

Accessories

Standard : ● Optional : ★

Item	Model	A8/10
1.Full-Enclosed Splash Guard		●
2.Full-enclosed splash guard & top cover		★
3.Front Mounted Screw Type Chip Conveyor		★
4.Link type chip conveyor & portable chip bucket		★
5.Coolant Flushing Device		★
6.Coolant system_Coolant Pump Motor, Standard		●
7.Coolant system_Coolant Pump Motor, Upgrade		★
8.Spray around spindle		●
9.Spindle Air Curtain		●
10.Air Blast Through Spindle		●
11.Air blast through spindle		★
12.Spindle Oil Cooler_Pulley Spindle		★
13.Lubrication System		●
14.Oil Fluid Separator		●
15.Pulley Spindle 8000RPM		●
16.Pulley Spindle 10000 RPM		★
17.Direct Drive Spindle 10000 RPM		★
18.Disk Type Tool Magazine_24T		●
19.Disk Type Tool Magazine_30T		★
20.X, Y, Z-axis ball screw enforce pressure		●
21.Additional Column Height 200MM		★
22.Tool Package		●
23.Foundation bolt, General		●
24.Foundation bolt, Concrete		★
25.Coiling Tube Coolant gun		●
26.Hydraulic Hose Coolant gun		★
27.Air gun		★
28.Mist coolant system		★
29.Oil skimmer		★
30.Oil Mist Collector System		★
31.4th/5th axis rotary table		★
32.X, Y, Z axis linear scale system		★
33.Coolant Through Spindle		★
34.Coolant Through Spindle-20 BAR		★
35.Coolant Through Spindle-25 / 40 / 70BAR		★
36.Manual x1		●
37.Manual x 2		★
38.DNC Software		●
39.Remote manual pulse generator		●
40.Convection Heat Exchanger in Control		●
41.Auto Power off		●
42.RS232 Interface		●
43.Fluorescent lamp x1		●
44.Fluorescent lamp x2		★
45.Operation Finish Lamp		★
46.Auto Tool Length Measurement		★
47.Auto Work Piece Measurement		★

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Standard & Optional Electrical Function

Hartrol / Standard

- Workpiece calibration by MPG directly
- Parameter package
- Thread cutting(0i& 31i only)
- Tool magazine display(0i&31i only)
- Tool status display((0i&31i only)
- Special engraving marco

Electrical Function /Optional

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

Website



Facebook



Hartford

Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

Hartford
 EXCLUSIV
 Hartrol Plus APP

Intelligent Machining Center

A series Acme Smartcenter

- Hartrol plus controller
- 5-Year warranty on guideways
- One-piece bed design
- X / Y axis verticality: 0.015/300mm



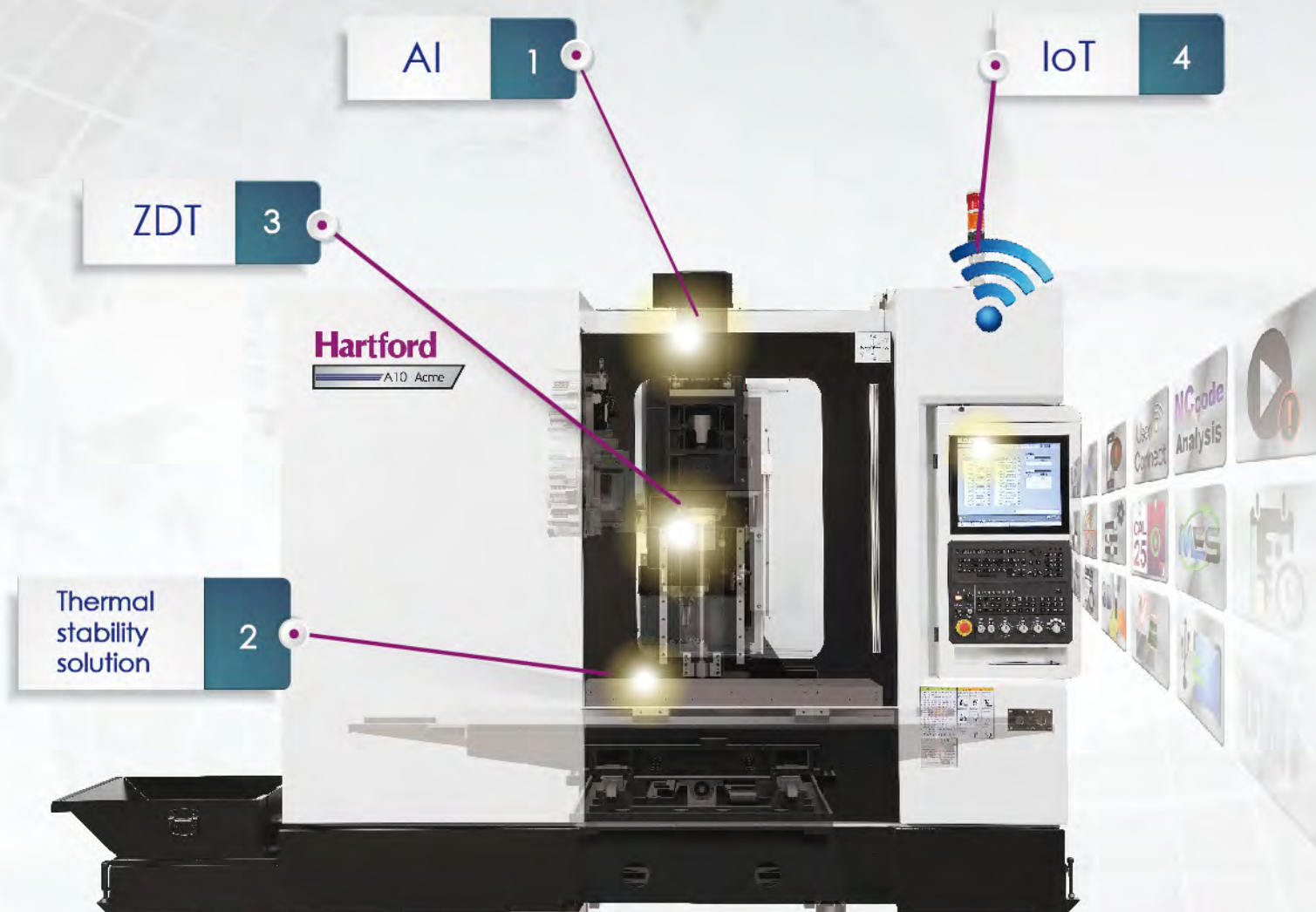
A.I. Applications inside, Hartrol Plus is the control which provides machining status with advanced features.

