

## Accessories

Standard : ● Optional : ★

| Description   | Model | HMC-6/600 | HMC-8/800 | HMC-10/1000 |
|---|-------|-----------|-----------|-------------|
| 1.Full-Enclosed Splash Guard                            |       | ●         | ●         | ●           |
| 2. 50 ARM Type ATC                                      |       | ●         | ●         | ●           |
| 3.Cooling System  |       | ●         | ●         | ●           |
| 4.Coolant Jets Around Spindle                           |       | ●         | ●         | ●           |
| 5.Spindle Air Curtain                                   |       | ●         | ●         | ●           |
| 6.Air Blast Through Spindle                             |       | ●         | ●         | ●           |
| 7.Lubrication System                                    |       | ●         | ●         | ●           |
| 8.Fluorescent Lamp x2                                   |       | ●         | ●         | ●           |
| 9.Foundation bolt, General                              |       | ●         | ●         | ●           |
| 10.Spindle Oil Cooler                                   |       | ●         | ●         | ●           |
| 11.X, Y, Z-Axis Ball Screw Enforce Pressure             |       | ●         | ●         | ●           |
| 12.Link Type Chip Conveyor & Portable Chip Bucket(1 EA) |       | ●         | ●         | ●           |
| 13.Screw type chip conveyor                             |       | ●         | ●         | ●           |
| 14.Oil Fluid Separator                                  |       | ●         | ●         | ●           |
| 15.Tool package   |       | ●         | ●         | ●           |
| 16.Individual machine manual                            |       | ●         | ●         | ●           |
| 17.Auto Power off                                       |       | ●         | ●         | ●           |
| 18.B-axis coupling (1 degree)                           |       | ●         | ●         | ●           |
| 19.#50 ARM Type ATC(30 PCS)                             |       | -         | ●         | ●           |
| 20.#50 ARM Type ATC(40 PCS)                             |       | ●         | ★         | ★           |
| 21.#50 ARM Type ATC(60 PCS)                             |       | ★         | ★         | ★           |
| 22.Mist Coolant System                                  |       | ★         | ★         | ★           |
| 23.Oil Mist Collector System                            |       | ★         | ★         | ★           |
| 24.Coolant Through Spindle, Prepare                     |       | ★         | ★         | ★           |
| 25.Coolant Through Spindle(20 BAR )                     |       | ★         | ★         | ★           |
| 26.Coolant Through Spindle(25 BAR )                     |       | ★         | ★         | ★           |
| 27.Coolant Through Spindle(70 BAR)                      |       | ★         | ★         | ★           |
| 28.Coolant Through Spindle(40 BAR)                      |       | ★         | ★         | ★           |
| 29.Coolant Flushing Device (Power : 1.5 HP)             |       | ★         | ★         | ★           |
| 30.Coiling Tube Coolant gun                             |       | ★         | ★         | ★           |
| 31.Air Gun  |       | ★         | ★         | ★           |
| 32.Rotary window  |       | ★         | ★         | ★           |
| 33.Individual machine manual x 2                        |       | ★         | ★         | ★           |
| 34.Individual machine manual x 3                        |       | ★         | ★         | ★           |
| 35. Individual machine manual x 4                       |       | ★         | ★         | ★           |
| 36.Closed Loop Linear Scale Positioning System          |       | ★         | ★         | ★           |

### Electrical

#### Standard-Electrical

- M code display
- PLC bit setting screen
- Tool comment
- Hole pattern
- Face milling cycle
- Side milling cycle
- Pocketing cycle
- Round cutting
- Workpiece calibration (Manually)
- Spindle load monitor
- High speed, high accuracy parameter screen
- Tool magazine display

#### Optional-Electrical

- DNC software
- Lifting function against gravity
- Intelligent MPG

Website



Facebook



**Hartford**  
EXCLUSIV  
Hartrol Plus APP

# Intelligent Machining Center

## HMC Series Smartcenter

- Hartrol plus controller
- 5-Year warranty on guideways
- One-piece bed design
- Tool change time: 2.9sec
- Oversized column design

**Hartrol Plus**®  
From tradition to intelligent



Photo show is HMC-10

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**Hartford**

Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

A.I. Applications inside, Hartrol Plus is the control which provides machining status with advanced features.

Imagine what future machines ought to be outlined.

# AiSmartcontrol



## Hartford redefine the future



Major functions of Hartford AI controller

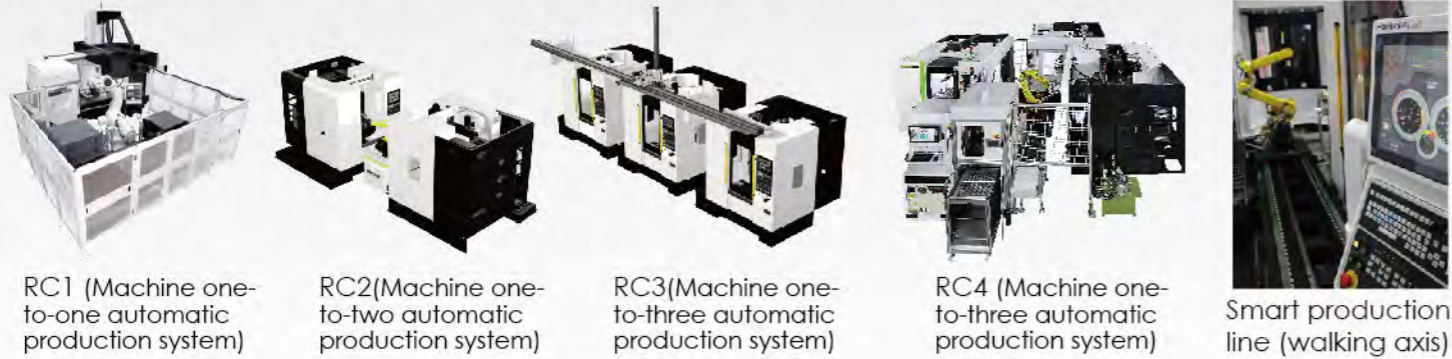
- AI Facial Recognition system-Face ID
- AI Environment Thermal Displacement Compensation
- AI Efficient Lubrication Management
- AI Broken Tool Deflection System
- AI Highlight on Intelligent Auger
- AI Navi

|  |   |
|--|---|
| <p><b>IoT</b></p> <ul style="list-style-type: none"> <li>+ Remote Warm-up &amp; Turn-on</li> <li>+ Hartrol Plus Sync &amp; Update</li> <li>+ User Connect</li> </ul> | <p><b>Thermal stability solution</b></p> <ul style="list-style-type: none"> <li>+ Spindle Thermal Compensation</li> <li>+ Casting Thermal Compensation</li> <li>+ Thermal Symmetry / Thermal Balancing</li> </ul> |
| <p><b>ZDT</b></p> <ul style="list-style-type: none"> <li>+ Diagnosis Report on Spindle Operation</li> <li>+ Alarm Report System</li> </ul>                           | <p><b>AI</b></p> <ul style="list-style-type: none"> <li>+ Facial Recognition System</li> <li>+ AI Efficient Lubrication Management</li> <li>+ Smart Efficient Chip Collection</li> </ul>                          |

