

Mazak

INTEGREX e-H

S E R I E S



INTEGREX e-H SERIES

Advanced horizontal Multi-Tasking machine that can produce large workpieces from turning to milling in a single setup

Large swing and Y-axis stroke for large workpieces

Powerful turning and milling spindles plus rigid machine construction provide unsurpassed productivity

Wide variety of optional equipment available for enhanced versatility



INTEGREX e-670H (4000U)
Shown with optional equipment

Process Integration










The INTEGREX e-H Series incorporates all machining processes into a single machine, from raw material input through final machining. It enables shops to reduce production lead time, improve machining accuracy, reduce floor space and initial cost, lower operating expenses, reduce operator requirements and improve the work environment.



Previously, processing this sample printing machinery roll component with high-accuracy machining requirements relied on several machine tools, multiple setups and workpiece handlings. Now, INTEGREX DONE IN ONE® processing has realized the benefits shown below, along with substantial reductions in in-process time and inventory.

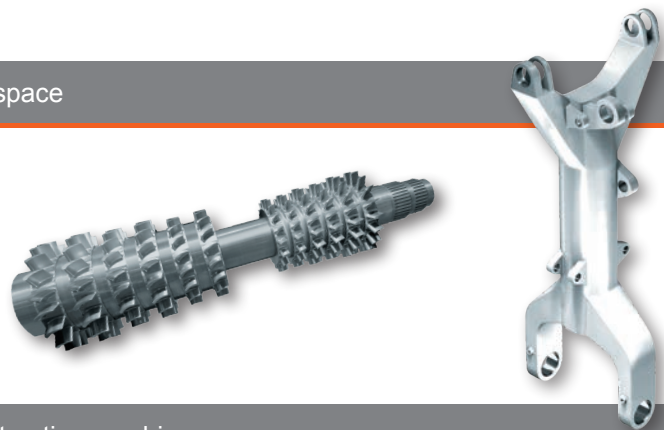


Workpiece length: 2500 mm (98.43")

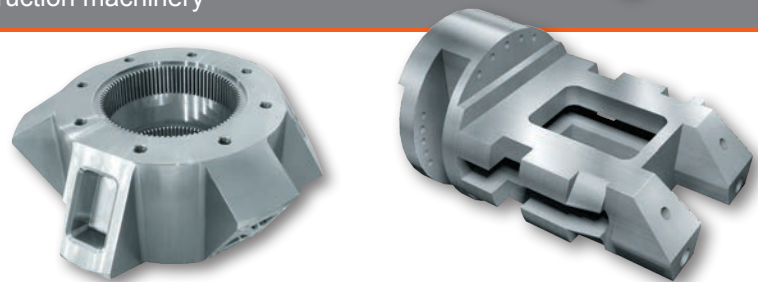
| Previous Production Process | | INTEGREX e-H | |
|--|---|---|--|
| Number of Operators |  Four |  One | |
| Number of Machines | <div><ul style="list-style-type: none">•Large turning center: One•Large vertical machining center + rotary table: One•Large horizontal boring mill: One•Large vertical machining center: One Four</div> |  One | |
| Number of Programs |  Eight |  One | |
| Number of Machine Setups (Loading and positioning workpieces) | Eight | One | |
| Sets of Cutting Tools |  Four |  One | |
| Fixtures |  Three | None | |



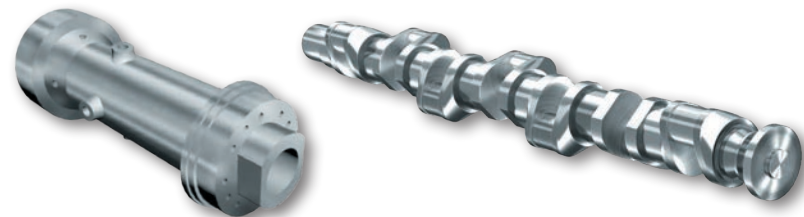
Aerospace



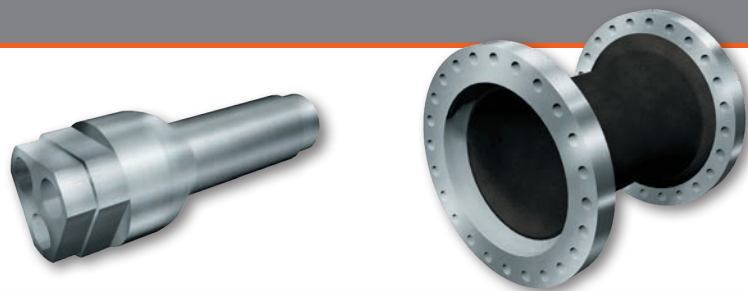
Construction machinery



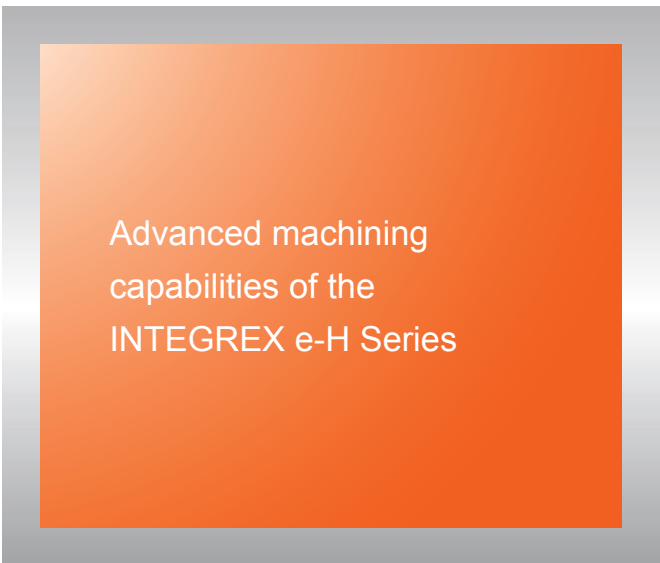
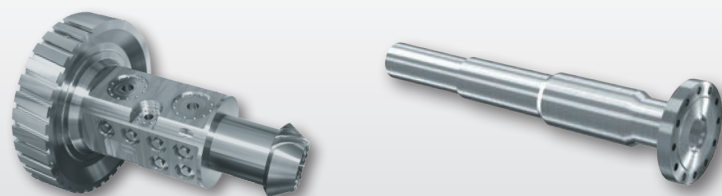
Marine



