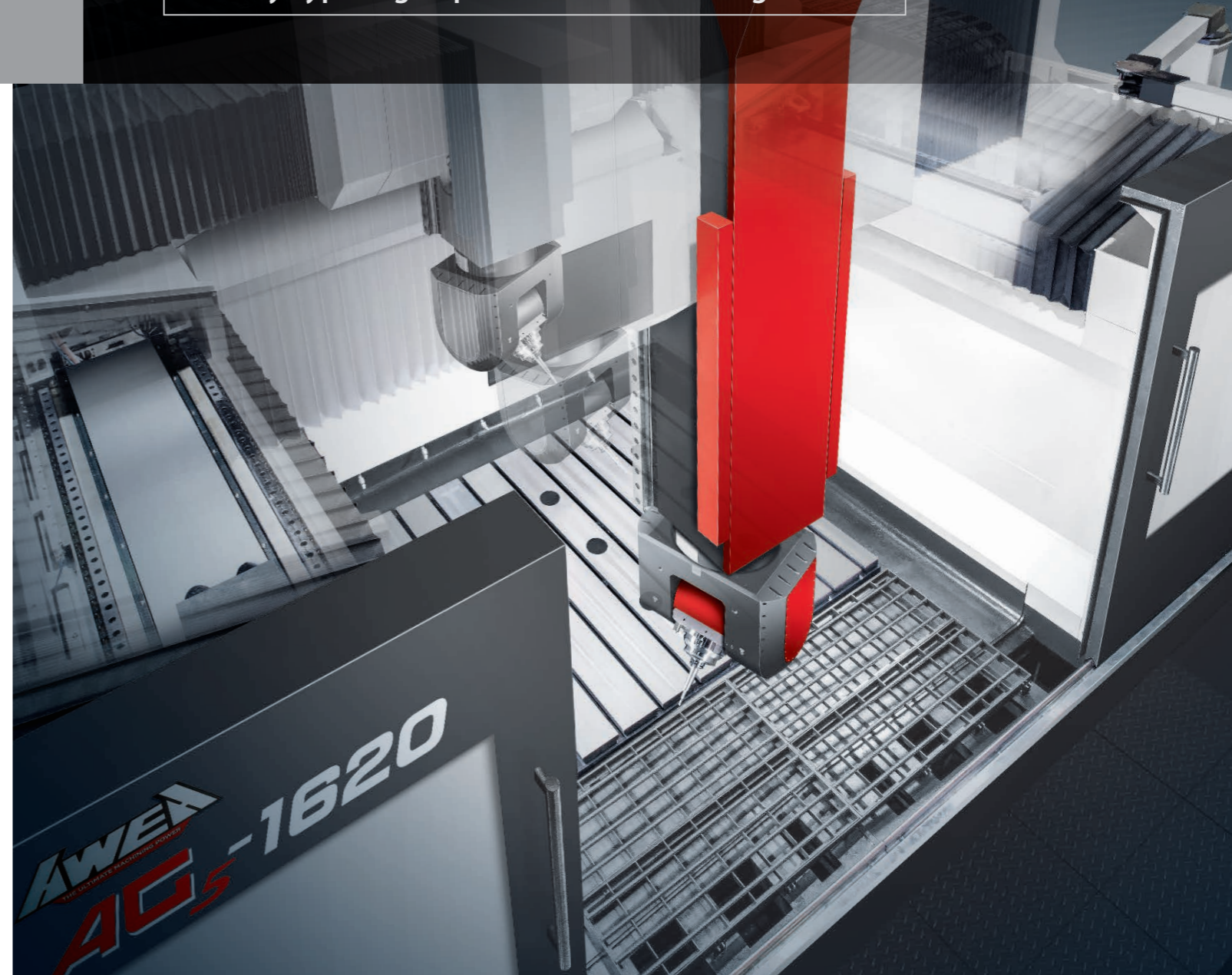




AG5 series

AG5 SERIES

Gantry Type High Speed 5 axes Machining Centers



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5 AXES TECHNOLOGY

Comprehensive 5 Axes Machine Product Lines

Structural Features

- Vertical Type
- Horizontal Type
- Bridge Type
- Gantry Type

Rotary-axis Features

- High Performance Trunnion Tables
- ITALIAN Made Two Axes Head

High-quality finishes in aerospace and die / mold applications

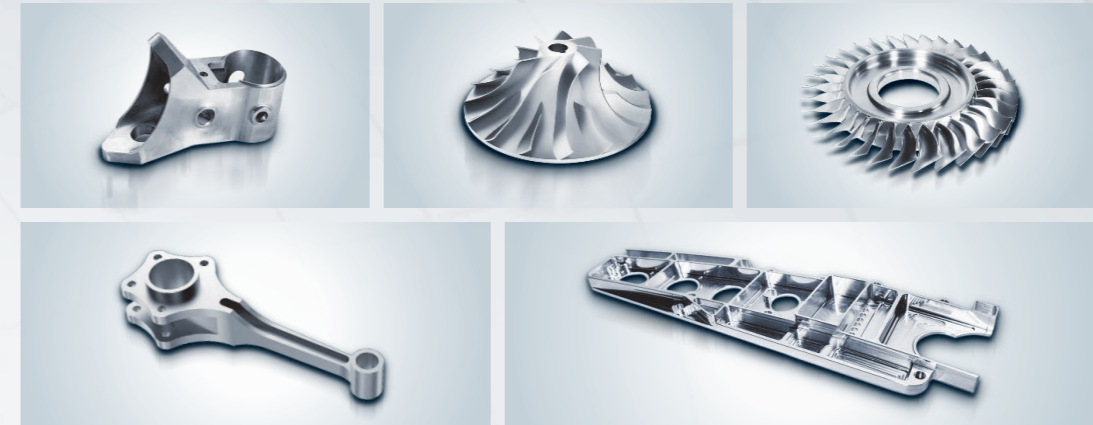


Table Size
Ø 210 mm

Table Size (X x Y)
10,000 x 4,800 mm



FV SERIES

High Performance Trunnion Table

A-axis : ±100° *1
-42°~+120° *2
C-axis : ±360°
Table size : Ø 210 mm*1
Ø 350 mm*2

*1 FV-560 *2 FV-960

EH5 SERIES

High Performance Trunnion Table

A-axis : -120° ~ +42°
B-axis : ±360°
Table size : Ø 400 mm

FCV-620 SERIES

High Performance Trunnion Table

B-axis : -50° ~ +110°
C-axis : ±360°
Table size : Ø 650 mm

FCV-800S SERIES

High Speed Rotary Table

A-axis : -120° ~ +30°
C-axis : ±360°
Table size : Ø 850 mm
Turning speed : 800 rpm

AG5 SERIES

ITALIAN Made Two Axes Head

B-axis : ±100°
C-axis : ±250°
X / Y axes driven by high speed linear motors

RG5 SERIES

ITALIAN Made Two Axes Head

B-axis : ±100°
C-axis : ±250°
Advanced feed system with cooling technology

MEGA5 P SERIES

ITALIAN Made Two Axes Head

B-axis : ±100°
C-axis : ±250°
Bridge type structure

MEGA5 G SERIES

ITALIAN Made Two Axes Head

B-axis : ±100°
C-axis : ±250°
Gantry type structure

(Additional milling heads with different features and rotation angles are available on request.)

Gantry type rigid structure

- 40% less floor space required compared to other bridge type machines with similar travel ranges.
- All axial movements are executed by the cutting tool instead of the work-piece, causing less load on the axes and thus improving dynamic accuracy.

High performance B/C two axes head

- ITALIAN made two axes head designed for high performance & high stability.
- A variety of milling heads are available optionally - high rotation speed / high torque / compact structure.

