

Accessories

Standard : ● Optional : ★

Item	mode	PBM-115A	PBM-135A/B
1.Semi-enclosed Splash Guard		●	●
2.Full-enclosed Splash Guard		★	★
3.Full-enclosed Splash Guard For CTS		★	★
4.2500RPM Gear Head		-	●
5.3000RPM Gear Head		●	-
6.Coolant Through Spindle		★	★
7.Centralized Automatic Lubrication System		●	●
8.Air Blast Through Spindle		●	●
9.Spindle Oil Cooler		●	●
10.Extend Head (G.Y.)		★	★
11.Table Side Air Blast (1 Tube)		●	●
12.Cooling System(With Coolant Tank)		★	★
13.Screw Type Chip Conveyor		●	●
14.Link Type Chip Conveyor and Portable Chip Bucket		★	★
15.Double Screw and Link Type Chip Conveyor and Portable Chip Bucket		★	★
16.Oil Fluid Separator		★	★
17.Oil Skimmer		★	★
18.X/Y/X AXIS Closed Loop Linear Scale Positioning System for FAGOR		●	●
19.ARM Type ATC(32pcs)		●	●
20.ARM Type ATC(40pcs)		★	★
21.ARM Type ATC(60pcs)		★	★
22.Without Tool Magazine		★	★
23.Foot Switch For Spindle Clamp / Unclamp		★	★
24.Work Light		●	●
25.Fluorescent Light		★	★
26.Air gun		★	★
27.Coolant Gun(With Coolant Tank)		★	★
28.Leveling Bolts And Blocks		●	●
29.Adjusting Bolt And Blocks		●	●
30.Adjusting Tools And Box		●	●
31.Hoist Seat		★	★
32.Shaft Support Block300L		★	★
33.Shaft Support Block500L		-	★
34.Extend Head (G.Y.)		★	★
35.Mutiangular Milling Head (G.Y.)		★	★
36.Operation Manual & Electric Drawing Equipment		●	●
37.Convection Heat Exchanger in Control Box		●	●
38.Auto Power Off		●	●
39.Tri-color Light		●	●
40.Remote Manual Pulse Generator		●	●
41.RS-232 Interface		●	●
42.Auto Tool Length Measurement(RENISHAW)		-	★
43.CE Mark		★	★
44. DNC Software		★	★
45.B-AXIS Closed Loop Linear Scale Positioning System for HEIDENHAIN		●	●

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Electrical

Hartrol / Standard

- Workpiece calibration by MPG directly
- Parameter package
- Tool magazine display(0i&31i only)
- Tool status display
- Utilization rate of machining
- Machining time countdown
- B-axis workpiece calibration (manually)

Hartnet / Optional

- Management system of utilization
- Machining time countdown
- Convenient file transfer

Electrical / Optional

- Lifting function against gravity
- Retraction for rigid tapping
- Intelligent MPG

Facebook



Website



Hartford

Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

Hartford
EXCLUSIV
HartrolPlus APP

Intelligent Machining Center

PBM Series

- Hartrol plus controller
- 5-Year warranty on guideways
- Maximum cutting torque : 6494N-m(PBM-135)
- W-axis supported by two linear guideways
- B-axis repetitive positioning accuracy: $\pm 8''$

