Accessories

Standard : ● Optional : ★

item \ model	HSA-x20(EA)	HSA-x23(EA)	HSA-x27(EA)	HSA-x28(EA)	HSA-x32(EA)	HSA-x36(EA)
1.5 Years Warranty_Linear Guide Way	●	●	●	●	●	●
2.Spindle Air Curtain	●	●	●	●	●	●
3.Air Blast Through Spindle	●	●	●	●	●	●
4.Table Side Air Blast	●	●	●	●	●	●
5.Centralized Automatic Lubrication System	●	●	●	●	●	●
6.Screw type chip conveyor	●	●	●	●	●	●
7.Tool package	★	★	★	★	★	★
8.Without Mist coolant system	●	●	●	●	●	●
9.Foundation bolt	●	●	●	●	●	●
10.Absolute pulse coder	●	●	●	●	●	●
11.Spindle Oil Cooler	●	●	●	●	●	●
12.Automatic Power off	●	●	●	●	●	●
13.Operation Finish Lamp	●	●	●	●	●	●
14.Foot Switch For Spindle Clamp/Unclamp	●	●	●	●	●	●
15.Remote Manual Pulse Generator	●	●	●	●	●	●
16.RS-232 Interface	●	●	●	●	●	●
17.Habor Convection Heat Exchanger In Control Box	●	●	●	●	●	●
18.Fluorescentx1	●	●	●	●	●	●
19. Link type chip conveyor 0.19 KW(Without Coolant Tank) & portable chip bucket(1 EA)	●	●	●	●	●	●
20.Manual x1	●	●	●	●	●	●
21.6000RPM Gear Head	●	●	●	●	●	●
22.Full-enclosed splash guard	●	●	●	●	●	●
23.CTS full splash guard with top cover	★	★	★	★	★	★
24.Fluorescent x2/4/6	★	★	★	★	★	★
25.X/Y/Z-axis linear scale system_HEIDENHAIN	★	★	★	★	★	★
26.Manual x2/3	★	★	★	★	★	★
27.Hartford Manual x1/2/3	★	★	★	★	★	★
28.Hydraulic Hose Coolant gun	★	★	★	★	★	★
29.Air gun	★	★	★	★	★	★
30.Oil Fluid Separator	★	★	★	★	★	★
31.Hoist Seat	★	★	★	★	★	★
32.Maintenance safety guard(Including maintenance ladder)	★	★	★	★	★	★
33.X / Y-axis ball screw support device	—	★	★	★	★	★
34.Pedal Ladder	★	★	★	★	★	★
35.Hybrid Spindle 10000RPM	★	★	★	★	★	★
36.ARM Type ATC	★	★	★	★	★	★
37.Coolant through spindle_Prepare	★	★	★	★	★	★
38.Coolant through spindle	★	★	★	★	★	★
39.TOUCH PROBE	★	★	★	★	★	★
40.Imitative Mold Cutting System	★	★	★	★	★	★
41.Closed Loop Linear Scale Positioning System	★	★	★	★	★	★
42.DNC Software	★	★	★	★	★	★

Electrical features Standard equipment & optional features

Hartrol / standard equipment

- Manual workpiece alignment
- Tool magazine graphics and data display
- Pop-up computer
- Supporting processing parameters
- Machine utilization rate analysis (only suitable for Fanuc)
- Internal and external thread cutting (only suitable for Fanuc)
- Tool magazine data display-Tool style graphical data display (only suitable for Fanuc)
- Tool life monitoring(only suitable for Fanuc)
- Lettering processing function
- Tool correction screen & fast tool change function((only suitable for Fanuc)

Hartnet / Optional features

- Whole plant utilization rate management system
- Processing countdown management
- Whole plant file transfer system
- Output management

Electrical function / Optional features

- Power-off gravity axis lift function
- Coordinate display hand input
- Tool magazine HMI
- Rigid tapping tool retraction
- Spindle thermal displacement compensation

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Website

Facebook

Hartford EXCLUSIVE HartrolPlus APP

Intelligent 5 - Face machining center

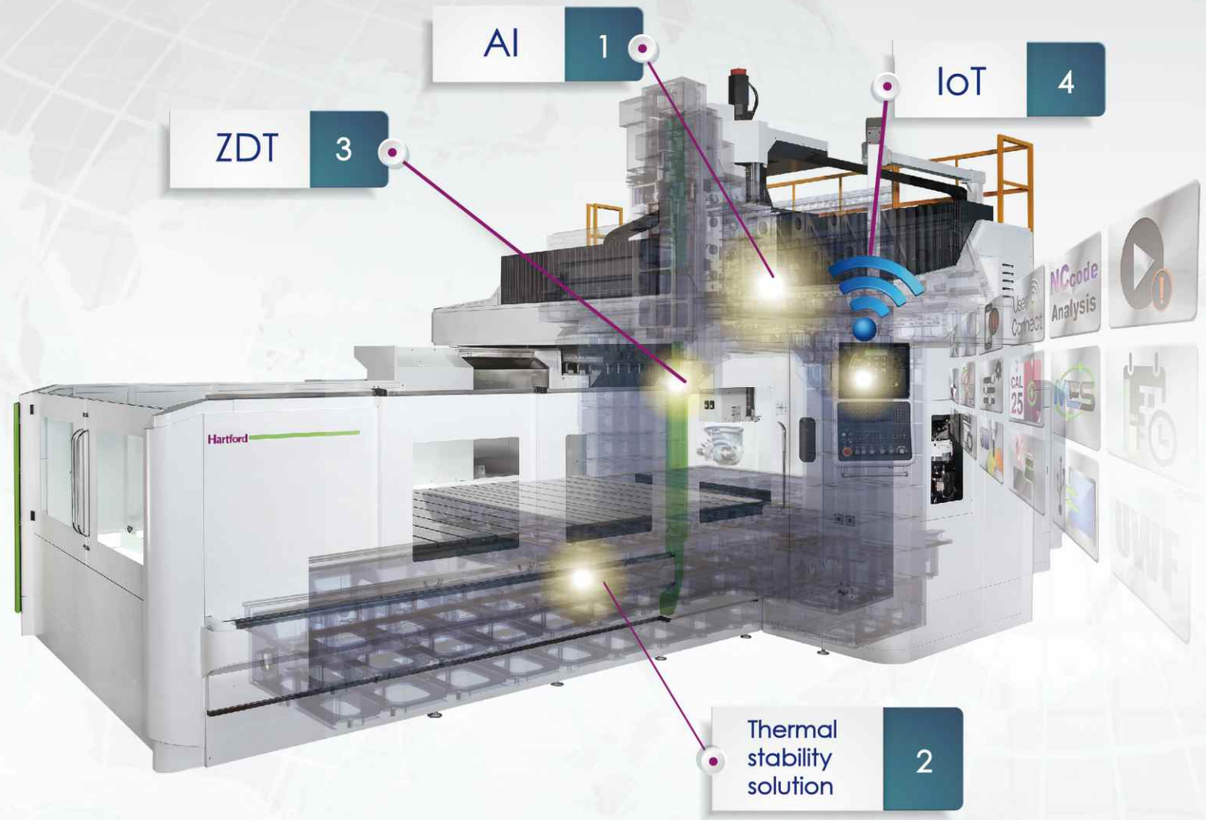
Software machine

AI. 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



IoT 1
+ Hartrol Plus Sync & Update
+ User Connect

Thermal stability solution 2
+ Spindle Thermal Compensation
+ Casting Thermal Compensation
+ Thermal Symmetry / Thermal Balancing

ZDT 3
+ Diagnosis Report on Spindle Operation
+ Alarm Report System

AI 4
+ Facial Recognition System
+ AI Efficient Lubrication Management
+ Smart Efficient Chip Collection

Major functions of Hartford AI controller

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

The very first step for fully intelligent machining.

What is HartrolPremium?

Hartrol premium 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 premium and others

Function	Hartrol Premium	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 contorols 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.

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.

EXCLUSIVE HartrolPlus APP

Hartford smartcenter APP

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

AI Tool breakage detection (opt.)

Available with tool size 6mm above

- Tool wears when electric current ratio increased
- When tool abrasion over than your setting, machine alarms to avoid tool breakage

Highlight on Intelligent Auger(opt.)

50% efficiency 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

What Hartford APP can do for you?