# How to quickly implement automation?

## Hartford Robot Production Cell

Hartford has the biggest automation solution team in Taiwan. We design and plan the project by ourself. To be professional, provide rapidly response and efficient are our points. In this modern age, labor shortage is always a big problem for many companies. Hartford provides you a set of stable and efficient automatic solution project to solve your problems.



RC1 (Machine one-to-one automatic production system)

RC2 (Machine one-to-two automatic production system)

RC3 (Machine one-to-three automatic production system)

RC4 (Machine one-to-three automatic production system)

Smart production line (walking axis)

## Easy to get started

Hartford Robocell provides you a professional robot training and rich automation experience, to let you quickly learn and easily operate your automation systems



## Quality control monitoring

Automation systems have to pass all the strict Quality Control tests at every stage like design, assembly, testing, final inspection and shipment, complete quality control processes for all the products.



## Professional analysis

Robocell Machining optimization service, to let you be on the top by using professional machining methods



## Complete service

- Single window process
- Professional team
- Instant solution
- Quick service



# The Application of LAUREL

A perfect demonstration for machining accuracy and ability.

Underneath the compact appearance, the robust structure of LAUREL is engineered with the unique Hartford technology to decrease the cycle time and enhance your cutting efficiency.



1. Parts for motorcycle



2. Hydraulic valve

## Actual cutting tests

Model : HMC-6

■ Spindle: 6,000 rpm Gear type, 18.5kW ■ Cutting material : S45C



### Face milling

Tool diameter Ø125 X 7  
Feed rate 1,200 mm/min  
Cutting depth 4 mm  
CuttingWidth 100mm  
Cutting volume 480 cc/ mm

### End milling

Tool diameter Ø63 x 3  
Feed rate 2,000mm/min  
Cutting depth 30 mm  
Cutting width 5 mm  
Cutting volume 300 cc/min

### Tapping

Tool diameter M30 X3.5 mm  
Feed rate 420 mm/min  
Cutting depth 40 mm  
Speed 120rpm

### Drilling

Tool diameter Ø76 x 2  
Feed rate 60 mm/min  
Cutting depth 40 mm  
Speed 300rpm  
Spindle load 100%

All the results featured in this catalogue were produced under strict testing condition in a special zed testing environment. Under different testing conditions and in less than ideal testing environments. That the test results may vary form those shown in this catalogue.

# The very first step for fully intelligent machining.

## Hartford APP Store

### What is Hartrol Plus?

Hartrol plus is a brand new intelligent controller Hartrol , Hartnet and Hartford electrical function together which developed and made by Hartford.

HMI and operation is user friendly, it can achieve :

1. Internet connection, collect and analyze data, monitoring by portable device
2. Intelligent control: Auto revise human error and operating basis
3. Real time update new APPs

The difference between Hartrol plus and others

| Function                | Hartrol Plus P1      | Others          |
|-------------------------|----------------------|-----------------|
| Screen Size             | 19"Multi-touch Panel | 10.4" (OPT:15") |
| Look Ahead Block        | 2700(G5P20000)       | 400(1000 Max.)  |
| Hard Drive              | 32GB SSD             | NO              |
| Smoothing Interpolation | SSS 4G               | Option          |
| Industry 4.0            | Hartford UserConnect | NO              |



### The Intelligent Controller You Should Have

With three major solutions, Hartrol Plus takes you machining to the next level.

Highly optimized and intelligent controls bring even more capabilities and productivity to your metal cutting processes.

With ease use, advanced automation, and smart data collection, Hartrol plus is essential tool for enhancing performance on your production floor.

**Intelligent Support**

**Cost down to 20%**

- Multi Touch Screen
- CCD remote management
- E-book
- Remote Management
- Cutting Condition Calculator
- Stand-by Mode

**Intelligent Functions**

**Productivity increased 23%**

- HartCAM
- AFC= Automatic Feedrate Control.
- SSS-4G
- Machining Time Countdown for Single Block
- Optimized Machining Program
- Automatic measurement

**Intelligent Design**

**Efficiency increased 20%**

- MES(Manufacturing Execution System)
- Machine Utilization Management
- Operator Performance Management
- 24 Hours a Day Management
- Remote Management
- Hartford Userconnect

**Hartford UserConnect**

- Alert Notification
- Remote Diagnoses
- Remote Value Enhancement
- Remote Monitoring & Management

The main technologies of Hartford smartcenter include intelligent managing system, status monitoring, alarm predicting, machine status diagnosis, crash preventing, 3D program simulation, machining efficiency improving...etc. All the intelligent functions help you control the machine status and assure the job quality.



### Hartford smartcenter APP

|                                  |                                       |   |                           |                              |                                       |                               |
|----------------------------------|---------------------------------------|---|---------------------------|------------------------------|---------------------------------------|-------------------------------|
| set and inspect                  | ZDT                                   | NCcode Analysis<br>Machining Programming Analysis | Machining Time Estimation | Machining Path Simulation    | Utilization Statics                   | Machining Condition Computing |
| Spindle Loading Monitor          | AFC                                   | Message Board                                     | Tool Magazine             | Calculator                   | Online E-books                        | File Transfer                 |
| Spindle Bearing Diagnosis        | HartCAM                               | CCD   | Automatic Door            | Broken Tool Detection System | Integrated Information Monitor Screen | User connect                  |
| Z-direction Thermal Compensation | Spindle Collision Protection G Sensor | CTS Leakage Detect                                | i-Factory                 | Idling Stop                  | Remote Desk Connection                | Account Management            |

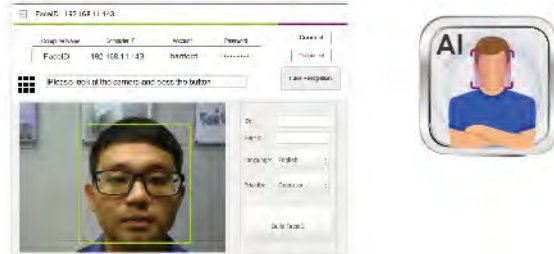
The fuctions mentioned above will need to option the Hartrol plus controller or Dual screen with Fanuc controller.