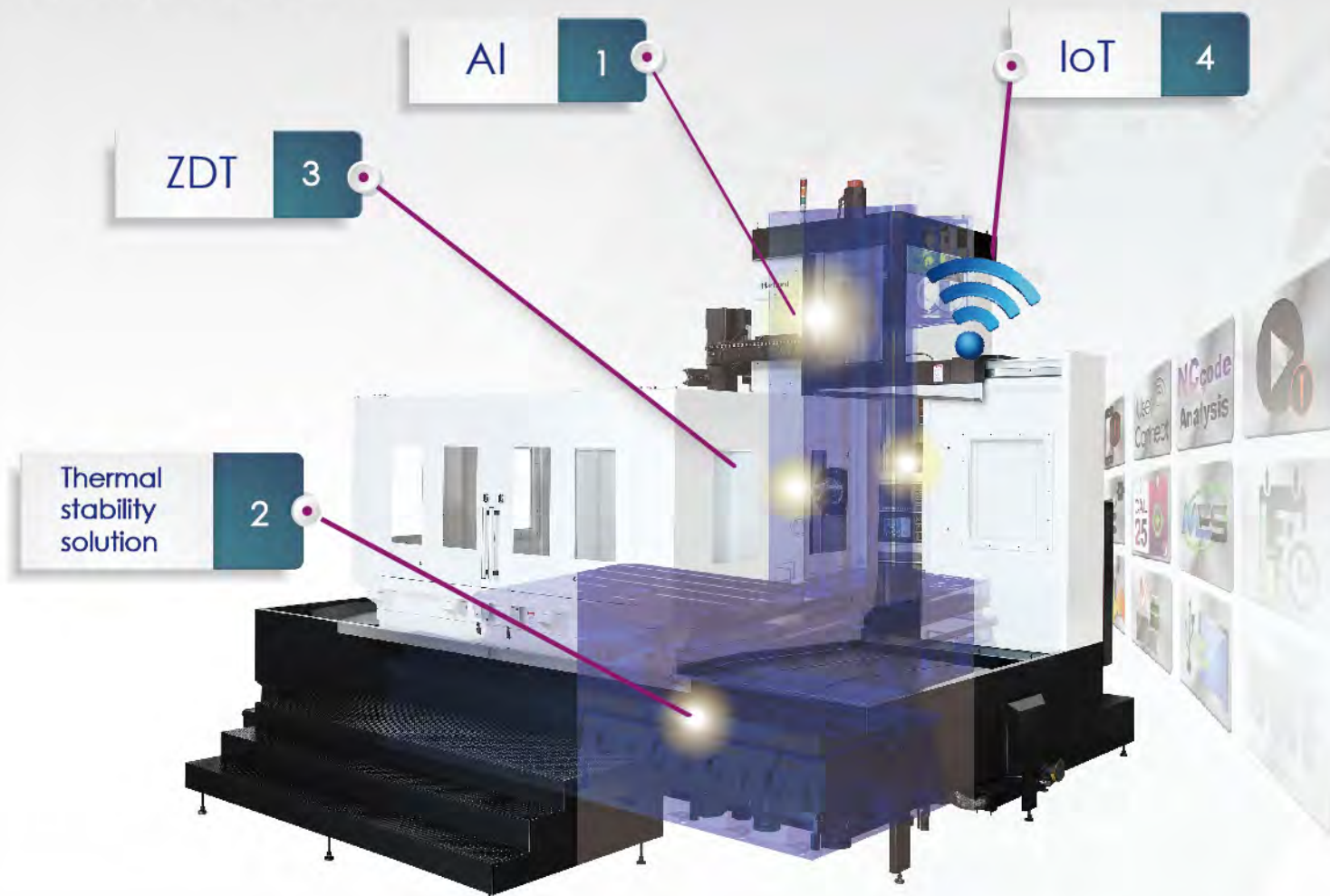


Hartrol Plus®
From tradition to intelligent



Imagine what future machines ought to be outlined.

Hartford redefine the future



AI

- + Remote Warm-up & Turn-on
- + Hartrol Plus Sync & Update
- + User Connect



1

Thermal stability solution

- + Spindle Thermal Compensation
- + Casting Thermal Compensation
- + Thermal Symmetry / Thermal Balancing



2

ZDT

- + Diagnosis Report on Spindle Operation
- + Alarm Report System



3

IoT

- + Facial Recognition System
- + AI Efficient Lubrication Management
- + Smart Efficient Chip Collection



4

What is Automation?

The meaning of automation?

Reducing manpower, increasing productivity, maintaining product quality & consistent precise movements without fatigue these all factors can be called "automation". There is a vast scope for automation from fully automatic engine cylinder manufacturing lines to simple robotic loading and unloading operations, the process of automatic workpiece measurement during machining can also be part of automation, so entering the field of automation is not so far away.