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 Efficient Lubrication Management (opt.)

50% lubrication saved.

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

AI Facial recognition system (opt.)

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

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

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

Strong cutting force; release your production potential

All New Infinity of high rigidity, high-precision can help you machine blank to become the finished mold of excellent precision and smoothness.

Hood

Automobile injection mold

Table of vertical machining center

column of vertical machining center

Actual Cutting Test

Model: HSA-428 EA
■ Spindle: 6,000 rpm Gear type, 37kW ■ Cutting material : S45C

Face milling

Tool diameter	Ø125 mm
Feed rate	2,000 mm/min
Cutting depth	5 mm
Cutting width	100 mm
Cutting volume	1000 cc/min
Spindle Load	104%

End milling

Tool diameter	Ø63 mm
Feed rate	2,000mm/min
Cutting depth	40 mm
Cutting width	10 mm
Cutting volume	800 cc/min
Spindle Load	104%

Tapping

Tool diameter	M36 x P4 mm
Feed rate	480 mm/min
Cutting depth	40 mm
Spindle speed	120rpm
Spindle Load	16%

Drilling

Tool diameter	Ø76 mm
Feed rate	60mm/min
Cutting depth	50 mm
Spindle speed	300rpm
Spindle Load	35%

All the test 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 from those shown in this catalogue.

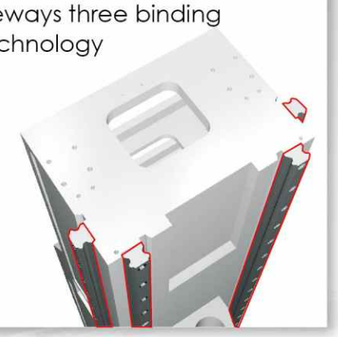
ALL NEW INFINITY, from roughing to finishing, allows you to accomplish at one go

The new HSA series gives you optimal processing performance and extreme precision performance, while increasing HSA architecture to pair up with homemade automatic switching head mechanism, reaching five-face machining models to meet a variety of your processing needs.

Z-axis four linear guideways three binding structure patented technology

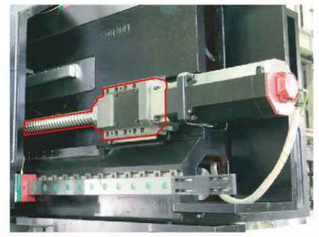
The patented HSA four linear guideways three binding structure technology, two-way support provides high rigidity while cutting, bringing you excellent performance.

Patent No.1264343 machining center Z-axis head Z-axis four linear guideways.



HSA three-axis direct-connected drive advantage

HSA series X-axis and Y-axis pair up with the planetary reducer, effectively enhancing the overall axial drive torque of the machine.



X-axis three linear guideways design HSA-X28/HSA-X32/HSA-X36

The X-axis three linear guideways design can be used to resist prcess rotation torsion and enhance rigidity by more than 50%. Moreover, the maximum load of a workbench can be 30,000kg, hus allowing you to meet your processing needs and help you each your accuracy and quality requirements.
(HSA-X20/X23/X27 are two linear guideways.)

5-Year Warranty

Full range of linear guideway five-year warranty

Warranty coverage will not apply under following conditions

1.Improper operation(collision)

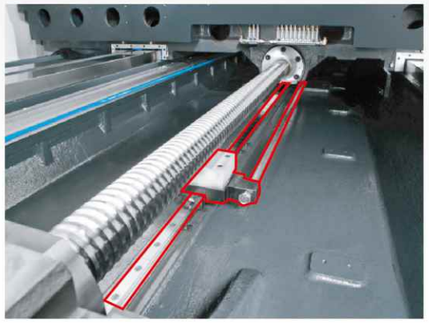
2.Lack of regular cleaningof accumulated debris causing damage to the linear rails &carriages.

Unique Machine Structure Design

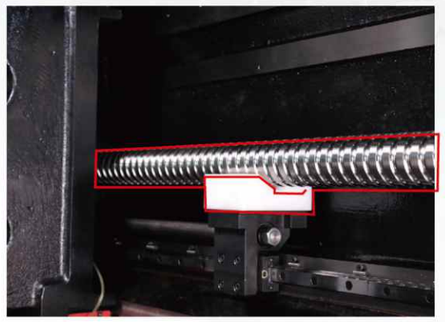
Screw support mechanism maintains excellent positioning accuracy

- In time of the transmission of the X and Y axes, ensure that power is maintained.
- Improve screw dead weight sagging; enhance the positioning accuracy and life of screw.

Model above the 5 meters X-axis is standard configuration; below 4 meters is optional configuration.
Y-axis support mechanism, X27EAY/ X28EAY/ X32EA X32EAY / X36EA/EAY is standard configuration.
Y-axis support mechanism, X23/X27/X28/EA is optional configuration.



X-axis screw support mechanism



Y-axis screw support mechanism

Diversified strong spindle meets your processing needs

Hartford made gear type 8,000 rpm Two-stage spindle (optional feature)

- To follow the process attribute, pair up with high or low gear.
- Spindle-mounted structure design
- Thermal separation technology enables thermal extension to control and apple to HAS-X20/X23/X27/X28/X32/X36

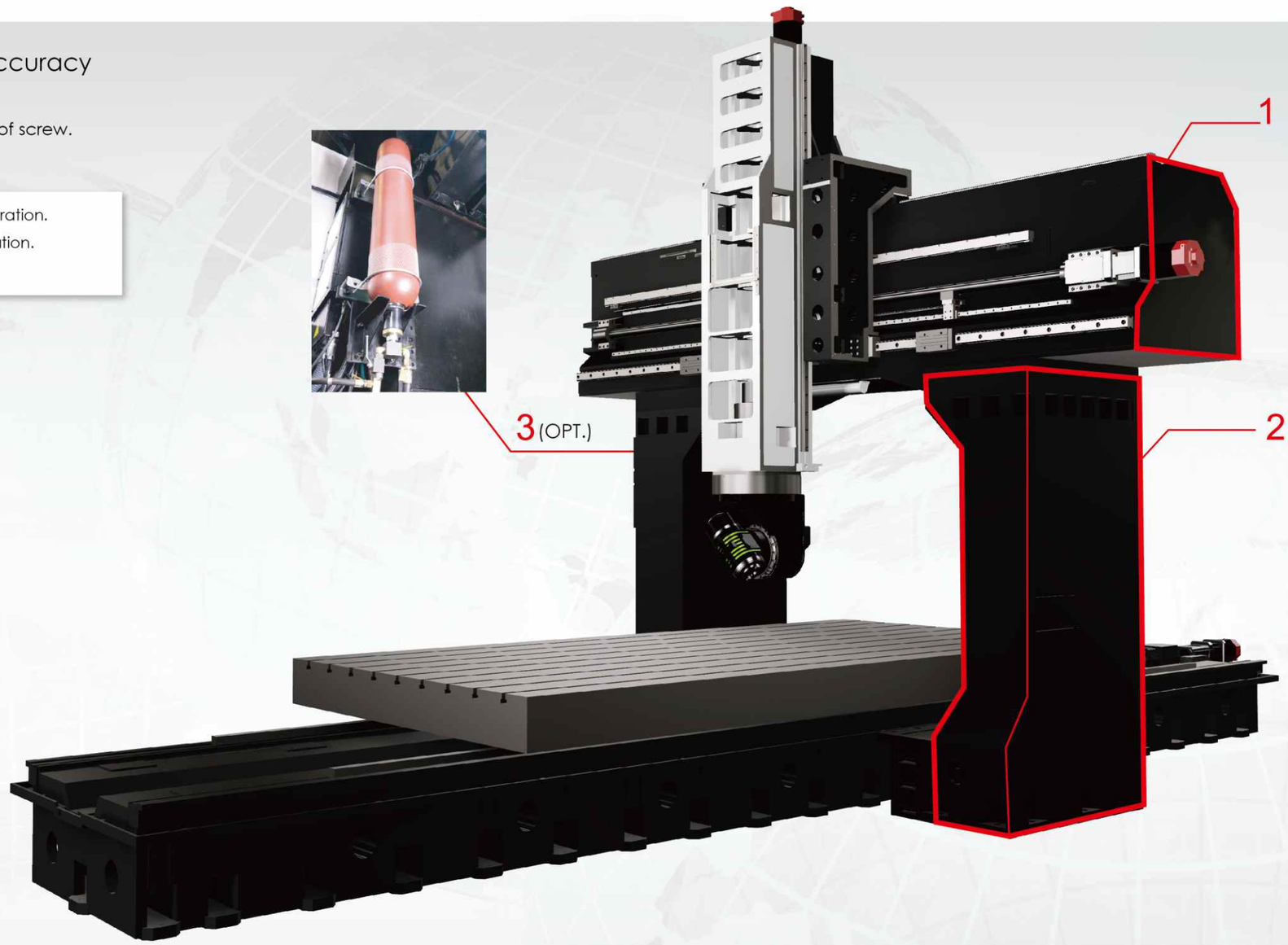
Hartford made i-Tech hybrid type 10,000 rpm spindle(optional feature)