Imagine what future machines ought to be outlined.

AiSm@rtcontrol



Hartford
redefine the future



Major functions
of Hartford AI
controller



Facial
Recognition
system-Face ID



AI Environment
Thermal
Displacement
Compensation



AI Efficient
Lubrication
Management



Broken Tool
Detection
System



Highlight on
Intelligent
Auger



AI Navi

IOT

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



Thermal stability solution

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



ZDT

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



AI

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



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

Superior Value in Mould Making

A perfect demonstration for machining accuracy and ability

Hartford Model A is designed for die & mold industry. It cannot only boost your machining efficiency but also be your best partner.



1. Shoe Mold



2. Spiral Mold

Actual cutting tests

Model : A10
■ Spindle : 15,000 rpm DDS type 11kW ■ Cutting material : S45C



Face milling
Tool diameter Ø80 mm
Feed rate 2,000 mm/min
Cutting depth 3 mm
Cutting width 64mm
Cutting volume 384cc/min



End milling
Tool diameter Ø63 mm
Feed rate 4,500mm/min
Cutting depth 30 mm
Cutting width 3mm
Cutting volume 405cc/min



Tapping
Tool diameter M20 x 2mm
Feed rate 635 mm/min
Cutting depth 20 mm



Drilling
Tool diameter Ø32mm
Feed rate 270mm/min
Cutting depth 32 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