# What Hartford APP can do for you?

The integrated intelligent functions of Hartrol plus could achieve your machining requirements.  
For more Hartrol Plus functions, please contact our sales person.

## AI Facial recognition system(opt.)

- Face ID log-in authority
- Recognition time: **2** seconds
- Recognition accuracy: **100%**



## Highlight on Intelligent Auger(opt.)

**50%** efficacy increases

- Intelligent auger automatically proceeds cleaning iron chips based on electrical current of spindle.
- Intelligent auger automatically performing reversal mode in case amount of iron chips outnumbers, preventing from machine stop.
- Auger is overly shielded



## AI Efficient Lubrication Management(opt.)

**50%** lubrication saved.

- Auto-adjustment oil supply base on machining condition.
- 50% oil consumption saved



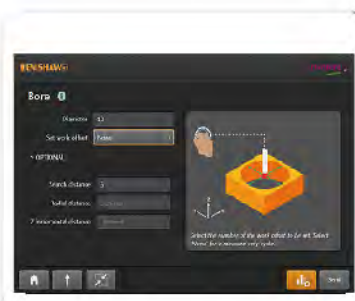
## On line update

With online updating system similar to smart phone will make sure your operating system stays the latest version with Hartford.

- 24hr ➡ Live updating , no boundary no time zone difference.
- NEW ➡ Synchronize with Hartford for the latest information and functions.
- Easy ➡ One key updating, easy and fast !



The Hartrol plus NC version must be A6 or above



Graphical user interfaces for part setting, inspection, tool setting

- Ease of use
- Increasing usability
- Eliminating manual set-up tasks
- Increasing efficiency



## Hartford ZDT

Eliminate machine down time and increase efficiency.  
ZDT –

- Ease of use
- Check parts status clearly
- Eliminating unexpected down time
- Instant notification to your machine and your portable device



## Spindle Vibration Intelligent Monitoring System (B-Safe ) is ensuring spindle stability at times(opt.)

Highlights

- APP Vibration function is handy to set up manually.
- Alert status on crash protection.
- Responsive graphic is available for diagnosis by user, and analytic information is just-in-time served.

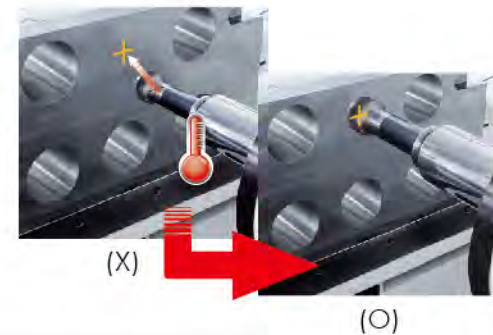


## AFC(opt.)

Machining efficiency is increased by **21%**↑

Controls the feed rate depending on the machining situation

- Adjusting feed rate automatically
- Lengthen your tool life
- Reduce machining time



## Thermal compensation on spindle(opt.)

No worries about HEAT!!

- Machine with compensation
    - #40 spindle thermal extension is within 0.03mm
    - #50 spindle thermal extension is within 0.02mm
  - Machine without compensation
    - Spindle thermal extension is around 0.10mm
- Notes: Above test is under room temperature