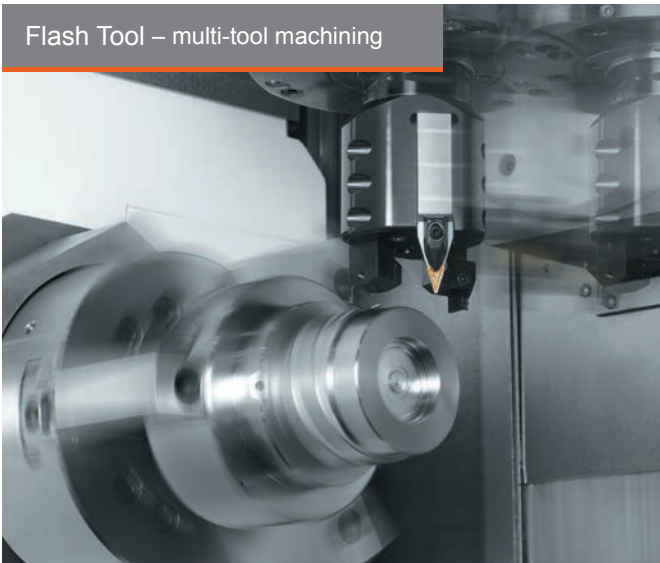
Oil



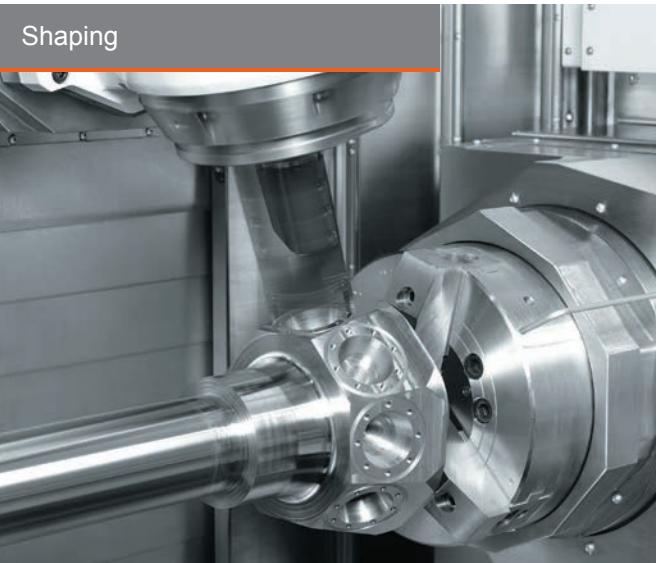
Energy



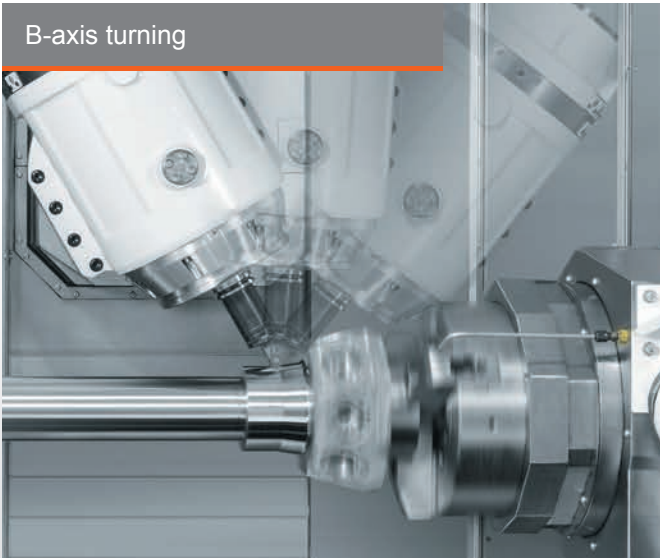
Gear hobbing



Flash Tool – multi-tool machining



Shaping



B-axis turning



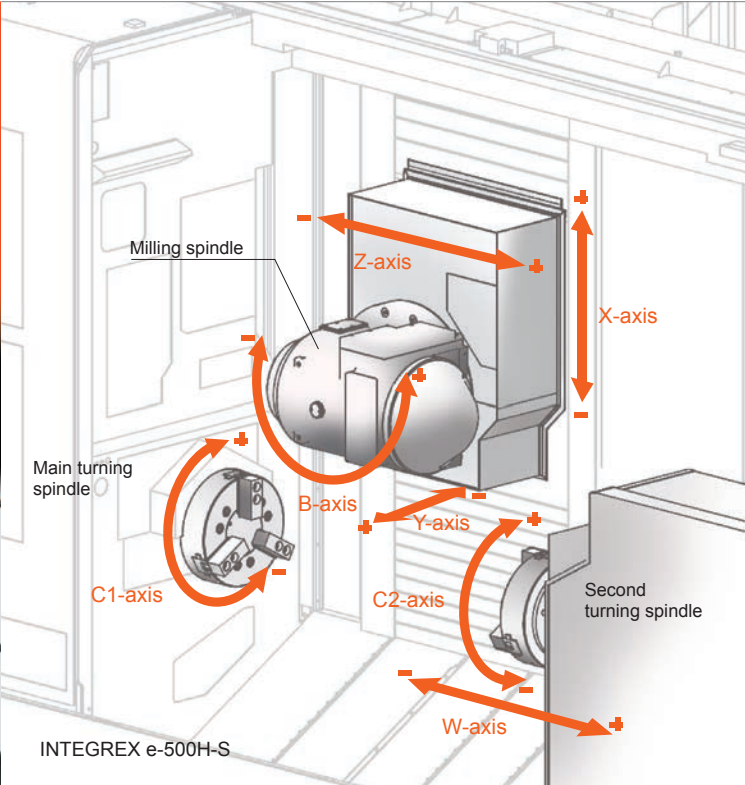
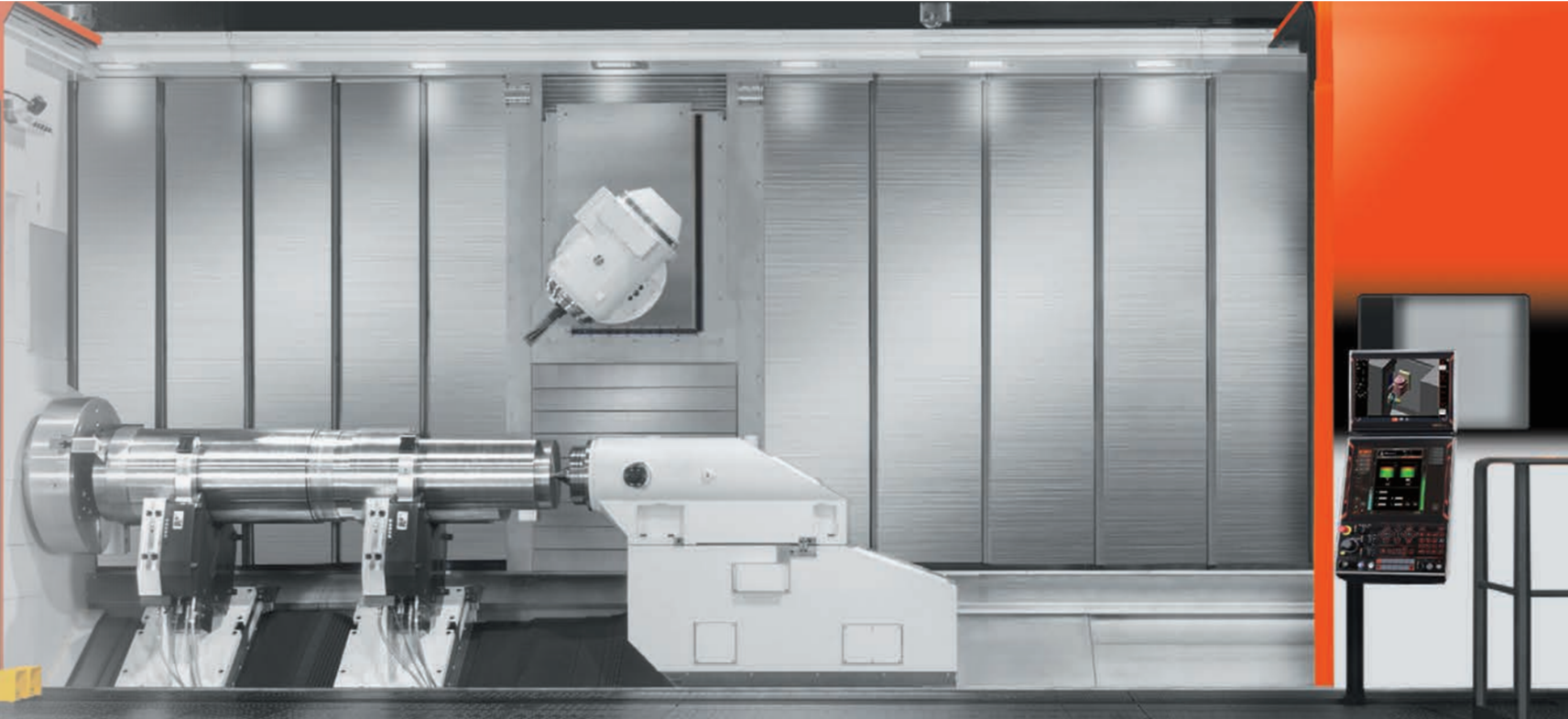
Mill turning




Mill turning: Rotation of both workpiece and milling tool for high-efficiency turning of difficult-to-cut workpiece materials.
Note: Optional mill-turning CNC function required

INTEGREX e-H Series

Designed for large workpieces —
Incorporating more than 30 years
of experience in the production of
Multi-Tasking machines

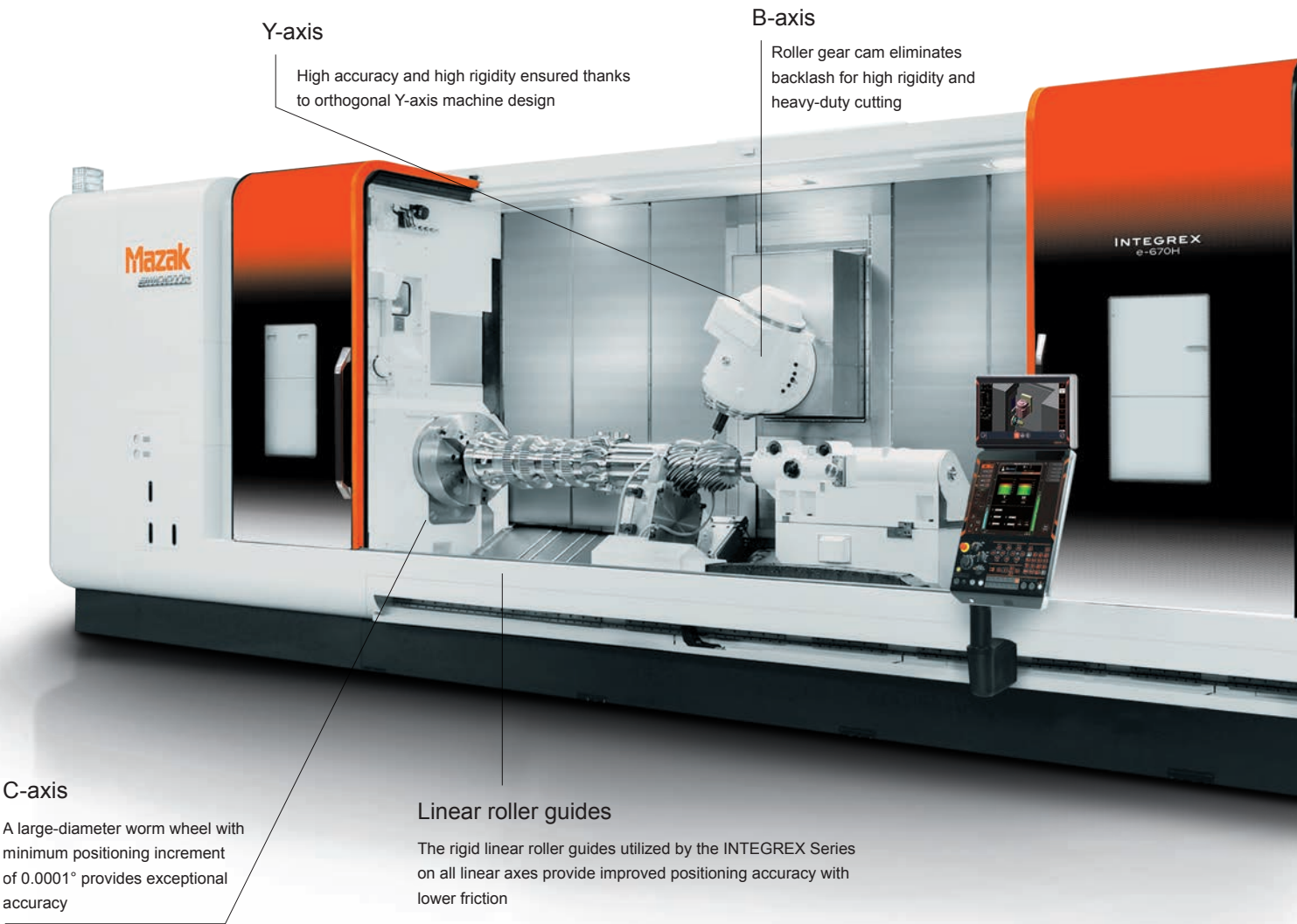
- Powerful milling performance comparable
to that of machining centers
- Largest Y-axis stroke in its class
- Wide range of options available, including
long boring bar system and rigid tool holder
system with four clamping units



| | | | Milling spindle | Y-axis stroke | Chuck size (Main turning spindle) | Tailstock/Max. supported weight** | Chuck size (Second turning spindle) |
|--|----------|-------------------------|--|--------------------|--------------------------------------|---|--|
|  INTEGREX e-500H Series | e-500H | 1500U 3000U 4000U | 10000 rpm [standard] 37 kW (50 HP) 260 N•m (192 ft•lbs) (40% ED/30-min. rating) 5000 rpm high torque [option] 37 kW (50 HP) 667 N•m (492 ft•lbs) (50% ED) | 500 mm (19.69") | 15" ~ 21" | NC tailstock MT No.5 (1500U/3000U/4000U) 1.5 t MT No.6 (3000U/4000U) [option] 3 t | |
| | e-500H-S | 1500U 3000U | | | | | 15" ~ 21" |
|  INTEGREX e-670H Series | e-670H | 3000U 4000U 6000U | 10000 rpm [standard] 37 kW (50 HP) 260 N•m (192 ft•lbs) (40% ED/30-min. rating) 5000 rpm high torque [option] 37 kW (50 HP) 667 N•m (492 ft•lbs) (50% ED) | 670 mm (26.38") | 18" ~ 32" | NC tailstock MT No. 6 (3000U/4000U) 3 t #80 Metric center (4000U) [option] 7 t #80 Metric center (6000U) 7 t | |
| | e-670H-S | 3000U 4000U | | | | | 18" ~ 24" |
|  INTEGREX e-800H | e-800H | 4000U 6000U 8000U | 10000 rpm [standard] 37 kW (50 HP) 260 N•m (192 ft•lbs) (40% ED/30-min. rating) 5000 rpm high torque [option] 37 kW (50 HP) 667 N•m (492 ft•lbs) (50% ED) | 800 mm (31.50") | 24" ~ 50" | NC tailstock #100 Metric center 15 t** | |

*1 Chuck included ** Maximum weight when using supportive device

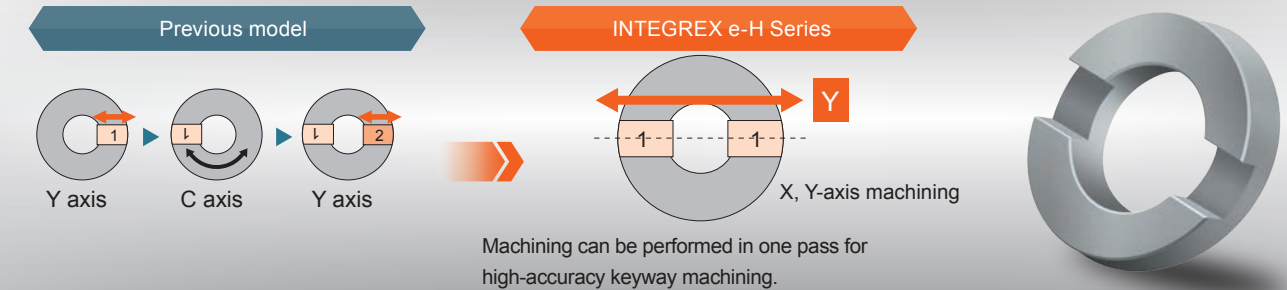
Orthogonal design provides large operation area and high-accuracy machining



Large operation area

Expanded machining versatility thanks to longer X and Y-axis stroke.

Machining is performed without C-axis rotation, which improves machining pitch and advancing accuracy.