- Motor and spindle dual cooling circulation design.
- Cooling cycle design
- Built-in motor-maximum 35kw, 600N-m

  Applicable models: EA / EAY

▲ Hartford made i-Tech hybrid type 10,000 rpm spindle(optional feature)

◀ Hartford made gear type 8,000 rpm Two-stage spindle (optional feature)



1.The new slant beam design effectively reduces vibration from cutting

- Reduce the vibration generated by the process.
- Enhance accuracy and surface sheet cleanliness during processing.

Patent :
M435318 Beam rear slant design

2.Extra-large columns effectively transfer the maximum cutting force

- The joint width between bottom of the column and the base is increased to 1,250mm
- Reduce overall vibration from cutting.

Patent:
M437316 Structure section has design to resist torsion.

M438938 Column foot span design

3. Z-axis nitrogen accumulator weight system(OPT.)

- Reduce operating noise of hydraulic tank.
- Reduce hydraulic tank oil temperature by 50%
- Effective energy-saving more than 20%

Suitable for HSA-X20/X23/X27/X28/X32 /X36 EA/EAY full ramge of models.

Complete angular head design package

Hartford has a full range of angular head specifications, in addition to automatic universal heads, automatic 90 degrees head, automatically extension head, automatic grab head to pair up with a 90-degree head, there are series of manual and semi-automatic universal heads, 90 designs head and extension head, etc., for you wide range of processing needs.

Automatic heads(automatic clamp) suitable for HSA-EA/EAY series models.

Automatic universal head(2.5°/5°)	Axis	A/C axis division angle configuration table			
A/C axis automatic rotation angle Maximum speed:4,000rpm Maximum power :26 kw The maximum torque to withstand : 930N-m Optional configuration of maximum pressure 70 BAR CTS	C-axis	1°	2.5°	2.5°	5°
	A-axis	1°	2.5°	5°	2.5°
	Remark	ST. standard feature	OPT. customized specifications		

Automatic 90° head(5° / 2.5° / 1°)

Maximum speed:4,000 rpm/2,500(opt.)
Maximum power :26kw
The maximum torque to withstand : 930N-m
Optional configuration maximum pressure 70 BAR CTS
Minimum optional configuration C-axis positioning indexing :1 degree

Automatically extension head (350/500mm)

Maximum speed:4,000 rpm
Maximum power :25kw
The maximum torque to withstand : 750N-m
Optional configuration of maximum pressure 70 BAR CTS
Automatic tool change function

Auto clamp/unclamp + the manual 90° head

Maximum speed:2,000 rpm
Maximum power :18.5kw
The maximum torque to withstand : 650N-m
External guide pins enhance the positioning accuracy of the exchange head, with automatic grab head function and manual rotating angle function.

Angular head exclusive technology

Patented technology

Patented technology

Clutch-type vertical skew angular axis head. The clutch lock of the horizontal axis(CHE)

During clutch, the electromanetic brake will activate on both the rotating and linkage shaft. The slanting swing is generated by gravity. Reduce the amount of slanting swing while in clutch to avoid tooth jamming.

Angular head C-axis 1 degree positioning mechanism (TWC)

Angular head C-axis 1-degree indexing positioning function. Because the whole transmission system is a fully closed loop, it can still better eliminate the origin of mechanical backlash.

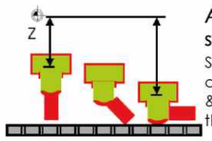
Angular head center coolant mechanism (UAC)

All automatic heads are optional with CTS function, can give customers maximum tool life and processing performance.

Intelligent technology

Minimum optional configuration A/C-axis positioning indexing : 1 degree

In AC travel, arbitrary integer angular inclined surface processing needs.(Optional accessory)



Auto angular head travel intelligent switching

Solves the problems of switching between travel and protected areas so that the travel limit (Y-axis & Z-axis) is autimatically adjusted according to the universal head angular.(Standard accessory)

AC universal head rotstion center + Tool tip automatic error measurement function

Raises processing accuracy, reduces manual measurement error, and shortens the measurement time. In time of measured comprising a heat deflection of the angle head, so it is possible to improve accuracy errors. (Optional accessory)

Adhere to quality and meticulous detail

Hartford adheres to each gradation, grasps every possibility, and is devoted to adhering to quality and meticulous detail.
By demanding quality precision within each process, we remain dedicated to producing the best.

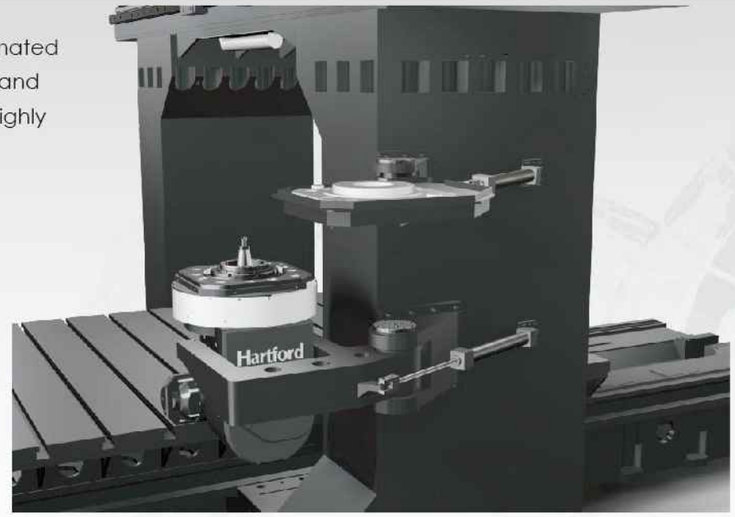
・Adjust teeth clearance

・Check gear

・End surface flatness correction

Automatic angular head switching head compartment

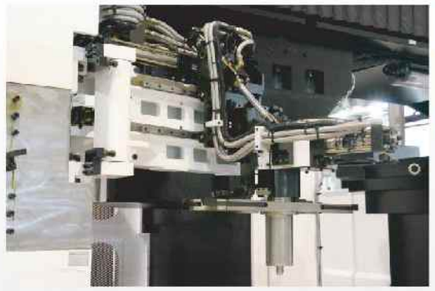
EA/EAY series can be combined with automated switching head compartment and vertical and horizontal tool change system, to provide highly efficient vwesatile processing.



EA/EAY jib head compartment module

- It can be used with automatic universal head / automatic 90-degree head /automatically extension head.
- Fully automated exchange head compartment is fitted with protective cover and independent angle head compartment.
- It is designed to be driven by a hydraulic cylinder to provide the angle head fast switching capability.
- Each compartment is fitted with an independent movable door, which opens only during switching of the head, to prevent chips from contaminating angle head.

Choose a variety of tool magazines



1.The vertical and horizontal tool magazine

- Automatic switching processing tool
- All tool change action and tool change points are fitted with detector and sequential scanning to ensure stability and reliability for machine tool change.
- Vertical type tool magazine : can be used with 32/40/60/90 tools(standard feature).
- Vertical and horizontal tool magazine: can be used with 32/40/62 tools (optional configuration)

Automatic angular head machining patterns

Working patterns	1.Composite bevel sharp cutting processing	2. 90 degrees side sharp machining	3.Elongation sharp cutting processing
Product form	AC universal head	90 degrees side cutting head	350/500mm extension head
Model code	HF-AU360H	HF-A90L/H	HF-AE35/50L
Maximum speed(rpm)	4000	4000	4000
Tool form	BT50	BT50	BT50
Automatic indexing	5°/2.5°/1°	5°/2.5°/1°	-
Automatic switching head	Automatic	Automatic	Automatic
Automatic tool changing	Automatic	Automatic	Automatic
Rotation angle	C : ±180° A : ±110°	±180°	-

2.

