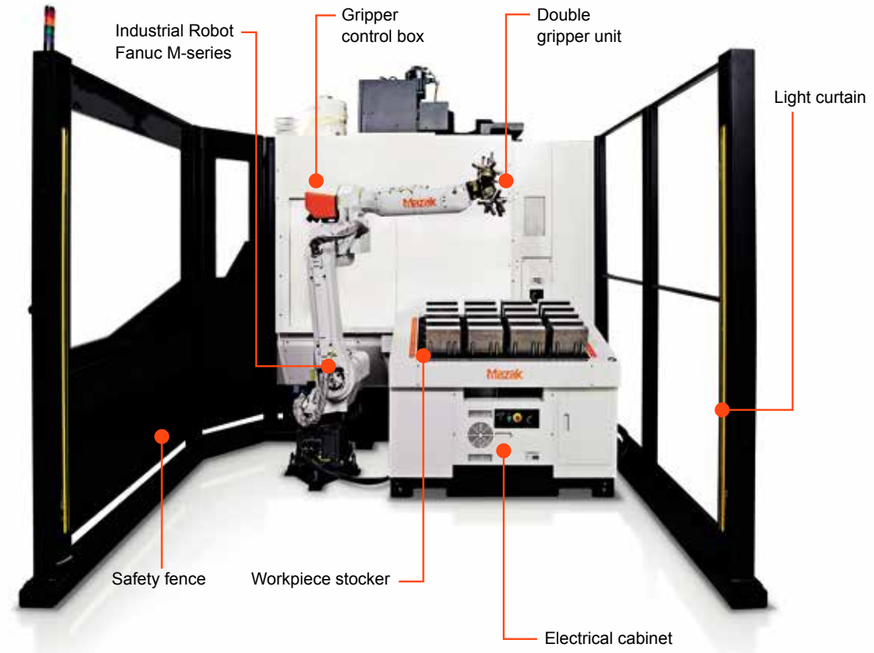
Automation systems provide a flexible solution to increase production on demand through lights-out operation, without the burden of adding manpower.


## CV5-500 + MA-20/400

The MA-20/400 is a user friendly automated robotic loading system realising enhanced productivity, machine utilisation and the ability to increase unmanned running. The CV5-500 is easily integrated with a variety of automation solutions thanks to the optional automation packages that include a side or front loading door, robot interface and through the table hydraulic or pneumatic fixture preparation.

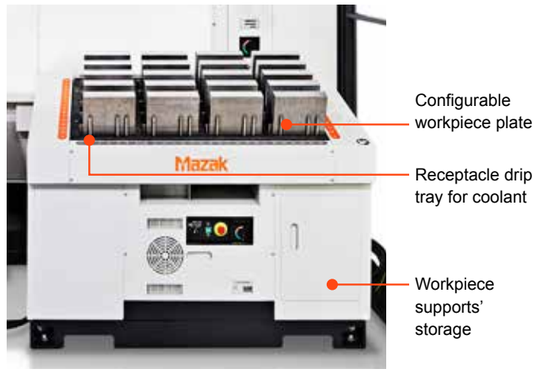
# Integration

## CV5-500 + MA-20/400 Typical Layout




## Versatile Stocker Unit

- Easily configurable part stocker
- Interchangeable workpiece support pillars
- Layout and setup of pillars guided by GUI
- Max. workpiece length 400mm
- Max. workpiece weight 14kg (20Kg total robot payload (including grippers))

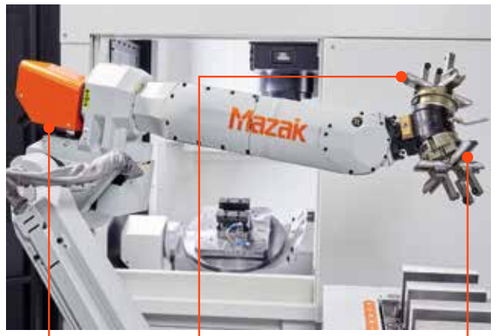



Images for illustration purposes only

# Automation

## Easy-to-Use Gripper System

- Double gripper hand for simultaneous load and unload of workpieces
- Easy adjustable gripper concept for rapid changeover of workpieces
- Workpiece detection function prevents misoperation


