

JOURNAL 6

The Ultimate Machining Power



The ultimate machining solution of all aspects



AWEA[®]

THE ULTIMATE MACHINING POWER

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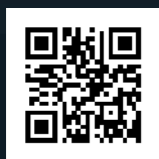
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AWEA[®]

AWEA MECHANTRONIC CO., LTD.



The Ultimate Machining Power

Dedicate on RD investment and quality product
 AWEA concentrates on revolution of
 technology of machine tools
 Insist on providing the excellent machining centers
 Let's grow together to the coming futures



HIGHLIGHTS



i Console Intelligent control system
 New Edition !!



5-axis machining centers
 Fully Upgraded !!



3rd generation HMC
 New Arrival !!



Brand new exterior design

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AWEA was established for 30 year



/ photo : President Edward (second from the right) group photo taken with core members at Wujiang Open House. /
/ article : excerpt from the speech at Open House /

Today, we establish a milestone, which wrote " Excel in innovation" at the entrance of our factory. The purpose is to remind everyone about continuously innovating from day to day, and constantly pursuing perfection on quality in order to reach our goal of 100% customer satisfaction. AWEA is grateful to you for all that expectations on AWEA. May it be the wisdom to encourage ourselves.

HONORARY PRESIDENT OF PRECISION MACHINERY DEVELOPMENT
ASSOCIATION OF TAIWAN (CMD)
HONORARY PRESIDENT OF MANUFACTURERS ASSOCIATION OF
TAICHUNG INDUSTRIAL PARK (TMBA)
The FOUNDING PRESIDENT OF TAIWAN MACHINE TOOL AND ACCESSORY
BUILDER'S ASSOCIATION (TCIPA)

AWEA MECHANTRONIC CO., LTD.
EDWARD TE-HWA YANG, PRESIDENT

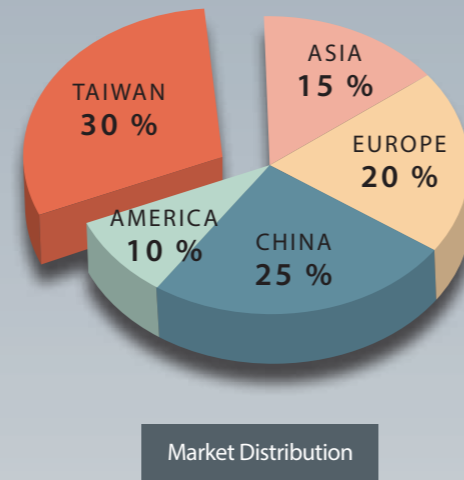
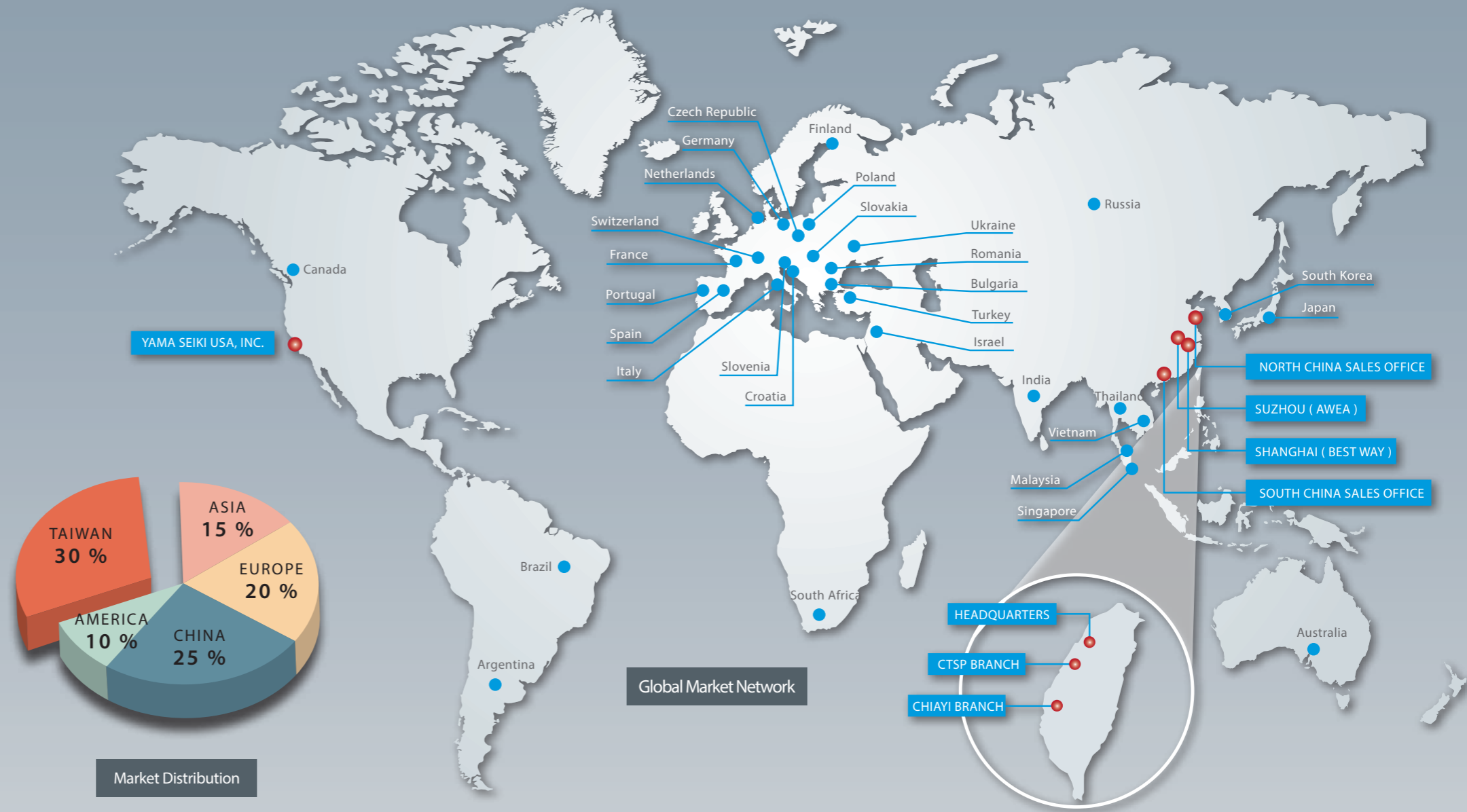
Operation Center

Continuing global presence efforts providing the best localized service

To manage the long-term development plan and growing business needs, AWEA recently and continuously expands branches and newly built factories, including headquarters expansion in Hsinchu, YAMA SEIKI USA office reconstruction, WuJiang factory opening in Suzhou and north China sales office established. AWEA looks forward to achieve a comprehensive global presence and build brand new modernized factories to provide the best localized service to every customers.



AWEA Mechantronic Co., LTD. was established in 1986. AWEA has being specialized in researching and developing machining centers in 30 years. In 1998, AWEA listed its share at Taiwan Stock Exchange. Regardless of the index of operating performance or equity, AWEA is one of the top in machine tools category, which represents the outstanding position of AWEA.



HEADQUARTERS 26,000 m²
Manufacturing of bridge type machining centers and boring mills
HSINCHU · TAIWAN



CTSP BRANCH 26,600 m²
Manufacturing of bridge type and C-frame VMC
TAICHUNG · TAIWAN



SUZHOU BRANCH 66,800 m²
Manufacturing of bridge type and C-frame VMC
SUZHOU · CHINA



SHANGHAI BRANCH 8,600 m²
Manufacturing of bridge type and C-frame VMC
SHANGHAI · CHINA



SOUTH CHINA BRANCH 500 m²
Sales and service
DONGGUAN · CHINA



YAMA SEIKI USA, INC. 20,000 m²
Sales and service
LOS ANGELES · CALIFORNIA



CHIAYI BRANCH 100,000 m²
In progress
CHIAYI · TAIWAN

Core Technology »

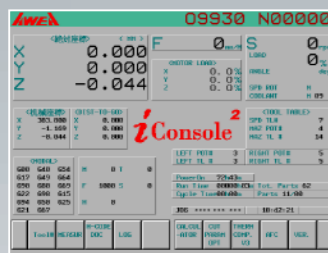
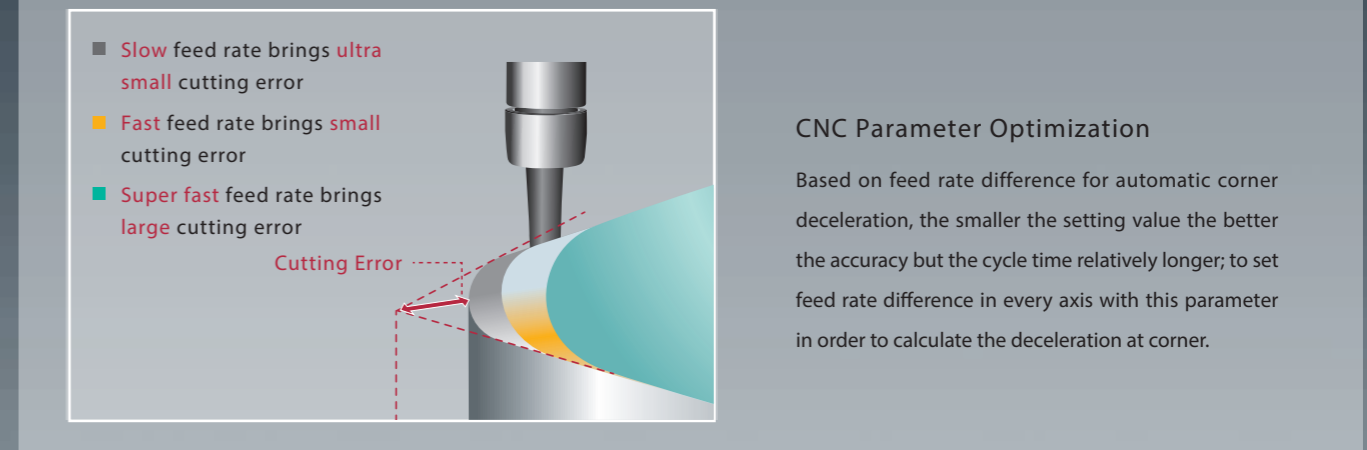
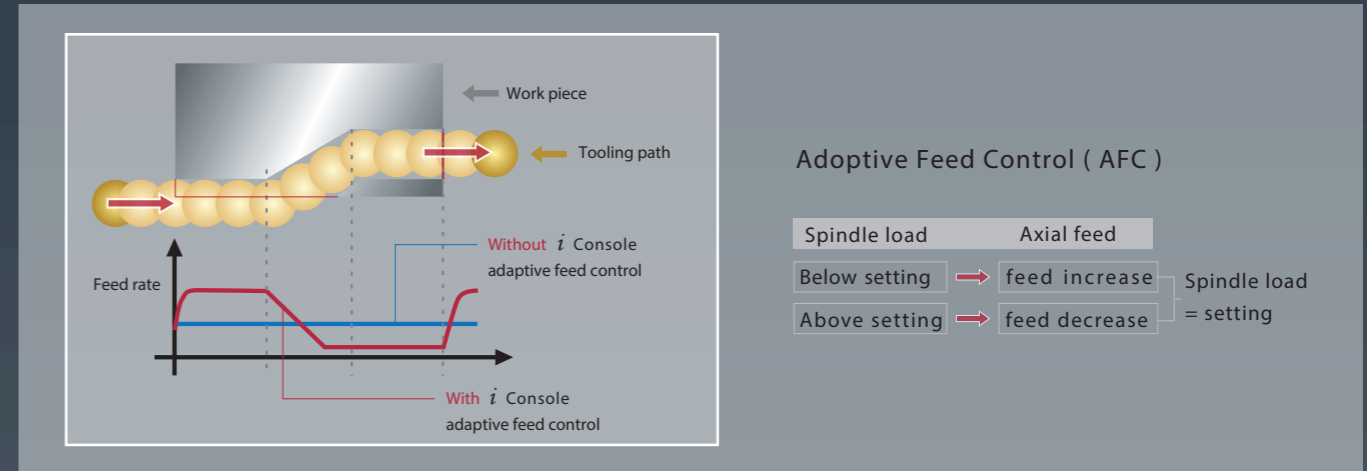


Console

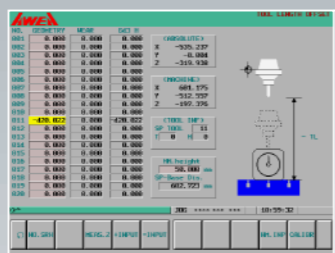
We make machine smarter!

NEW

1. Visual optimized design
2. Easy operating, complete database
3. Spindle thermal compensation
4. Auto. tool length measurement
5. Tools management
6. Work-piece counting
7. APC Monitor
8. Tasks records



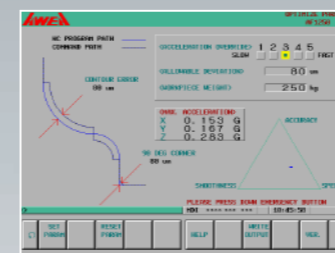
- Main screen
- Instant Messaging Sys.
- Tool list
- Work-piece measurement
- M code
- Calculator
- CNC parameter optimization (Opt.)
- Spindle thermal compensation
- Adoptive feed control (AFC)



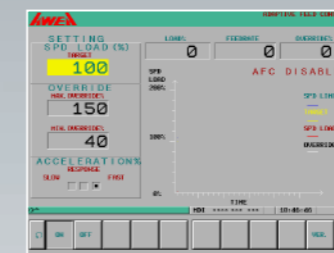
- Tool length offset
- After manually measuring the tool length, the controller will automatically calculate the tool tip position and enter the data into the tool length offset table.



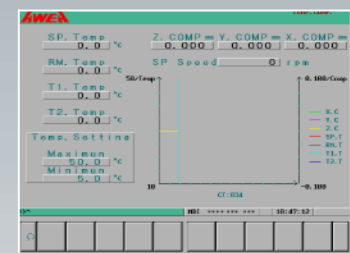
- Auto. tool length measurement
- Graphic user interface is easy to use, and up to 12 tool length measurement can be done in one button, which saves programming time and lowers operation error.



- CNC parameter optimization
- From rough cutting to fine finishing, the operator can select various cutting modes based on the working condition, and then set the allowable error and work piece weight to obtain the optimum parameter.



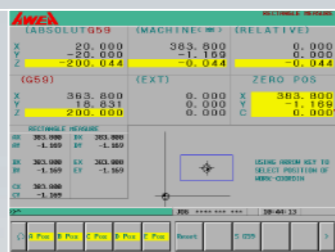
- Adoptive feed control (AFC)
- Adoptive feed control is capable of real-time monitoring the spindle load to control the axial feed rate which effectively extends tool life, shortens rough cutting time, and detects abnormal cutting conditions.



- Spindle thermal compensation
- Decrease deformation on parts that caused by heat, Instantly monitoring temperature for automatic compensation to increase machining accuracy.



- Circular work-piece measurement
- By measuring the A, B, C three points coordinates the circular work piece's center point can be correctly calculated.



- Basic rectangular work-piece measurement
- By measuring the X+ \ X- \ Y+ \ Y- four points coordinates, the rectangular work-piece's center point can be calculated. Then the center point coordinate can be entered in the work-piece coordinate system. (G54 - G59)



- Advanced rectangular work-piece measurement
- By measuring the A, B, C, D, and E five points coordinates, the rectangular work-piece's center point and slant angle can be calculated. Then the center point coordinate can be entered in the work piece coordinate system. (G54 - G59)



- Trouble shooting
- When the alarm appears, the screen will display the malfunction message and trouble shooting procedure enabling the operator to solve problems to shorten the shutdown time.



- Tools management
- Instinctive fast tool set-up, and complete tools database let operators easy to use and lower possibility of error caused.

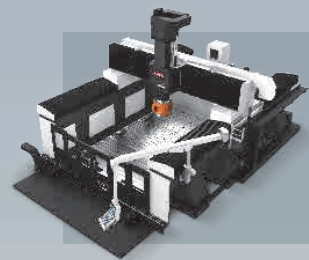


- Counter function
- There are 3 sets of counters ready for individually start, stop and wipe out history, which is convenient for operator to regularly maintain machine or gather statistics for utilization and production.