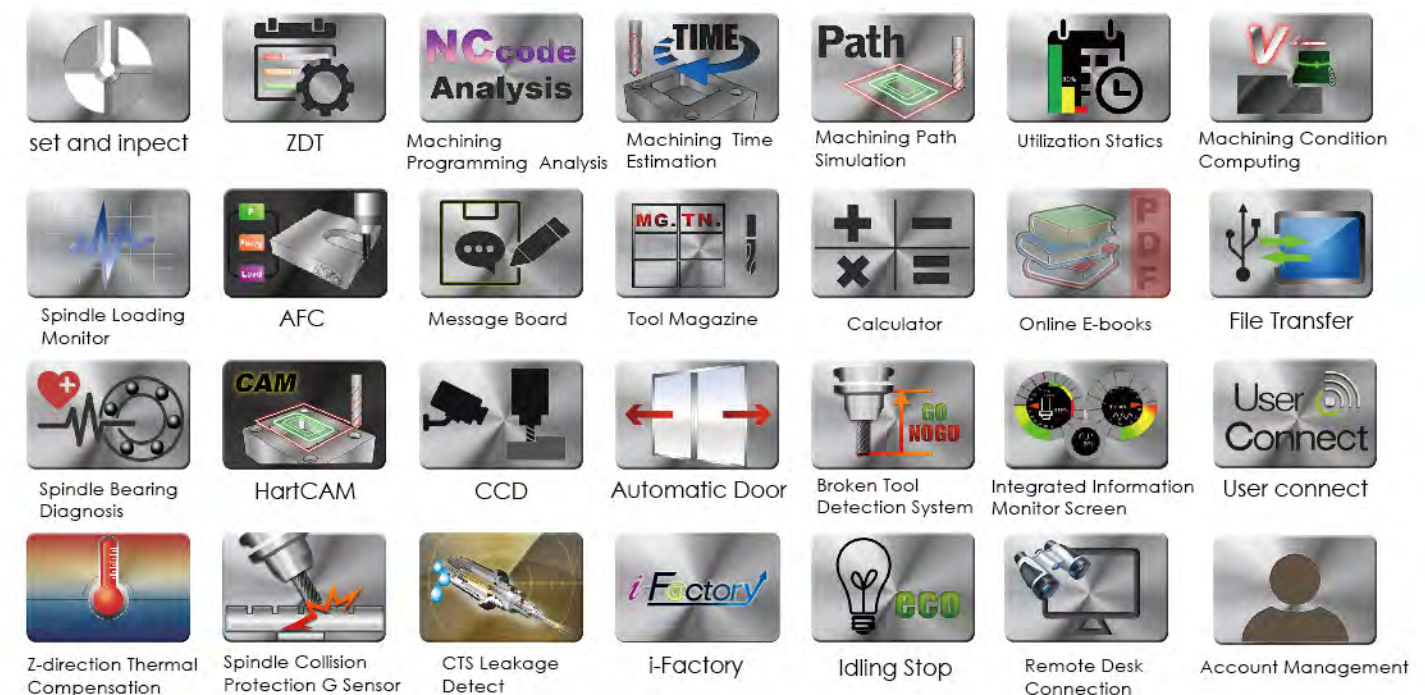


Hartford APP Store

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 functions 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.

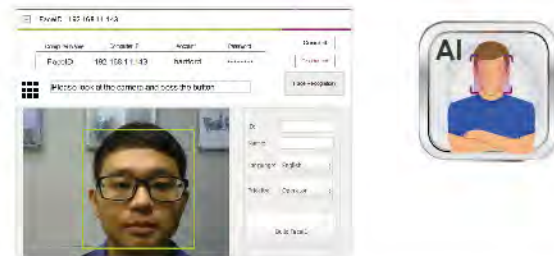
AI Environment Thermal Displacement Compensation(opt.)

Vertical machining center : **0.03mm**
Thermal displacement problem is improved up to **60%**
It can achieve good accuracy as in constant temperature room.



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



Set & Inspect(opt.)

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.

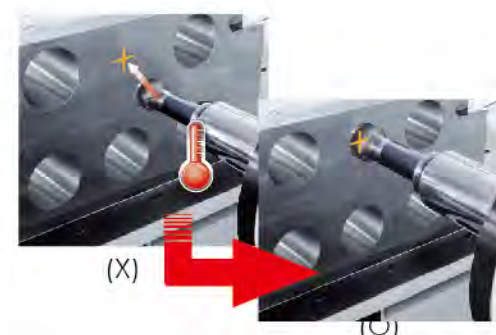


AFC(opt.)

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



Optimized structure enhances stability



Hartford A Series

Tough, rugged and durable structure design for Model A

Optimal structural design of Model A provides outstanding performance on rigidity. Stability presents based on Hartford self-made spindles during high - speed transmission, which reduces heat resulting from high - speed machining. Excellent cutting performance will be served accordingly.



Full range of linear guideway five-year warranty:

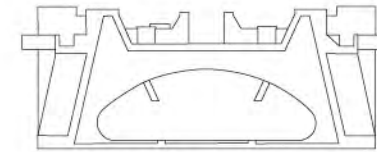
Warranty coverage will not apply under following conditions

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

Optimal rigid design construction

Dual-wall design is employed under arch - type column ribs.

Strengthened rigidity of base provides excellent damper, cutting performance, full-travel support on working table and optimum accuracy.

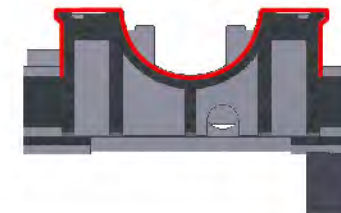


▲ Dual-wall design is employed under arch-type column ribs.



Cylinder-shape box provides stronger support for guideways.

40% deformation reduces based on anti-twist force of cylinder-shape box.



▲ Cylinder-shape box provides stronger support for guideways.

Oversized column & widest base design

- The increased width of column base enhances machining efficiency
- Increased width of interface between the column and base
- Enhances machine stability
- Increases machine rigidity and efficiency