Clamping force control for grippers

Exchangeable clamp gripper

Air blast nozzle

## Graphical User Interface (GUI)

GUI integrated into SmoothX controller

- Provides seamless interface with same look and feel for both machine and robot operation
- 3D visualization in software
- Simple to use
- Parametric style data entry
- Extremely fast set-up & programming 5 minutes' set-up time for new workpiece)

GUI design for robot application – consistent with Smooth control

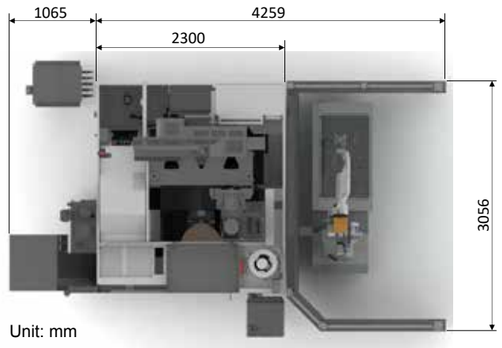
## 8 Reasons Why

- Unique MA series OEM automation package
- Extended unmanned operation
- Appropriate for both small and large batch sizes
- Fast reaction to market fluctuations
- Easy programming (no specialist robot programming knowledge required)
- Unhindered access for manual intervention, manual operation and maintenance
- Reduced cost due to combined control system for both machine and robot
- Alternative retrofit automation solutions require separate robot controllers and cannot offer the same advantages


### Specifications for MA Series

| | | | |
|---|---|---|---|
| Dimensions | Length | Min. WP Length | 25 mm |
| | | Max. WP Length | 400 mm |
| | ■ | Min. W,L,H | 25, 25, 15 |
| | ■ | Max. W,L,H | 400, 150, 200 |
| | ● | Min. WP Ø | 25 mm |
| | | Max. WP Ø | 400 mm |
| | ⬢ | Min. Width | 25 mm |
| | | Max. Width | 170 mm |
| Capacity | Max. Stacking Height | | 100 mm |
| | Max. Stacking Weight | | 600 kg |
| | Max. WP Weight | Combined for double cycle Or Individual for single cycle | 14 kg (20 kg payload) |
| Gripper Unit | Robot hand equipped with:<br>● One 4-p gripper for raw WP (A-gripper)<br>● One 4-p gripper for finished WP (B-gripper)<br>● Air blow nozzle for cleaning of WP & machine chuck jaw's | | |
| Gripping Jaw's | System delivered with double gripping hand with adjustable jaws (2 jaws per hand) to clamp onto the workpiece | | |
| Gripper Control | Individual force regulation on A & B gripper<br>Manual release of grippers by push buttons with LED indication | | |
| User Friendly | User-friendly robot-operating software integrated into Mazatrol SmoothX CNC with same look and feel GUI.<br>No previous robot knowledge required for operator: typical learning curve 2 hours / new workpiece set-up time typically less than 5 minutes. | | |

### Overview MA-20/400 with CV5-500




Unit: mm

# Ergonomics

## Designed for convenient accessibility

ergonomics

### Tool magazine

The tool magazine door is located at the side of the machine for convenient tool loading and unloading.


### Excellent accessibility

The operator has excellent access to the table from the front of the machine for convenient workpiece loading / unloading and machine setup.

### Verbal Message System - VOICE ADVISER

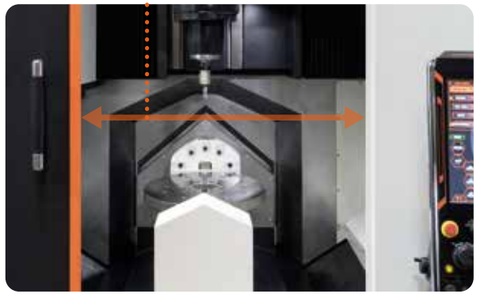
Verbal support for machine setup and safe conditions confirmation.

- Feedrate is 100%. Please watch out.
- There are tools not registered on tool data.
- X-axis was selected.
- Alarm occurred.

### Convenient operation when using an overhead crane

The large top opening is designed for convenient workpiece loading / unloading.