Application of automatic 90° head

Angular head cutting ability actual test data

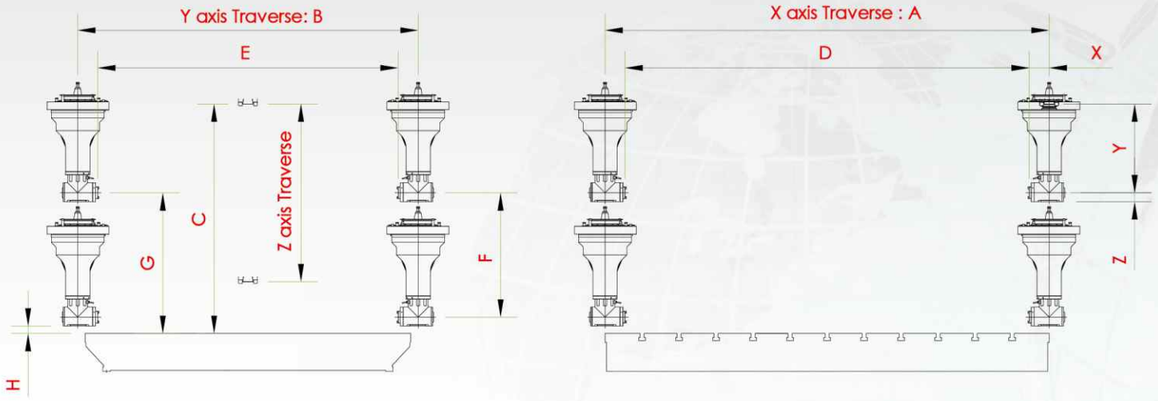
Spindle motor specifications : a30*7000lrpm*37kw(gear type)

Angle head	Auto AC universal axis (1°)		
Test models	HSA-428EAY	HSA-428EAY	HSA-428EAY
Angle	A-90/C90	C0/A90	C0/A0
Test item	Face milling/end milling	Face milling/end milling	Face milling/end milling
Test Results	1200(32.4cc/kw)/792(21.4cc/kw)	1200(32.4cc/kw)/792(21.4cc/kw)	1200(32.4cc/kw)/456(12.3cc/kw)
The maximum depth of cut(mm)	5/10 x 40	5/10 x 40	5/10 x 40

Test item	The maximum test size (mm)	Spindle current ratio(%)
Drilling (violent drilling)	ø76	38
Tapping	M32	16

The new Y-axis is designed to bring a broader range of processing

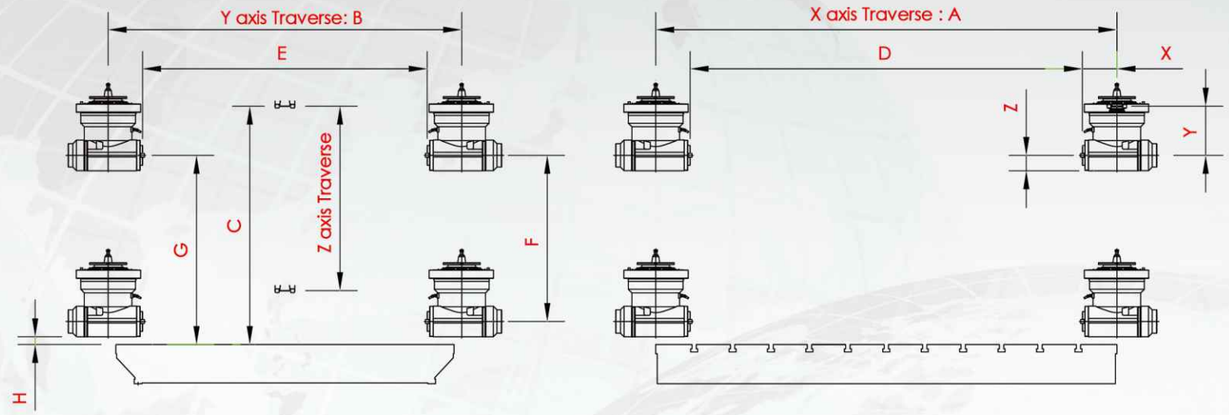
ALL NEW INFINITY ser ies models providing increased Y-axis travel design, you can upgrade you range of processing through the increase of Y-axis travel. We have achieved our purpose to process the widest range with the minimum cost.



Extensive 90 degree head_HF-AR90

MODLE	Z -TRAVEL	COLUMN - HIGH	Distance from column to column	A	B	C	D (A-X*2)	E (B-X*2)	F C-(Y+Z+H)	G C-Y	H	X/Y/Z
HSA-220EA/EAY			2000	2000	2000/2800		1730	1730				
HSA-320EA/EAY			2000	3000	2000/2800		2730	1730				
HSA-420EA/EAY			2000	4000	2000/2800		3730	1730				
HSA-323EA/EAY			2300	3000	2300/3100	1350	2730	2030	640	750		
HSA-423EA/EAY			2300	4000	2300/3100	1550	3730	2030	840	950		
HSA-523EA/EAY			2300	5000	2300/3100	1750	4730	2030	1040	1150		
HSA-623EA/EAY			2300	6000	2300/3100		5730	2030				
HSA-327EA/EAY			2700	3000	2700/3500		2730	2430				
HSA-427EA/EAY			2700	4000	2700/3500		3730	2430				
HSA-527EA/EAY	1000	2200	2700	5000	2700/3500		4730	2430				X:135
HSA-627EA/EAY	1200	2400	2700	6000	2700/3500		5730	2430				Y:600
HSA-428EA/EAY	1400	2600	2800	4000	2800/3600		3730	2530			50	Z:60
HSA-528EA/EAY			2800	5000	2800/3600		4730	2530				
HSA-628EA/EAY			2800	6000	2800/3600		5730	2530				
HSA-728EA/EAY			2800	7000	2800/3600	1310	6730	2530	600	710		
HSA-828EA/EAY			2800	8000	2800/3600	1510	7730	2530	800	910		
HSA-432EAY			3200	4000	4000	1710	3730	2930	1000	1110		
HSA-532EA/EAY			3200	5000	3200/4000		4730	2930				
HSA-632EA/EAY			3200	6000	3200/4000		5730	2930				
HSA-832EAY			3200	8000	4000		7730	2930				
HSA-536EA/EAY			3600	5000	3600/4400		4730	3330				
HSA-636EA/EAY			3600	6000	3600/4400		5730	3330				
HSA-736EA/EAY			3600	7000	3600/4400		6730	3330				
HSA-836EAY			3600	8000	4400		7730	3330				