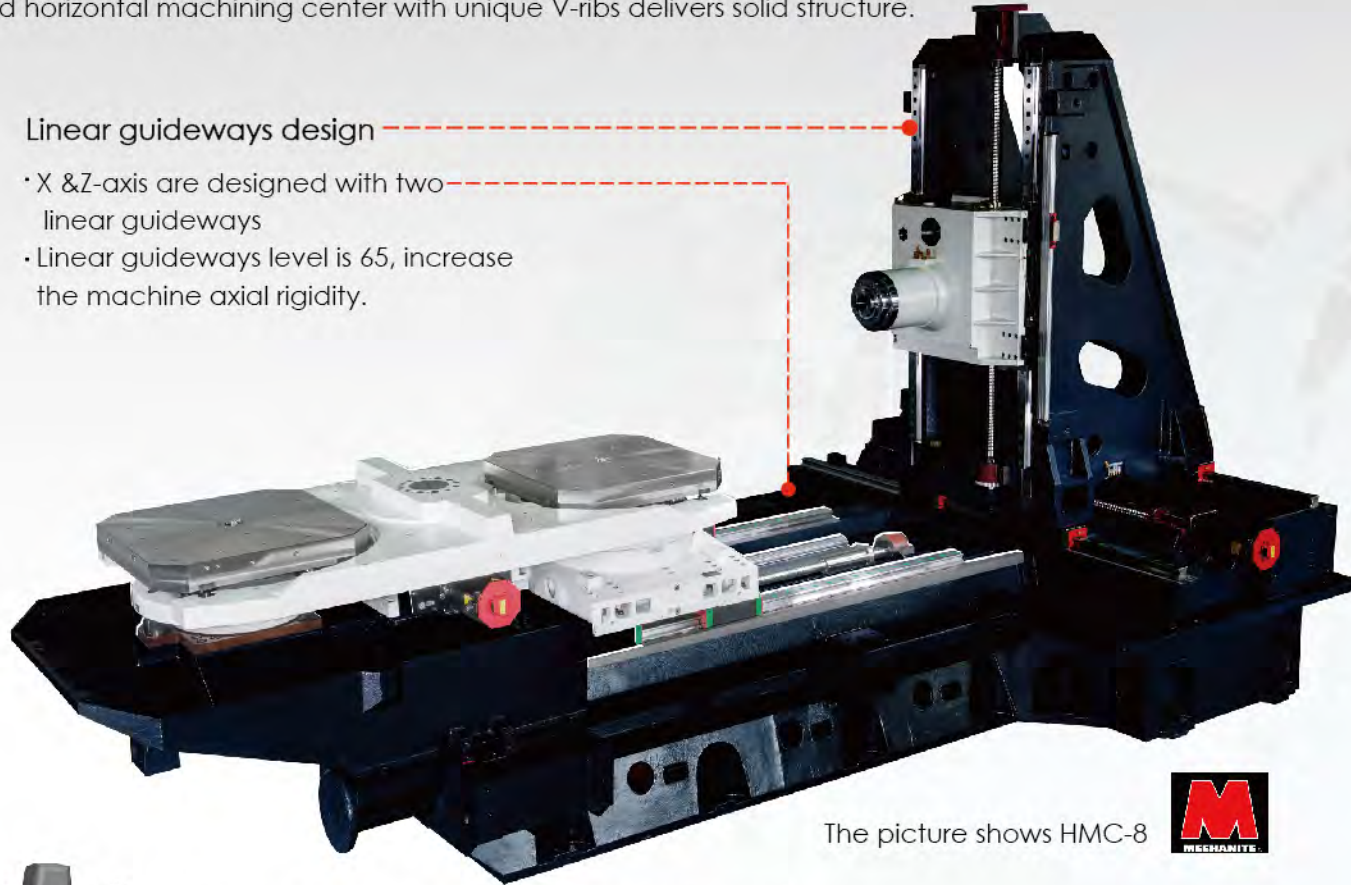
# Monolithic Machine Base of LAUREL

# Features Of Hartford Horizontal Machining Center

Hartford horizontal machining center with unique V-ribs delivers solid structure.

### Linear guideways design

- X & Z-axis are designed with two linear guideways
- Linear guideways level is 65, increase the machine axial rigidity.



The picture shows HMC-8



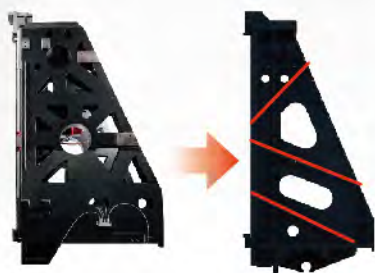
### Full range of linear guideway five-year warranty:

Warranty coverage will not apply under following conditions

1. Improper operation (collision)
2. Lack of regular cleaning of accumulated debris causing damage to the linear rails & carriages.

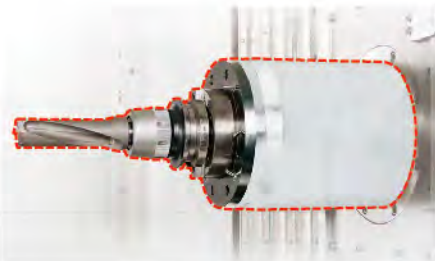
### High rigidity column design

- One-piece design on column, increases structure rigidity.
- Two-step design on column, enhances rigidity.
- Chamfer design on inner body increases torsion resistance capability.



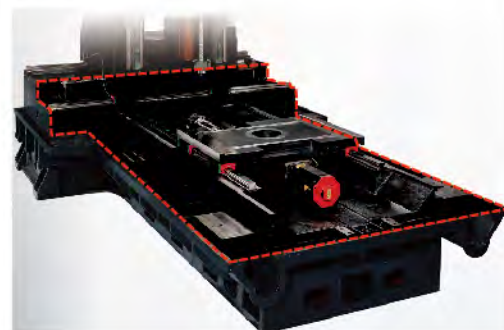
### One-piece design on spindle housing and head

- The all new machine head structure design.
- Increases machine rigidity and cutting performance.
- Delivers higher support.



### T-shape base features high stability

- Specially design on guideways, distance between linear guideways is 580mm
- Inside the casting are the heavy-duty, anti-flex, vibration-absorbing ribs.
- Makes the machines perfect for heavy-duty machining.



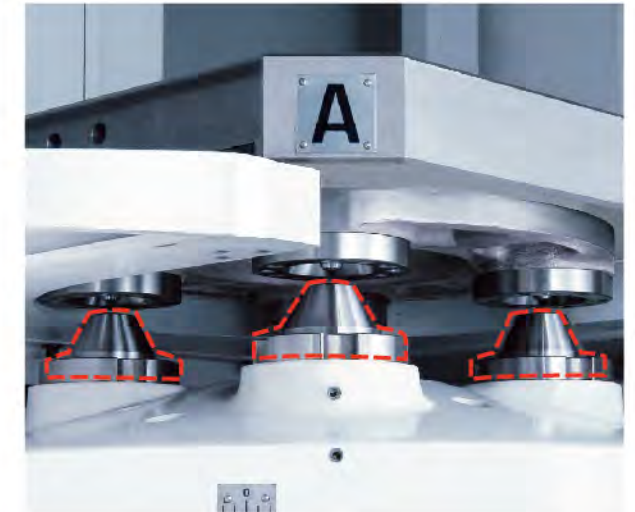
### Auto pallet changer

- Auto pallet changer system is anchored on the base.
- The APC of Laurel is integrated on the machine base, free form an possibility of accuracy deviation.
- Min. indexing angle : 0.001° (1°opt.)



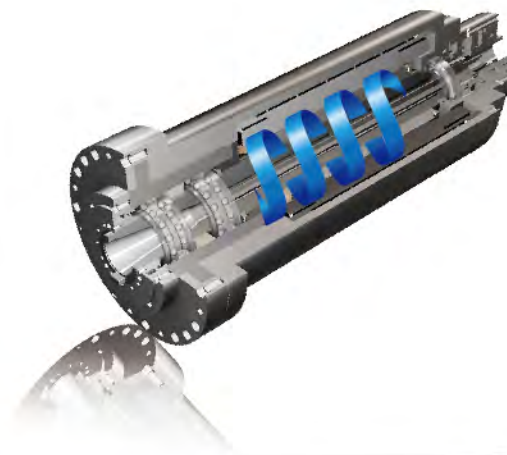
### Air blast in B-axis positioning cones

- Pallets are positioned on 4 taper cones in combination with air blast on cone surface and hydraulic drawbar.
- Provides high rigidity and accuracy of the pallet.
- Prevents the ingress of cutting chip or fluid



### Built-in type spindle 10,000rpm

- The built-in type spindle is capable of resisting longtime continuous running at high speeds.
- It features water & dustproof protection for the spindle bearing.
- Spindle thermal problem is controlled by cooler system.
- Spindle runs on special bearings, providing excellent resistance for axial and radial loads.



### ISO 50 Gear type spindle

- Two-step transmission.
- High torque output in low speed.
- Spur gear with big modulus delivers high rigidity and low abrasion.
- Suitable for heavy-load cutting.