Advanced axial feed system

- The X and Y axes are driven by linear motors providing low wear, zero backlash and high acceleration.
- The Z-axis is driven by symmetrically arranged servo motors and ballscrews providing optimal dynamic performance.
- The standard HEIDENHAIN linear scales ensure precise positioning accuracy.

Environment-friendly technology

- The GERMAN made hydraulic unit requires only 20% of the space ordinary hydraulic units occupy. It uses up to 90% less electricity than traditional hydraulic units, thus significantly reducing running costs.

Competent after-sales service

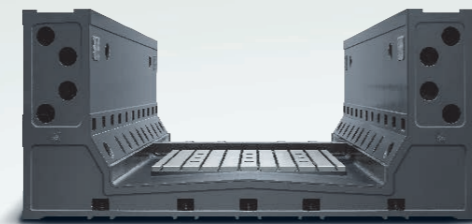


AWEA technicians have attended TECHNAI OEM training in Italy and can provide fast and efficient after-sales service for the two axes head to considerably reduce machine downtime and costs for our customers.



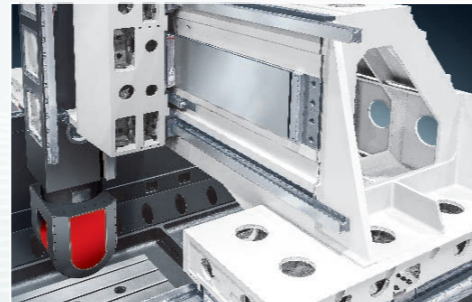
Four guide ways on a U-shaped base

- The highly rigid U-shaped machine base provides shock dampening and extremely low deformation properties. It offers excellent support for all moving members even under high-speed and heavy cutting conditions.
- The X-axis is supported by 4 linear guideways and 12 sliding blocks, that provide excellent rigidity and enhance accuracy.