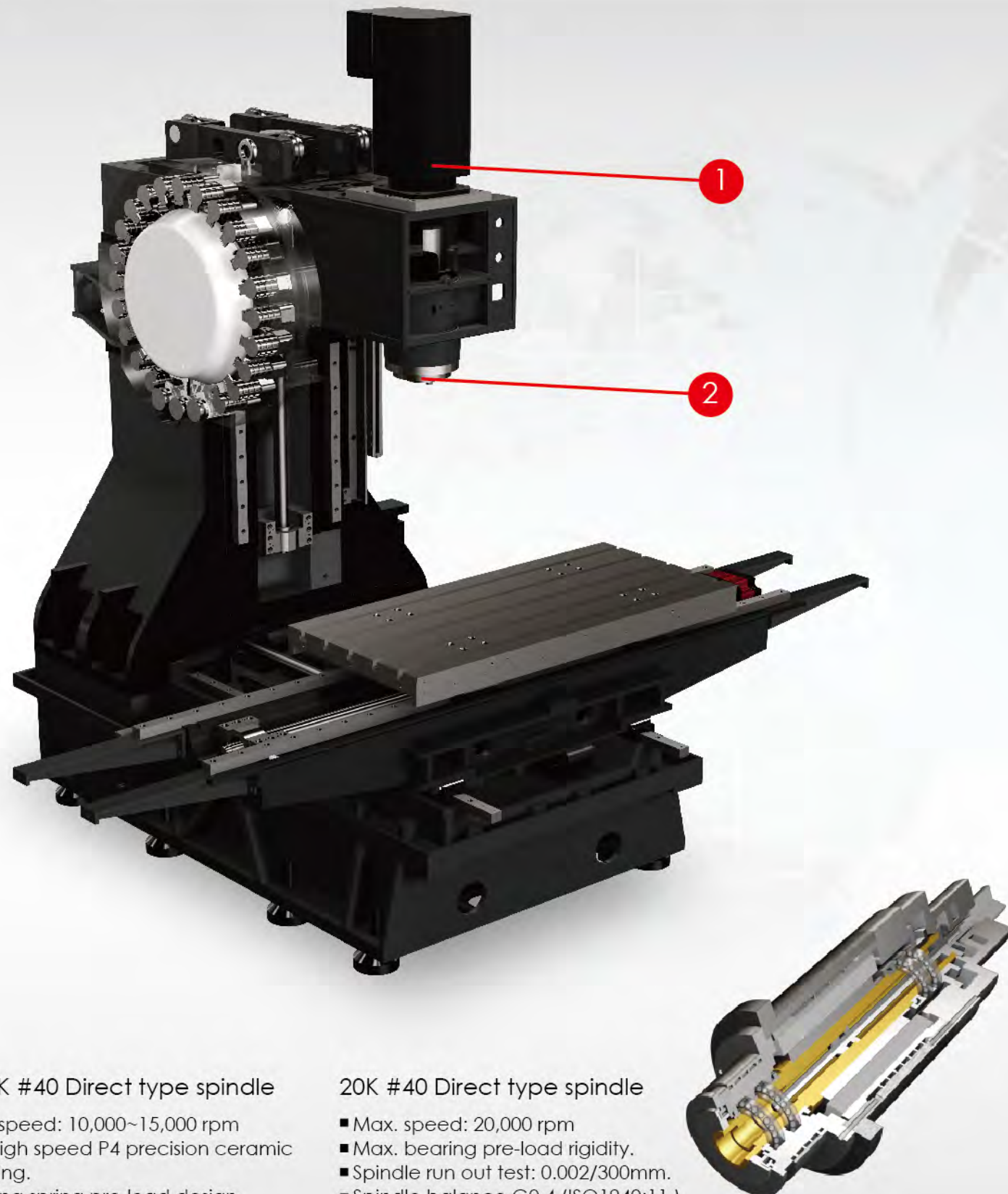
▲ Oversized column & widest base design

Direct-drive transmission design on 3 axis

- 3-Axis Ball Screw Direct Drive along with Servo Motors.
- Direct drive transmission without back lash
- Two sides of ball screws install high precision bearing.
- Stable transmission increase progressing efficiency.



Tough, rugged and durable for A

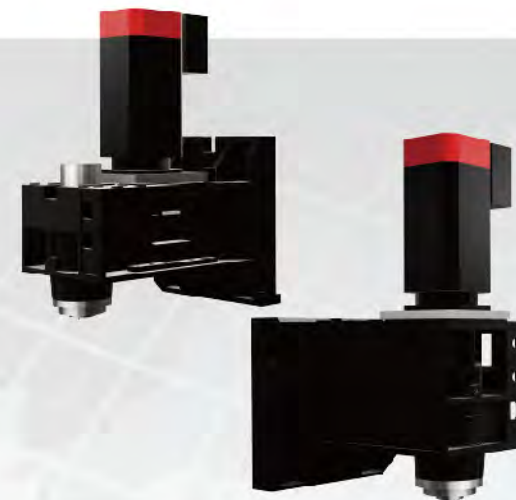
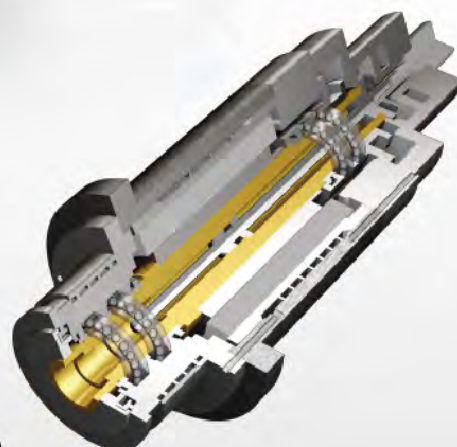


10~15K #40 Direct type spindle

- Max.speed: 10,000~15,000 rpm
- SKF high speed P4 precision ceramic bearing.
- Bearing spring pre-load design increases spindle rigidity after thermal extension
- Technical level equals to Japanese.

20K #40 Direct type spindle

- Max. speed: 20,000 rpm
- Max. bearing pre-load rigidity.
- Spindle run out test: 0.002/300mm.
- Spindle balance G0.4 (ISO1940:11.)
- Temperature evaluated can be controlled in 15 °C under 20K high speed machining.
- 3D die and mold machining results can be reached up to 6000mm/min.