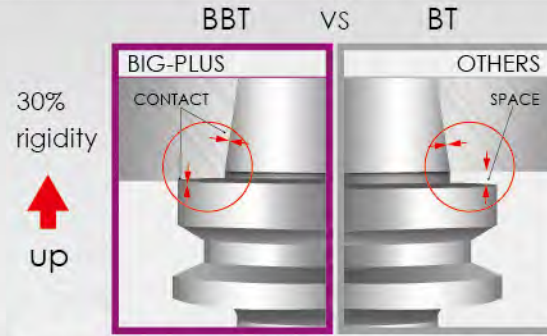


# Spindles Manufactured by Hartford OfferQuality Assurance

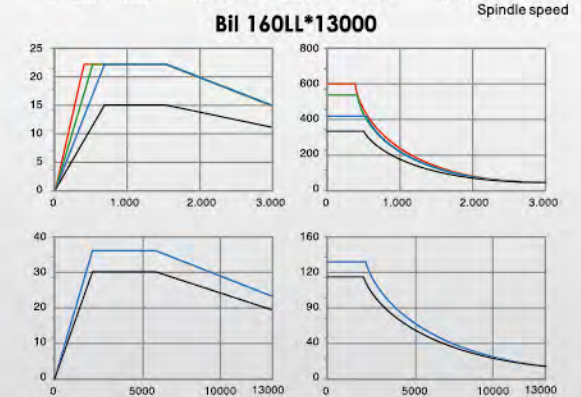
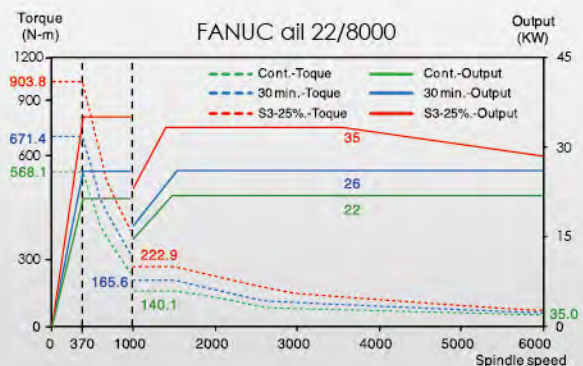
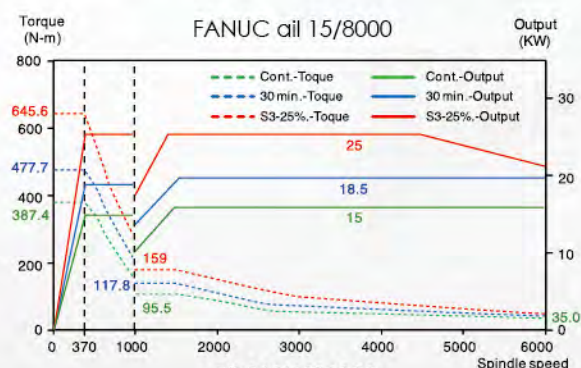
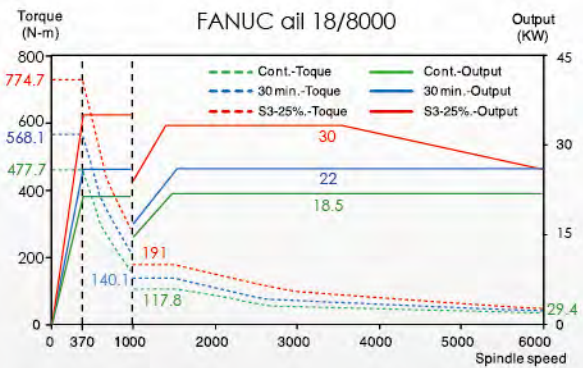
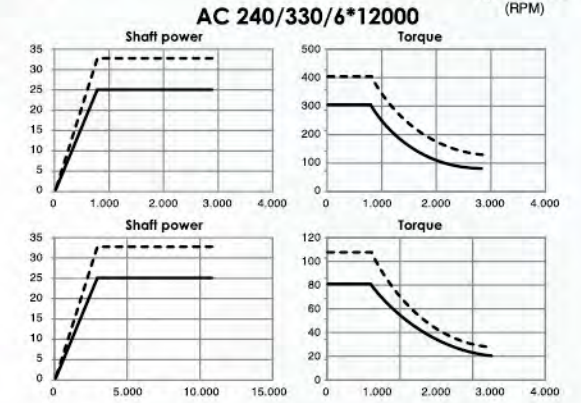
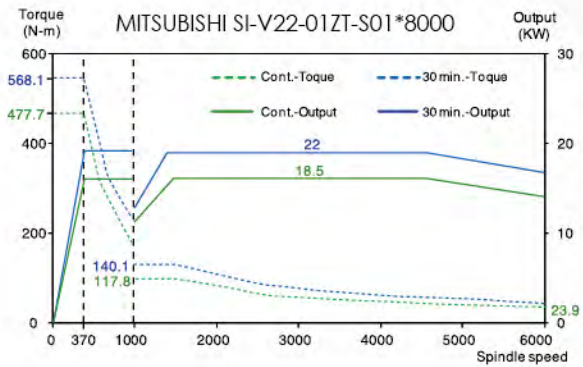
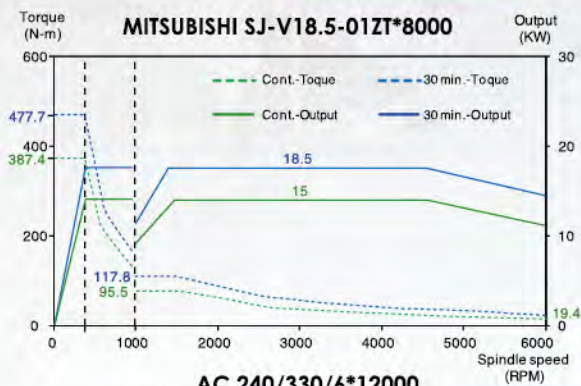
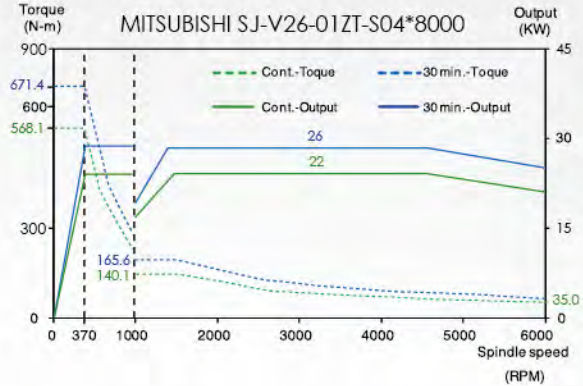
## Dimensions Drawing