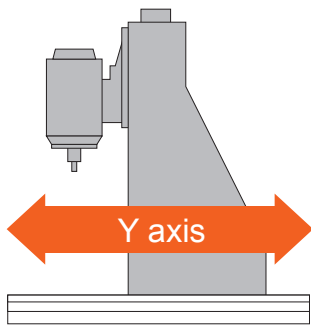
Y-axis

High-rigidity construction

The INTEGREX e-H Series features a traveling column with orthogonal 2-axis design. The Y-axis column utilizes linear roller guides to provide the high rigidity required for heavy-duty machining.

High-accuracy Y-axis design

Because the Y-axis column itself moves, the configuration is the same for every position on the Y-axis, which ensures high-accuracy machining.



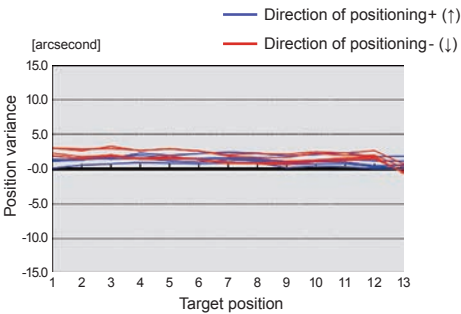
B-axis

Roller gear cam on B-axis eliminates backlash
Minimum indexing increment: 0.0001°

B-axis indexing accuracy two times better than the ISO standard.

| | | ISO tolerance | INTEGREX e-H Series | |
|--------|--|---------------|---------------------|-----------------|
| | | | MAZAK STD. | Example results |
| B-axis | Accuracy of positioning both directions | 28 sec | 14 sec | 4.88 sec |
| | Repeatability of positioning one direction (+) | 8 sec | 4 sec | 2.77 sec |
| | Repeatability of positioning one direction (-) | 8 sec | 4 sec | 2.46 sec |

Note: Above figures represent machine accuracies according to the MAZAK PRECISION STANDARD certified before shipment. The inspection is conducted according to ISO-230 on a recommended foundation with room temperature controlled to 22° C ± 1° C after machine has reached operating temperature.



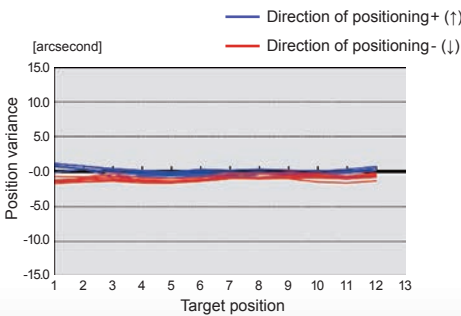
C-axis

C-axis indexing increment: 0.0001°

C-axis positioning accuracy is two times better than ISO and is driven by a large diameter worm wheel with a minimum positioning increment of 0.0001°.

| | | ISO tolerance | INTEGREX e-H Series | |
|--------|--|---------------|---------------------|-----------------|
| | | | MAZAK STD. | Example results |
| C-axis | Accuracy of positioning both directions | 28 sec | 14 sec | 3.4 sec |
| | Repeatability of positioning one direction (+) | 8 sec | 4 sec | 0.5 sec |
| | Repeatability of positioning one direction (-) | 8 sec | 4 sec | 1.0 sec |

Note: Above figures represent machine accuracies according to the MAZAK PRECISION STANDARD certified before shipment. The inspection is conducted according to ISO-230 on a recommended foundation with room temperature controlled to 22° C ± 1° C after machine has reached operating temperature.



Ball screw core cooling: X, Y, Z-axis ball screws – standard equipment

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

Note: Not available for INTEGREX e-800H Z-axis.



Higher Productivity and Accuracy

Wide variety of optional equipment available to reduce machining processes and improve machining capability

Special optional tool holders further expand versatility for the INTEGREX e-H Series

Special tool holders are automatically loaded/unloaded to/from the milling spindle, which can be used for 5-axis machining. Long boring bars can be loaded automatically for pipe machining, such as for the oil industry.



U-axis tool INTEGREX e-670H/e-670H-S/e-800H

An optional D'Andrea TA-C 160 U-axis facing tool is available to machine complex workpiece features.

Note: Max. swing of U-axis: ø1050 mm (ø41.34") (INTEGREX e-670H Series)



Rigid tool holder system with four clamping units INTEGREX e-670H/e-670H-S/e-800H

Special tool holders rigidly clamped by the four clamping units further increase the range of applications that can be performed. Because holders are loaded from a special stocker like standard tools, the number of machining processes is reduced for higher productivity.

Long angle mill holder

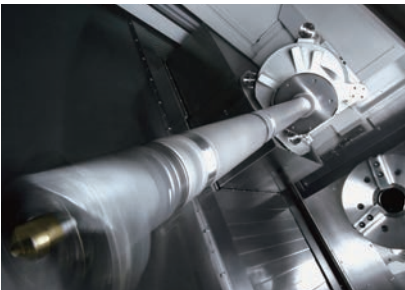
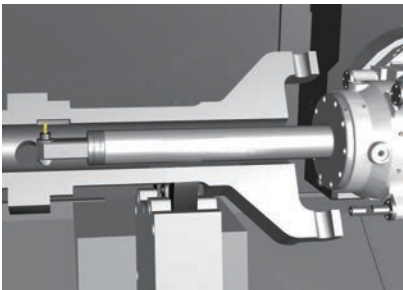
The long angle mill holder can be used for rotary tool machining deep in the bores of workpieces.

Long drill holder

The long drill holder [max. speed of 400 rpm with max. torque of 191 N·m (141 ft·lbs)] can perform deep hole drilling to a maximum depth of 800 mm (31.50"). Holders are loaded from a special stocker like standard tools, which reduces the number of machining processes for higher productivity.

Side cutter holder

The 90° side cutter provides a convenient method of high-accuracy groove cutting. The milling spindle's high-rigidity clamping system ensures high-performance cutting.



Long boring bar system INTEGREX e-500H/e-670H/e-800H

Higher productivity for deep machining of inner diameters of large workpieces

- Max. tool length: 1000 mm (39.37"), 1500 mm (59.06"), (6000U, 8000U)
- Tools can be stored in the long boring bar stocker
 - Two tools for e-500H -Three tools for e-670H
 - Four tools for e-800H
- Tool head is stored in the tool magazine and changed by the automatic tool changer

Note: ATC max. length: 1000 mm (39.37") (e-670H, e-800H)

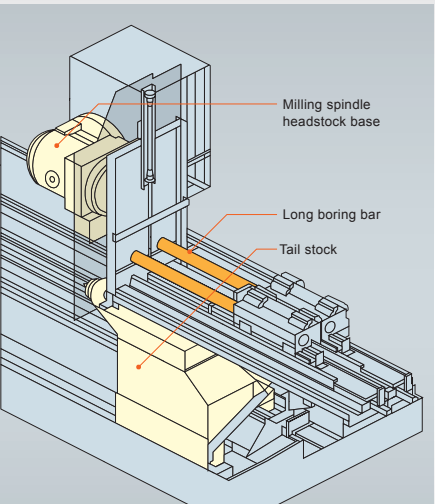


The unique long boring bar system is extremely effective for inner diameter and deep-hole machining of large workpieces that conventional turning centers cannot perform. The stocker located over the tailstock stores boring bars. The INTEGREX e-670H and INTEGREX e-800H automatically change the boring bar heads stored in the standard tool magazine.

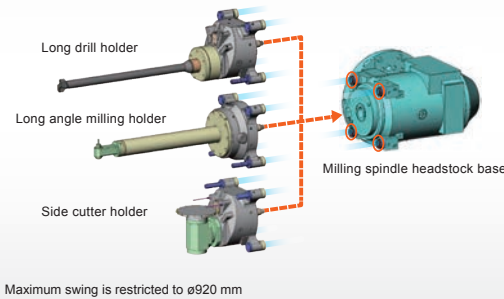
Specifications

| Machine model | e-500H | e-670H | | e-800H |
|--|------------------|---|---|---|
| Universal | 3000U/4000U | 3000U/4000U | 6000U | 4000U/6000U/8000U |
| Max. tool diameter | ø100 mm (ø3.94") | ø120 mm (ø4.72")* (Boring bar head ATC) | ø120 mm (ø4.72")* (Boring bar head ATC) | ø120 mm (ø4.72")* (Boring bar head ATC) |
| Max. tool length | 1000 mm (39.37") | 1000 mm (39.37") | 1500 mm (59.06") | 1500 mm (59.06") |
| Max. tool length (Boring bar head ATC) | — | 1000 mm (39.37") | 1000 mm (39.37") | 1000 mm (39.37") |
| Max. tool weight | 170 kg (375 lbs) | 180 kg (397 lbs) | 180 kg (397 lbs) | 240 kg (529 lbs) |
| Max. storage capacity | 2 tools | 3tools | 3tools | 4tools |

Note: During automatic tool changes of the boring bar head, maximum swing is restricted to ø920 mm (ø36.22"). Only BT and CAPTO boring bar heads can be changed automatically.

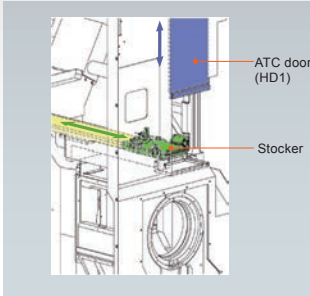


Rigid tool holder system with four clamping units enables drilling of small diameter holes located deep in large bores, and high-torque groove cutting with excellent access to the workpiece. In addition, special stockers are located on the top surface of the main/second spindle. A maximum of two of these milling holders can be stored.

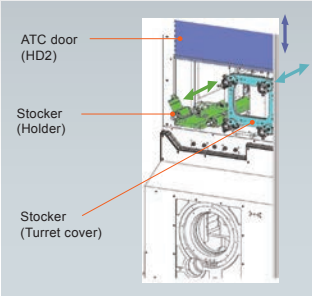


Maximum swing is restricted to ø920 mm

Stocker on HD1 side



Stocker on HD2 side



Specifications (HD1/HD2 stocker)

| | HD1 stocker | HD2 stocker |
|------------------------|--|---|
| Max. storage capacity | 1 tool | 1 tool |
| Type of milling holder | Long drill holder Long angle milling holder | Long drill holder Side cutter holder |

Note: When machine is equipped with four-clamping-unit rigid tool system, the number of long boring bars that can be stored is limited.

Higher Productivity and Accuracy

Milling spindle

Powerful milling spindle for faster cycle times

High-output, high-torque milling spindle provides performance comparable to that of a machining center.

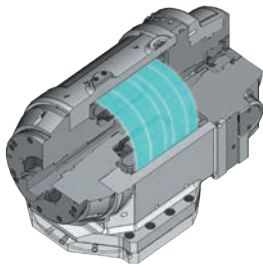


Integral spindle/motor

The integral spindle/motor design minimizes vibration during high-speed operation to ensure exceptional surface finishes and maximum tool life.

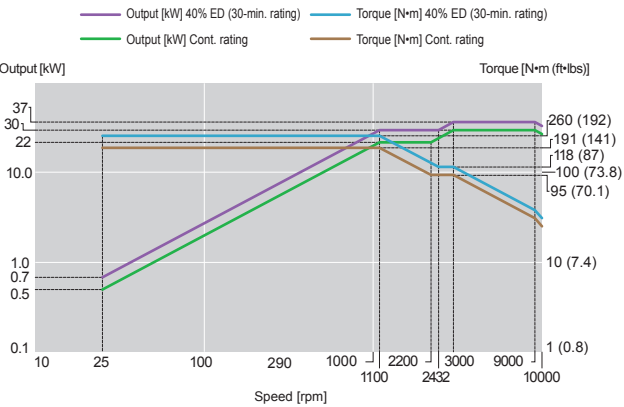
Spindle temperature control

For high-accuracy machining, temperature controlled cooling oil circulates around the spindle bearings and headstock to minimize any thermal change to the spindle.