5-AXIS MACHINING

Complete product range with great performance of AWEA high precision 5-axis machining series can easily meet all types of complex machining tasks.

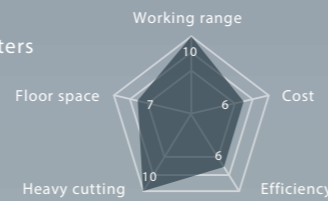
- ▶ Compound Angular Cutting
- ▶ Shorter Machining Time
- ▶ Better Machining Accuracy
- ▶ Longer Tool Life



MEGA5 G

Gantry type 5-axis machining centers

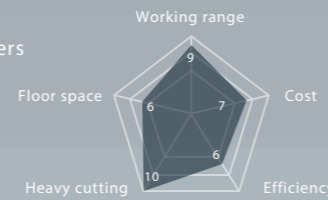
- ▶ B \ C axes head (B : ± 100° , C : ± 240° / B : ± 105° , C : ± 200°)
- ▶ Table load capacity : 2,500 kg / m²
- ▶ Spindle taper : HSK-A100 / HSK-A63



MEGA5 P

Bridge type 5-axis machining centers

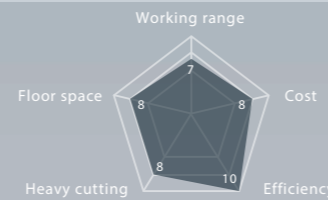
- ▶ B \ C axes head (B : ± 100° , C : ± 240° / B : ± 105° , C : ± 200°)
- ▶ Table load capacity : 20,000 kg (max.)
- ▶ Spindle taper : HSK-A100 / HSK-A63



FMV-99

Gantry type 5-axis machining center

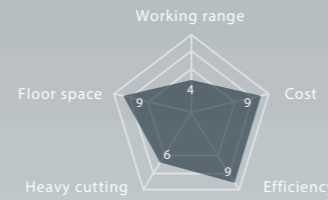
- ▶ A \ C axes rotary table (A : -120° ~ +30° , C : 360°)
- ▶ Table load capacity : 1,000 kg (max.)
- ▶ Spindle taper : BT40



FCV-620

High speed 5-axis machining center

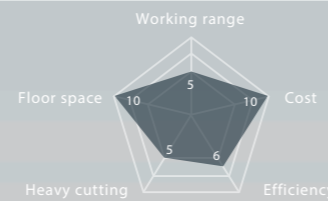
- ▶ B \ C axes rotary table (B : -50° ~ +110° , C : 360°)
- ▶ Table load capacity : 300 kg (max.)
- ▶ Spindle taper : BBT40 / HSK-A63



FV-960

Affordable 5-axis machining center

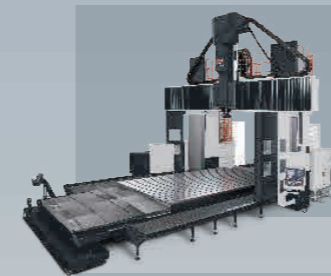
- ▶ B \ C axes rotary table (B : -42° ~ +120° , C : 360°)
- ▶ Table load capacity : 200 kg (max.)
- ▶ Spindle taper : BBT40



5-FACE MACHINING

Complete product range with AWEA self-developed ATC, AHC system and attachment heads, which ensure integrated quality of equipment.

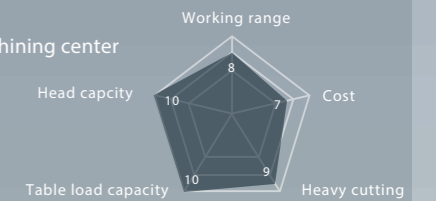
- ▶ The whole development process and assembly of machine is done in factory to ensure the best performance of machine
- ▶ 5-face machining coordinate conversion software makes operation more convenient and efficient.
- ▶ Abundant spareparts speed up after-sales service.



MVP

Moving cross rail bridge type 5-face machining center

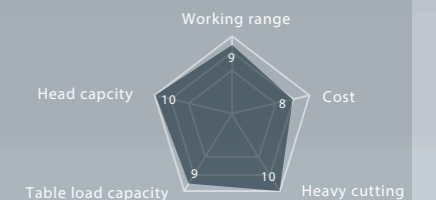
- ▶ W-axis moving cross rail structure
- ▶ X / Y / Z axes travel (max.) : 7,000 / 4,000 / 1,400 mm
- ▶ Table load capacity : 20,000 kg



HP

Bridge type 5-face machining center

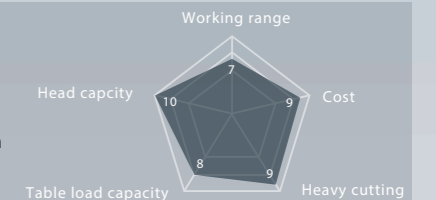
- ▶ Model that enforced on heavy cutting
- ▶ X / Y / Z axes travel (max.) : 8,200 / 4,900 / 1,400 mm
- ▶ Table load capacity : 40,000 kg



HVM

Bridge type 5-face machining center

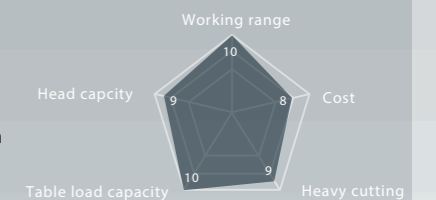
- ▶ More than 10 years sales history
- ▶ X / Y / Z axes travel (max.) : 7,000 / 4,500 / 1,000 mm
- ▶ Table load capacity : 20,000 kg



LG

Gantry type 5-face machining center

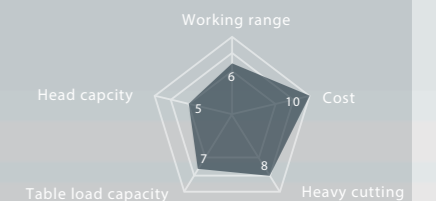
- ▶ Gantry type structure, super large working range
- ▶ X / Y / Z axes travel (max.) : 20,000 / 7,000 / 1,400 mm
- ▶ Table load capacity : 2,500 kg/m²



LP-F

Bridge type 5-face machining center

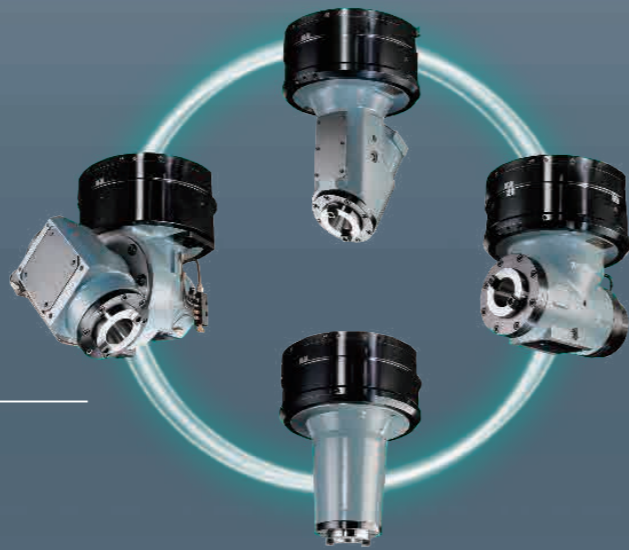
- ▶ High efficiency, high CP value
- ▶ X / Y / Z axes travel (max.) : 7,000 / 3,900 / 1,400 mm
- ▶ Table load capacity : 20,000 kg



Core Technology >>

Milling Heads

- All types of milling heads are AWEA self-developed and assembled to provide more flexible machining solutions.
- The contact surface of all milling heads and head caps are precisely hand scraped and using the Japanese made 2-piece curvic coupling for precision positioning.



Horizontal Machining

To present hi-tech and more advanced horizontal machining center, AWEA has constantly evolved 3 generations by refinement of research in 10 years. Recently, 3rd generation AH-500 and AH-630 has been approved by the market and commercialized, and successful exhibition at IMTS2014 and TMTS2014.



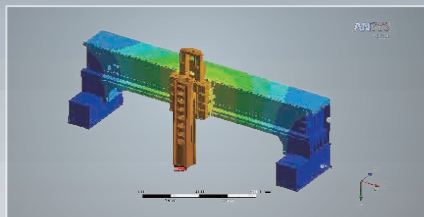
Large Machines Development Capacity

LG SERIES

Gantry Type Machining Centers

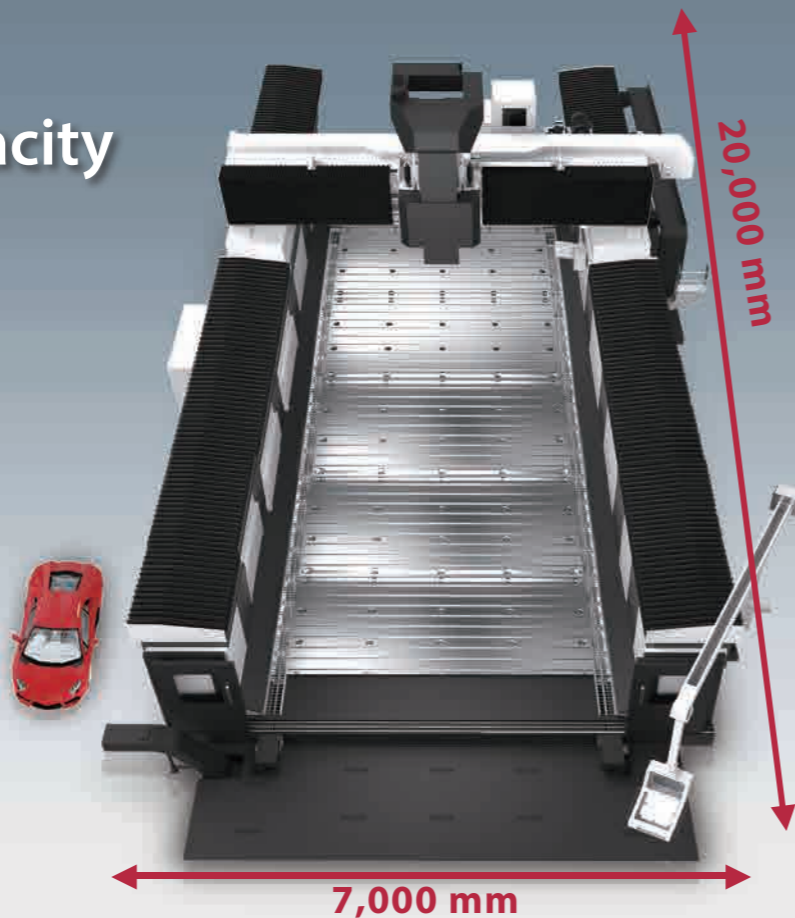
Max. X-axis travel : 20,000 mm

Max. Y-axis travel : 7,000 mm



PAT. NO. : M377276

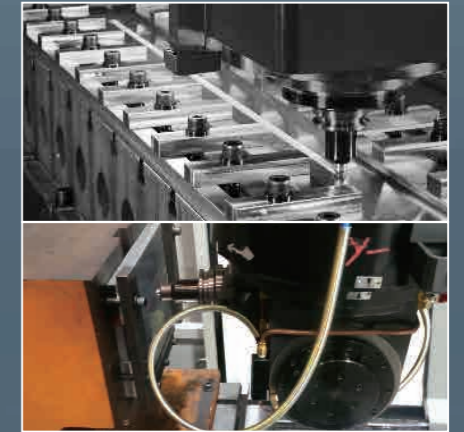
Crossbeam Adjustment Mechanism
After adjusting, deformation is close to **0 mm**



Friction Stir Welding (FSW)

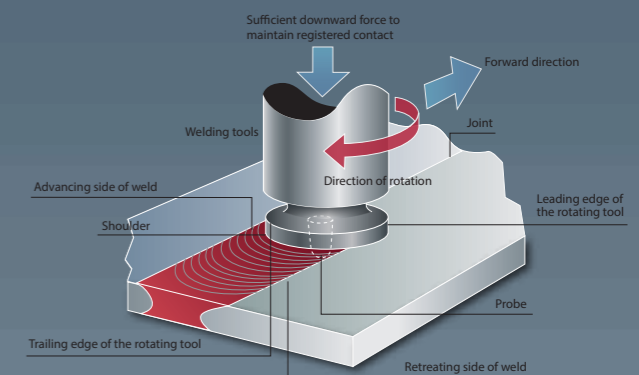
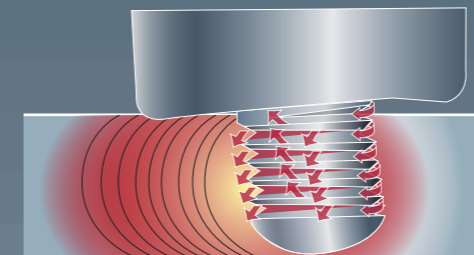
TWI developed FSW technology achieves high quality welding featuring safety, environmental friendly, high efficiency and low waste results.

- Rigidity and spindle load capacity of AWEA machines are verified by TWI's strict standard
- TWI patent authorized (AWEA's exclusive, Taiwan)



FSW Technology

Friction → Stir → Material fusion → Material re-construction → Cooling and solidify



