



# GF series

## Ultra Large 5-Axis High Speed Gantry Machining Center

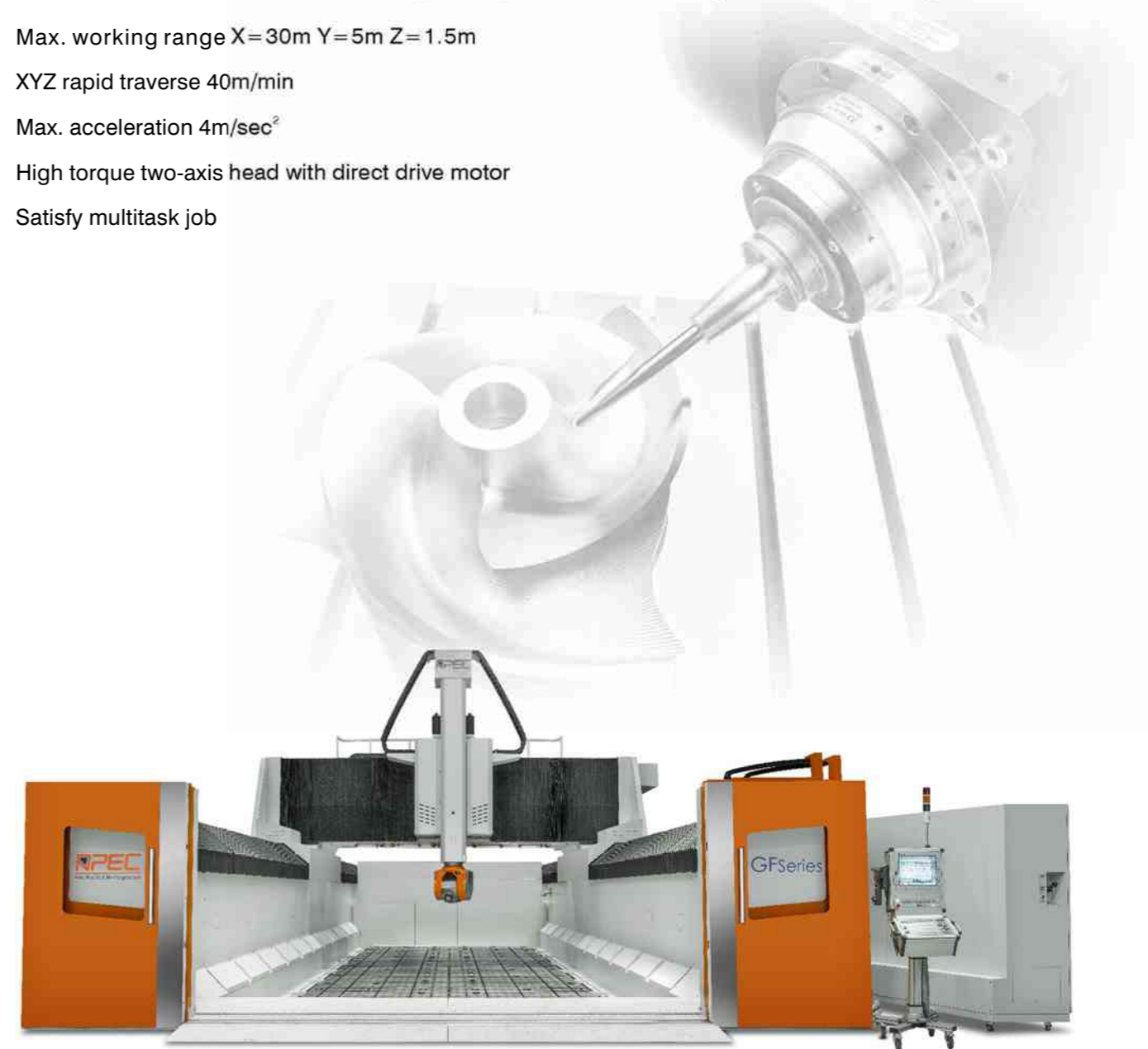
Max. working range X=30m Y=5m Z= 1.5m

XYZ rapid traverse 40m/min

Max. acceleration 4m/sec<sup>2</sup>

High torque two-axis head with direct drive motor

Satisfy multitask job



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## APEC Wide ranges of large-scale machining centers