### BBT for optional

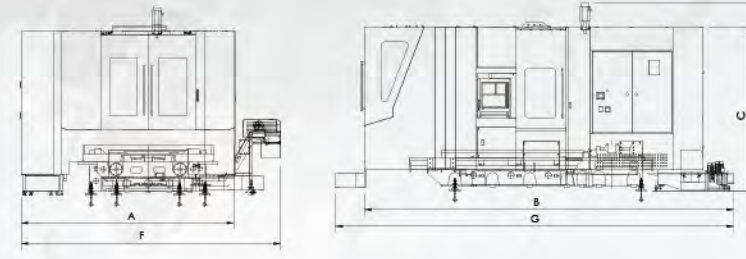
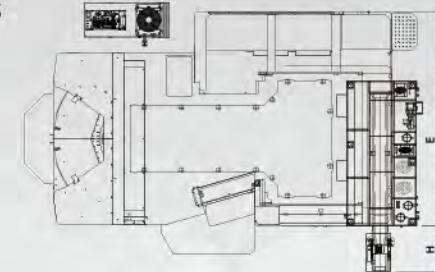
- Dual contact between the taper and the flange.
- Improves the rigidity, accuracy, speed and performance.
- Radial deflection, vibration and deviation are significantly reduced.



### Spindle torque diagrams



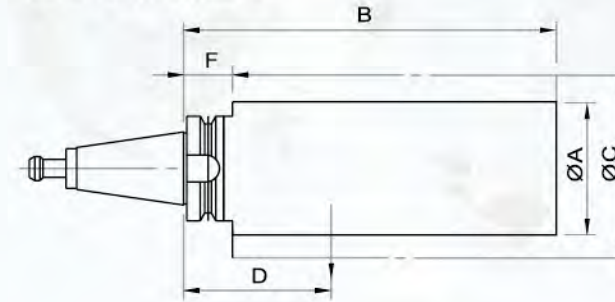
### Machine Dimensions



| Item | HMC-6 | HMC-8 | HMC-10 | HMC-600 | HMC-800 | HMC-1000 |
|------|-------|-------|--------|---------|---------|----------|
| A    | 3461  | 3518  | 4346   | 3461    | 3518    | 4346     |
| B    | 5257  | 5883  | 7227   | 5182    | 5466    | 5827     |
| C    | 3000  | 3032  | 3282   | 3000    | 3040    | 3282     |
| D    | 3094  | 3393  | 3619   | 3094    | 3393    | 3619     |
| E    | 3461  | 3518  | 4296   | 3464    | 3521    | 3200     |
| F    | 3817  | 4727  | 5284   | 3835    | 4966    | 5284     |
| G    | -     | 6358  | 7807   | -       | 5987    | 7322     |
| H    | -     | -     | 950    | -       | -       | 950      |

Unit : mm

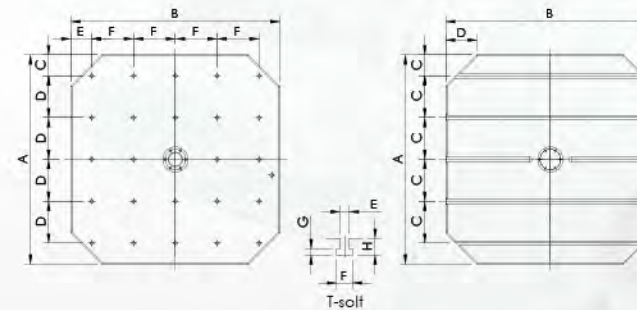
### Tool dimension



| Item      | A   | B   | C   | D   | E    | F  | Max. tool mass moment |
|-----------|-----|-----|-----|-----|------|----|-----------------------|
| HMC-6/600 | 125 | 400 | 250 | 130 | 20kg | 50 | 25.5N-m               |
| HMC-8/800 | 125 | 500 | 250 | 130 | 20kg | 50 | 25.5N-m               |
| HMC-10    | 125 | 600 | 250 | 100 | 20kg | 45 | 24.5N-m               |
| HMC-1000  | 125 | 600 | 250 | 100 | 20kg | 45 | 24.5N-m               |

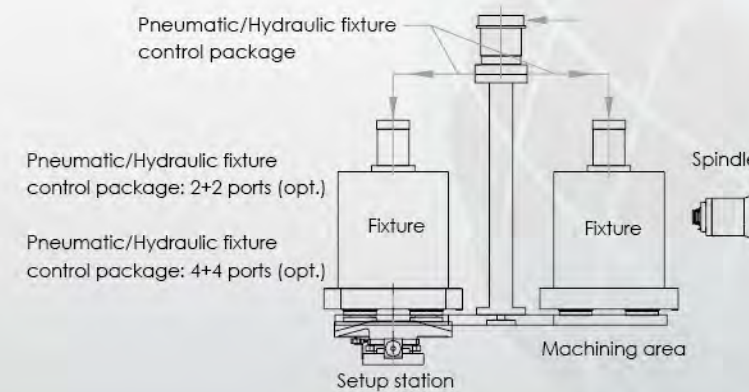
Unit : mm

### Pallet dimension



| Item                | A    | B    | C   | D   | E  | F   | G  | H          |
|---------------------|------|------|-----|-----|----|-----|----|------------|
| HMC-6/600(hole)     | 630  | 630  | 65  | 125 | 65 | 125 | -  | M16x2Px25L |
| HMC-8/800(hole)     | 800  | 800  | 80  | 160 | 80 | 160 | -  | M16x2Px28L |
| HMC-10/1000(T-slot) | 1000 | 1000 | 125 | 125 | 22 | 36  | 16 | 42         |

