



# GM series

## 5-Axis High Speed Gantry Machining Center

XYZ-axis with linear motor drive

XYZ rapid traverse 60m/min

Max. acceleration 5m/sec<sup>2</sup>

Box-in-Box structure design

Two-axis head with direct drive motor

Customized design for special needs



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## APEC Wide ranges of large-scale machining centers

### G Series

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



### GM Series

X=4.0~6.0 m Y=2.2~3.0 m  
Rapid traverse=60 m/min



### GF Series

X=6.0~30.0 m Y=4.0~6.0 m  
Rapid traverse=40 m/min



### MT Series

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



### MDU Series

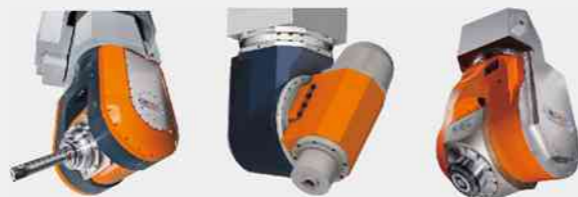
X=2.0~2.5 m Y=2.0~2.5 m  
Rapid traverse=10 m/min



### Auto attachment heads



### Built-in-motor drive attachment heads



### Manual attachment heads

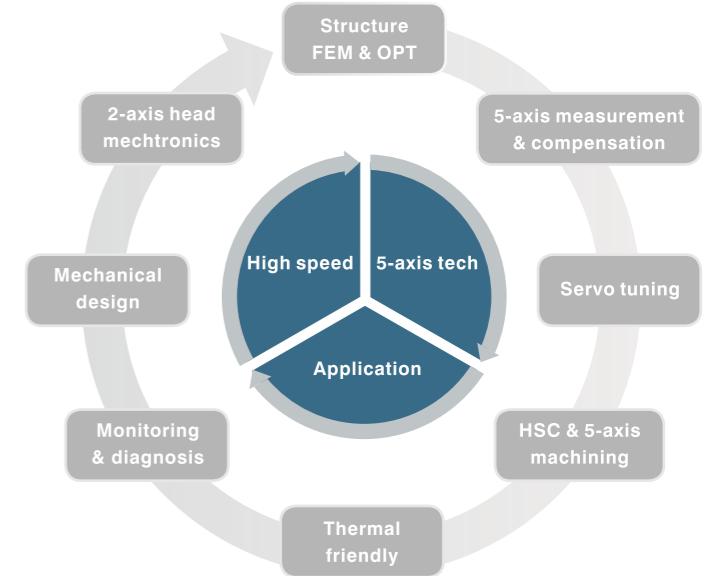


### Unchangeable attachment heads



## 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, 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.

# GM series

## Large scale high speed machining center

Designed for heavy cutting, high-speed cutting and high precision parts machining of various industries.



Car fender finishing



Aerospace rib parts



5-axis with R0.5mm pencil cleaning





## High rigidity structure design

Symmetrical geometry design with Box-in-Box structure of cross beam and saddle, with excellent force flow design decrease thermal deformation and also reduce the weight of moving parts.

Box-in-Box structure distributes the force equally to improve deformation and to perform high accuracy at high speed machining.

Ram (Z-axis) is made of innovative double-layer walls (inner and outer) structure with reinforced ribs to carry out the rigidity. With high power linear motors, linear scale and high rigid linear roller guideways to ensure simultaneous precision.

Trapezoid structure of fixed side walls (X-axis) with linear motors, linear scales and high rigid linear guideways to ensure simultaneous precision.