### G Series

X=1.6~12 mm Y=2.0~3.0 mm  
Rapid traverse=60 m/min



### GL Series

X=1.6~12 mm Y=2.2~3.2 mm  
Rapid traverse=60 m/min



### GM Series

X=1.6~12 mm Y=2.2~3.2 mm  
Rapid traverse=60 m/min



### GF Series

X=6.0~30.0 mm Y=3.5~5.0 mm  
Rapid traverse=40 m/min



### MT Series

X=2.2~7.2 mm Y=1.6~3.2 mm  
Rapid traverse=12 m/min



### Auto attachment heads



### Built-in-motor drive attachment heads



### Manual attachment heads

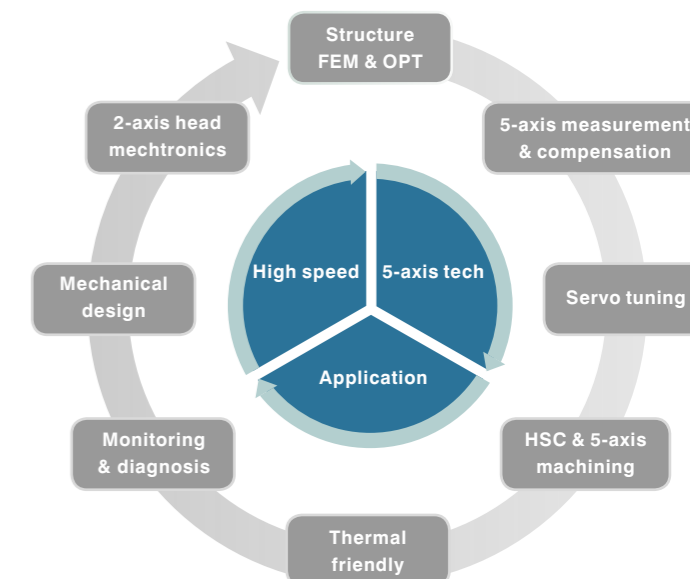


### Unchangeable attachment heads



## About Asia Pacific Elite Corp.

Creating benchmarks of large-scale 5-axis expert for high speed gantry machining center



## MAJOR STRENGTHS

### Wealth and successful practical experience which meets customer requirements

We already completed the first machine delivery and installation overseas. We continue delivering machines to Taiwan and overseas industry, such as mold, automotives, aerospace, special electrical equipment, etc.

### Maintenance ability for 5-axis key parts, and owns complete spare parts

Benefit from the cumulative number of 5-axis machine sales, we had established a comprehensive spare parts warehouse for faster replacement and repair.

After transferring 5-axis assembly and maintenance technique from Europe to APEC, we have a professional team to maintain and assembly milling heads.

### Assist customers to implement 5-axis technology

With complete 5-axis technology, APEC has been successfully counseling and implementing 5-axis machining technology to many customers.

We are able to provide a professional 5-axis training.

### Spent a long period in researching and developing large-scale 5-axis machines, and continue to explore insight of 5-axis technology

APEC has passed through a national science plan, and becomes the 1st successful applicant of a large-scale machine tool manufacturer in Taiwan.



# High rigidity structure design

The driving mechanisms are designed symmetrically on both sides of ram ; the principle of driving in the gravity center can reduce vibration during high speed movement.

The ram of Z-axis, made of ductile cast iron with appropriate damping feature, supplies high anti-bending strength and stable cutting condition for large Z-axis ranges.

25% working area is saved compared with conventional type machine for more flexibility of manufacturing and application.

Complete foundation plan and standard for customers carries out permanent working performance perfectly.

Cross rail drives on both side walls keep moving units away from the dirt area, and linear guides on both side walls are designed with optimized span for working stability.