Unit : mm



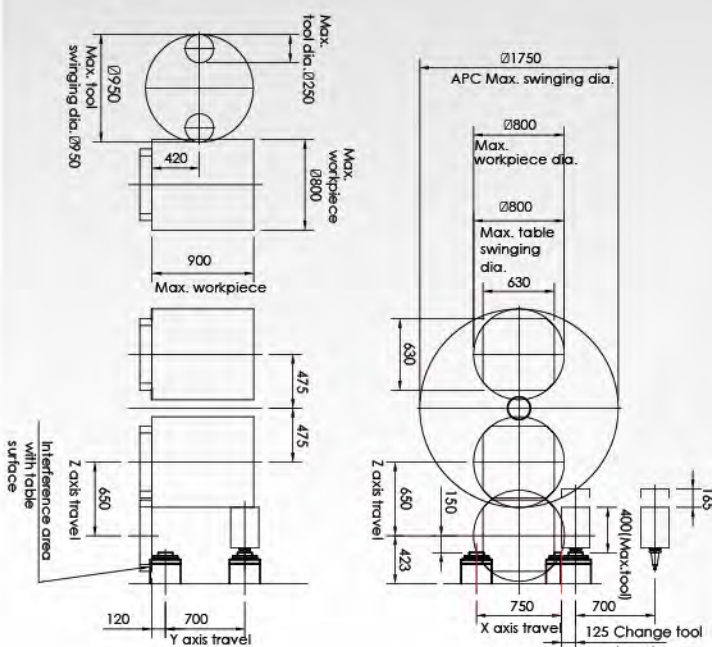
| Item   | A    | B    | C   | D   | E  | F  | H  |
|--------|------|------|-----|-----|----|----|----|
| HMC-10 | 1000 | 1000 | 125 | 125 | 22 | 38 | 42 |