When it comes to machining processes, following features we can recommend to help our customers to enter the field of automation



With more intelligent function equals to closer automation.

How to quickly implement automation?

Hartford Robot Production Cell

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

What definition of Automation interface only :



- 1. Automatic Door
- 2. Automatic Interface
- 3. Pneumatic/ Hydraulic Interface
- 4. Other options

1. Automatic Door

- Pneumatic/Automatic Door System_Operating Door
- Pneumatic/ Servo Automatic Door System_Right Side Door

2. Automatic Interface

- I/O Preparation
- Profibus Link Preparation
- CC-Link Preparation
- EtherNet/IP Link Preparation

3. Pneumatic/ Hydraulic Interface

- 1/2/3 Cell Automatic Pneumatic/ Hydraulic Interface in the machine

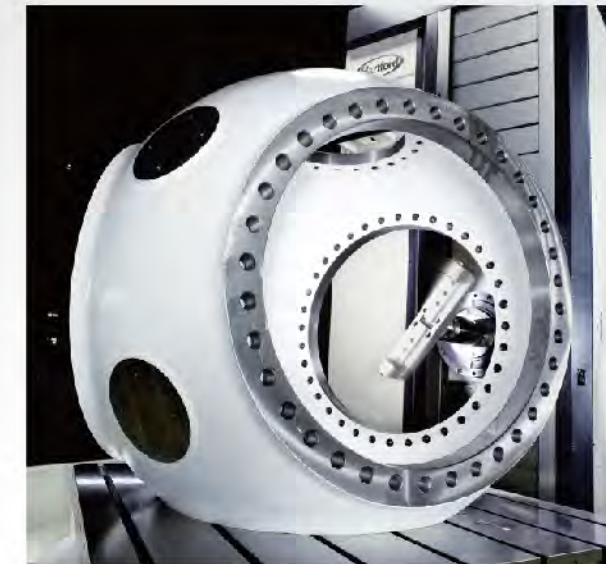
4. Other options

- High Pressure Spray Nozzle with Automatic Preparation
- HStainless Base
- High-volume chip-removal system comprising dual side augers

Optimized Cutting Efficiency

A perfect demonstration for machining accuracy and ability.

The optimized cutting efficiency and capability of Hartford Precision Boring is your best partner.



1. Component of wind power generation



2. Vertical machine head

Actual Cutting Test

Model: PBM-135

■ Spindle: 2,500 rpm Gear type, 26kW ■ Cutting material : S45C



Face milling

Tool diameter Ø160 mm
Feed rate 2,550 mm/min
Cutting depth 2.5 mm
Cutting width 120 mm
Spindle speed 500 rpm
Cutting volume 765 cc/min



Tapping

Tool diameter M42 x P4.5mm
Feed rate 315 mm/min
Cutting depth 60 mm



Drilling

Tool diameter Ø76 mm
Feed rate 120mm/min
Cutting depth 30 mm

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.