UNIT : mm

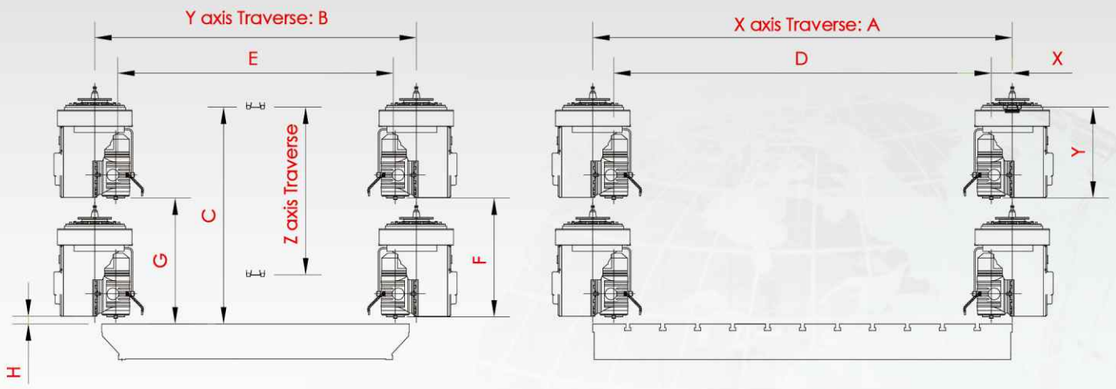


Automatic 90° head_HF-A90

MODLE	Z -TRAVEL	COLUMN - HIGH	Distance from column to column	A	B	C	D (A-X*2)	E (B-X*2)	F C-(Y+Z+H)	G C-Y	H	X/Y/Z
HSA-220EA/EAY			2000	2000	2000/2800		1552	1552				
HSA-320EA/EAY			2000	3000	2000/2800		2552	1552				
HSA-420EA/EAY			2000	4000	2000/2800		3552	1852				
HSA-323EA/EAY			2300	3000	2300/3100	1350	2552	1852	880	1030		
HSA-423EA/EAY			2300	4000	2300/3100	1550	3552	1852	1080	1230		
HSA-523EA/EAY			2300	5000	2300/3100	1750	4552	1852	1280	1430		
HSA-623EA/EAY			2300	6000	2300/3100		5552	2252				
HSA-327EA/EAY			2700	3000	2700/3500		2552	2252				
HSA-427EA/EAY			2700	4000	2700/3500		3552	2252				
HSA-527EA/EAY	1000	2200	2700	5000	2700/3500		4552	2252				X:224
HSA-627EA/EAY	1200	2400	2700	6000	2700/3500		5552	2352				Y:320
HSA-428EA/EAY	1400	2600	2800	4000	2800/3600		3552	2352			50	Z:100
HSA-528EA/EAY			2800	5000	2800/3600		4552	2352				
HSA-628EA/EAY			2800	6000	2800/3600		5552	2352				
HSA-728EAY			2800	7000	3600	1310	6552	2352	840	990		
HSA-828EA/EAY			2800	8000	2800/3600	1510	7552	2352	1080	1190		
HSA-432EAY			3200	4000	4000	1710	3552	2752	1280	1390		
HSA-532EA/EAY			3200	5000	3200/4000		4552	2752				
HSA-632EA/EAY			3200	6000	3200/4000		5552	2752				
HSA-832EAY			3200	8000	4000		7552	2752				
HSA-536EA/EAY			3600	5000	3600/4400		4552	3152				
HSA-636EA/EAY			3600	6000	3600/4400		5552	3152				
HSA-736EAY			3600	7000	4400		6552	3152				
HSA-836EAY			3600	8000	4400		7552	3152				

UNIT : mm

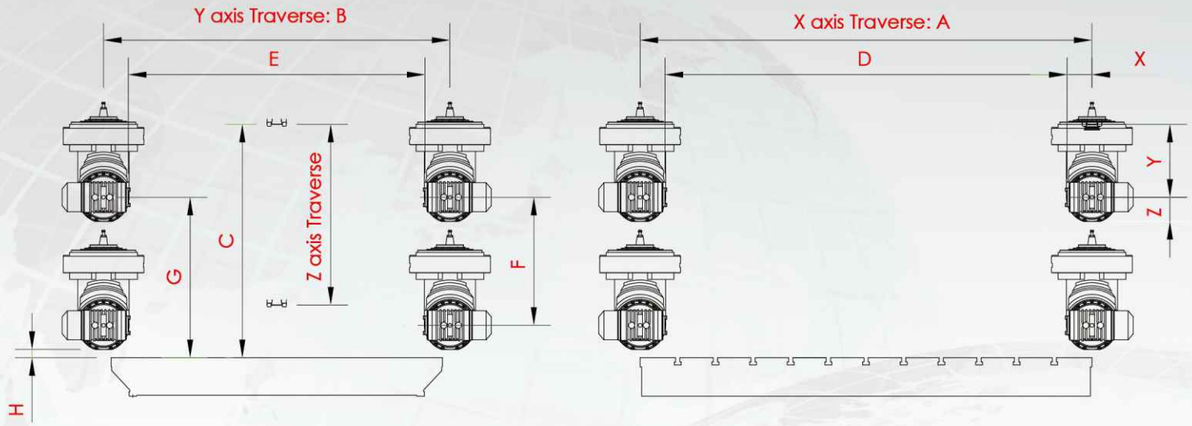
The new Y-axis is designed to bring a broader range of processing



Automatic universal head_HF-AU360_ V

MODLE	Z -TRAVEL	COLUMN - HIGH	Distance from column to column	A	B	C	D (A-X*2)	E (B-X*2)	F C-(Y+Z+H)	G C-Y	H	X/Y
HSA-220EA/EAY	1000 1200 1400	2200 2400 2600	2000	2000	2000/2800	1350 1550 1750	1700	1700	650 850 1050	700 900 1100	50	X:150 Y:650
HSA-320EA/EAY			2000	3000	2000/2800		2700	1700				
HSA-420EA/EAY			2000	4000	2000/2800		3700	2000				
HSA-323EA/EAY			2300	3000	2300/3100		2700	2000				
HSA-423EA/EAY			2300	4000	2300/3100		3700	2000				
HSA-523EA/EAY			2300	5000	2300/3100		4700	2000				
HSA-623EA/EAY			2300	6000	2300/3100		5700	2400				
HSA-327EA/EAY			2700	3000	2700/3500		2700	2400				
HSA-427EA/EAY			2700	4000	2700/3500		3700	2400				
HSA-527EA/EAY			2700	5000	2700/3500		4700	2400				
HSA-627EA/EAY			2700	6000	2700/3500		5700	2500				
HSA-428EA/EAY			2800	4000	2800/3600	1310 1510 1710	3700	2500	610 810 1010	660 860 1060		
HSA-528EA/EAY			2800	5000	2800/3600		4700	2500				
HSA-628EA/EAY			2800	6000	2800/3600		5700	2500				
HSA-728EAY			2800	7000	3600		6700	2500				
HSA-828EA/EAY			2800	8000	2800/3600		7700	2500				
HSA-432EAY			3200	4000	4000		3700	2900				
HSA-532EA/EAY			3200	5000	3200/4000		4700	2900				
HSA-632EA/EAY			3200	6000	3200/4000		5700	2900				
HSA-832EAY			3200	8000	4000		7700	3300				
HSA-536EA/EAY			3600	5000	3600/4400		4700	3300				
HSA-636EA/EAY			3600	6000	3600/4400		5700	3300				
HSA-736EAY			3600	7000	4400		6700	3300				
HSA-836EAY			3600	8000	4400		7700	3300				