Door opening 800 mm

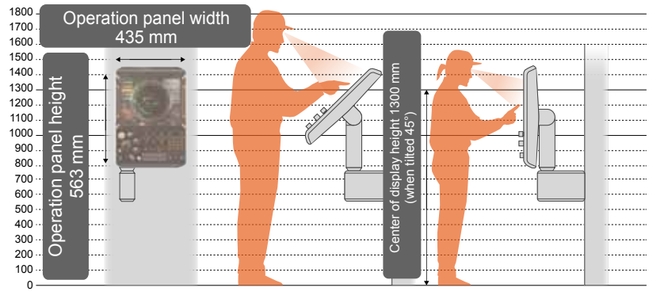


### Large window

The large front door window allows workpiece machining to be easily monitored by the operator.

### Touch panel adjustable to be comfortable for all operators

The tilting operation panel allows optimum positioning of the touch panel for any height operator to ensure ease of operation.




# DONE IN ONE

## Large reduction of total production time

The "DONE-IN-ONE" concept incorporates all machining processes from raw material input through final machining - in just one machine. It provides the ability to reduce production lead time, improve machining accuracy, reduce floor space and initial cost, lower operating expenses, reduce operator requirements and to improve the work environment. As a result, the concept not only streamline production, it also improves overall management.

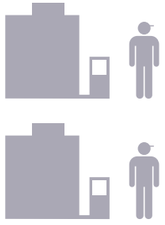

Automotive component


General machinery component


Aerospace component

DONE IN ONE example ■ Reduction of production lead time ■ Improved machining accuracy ■ Lower investment ■ Lower labor expense ■ Minimized manual finishing

Previous production method



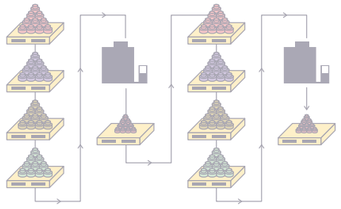
HMC ×2

Fixtures and tools ×2

Operators ×2

In-process inventory / In-process time

Large



CV5-500


CV5-500

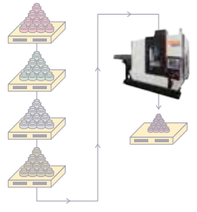
CV5-500 ×1

Fixtures and tools ×1

Operators ×1

In-process inventory / In-process time

Small

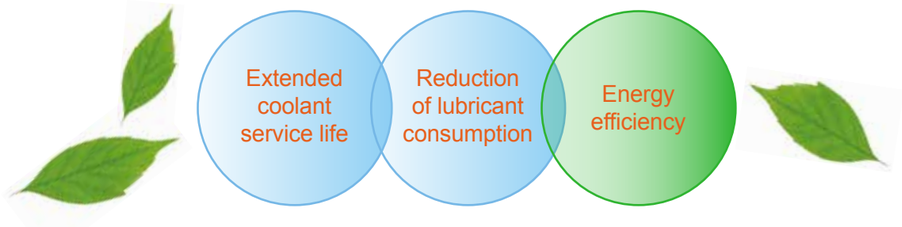




# Environmental Considerations

eco-friendly

The environment has always been important to Yamazaki Mazak. All of our factories where Mazak machine tools are produced are ISO 14001 certified, confirming that the operation of our production facilities does not adversley affect air, water or land.




The roller guides utilised by all inner axes are lubricated by a grease lubrication system instead of oil. (Spindle bearings are greased). With this system, tramp oil in the coolant is considerably reduced, resulting in a longer coolant service life. Additionally, the work light, the CNC display, and the optional chip conveyor are automatically shut off after a predetermined period for lower power consumption where the machine is in stand-by state.

**Grease lubrication system** (standard equipment)
Linear axes are lubricated by a grease lubrication system instead of oil. With this sytem, tramp oil in the coolant is considerably reduced resulting in an extended service life of coolant for reduced frequency of disposal.

**Power consumption display** (optional equipment)
The electrical power meter displays the machine accumulated electrical power consumption.

**Automatic power off CNC display** (standard equipment)
The CNC display turns off automatically after a predetermined period has passed.

**Chip conveyor/automatic power off** (optional equipment)
The optional chip conveyor is automatically shut off after a predetermined period for lower power consumption when the machine is in the stand-by state.