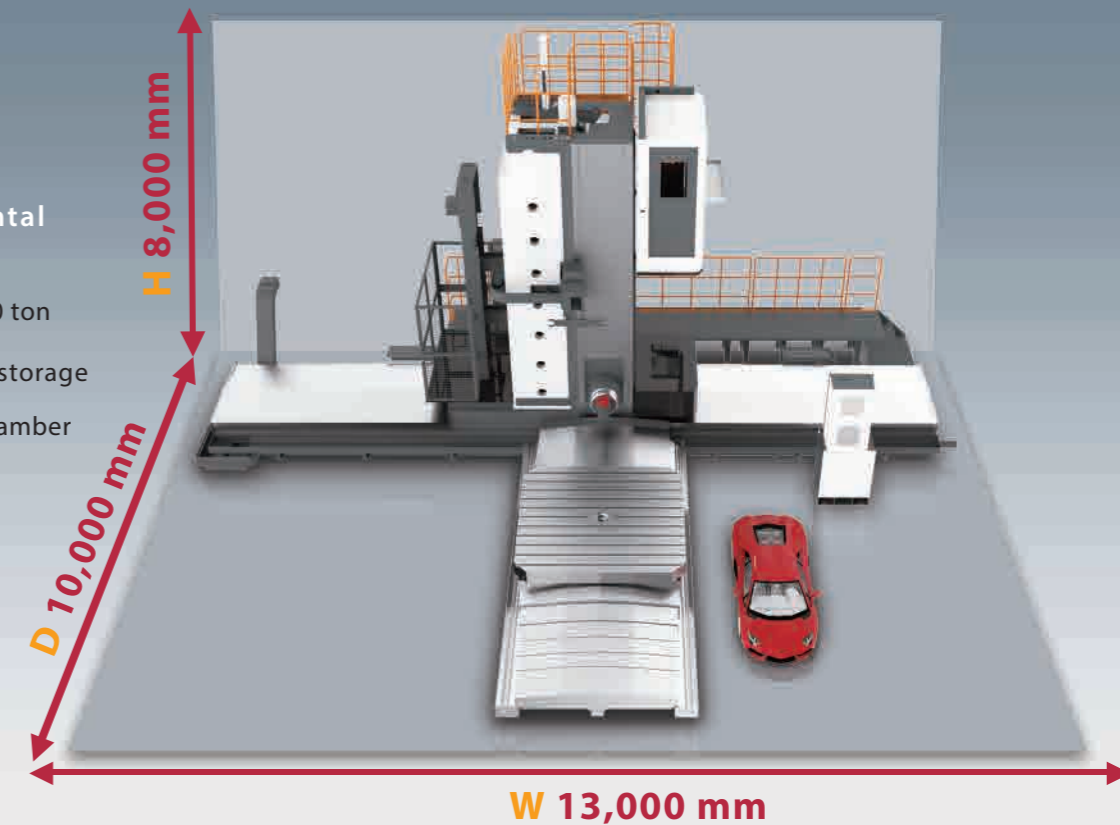
JB SERIES

Floor Type Horizontal Boring Mills

Table load capacity : 30 ton

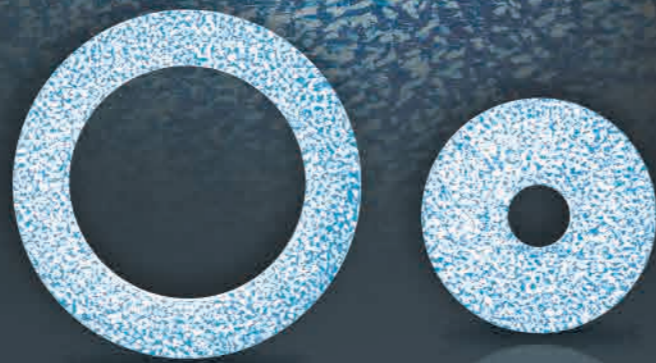
Auto. exchange head storage

Elevating operation chamber

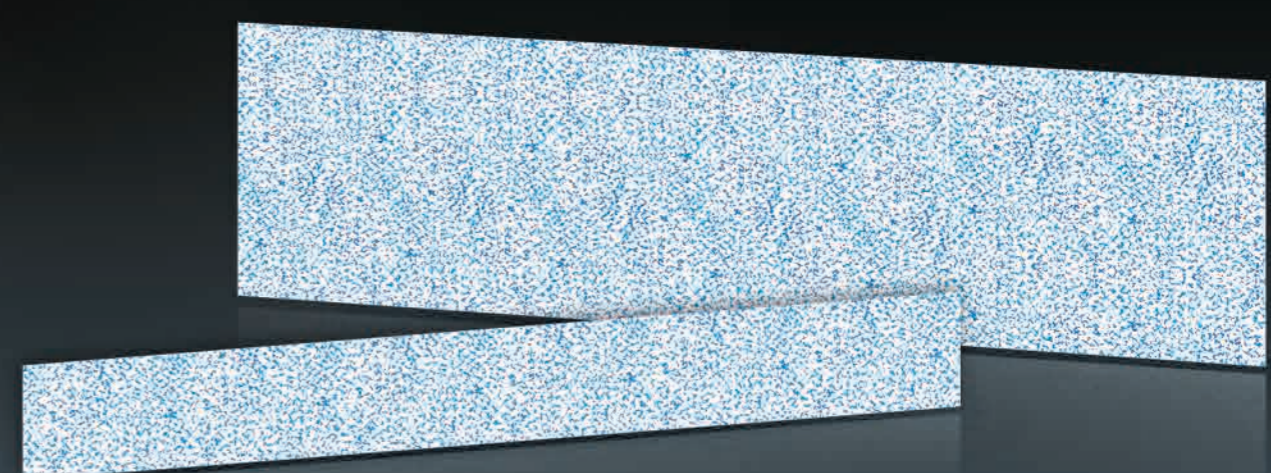




Core Technology » Hand Scraping



Rubbing data for scraping surfaces are well kept in files, ensuring the best quality control for customers.



Hand-Scraping Standard

- Fixed surface hand-scraping density :
10 ~ 15 dots / in²
- Sliding surface hand-scraping density :
15 ~ 20 dots / in²

High precision machine tools come from superb hand scraping skills. AWEA's well trained hand scraping team makes sure that all contact surfaces are precisely hand scrapped and carefully inspected to ensure the highest quality of our machines.



- 1 Standard Hand Scraping Platform
 - Monthly maintain and annually inspected by 3D coordinate measuring machine.
 - Platform flatness : 0.005 mm
 - Hand-scraping density : 10 ~ 15 dots / in²
- 2 Well Established Scraping Team And Dedicated Space

Key Manufacturing

Along with the leading in house production ratio, including R&D, machining, assembling and quality control are processed by AWEA to reach the quality restrictions and achieve the ultimate machining performance with long-lasting service life.

R&D center



■ R&D department of 5-axis / vertical / horizontal machining centers



■ R&D department of bridge type machining centers

Assembly of core components

All core components are precisely assembled in a constant temperature controlled room, which possesses higher assembly quality and higher technology integration of machines than general competitors in the market.

■ Key components are imported from world famous companies



■ Precisely assembly of spindle



■ Gear box run-in test



■ Spindle & motor dynamic balancing analysis

Casting Machining

Core components are precisely machined by several world class equipments in a constantly temperature controlled A/C system to achieve the strict accuracy requirements.



■ Japan-made SUMITOMO high precision vertical grinding machine

■ Japan-made YASDA high precision horizontal machining center



■ Japan-made MITSUI SEIKI horizontal machining center



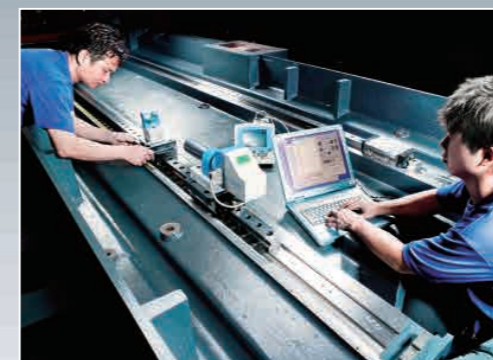
■ Japan-made TOSHIBA bridge type 5-face machining center



■ German-made WENZEL 3D coordinate measuring machine

Quality control

Utilizing advanced inspection equipments to implement the accuracy check to ensure the final performance and quality of machine.



■ Straightness check for linear guide ways



■ Laser detection of accuracy



■ Ball bar detection for 3 axes

Productive capacity

Depend on the modern facilities with air conditioning and the well-trained technicians, all AWEA machines are assembled according the Standard Operation Procedure (SOP) to ensure the consistently high quality and high performance of **AWEA** brand image.



► SUZHOU Branch Bridge type machining center production line



► CTSP Branch Vertical machining center production line



► HSINCHU Headquarters Bridge type machining center production line



► CTSP Branch Bridge type machining center production line

Social Responsibilities

Besides concentrating on new products development and quality achievement, AWEA also concerned about development of whole industry, including talents through cooperation with technical college/university development to build technique and craftsmanship base in schools; Uniting industry resources, and collaboratively researching development create win-win situation. Meantime, AWEA is sparing no effort to complete corporate responsibility and contribute to society.



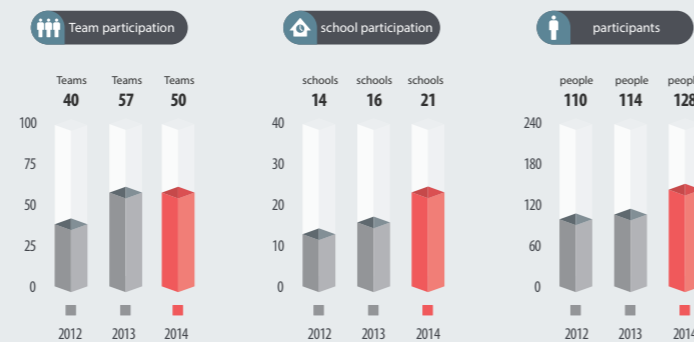
Sketches of Taiwan

Besides machine tools, AWEA has constantly been concerned about cultural development. AWEA sponsored a musical film "Sketches of Taiwan" filmed by a group of culture workers who are full with passion and aspiration. This film was planned for 4 years, and shot for 2 years, which represent the unique cultural customs of Taiwan featuring with graceful symphonic music.



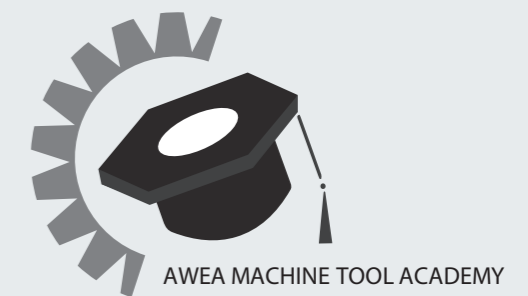
Precision CNC machine tool essay contest

To ramp up interest in machine tool industry, AWEA established "Precision CNC machine tool essay contest prize" with National Chung-Hsing University in 2012. The competition has been held annually. Participants, prizes, and the scale of competition are growing year after year. Also, it has become one of the great events for mechanics fields in universities every September when competition is been held.



College internship project

Collaborating with college and university about school-to-work program. Includes 「National Yunlin University of Science and Technology」, 「National Formosa University」, 「Hsiuping University of Science and Technology」 and 「National Taichung Industrial High School」 AWEA annually allocates amount of students to have internships. After those students graduate, they have priority to be hired.

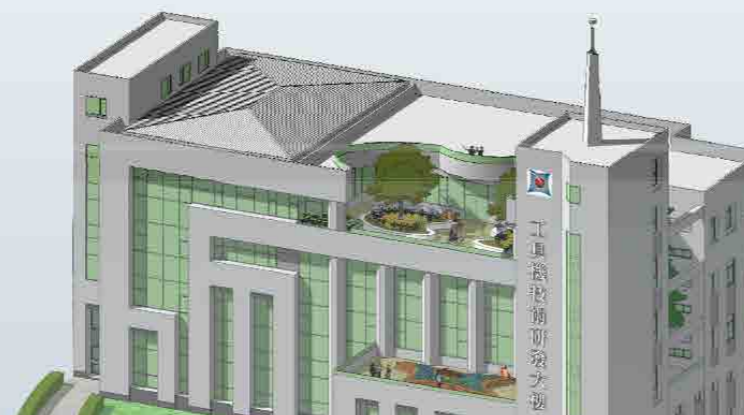


AWEA MACHINE TOOL ACADEMY

To continuously improve ability of employees, AWEA machine tool academy is based on education system. All lecturers are specialized in specific fields, and it's necessary for all employees to attend general and professional courses. Learning results will be included in achievements review.

Machine Tool Technology Research Department

In December 2014, president Mr. Edward Yang donated \$7 Million dollar by his own for National Chung-Hsing University to build Machine tool Technology Research Department. Edward appreciates the school he attended, he expects that all students can get assisted and taught in modern environment with advanced equipments. Edward wishes students can keep on top of development in industry and contribute their expertise to the fields.



FMV-45 5-axis machining center

Because of lack of advanced machining equipments in college, at the board meeting AWEA decided to donate FMV-45 5-axis machining center to Hsiuping University of Science and Technology. AWEA expects that students can be familiar with advanced equipments earlier, so that it's helpful for them to enter career after graduation.



Aerospace equipments development league

AWEA united with 12 major machine tool corporations, and Industrial Technology Research Institute to co-develop technology. It's the pioneering work for Taiwan machine tools industry to integrate cooperate, academy, institute and certification, and eventually becomes an ultimate R&D league. The league arranges to develop various types of 5-axis machine tools to meet the future growing demands.

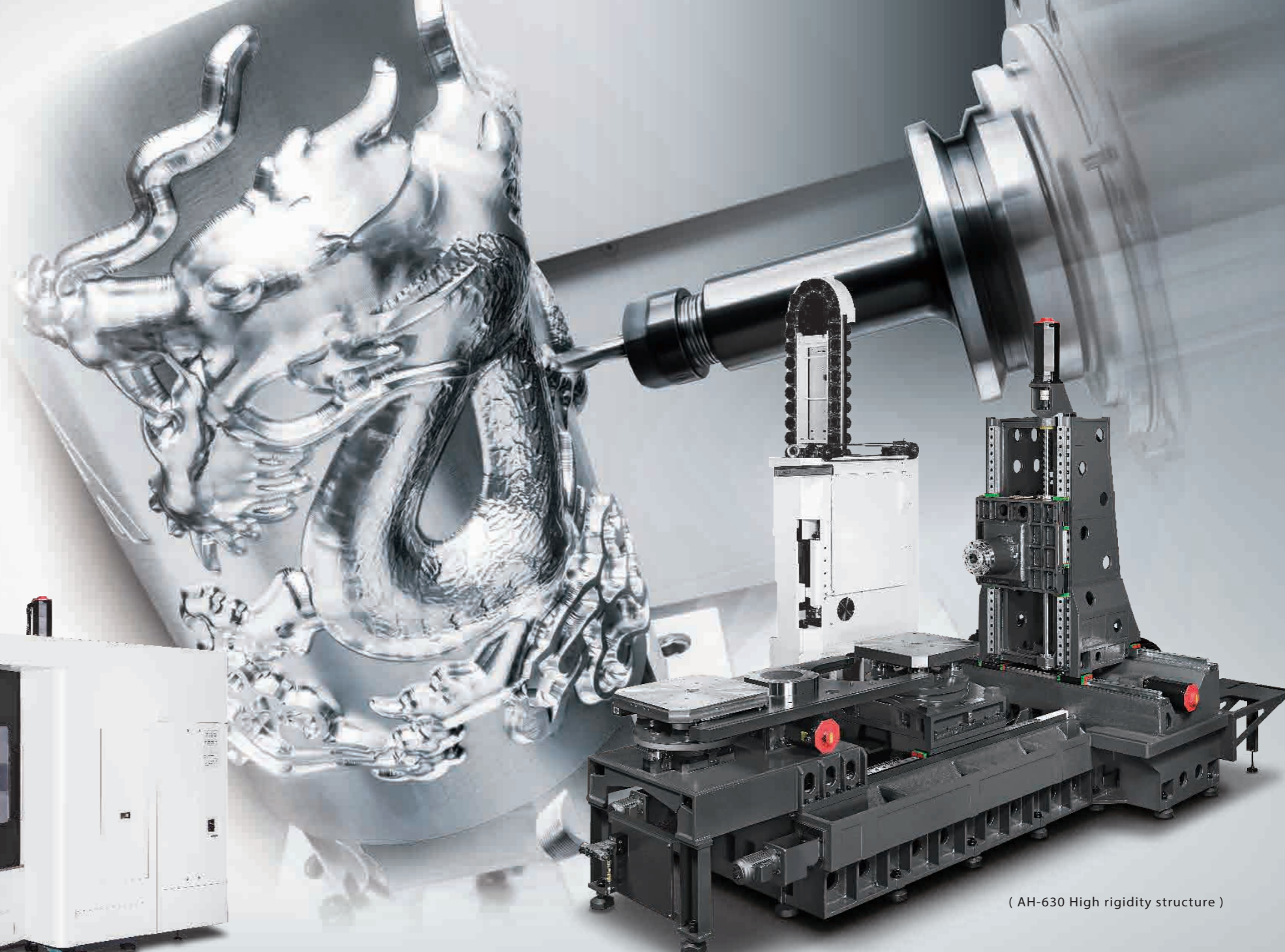
AH series

Horizontal Machining Center

Matching All The Expected Needs

- High power 26 kW direct drive spindle and high torque 846 N-m gear spindle are available for option.
- 180° index table only takes 16 seconds for the pallets to exchange.
- Symmetrical structure design provides high rigidity and stable accuracy.
- Three axes equip with roller type linear guide ways and double nut ball screw. Max. rapid feed rate of 3 axes is up to 48 m/min.*1
- 60T (240T Opt.) servo driven arm type ATC, T-T takes only 3 seconds.
- Equipped high efficiency chips conveyor with twin screw type chips augers.

*1 : Maybe be different between models.



(AH-630 High rigidity structure)



The clamping mechanism

The clamping mechanism uses four hydraulic cylinders and cone seat design which provides stable machine accuracy and ample clamping force to the table.



Indexing of B-axis (1°)

High rigidity clutch indexing, positioning accuracy 8", repeatability 2", makes it suitable for heavy machining.



Indexing of B-axis (0.001°)

Adopt with high precision worm gear mechanism featuring numbers of teeth and area, and provide 4-axis simultaneously machining.



Powerful Chip Removal System

The coolant flushing system around the spindle and roof can effectively flush chips away from the working area to ensure stability and precision of the machine.

		AH-500	AH-630
X-axis travel	mm	780	1,020
Y-axis travel	mm	670	900
Z-axis travel	mm	650	900
Table size	mm	500 x 500	630 x 630
Max. dia. / height of work-piece	mm	Ø 700 / 800	Ø 1,020 / 1,000
Table load capacity	kg	500	1,200
Spindle taper		BBT 50	
Spindle speed	rpm	6,000(Gear) / 10,000 (Direct drive)	
Spindle motor	kW	22 / 26 (cont. / 30 min)	

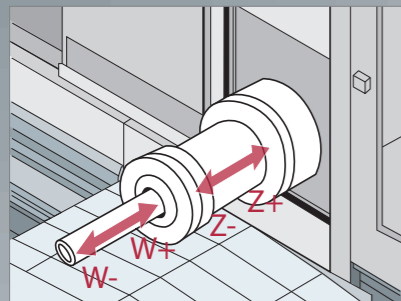
Specifications are subject to change without notice.