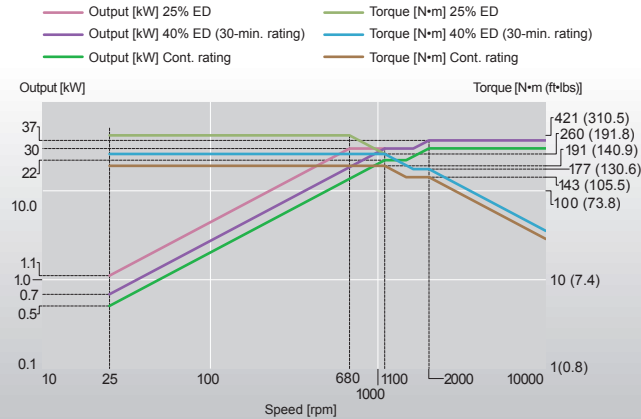
■ INTEGREX e-500H Series

10000 rpm milling spindle



■ INTEGREX e-670H Series, e-800H

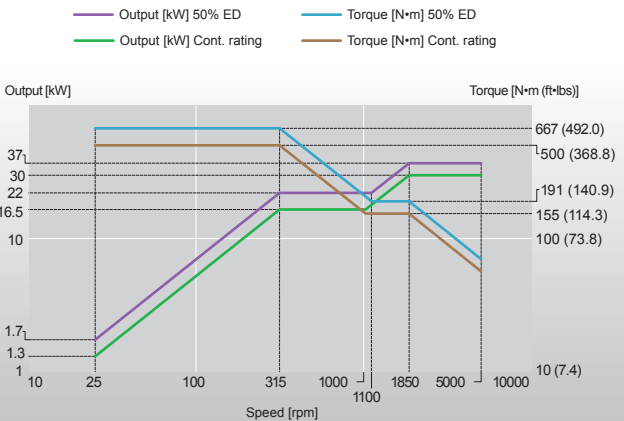
10000 rpm milling spindle



■ INTEGREX e-500H Series, e-670H Series, e-800H

5000 rpm high-torque spindle

OPTION



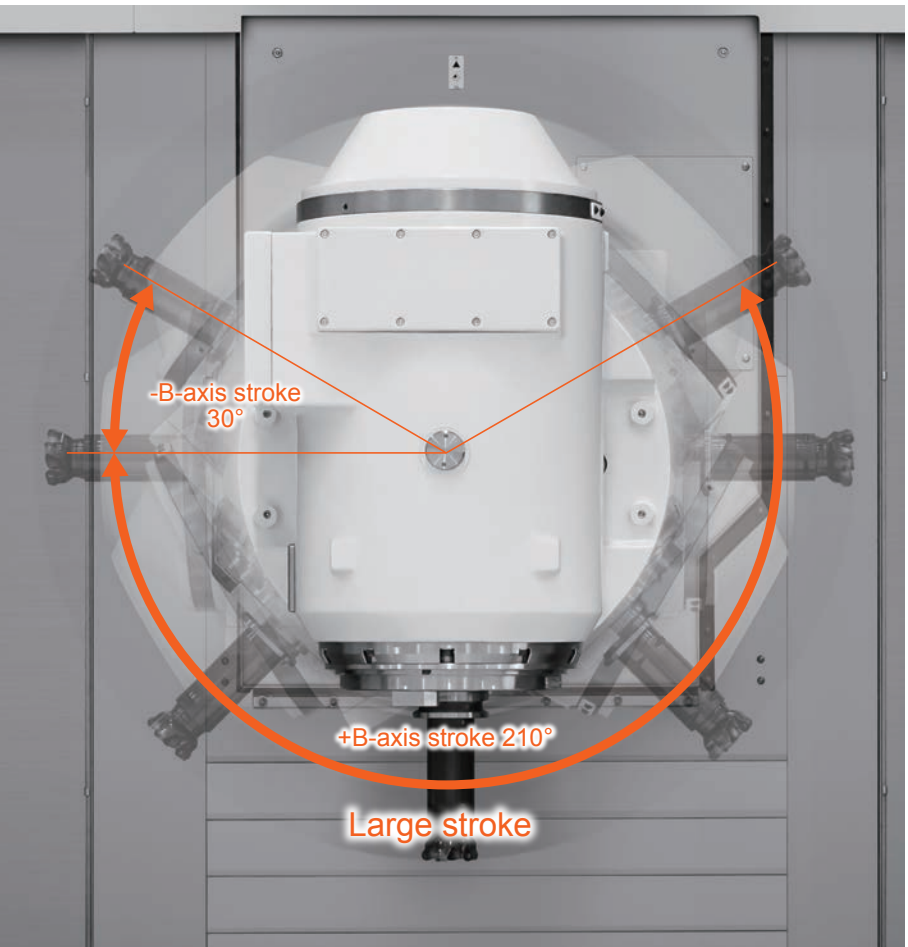
High-rigidity, high-accuracy B axis

Rigid roller gear cam on B axis

The B axis adopts a roller gear cam for high-rigidity, heavy-duty cutting. Along with minimizing friction coefficient and heat generation, it also eliminates backlash to ensure high-accuracy positioning.

Large machining area

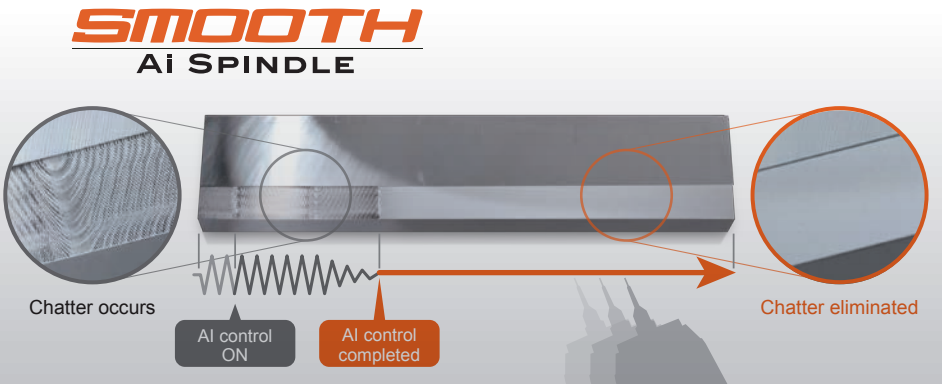
The single spindle turret with automatic tool changer simplifies tool setup with minimum interference. The milling spindle provides excellent performance over a wide range of applications, from steel machining to high-speed machining of aluminum.



SMOOTH Ai Spindle

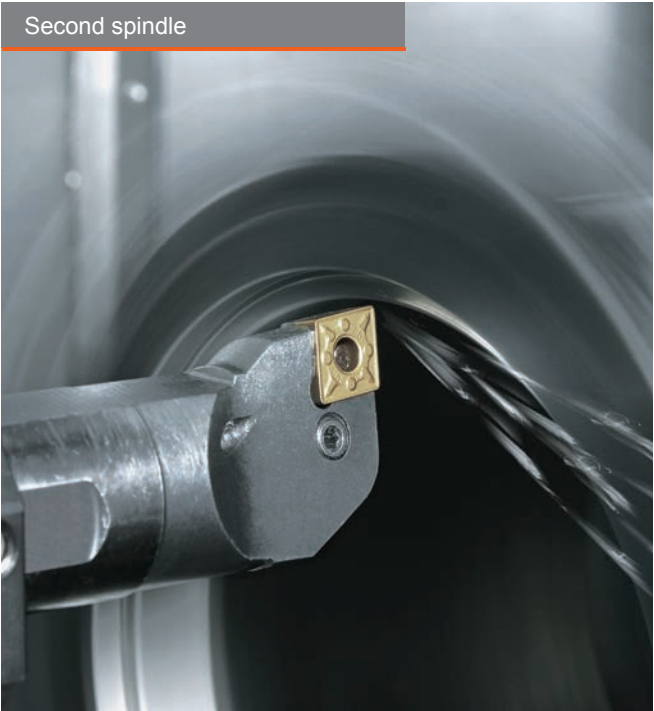
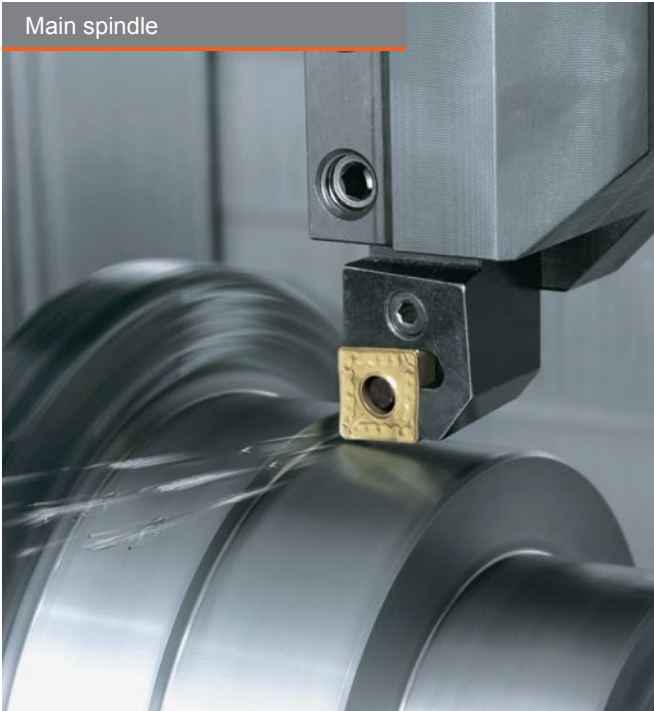
OPTION

AI enables detection of milling spindle vibration and automatic adjustment of machining conditions to produce unsurpassed surface finishes and high productivity. AI also makes quick adjustments easy, even without a skilled operator.



Main spindle/Second spindle

Spindles feature high-output integral spindle/motors with two gear ranges for a wide range of heavy-duty machining. The C axis (0.0001°program increment) is driven by a worm wheel system with high positioning accuracy – the same as machining center rotary tables.

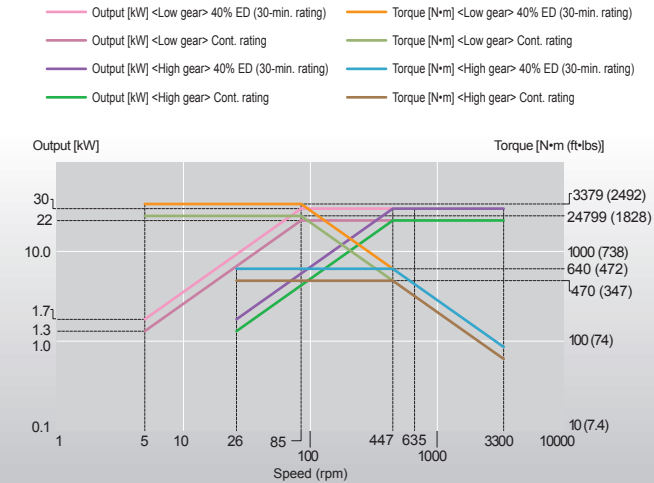


INTEGREX e-500H Series

3300 rpm spindle, spindle bore $\varnothing 104$ mm ($\varnothing 4.09$ ")

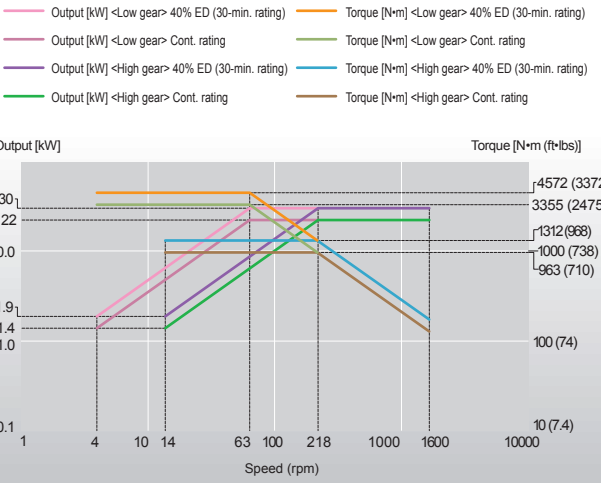
e-500H, e-500H-S main spindle (standard)

e-500H-S second spindle (standard)