UNIT：mm

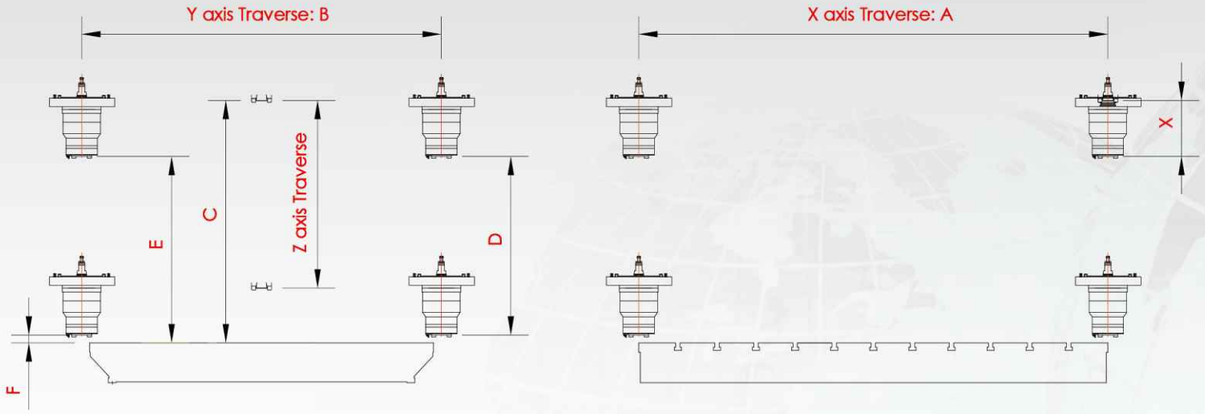


Automatic universal head_HF-AU360_ H

MODLE	Z -TRAVEL	COLUMN - HIGH	Distance from column to column	A	B	C	D (A-X*2)	E (B-X*2)	F C-(Y+Z+H)	G C-Y	H	X/Y/Z
HSA-220EA/EAY	1000 1200 1400	2200 2400 2600	2000	2000	2000/2800	1350 1550 1750	1670	1670	655 855 1055	865 1065 1265	50	X:165 Y:485 Z:160
HSA-320EA/EAY			2000	3000	2000/2800		2670	1670				
HSA-420EA/EAY			2000	4000	2000/2800		3670	1970				
HSA-323EA/EAY			2300	3000	2300/3100		2670	1970				
HSA-423EA/EAY			2300	4000	2300/3100		3670	2370				
HSA-523EA/EAY			2300	5000	2300/3100		4670	2370				
HSA-623EA/EAY			2300	6000	2300/3100		5670	2370				
HSA-327EA/EAY			2700	3000	2700/3500		2670	2370				
HSA-427EA/EAY			2700	4000	2700/3500		3670	2370				
HSA-527EA/EAY			2700	5000	2700/3500		4670	2370				
HSA-627EA/EAY			2700	6000	2700/3500		5670	2370				
HSA-428EA/EAY			2800	4000	2800/3600	1310 1510 1710	3670	2470	615 815 1015	825 1025 1225		
HSA-528EA/EAY			2800	5000	2800/3600		4670	2470				
HSA-628EA/EAY			2800	6000	2800/3600		5670	2470				
HSA-728EA/EAY			2800	7000	2800/3600		6670	2470				
HSA-828EA/EAY			2800	8000	2800/3600		7670	2470				
HSA-432EAY			3200	4000	4000		3670	2870				
HSA-532EA/EAY			3200	5000	3200/4000		4670	2870				
HSA-632EA/EAY			3200	6000	3200/4000		5670	2870				
HSA-832EAY			3200	8000	4000		7670	2870				
HSA-536EA/EAY			3600	5000	3600/4400		4670	3270				
HSA-636EA/EAY			3600	6000	3600/4400		5670	3270				
HSA-736EAY			3600	7000	4400		6670	3270				
HSA-836EAY			3600	8000	4400		7670	3270				

UNIT：mm

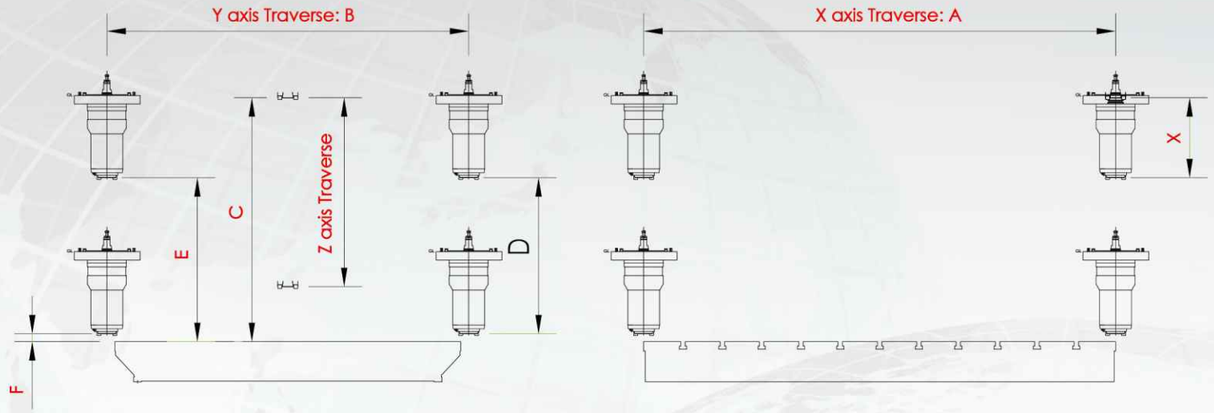
The new Y-axis is designed to bring a broader range of processing



Automatically extension head_HF-AE35L

MODLE	Z - TRAVEL	COLUMN - HIGH	Distance from column to column	A	B	C	D C-(X+F)	E C-X	F	X
HSA-220EA/EAY			2000	2000	2000/2800					
HSA-320EA/EAY			2000	3000	2000/2800					
HSA-420EA/EAY			2000	4000	2000/2800					
HSA-323EA/EAY			2300	3000	2300/3100					
HSA-423EA/EAY			2300	4000	2300/3100	1350	942	992		
HSA-523EA/EAY			2300	5000	2300/3100	1550	1142	1192		
HSA-623EA/EAY			2300	6000	2300/3100	1750	1342	1392		
HSA-327EA/EAY			2700	3000	2700/3500					
HSA-427EA/EAY			2700	4000	2700/3500					
HSA-527EA/EAY	1000	2200	2700	5000	2700/3500					
HSA-627EA/EAY	1200	2400	2700	6000	2700/3500					
HSA-428EA/EAY	1400	2600	2800	4000	2800/3600				50	358
HSA-528EA/EAY			2800	5000	2800/3600					
HSA-628EA/EAY			2800	6000	2800/3600					
HSA-728EAY			2800	7000	3600	1310	902	952		
HSA-828EA/EAY			2800	8000	2800/3600	1510	1102	1152		
HSA-432EA/EAY			3200	4000	3200/4000	1710	1302	1352		
HSA-532EA/EAY			3200	5000	3200/4000					
HSA-632EA/EAY			3200	6000	3200/4000					
HSA-832EAY			3200	8000	4000					
HSA-536EA/EAY			3600	5000	3600/4400					
HSA-636EA/EAY			3600	6000	3600/4400					
HSA-736EAY			3600	7000	4400					
HSA-836EAY			3600	8000	4400					

UNIT : mm

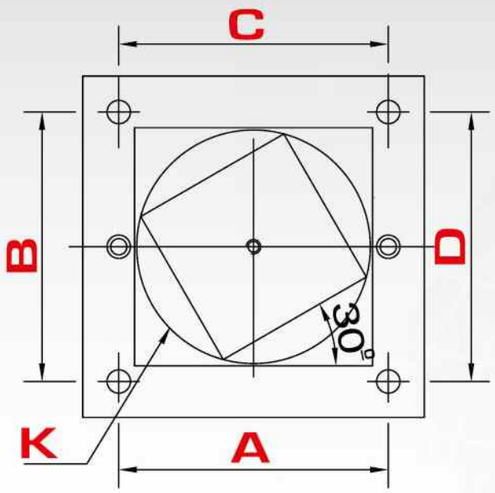


Automatically extension head_HF-AE50L

MODLE	Z - TRAVEL	COLUMN - HIGH	Distance from column to column	A	B	C	D C-(X+F)	E C-X	F	X
HSA-220EA/EAY			2000	2000	2000/2800					
HSA-320EA/EAY			2000	3000	2000/2800					
HSA-420EA/EAY			2000	4000	2000/2800					
HSA-323EA/EAY			2300	3000	2300/3100					
HSA-423EA/EAY			2300	4000	2300/3100	1350	792	842		
HSA-523EA/EAY			2300	5000	2300/3100	1550	992	1042		
HSA-623EA/EAY			2300	6000	2300/3100	1750	1192	1242		
HSA-327EA/EAY			2700	3000	2700/3500					
HSA-427EA/EAY			2700	4000	2700/3500					
HSA-527EA/EAY	1000	2200	2700	5000	2700/3500					
HSA-627EA/EAY	1200	2400	2700	6000	2700/3500					
HSA-428EA/EAY	1400	2600	2800	4000	2800/3600				50	508
HSA-528EA/EAY			2800	5000	2800/3600					
HSA-628EA/EAY			2800	6000	2800/3600					
HSA-728EAY			2800	7000	3600	1310	752	802		
HSA-828EA/EAY			2800	8000	2800/3600	1510	952	1002		
HSA-432EA/EAY			3200	4000	3200/4000	1710	1152	1202		
HSA-532EA/EAY			3200	5000	3200/4000					
HSA-632EA/EAY			3200	6000	3200/4000					
HSA-832EAY			3200	8000	4000					
HSA-536EA/EAY			3600	5000	3600/4400					
HSA-636EA/EAY			3600	6000	3600/4400					
HSA-736EA/EAY			3600	7000	3600/4400					
HSA-836EAY			3600	8000	4400					

UNIT : mm

QC cutting ability test present the beat quality of Hartford



HSA-423 Mold Testing

- Test materials：F25C
- Cutting speed：F200-500
- Spindle speed：S500-800
- Test tool diameter：ø25mm

Positioning machining precision
Positioning accuracy

Through FIG cutting accuracy
Precision through FIG.