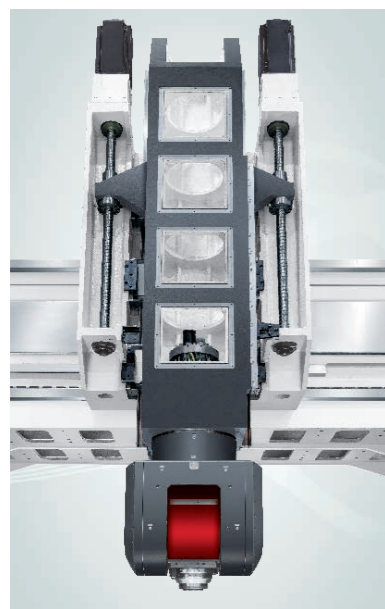
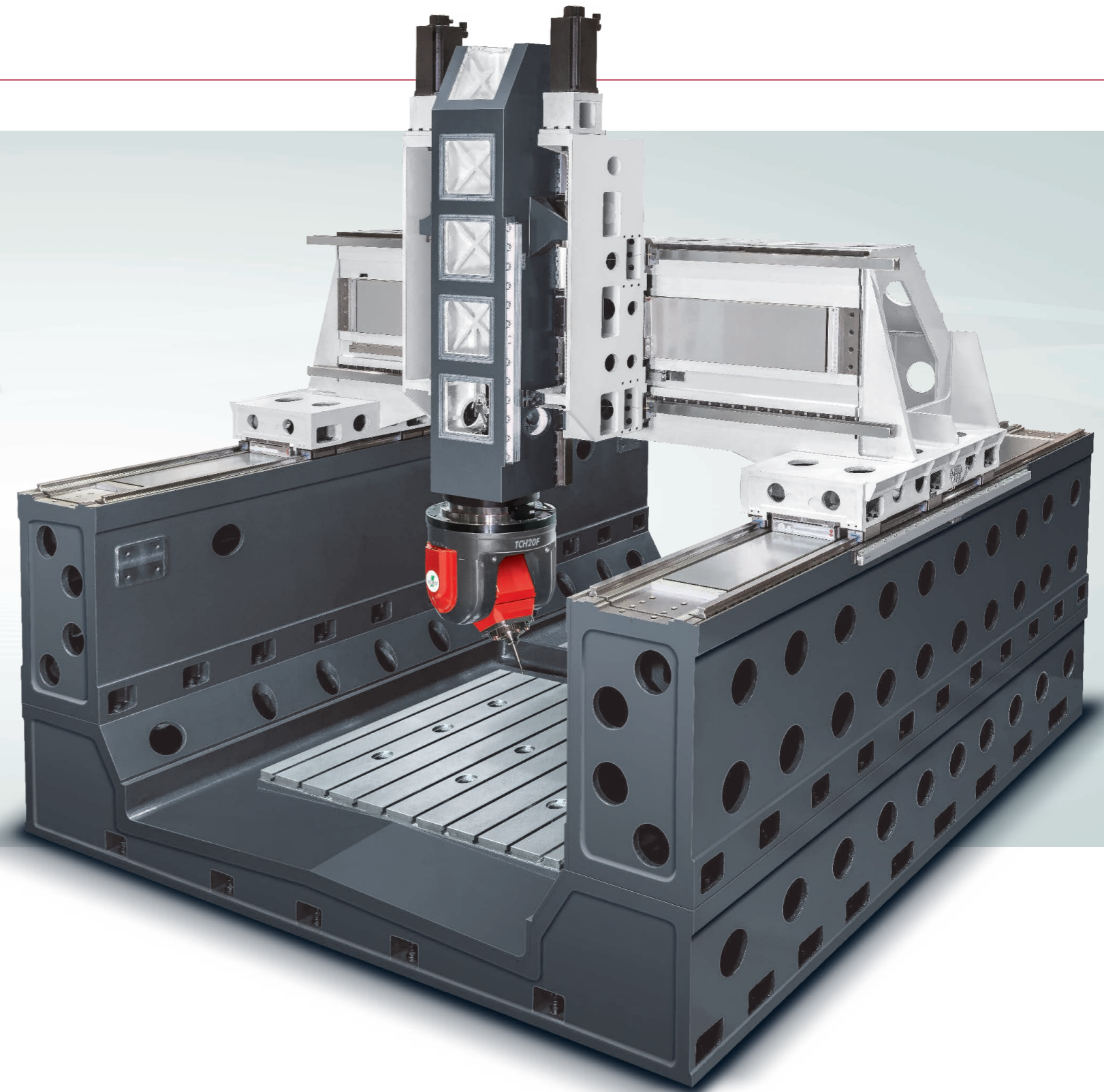
One-piece cast box structure cross beam

- The highly tensioned Y-axis' box structure with special light weight rib enhancements provides the structural rigidity needed for heavy cutting. It reduces the inertia during high speed movements and adds significantly to the dynamic response ability of the X-axis.



High rigidity roller type linear guide ways

- The super rigid roller type linear guide ways on the X, Y and Z axes provide heavy-duty cutting, fast movement and low friction capabilities.



Super rigid headstock structure

Symmetrically arranged servo drive motors

- The Z-axis adopts a dual drive system with two servo motors and ballscrews arranged symmetrically to balance torque and control thermal distortion, thus offering heavy duty cutting with optimal accuracy.

Super rigid headstock structure

- Two linear guideways with three sliding blocks each support the headstock. They ensure excellent machining accuracy even when the Z-axis is fully extended.
- The headstocks' multi-layered box structure design is light weight and highly rigid. It also offers excellent cooling properties, thereby ensuring optimal accuracy during long term precision cutting operations.

Standardly equipped with high resolution linear scales

- X / Y / Z equipped with resolution at $0.01 \mu\text{m}$ HEIDENHAIN linear scale, achieves ultimate repeatability accuracy.
- B, C axes are respectively equipped with HEIDENHAIN and AMO rotary encoder.