1600 rpm high-torque spindle, spindle bore $\varnothing 185$ mm ($\varnothing 7.28$ ")

e-500H, e-500H-S main spindle (option)

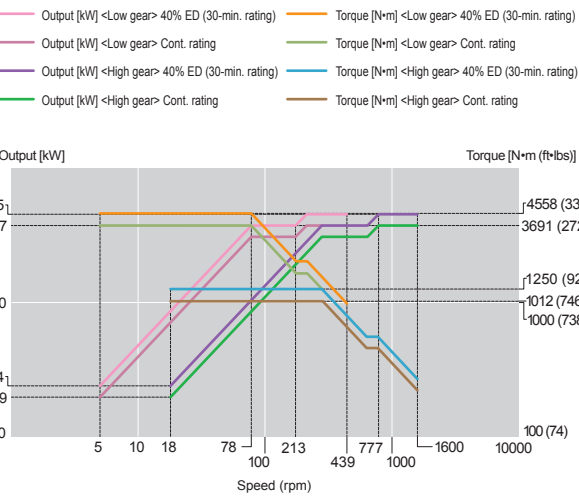


INTEGREX e-670H Series

1600 rpm spindle, spindle bore $\varnothing 170$ mm ($\varnothing 6.69$ ")

e-670H [3000U•4000U], e-670H-S main spindle (standard)

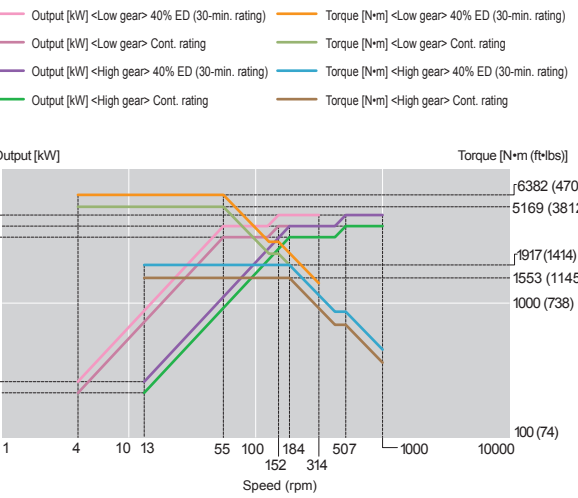
e-670H-S second spindle (standard)



1000 rpm spindle, spindle bore $\varnothing 260$ mm ($\varnothing 10.24$ ")

e-670H [6000U] main spindle (standard)

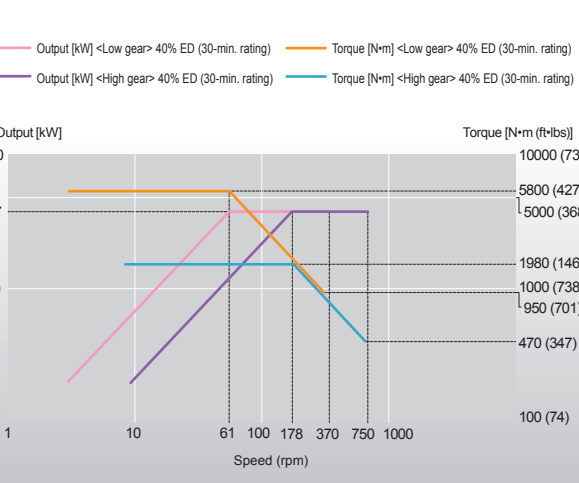
e-670H [3000U•4000U], e-670H-S main spindle (option)



INTEGREX e-670H Series

750 rpm spindle, spindle bore $\varnothing 320$ mm ($\varnothing 12.60$ ")

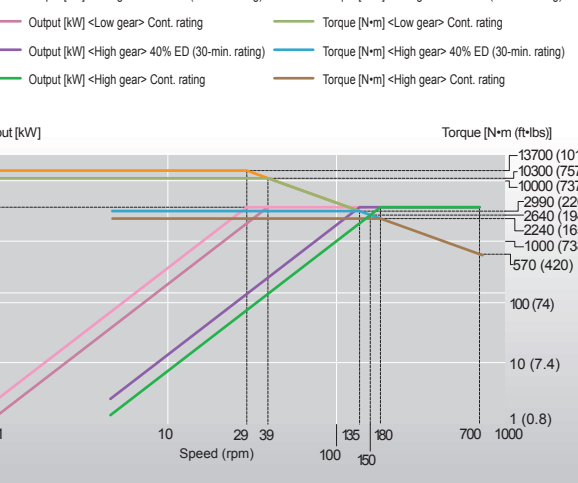
e-670H, e-670H-S main spindle (option)



INTEGREX e-800H

700 rpm spindle, spindle bore $\varnothing 275$ mm ($\varnothing 10.83$ ")

e-800H main spindle (standard)



NC tailstock

Controlling the movement and setting the thrust force of the tailstock is a simple operation using the CNC. The operator can set the tailstock thrust by 0.1 kN (22.5 lbs) on the setup screen and move the tailstock to the desired position by menu-key or M-code. This enables a workpiece to be machined with optimum thrust force from rough to finish machining. The motion of the tailstock body is much faster than a conventional system with the tailstock pulled by the machine carriage.

| | | | |
|--------|--------------------------|-------------------|--|
| e-500H | MT No. 5 built-in center | Max. thrust 1.5 t | 1500U/3000U/4000U |
| | MT No. 6 built-in center | Max. thrust 3.0 t | 3000U OPTION /4000U OPTION |
| e-670H | MT No. 6 built-in center | Max. thrust 3.0 t | 3000U/4000U |
| | Metric center #80 | Max. thrust 7.0 t | 4000U OPTION /6000U |
| e-800H | Metric center #100 | Max. thrust 7.5 t | 4000U/6000U/8000U |

OPTION

Two-position tailstock quill (manual quill positioning) to support short workpieces

INTEGREX e-670H

The tailstock quill can extend a stroke of 250 mm (9.84") to support both short and long-shaft workpieces.



Tool magazine

Various tool magazine capacities are available to meet the machining requirements of a wide variety of workpieces (40 tools – standard, 80 tools and 120 tools – optional).

The INTEGREX e-H Series is available with four tool holder specifications.

• Tool system

| | | | | | Max. tool length |
|---------------|--------------------|---------------------|----------|----------|--------------------|
| e-500H Series | BT-50 (CAT/MAS) | BBT-50 (CAT/MAS) | CAPTO C8 | HSK-T100 | 500 mm (19.69") |
| e-670H Series | | | | | 650 mm (25.59") |
| e-800H | | | | | |



OPTION

Maximum automatic tool changer tool length: 650 mm (25.59")/1000 mm (39.37")

The INTEGREX e-500H is available with an optional maximum tool length of 650mm (25.59") that can be handled by the automatic tool changer and tool magazine. 1000 mm (39.37") is available as an option for the INTEGREX e-670H and INTEGREX e-800H.



Steady rests

Various steady rests are available for high accuracy and efficient machining.
The INTEGREX e-800H (6000U) can be equipped with up to 3 steady rests; the 8000U with up to 4 steady rests.

Automatic steady rest

Operation by the CNC reduces positioning time considerably.

| | |
|---------------|---|
| Machine model | INTEGREX e-500H INTEGREX e-670H INTEGREX e-800H |
|---------------|---|

e-500H

| Steady rest manufacturer/model | Gripping diameter |
|--------------------------------|--------------------------------------|
| SMW SLU-X5M, SR5M | ø45 mm ~ ø310 mm (ø1.77" ~ ø12.20") |
| SMW SLU-X5.1M, SR5.1M | ø85 mm ~ ø350 mm (ø3.35" ~ ø13.78") |
| SMW K5M | ø80 mm ~ ø390 mm (ø3.15" ~ ø15.35") |
| SMW K5.1M | ø100 mm ~ ø410 mm (ø3.94" ~ ø16.14") |

Large workpiece diameter capacity steady rest

| | |
|---------------|-------------------------------|
| Machine model | INTEGREX e-670H Series/e-800H |
|---------------|-------------------------------|

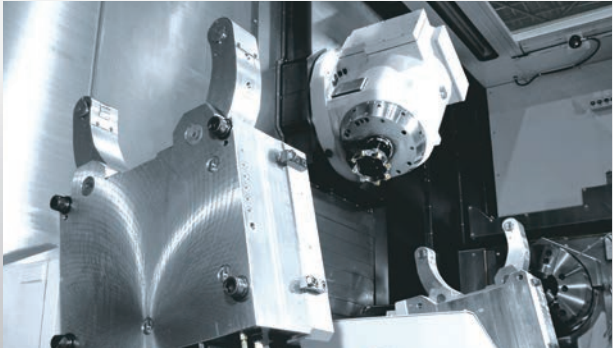


e-670H

| Steady rest manufacturer/model | Gripping diameter |
|--------------------------------|--------------------------------------|
| SMW SLU-X5Z, SR5Z | ø45 mm ~ ø310 mm (ø1.77" ~ ø12.20") |
| SMW SLU-X5.1Z, SR5.1Z | ø85 mm ~ ø350 mm (ø3.35" ~ ø13.78") |
| SMW K5Z | ø80 mm ~ ø390 mm (ø3.15" ~ ø15.35") |
| SMW K5.1Z | ø100 mm ~ ø410 mm (ø3.94" ~ ø16.14") |
| SMW K6Z | ø35 mm ~ ø460 mm (ø5.31" ~ ø18.11") |
| SMW K6.1Z | ø215 mm ~ ø510 mm (ø8.46" ~ ø20.08") |

Two NC steady rests

| | |
|---------------|-------------------------------|
| Machine model | INTEGREX e-670H Series/e-800H |
|---------------|-------------------------------|



e-800H

| Steady rest manufacturer/model | Gripping diameter |
|--------------------------------|---------------------------------------|
| SMW K6Z | ø135 mm ~ ø460 mm (ø5.31" ~ ø18.11") |
| SMW K6.1Z | ø215 mm ~ ø510 mm (ø8.46" ~ ø20.08") |
| SMW KA7Z | ø340 mm ~ ø660 mm (ø13.39" ~ ø25.98") |
| SMW KA7.1Z | ø650 mm ~ ø910 mm (ø25.59" ~ ø35.83") |

Unsurpassed ease of operation and maintenance from a machine design focused on ergonomic considerations

1

Minimum spindle center line height

The height from the floor to the center of the spindle is designed for easy loading/unloading workpieces and machine setup.



4

Wide door opening and convenient access for overhead crane

For ease of operation when loading/unloading workpieces using an overhead crane.

2

Movable CNC operation panel

The CNC operation panel moves in the Z-axis direction for easy setup and automatic operation.

3

Large window

The large front door window enables the operator to monitor workpiece machining easily.

5

Adjustable CNC touch panel

To ensure ease of operation, the operational touch panel tilts to the optimal position for any operator's height.