JB series

Horizontal Boring Mills

Mega Table Load Capacity Up to 30,000 kg

- Floor type large base and column structure provide stability required of higher accuracy.
- Moving column structure design. X / Y / Z / V / W axes control with 4-axis simultaneously machining.
- Elevated operation room design (Y-axis 3,000 mm longer) for operational convenience.
- 40T / 60T arm type ATC, max. tool load 25 kg, max. tool length 400 mm.



Z + W axes

- ▶ Boring bar diameter $\varnothing 150$ mm / $\varnothing 130$ mm
Max. travel of W-axis 900 mm
- ▶ Axle sleeve diameter $\varnothing 360$ mm
Max. travel of Z-axis 450 mm
- ▶ Z + W axes travel 900 mm. Axle sleeve ensures cutting rigidity of boring bar when fully stretch out.

X-axis

X-axis adopts mechanical dual driven backlash reduction device eliminates backlash and roller type linear guide ways (SRG100LC blockslider) greatly improve axial load capability.

Y-axis

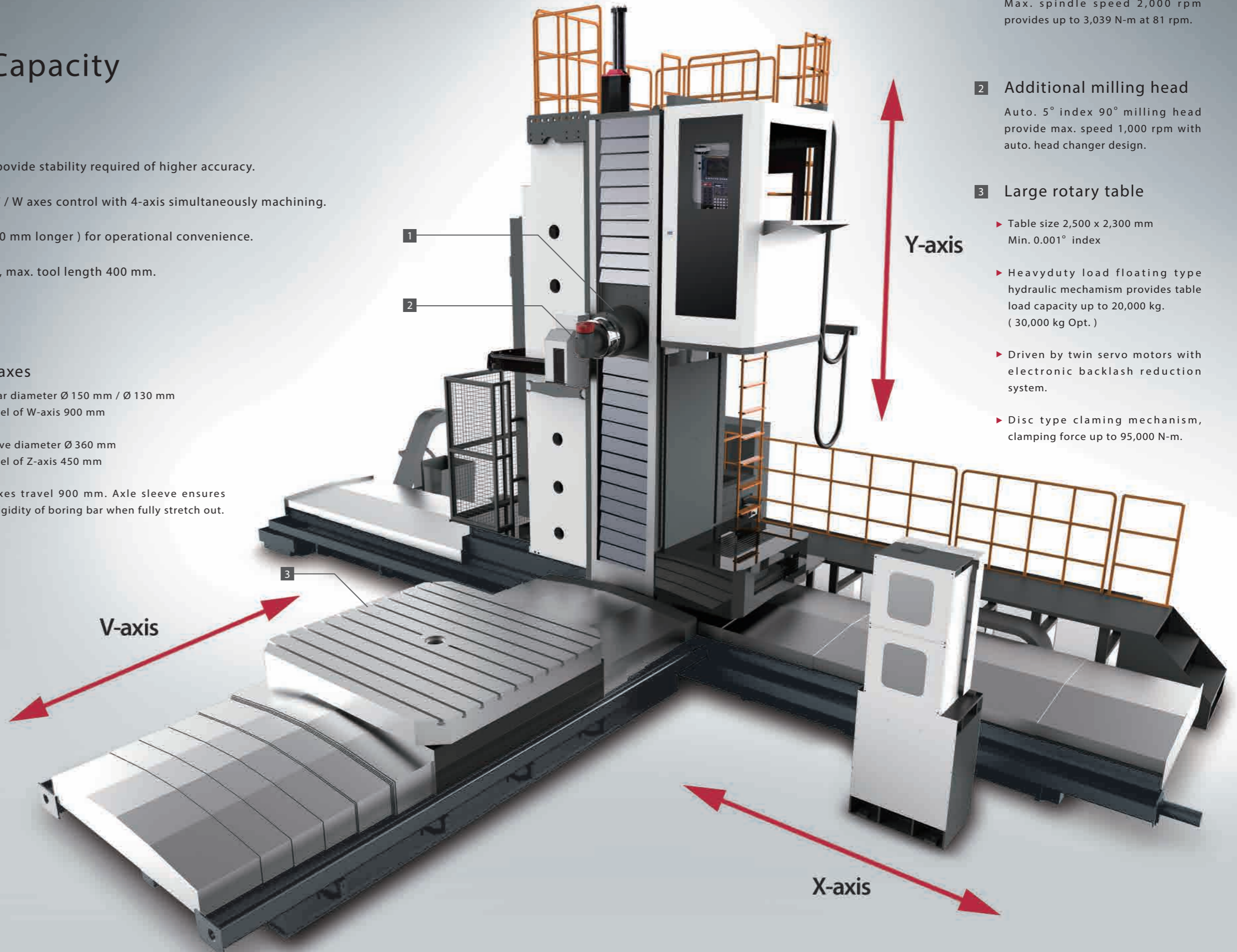
Y-axis adopts high rigidity box ways design which is suitable for heavy cutting.

V-axis

4 linear guide ways design provides the best table support rigidity.

JB series		
X-axis travel	mm	3,000 ~ 10,000
Y-axis travel	mm	1,800 ~ 3,600
Z-axis travel	mm	450
V-axis travel	mm	1,300 ~ 2,500
W-axis travel	mm	900

Specifications are subject to change without notice.



1 High torque 3-step gear spindle

Max. spindle speed 2,000 rpm provides up to 3,039 N-m at 81 rpm.

2 Additional milling head

Auto. 5° index 90° milling head provide max. speed 1,000 rpm with auto. head changer design.

3 Large rotary table

▶ Table size 2,500 x 2,300 mm
Min. 0.001° index

▶ Heavyduty load floating type hydraulic mechanism provides table load capacity up to 20,000 kg. (30,000 kg Opt.)

▶ Driven by twin servo motors with electronic backlash reduction system.

▶ Disc type clamping mechanism, clamping force up to 95,000 N-m.

BL series

Horizontal Boring Mills

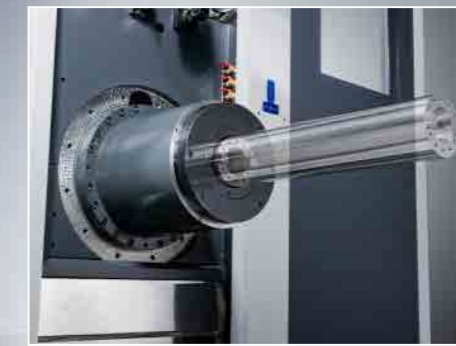
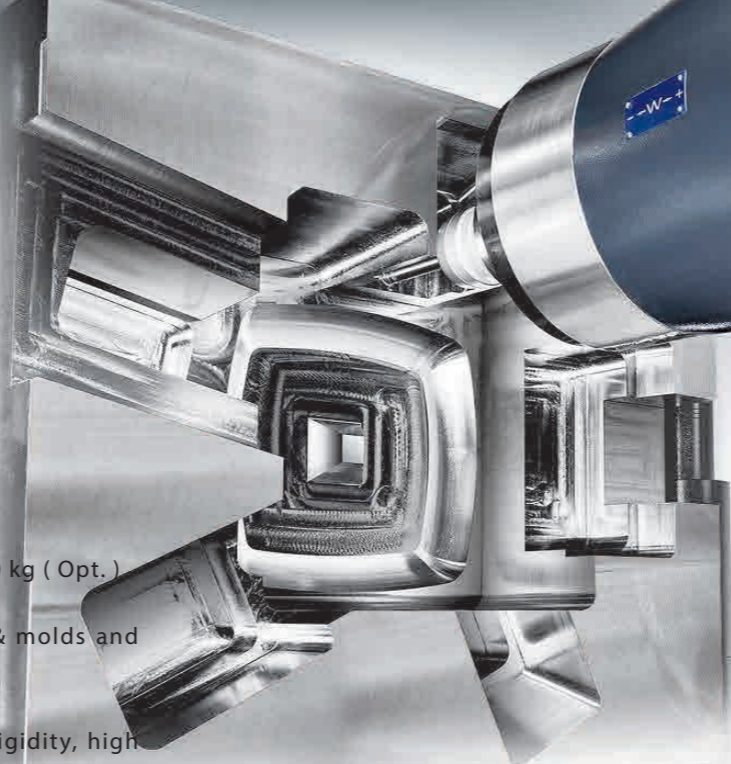
Solution For Medium To Large Work-Piece

- Max. work-piece \varnothing 1,600 mm x 1,300 mm (H), table load capacity up to 15,000 kg (Opt.)
- Modular quill type or ram type spindle design fulfills high precision dies & molds and parts machining requirements.
- X / Y axes adopt heavy-duty roller type linear guide ways featuring high rigidity, high accuracy and fast movement.
- X / Y / Z axes equip high resolution linear scale that provide optimal machining accuracy.
- B-axis with definition at 0.001°, it utilizes disc type hydraulic clamping mechanism to ensure table rigidity after positioning.
- 40T / 60T arm type ATC, max. tool load is 25 kg and max. magazine load is up to 600 kg.



Heavy Load Rotary Table

High rigidity and accuracy slew ring design with full travel support on bed, table load capacity reaches up to 12,000 kg. (15,000 kg Opt.)



Quill Type Spindle (BL-S)

- ▶ \varnothing 120 mm high precision quill type spindle. Max. travel of W-axis 600 mm.
- ▶ 2-step gear box design provides max. torque up to 1,308 N-m at 189 rpm.



Ram Type Spindle(BL-FM)

- ▶ Cross section of ram 480 x 470 mm . Max. travel of W-axis 600 mm.
- ▶ Built-in spindle design provides high accuracy and reliability. Max. spindle speed is up to 8,000 rpm.



		BL-2018	BL-3018	BL-4018	BL-2024	BL-3024	BL-4024
X-axis travel	mm	2,000	3,000	4,000	2,000	3,000	4,000
Y-axis travel	mm	1,800			2,400		
Z-axis travel	mm	1,300 (1,700 Opt.)					
W-axis travel	mm	600					
Table size	mm	1,600 x 1,800					
Boring spindle size	mm	Quill type \varnothing 120			Ram type 480 x 470		
Table load capacity	kg	12,000 (15,000 Opt.)					
Spindle speed	rpm	2-step gear box 2,400			Built-in 6,000 (8,000 Opt.)		
Spindle motor	kW	22 / 26 (cont. / 30 min)					

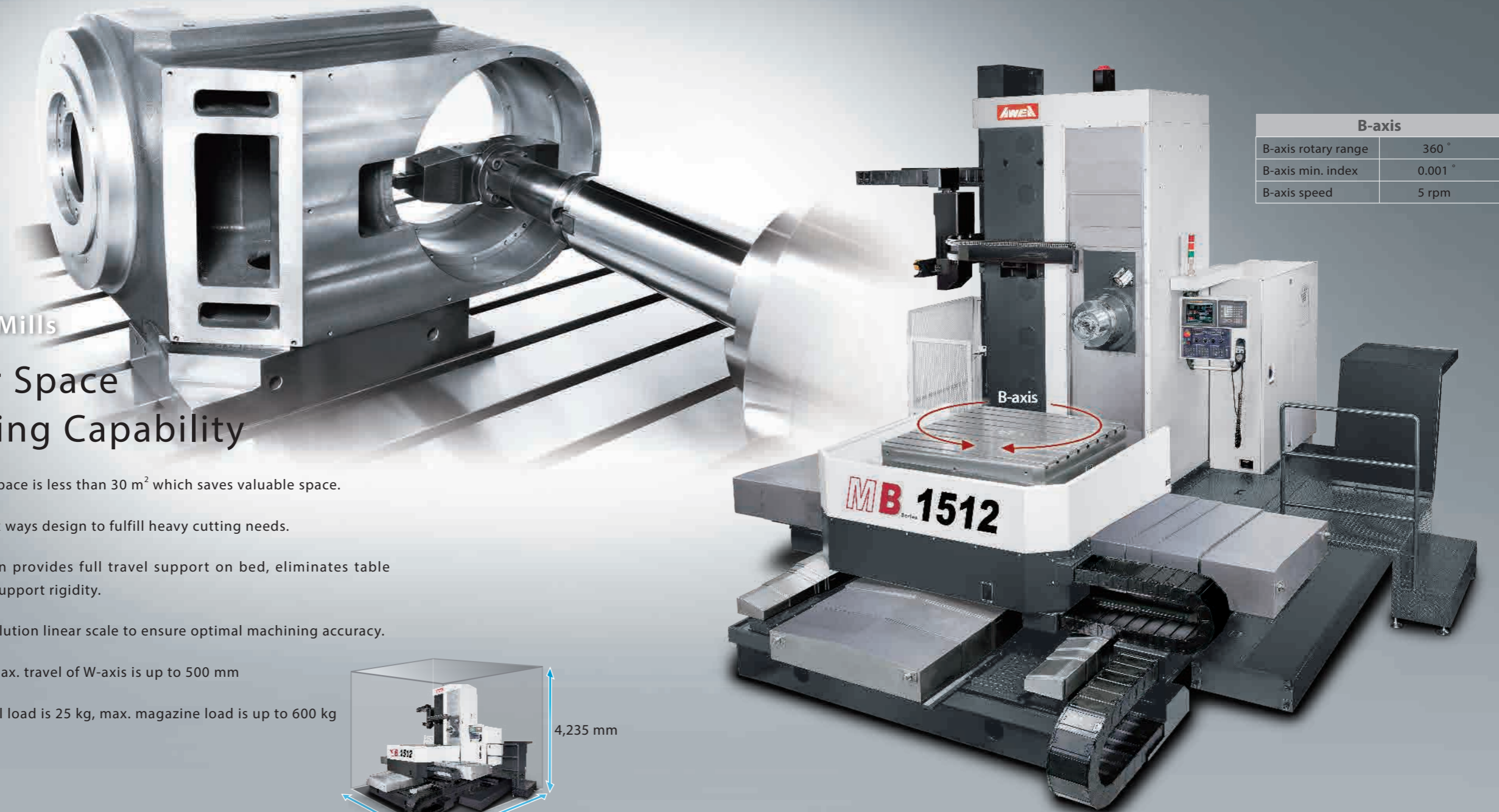
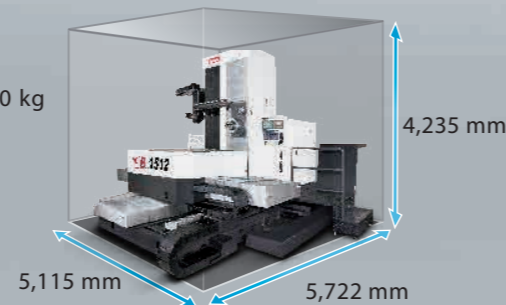
Specifications are subject to change without notice.

MB series

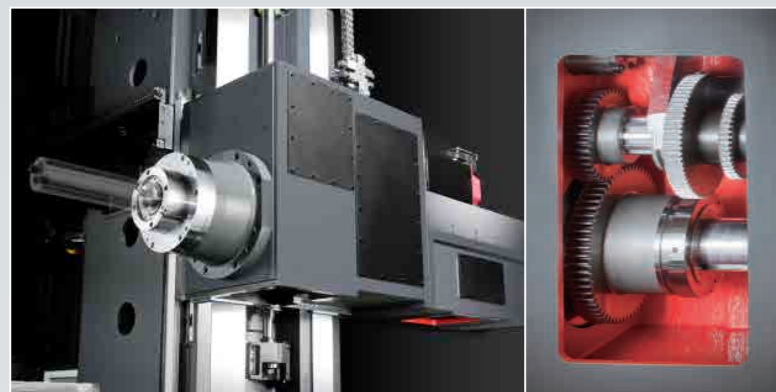
Horizontal Boring Mills

Minimal Floor Space Great Machining Capability

- Compact exterior design. Floor space is less than 30 m² which saves valuable space.
- X / Y axes adopt high rigidity box ways design to fulfill heavy cutting needs.
- Compound 4 guide ways design provides full travel support on bed, eliminates table overhang problem and ensures support rigidity.
- X / Y / Z / B axes equip high resolution linear scale to ensure optimal machining accuracy.
- Ø 110 mm high precision quill, max. travel of W-axis is up to 500 mm
- 40T / 60T arm type ATC, max. tool load is 25 kg, max. magazine load is up to 600 kg



B-axis	
B-axis rotary range	360 °
B-axis min. index	0.001 °
B-axis speed	5 rpm



High torque gear spindle

3,200 rpm 3-step gear spindle with high power 26 kW spindle motor can provide max. torque output of 1,800 N·m at 137 rpm.