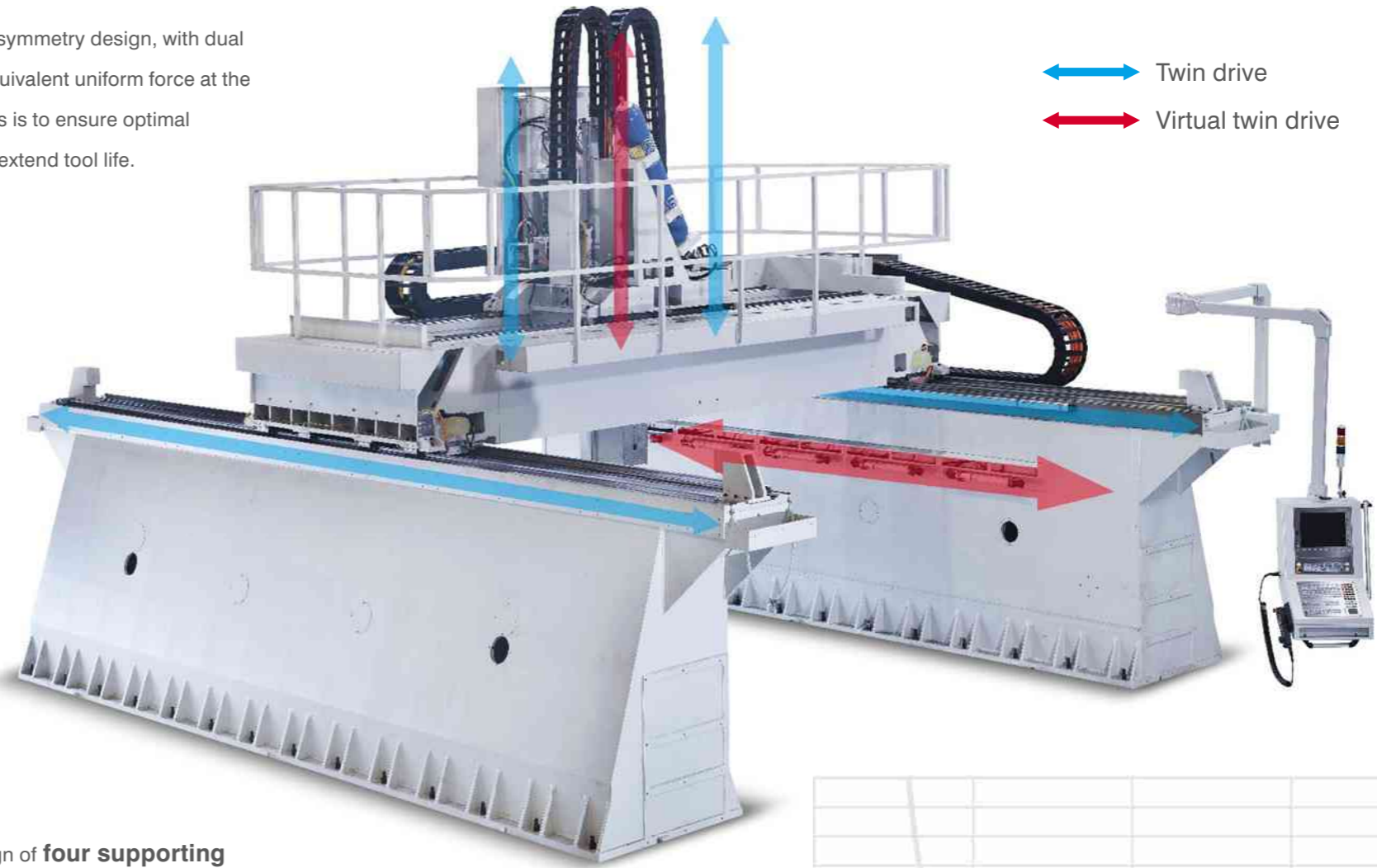




# Excellent driving at the center of gravity & force flow structure



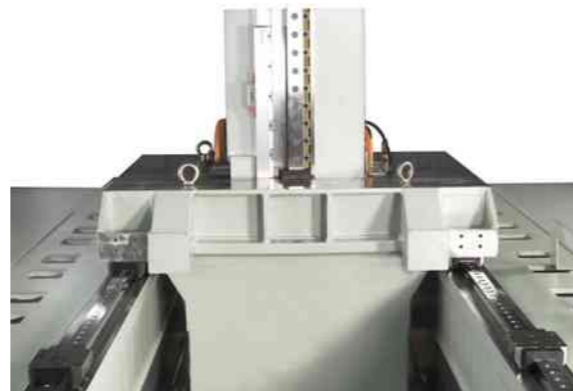
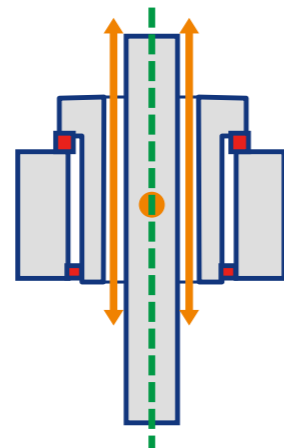
XYZ axis with force symmetry design, with dual driving units and equivalent uniform force at the center of gravity, this is to ensure optimal surface quality and extend tool life.