Innovation for Higher Productivity

MAZATROL
*SMOOTH*Ai

New MAZATROL Smooth CNC

Designed to provide unsurpassed productivity through even faster and higher-precision control while elevating your production to the next level with AI and digital twin technology

- Touch screen operation – similar to using your smartphone/tablet
- MAZATROL Smooth graphical user interface for unsurpassed ease of operation
- CNC system integrates with your Microsoft® Windows® PC
- Latest hardware and software for unprecedented speed and precision
- Higher machining speed for high accuracy 5-axis machining
- Fine-tuning function – Easy machining parameter setting for various workpieces
- MAZATROL TWINS – Software that enables real-time sharing and centralized management of various data for increased productivity

■ AI

Increase your productivity with AI technology



■ Digital Twin

Create a virtual machine on your office PC for efficient setup and improved productivity



■ Automation

Advanced automation with robot and software



Shown with optional MAZATROL SmoothAi dual monitor

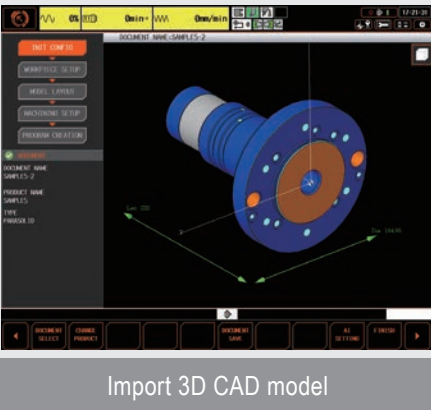
Innovative Functions for Higher Productivity

Innovative functions improve productivity from programming to machining

Automatic programming

Solid MAZATROL

A program is generated automatically from 3D CAD data. AI learning utilizes machining knowhow from past programs and automatically calculates the machining process to generate the optimal program.



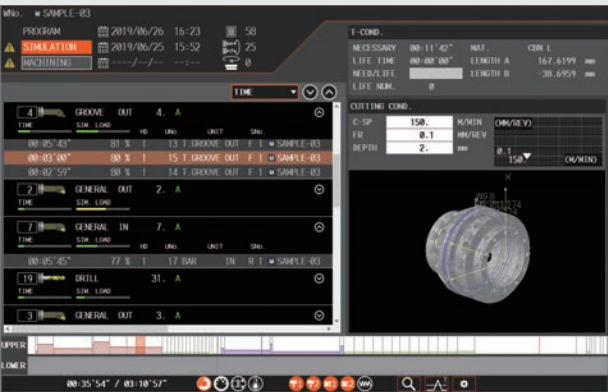
Required time for programming
2.5 min.



Simulation and test cutting (machining analysis, optimization)

SMOOTH Cutting Adviser

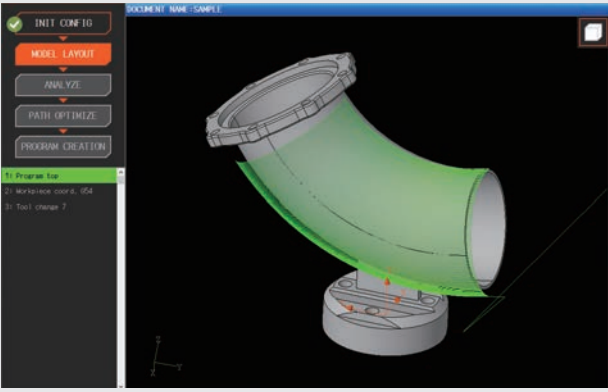
Cutting adviser optimizes machining conditions through MAZATROL SmoothAi CNC and SMOOTH CAM Ai simulation (optional software).



SMC PLUS

OPTION

Compares the cutting point of the EIA program with the 3D model to change to the correct command point, which ensures the correct tool path and high-accuracy finished surfaces.



Advanced Digital Technology

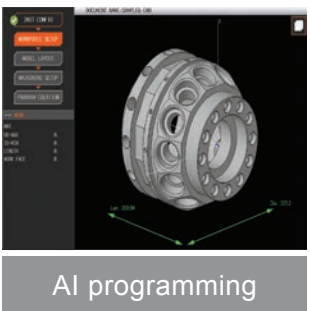
MAZATROL TWINS (software) for high productivity

OPTION

Virtual machines in your office accurately duplicate the operation of machines on your factory floor. Substantially increase your production efficiency with available software, together with machines equipped with the MAZATROL SmoothAi CNC.

SMOOTH CAM Ai

On the SMOOTH CAM Ai, make and edit programs and perform simulation and analysis for multiple machines. Send data to machines in the factory for fast and accurate machine setups.

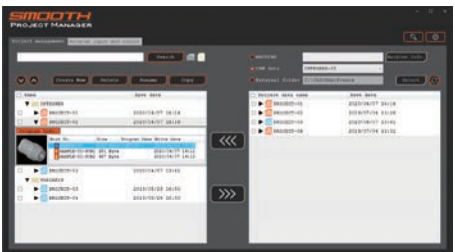


SMOOTH Project Manager

Manage project data for an entire factory. Synchronize data between the machine in the factory and the PC in the office.

SMOOTH Tool Management

For higher productivity, manage data about the large number of tools in use by a factory.



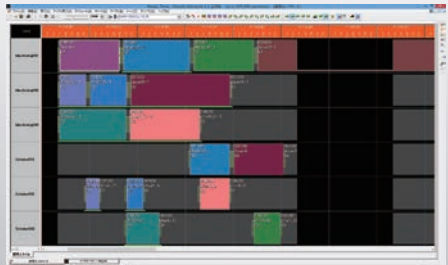
SMOOTH Monitor AX, SMOOTH Link

Software monitors operational status and analyzes accumulated manufacturing data for factory productivity improvement. View operational status and machining programs on tablets and smartphones so the operator can see necessary information instantly while away from the machine.



SMOOTH Scheduler

Software creates effective machining schedules that use production data. Schedules are displayed for convenient monitoring of production progress.



■ Standard Machine Specifications

INTEGREX e-500H Series

| | | INTEGREX e-500H | | | INTEGREX e-500H-S | |
|--------------------------------------|---|--|---------------------------------------|---------------------------------------|--|---|
| | | 1500U | 3000U | 4000U | 1500U | 3000U |
| Capacity | Max. swing | ø820 mm (ø32.28") | | | ø820 mm (ø32.28") | |
| | Max. supported weight (including chuck weight) | Shaft workpiece: 1500 kg (3307 lbs) | | | Chuck workpiece: 710 kg (1565 lbs) | |
| | Max. machining diameter | ø820 mm (ø32.28") | | | ø820 mm (ø32.28") | |
| Travel | X-axis travel | 870 mm (34.25") | | | 870 mm (34.25") | |
| | Z-axis travel | 1598 mm (62.91") | 3122 mm (122.91") | 4138 mm (162.91") | 1598 mm (62.91") | 3122 mm (122.91") |
| | Y-axis travel | 500 mm (19.69") | | | 500 mm (19.69") | |
| | W-axis travel | 1466 mm (57.72") | 2990 mm (117.72") | 3528 mm (138.90") | 1529 mm (60.20") | 2463 mm (96.97") (Equipped with one steady rest) |
| | B-axis travel | -30° ~ 210° | | | -30° ~ 210° | |
| | C-axis travel | 360° | | | 360° | |
| Spindle | Max. spindle speed ^{*1} | 3300 rpm | | | 3300 rpm | |
| | Spindle nose | A2-11 | | | A2-11 | |
| | Spindle bore | ø104 mm (ø4.09") | | | ø104 mm (ø4.09") | |
| | Bearing ID | ø150 mm (ø5.91") | | | ø150 mm (ø5.91") | |
| | Min. spindle indexing increment | 0.0001° | | | 0.0001° | |
| Second spindle | Max. spindle speed ^{*1} | — | | | 3300 rpm | |
| | Min. spindle indexing increment | — | | | 0.0001° | |
| Milling spindle | Milling spindle type | Single spindle turret with ATC | | | Single spindle turret with ATC | |
| | Max. spindle speed | 10000 rpm | | | 10000 rpm | |
| | Min. spindle indexing increment | 0.0001° | | | 0.0001° | |
| | Tool shank height | 25 mm (1.00") | | | 25 mm (1.00") | |
| | Boring bar shank diameter | ø50 mm (ø2.00") | | | ø50 mm (ø2.00") | |
| Feedrate | Rapid traverse rate: X axis | 40 m/min (1575 IPM) | | | 40 m/min (1575 IPM) | |
| | Rapid traverse rate: Z axis | 40 m/min (1575 IPM) | | 30 m/min (1181 IPM) | 40 m/min (1575 IPM) | |
| | Rapid traverse rate: Y axis | 40 m/min (1575 IPM) | | | 40 m/min (1575 IPM) | |
| | Rapid traverse rate: B axis | 30 rpm | | | 30 rpm | |
| | Rapid traverse rate: C axis | 20 rpm | | | 20 rpm | |
| | Rapid traverse rate: W axis | 6 m/min (236 IPM) | | | 12 m/min (472 IPM) | |
| Automatic tool changer system | Tool shank taper | No. 50 | | | No.50 | |
| | Tool storage capacity | 40 tools | | | 40 tools | |
| | Max. tool diameter/Length (from gauge line)/Weight | ø135 mm (ø5.31") [when adjacent pockets empty: ø260 mm (ø10.24")]/500 mm (19.69")/30 kg (66 lbs) | | | ø135 mm (ø5.31") [when adjacent pockets empty: ø260 mm (ø10.24")]/500 mm (19.69")/30 kg (66 lbs) | |
| | Tool selection method/Tool change time (tool to tool) | MAZATROL Random memory (random pocket assignment)/1.8 sec | | | MAZATROL Random memory (random pocket assignment)/1.8 sec | |
| Tailstock | Tailstock center | MT No. 5 | | | — | |
| | Travel | 1466 mm (57.72") | 2990 mm (117.72") | 3528 mm (138.90") | — | |
| | Feedrate | 6 m/min (236 IPM) | | | — | |
| | Max. thrust force | 15.0 kN (3372 lbs) | | | — | |
| Motors | Spindle motor 40% ED (30-min. rating) ^{*2} | 30 kW (40 HP) | | | 30 kW (40 HP) | |
| | Second spindle motor 40% ED (30-min. rating) | — | | | 30 kW (40 HP) | |
| | Milling spindle motor 40% ED (30-min. rating) | 37 kW (50 HP) | | | 37 kW (50 HP) | |
| | | | | | | |
| Power requirements | Electrical power supply (Cont. rating) | 98.2 kVA | | | 102.0 kVA | |
| | Air supply | 0.5 MPa (73 PSI), 460 L/min (16.25 ft³/min) | | | 0.5 MPa (73 PSI), 550 L/min (19.43 ft³/min) | |
| Tank capacity | Coolant tank capacity | 620 L (164 gal) | 800 L (211 gal) | 1165 L (308 gal) | 700 L (185 gal) | 1020 L (269 gal) |
| Machine size (with 40-tool magazine) | Machine height | 3220 mm (126.77") | | | 3220 mm (126.77") | |
| | Floor space requirement ^{*3} | 6540 mm × 4600 mm (257.48" × 181.10") | 8040 mm × 4600 mm (316.54" × 181.10") | 9594 mm × 4600 mm (377.72" × 181.10") | 7140 mm × 4600 mm (281.10" × 181.10") | 8640 mm × 4600 mm (340.16" × 181.10") |
| | Weight | 22600 kg (49824 lbs) | 28600 kg (63051 lbs) | 32600 kg (71869 lbs) | 23800 kg (52469 lbs) | 29800 kg (65697 lbs) |

^{*1} Max. spindle speed and max. turning length depend on chuck specifications.
^{*2} Even within the specifications, machining is restricted with a standard outer diameter tool whose main cutting force exceeds 17658 N (1800 kgf).
^{*3} Chip conveyor not included.