The X and Y axes are driven by contactless linear motors. Compared to traditional motors they offer better positioning accuracy and higher efficiency. The drive system is frictionless and free of wear and tear, thus enhancing the dynamic responses of the axes and ultimately the surface quality of the work piece.

High Speed

- Ample 17,000 Nm (peak) thrust European made linear motors.
- Without any internal friction the full thrust is available to move the axes.
- Closed-loop high-resolution optical scales on all linear axes ensure optimal accuracy.
- Axial control with optimized parameters.

	Compare Models	V.S	AG5 series	
	Servo Motor Drive Ball Screw		Linear Motor Direct Drive	
Acceleration	0.2G		0.5G	↑ 250%
Rapid Feed Rate	15 m/min.		60 m/min.	↑ 400%

High Precision

- Optimal positioning accuracy with zero backlash.
- Free of internal friction and wear the linear motors ensure high accuracy for a long time.
- The comprehensive coolant circulation design effectively reduces thermal deformation.

Cooling System

The built-in spindle, the B and C axes direct drive motors, as well as the X and Y axes linear motors are equipped with a comprehensive cooling system to ensure high accuracy in long-term and heavy duty operations.



AG5 series

ITALIAN Made Two Axes Head

The rigid fork structure of the two axes head is made from GGG40 modular graphite cast iron and can easily sustain and disperse the complex cutting forces imposed on it during heavy cutting.

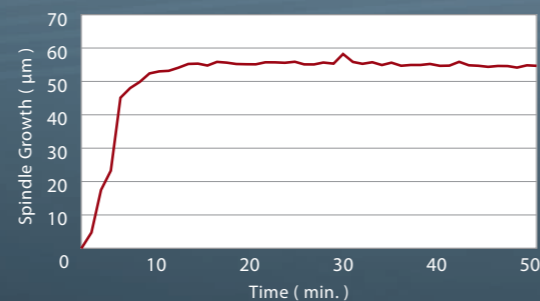
Two Axes Heads Line-up

Models	Taper	Max. Speed	Motor Output*2
TCH-20F	HSK-A63	24,000 rpm	42 / 55 kW
TCH-19	HSK-A63	24,000 rpm	42 / 55 kW
KESSLER*1	HSK-A63	24,000 rpm	37 / 46 kW

*1 GERMAN made two axes head *2 S1 / S6 40%

Thermal stability of the spindle

The spindle reaches thermal stability within 10 minutes from a cold start; afterwards thermal expansion is limited to less than 0.01 mm, even during long time machining.



Advanced B, C axes structure

- Driven by three direct drive motors that provide high rotation speed, high torque and zero backlash.
- Equipped with cross roller bearings to sustain axial and radial loads from all directions.
- Disk type hydraulic clamping system featuring agile response and better heat dissipation to accommodate frequent clamping demands.
- High resolution absolute encoders ensure optimal machining accuracy.

	B-axis	C-axis
Max. speed	50 rpm	50 rpm
Max. acceleration	30 rad/sec ²	30 rad/sec ²
Max. torque	1,400 Nm (TCH-20F) / 1,100 Nm (TCH-19)	1,300 Nm (TCH-20F) / 900 Nm (TCH-19)
Clamping torque	4,000 Nm	4,000 Nm
Position accuracy	± 3 arc.sec	± 3 arc.sec
Rotary angle	± 100°	± 250°

Please refer to page 13 for specifications of & KESSLER series.