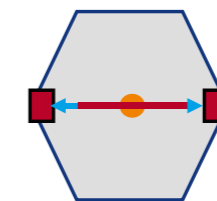
←→ Twin drive  
←→ Virtual twin drive

## Box-in-Box

The symmetry design of **four supporting points**, gravity and driving force center is coaxial, this is to perform high rigidity and high reliability.



Ram equipped with **honeycomb structure** to possess short force flow, this is to perform the best balancing design and better geometry interior.





## Excellent 5-axis capability

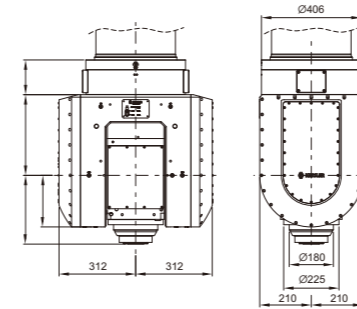


The innovative direct drive two-axis head achieve flexible applications. No matter simultaneous 3+2 axis machining or 5-axis machining or 5-face machining operation, it minimizes the setup time and reaches done-in-once process.

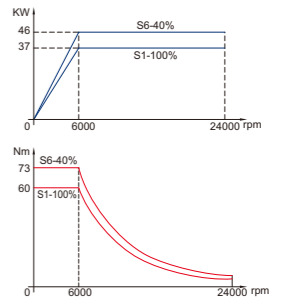
Thanks to B and C axis with direct-driven motors and XYZ motions dedicating to a high speed 5-axis synchronizations in precious free surface machining.

## Multiple spindle choices to achieve wide ranges of applications

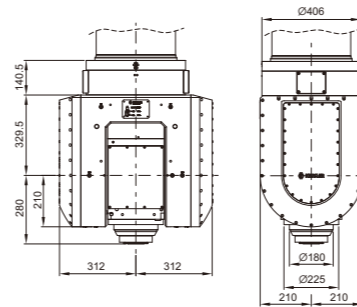
### 24,000 rpm / HSK 63A



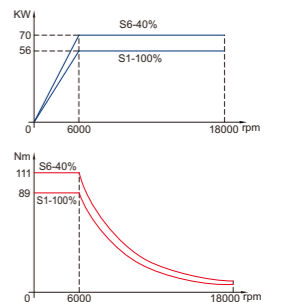
|                              |                 |
|------------------------------|-----------------|
| Spindle taper                | HSK 63A         |
| Spindle speed                | 24,000 rpm      |
| Spindle power (S1/S6)        | 37 / 46 kW      |
| Spindle torque (S1/S6)       | 60 / 73 Nm      |
| Max. swivel / rotation speed | B=30rpm C=30rpm |
| Swivel / Rotation angle      | B=±105° C=±200° |



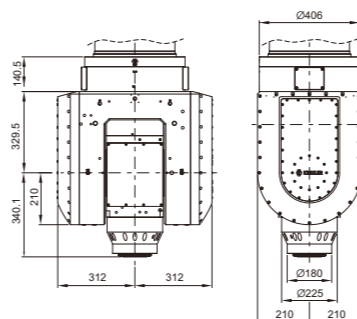
### 18,000 rpm / HSK 63A



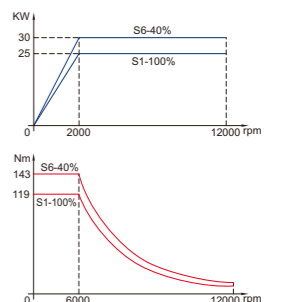
|                              |                 |
|------------------------------|-----------------|
| Spindle taper                | HSK 63A         |
| Spindle speed                | 18,000 rpm      |
| Spindle power (S1/S6)        | 56 / 70 kW      |
| Spindle torque (S1/S6)       | 89 / 111 Nm     |
| Max. swivel / rotation speed | B=30rpm C=30rpm |
| Swivel / Rotation angle      | B=±105° C=±200° |