High rigidity rotary table

Table adopts double-layer enforced ribs design which could keep dimension stability while loading large unsymmetrical work-piece.



Automatic pallets changer

High efficiency APC system increases production efficiency.

		MB-1512	MB-2012
X-axis travel	mm	1,500	2,000
Y-axis travel	mm	1,200	1,200
Z-axis travel	mm	900	900
W-axis travel	mm	500	
Table size	mm	1,250 x 1,150	
Boring spindle size	mm	Ø 110	
Table load capacity	kg	4,000	
Spindle speed	rpm	3,200	
Spindle motor	kW	22 / 26 (cont. / 30 min)	

Specifications are subject to change without notice.

MVP series

Moving Cross Rail Bridge Type 5-Face Machining Center

W-axis travel 1,250 mm New Frontier for Cutting Rigidity and Working Range

- W-axis moving cross rail design improve cutting rigidity, working range and tool life.
- 4,000 rpm 2-step gear spindle with high power 26 kW spindle motor, max. torque is up to 977 N-m.
- Column is 30% larger than immovable column type, which supports structure rigidity for moving cross rail.
- High rigidity compound 4 guide ways provide full travel support on table effectively enhances table load capacity and dynamic accuracy.
- 3 axes adopt heavy-duty roller type linear guide ways, W-axis adopts high rigidity box ways.
- The standard Five Sided Coordinate Conversion System is synchronized to the cutting conditions which saves a great deal of time in the working process.



▲ MVP-7040



W-axis

W-axis adopts twin hydraulic cylinder counterweight and driven by AWEA "simultaneous-controlled technology" which can prevent error caused by two sides of moving cross rails to ensure machining accuracy.



Multiple head auto. storage

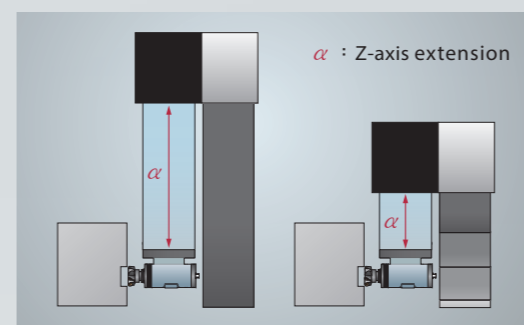
- ▶ Multiple head auto. storage can store up to 6 heads. (Opt.)
- ▶ Head storage adopts full splash guards design which isolates heads and machining zone to avoid chips contamination.



Horizontal / Vertical ATC

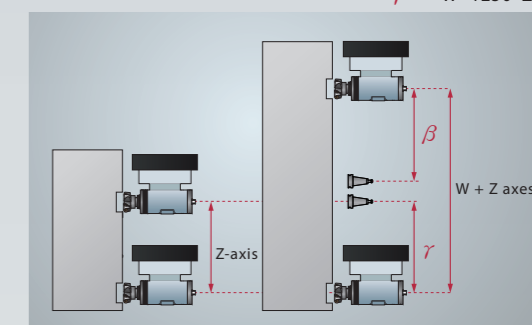
40T / 60T horizontal / vertical ATC, all tool changing processes and changing point are scanned and detected to improve reliability of tool changing.

Increase machining rigidity



General Structure Moving Cross Rail Structure

Extend working range



General Structure Moving Cross Rail Structure

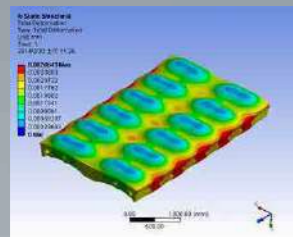
		MVP-4032	MVP-5032	MVP-6032	MVP-7032	MVP-4040	MVP-5040	MVP-6040	MVP-7040
X-axis travel	mm	4,000	5,000	6,000	7,000	4,000	5,000	6,000	7,000
Y-axis travel	mm	3,200				4,000			
Z-axis travel	mm	1,000 (1,200 / 1,400 Opt.)							
W-axis travel	mm	1,250							
Table size (X x Y)	mm	4,020 x 2,400	5,020 x 2,400	6,020 x 2,400	7,020 x 2,400	4,020 x 3,010	5,020 x 3,010	6,020 x 3,010	7,020 x 3,010
Table load capacity	kg	15,000	18,000	20,000		15,000	18,000	20,000	
Spindle speed (V / H)	rpm	4,000 / 2,000							
Spindle motor	kW	22 / 26 (cont. / 30 min)							

Specifications are subject to change without notice.

HP series

Bridge Type 5-Face Machining Center Newly Delivered Heavyduty Machining Solutions

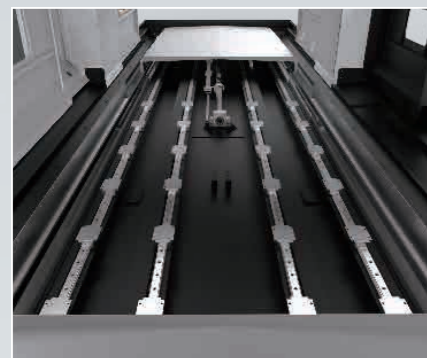
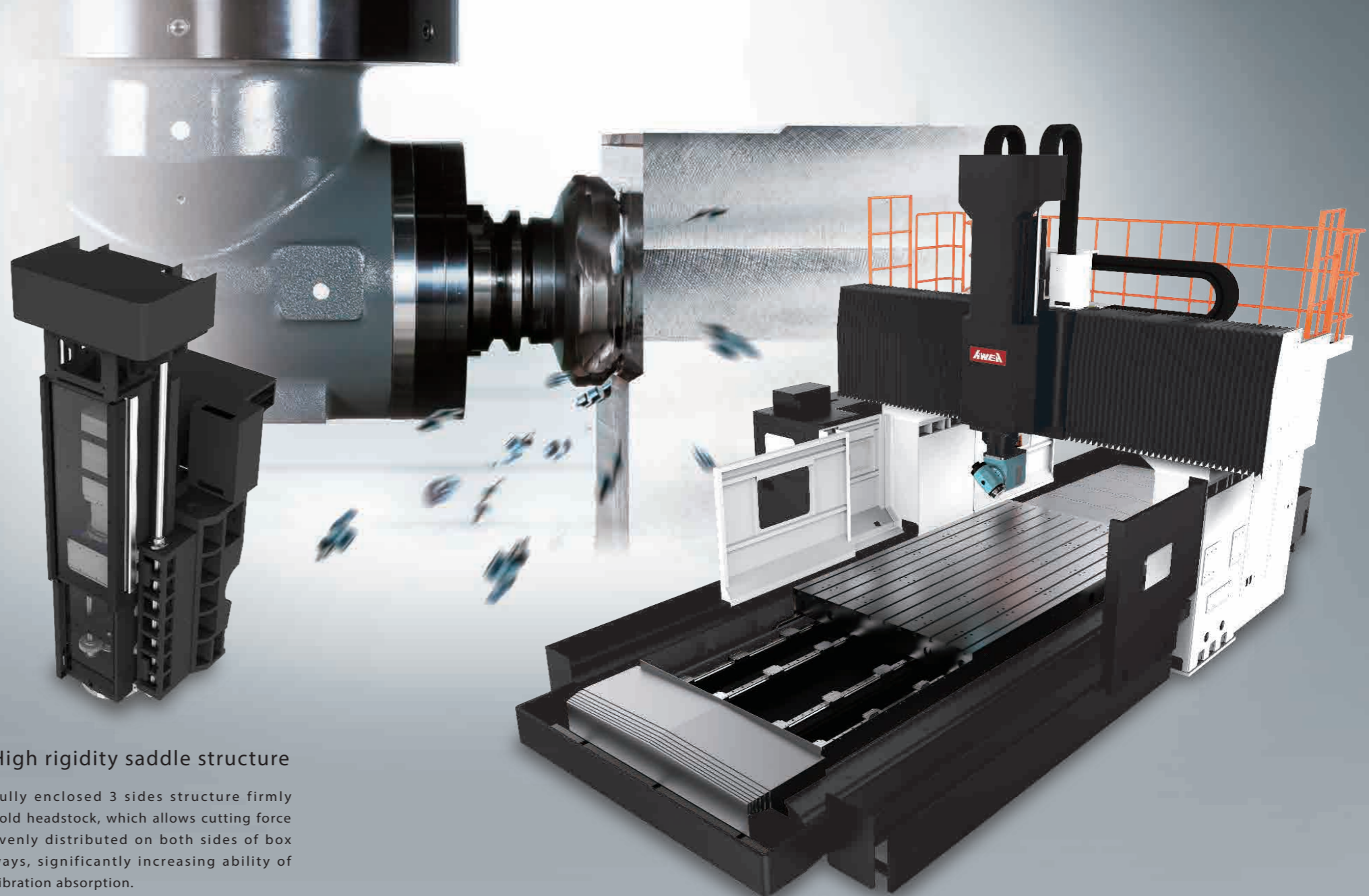
- 6,000 rpm 2-step gear spindle, transmission shaft shortens 20% which effectively enhances rigidity of gear driven.
- Optimal design on cross beam structure, the cross section area increases 30% which improves cutting rigidity.
- Optimal design on table structure, the thickness increases 20% which allows table load up to 40 tons.
- Z-axis adopts closed-loop hydraulic counterweight system which provides stable support and swift dynamic response.
- The standard Five Sided Coordinate Conversion System is synchronized to the cutting conditions which saves a great deal of time in the working process.



Based on Finite Element Analysis (FEA), rigidity increases 60%.

High rigidity saddle structure

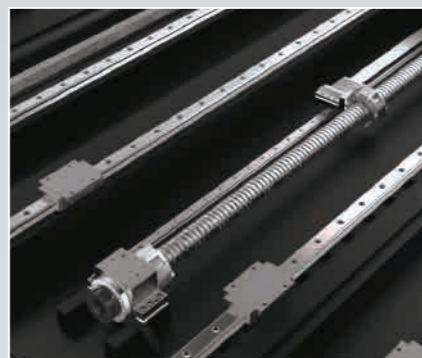
Fully enclosed 3 sides structure firmly hold headstock, which allows cutting force evenly distributed on both sides of box ways, significantly increasing ability of vibration absorption.



High rigidity 4 linear guide ways on bed

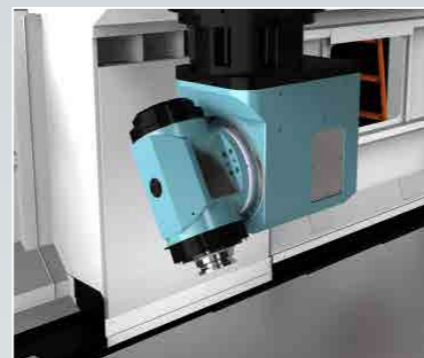
High rigidity 4 linear guide ways on bed with full travel support on table, effectively enhances table load capacity and dynamic accuracy*1.

*1 : Y-axis 2,800 mm longer



Ball screw shaft support mechanism

Long travel X / Y axes equip ball screw support mechanism which prevents deformation of ball screw to ensure rapid feed rate up to 15 / 20 m / min.



A \ C axes automatic universal head (Opt.)

- A \ C axes automatic 5° index.
- Automatic head change.
- Automatic tool exchange.
- Max. speed 3,000 rpm.

		HP-3221	HP-4221	HP-5221	HP-6221	HP-3228	HP-4228	HP-5228	HP-6228	HP-7228	HP-8228
X-axis travel	mm	3,200	4,200	5,200	6,200	3,200	4,200	5,200	6,200	7,200	8,200
Y-axis travel	mm	2,100 (2,800 Opt.)				2,800 (3,500 Opt.)					
Z-axis travel	mm	850 (1,000 / 1,200 / 1,400 Opt.)									
Table size (X x Y)	mm	3,020 x 2,000	4,020 x 2,000	5,020 x 2,000	6,020 x 2,000	3,020 x 2,400	4,020 x 2,400	5,020 x 2,400	6,020 x 2,400	7,020 x 2,400	8,020 x 2,400
Table load capacity	kg	13,000	17,000	20,000	25,000	13,000	17,000	20,000	25,000	32,000	40,000
Spindle speed	rpm	6,000									
Spindle motor	kW	22 / 26 (cont. / 30 min)									

		HP-4235	HP-5235	HP-6235	HP-7235	HP-8235	HP-5242	HP-6242	HP-7242	HP-8242	
X-axis travel	mm	4,200	5,200	6,200	7,200	8,200	5,200	6,200	7,200	8,200	
Y-axis travel	mm	3,500 (4,200 Opt.)				4,200 (4,900 Opt.)					
Z-axis travel	mm	850 (1,000 / 1,200 / 1,400 Opt.)									
Table size (X x Y)	mm	4,020 x 3,000	5,020 x 3,000	6,020 x 3,000	7,020 x 3,000	8,020 x 3,000	5,020 x 3,600	6,020 x 3,600	7,020 x 3,600	8,020 x 3,600	
Table load capacity	kg	17,000	20,000	25,000	32,000	40,000	20,000	25,000	32,000	40,000	
Spindle speed	rpm	6,000									
Spindle motor	kW	22 / 26 (cont. / 30 min)									

Specifications are subject to change without notice.

HVM series

Bridge Type 5-Face Machining Center

Modular Multiple Head Storage Fulfill Complex 5-Face Machining Needs

- 4,000 rpm 2-step gear spindle with 26 kW spindle motor, output of torque is up to 827 N-m.
- Multiple head automatic storage compartment could store up to 6 heads. (Opt.)
- 60T / 90T / 120T horizontal/vertical ATC, max. tool \varnothing 240 mm, max. tool length 400 mm.
- High rigidity compound 4 guide ways on bed with full travel supported on table, which effectively improves table load capacity and maintain stable dynamic accuracy.
- Overhead swivel pendulum type control panel and mobile handwheel provides optimal operation interface.
- Standard Five Sided Coordinate Conversion System.



90° head adopts high rigidity curvic coupling and 5° indexing with max. clamping force up to 20,000 kg.



		HVM-3018	HVM-4018	HVM-4025	HVM-5025	HVM-6025
X-axis travel	mm	3,060	4,000	4,000	5,000	6,000
Y-axis travel	mm	2,500		3,200		
Z-axis travel	mm	1,000				
Table size (X x Y)	mm	3,260 x 1,500	4,020 x 1,500	4,020 x 2,010	5,020 x 2,010	6,020 x 2,010
Table load capacity	kg	10,000	12,000	12,000	15,000	17,000
Spindle speed	rpm	4,000 (V) / 2,400 (H)				
Spindle motor	kW	22 / 26 (cont. / 30 min)				

		HVM-4032	HVM-5032	HVM-6032	HVM-6033Y	HVM-7033Y
X-axis travel	mm	4,000	5,000	6,000	6,000	7,000
Y-axis travel	mm	3,900		4,500		
Z-axis travel	mm	1,000				
Table size (X x Y)	mm	4,020 x 2,400	5,020 x 2,400	6,020 x 2,400	6,020 x 2,400	6,020 x 2,400
Table load capacity	kg	15,000	18,000	20,000	20,000	20,000
Spindle speed	rpm	4,000 (V) / 2,400 (H)				
Spindle motor	kW	22 / 26 (cont. / 30 min)				

Specifications are subject to change without notice.

