

# Mazak

Digital Manufacturing Innovation

## MAZATROL *SMOOTH*Ai



# Next Generation MAZATROL Smooth CNC Innovation for Higher Productivity

The newest MAZATROL Smooth CNC system is designed to meet your production requirements in today's constantly changing manufacturing environment.

## MAZATROL *SMOOTH Ai* Next generation MAZATROL Smooth CNC

Designed to provide unsurpassed productivity through faster setups and cycle times, improved surface finishes, high accuracy machining and incomparable ease of operation.



### AI

Increase your productivity with AI technology



Shown with optional Smooth Ai second monitor for  
SMOOTH Ai Spindle, SMOOTH PMC and SMOOTH RCC



# MAZATROL **TWINS**

Virtual TWINS of machines equipped with the MAZATROL SmoothAi

## Digital Twin

Make programs in an office with machine specific data



## Automation

Advanced automation utilizing robot and software



# Innovative Functions for Higher Productivity

## MAZATROL *SMOOTH*Ai

AI support for operations normally requiring extensive experience and skills

**Solid MAZATROL** Optimize machining process through AI determination

Extremely fast programming using 3D CAD data

Import 3D CAD model



Required time for programming  
**2.5 min.**

MAZATROL programming completed

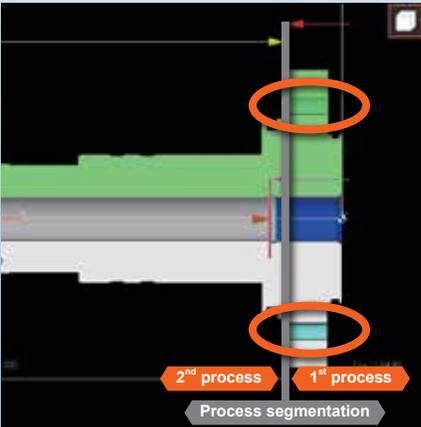


Optimum machining process thanks to AI learning



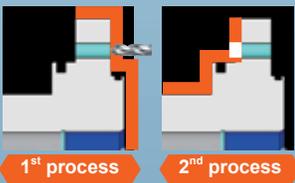
Thanks to AI learning, which utilizes machining expertise from accumulated programming experience, the optimum machining processes will be automatically determined and programs will be generated. Standard equipment for the INTEGREX i-H series is equipped with the SmoothAi CNC.

Example of machining process determination



Process segmentation

**Without AI learning**

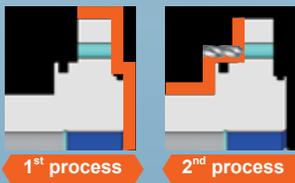


1<sup>st</sup> process  
Turning, Drilling

2<sup>nd</sup> process  
Turning

Interrupted cutting will be required in 2<sup>nd</sup> process which will affect finished surface.

**With Ai learning**



1<sup>st</sup> process  
Turning

2<sup>nd</sup> process  
Turning, Drilling

Drilling is performed in the 2<sup>nd</sup> process for high accuracy in finished surface.

## SMOOTH Ai Spindle Optimized cutting conditions option

### Advanced spindle vibration detection by AI improves finished surfaces and productivity

When milling spindle vibrations are detected, this AI-powered software automatically adjusts spindle speed for unsurpassed surface finishes and higher productivity.



## Ai Thermal Shield Ensures stable machining accuracy

### Ai Thermal Shield ensures enhanced heat displacement compensation

New algorithms automatically determine the amount of compensation required by ambient temperature changes. As inspection results are accumulated, machine learning algorithms optimize the accuracy of compensation for the highest possible machining performance.

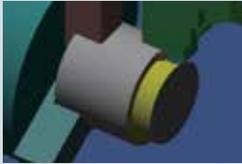


## Cutting Adviser

Cutting adviser optimizes machining conditions by MAZATROL SmoothAi CNC and MAZATROL SMOOTH CAM Ai simulation.

### Select data

#### Simulation results



OR

#### Machining results



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PROGRAM 2019/06/26 16:23

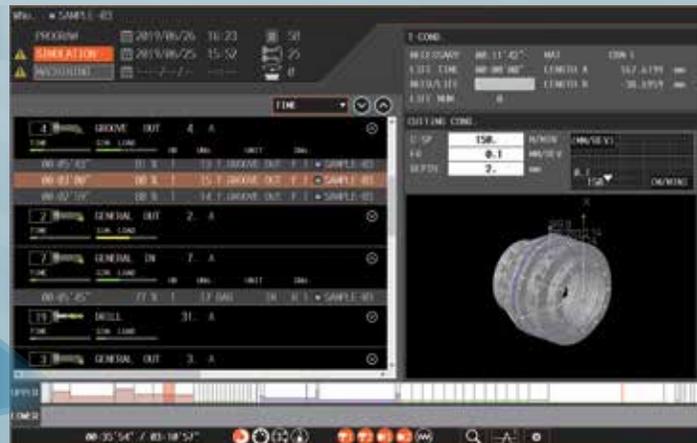
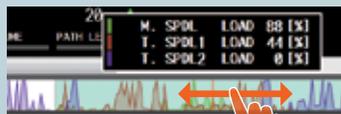
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MACHINING ---/--/-- ---:--