### 12,000 rpm / HSK 100A



|                              |                 |
|------------------------------|-----------------|
| Spindle taper                | HSK 100A        |
| Spindle speed                | 12,000 rpm      |
| Spindle power (S1/S6)        | 25 / 30 kW      |
| Spindle torque (S1/S6)       | 119 / 143 Nm    |
| Max. swivel / rotation speed | B=30rpm C=30rpm |
| Swivel / Rotation angle      | B=±105° C=±200° |





# XYZ with high speed, high accuracy linear motor drive

XYZ-axis with linear motor drive which power has directly transfer without mechanical elements, and this is to increase high speed response.

XYZ-axis with individual linear scale to feedback the position and control the contouring accuracy.



Rapid traverse 60 m/min

**Benefit**

- Non-contact, no backlash, no wear out
- 100% direct-transmitted power, no energy loss done by mechanical form
- Simple structure, easy maintenance longer lifetime
- Best dynamic/ static rigidity

**Benefit**

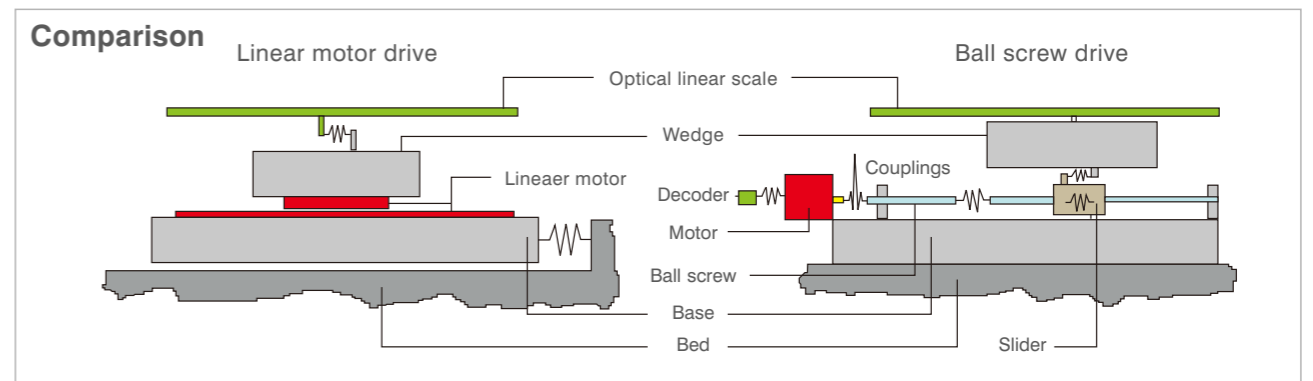
Deviation : 0.4 μm

Circularity diagram with forward control

|          |          |
|----------|----------|
| Diameter | 300 mm   |
| Velocity | 4 m/min  |
| Mass     | ca. 1.2t |

Deviation : 5 μm

Source : Siemens Laboratory



### Counter balance system



- Rapid response of nitrogen hydraulic counter balance system balances the weight of spindle and ram to make up the gravity loading of high speed and acceleration by accumulator principle.
- Prevent oil from filling up or leaking instantly causing hydraulic pressure unstable effects of ram movement, and unwanted lead patterns may appear while machining.

### Multi-split air conditioner

- **Long term reliability :**  
Linear motor cooling by independent cooler, equipped with temperature sensor to monitor motor temperature to maintain machine service life and reliability.
- **Accuracy & power saving :**  
Spindle equipped with temperature sensor to monitor spindle bearing temperature  $\pm 0.1^{\circ}\text{C}$  for protection, this is to ensure accuracy and service life at high speed.
- **Longer electronics lifetime :**  
Electrical cabinet providing with air conditioner to maintain cabinet at a constant temperature for avoiding inner electrical device damaging.