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

Hartrol Plus

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



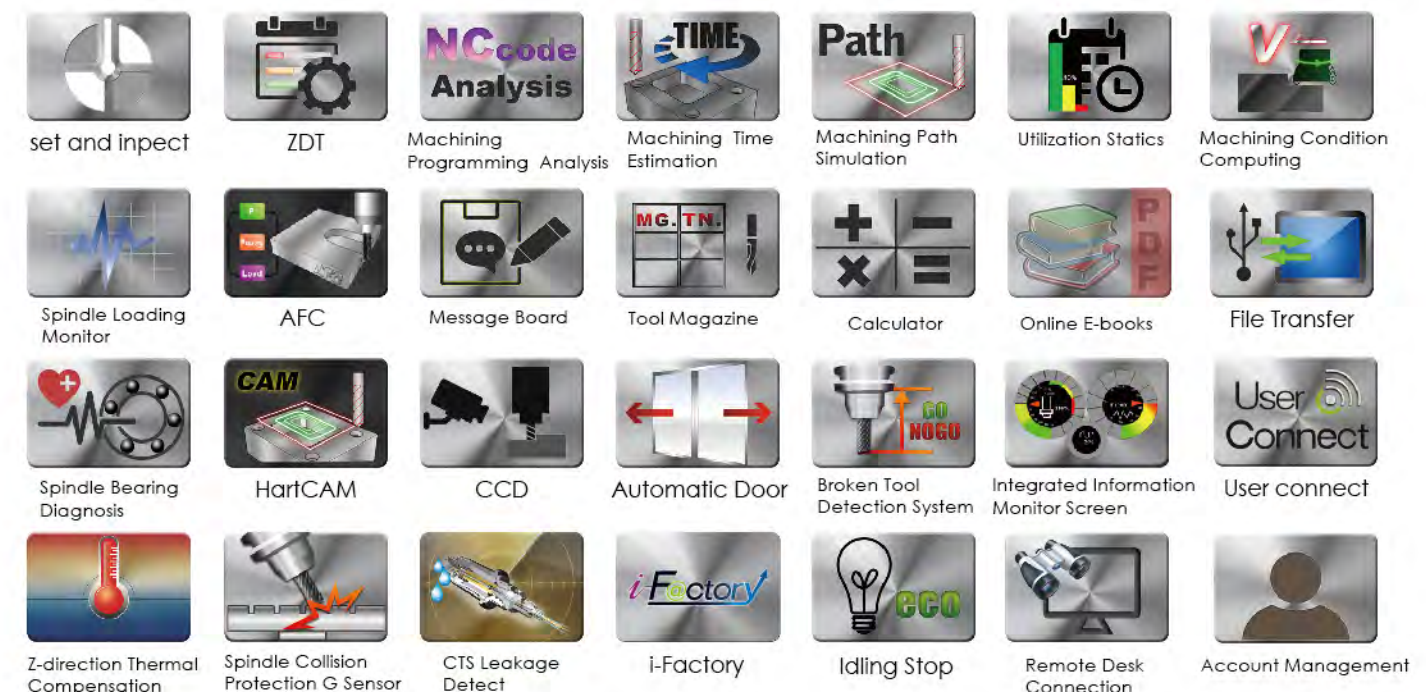
- Alert Notification
- Remote Diagnoses
- Remote Value Enhancement
- Remote Monitoring & Management

Hartford APP Store?

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



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.

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 !

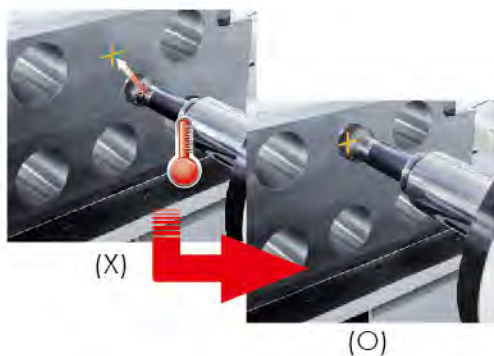
The Hartrol plus NC version must be A6 or above

On line intelligent remote system.

Integrate 4 major intelligent functions: remote booting warning, controller monitoring, CCD live feeding, auto alarm noticing. Save your time and efficiently increase the convivance of machine operating.



- Increase production efficiency and profit.
- Time saving and better productivity
- Prevent the machine damaging by on time operation monitoring.



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



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



Complete screen of the workpiece measurement



Set & Inspect(opt.)

Graphical user interfaces for part setting, inspection, tool setting

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



CIS Integral Design page



Hartford ZDT

Eliminate machine down time and increase efficiency. ZDT—

- 1.Ease of use
- 2.Check parts status clearly
- 3.Eliminating unexpected down time
- 4.Instand notification to your machine and your protable device



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

Highlights

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



Lubricator detector is a new function (opt.)

Ensuring your machine working smoothly.