	A	B	C	D	K
Error value	0.020	0.020	0.020	0.020	0.015
Actual value	0.0016 (⊕)	0.0015 (⊕)	0.0070 (⊕)	0.0019 (⊕)	0.0037 (◯)

unit(mm)

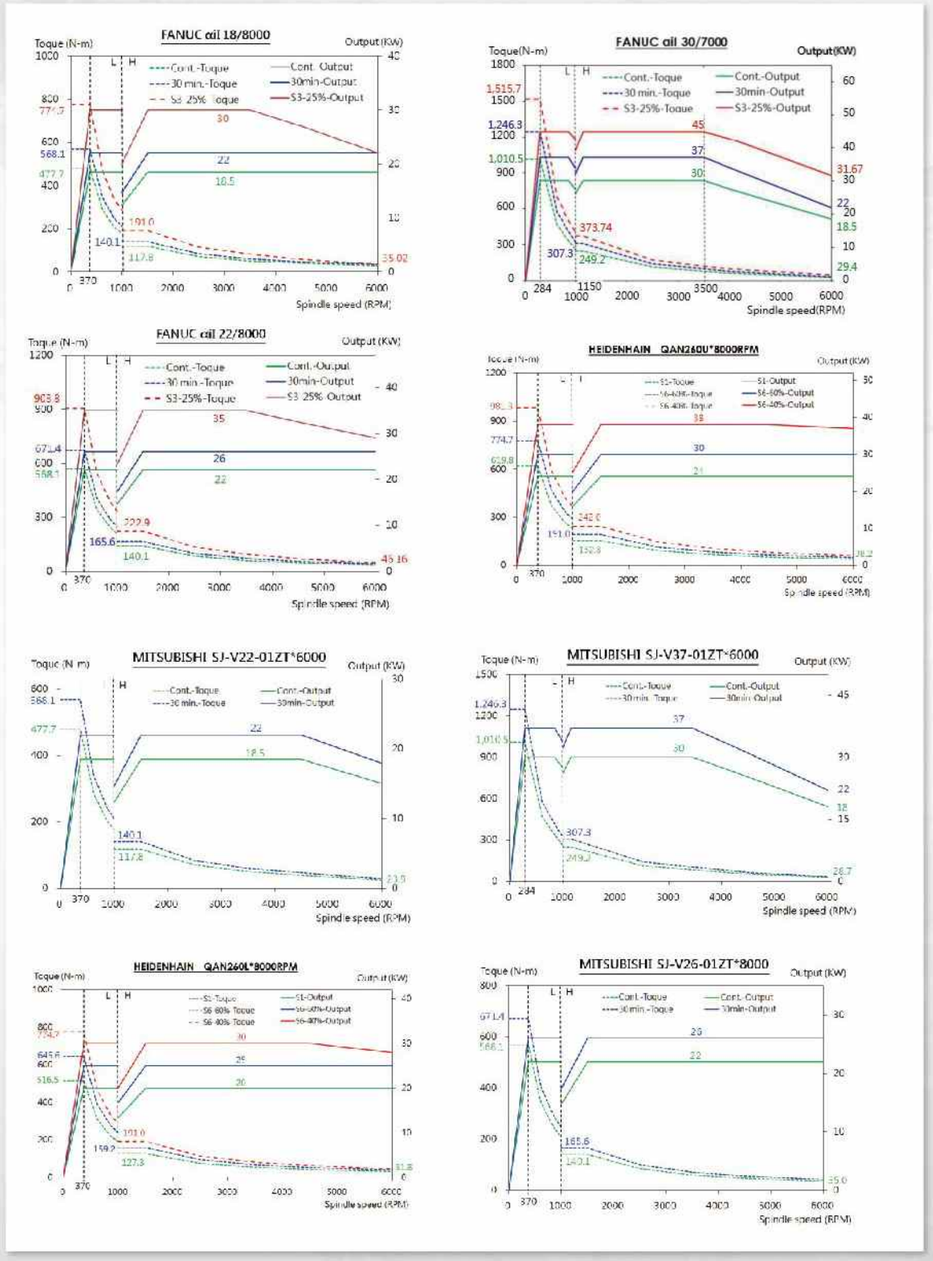
Accuracy	Error value	The actual value
The true flatness of bed top surface(X/Y-axis)	1000▼0.05/M,1000-2000▲0.06/M, 2000 0.07/M	0.02
Right angle of mutual movement of each axis(X/Y-axis)	0.020/500	0.005
Right angle of mutual movement of each axis(Y/Z-axis)	0.02/500	0.005
Slanting swing in spindle hole	Fixed Side : 0.005,Free Side : 0.015/300	0.001/0.005
Accuracy through roundness	0.012/150(X-axis 5000以上 0.020/150)	0.003

A variety of Hartford made spindles have Quality assurance

Torque curve diagram

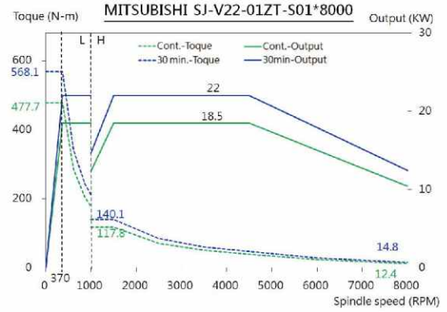
- 6,000 rpm gear type spindle
- 8,000rpm gear type spindle(optional configuration)
- Hybrid 10,000rpm spindle (optional configuration is applicab to EA/EAY)

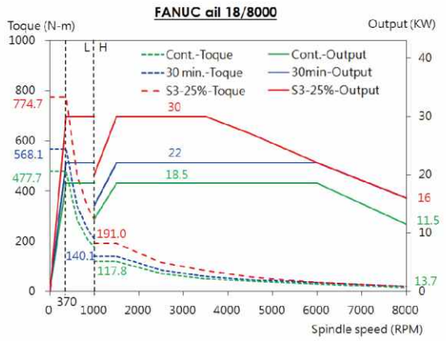
Gear type 6,000RPM

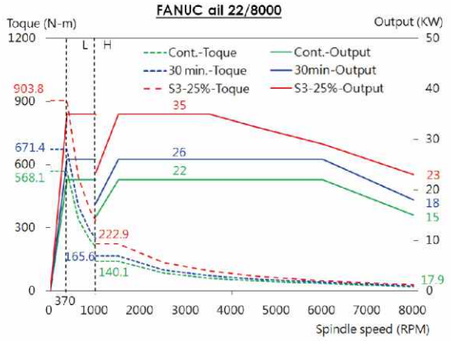


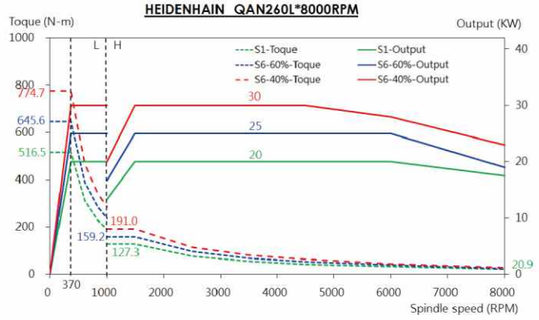
QC cutting ability test present the beat quality of Hartford