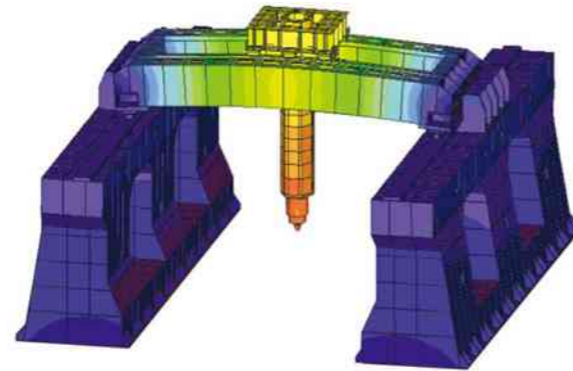


# Design advantages

## Modular design concept

FEM-analysis and optimal machine design with Box-in-Box structure of the cross beam and saddle provide the high stiffness, fast response, rapid traverse for best reliability and excellent accuracy.

Modular design structure of trapezoid side walls and Box-in-Box cross beam with fixed working table for best static and dynamic rigidity.

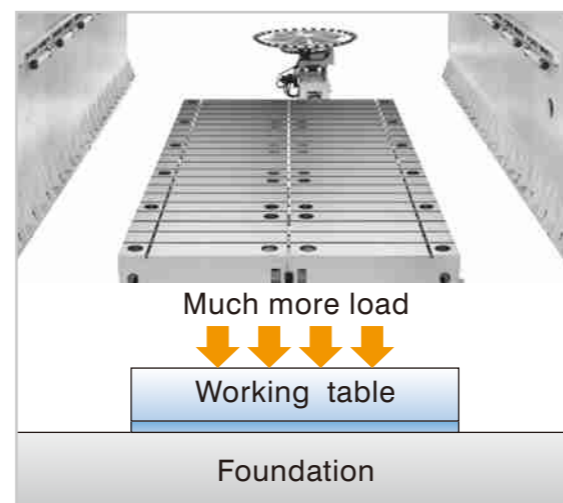


## Box-in-Box thermal symmetry and geometry symmetry

Gantry beam with Box-in-Box thermal and geometrical symmetrically structure to eliminate thermal and weight deformation. Box-in-Box cross beam distributes force equally without torsion to ensure optimal performance of high accuracy.

## High dynamic characteristics

The cross beam moving structure of GM series is the optimal solution. All the moving parts are overhead and workpiece is mounted on the fixed working table, this is to make easily access for workpieces loading and unloading. So, the movement characteristics does not reduce due to the extra-loading, it also saves energy consumption.



## Collision protection

In case of collision protection during manufacturing process, especially in complex work pieces machining, the "DCM" (Dynamic Collision Monitoring) function is preinstalled in Heidenhain control system.

- DCM can identify collision location.
- When there is a potential collision risk within the machining space, the system will interrupt the machining process automatically.
- Spindle is also mounted by vibration sensor to detect the over level oscillation and immediately stops if any crash happens.
- When power failure happens, three axes of German made braking system will turn on and lock guideways automatically to assure operation security.



**Intelligence**



**Operational Assistance Applications**



**Machining Applications**

## Customized solution

APEC delivers rich application experiences, different kind of manufacturing needs different machining strategy, CAD/CAM programming and machining simulation can be fully supported by APEC to maximize our product strength for production.

APEC is a machine maker, and also a channel to get high-end service, and we are glad to develop a persistent cooperation with every customer.





# Safe, simple, practical maintenance

- Gantry machine structure with moving cross beam and embedded working table makes easily access for workpiece loading and unloading.
- Fixed working table enables accurate machining with heavy loading for flexible applications. Max. table loading is 7,000 kg/m<sup>2</sup>

- Tool magazine with full enclosed splash guard, and this is to achieve safety regulation.



Both sides with ball screw chip conveyer could provide excellent chip evacuation capacity, could also equipped with cooling devices, water tank, pump and filtration system.



- The fence could protect the safety of maintenance personnel, while they are working.