- Lubricant remaining capacity on display
- Reminder time to low oil level on display
- Pumping times on display



Tough, rugged and durable for MVP

With the extra rigid structure design, the Hartford PBM series precision boring milling machine features greater durability, stability and accuracy.



The picture shows PBM-115



The picture shows PBM-135



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.



Oversized column design (PBM-135)

- For greater stability during cutting.
- Span between box guideways : **780mm**
- Box guideway thickness : **100mm**
- Box guideway surface width: **180mm**



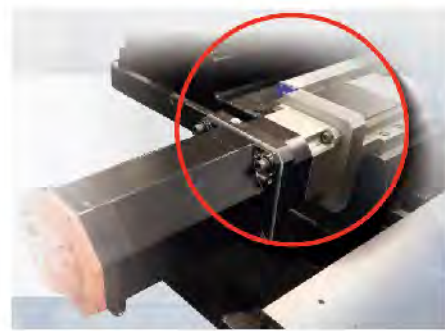
Specially design on front & rear base structure (PBM-135)

- Widen base design, span between box guideways **1080mm**, box guideway width : **200mm**(Front base)
- Increased machine structure rigidity.
- Span between box guideway **1140mm**
• box guideway width : **250mm**
(Rear base)



X / Y / Z direct-connected drive system

- X & Z axis are designed with planetary reducer enhance the overall axial drive torque.
- Y axis is direct-connect drive delivers high speed and less noise.



High Rigidity & High Accuracy Spindle

Heavy duty precision spindle

- The spindle supported by D4 class bearings guarantee superior dynamic running accuracy .
- Bearings & gear box are designed with cooling lubrication system so that spindle thermal problem can be reduced and prolong lifespan of parts.
- PBM-115 Spindle diameter : **Ø110mm**
- PBM-135 Spindle diameter : **Ø130mm**
- PBM-115 W-axis travel : **500mm**
- PBM-135 W-axis travel : **700mm**



W-axis supported by two linear guideways

- Increases the supported rigidity of W-axis.
- Increase the accuracy of W-axis.
- Delivers greater supporting capacity.

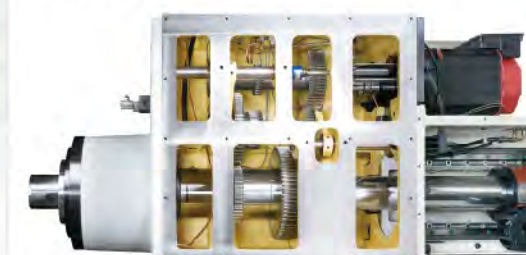


Gear-driven spindle

- The spindle is driven by gear box.
- Allowing for 4-step speed change delivers higher torque output and durability.
- Spindle torque is **6494N·(37kW)** (PBM-135)

High rigidity spindle stock

- The spindle stock is a high rigid box type construction.
- Ensures maximum stability during boring cutting.



A Variety of Accessories

Universal head

- Spindle taper: #50
- Max. tool diameter: Ø200
- Tool clamping : Manual
- Max. power : 55 kW
- Max. speed : 1000 rpm
- Indexing method : Manual



90 degree head

- Spindle taper: #50
- Max. tool diameter : Ø200
- Tool clamping : Manual
- Max. power : 55 kW
- Max. speed : 1000 rpm
- Indexing method : Manual



Quill support

- Spec.:
300L (PBM-115)
300L (PBM-135)
500L (PBM-135)
- Max. speed : 1500 rpm



90 degree extension

- Spindle taper: #50
- Max tool diameter: Ø150
- Tool clamping : Manual
- Max. power : 38 kW
- Max. speed : 1000 rpm
- Indexing method : Manual