1.Spindle spec

Modle	Spindle Nose Tape	Spindle Speed	
		Pulley	DDS
A8	ISO40	8000/10000 /12000(rpm)	10000/15000 /20000(rpm)
A10	ISO40	8000/10000 /12000(rpm)	10000/15000 /20000(rpm)

Direct drive in Z axis servo motor and ball screws

- Z axis not be used pulley type transmission, servo motor direct drive ball screws.
- No back lash problem, no regular pulley type transmission cause servo lag problem.
- Increase machine efficiency and stability.



2.One- piece design for spindle housing and casting iron

- Increases rigidity and cutting performance. Reducing weight to reduce acceleration stresses and increase positional accuracy.
- The structural of the head has been adjusted.
- Provide additional support for the spindle to absorb the cutting forces.



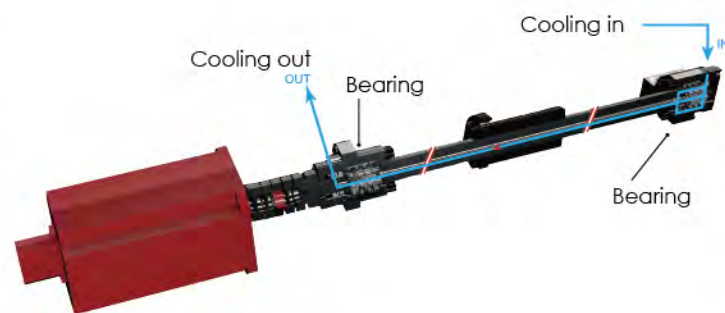
Laser measurement pitch:
Standard measurement
compensation.



X / Y axis verticality : 0.010/500mm



Tough, rugged and durable for A MOLDE



Thermal growth control on 3 axes(opt.)

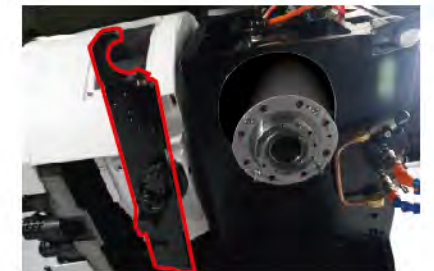
3-axis feed system such as motor base, ballscrews, bearings and nuts are designed with cooling tunnels. Thermal deformation problem can be reduced. Machining movement can be improved. Cutting surface accuracy is always maintain. Axis accuracy increased by **15%**. Features may vary by model.

Fine scraping process



Excellent tool change time

- A Modle minimum tool change time **1.38** sec (tool-to-tool).



Oversized column & widest base design

- Column width is **1100mm** and base is **1600mm**
- Increased width of interface between the column and base.
- Enhances machine stability.
- Increases machine rigidity and efficiency.



3-axis with ballscrew

- Supported by high precision angular contact thrust bearings.
- All servo motors with absolute encoders.
- Increase efficiency and dependability. (Mitsubishi & Fanuc only).

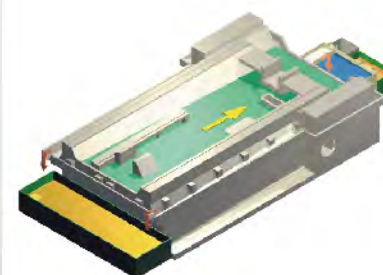
Axis overhand

- The base has been redesigned to widen the support points on the base.
- Guarantee full support throughout the X axis traverse.
- Eliminating with overhand, especially on heavier work piece.



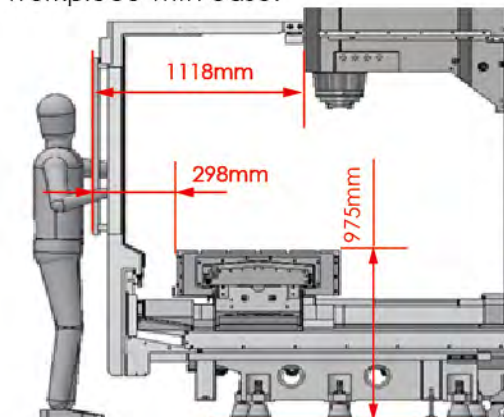
One-piece bed design

- Separates oil and coolant on the machine effectively.
- Prevents coolant contamination problems.