- The **complete peripheral units** are placing at the side of the machine, and according to the site space constraints, the placed position could be adjusted.



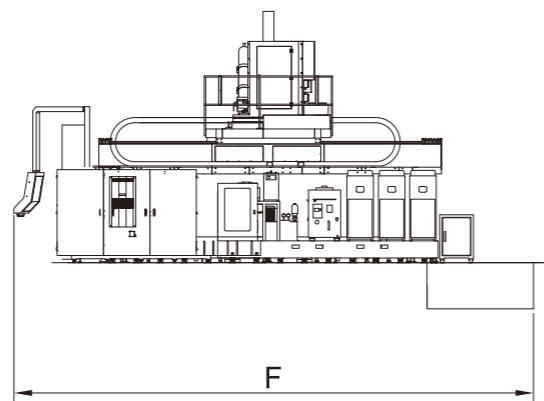
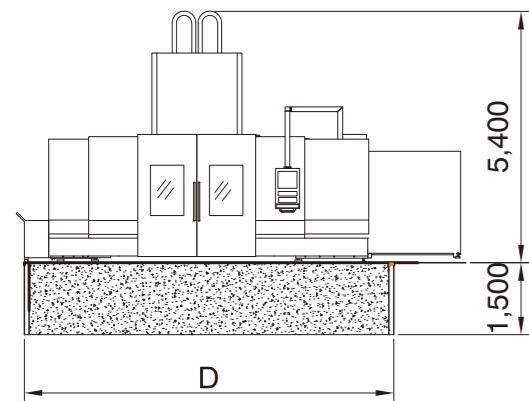
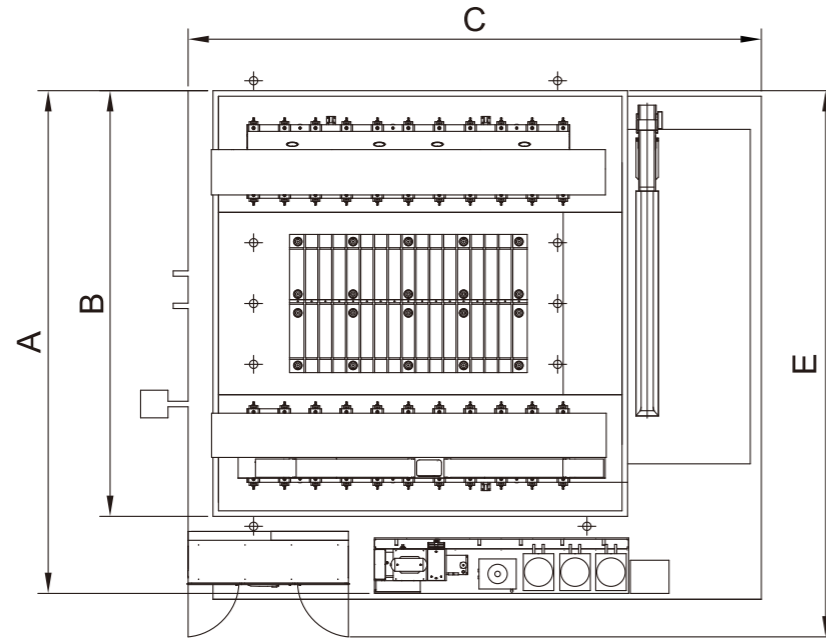
- Side-hanging control panel could move around according to working request.

## Ensure operators are working under the safe and clearly working position

Closed machining area ensures the safety of operators, and front doors have safety lock and large reinforced windows to observe machining status.



# Machine layout



Unit : mm

| Model   | A      | B     | C      | D     | E      | F      |
|---------|--------|-------|--------|-------|--------|--------|
| GM 2240 | 9,100  | 7,700 | 10,370 | 7,700 | 9,880  | 10,830 |
| GM 2732 | 9,600  | 8,200 | 9,570  | 8,200 | 10,380 | 10,030 |
| GM 2750 | 9,600  | 8,200 | 11,370 | 8,200 | 10,380 | 11,830 |
| GM 3060 | 10,100 | 8,700 | 12,370 | 8,700 | 10,880 | 12,830 |