Two-axis head with torque motor driving system is the best solution to achieve extreme precision and high efficiency production in multi-axis machining field.

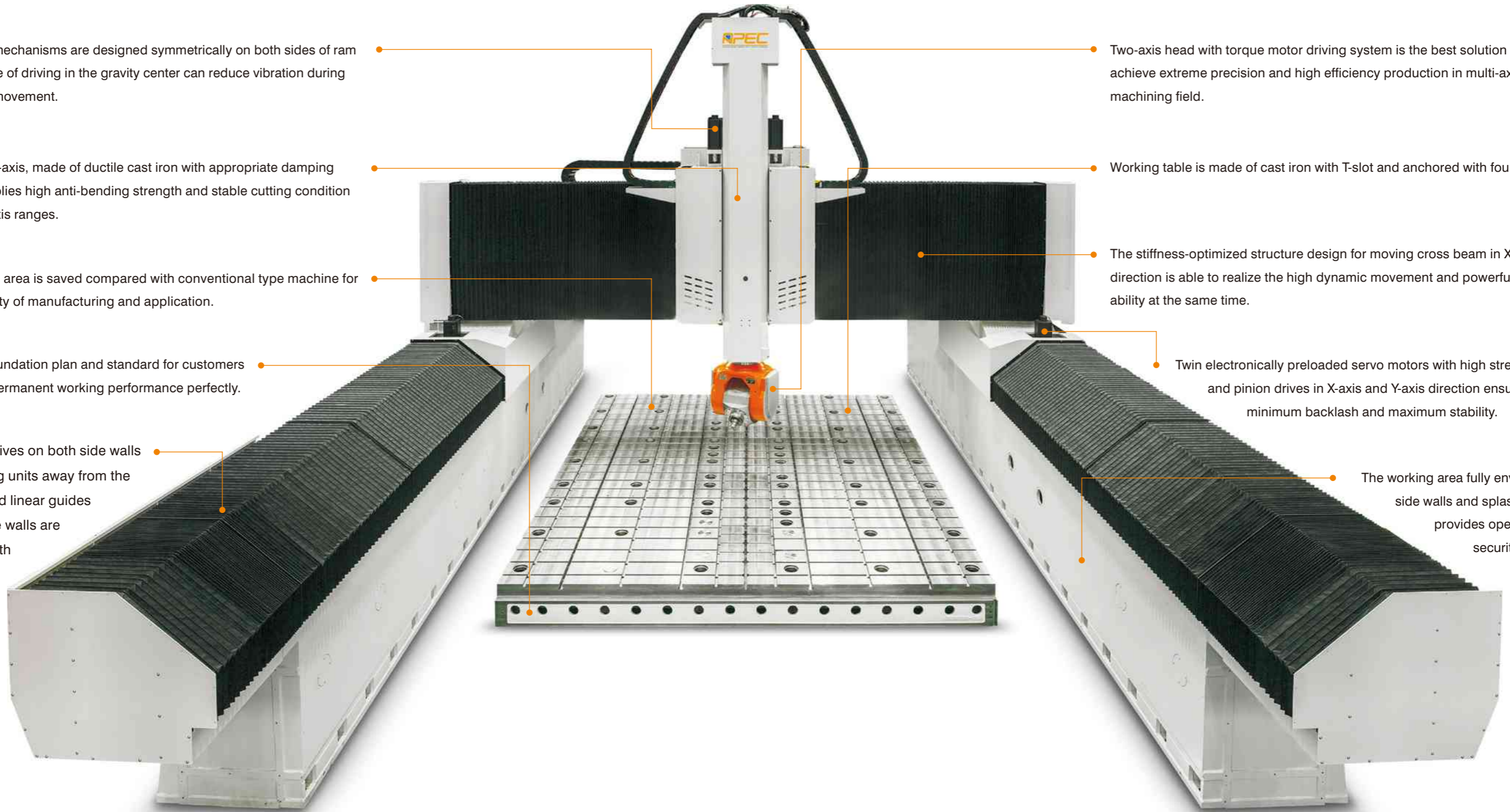
Working table is made of cast iron with T-slot and anchored with foundation.