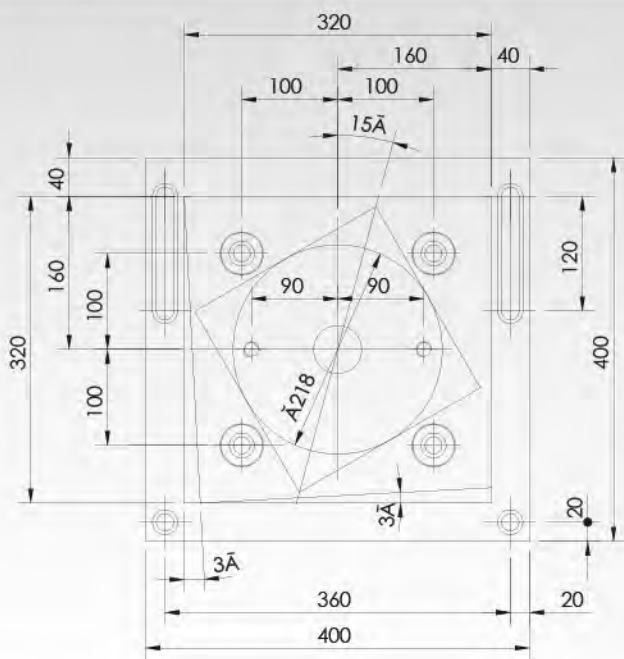


Easy for operation

- A series design meets the human engineering principle.
- Allows the operator to load and unload workpiece with ease.



Inspection Standard



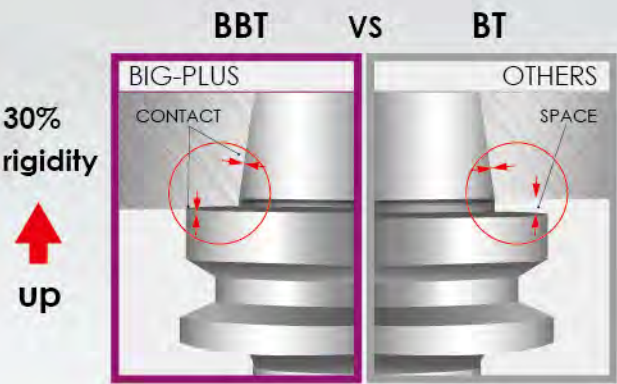
Spindles Manufactured by Hartford Offer Quality Assurance

Spindle type

- #40 Pulley 8000rpm opt. 10000/12000 rpm
- #40 DDS opt. 10000/12000/15000/20000 rpm

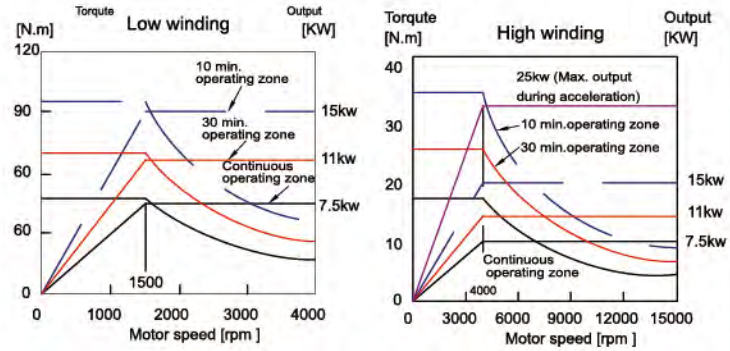
BBT for optional

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

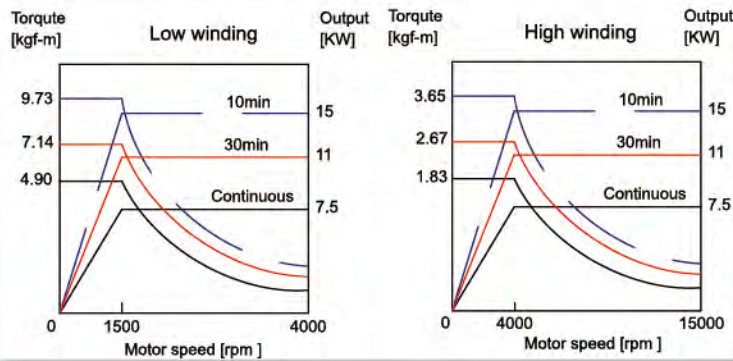


Spindle torque diagrams

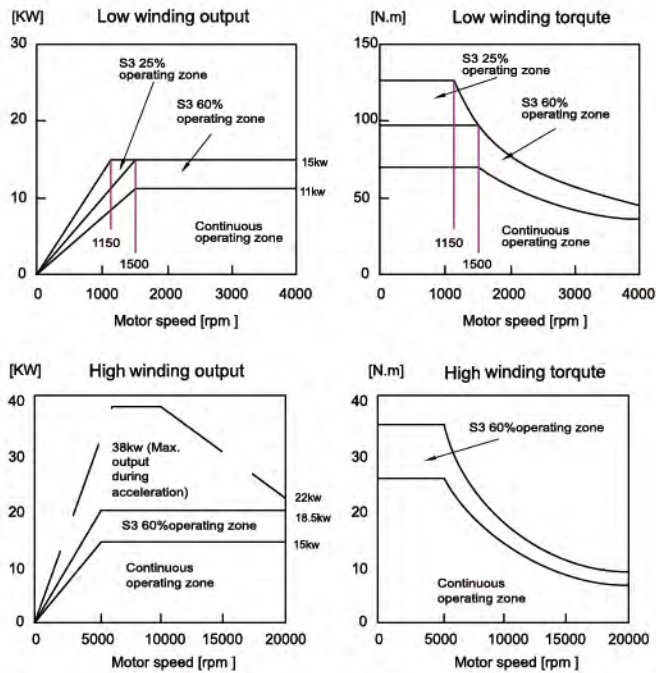
Fanuc a8/15000 it(DDS 15000 rpm)