LP-F series

Bridge Type 5-Face Machining Center

High Efficiency Head Storage 5-Face Machining With Great CP Value

- Most affordable 5-face machining solution.
- Dual compartment head storage offers, efficient head change function.
- 32T / 60T / 90T / 120T horizontal/vertical ATC with excellent reliability and tool changing efficiency.
- Modular spindle design provides various cutting characteristics to fulfill diverse machining conditions.
- Standard Five Sided Coordinate Conversion System.



X-axis adopts symmetrical center-driven design which ball screw is placed at the middle of bed to provide high accuracy axial feed.



		LP-2516YF	LP-3016YF	LP-4016YF	LP-5016YF	LP-3021YF	LP-4021YF	LP-5021YF	LP-6021YF
X-axis travel	mm	2,500	3,000	4,000	5,000	3,000	4,000	5,000	6,000
Y-axis travel	mm	1,900				2,400			
Z-axis travel	mm	760 (1,000 Opt.)				760 (1,000 / 1,200 / 1,400 Opt.)			
Table size (X x Y)	mm	2,310 x 1,500	3,260 x 1,500	4,200 x 1,500	5,000 x 1,500	3,020 x 2,010	4,020 x 2,010	5,020 x 2,010	6,020 x 2,010
Table load capacity	kg	8,000	10,000	12,000	14,000	10,000	12,000	15,000	18,000
Spindle speed (V / H)	rpm	6,000 (8,000 / 10,000 Opt.) / 2,000							
Spindle motor	kW	22 / 26 (cont. / 30 min)							

		LP-3025YF	LP-4025YF	LP-5025YF	LP-6025YF	LP-4033YF	LP-5033YF	LP-6033YF	LP-7033YF
X-axis travel	mm	3,000	4,000	5,000	6,000	4,000	5,000	6,000	7,000
Y-axis travel	mm	3,200				3,900			
Z-axis travel	mm	760 (1,000 / 1,200 / 1,400 Opt.)							
Table size (X x Y)	mm	3,020 x 2,400	4,020 x 2,400	5,020 x 2,400	6,020 x 2,400	4,020 x 2,400	5,020 x 2,400	6,020 x 2,400	7,020 x 3,000
Table load capacity	kg	12,000	15,000	18,000	20,000	15,000	18,000	20,000	20,000
Spindle speed (V / H)	rpm	6,000 (8,000 / 10,000 Opt.) / 2,000							
Spindle motor	kW	22 / 26 (cont. / 30 min)							

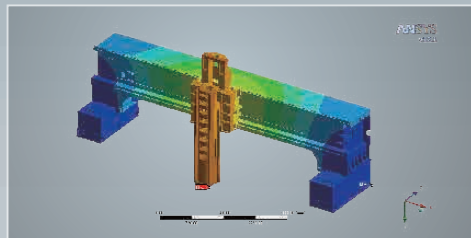
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LG series

Gantry Type Machining Center

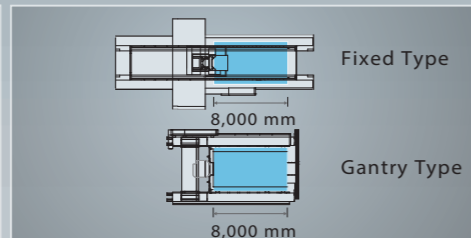
Capitalizing Body Structure Usability of Space Raises Up To 40%

- Extreme large travel range : X-axis 20,000 mm, Y-axis 7,000 mm, Z-axis 1,400 mm.
- Gantry type structure minimizes floor space, and features high machining accuracy and ease of loading work-piece.
- High rigidity floor type table provides table load up to 2,500 kg/m².
- High rigidity side columns and table adopt modular design which allows flexible of X-axis travel.
- X-axis is driven by AWEA "synchronised-controlled technology" which can prevent error from both sides of ball screws / gear and pinions to ensure machining accuracy.
- LG series is currently the AWEA largest 5-face machining center.



Crossbeam adjustment

Patented design. It prevents deformation caused by the weight of Y-axis travel 7,000 mm or longer to ensure machining accuracy.



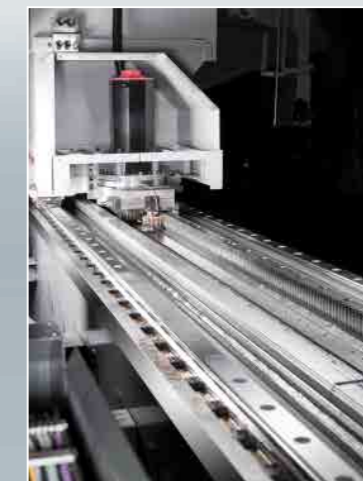
Gantry type V.S Fixed type

Floor space of machine reduces 40%



Spindle system

4,000 rpm high torque gear spindle or 6,000 / 8,000 rpm high speed, high accuracy built-in spindle.



Axial feed system

X / Y axes adopt AWEA's patented rack / pinion design with 1μm high resolution linear scale to ensure dynamic accuracy of long travel. (X-axis 6,000 mm or longer)



5-face machining ability

Horizontal/vertical ATC and automatic head changer (2 ~ 3 heads storage) can be equipped to upgrade to 5-face machining center (Opt.)



		LG-4030	LG-5030	LG-6030	LG-8030	LG-10030	LG-5040	LG-6040	LG-8040
X-axis travel	mm	4,000	5,000	6,000	8,000	10,000	5,000	6,000	8,000
Y-axis travel	mm	3,000			4,000				
Z-axis travel	mm	1,000 (1,200 / 1,400 Opt.)							
Table load capacity	kg/m ²	2,500							
Spindle speed	rpm	4,000 (6,000 / 8,000 / 10,000 Opt.)							
Spindle motor	kW	22 / 26 (cont. / 30 min)							

		LG-10040	LG-6050	LG-8050	LG-10050	LG-14050	LG-10070	LG-20070	
X-axis travel	mm	10,000	6,000	8,000	10,000	14,000	10,000	20,000	
Y-axis travel	mm	4,000	5,000			7,000			
Z-axis travel	mm	1,000 (1,200 / 1,400 Opt.)							
Table load capacity	kg/m ²	2,500							
Spindle speed	rpm	4,000 (6,000 / 8,000 / 10,000 Opt.)							
Spindle motor	kW	22 / 26 (cont. / 30 min)							

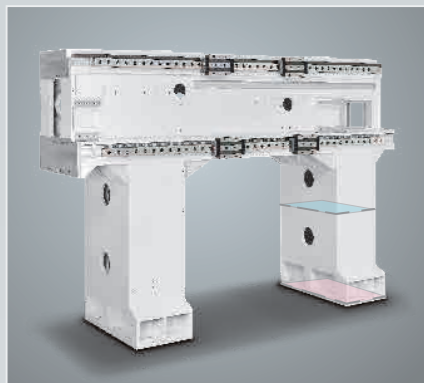
Specifications are subject to change without notice.

HD series

Bridge Type Machining Center

Unsurpassed Cutting Capacity Among Peers (55 of Stronger)

- Strengthened major casting structure increase overall rigidity up to 30%.
- 6,000 rpm gear spindle equips 26 kW high power spindle motor which can fulfill heavy cutting needs.
- X / Y axes adopt roller type linear guide ways, and Z-axis adopts high rigidity-box ways, optimized axial system features heavy table load and fast movement characteristics.
- Large size Ø 63 mm ball screw on X-axis greatly improve capability of axial load and extend life of usage.
- Superior 7 kW servo motor on X-axis highly increases axial thrust.



High rigidity of bridge

HD V.S Previous Models

■ Cross section area of column

↑ **24%**

■ Contact area btw column and bed

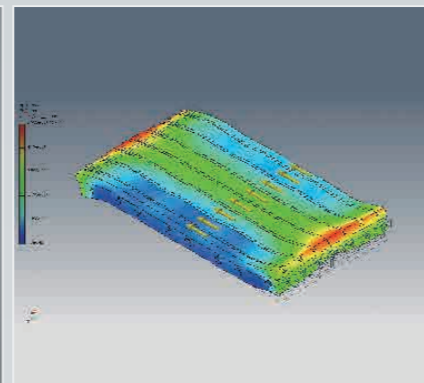
↑ **42%**



High rigidity of bed

▶ One-piece bed adopts enclosed rectangular structure design which greatly enhances capability of table load and anti-shake.

▶ Enlarged slant on both sides of bed significantly increases chip removal efficiency.



High rigidity of table

Table adopts enclosed bottom with double layers structural design, which increases structural rigidity and heavy cutting capability.

HD-2012 Cutting test

Tool size : Ø 60 mm No. of blade : 7 Spindle speed : 477 rpm

32 cc / kW
720 cc / min.
Chips removal rate

Cutting width : 60 mm
Cutting depth : 4 mm
Feed rate : 3,000 mm/min
Spindle load : 105%

57 cc / kW
1260 cc / min.
Chips removal rate

Cutting width : 60 mm
Cutting depth : 5 mm
Feed rate : 4,200 mm/min
Spindle load : 133%

		HD-2012	HD-3012
X-axis travel	mm	2,000	3,000
Y-axis travel	mm	1,200	1,200
Z-axis travel	mm	760	760
Table size (X x Y)	mm	2,000 x 1,100	3,000 x 1,100
Table load capacity	kg	4,500	5,500
Spindle speed	rpm	6,000	6,000
Spindle motor	kW	22 / 26 (cont. / 30 min)	22 / 26 (cont. / 30 min)

Specifications are subject to change without notice.

VP / SP / LP series

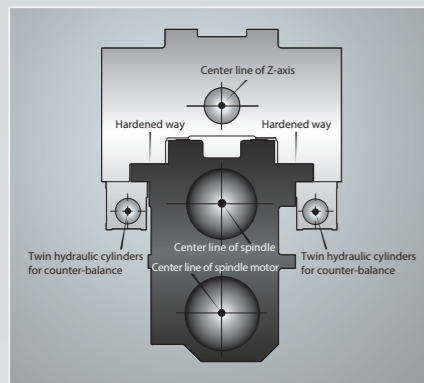
Bridge Type Machining Center

Complete Product Portfolio AWEA Most Popular Series

- More than 3,000 units in the globe.
- Complete product portfolio, X-axis 1,600 ~ 7,000 mm, Y-axis 1,200 ~ 4,000 mm, Z-axis 760 ~ 1,400 mm
- Modular spindle design can select multiple spindle motors, which fulfills high precision dies&molds and parts machining needs.
- X / Y axes adopt roller type linear guide ways, and Z-axis adopts high rigidity box ways, which allow axial system combines heavy load and fast movement characters.
- Equipped with ball screw support mechanism (6 m or longer travel) to prevent deformation of ball screw and increase machining accuracy.
- All contact surfaces of structure are precisely hand scraped to ensure optimal accuracy and balanced load.

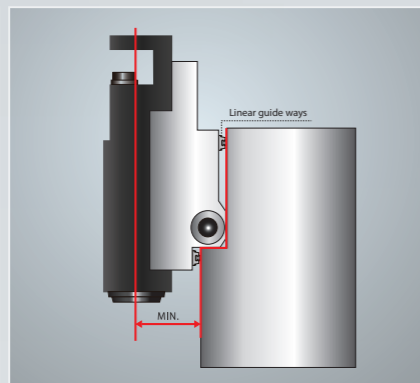


▲ High class roof enclosure with extension door provides large space for loading and unloading processes. (Opt.)



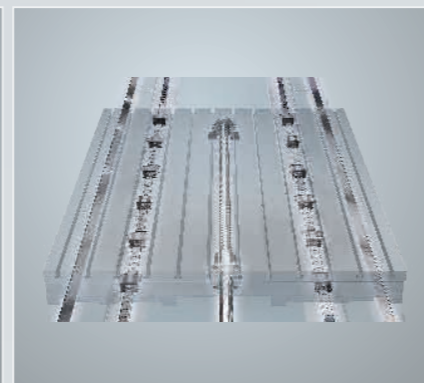
Centro-symmetric spindle system

Hereby preventing thermal distortion and minimizing deflection ensures accuracy and heavy cutting capability.



Y-axis sectional guide ways design

Strengthened spindle and crossbeam design shorten the distance between tool to crossbeam to enhances overall cutting performance.



Symmetrical center-driven design

Wide span symmetrical center-driven with ball screw placed in the center of the X-axis movement provides high precision axial feeding features

LP series

- ▶ Compound 4 guide ways bed
- ▶ 5-face machining (Opt.)



X-axis travel	2,500 ~ 7,000 mm
Y-axis travel	1,600 ~ 4,000 mm
Z-axis travel	760 ~ 1,400 mm
Spindle speed	6,000 rpm
Spindle motor	22 / 26 kW (cont. / 30 min)

SP series

- ▶ One-piece bed
- ▶ High speed spindle (Opt.)



X-axis travel	2,100 ~ 4,000 mm
Y-axis travel	1,600 mm
Z-axis travel	760 mm
Spindle speed	6,000 rpm
Spindle motor	22 / 26 kW (cont. / 30 min)

VP series

- ▶ One-piece bed
- ▶ High speed spindle (Opt.)



X-axis travel	1,600 ~ 5,000 mm
Y-axis travel	1,200 mm
Z-axis travel	760 mm
Spindle speed	6,000 rpm
Spindle motor	11 / 15 kW (cont. / 30 min)

MEGA5 series

Bridge Type 5-Axis Machining Center

Top Choice for Aerospace Industry 5-Axis Machining For Large Workpieces

- High quality 2-axis head module featuring high speed, power and accuracy can easily achieve complex machining tasks.
- Complete product portfolio, high rigidity bridge type structure.
 - ▶ MEGA5 P series : Bridge type 5-axis machining center (Fixed column)
 - ▶ MEGA5 G series : Gantry type 5-axis machining center (Moving column)
- Advanced HEIDENHAIN iTNC 530 5-axis simultaneous control system.
- Standard X / Y / Z closed-loop linear scales ensure positioning accuracy.
- 40T arm type ATC (MEGA5 P) , 20T / 40T drum type. (MEGA5 G)



		MEGA5 P	MEGA5 G
X-axis	mm	3,200 ~ 4,000	3,700 ~ 4,700
Y-axis (vertical)	mm	2,500 ~ 3,300	3,000 ~ 4,000
Y-axis (horizontal)	mm	1,000 ~ 1,200	1,200 ~ 1,400
Z-axis	mm	1,000 / 1,200 / 1,400	
Table load capacity	kg	12,000 ~ 20,000	2,500 (kg/m ²)

Specifications are subject to change without notice.



HSK-A100 High torque spindle

Max. speed	Max. output	Max. torque
12,000 rpm	50 kW	314 N-m

HSK-A63 High speed spindle

Max. speed	Max. output	Max. torque
24,000 rpm	42 kW	87 N-m

B / C Axes

		B-axis	C-axis
Max. speed	rpm	50	50
Max. accel. speed	rad/sec ²	30	30
Cont. torque	N-m	1,400	1,450
Max. torque	N-m	2,200	2,400
Clamping torque	N-m	10,000	10,000
Position accuracy	arc.sec	± 3	± 3
Rotary angle	deg	± 100	± 240

Specifications are subject to change without notice.



HSK-A63 High power spindle

Max. speed	Max. output	Max. torque
18,000 rpm	70 kW	111 N-m

* Up to 8 models of spindles are available.

600°/sec

B-axis Swivel speed



High Productivity

B / C Axes

		B-axis	C-axis
Max. speed	rpm	100	100
Max. accel. speed	rad/sec ²	30	30
Cont. torque	N-m	764	810
Max. torque	N-m	1,150	1,100
Clamping torque	N-m	2,160	3,040
Position accuracy	arc.sec	± 5	± 3
Rotary angle	deg	± 105	± 360

Specifications are subject to change without notice.