**LED lights** (standard equipment)
These lights have lower power consumption and a service life 10 times longer than conventional fluorescent lamps.

RESOURCE SAVING MACHINE OPERATION

MINIMUM POWER CONSUMPTION IN STAND-BY

MINIMUM LUBRICANT CONSUMPTION

# MAZATROL CNC SYSTEM

The seventh generation MAZATROL CNC system
— the core of Smooth Technology

MAZATROL SMOOTHX

## From setup to machining
## — designed for unsurpassed ease of operation

**Three color status indicator** (SmoothX only)

Machining status is indicated by three colors
Green : automatic operation mode
Yellow : Machining completion
Red : Alarm

**19" touch panel**

Touch panel operation
— similar to your smartphone or tablet

**USB port**

Interface for peripheral equipment of
USB-1.0 + 2.0 standard

**SD card slot**

Transfer program and tool data

**Operation switches**

Large switches
— color changes from orange to green when turned on

**Dials**

For frequently-used axes selection and feedrate changes



## New interface with touch operation ensures convenient data processing
## — programming, confirmation, editing, and tool data registration

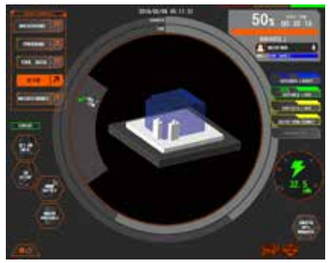
### Process home screens

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

Setup



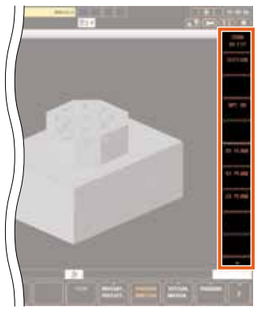
Machining

Maintenance

### Pop-up windows

Values and items can easily be input / selected on pop-up windows.

Side menu



List menu

Screen key board

# Ease of Programming

## Easy programming

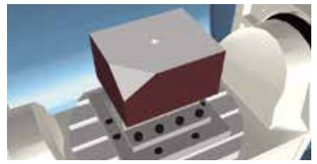
### Multiple-surface machining

Easy programming of multiple-surface machining which normally requires complex machining programs.


Setting Coordinate

Setting Index Angle

The same home position and coordinate system can be used for the top surface and angled surfaces without requiring any complicated programming for the angled surfaces.



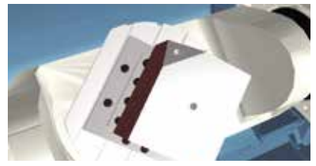
### Program origin automatic calculation workpiece coordinate shift

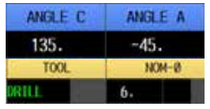
Program origin automatic calculation workpiece coordinate shift.


Setting Index Angle

Coordinate Shift

No complicated calculations required when changing program coordinate system.

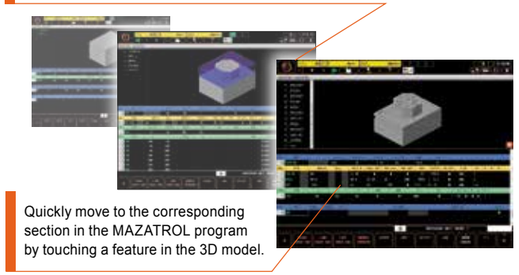





## QUICK MAZATROL

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.

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



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

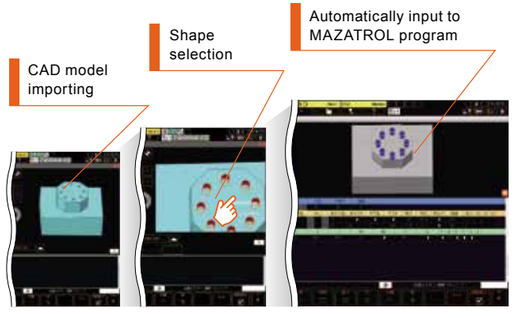
## 3D assist

Workpiece 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.