The stiffness-optimized structure design for moving cross beam in X-axis direction is able to realize the high dynamic movement and powerful cutting ability at the same time.

Twin electronically preloaded servo motors with high strength rack and pinion drives in X-axis and Y-axis direction ensure minimum backlash and maximum stability.

The working area fully enveloped by side walls and splash guards provides operators security while

working, the front doors have transparent windows for inspection.





# Excellent 5-axis capability

## Magic Vertical Slider

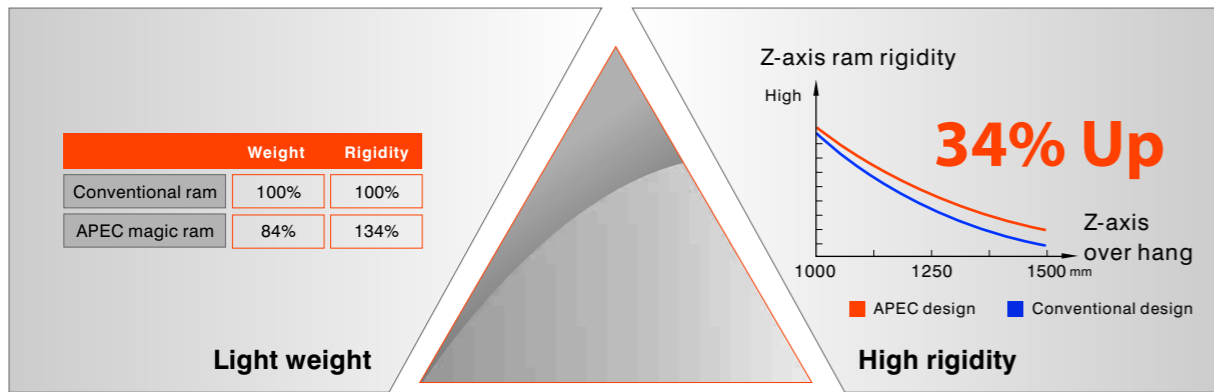
In order to achieve large working space for GF series to carry out flexible manufacturing, the stroke of Z-direction has been upgraded up to 1500 mm. In this condition, the rigidity of ram becomes a very critical issue especially as the travel over 1000 mm. A complete innovative structure design has been created through FEM analysis.

Not only the structure design is optimized but also the high strength material ductile cast iron is integrated to totally bring the powerful built-in spindle ability in to play.

By means of the innovation of GF series vertical slider, about 34% stiffness is raised compare with other conventional design and also 18% mass less. The obvious innovation improvement makes large component machining with excellent performance and high accuracy come true.

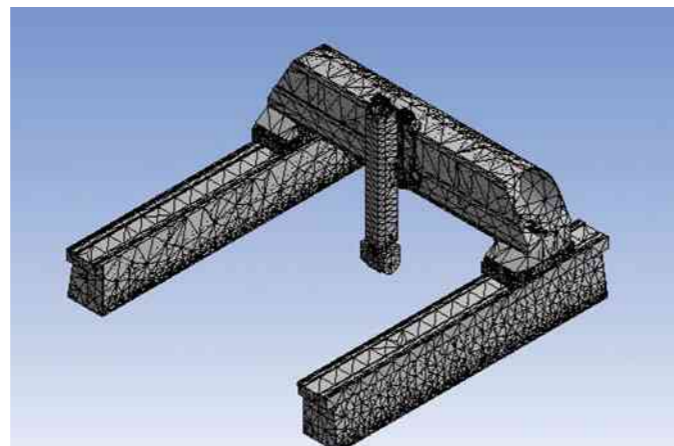


## High response



FEM analysis is integrated with 3D CAD structure design, and the dynamic feature is also concerned such as structure stability, heat symmetrization design, geometry accuracy and high speed characteristic.

With excellent technical analysis and long term experience in gantry machine design, the maximum machine precision and performance are guaranteed.