Unit : mm

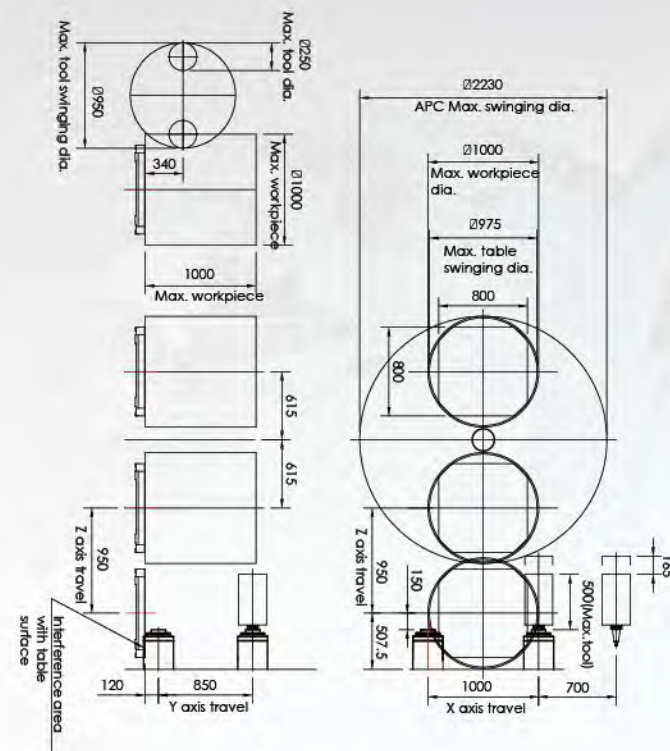
# Interference Drawing

# Specifications

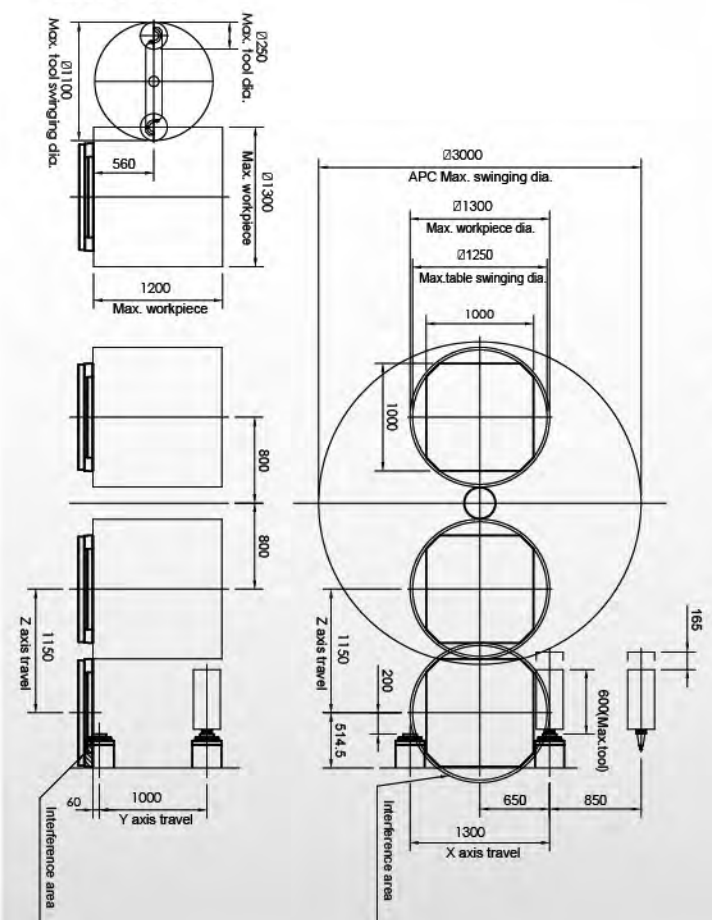
**HMC-6**



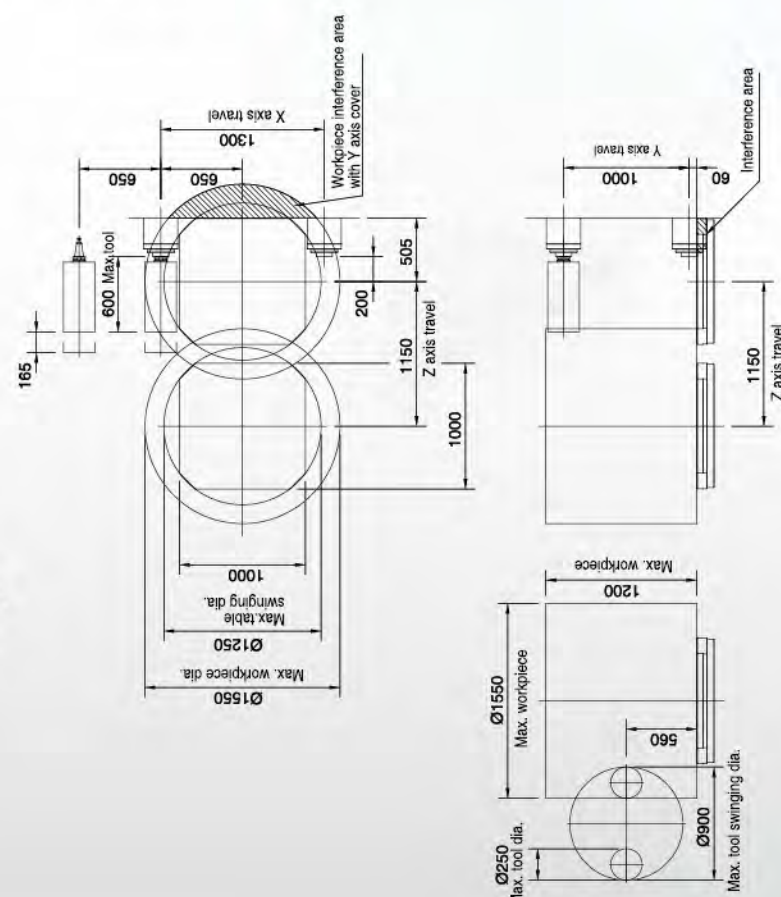
**HMC-8**



**HMC-10**



**HMC-1000**



| Model   | Unit               | HMC-6/600                           | HMC-8/800                           | HMC-10/1000                         |
|---|--------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| <b>Table</b>                                  |                    |                                     |                                     |                                     |
| Working surface                               | mm                 | 630x630                             | 800x800                             | 1000x1000                           |
| Max. workpiece swing diameter                 | mm                 | 6 : Ø800x900                        | 8 : Ø1000x1000                      | 10 : Ø1300x1200                     |
| Max. table load                               | kg                 | 600 : Ø900x900                      | 800 : Ø1350x1000                    | 1000 : Ø1550x1200                   |
| Indexing type                                 | deg                | 600                                 | 1500                                | 2000                                |
| Max. speed of pallet top                      | rpm                | 0.001(1)                            | 0.001(1)                            | 0.001(1)                            |
| <b>Travel</b>                                 |                    |                                     |                                     |                                     |
| Longitudinal travel (X-axis)                  | mm                 | 750                                 | 1000                                | 1300                                |
| Cross travel (Y-axis)                         | mm                 | 700                                 | 850                                 | 1000                                |
| Vertical travel (Z-axis)                      | mm                 | 650                                 | 950                                 | 1150                                |
| Distance from spindle center to table surface | mm                 | 6 : 120-820 ;<br>600 : 150 - 850    | 8 : 10-960 ;<br>800 : 120 - 970     | 10 : 60-1060 ;<br>1000 : 100 - 1100 |
| Distance from spindle end to table center     | mm                 | 150 - 800                           | 150 - 1100                          | 200 - 1350                          |
| <b>Spindle</b>                                |                    |                                     |                                     |                                     |
| Spindle nose taper                            |                    | ISO 50                              | ISO 50                              | ISO 50                              |
| Spindle speed (Gear type)                     | rpm                | 6000                                | 6000                                | 6000                                |
| Spindle speed (DDS)                           | rpm                | -                                   | -                                   | -                                   |
| Spindle speed (Built-in)                      | rpm                | -                                   | (10000 opt.)                        | (10000 opt.)                        |
| <b>Feed</b>                                   |                    |                                     |                                     |                                     |
| Cutting feedrate (X/Y/Z axis)                 | m/min              | 12/12/12                            | 12/12/12                            | 12/12/12                            |
| Rapid Traverse feedrate(X/Y/Z axis)           | m/min              | 40/30/40                            | 30/30/30                            | 30/30/30                            |
| <b>ATC</b>                                    |                    |                                     |                                     |                                     |
| Tool storage capacity                         | PCS                | 40(60 opt.)                         | 30(40/60opt.)                       | 30(40/60 opt.)                      |
| Max. tool weight                              | Kg                 | 20                                  | 20                                  | 25 ; 20(30/40PCS) 25(60PCS)         |
| Max. tool size (Diameter x length)            | mm                 | Ø125x400L(Ø250x400L neighbor empty) | Ø125x500L(Ø225x500L neighbor empty) | Ø125x600L(Ø250x600L neighbor empty) |
| Tool selection                                |                    | Random                              | Random                              | Random                              |
| Tool shank                                    |                    | BT50(BBT/CAT/DIN)                   | BT50(BBT/CAT/DIN)                   | BT50(BBT/CAT/DIN)                   |
| Pull stud bolt                                |                    | P50T-1/CAT-50/DIN69872              | P50T-1/CAT-50/DIN69872              | P50T-1/CAT-50/DIN69872              |
| <b>Spindle motor</b>                          |                    |                                     |                                     |                                     |
| Motor (Cont./30min)                           | kw                 | 15/18.5(18.5/22 , 22/26 opt.)       | 15/18.5(18.5/22 , 22/26 opt.)       | 15/18.5(18.5/22 , 22/26 opt.)       |
| <b>Positioning accuracy</b>                   |                    |                                     |                                     |                                     |
| 3-axes laser positioning accuracy(JIS B6336)  |                    |                                     |                                     |                                     |
| Positioning accuracy / Full travel            | mm                 | ±0.008                              | ±0.008                              | ±0.008                              |
| Repetitive positioning accuracy               | mm                 | ±0.002                              | ±0.002                              | ±0.002                              |
| 3-axes laser positioning accuracy(JIS B6336)  |                    |                                     |                                     |                                     |
| Positioning accuracy                          | mm                 | 0.010                               | 0.010                               | 0.010                               |
| Repetitive positioning accuracy               | mm                 | 0.007                               | 0.007                               | 0.007                               |
| <b>Other</b>                                  |                    |                                     |                                     |                                     |
| Required Air Pressure                         | kg/cm <sup>2</sup> | 6.5                                 | 6.5                                 | 6.5                                 |
| Electric power consumption                    | KVA                | 40~60                               | 40~60                               | 45~70                               |
| Floor space (Full Guarding)                   | mm                 | 6 : 7791x5572<br>600 : 7241x5572    | 8 : 8430x5635<br>800 : 8046x6877    | 10 : 9680x7400<br>1000 : 9630x7190  |
| Machine Weight                                | kg                 | 6 : 17000 ; 600 : 16000             | 8 : 21000 ; 800 : 18000             | 10 : 25000 ; 1000 : 22500           |
| Coolant Capacity(Standard)                    | L                  | 500                                 | 650                                 | 1100                                |

VDI 3441 accuracy available upon order request.