INTEGREX e-670H Series

| | | INTEGREX e-670H | | | INTEGREX e-670H-S | |
|--------------------------------------|---|--|---------------------------------------|--|--|--|
| | | 3000U | 4000U | 6000U | 3000U | 4000U |
| Capacity | Max. swing | ø1070 mm ^{*2} (ø42.13") | | | ø1070 mm (ø42.13") | |
| | Max. supported weight (including chuck weight) | Shaft workpiece: 3000 kg (6614 lbs) | | Shaft workpiece: 7000 kg (15432 lbs) | Shaft workpiece: 3000 kg (6614 lbs) | |
| | Max. machining diameter | ø1070 mm ^{*2} (ø42.13") | | | ø1070 mm (ø42.13") | |
| Travel | X-axis travel | 1025 mm (40.35") | | | 1025 mm (40.35") | |
| | Z-axis travel | 3122 mm (122.91") | 4138 mm (162.91") | 6170 mm (242.91") | 3122 mm (122.91") | 4138 mm (162.91") |
| | Y-axis travel | 670 mm (26.38") | | | 670 mm (26.38") | |
| | W-axis travel | 2879 mm (113.35") | 3890 mm (153.15") | 5054 mm (198.98") (Equipped with one steady rest) | 3053 mm (120.20") (without steady rest) | 3214 mm (126.54") (Equipped with one steady rest) |
| | B-axis travel | -30° ~ 210° | | | -30° ~ 210° | |
| | C-axis travel | 360° | | | 360° | |
| Spindle | Max. spindle speed ^{*1} | 1600 rpm | | 1000 rpm ^{*7} | 1600 rpm | |
| | Spindle nose | A2-11 | | Previous JIS A2-15 ^{*8} | A2-11 | |
| | Spindle bore | ø170 mm (ø6.69") | | ø260 mm (ø10.24") | ø170 mm (ø6.69") | |
| | Bearing ID | ø240 mm (ø9.45") | | ø330.2 mm (ø13.00") | ø240 mm (ø9.45") | |
| | Min. spindle indexing increment | 0.0001° | | | 0.0001° | |
| Second spindle | Max. spindle speed ^{*1} | — | | | 1600 rpm | |
| | Min. spindle indexing increment | — | | | 0.0001° | |
| Milling spindle | Milling spindle type | Single spindle turret with ATC | | | Single spindle turret with ATC | |
| | Max. spindle speed | 10000 rpm | | | 10000 rpm | |
| | Min. spindle indexing increment | 0.0001° | | | 0.0001° | |
| | Tool shank height | 25 mm (1.00") | | | 25 mm (1.00") | |
| | Boring bar shank diameter | ø50 mm (ø2.00") | | | ø50 mm (ø2.00") | |
| Feedrate | Rapid traverse rate: X axis | 40 m/min (1575 IPM) | | | 40 m/min (1575 IPM) | |
| | Rapid traverse rate: Z axis | 40 m/min (1575 IPM) | 30 m/min (1181 IPM) | 18 m/min (709 IPM) | 40 m/min (1575 IPM) | 30 m/min (1181 IPM) |
| | Rapid traverse rate: Y axis | 40 m/min (1575 IPM) | | | 40 m/min (1575 IPM) | |
| | Rapid traverse rate: B axis | 30 rpm | | | 30 rpm | |
| | Rapid traverse rate: C axis | 20 rpm | | | 20 rpm | |
| | Rapid traverse rate: W axis ^{*2} | 11 ~ 12 m/min (433 ~ 472 IPM) | 6 ~ 12 m/min (236 ~ 472 IPM) | 3 ~ 6 m/min (118 ~ 236 IPM) | 12 m/min (472 IPM) | 10 m/min (394 IPM) |
| | Tool shank taper | No. 50 | | | No. 50 | |
| | Tool storage capacity | 40 tools | | | 40 tools | |
| Automatic tool changer system | Max. tool diameter/Length (from gauge line)/Weight | ø135 mm (ø5.31") [when adjacent pockets empty: ø260 mm (ø10.24")]/500 mm (19.69")/30 kg (66 lbs) | | | ø135 mm (ø5.31") [when adjacent pockets empty: ø260 mm (ø10.24")]/500 mm (19.69")/30 kg (66 lbs) | |
| | Tool selection method/Tool change time (tool to tool) | MAZATROL Random memory (random pocket assignment)/1.8 sec | | | MAZATROL Random memory (random pocket assignment)/1.8 sec | |
| | Tailstock center | MT No. 6 | | No. 80 metric center | — | |
| | Max. thrust force | 30.0 kN (6744 lbs) | | 70.0 kN (15736 lbs) | — | |
| Motors | Spindle motor 40% ED (30-min. rating) ^{*3} | 45 kW (60 HP) | | | 45 kW (60 HP) | |
| | Second spindle motor 40% ED (30-min. rating) | — | | | 45 kW (60 HP) | |
| | Milling spindle motor 40% ED (30-min. rating) | 37 kW (50 HP) | | | 37 kW (50 HP) | |
| Power requirements | Electrical power supply (Cont. rating) | 103.6 kVA | | 109.9 kVA | 104.6 kVA | |
| | Air supply | 0.5 MPa (73 PSI), 590 L/min (20.84 ft³/min) | | | 0.5 MPa (73 PSI), 660 L/min (23.31 ft³/min) | |
| Tank capacity | Coolant tank capacity | 960 L (254 gal) | 1110 L (293 gal) | 1560 L (412 gal) | 1060 L (280 gal) | 1260 L (333 gal) |
| Machine size (with 40-tool magazine) | Machine height ^{*4} | 3886 mm (152.99") | | | 3886 mm (152.99") | |
| | Floor space requirement ^{*5} | 8465 mm × 5100 mm (333.27" × 200.79") | 9481 mm × 5100 mm (373.27" × 200.79") | 12173 mm × 5100 mm (479.25" × 200.79") | 9125 mm × 5100 mm (359.25" × 200.79") | 10141 mm × 5100 mm (399.25" × 200.79") |
| | Weight | 31000 kg (68342 lbs) | 36000 kg (79365 lbs) | 44500 kg (98105 lbs) | 33000 kg (72751 lbs) | 38000 kg (83774 lbs) |

^{*1} Max. spindle speed and max. turning length depend on chuck specifications.
^{*2} The range of the rapid traverse rate of the W-axis (tailstock feed axis) is based on variable speed control.
^{*3} Even within the specifications, machining is restricted with a standard outer diameter tool whose main cutting force exceeds 17658 N (1800 kgf).
^{*4} Distance from the floor to the counter-balance with the X-axis positioned at + O.T.
^{*5} Chip conveyor not included.
^{*6} When performing automatic tool change of boring bar head, maximum swing is restricted to ø920 mm (ø36.22").
^{*7} When the tailstock is in the high thrust range (30.7 kN to 70.0 kN), the spindle speed is limited to 500 rpm or less.
^{*8} When installing a chuck that complies with the ISO702-1 standard, an adaptor must be added to the chuck because of the different tap size.

■ Standard Machine Specifications

INTEGREX e-800H

| | | INTEGREX e-800H | | |
|---|---|--|--|---|
| | | 4000U | 6000U | 8000U |
| Capacity | Max. swing | ø1300 mm (ø51.18") | | |
| | Max. supported weight (including chuck weight) ¹ | Shaft workpiece: 15000 kg (33069 lbs) | | |
| | Max. machining diameter | ø1300 mm (ø51.18") | | |
| Travel | X-axis travel | 1300 mm (51.18") | | |
| | Z-axis travel | 4380 mm (172.44") | 6380 mm (251.18") | 8380 mm (329.92") |
| | Y-axis travel | 800 mm (31.50") | | |
| | W-axis travel | 4140 mm (162.99") | 6055 mm (238.39") (Equipped with one steady rest) | 6870 mm (270.47") (Equipped with two steady rests) |
| | B-axis travel | -30° ~ 210° | | |
| | C-axis travel | 360° | | |
| Spindle | Max. spindle speed ² | 700 rpm | | |
| | Spindle nose | A2-20 | | |
| | Spindle bore | ø275 mm (ø10.83") | | |
| | Bearing ID | ø355.6 mm (ø14.00") | | |
| | Min. spindle indexing increment | 0.0001° | | |
| Milling spindle | Milling spindle type | Single spindle turret with ATC | | |
| | Max. spindle speed | 10000 rpm | | |
| | Min. spindle indexing increment | 0.0001° | | |
| | Tool shank height | 25 mm (1.00") | | |
| | Boring bar shank diameter | ø50 mm (ø2.00") | | |
| Feedrate | Rapid traverse rate: X axis | 18 m/min (709 IPM) | | |
| | Rapid traverse rate: Z axis | 24 m/min (945 IPM) | 18 m/min (709 IPM) | 18 m/min (709 IPM) |
| | Rapid traverse rate: Y axis | 18 m/min (709 IPM) | | |
| | Rapid traverse rate: B axis | 30 rpm | | |
| | Rapid traverse rate: C axis | 12.5 rpm | | |
| | Rapid traverse rate: W axis ³ | 6 m/min (236 IPM) | 3 ~ 6 m/min (118 ~ 236 IPM) | 2 ~ 6 m/min (79 ~ 236 IPM) |
| Automatic tool changer system | Tool shank taper | No. 50 | | |
| | Tool storage capacity | 40 tools | | |
| | Max. tool diameter/Length (from gauge line)/Weight | ø135 mm (ø5.31") [when adjacent pockets empty ø260 mm (ø10.24")]/650 mm (25.59")/30 kg (66 lbs) | | |
| | Tool selection method/Tool change time (tool to tool) | MAZATROL Random memory (random pocket assignment)/1.8 sec | | |
| Tailstock | Tailstock center | No. 100 metric center | | |
| | Max. thrust force | 75.0 kN (16860 lbs) | | |
| Motors | Spindle motor (40% ED) ⁴ | 45 kW (60 HP) | | |
| | Milling spindle motor (40% ED) | 37 kW (50 HP) | | |
| Power requirements | Electrical power supply (Cont. rating) | 125.6 kVA | 131.4 kVA | |
| | Air supply | 0.5 MPa (73 PSI), 510 L/min (18.02 ft³/min) | | |
| Tank capacity | Coolant tank capacity | 1800 L (476 gal) | 2400 L (634 gal) | |
| Machine size (with 40-tool magazine) | Machine height | 4650 mm (183.07") | | |
| | Floor space requirement ⁵ | 12000 mm × 6000 mm (472.44" × 236.22") | 14000 mm × 6000 mm (551.18" × 236.22") | 16000 mm × 6000 mm (629.92" × 236.22") |
| | Weight | 78600 kg (173280 lbs) | 87300 kg (192460 lbs) | 96500 kg (212743 lbs) |

^{*1} Max. supported weight when using supportive device such as steady rest, etc.

^{*2} Max. spindle speed and max. turning length depend on chuck specifications.

^{*3} The range of the rapid traverse rate of the W-axis (tailstock feed axis) is based on variable speed control.

^{*4} Even within the specifications, machining is restricted with a standard outer diameter tool whose main cutting force exceeds 17658 N (1800 kgf).

^{*5} Depth dimension includes the operation panel (for details, refer to the machine dimensions).