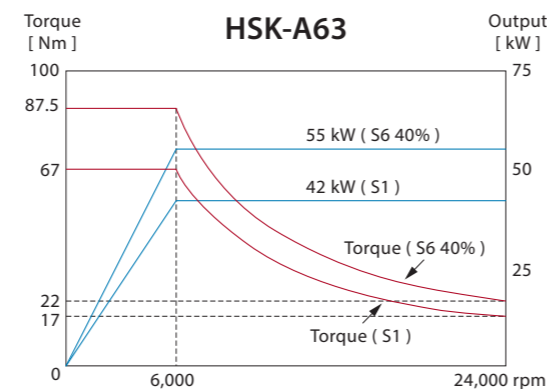
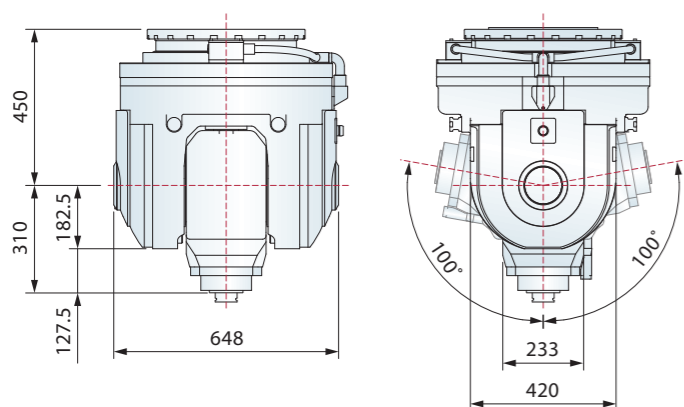


The symmetric fork structure

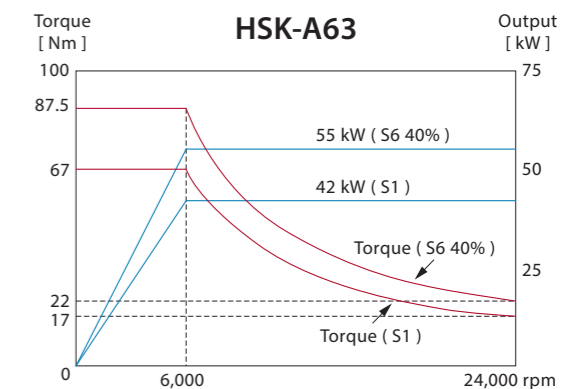
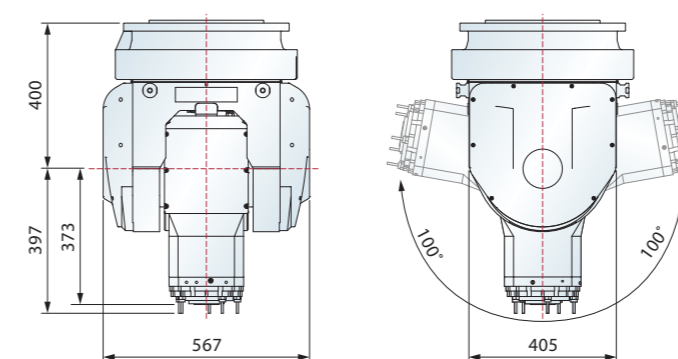
Compact design with low interference

High torque direct drive motors

TCH-20F High Speed Built-in Spindle Standard

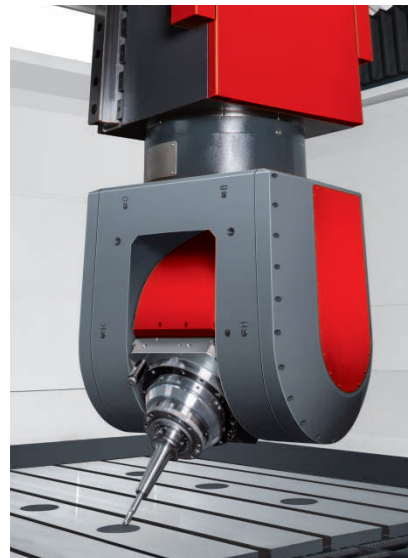


TCH-19 High Speed Built-in Spindle Optional



High reliability ATC system

- The 24T / 30T carousel type ATC imposes no force on the spindle bearings during tool changes, thus effectively extending the spindle's service life.
- The tool magazine is fully isolated from the work area. The auto door opens during tool changes only, thus preventing chips and coolant from contaminating the ATC mechanism, the tool magazine, and the tools and thereby ensuring long term tool change accuracy.