# The innovative direct drive two-axis head to minimize the setup time

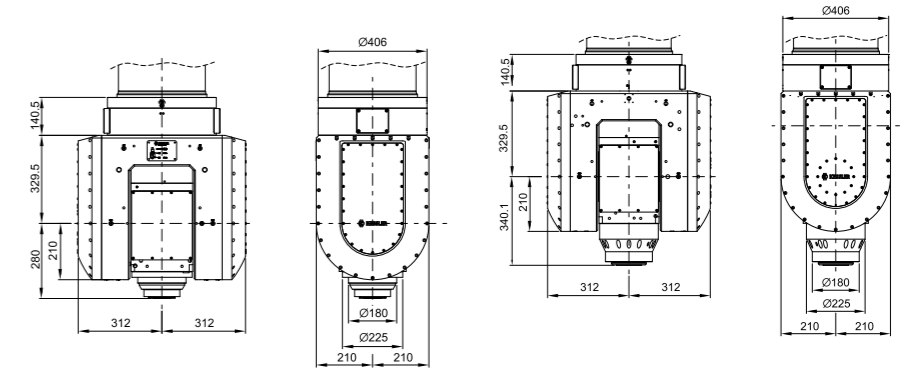
## Small size 2-axis head

Thanks to B and C axis with direct-driven motors, this is suitable for complex surface machining to achieve the best contour machining.



**24,000 rpm & 18,000 rpm / HSK 63A**

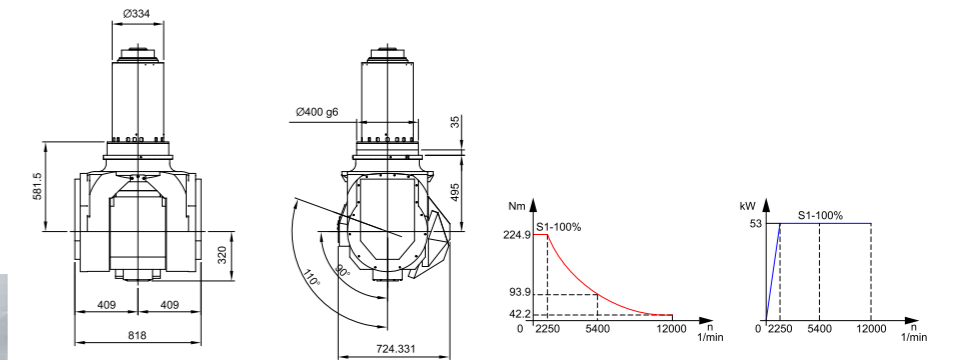
**12,000 rpm / HSK 100A**



Spindle taper	HSK 63A		HSK 100A
Spindle speed	24,000 rpm	18,000 rpm	12,000 rpm
Spindle power (S1/S6)	37 / 46 kW	56 / 69 kW	25 / 30 kW
Spindle torque (S1/S6)	60 / 73 Nm	89 / 111 Nm	120 / 144 Nm
Max. swivel / rotation speed	B=30rpm C=30rpm		
Swivel / Rotation angle	B=±105° C=±200°		

## High power and high torque 2-axis head

With powerful torque and clamping force can be flexibly applied to various machining areas.



Spindle taper	HSK 100A
Spindle speed	12,000 rpm
Spindle power (S1-100%)	53 kW
Spindle torque (S1-100%)	225 Nm
Max. swivel / rotation torque (S1-100%)	B=1,628 Nm C=640 Nm
Clamping torque	B=4,680 Nm C=6,000 Nm
Max. swivel / rotation speed	B=30rpm C=30rpm
Swivel / Rotation angle	B=±120° C=±200°

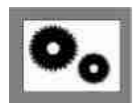


# Ensured Permanent Precision

All axes are equipped with "Twin Power"

- High Precision
- Excellent Dynamic
- Balanced Drive
- Max. Rigidity
- Less Vibration
- Less Maintenance

MAX. Acceleration : **4 m/s<sup>2</sup>**  
 Rapid traverse : **40 m/min.**



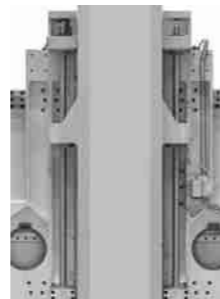
### X/Y-axis - Twin pinion with double driving power

GF series is a 5-axis machine with gantry driven technology in cross rail movement. High quality **Rack and Pinion** system is applied in X-axis and Y-axis transmission with each two preloaded servo motors. Through this driving technology, high machining quality is expected.