Machine Specifications

Model	Unit	PBM-115A	PBM-135A/B	PBM-135A/B	PBM-135A/B	PBM-135P2	PBM-135P3
Table							
Working surface	mm	1400 x1600	(X=2.5M)Standard 1400 x1600(A) /1600x1800(B)	(X=3M) 1400 x1600(A)/1600x1800(B)	(X=4M) 1400 x1600(A)/1600x1800(B)	Plane table type 1500 x2000	Plane table type 1500 x3000
T- slot (Size x Number x Pitch)	mm	22 x 7 x 200	22 x 7 x 200(A)/22x7x225(B)	22x7x200(A)/22x7x225(B)	22x7x200(A)/22x7x225(B)	22x200x7	22x200x7
Max. table load	Kg	8000	8000(A)/12000(B)	8000(A)/12000(B)	8000(A)/12000(B)	10000	12000
Min. indexing degree	deg.	0.001	0.001	0.001	0.001	-	-
Max.rpm	rpm	2	2	2	2	-	-
Max. Rotating range	mm	2400	2500	3000	3000	-	-
Travel							
Longitudinal travel(X-axis)	mm	2000	2500	3000	4000	2000	3000
Cross travel(Y-axis)	mm	1600	2000(2500 opt.)	2000(2500 opt.)	2000(2500 opt.)	2000(2500 opt.)	2000(2500 opt.)
Vertical travel(Z-axis)	mm	1500	1500(2000 opt.)	1500(2000 opt.)	1500(2000 opt.)	1500(2000 opt.)	1500(2000 opt.)
W-axis travel	mm	500	700	700	700	700	700
Spindle							
Spindle diameter	mm	110	130	130	130	130	130
Spindle sleeve	mm	225	245	245	245	245	245
Spindle nose taper		#50	#50	#50	#50	#50	#50
Spindle speed(Gear type)	rpm	3000	2500	2500	2500	2500	2500
Feed							
Cutting feedrate(X / Y / Z axis)	m/min	5 / 5 / 5	5 / 5 / 5	5 / 5 / 5	5 / 5 / 5	5 / 5 / 5	5 / 5 / 5
Rapid Traverse feedrate (X / Y / Z axis)	m/min	10/10/10	10/10/10	10/10/10	10/10/10	10/10/10	10/10/10
Rapid Traverse feedrate (W-axis)	m/min	6	6	6	6	6	6
Motor							
Spindle motor(Fanuc)	kw	18.5(22/26 opt.)	26(37 opt.)	26(37 opt.)	26(37 opt.)	26(37 opt.)	26(37 opt.)
ATC							
Tool storage capacity	Pcs	32(40/60 opt.)	32(40/60 opt.)	32(40/60 opt.)	32(40/60 opt.)	32(40/60 opt.)	32(40/60 opt.)
Max. tool weight	Kg	25	25	25	25	25	25
Max. tool size(diameter x Length)	mm	125x400	125x400	125x400	125x400	125x400	125x400
Max. adjacent tool size(dia.x length)	mm	250x400	250x400	250x400	250x400	250x400	250x400
Positioning Accuracy							
3 axes laser positioning accuracy(JISB6330)							
Positioning accuracy /Full travel	mm	±0.008	±0.008	±0.008	±0.010	±0.008	±0.010
Repetitive positioning accuracy	mm	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003
3 laser positioning accuracy (VDI3441)/Repeated 5 times							
Positioning accuracy	mm	0.015	0.015	0.015	0.015	0.015	0.015
Repetitive positioning accuracy	mm	0.012	0.012	0.012	0.013	0.013	0.013
Other							
Coolant Capacity	L	310	310	310	310	310	310
Required Air Pressure	kg/cm²	6.5	6.5	6.5	6.5	6.5	6.5
Electric power consumption	kVA	40~50	50~65	50~65	50~65	50~65	50~65
Machine dimension	mm	ST:6800x8250(CTS:7000x10000)	ST:7370x8550(CTS:8080x10340)	8370x8550	9370x8550	7370x8550	9370x8550
Machine Weight	kg	25000	30000/32000	32000/34000/35000	34000/36000/37000	30000	34000

VDI 3441 accuracy available upon order request.

Specifications & dimensions are subject to change without notice (for actual weight, shipped product shall prevail.)