CAD model importing

Shape selection

Automatically input to MAZATROL program



## Visible programming screen

## QUICK EIA

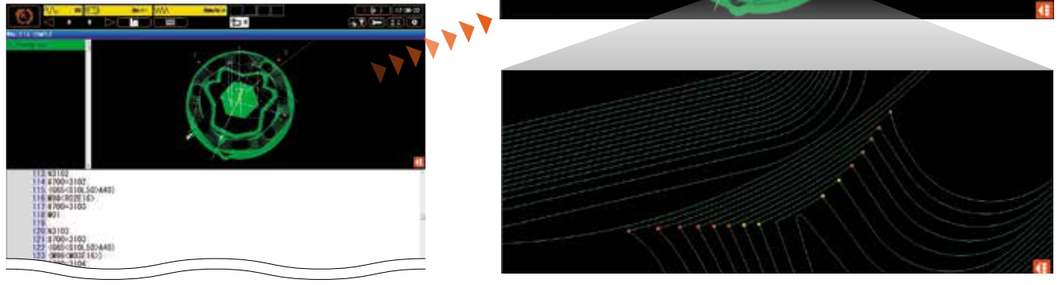
Program, process list and 3D tool path display are linked to each other. Visible search on touch screen can reduce the time for program checking.

Selecting tool path by touching the screen.

Moving to the corresponding EIA program line.

## VIEW SURF

By analyzing the 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.



# Interoperation

## Network integration - convenient connection to automation equipment

### Smooth Process Support Software for efficient factory management OPTION

Data sharing between SmoothCNC and office PCs for improved production efficiency.

**SMOOTH CAM RS**
MAZATROL CAM
-conversational programming high speed simulation software
-including 5-axis programs

**SMOOTH SCHEDULER**
Production scheduling software

**SMOOTH TOOL MANAGEMENT**
Tool management software (SmoothG only)

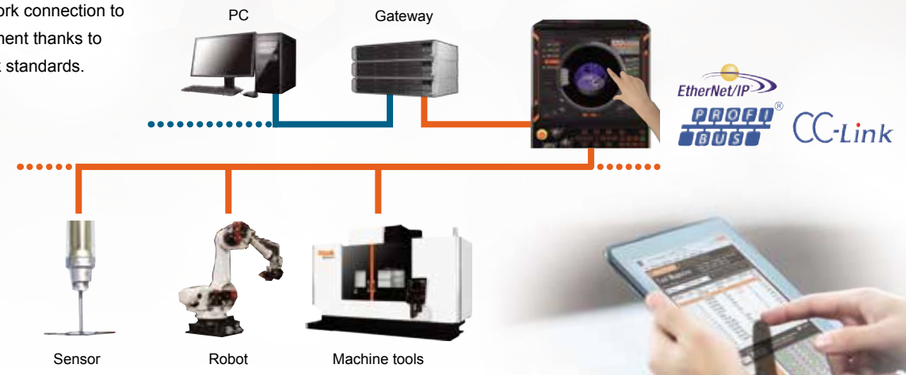
**SMOOTH MONITOR**
Machining · operation monitor / maintenance information management software

**SMOOTH PMC**
FMS control / management software (PALLETECH)

MTConnect

### Networking to peripheral equipment OPTION

Convenient network connection to peripheral equipment thanks to industrial network standards.