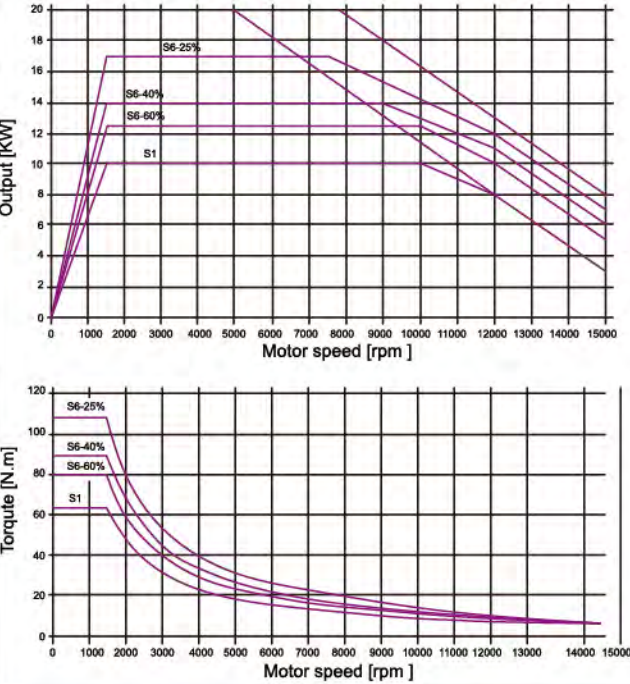
Mitsubishi SJ-VKS26-90ZT-S01x 15000



Fanuc a8/2000 it(DDS 20000 rpm)



HEIDENHAINL: QAN200UH x 15000



ITEM		A8/10 (General manufacturing process)	A8/10 ACME (u-level manufacturing process)
Straightness	X	0.015/Full Stroke	0.010/Full Stroke
	Y	0.01/Full Stroke	0.010/Full Stroke
	Z	0.01/Full Stroke	0.010/Full Stroke
Squareness	X-Y	0.02/ 500	0.01/ 500
	Y-Z	0.02/ 500	0.01/ 500
	Z-X	0.02/ 500	0.01/ 500
Positioning accuracy (VDI3441)	X	0.010	0.008
	Y	0.010	0.008
	Z	0.010	0.008
Repetitive positioning accuracy(VDI3441)	X	0.006	0.004
	Y	0.006	0.004
	Z	0.006	0.004
The movement squareness of spindle and X axis or Y axes	300mm	0.02/300	0.01/300
Spindle run-out	At base	0.01	0.004
	At 300mm	0.015	0.008
Roundness(R150mm)	CW	0.012	0.01
	CCW	0.012	0.01
Positioning accuracy (hole to hole)		NA	0.005

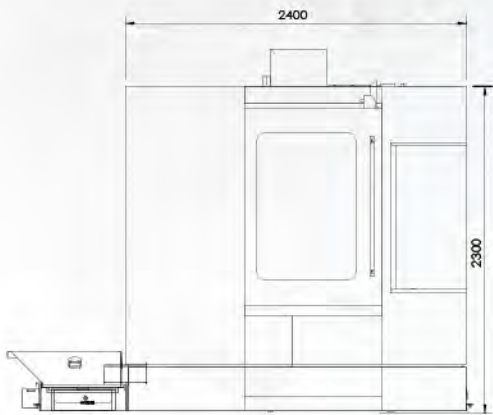
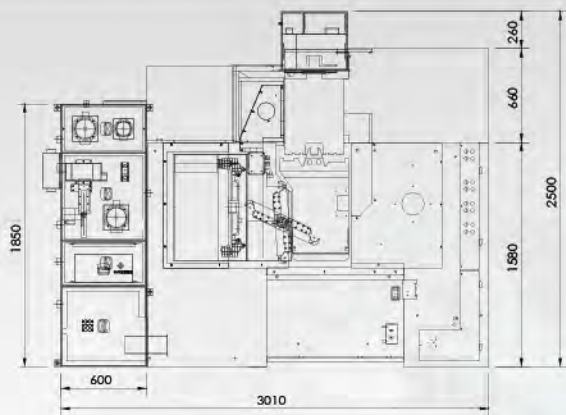
Unit : mm