### Machining data

- Tools
- Material removal amount
- Machining load
- Machining time

#### Spindle : servo load data



### Change of machining conditions

- Cutting speed
- Feed rate
- Depth of cut



## SMC (SMOOTH MACHINING CONFIGURATION)

### Tuning machining features

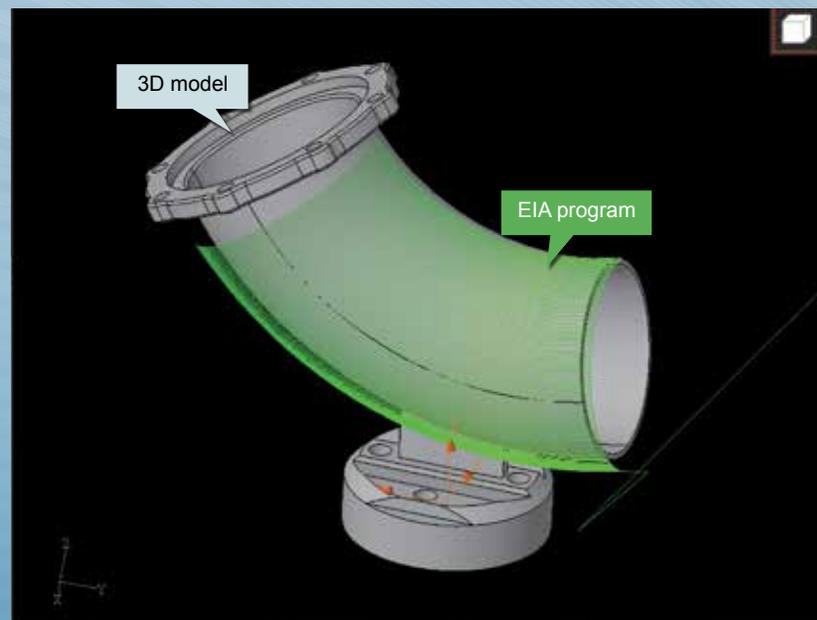
Machining features including cycle time, finished surface and machining shape can be adjusted by slider switches on the display according to material requirements and machining methods. This is especially effective for complex workpiece contours defined in small program increments. Once the desired results are shown, the settings can be stored in memory so they can easily be used again in the future. Additionally, the rotary axis acceleration tuning parameter can be adjusted by a slider switch as well as selecting speed or accuracy priority. These operations can be performed by both the SMOOTH CAM Ai and MAZATROL SmoothAi CNC.



## SMC PLUS OPTION

### Optimize EIA programs utilizing 3D models

Compares tool contact point of EIA program with 3D model so program points can be changed to ensure the correct tool path and high accuracy finished surfaces. This is an available option for the MAZATROL SmoothAi.





# FACTORY PHYSICAL SPACE

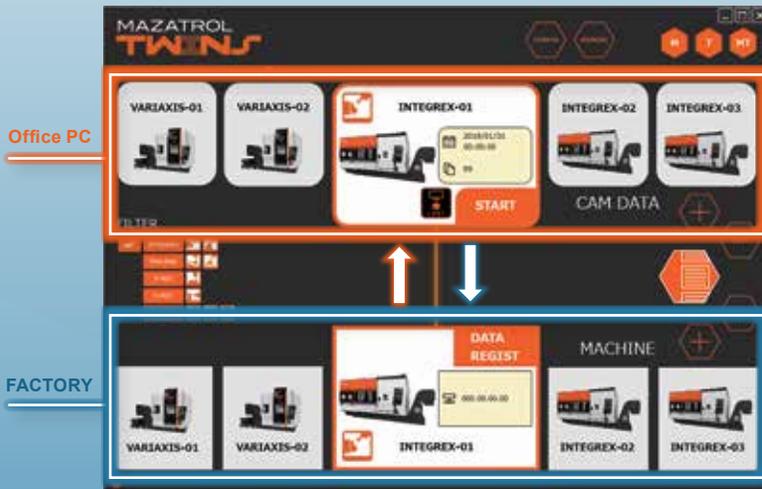
## Advanced Digital Technology for Manufacturing

### MAZATROL TWINS

Virtual machines in your office accurately duplicate the operation of machines on your factory floor. Available software can be used together with machines equipped with the MAZATROL SmoothAi CNC to substantially increase the efficiency of your production.