# Machine specifications

| Specifications                                 | Unit               | GM2240                     | GM2732        | GM2750        | GM3060        |
|--|--------------------|----------------------------|---------------|---------------|---------------|
| <b>Travel</b>                                  |                    |                            |               |               |               |
| X-axis   | mm                 | 4,000                      | 3,200         | 5,000         | 6,000         |
| Y-axis   | mm                 | 2,200                      | 2,700         | 2,700         | 3,000         |
| Z-axis   | mm                 | 1,000                      |               |               |               |
| Distance between spindle nose to table surface | mm                 | 100-1,100 (Opt. 300-1,300) |               |               |               |
| Distance between side walls                    | mm                 | 4,030                      | 4,530         | 4,530         | 4,830         |
| <b>Table</b>                                   |                    |                            |               |               |               |
| Table length                                   | mm                 | 4,300                      | 3,300         | 5,300         | 6,300         |
| Table width                                    | mm                 | 2,500                      | 3,000         | 3,000         | 3,300         |
| T-slot size (width x No. x pitch)              | mm                 | 28 x 16 x 250              | 28 x 12 x 250 | 28 x 20 x 250 | 28 x 24 x 250 |
| Max. table load                                | kg/m <sup>2</sup>  | 7,000                      |               |               |               |
| <b>Spindle</b>                                 |                    |                            |               |               |               |
| Spindle taper                                  |                    | HSK 63A                    |               |               |               |
| Spindle speed                                  | rpm                | 24,000                     |               |               |               |
| Spindle power (S1/S6)                          | kW                 | 37/46                      |               |               |               |
| Spindle torque (S1/S6)                         | Nm                 | 60/73                      |               |               |               |
| <b>2-Axis Head</b>                             |                    |                            |               |               |               |
| Max. swivel/rotation speed                     | rpm                | B=30 C=30                  |               |               |               |
| Max. swivel/rotation torque (S1-100%)          | Nm                 | B=760 C=800                |               |               |               |
| Clamping torque                                | Nm                 | B=2,100 C=3,000            |               |               |               |
| Swivel / rotation angle                        | degree             | B=±105° C=±200°            |               |               |               |
| <b>Traverse</b>                                |                    |                            |               |               |               |
| Rapid traverse                                 | m/min              | XYZ=60                     |               |               | XYZ=50        |
| Acceleration                                   | m/sec <sup>2</sup> | XYZ=5                      |               |               |               |
| <b>Automatic Tool Changer</b>                  |                    |                            |               |               |               |
| Tool magazine capacity                         | pc                 | 30                         |               |               |               |
| Max. tool length                               | mm                 | 300                        |               |               |               |
| Max. tool diameter -with adjacent tools        | mm                 | Ø100                       |               |               |               |
| Max. tool diameter -without adjacent tools     | mm                 | Ø200                       |               |               |               |
| Max. tool weight per piece                     | kg                 | 7                          |               |               |               |
| <b>Others</b>                                  |                    |                            |               |               |               |
| Power supply                                   | kVA                | 200                        |               |               |               |
| Machine weight                                 | kg                 | 66,000                     | 67,000        | 84,030        | 99,230        |

- Standard accessories**
- Heidenhain iTNC530 CNC controller
  - 2-axis head with HSK 63A 24,000 rpm
  - Automatic tool magazine 30 tools
  - X/Y/Z-axis with linear motor drive
  - X/Y/Z-axis with air conditioner for linear motors
  - X/Y/Z-axis with Heidenhain linear scales
  - X/Y/Z-axis with roller linear guideways
  - X/Y/Z-axis with brake system
  - Air conditioner for spindle
  - Spindle lubrication system
  - Counter balance system
  - Manual pulse generator
  - Air conditioner for electrical cabinet
  - Auger type chip conveyor
  - Chip conveyer
  - 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
  - Automatic tool changer 40 / 50 tools
  - Coolant through spindle 20 / 70 bar
  - Coolant around spindle nose
  - Dryer for spindle
  - Tool measuring system
  - Workpiece measurement system
  - Automatic voltage regulator
  - Coolant tank with pumps
  - Chip cart
  - X-axis travel extends per meter

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