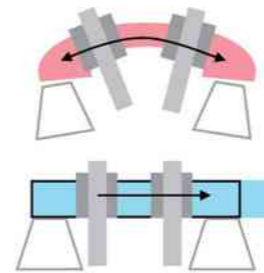
### Z-axis - Twin pinion with double driving power

In order to achieve the best response in Z-axis movement, not only hydraulic balancing compensation has been applied, the principle of drive in the gravity center must be also remained. **Twin Ball Screws** drive with master-slave control has achieved the requirement on that.



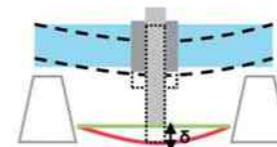
### Swiveling axis - Twin direct torque motors

The driving system for tilting head is mounted with two symmetric direct drive motors through a strong forked structure. The feature is obviously dynamic, high precision, backlash and vibration free without mechanism transmission.



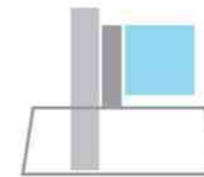
### Thermal expansion prevention strategy

The temperature variation is always a challenge for big machine tools. The expansion of material is difficult to be compensated with software. All the geometry precision will be lost and the stress caused by expansion also damages some important components of machine. Thermal expansion prevention strategy is concerned in cross rail and side wall design of GF series. It makes components of machine well protected and also ensures long term mechanism stability.



### Minimize the possible errors

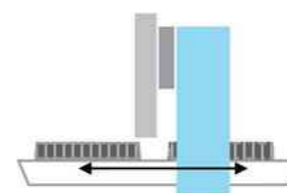
For a long travel of cross rail in Y-axis direction up to 5000 mm, the geometry deviation in Z-axis direction caused by gravity during the Y-axis movement must be concerned especially in 5-axis machining process. It is necessary to improve the stiffness and fine adjustment of cross beam to prevent any dropping error due to weakness in the middle of cross rail.



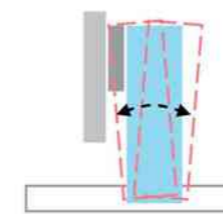
High dynamic & space saved

### High dynamic characteristic

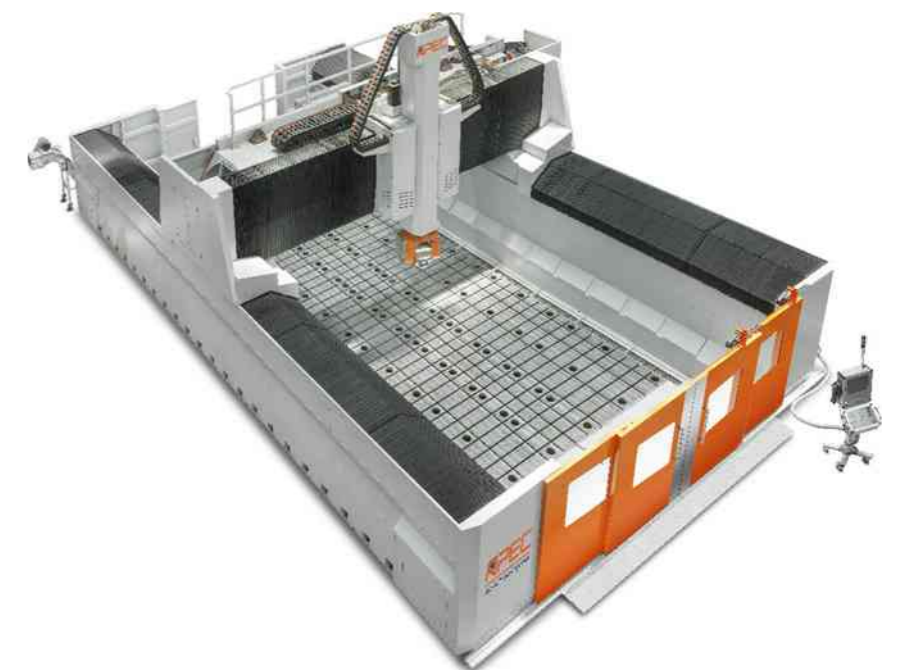
The design concept of structure for high dynamic movement is very important. The cross beam moving structure of GF series is the optimal solution for that. All the moving parts are overhead and work piece is mounted on the fixed table. It makes the work pieces transportation easier and the movement characteristic does not reduce due to the extra-loading, and also saves energy consumption.