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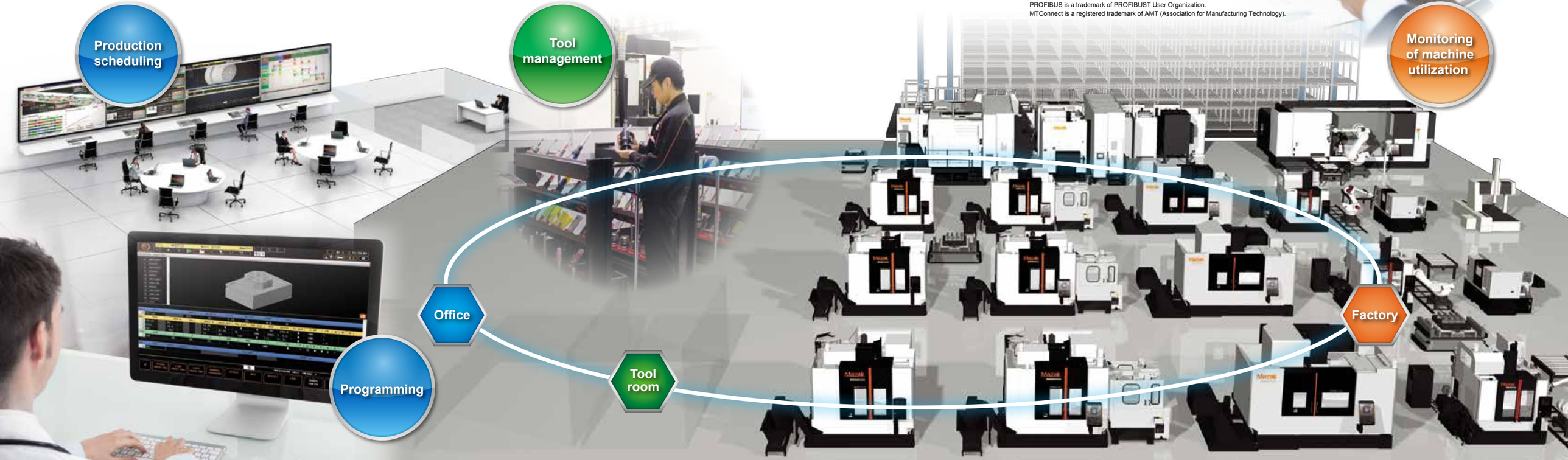
PROFIBUS is a trademark of PROFIBUST User Organization.
MTConnect is a registered trademark of AMT (Association for Manufacturing Technology).



# Standard Machine Specifications

| | | CV5-500 |
|---|---|---|
| Stroke | X-axis travel (spindle head left / right) | 730 mm |
| | Y-axis travel (table back / forth) | 450 mm |
| | Z-axis travel (spindle head up / down) | 470 mm |
| | B-axis travel (table tilt) | 220° (±110°) |
| | C-axis travel (table rotation) | 360° |
| Table | Distance from table top to spindle nose | 50 ～ 520 mm (table B-axis 0°) |
| | Table size | Φ500 mm |
| | Max. workpiece size | Φ500 mm × 320 mm |
| | Table load capacity (evenly distributed) | 200 kg |
| | Table surface configuration | M16 × P2 tap (16 holes) |
| Spindle | Max. spindle speed | 12000 $min^{-1}$ |
| | Spindle taper | No. 40 |
| | Spindle bearing ID | Φ70 mm |
| Feedrate | Rapid traverse rate (X-,Y-,Z-axis) | 36 m/min |
| | Rapid traverse rate (B-, C-axis) | 30 $min^{-1}$ |
| | Cutting feedrate (X-,Y-,Z-axis) | 36000 mm/min |
| | Simultaneously controlled axes | 5 |
| | Min. indexing increment (B-, C-axis) | 0.0001° |
| | Indexing time (B-axis) | 0.6 sec / 90° |
| | Indexing time (C-axis) | 0.6 sec / 90° |
| Automatic tool changer | Tool shank configuration | No. 40 |
| | Tool storage capacity | 30 |
| | Max. tool diameter / length (from gauge line) / weight | Φ80 mm / 300 mm / 8 kg |
| | Max. tool diameter with adjacent tool pockets empty | Φ125 mm |
| | Tool selection method | Random selection, shortest path |
| | Tool change time (chip-to-chip) | 4.6 sec |
| Motors | Spindle motor (10% ED / 25% ED / 40% ED / Cont. rating) | 18.5 / 15.0 / 11.0 / 11.0 kW |
| | Spindle torque (10% ED / 25% ED / 40% ED / Cont. rating) | 119.4 / 95.5/ 70.0 / 57.3 Nm |
| | Electrical power requirement (40% ED / Cont. rating) 12000 $min^{-1}$ | 45.5/43.4 KVA |
| | Electrical power requirement (40% ED / Cont. rating) 18000 $min^{-1}$ | 52.3 / 47.3 KVA |
| | Air supply | 0.5 MPa ～ 0.9 MPa 200 NL / min |
| Machine size | Height | 2933 mm |
| | Length | 2300 mm (3365 mm with conveyor) |
| | Width | 2570 mm (2984 mm with CNC panel) |
| | Machine weight | 6,500 kg |
| CNC | | MAZATROL SmoothX |
| Sound | Equivalent continuous sound pressure level at operator position (dependant on equipment options) | Less than 80 db (A) |