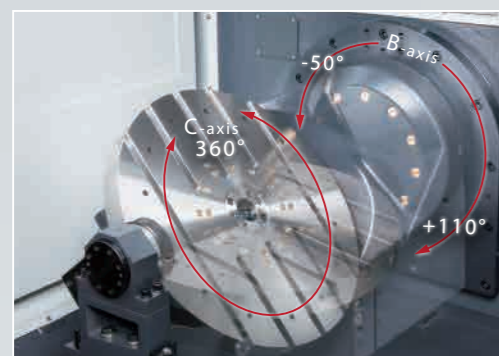
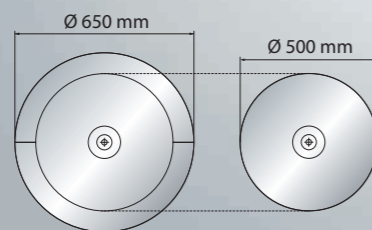
FCV series

High Speed 5-Axis Machining Centers

Newly Delivered 5-Axis Machining Solution Popular Size With Ease of Use

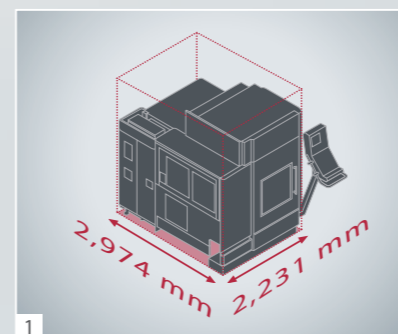
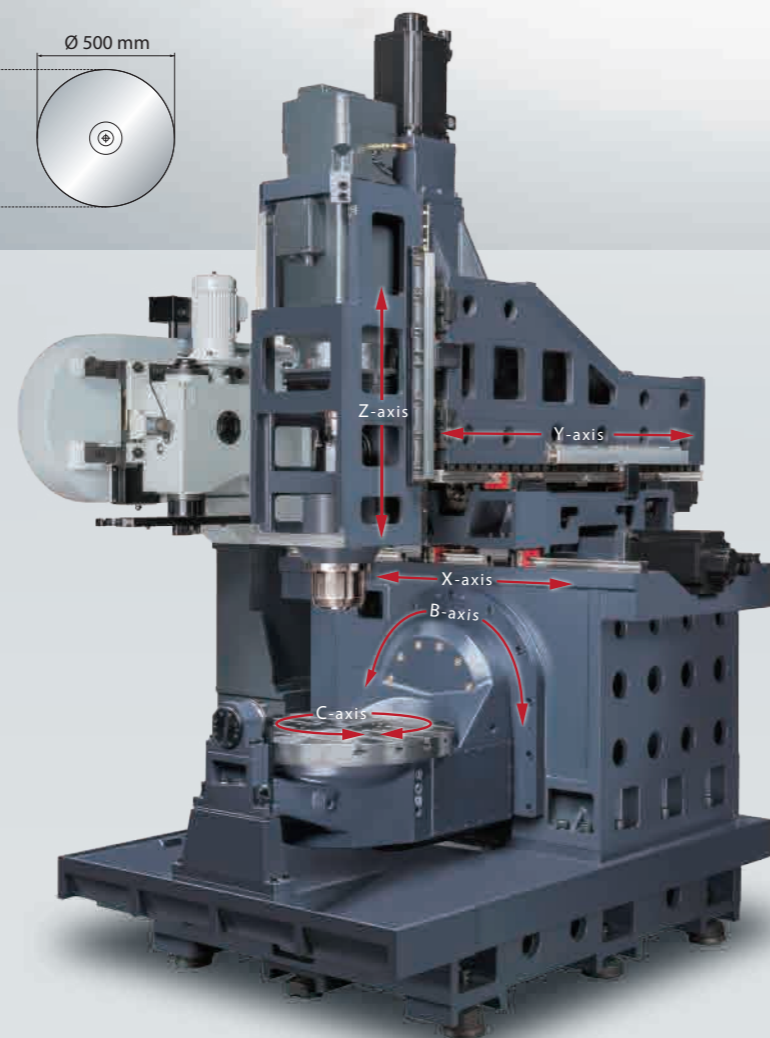
- \varnothing 650 mm B / C axes rotary table. Top choice for medium-small work-piece.
- Wide open guarding door and swing type control panel provide the best operation interface.
- Moving rail type C-shape structure can minimize extension of spindle to provide extreme cutting rigidity.
- Column and saddle of Y-axis adopt thicker wall casting structure to ensure stability while machining in high speed, which improve machining accuracy.
- 12,000 / 15,000 rpm direct drive spindle. 16,000 / 20,000 rpm built-in spindle.
- 3 axes adopt heavy-duty roller type linear guide ways and driven by AC servo direct drive motor. Rapid feed rate reaches 36 m / min.

Detachable design of table.
(inner plate / outer plate)



Rotary table

- ▶ FC300 meehanite one-piece bed with single driven and both ends support on table improve rigidity, accuracy.
- ▶ B / C axes equip HEIDENHAIN rotary linear scale as standard.
- ▶ B-axis adopts fill-circle hydraulic brake system which provides excellent braking capacity.



1 6.6 m² minimal floor space.



2 Two wide doors provides large space for loading / unloading.



3 Swing type control panel makes operator easier to operate.

		FCV-620
X / Y / Z axes travel	mm	635 / 535 / 460
Table load capacity	kg	300
Table diameter (inner)	mm	\varnothing 500
Table diameter (outer)	mm	\varnothing 650
Spindle speed	rpm	12,000
Spindle motor	kW	11 / 15 (cont. / 30 min)
Spindle taper		BBT40 / HSK-A63
X / Y / Z rapid feed rate	m/min	36
ATC	T	32 (40 / 60)

Specifications are subject to change without notice.

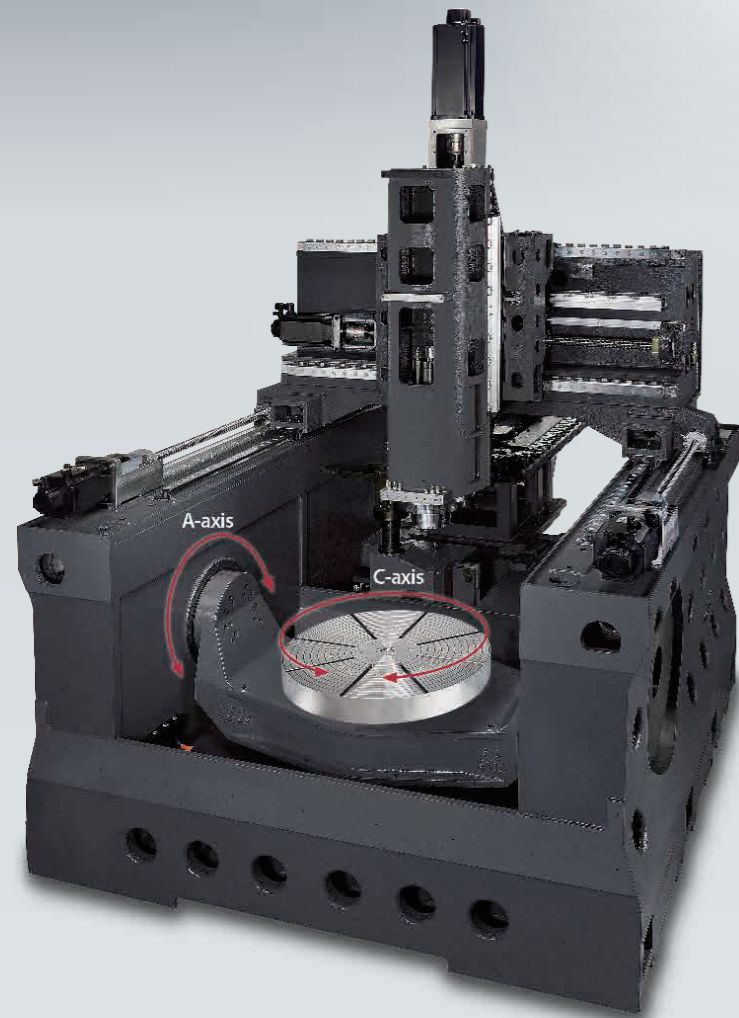
FMV series

Gantry Type 5-Axis Machining Centers

Upgraded A,C Axes

Powerful 5-Axes Machining

- Gantry type structure featuring AWEA "simultaneous-controlled technology" of X-axis provides excellent dynamic accuracy.
- 16,000 / 22,000 rpm high speed built-in spindle ensure optimal burnished surface.
- Brand new design of A / C axes rotary table promotes dynamic accuracy and brake performance.
- 3 axes adopt roller type linear guide ways, rapid feed rates are 48 m/min, cutting feed rate is 24 m/min.
- 40T / 80T arm type high efficiency, reliable ATC. Rear-extruded type design maintain rigidity of U-shape bed structure.
- Side exit type or rear exit type chips conveyor is available for different machine layout (Opt.)

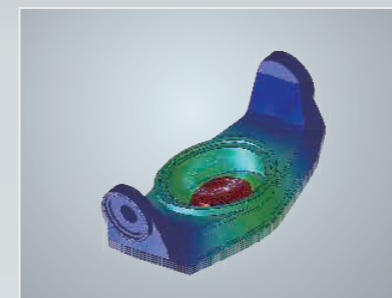


A-axis

- ▶ Adopt high class servo motor, max. output of torque is up to 12,600 N-m
- ▶ Brake system adopts servo motor with dish spring design to provide stable and reliable performance. Even the power gets cut off suddenly, table wouldn't drop in speed to greatly improve the safety.

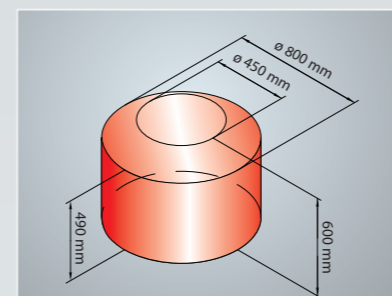
C-axis

- ▶ High speed, high torque with zero backlash driven system adopts DD motor which can transfer 100% power.
- ▶ Outer diameter of bearing increases 35% more than last generation, and rigidity of C-axis rigidity increases more than 70%.
- ▶ Brake system adopts specialized brake featured dish spring design nimbly achieving excellent brake performance.



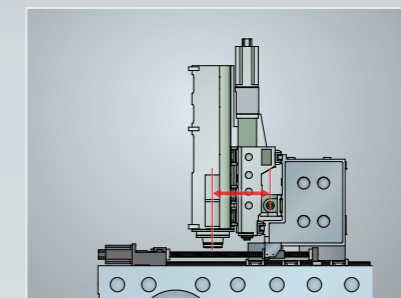
Finite Element Analysis

Applying Finite Element Analysis (FEA) makes one-piece table reaching optimal design. Mechanic strength improves 30% higher than traditional design.



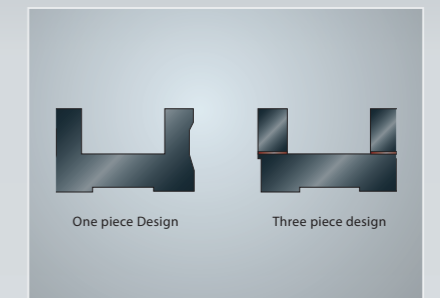
Work range

- Ø 850 mm table size
- Table load capacity
- ▶ 1,000 kg (horizontal)
- ▶ 700 kg (45°)



Minimal extension of spindle

Minimal extension of spindle design effectively improves cutting rigidity and accuracy.



One-piece U-shape bed

FC300 meehanite one-piece bed with high damping and minimal deformation ability makes structure rigidity greatly surpass 3-piece bed structure.

		FMV-99
X / Y / Z axes travel	mm	800 / 900 / 660
Table load capacity	kg	1,000
Table size	mm	Ø 850
Spindle speed	rpm	16,000
Spindle taper	kW	25 / 29 (cont. / 30 min)
Spindle taper		BT40 / HSK-A63
X / Y / Z rapid feed rate	m/min	48
ATC	T	40 (80 Opt.)

F series

Bridge Type High Speed Machining Center

Top Choice For High Precision Dies & Molds Machining

- High rigidity bridge type structure with modular high speed spindle makes F series the top choice for high precision dies & molds machining.
- Compact casting structure features high quality core elements.
 - ▶ Mechanic strength is 40% higher than same range vertical machining center.
 - ▶ Heavy cutting ability is 50% higher than same range vertical machining center.
- 3 axes adopt roller type linear guide ways and precise ball screw which is specific for mold making, and driven by high power direct drive servo motor, cutting feed rate is up to 24 m/min. (F-7 / F-87)
- 20T drum type ATC (F-7 / F-87 / F-16) , 30T arm type ATC (F-101)



(F-101)



(F-87)

Ultra rigidity structure

- ▶ One-piece column and bridge
- ▶ Compact bed structure
- ▶ Specialized enforced ribs structure of table
- ▶ Minimal extension of spindle
- ▶ Wide span 4 points support on saddle of Y-axis (F-16 / F-101)
- ▶ Two sides chip augers (F-16 / F-101)



	Max. speed	Max. output
Built-in spindle	30,000 rpm	24 kW
	22,000 rpm	30 kW
	21,000 rpm	24 kW
	20,000 rpm	18.5 kW
Direct drive spindle	15,000 rpm	18.5 kW
	12,000 rpm	18.5 kW

Spindle differentiates on models.

		F-7	F-87	F-16	F-101
X-axis travel	mm	700	800	1,000	1,000
Y-axis travel	mm	500	700	600	1,000
Z-axis travel	mm	350	420	500	500
Table size (X x Y)	mm	770 x 500	850 x 700	1,160 x 600	1,100 x 1,000
Table load capacity	kg	600	800	1,000	2,000
Spindle speed	rpm	Built-in 21,000	Built-in 15,000	Direct drive 12,000	
Spindle motor	kW	20 / 24 (cont. / 30 min)	18.5 / 22 (cont. / 30 min)	15 / 18.5 (cont. / 30 min)	

Specifications are subject to change without notice.

AF series

Vertical Machining Center

High Speed Spindle & Linear Guide Ways Excellent Models For Dies & Molds

- High rigidity Δ (Delta) body structure provides the foundation of heavy load and powerful cutting.
- 3 axes adapt linear guide ways to provide the optimum control and efficient movement, rapid feed rates are up to 48 m/min.*1
- Z-axis could adopt with heat treated box way structure with gear spindle. Very suitable for heavy cutting requirements.
- The quantity of chip augers depends on size of machine, which provides the most effective chip removal solution.
- 24 / 30 / 32 / 40T arm type ATC. High speed servo ATC is option.

*1 : Different between models.

The modular spindle design provides cutting flexibility for various machining needs

Solution for Precision Parts

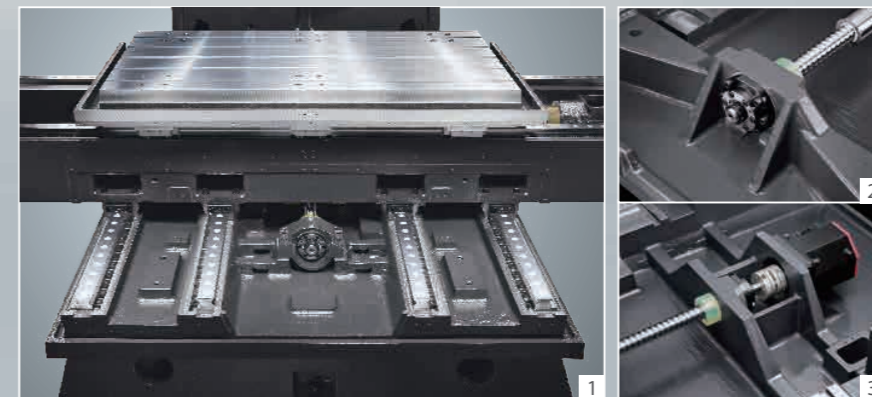
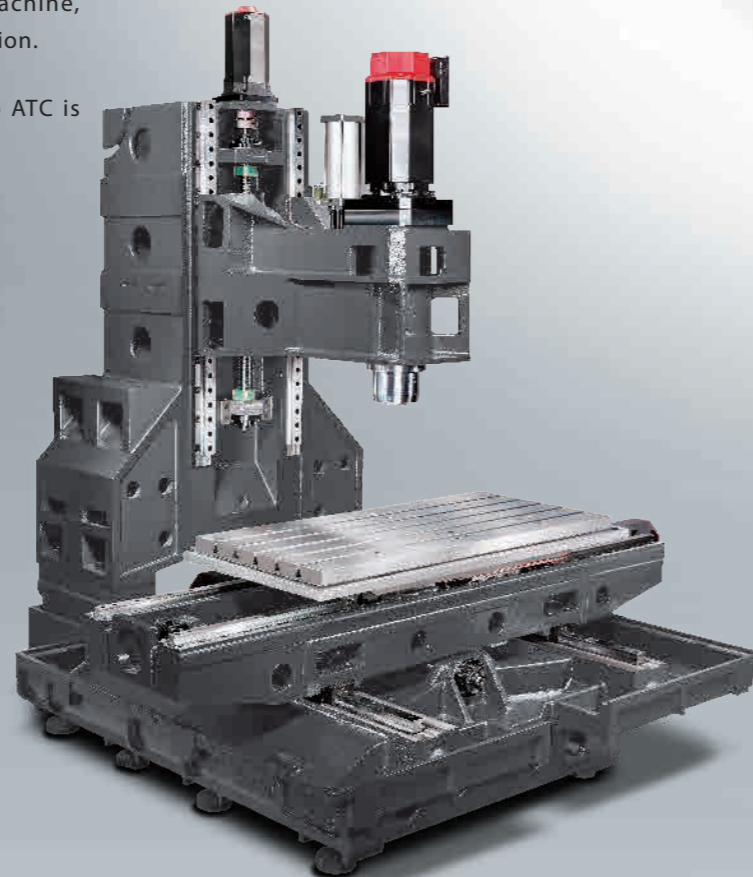
Spindle	Taper	Speed Range
Belt-drive	BT40	8,000 ~ 10,000 rpm

Solution for Precision Mold

Spindle	Taper	Speed Range
Direct-drive	BT40 / BT50	8,000 ~ 15,000 rpm

Solution for Heavy Cutting

Spindle	Taper	Speed Range
Gear	BT40 / BT50	8,000 / 6,000 rpm



1 4 linear guide ways design on bed effectively eliminates the overhang problem of working table and ensure the optimal support rigidity. (AF-1400 / 1600 / 1800)

2 One-piece ball screw driving motor support and bearing support enable cutting force to spread evenly into casting body, so it efficiently enhances axial system of entire rigidity and prevents deformation of ball screw.