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Machine Dimensions

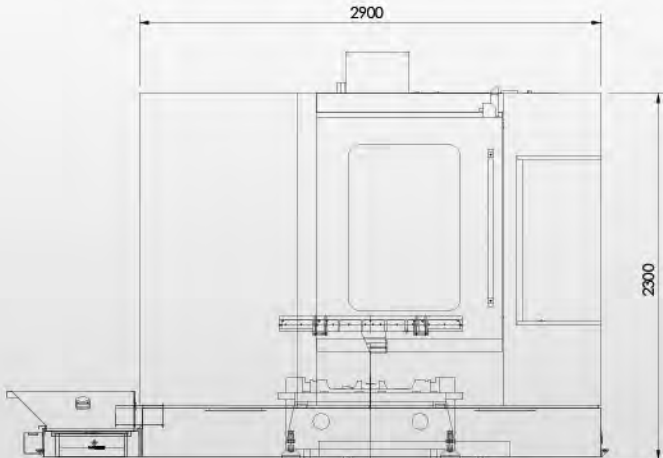
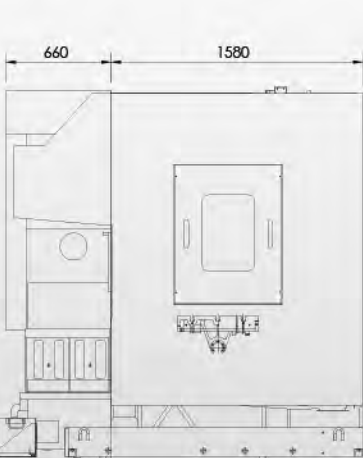
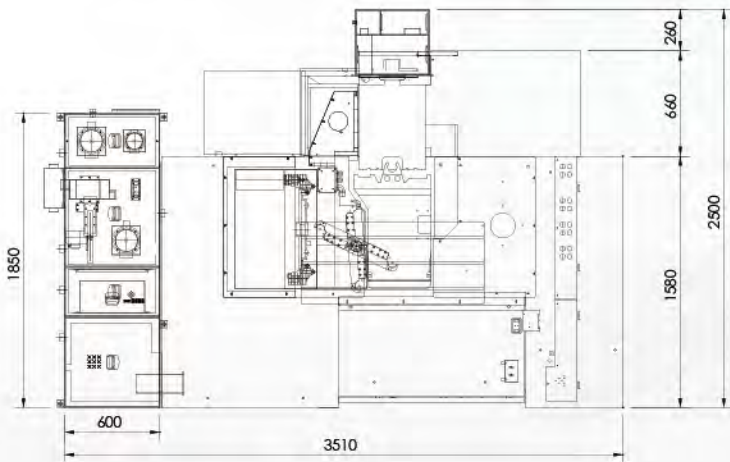
Machine Specifications

A8



unit:mm

A10



Model		unit
Table	Working Surface	mm
	T-slot (Size x Number x Pitch)	mm
	Max Table Load	kg
Travel	Longitudinal travel (X-axis)	mm
	Cross travel (Y-axis)	mm
	Vertical travel (Z-axis)	mm
	Distance From Spindle End to Table Center	mm
Spindle	Distance From Spindle Center to Column	mm
	Spindle Nose Tape	
	Spindle Speed (Pulley)	rpm
	Spindle Speed (DDS)	rpm
Feed	Cutting feedrate (X / Y / Z Axes)	m/min
	Rapid Traverse feedrate (X / Y / Z Axes)	m/min
	Tool Storage Capacity (A type)	pcs
ATC	Max. Tool Weight	kg
	Max. Tool Size (Diameter x Length)	mm
	Tool selection	
	Tool change time (A type)	sec.
Motor	Tool Shank	
	Tool stud bolt	
	Spindle drive motor (30 min rating)	MITSUBISHI kw
		FANUC kw
		HEIDENHAIN kw
	X,Y,Z axis drive motor	MITSUBISHI kw
		FANUC kw
Positioning Accuracy		HEIDENHAIN kw
	3 axes laser positioning accuracy (VDI 3441) / Repeated 5 times	
	Positioning accuracy	mm
Other	Repetitive positioning accuracy	mm
	Required Air Pressure	kg/cm ²
Other	Electric Power Consumption	kVA
	Floor Space(Full Guarding)	mm
	Net Weight	kg
Other	Coolant tank(Standard)	L

A8	A8 Acme	A10	A10 Acme
(General manufacturing process)	(u-level manufacturing process)	(General manufacturing process)	(u-level manufacturing process)
800 x 530		1150 x 530	
18 x 5 x 100		18 x 5 x 100	
500		700	
700		1050	
530		530	
510		510	
100~610		100~610	
600		600	
ISO40		ISO40	
8000/10000/12000		8000/10000/12000	
10000/15000/20000		10000/15000/20000	
20/20/20		20/20/20	
36 / 36 / 30		36 / 36 / 30	
24(30 opt.)		24(30 opt.)	
7		7	
ø75 x 300L		ø75 x 300L	
3		3	
BT40/BBT40/CAT40/DIN69871		BT40/BBT40/CAT40/DIN69871	
MAS-P40T-1/CAT40/DIN69872		MAS-P40T-1/CAT40/DIN69872	
7.5/11		7.5/11	
7.5/11		7.5/11	
10/12.5		10/12.5	
2 / 2 / 4.5		2 / 2 / 4.5	
3 / 3 / 7		3 / 3 / 7	
3.1 / 3.1 / 5.4		3.1/3.1 / 5.4	
0.010		0.010	0.008
0.006		0.006	0.004
6.5		6.5	
20~45		20~45	
3000 x 2501		3500 x 2501	
6130		6330	
279		306	

VDI 3441 accuracy available upon order request.

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