GERMAN made two axes head (KESSLER) Optional

	B-axis	C-axis	Spindle	
Max. speed	100 rpm		Motor output (S1 / S6 40%)	37 / 46 kW
Max. acceleration	30 rad/sec ²		Max. torque (S1 / S6 40%)	60 / 73 Nm
Max. torque	1,200 Nm	1,100 Nm	Max. speed	24,000 rpm
Clamping torque	2,160 Nm	3,024 Nm	Taper	HSK-A63
Position accuracy	± 5 arc.sec	± 3 arc.sec		
Rotary angle	± 105°	± 360°		

Standard Accessories

- Spindle air curtain
- Spindle cooling system
- Coolant nozzle around spindle
- Chips flush coolant system
- Carousel type 24 tools magazine
- X / Y / Z axes with optical linear scales
- Centralized automatic lubrication system
- Spindle oil mist lubricant collecting device
- Coolant system with pump and tank
- Caterpillar type chip conveyor and bucket
- Full splash guard w/o roof
- Electric cabinet with air conditioner
- Swing type control panel
- MPG
- Foundation bolt kit

Optional Accessories

- Spindle thermal compensation
- Gravity axis anti-drop function
- 20 / 40 bar coolant through spindle
- Carousel type 30 tools magazine
- Automatic tool length measurement
- Automatic work piece measurement
- Oil skimmer
- 19" LCD
- Transformer

		AG5-1620	AG5-3220
SPECIFICATIONS			
X-axis travel	mm	1,600	3,200
Y-axis travel	mm	2,000	
Z-axis travel	mm	1,000	
Dist. between columns (with water eliminator)	mm	3,000 (2,805)	
Dist. from spindle nose to table top (B-axis = 0°)	mm	50 ~ 1,050	
Dist. from 90° spindle center line to table (B-axis = 90°)	mm	373 ~ 1,373	
TABLE			
Table size (X x Y)	mm	1,600 x 2,000	3,200 x 2,000
T-slot (width x pitch)	mm	28 x 200	
Table load capacity	kg/m ²	3,000	
SPINDLE (TCH-20F TWO AXES HEAD)			
Spindle taper		HSK-A63	
Spindle motor (S1 / S6 40%)	kW	42 / 55	
Spindle speed	rpm	Built-in 24,000	
FEED RATE			
X / Y axes rapid feed rate	m/min.	60	
Z-axis rapid feed rate	m/min.	50	
Cutting feed rate	m/min.	1 ~ 20	
TOOL MAGAZINE			
Tool magazine capacity	T	24	
Max. tool length	mm	300	
Max. tool weight	kg	7	
Max. tool diameter / adj. pocket empty	mm	Ø100 / Ø125	
ACCURACY			
Positioning accuracy (JIS B 6338)	mm	± 0.010 / Full Travel	
Positioning accuracy (VDI 3441)	X-axis	mm	P = 0.016 / Full Travel
	Y-axis	mm	P = 0.020 / Full Travel
	Z-axis	mm	P = 0.016 / Full Travel
Repeatability (JIS B 6338)	mm	± 0.003 / Full Travel	
Repeatability (VDI 3441)	X-axis	mm	Ps = 0.012
	Y-axis	mm	Ps = 0.015
	Z-axis	mm	Ps = 0.012
GENERAL			
Coolant tank capacity	liter	900	
Lubrication oil tank capacity	liter	4.6	
Hydraulic tank capacity	liter	2.7	
Pneumatic pressure requirement	kg/cm ²	6 ~ 8 (6)	
Machine weight	kg	35,000	45,000
Max. work-piece dimension L x W x H (Tool length 150 mm)	mm	1,600 x 2,000 x 1,000	3,200 x 2,000 x 1,000

Specifications are subject to change without notice.