### SMOOTH CAM Ai OPTION

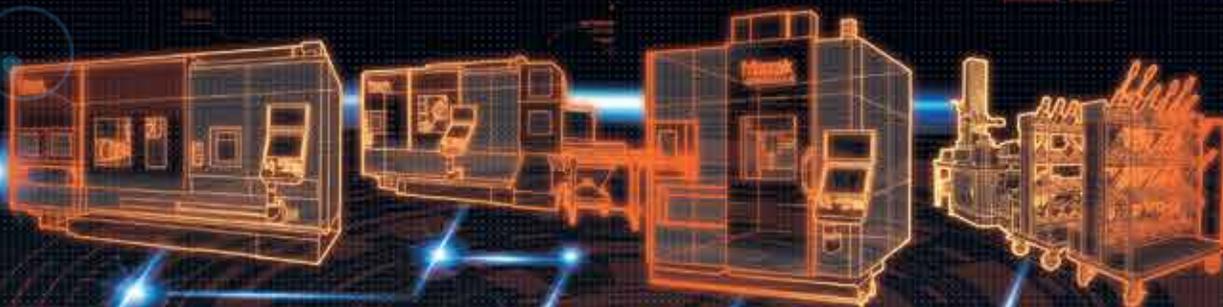
Programs can be made and edited, and simulation and analysis can be performed, on the SMOOTH CAM Ai for multiple machines.



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MAZATROL SMOOTH Ai

# VIRTUAL SPACE OFFICE PC



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## SMOOTH PROJECT MANAGER

### File management

Convenient management of data required to execute machining programs.

- Tool data
- Parameters
- Fixtures
- Workpiece 3D model
- Coordinate system

### Project data synchronization

Project data is synchronized between machines and SMOOTH CAM Ai and other CAD/CAM software. Data produced by virtual machines is outputted to machines equipped with the MAZATROL SmoothAi CNC for fast setups.



hyperMILL®



## SMOOTH TOOL MANAGEMENT

OPTION

The SMOOTH Tool Management software manages data of the large number of tools in use by a factory. By centrally managing tools and registering tool data as well as tool setup, machine non-cutting time can be reduced. This software can also eliminate tool information input errors in the CNC to improve productivity.



# Advanced Automation Utilizing Robots



Making production schedule

Checking production status

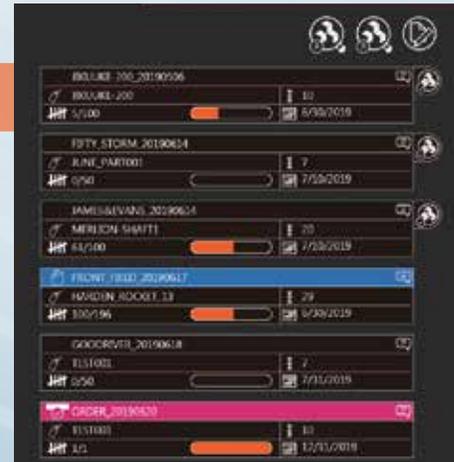
Management of required tools / fixtures

Report missing tools / alarm

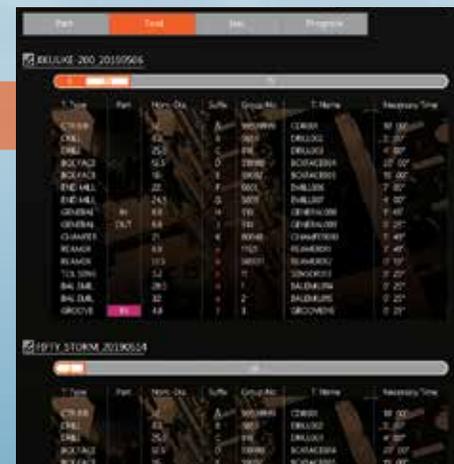
Optional second monitor



## Schedule



## Required tools



# SMOOTH RCC

Dedicated management software for high-mix, low-volume production utilizing a robot — operator can easily make the production schedule for extended periods of operation and check resources on the dedicated screen. **OPTION**

## Functions to reduce automatic operation setup time

### Resource check

#### Prevent missing items which will stop automatic operation

SMOOTH RCC displays missing programs and tools thanks to resource check. During automatic operation, real-time tool simulation displays tools which have short remaining tool life to indicate which tools require setup.

#### Before start of operation

- Workpiece/fixture set up
- Required program in CNC memory
- Confirm required tools for machining are in magazine and tool life is sufficient for scheduled machining

#### During operation

Continue to check remaining tool life to confirm there is sufficient tool life to perform production over the next 16 hours

If something missing

Instructions are displayed on screen



### Robot setup assist

#### Fast and easy robot setup

Automatically makes robot programs by inputting length and diameter of material and robot hand specification into the MAZATROL SmoothAi. For exceptional ease of operation, this conversational programming eliminates robot teaching.

Machining program

Robot setup data



Workpiece display from MAZATROL machining program

Input data for robot operation

# Mazak

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