■ Standard and Optional Equipment

| | | ●: Standard ○: Option —: N/A | | | | |
|------------------------|---|----------------------------------|----------|-----------------|----------|--------|
| | | e-500H | e-500H-S | e-670H | e-670H-S | e-800H |
| Machine | Main spindle bore ø104 mm (ø4.09") 3300 rpm | ● | ● | — | — | — |
| | Main spindle bore ø170 mm (ø6.69") 1600 rpm | — | — | ● ^{*4} | ● | — |
| | Main spindle bore ø185 mm (ø7.28") 1600 rpm | ○ | ○ | — | — | — |
| | Main spindle bore ø260 mm (ø10.24") 1000 rpm | — | — | ○ | ○ | — |
| | Main spindle bore ø275 mm (ø10.83") 700 rpm | — | — | — | — | ● |
| | Main spindle bore ø320 mm (ø12.60") 750 rpm | — | — | ○ | ○ | — |
| | Variety of chucks/chuck cylinders (Main spindle side) | ○ | ○ | ○ | ○ | ○ |
| | High/low chuck pressure | ○ | ○ | ○ | ○ | — |
| | 40-tool magazine | ● | ● | ● | ● | ● |
| | 80-tool magazine | ○ | ○ | ○ | ○ | ○ |
| | 120-tool magazine | ○ | ○ | ○ | ○ | ○ |
| | Automatic steady rest | ○ | ○ | ○ | ○ | ○ |
| | Variety of chucks/chuck cylinders (second spindle side) | — | ○ | — | ○ | — |
| | Automatic tailstock | ● | — | ● | — | ● |
| | Extended tailstock center 150 mm (ø5.91") | ● | — | — | — | — |
| | Two position tailstock quill | — | — | ○ | — | — |
| | Status light (3 colors) | ○ | ○ | ○ | ○ | ○ |
| High accuracy | Absolute position detection (linear axes) | ● | ● | ● | ● | ● |
| | X, Y, Z-axis pitch error compensation input | ● | ● | ● | ● | ● |
| | Scale feedback (X, Y, Z axis) ^{*1} | ○ | ○ | ○ | ○ | ○ |
| | Hydraulic fluid temperature control system | ○ | ○ | ○ | ○ | ○ |
| | Coolant temperature control system | ○ | ○ | ○ | ○ | ○ |
| | Preparation for Mazak monitoring systemB (RMP600) | ● | ● | ● | ● | ● |
| | MAZA-CHECK (software, reference sphere) ^{*2} | ● | ● | ● | ● | ● |
| Safety equipment | Operator door interlock | ● | ● | ● | ● | ● |
| | Overload detection system | ○ | ○ | ○ | ○ | ○ |
| | Automatic opening/closing front door | ○ | ○ | ○ | ○ | ● |
| | Machining completion buzzer | ○ | ○ | ○ | ○ | ○ |
| Automation | Automatic tool eye | ○ | ○ | ○ | ○ | ○ |
| | Laser milling tool measurement system | ○ | ○ | ○ | ○ | ○ |
| | Long boring bar system ^{*3} | ○ | — | ○ | — | ○ |
| | Chuck open/close confirmation | ● | ● | ● | ● | ● |
| | Automatic chuck open/close | ○ | ● | ○ | ● | ○ |
| | Double foot pedal chuck switch | ○ | ○ | ○ | ○ | ○ |
| | Tailstock body positioning by foot switch | ○ | — | ○ | — | ○ |
| | Visual tool ID | ○ | ○ | ○ | ○ | ○ |
| | Automatic workpiece measurement (RMP600) | ○ | ○ | ○ | ○ | ○ |
| | Auto power on/off + warm-up | ● | ● | ● | ● | ● |
| | Rigid tool holder system with four clamping units ^{*3} | — | — | ○ | ○ | ○ |
| | Turret air blast (flood coolant nozzle) | ○ | ○ | ○ | ○ | ○ |
| | Spindle internal air blast | ○ | ○ | ○ | ○ | ○ |
| Coolant/ Chip disposal | Chuck jaw air blast | ○ | ● | ○ | ● | ○ |
| | Side discharge chip conveyor (ConSep2000) | ○ | ○ | ○ | ○ | ○ |
| | Chip conveyor (abrasion resistant) ConSep2000 | — | — | ○ | ○ | ○ |
| | Chip bucket | ○ | ○ | ○ | ○ | ○ |
| | Mist collector | ○ | ○ | ○ | ○ | ○ |
| | Oil skimmer | ○ | ○ | ○ | ○ | ○ |
| | Coolant through milling spindle | ● | ● | ● | ● | ● |
| | High pressure coolant 1.5 MPa (218 PSI) | ○ | ○ | ○ | ○ | ● |
| | Coolant tank (separate) | — | — | — | — | ● |
| | SUPERFLOW coolant system | ○ | ○ | ○ | ○ | ○ |
| | | | | | | |
| | | | | | | |
| Other | Steps (inside the machine) | — | — | — | — | ● |
| | External platform | — | — | — | — | ● |
| | External steps with handrails | — | — | — | — | ○ |
| | MAZATROL SmoothAi dual monitor | ○ | ○ | ○ | ○ | ○ |

^{*1} Z-axis scale feedback is standard equipment for the INTEGREX e-670H (6000U) and INTEGREX e-800H.

^{*2} Optional wireless touch probe RMP600 is required for the MAZA-CHECK inspection procedure.

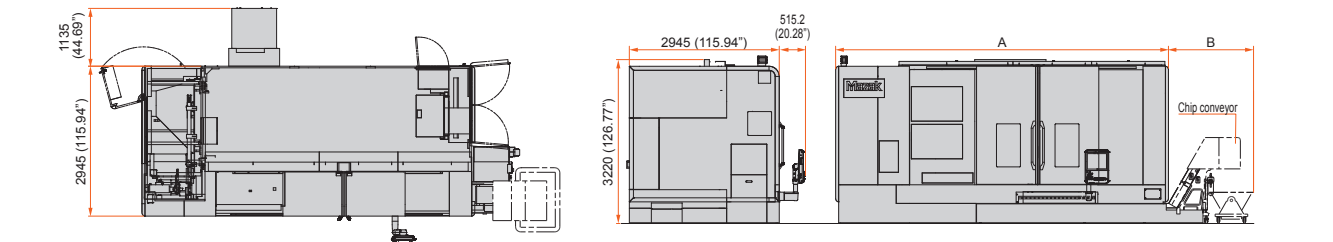
^{*3} Tool storage capacity is restricted when equipped with both long boring bar system and rigid tool holder system with four clamping units.

^{*4} ø260mm (ø10.24") (1000 rpm) is standard for INTEGREX e-670H (6000U).

Machine Dimensions

INTEGREX e-500H Series

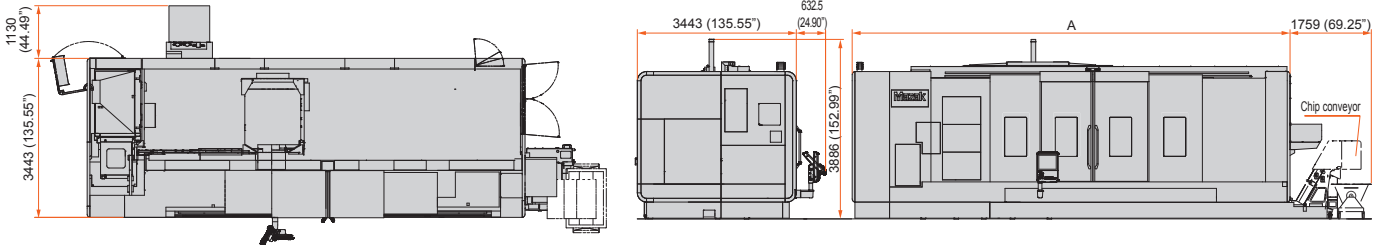
Unit: mm (inch)



| e-500H | | | | e-500H-S | |
|--------|-----------------|----------------|-----------------|----------------|-----------------|
| | 1500U | 3000U | 3000U with LBB | 4000U | |
| A | 6540 (257.48") | 8040 (316.54") | 8040 (316.54") | 9594 (377.72") | 7140 (281.10") |
| B | 1672.1 (65.83") | 1696 (66.77") | 2254.8 (88.77") | 2001 (78.78") | 1682.1 (66.22") |

INTEGREX e-500H (1500U) with 40-tool magazine and chip conveyor ConSep2000 (option) shown

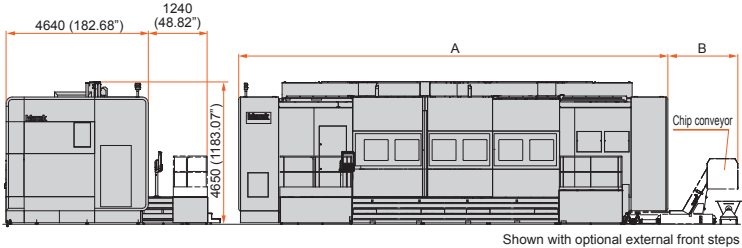
INTEGREX e-670H Series



| e-670H | | | e-670H-S | |
|--------|----------------|----------------|-----------------|-----------------|
| | 3000U | 4000U | 6000U | |
| A | 8465 (333.27") | 9481 (373.43") | 12173 (479.25") | 9125 (359.25") |
| B | | | | 10141 (399.14") |

INTEGREX e-670H (4000U) with 40-tool magazine and chip conveyor ConSep2000 (option) shown

INTEGREX e-800H



| e-800H | | e-800H | |
|--------|-----------------|-----------------|-----------------|
| | 4000U | 6000U | 8000U |
| A | 12000 (472.44") | 14000 (551.18") | 16000 (629.92") |
| B | 2376.7 (93.57") | 2282 (89.84") | 2250 (88.58") |

INTEGREX e-800H (6000U) with 40-tool magazine and chip conveyor ConSep2000 (option) shown

MAZATROL SmoothAi Specifications

| | MAZATROL | EIA |
|------------------------------------|--|---|
| Number of controlled axes | Simultaneous 2 ~ 4 axes | Simultaneous 5 axes* |
| Least input increment | 0.0001 mm, 0.00001 inch, 0.0001° | |
| 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, 5-axis spline*, Path error suppression control*, Tool path optimization* |
| Interpolation | Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Cylindrical interpolation, Polar coordinate interpolation, Constant lead threading, Re-threading*, Thread start point compensation*, Thread cut-speed override*, Synchronous tapping* | Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Constant lead threading, Variable lead threading, Threading (C-axis interpolation type), Cylindrical interpolation*, Involute interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Re-threading*, Thread start point compensation*, Thread cut-speed override*, 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: 2MB, Program memory expansion: 8MB*, Program memory expansion: 32MB* | |
| 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), Tool life monitoring (wear) | 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), Tool life monitoring (wear) |
| Miscellaneous functions | M code output, Simultaneous output of multiple M codes | |
| Tool offset function | Tool position offset, Tool length offset, Tool diameter/tool nose R offset, Tool nose shape offset, Tool wear offset, Fixed amount offset, Simple wear offset | Tool position offset, Tool length offset, Tool diameter/tool nose R offset, Tool wear offset, Fixed amount offset, Simple wear offset |
| Coordinate system | Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set) | |
| Machine functions | Rotary axis prefilter, Tilted working plane, Polygonal machining*, Hobbing II*, Shaping function*, Dynamic compensation II*, Tool center point control*, Tool radius compensation for 5-axis machining*, Workpiece positioning error compensation*, 5-axis tool length compensation*, 5-axis parameter select* | |
| Machine compensation | Backlash compensation, Pitch error compensation, Geometric deviation compensation, Ai Thermal shield, Volumetric compensation* | |
| Protection functions | Emergency stop, Interlock, Pre-move stroke check, Barrier, 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, Single process, Machine lock | Optional block skip, Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Restart 2, Collation stop, Machine lock |
| Manual measuring functions | Tool-setting data teach, Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine, Tool eye measurement | Tool-setting data teach, Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, Measurement on machine, Tool eye measurement |
| Automatic measuring functions | WPC coordinate measurement, Automatic tool length measurement, Laser tool length/diameter measurement, Workpiece measurement, Sensor calibration, Tool eye auto tool measurement, Tool breakage detection | Automatic tool length measurement, Laser tool length/diameter measurement, Workpiece measurement, Sensor calibration, Tool eye auto tool measurement, Tool breakage detection |
| MDI measurement | Coordinate measurement, Laser measurement | |
| Peripheral network | PROFIBUS-DP*, EtherNet/IP*, CC-Link*, CC-Link IE Field Basic | |
| Interface | SD card interface, USB | |
| EtherNet | 10 M/10M/1Gbps | |

* Option



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