Dynamic characteristic is not permanently stable due to the loading from different work pieces

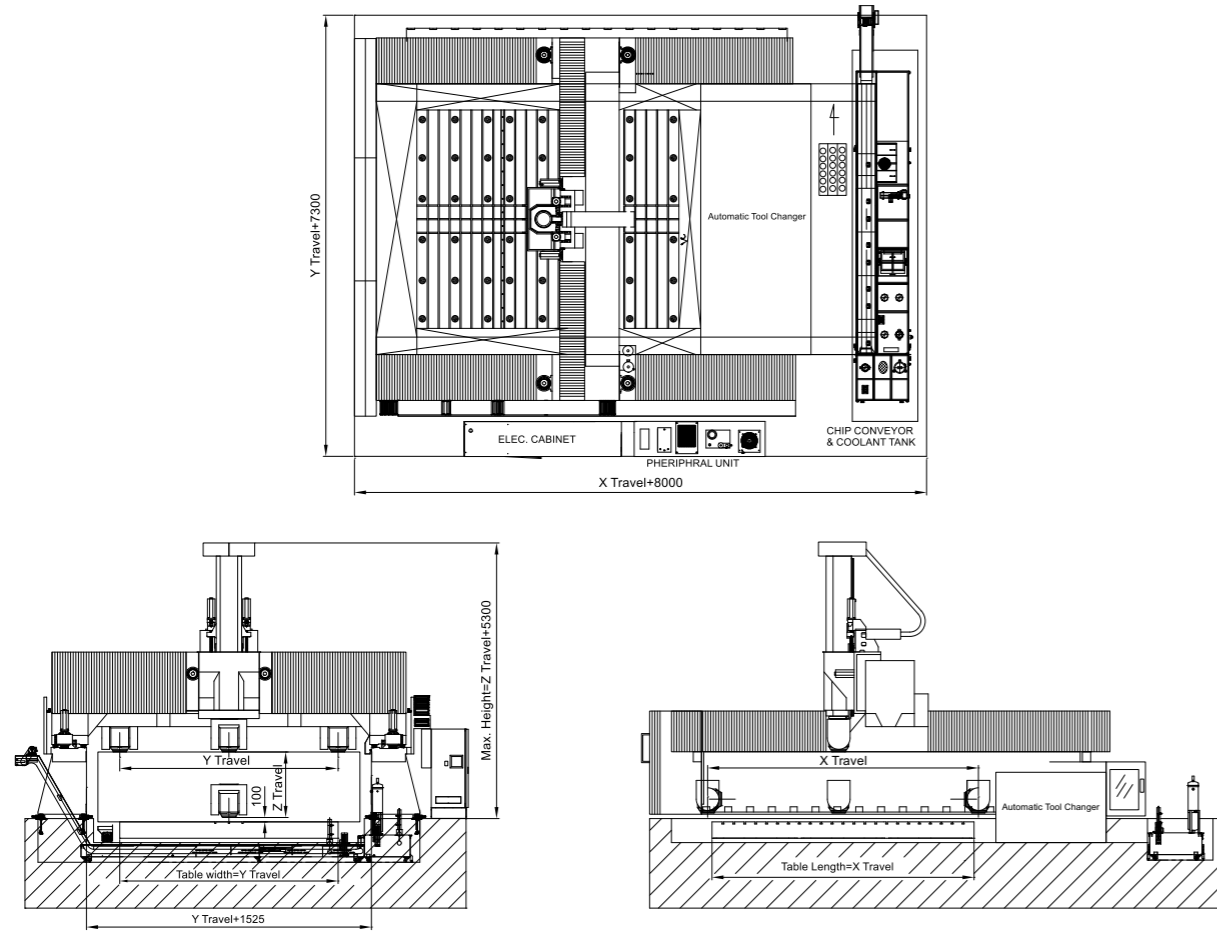


Low dynamic characteristic





# Machine layout



## Machine Accessories

### Standard accessories

- Heidenhain iTNC530 CNC controller
- 2-Axis head with HSK 63A 24,000 rpm
- 2-Axis head with HSK 100A 12,000 rpm
- Automatic tool change 40 tools
- X/Y-axis with Rack & Pinion with servo preload
- Z-axis with Twin Ball Screws
- X/Y/Z-axis with Heidenhain linear scales
- X/Y/Z-axis with roller linear guideways
- Air conditioner for electrical cabinet
- Chiller for spindle
- Spindle Oil-Air lubrication system
- Counter balance system
- Manual pulse generator
- Air conditioner for electrical cabinet
- Auger type chip conveyor
- Chip conveyor
- Transformer
- Security door interlocks
- Waterproof working lamp
- Full-enclosure splash guard (without roof)

### Optional accessories

- 2-Axis head with HSK 63A 18,000 rpm
- 2-Axis head with HSK 100A 12,000 rpm
- Dryer for spindle
- Coolant through spindle 20 / 70 bar
- Coolant around spindle nose
- External coolant supply unit
- Tool measuring system
- Workpiece measurement system
- Automatic voltage regulator
- Coolant tank with pumps
- Chip cart

# Machine specifications

Specifications	Unit	GF40	GF50	GF60