# Standard and Optional Equipment

● : Standard ○ : Option – : N/A

| | | | CV5-500 |
|---|---|---|---|
| Table | Φ500 mm mm tapped pallet | | ● |
| | Φ500 mm T-slot table | | ○ |
| ATC | ATC 30 tool magazine | | ● |
| | ATC 48 tool magazine | | ○ |
| Spindle | 7/24 taper No. 40 spindle | | ● |
| | Big-Plus No. 40 spindle | | ○ |
| | HSK-A63 spindle (18000 $min^{-1}$ only) | | ○ |
| | 12000 $min^{-1}$ spindle | | ● |
| | 18000 $min^{-1}$ spindle | | ○ |
| High Accuracy | Ball screw core cooling (X, Y, Z-axis) 18000 $min^{-1}$ only | | ● |
| | Scale feedback (X, Y, Z-axis) | | ○ |
| Factory automation | Absolute position detection | | ● |
| | Automatic power on / off and warm-up operation | | ● |
| | Status light (3 colours) | | ○ |
| | Tool ID magazine panel | | ○ |
| | Auto tool length measurement and tool breakage detection | | ○ |
| | Remote manual pulse generator | | ○ |
| | Automatic front door auto open / close | | ○ |
| | Additional M codes (6 x) | | ○ |
| | Measurement Package 1<br>(Including preparation for RMP600 touch senor) | - RMI-Q multiple probe radio interface<br>- RLP40 automatic tool setting unit<br>- Mazacheck<br>- Auto Tool length measure & breakage detect | ○ |
| | Measurement Package 2<br>(Including RMP600 touch senor) | - RMI-Q multiple probe radio interface<br>- RMP600 touch sensor<br>- RLP40 automatic tool setting unit<br>- Mazacheck<br>- Auto Tool length measure & breakage detect | ○ |
| | Automation package | - Automatic side loading door for robot (R/H)<br>- Robot interface<br>- Preparation for hydraulic and pneumatic fixture clamping | ○ |
| | Mazak NC Gage | | ○ |
| | Smooth Set And Inspect | | ○ |
| Coolant and chip disposal | Coolant package 1 | - Flood coolant 0.5MPa<br>- Bed wash coolant<br>- Chip tank (Lift out baskets) | ● |
| | Coolant package 2 | - Flood coolant 0.5MPa<br>- Coolant through spindle 0.5MPa<br>- Bed wash coolant<br>- Chip conveyor hinge type (left or right side) | ○ |
| | Coolant package 3 | - Flood coolant 1.5MPa<br>- Coolant through spindle 1.5MPa<br>- Bed wash coolant<br>- Chip conveyor hinge type (left or right side) | ○ |
| | Coolant package 4 | - Flood coolant 1.5MPa<br>- Coolant through spindle 1.5MPa<br>- Bed wash coolant<br>- Cover coolant<br>- Swarf Management system (left or right side) | ○ |
| | Coolant package 5 | - Flood coolant 0.5MPa<br>- High pressure coolant through spindle 7.0MPa<br>- Bed wash coolant<br>- Cover Coolant<br>- Swarf Management system (left or right side) | ○ |
| | Workpiece air blast | | ○ |
| | Air through spindle with rotation | | ○ |
| | Hand held coolant nozzle | | ○ |
| | Oil skimmer | | ○ |
| | Chip bucket (fixed type) | | ○ |
| | Chip bucket (swing type) | | ○ |
| Working environment | Enclosed roof cover | | ● |
| | Work light | | ● |
| | Mist collector | | ○ |
| | Preparation for mist collector | | ○ |
| | Operation Mode 3 | | ○ |

Above specifications are for European market. Standard and optional equipment vary by market.