		AF-510	AF-610	AF-650	AF-860	AF-1000	AF-1060
X-axis travel	mm	510	610	650	860	1,020	1,060
Y-axis travel	mm	400	450	510	600	550	600
Z-axis travel	mm	330	450	510	600	635	600
Table size (X x Y)	mm	610 x 400	700 x 450	750 x 510	1,000 x 600	1,200 x 550	1,200 x 600
Table load capacity	kg	250	450	500	700	700	700
Spindle speed	rpm	Belt drive 8,000 / 10,000					
Spindle taper		BT30		BT40			

		AF-1250	AF-1460	AF-1400	AF-1600	AF-1800
X-axis travel	mm	1,250	1,400	1,400	1,600	1,800
Y-axis travel	mm	620		800		
Z-axis travel	mm	620		800		
Table size (X x Y)	mm	1,350 x 620	1,500 x 620	1,500 x 800	1,700 x 800	1,900 x 800
Table load capacity	kg	1,000	1,000	1,200	1,500	1,800
Spindle speed	rpm	Belt drive 8,000 / 10,000			Direct drive 10,000	
Spindle taper		BT40			BT50	

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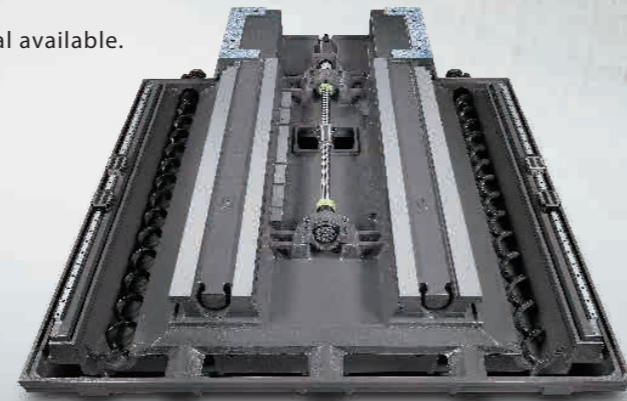
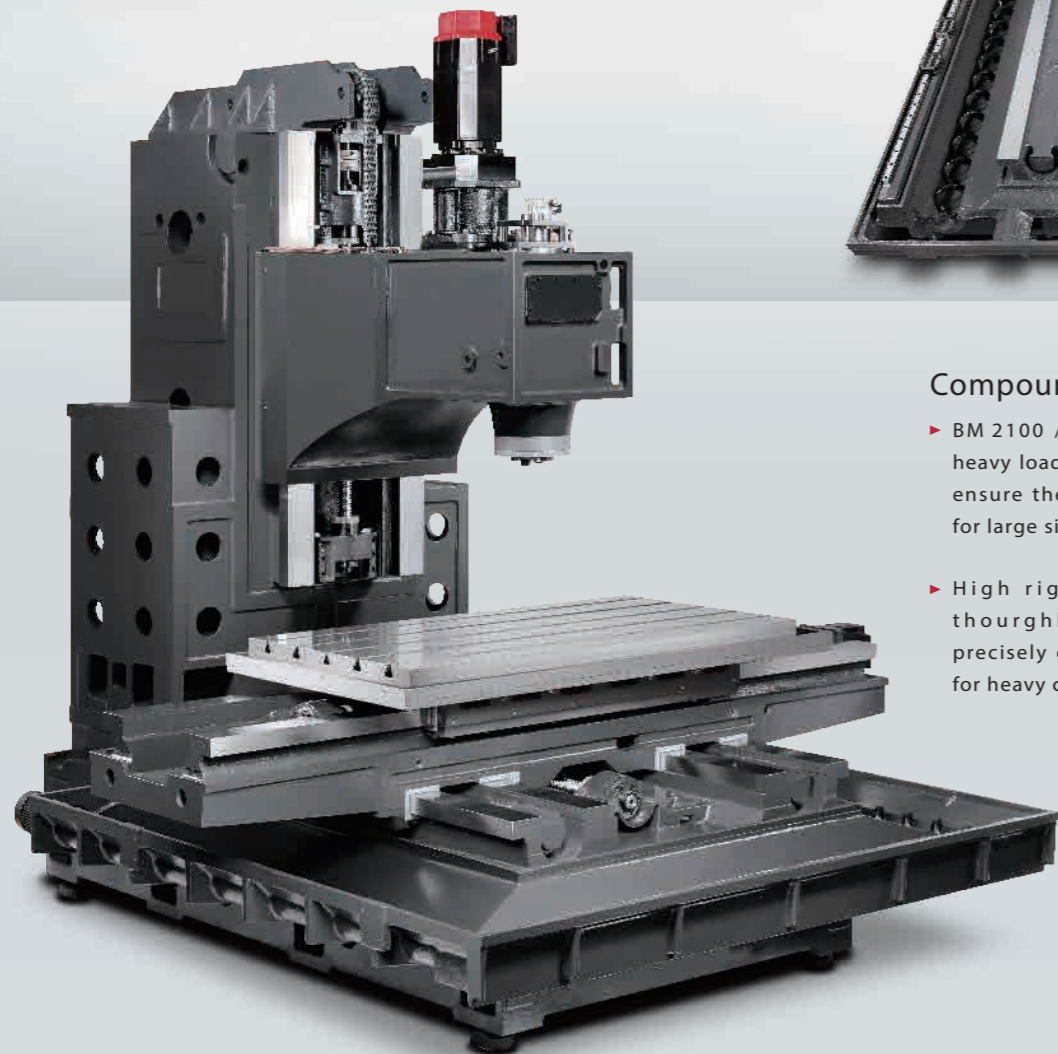
BM series

Vertical Machining Center

Super-rigidity Box Ways Excellent Hand Scraped Ultimate Heavy Cutting Series

- Gear spindle*1 with 3 axes box ways design provides optimal heavy cutting ability.
- Precisely hand scraped ensures the best assembly precision and structure strength.
- The quantity of chip augers depends on size of machine, which provides the optimal chip removal solution.
- Complete product portfolio can depend on needs to select #40 / #50 spindle taper.
- 24 / 30 / 36 / 60T arm type ATC. High speed servo ATC is optional available.

*1 : Belt drive, direct drive spindle (Opt.)

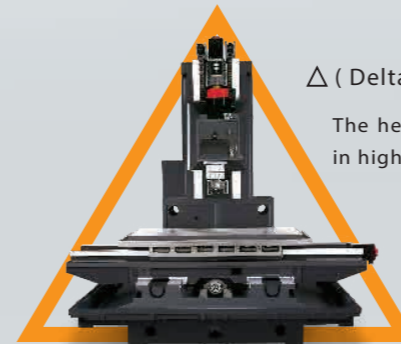


Compound 6 guide ways bed

- ▶ BM 2100 / BM 2500, bed adopts heavy load 6 guide ways design to ensure the best support stiffness for large size table and saddle.
- ▶ High rigidity box ways are thoroughly heat treated and precisely grind, which is suitable for heavy cutting

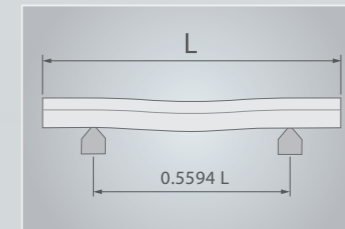


Automatic Pallets Changer (Opt.)
(AF860 is also optional available.)



△ (Delta) wide span column structure

The headstock retains stable even in high speed movement.



BESSEL POINTS

Bessel Point concept provides the stable support on Y-axis saddle to keep in minimum deformation, thus to enhance the table dynamic accuracy.

		BM 850	BM 1020	BM 1200	BM 1460	BM 1400	BM 1600	BM 1800	BM 2100	BM 2500
X-axis travel	mm	850	1,020	1,200	1,400	1,400	1,600	1,800	2,100	2,500
Y-axis travel	mm	600			800			1,000		
Z-axis travel	mm	600			700	800		1,000		
Table size (X x Y)	mm	1,050 x 600	1,120 x 600	1,300 x 600	1,500 x 650	1,500 x 800	1,700 x 800	2,000 x 800	2,300 x 1,000	2,700 x 1,000
Table load capacity	kg	850	1,000	1,200	1,400	1,800	2,000	2,200	3,000	4,000
Spindle speed	rpm	Gear drive 8,000				Gear drive 6,000				
Spindle taper		BT40 (BT50 Opt.)			BT50 (BT40 Opt.)			BT50		

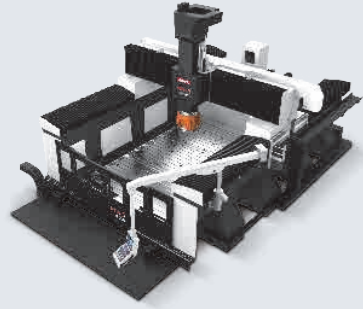
Specifications are subject to change without notice.

5-Axis Machining Centers

MEGA5 G series

Gantry type 5-Axis
Machining Centers

Travel X : 4,000 ~ 20,000 mm
Y : 3,000 ~ 4,000 mm
Z : 1,200 ~ 1,400 mm
B : ± 100° C : ± 240°



MEGA5 P series

Bridge Type 5-Axis
Machining Centers

Travel X : 2,500 ~ 6,000 mm
Y : 2,000 ~ 2,500 mm
Z : 1,000 ~ 1,200 mm
B : ± 100° C : ± 240° (Italy)
B : ± 105° C : ± 360° (Germany)



FMV-99 series

Gantry Type 5-Axis
Machining Centers

Travel X : 800 mm
Y : 900 mm
Z : 660 mm
A : -120° ~ +30° C : 360°



FCV-620 series

High Speed 5-Axis
Machining Centers

Travel X : 635 mm
Y : 535 mm
Z : 460 mm
B : -50° ~ +110° C : 360°



5-Axis Machining Centers

FV-960 series

Vertical 5-Axis
Machining Centers

Travel X : 960 mm
Y : 600 mm
Z : 480 mm
A : -42° ~ +120° C : 360°



Horizontal Boring Mills

JB series

Floor Type
Horizontal Boring Mills

Travel X : 3,000 ~ 10,000 mm
Y : 1,800 ~ 3,600 mm
Z : 450 mm
V : 1,300 ~ 2,500 mm
W : 900 mm



BL series

Heavy Load
Horizontal Boring Mills

Travel X : 2,000 ~ 4,000 mm
Y : 1,800 ~ 2,400 mm
Z : 1,300 ~ 1,700 mm
W : 600 mm



MB series

High precision
Horizontal Boring Mills

Travel X : 1,500 ~ 2,000 mm
Y : 1,200 mm
Z : 900 mm
W : 500 mm



Horizontal Machining Centers

AH series

High Performance
Horizontal Machining Centers

Travel X : 780 ~ 1,020 mm
Y : 670 ~ 900 mm
Z : 650 ~ 900 mm



Vertical Machining Centers

BM series

Super-rigidity
Vertical Machining Centers

Travel X : 850 ~ 2,500 mm
Y : 600 ~ 1,000 mm
Z : 600 ~ 1,000 mm



AF series

High Performance
Vertical Machining Centers

Travel X : 510 ~ 1,800 mm
Y : 400 ~ 800 mm
Z : 330 ~ 800 mm



BM-APC series

Vertical Machining Centers With
Auto Pallet Changers

Travel X : 850 mm
Y : 600 mm
Z : 600 mm



Bridge Type 5-Face Machining Centers

MVP series

Moving Cross Rail Bridge Type
5-Face Machining Centers

Travel X : 4,000 ~ 7,000 mm
Y : 3,200 ~ 4,000 mm
Z : 1,000 ~ 1,400 mm
W : 1,250 mm



HP series

Bridge Type 5-Face
Machining Centers

Travel X : 3,200 ~ 8,200 mm
Y : 2,100 ~ 4,900 mm
Z : 850 ~ 1,400 mm



HVM series

Bridge Type 5-Face
Machining Centers

Travel X : 3,000 ~ 7,000 mm
Y : 2,500 ~ 4,500 mm
Z : 1,000 ~ 1,400 mm



LP-F series

Bridge Type 5-Face
Machining Centers

Travel X : 2,500 ~ 7,000 mm
Y : 1,600 ~ 4,000 mm
Z : 760 ~ 1,400 mm



Bridge Type Machining Centers

LP series

Bridge Type
Machining Centers

Travel X : 2,500 ~ 7,000 mm
Y : 1,600 ~ 4,000 mm
Z : 760 ~ 1,400 mm



SP series

Bridge Type
Machining Centers

Travel X : 2,100 ~ 4,000 mm
Y : 1,600 mm
Z : 760 mm



VP series

Bridge Type
Machining Centers

Travel X : 1,600 ~ 5,000 mm
Y : 1,200 mm
Z : 760 mm



HD series

Bridge Type
Machining Centers

Travel X : 2,000 ~ 3,000 mm
Y : 1,200 mm
Z : 760 mm



Horizontal Machining Centers

AH series

High Performance
Horizontal Machining Centers

Travel X : 780 ~ 1,020 mm
Y : 670 ~ 900 mm
Z : 650 ~ 900 mm



Vertical Machining Centers

BM series

Super-rigidity
Vertical Machining Centers

Travel X : 850 ~ 2,500 mm
Y : 600 ~ 1,000 mm
Z : 600 ~ 1,000 mm



AF series

High Performance
Vertical Machining Centers

Travel X : 510 ~ 1,800 mm
Y : 400 ~ 800 mm
Z : 330 ~ 800 mm



BM-APC series

Vertical Machining Centers With
Auto Pallet Changers

Travel X : 850 mm
Y : 600 mm
Z : 600 mm



Bridge Type Machining Centers

LG series

Gantry Type
Machining Centers

Travel X : 4,000 ~ 20,000 mm
Y : 3,000 ~ 7,000 mm
Z : 1,000 ~ 1,400 mm



Bridge Type High Speed Machining Centers

SP-HSS series

Bridge Type High Speed
Machining Centers

Travel X : 2,000 ~ 3,000 mm
Y : 1,200 ~ 1,600 mm
Z : 760 mm



F series

Compact Bridge Type High
Speed Machining Centers

Travel X : 700 ~ 1,000 mm
Y : 500 ~ 1,000 mm
Z : 350 ~ 500 mm



AT series

High Speed
Tapping Centers

Travel X : 510 mm
Y : 400 mm
Z : 350 mm