<b>Travel</b>				
X-axis	mm	6,000-30,000		
Y-axis	mm	4,000 / 5,000 / 6,000		
Z-axis	mm	1,000 / 1,300 / 1,500		
Distance between spindle nose to table surface	mm	100-1,100 100-1,410 100-1,610		
Distance between side walls	mm	5,525 / 6,525 / 7,525		
<b>Table</b>				
Table length	mm	6,000 - 30,000		
Table width	mm	4,000 / 5,000 / 6,000		
T-slot size	mm	28		
Max. table load	kg/m <sup>2</sup>	7,000		
<b>Spindle</b>				
Spindle taper		HSK 63A	HSK 100A	
Spindle speed	rpm	24,000	12,000	
Spindle power (S1/S6)	kW	37 / 46	53 (S1)	
Spindle torque (S1/S6)	Nm	60 / 73	225 (S1)	
<b>2-Axis Head</b>				
Max. swivel / rotation speed	rpm	B=30 C=30	B=30 C=30	
Max. swivel / rotation torque	Nm	B=760 C=800	B=1,200 C=2,650	
Clamping torque	Nm	B=2,160 C=3,024	B=4,680 C=6,000	
Swivel / rotation angle	degree	B=±105° C=±200°	B=±120° C=±200°	
<b>Traverse</b>				
Rapid traverse	m/min	XYZ=40		
Max. acceleration	m/sec <sup>2</sup>	XYZ=4		
<b>Automatic Tool Changer</b>				
Tool magazine capacity	pcs	40		
Max. tool length	mm	300	400	
Max. tool dimensions-with adjacent tools	mm	Ø100	Ø125	
Max. tool dimensions-without adjacent tools	mm	Ø200	Ø250	
Max. tool weight	kg	7	12	
<b>Others</b>				
Power supply	kVA	150		

X-axis traver can be incremented per 2 meters.

※ All specifications and designs are subjected to change without notice.