# MAZATROL SmoothX Specifications（CV5-500）

| | MAZATROL | EIA |
|---|---|---|
| Number of controlled axes | Simultaneous 2 ～ 4 axes | Simultaneous 2 ～ 4 axes, Simultaneous 5 axes |
| Least input increment | 0.0001 mm , 0.00001", 0.0001° | |
| High speed, high precision control | Shape compensation, Smooth corner control, Rapid traverse overlap, Rotational-shape correction | Shape compensation, Smooth corner control, Rapid traverse overlap, Rotational-shape correction, High-speed machining mode, High-speed smoothing control, 5-axis spline |
| Interpolation | Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Cylindrical interpolation, Polar coordinate interpolation, Synchronous tapping* | Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Involute compensation*, 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), 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 | – | Rotary axis pre-filter, Tilted working plane, Hobbing*, Shaping function*, Dynamic compensation Ⅱ*, Tool center point control* Tool radius compensation for 5-axis machining Workpiece positioning error compensation* |
| Machine compensation | Backlash compensation, Pitch error compensation, Geometric deviation compensation, Volumetric compensation* | |
| Protection functions | Emergency stop, Interlock, Pre-move stroke check, Retraction function for the vertical axis, 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 mode | 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, WPC coordinate measurement, Measurement on machine |
| Automatic measuring functions | WPC coordinate measurement, Automatic tool length measurement, Touch sensor orientation confirmation, Tool breakage detection, External tool breakage detection* | Automatic tool length measurement, Touch sensor orientation confirmation, 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*, USB | |
| Card interface | SD card interface | |
| EtherNet | 10 M / 100 M / 1 Gbps | |

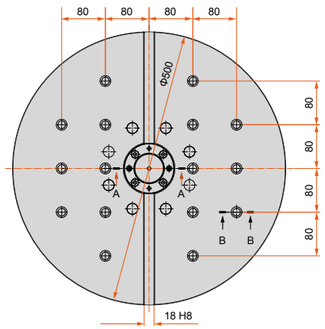
*Option

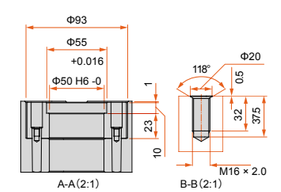
# Table Dimensions

unit : mm

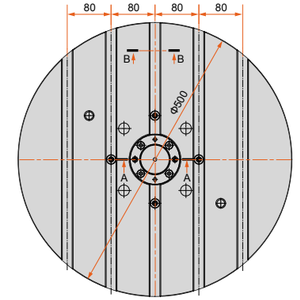
## CV5-500

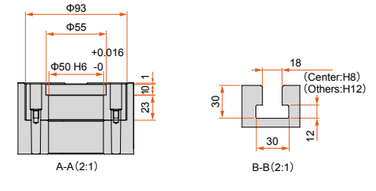
Tapped pallet with location bore ( standard )




T-slot pallet with location bore ( option )

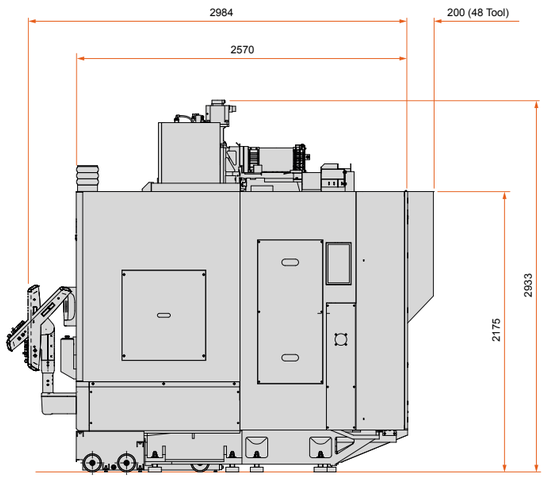


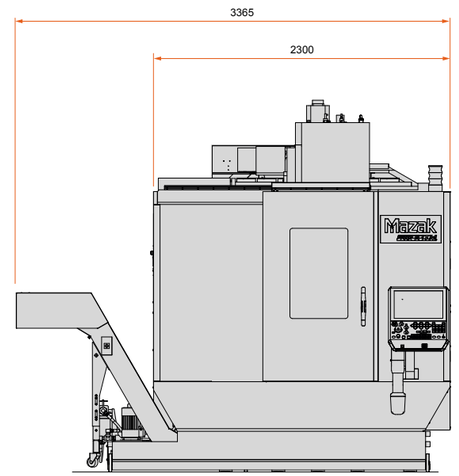




# Machine Dimensions

unit : mm

## CV5-500



CV5-500

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