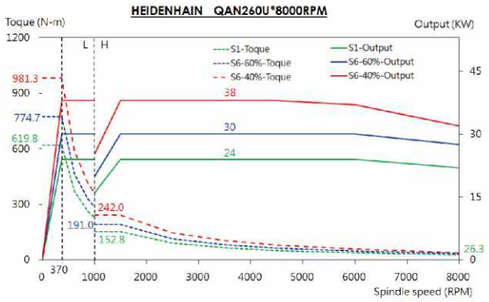
Gear type 6,000RPM



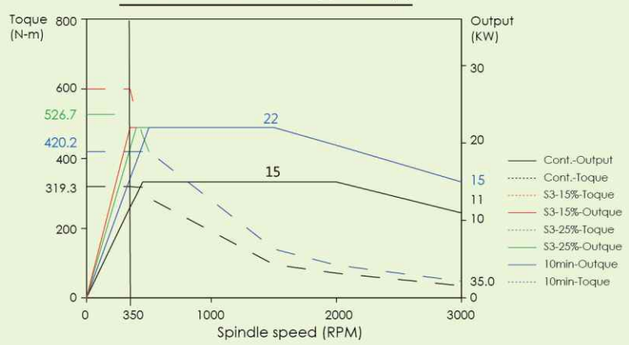




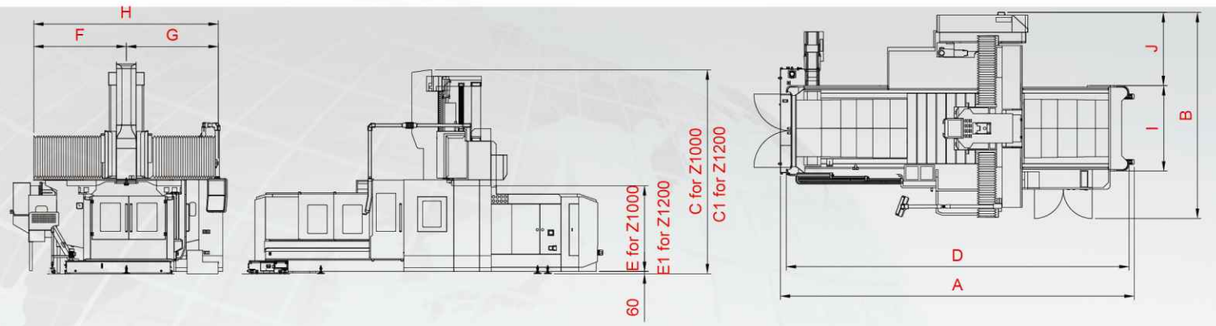




Hybrid 10,000RPM(opt.)



Machine Dimension



HSA-X20/X23/X27/X28/X32/X36 Series(EA/EAY)

Model	A	B	C	C1	D	E	E1	F	G	H	I	J
HSA-220EA	7755	5040	5235	5635	7545	2200	2400	2130	2190	4400	2194	1630
HSA-320EA	9000	5040	5235	5635	8795	2200	2400	2130	2190	4400	2194	1630
HSA-420EA	11000	5040	5235	5635	10795	2200	2400	2130	2190	4400	2194	1630
HSA-220EAY	7755	5290	5235	5635	7545	2200	2400	2380	2280	4740	2194	1880
HSA-320EAY	9000	5290	5235	5635	8795	2200	2400	2380	2280	4740	2194	1880
HSA-420EAY	11000	5290	5235	5635	10795	2200	2400	2380	2280	4740	2194	1880
HSA-323EA	9000	5340	5235	5635	8795	2200	2400	2205	2265	4625	2494	1630
HSA-423EA	11000	5340	5235	5635	10795	2200	2400	2205	2265	4625	2494	1630
HSA-523EA	13000	5340	5235	5635	12795	2200	2400	2205	2265	4625	2494	1630
HSA-323EAY	9000	5590	5235	5635	8795	2200	2400	2625	2535	5225	2494	1880
HSA-423EAY	11000	5590	5235	5635	10795	2200	2400	2625	2535	5225	2494	1880
HSA-523EAY	13000	5590	5235	5635	12795	2200	2400	2625	2535	5225	2494	1880
HSA-327EA	9000	5840	5235	5635	8795	2200	2400	2525	2585	5195	2994	1630
HSA-427EA	11000	5840	5235	5635	10795	2200	2400	2525	2585	5195	2994	1630
HSA-327EAY	9000	6090	5235	5635	8795	2200	2400	2875	2785	5725	2994	1880
HSA-427EAY	11000	6090	5235	5635	10795	2200	2400	2875	2785	5725	2994	1880
HSA-428EA	11000	5840	5235	5635	10795	2200	2400	2525	2585	5195	2994	1630
HSA-528EA	13000	5840	5235	5635	12795	2200	2400	2525	2585	5195	2994	1630
HSA-628EA	15200	5840	5235	5635	14995	2200	2400	2525	2585	5195	2994	1630
HSA-828EA	19200	5840	5235	5635	18995	2200	2400	2525	2585	5195	2994	1630
HSA-428EAY	11000	6090	5235	5635	10795	2200	2400	2875	2785	5725	2994	1880
HSA-528EAY	13000	6090	5235	5635	12795	2200	2400	2875	2785	5725	2994	1880
HSA-628EAY	15200	6090	5235	5635	14995	2200	2400	2875	2785	5725	2994	1880
HSA-728EAY	17200	6090	5235	5635	16995	2200	2400	2875	2785	5725	2994	1880
HSA-828EAY	19200	6490	5235	5635	18995	2200	2400	2875	2785	5725	2994	1880
HSA-532EA	13000	6490	5235	5635	12795	2200	2400	2750	2810	5670	3394	1630
HSA-532EAY	13000	6740	5235	5635	12795	2200	2400	3100	3010	6220	3394	1880
HSA-832EAY	17200	6740	5235	5635	18995	2200	2400	3100	3010	6220	3394	1880
HSA-536EA	13150	6990	5235	5635	12945	2200	2400	3025	3085	6195	3794	1715
HSA-536EAY	13150	7240	5235	5635	12945	2200	2400	3275	3185	6525	3794	1965
HSA-736EAY	17350	7240	5235	5635	17145	2200	2400	3275	3185	6525	3794	1965
HSA-836EAY	19350	7240	5235	5635	19145	2200	2400	3275	3185	6525	3794	1965

Mechanical Specifications Table

	Model	Unit	HSA-220/320/420(EA/EAY)	HSA-323/423/523(EA/EAY)	HSA-327/427(EA/EAY)	HSA-428/528/628/828(EA/EAY)	HSA-532/832(EA/EAY)	HSA-536/636/736/836(EA/EAY)
Workbench	Workbench size	mm	2000 / 3000 / 4000 x1800	3000 / 4000 / 5000 x 2200	3000 / 4000 x2200	4000 / 5000 / 6000 / 8000 x 2500	5000 / 8000 x 2500	5000 / 6000 / 7000 / 8000 x 3000
	T-slot Width X pitch(number)	mm	22 x 250 (7 / 11 / 15)	28 x 250 (11 / 15 / 19)	28 x 250 (11 / 15)	28 x 250(15 / 19 / 23 / 31)	28 x 250 (19 / 31)	28 x 250(19 / 23 / 27 / 31)
	Max. load (Average)	kg	8000 / 10000 / 12000	10000 / 12000 / 15000	10000 / 12000	18000 / 20000 / 23000 / 27000	20000/ 27000	EA: 21000 / 24000 / 27000 / 30000 EAY:21000 / 24000 / 27000 / 30000
Travel	X-axis travel	mm	2000 / 3000 / 4000	3000 / 4000 / 5000	3000 / 4000	4000 / 5000 / 6000 / 8000	5000 / 8000	5000 / 6000 / 7000 / 8000
	Y-axis travel	mm	EA : 2000 ; EAY : 2800	EA : 2300 ; EAY : 3100	EA : 2700 EAY :3500	EA : 2800 EAY :3600	EA : 3200 EAY :4000	EA : 3600 EAY :4400
	Z-axis travel	mm	1000 (1200)	1000(1200)	1000(1200)	1000(1200)	1000(1200)	1000(1200)
	Distance from spindle center to column	mm	450	450	450	450	450	450
	Distance between two columns	mm	2000	2300	2800	2800	3200	3600
	Distance from Spindle End to Table #50	mm	350~1350(Z:1000_Column 2200) 350~1550(Z:1200_Column 2400)	350~1350(Z:1000_Column 2200) 350~1550(Z:1200_Column 2400)	350~1350(Z:1000_Column 2200) 350~1550(Z:1200_Column 2400)	310~1310(Z:1000_Column 2200) 310~1510(Z:1200_Column 2400)	310~1310(Z:1000_Column 2200) 310~1510(Z:1200_Column 2400)	310~1310(Z:1000_Column 2200) 310~1510(Z:1200_Column 2400)
Spindle	Spindle nose taper		#50	#50	#50	#50	#50	#50
	Spindle speed(Gear)	rpm	6000(8000)	6000(8000)	6000(8000)	6000(8000)	6000(8000)	6000(8000)
	Spindle speed(Hybrid built-in)	rpm	10000	10000	10000	10000	10000	10000
Feed	Cutting feedrate(X/Y/Z)	m/min	12/12/12	12/12/12(323) 10/12/12(423) 8/12/12(523)	12/12/12(327) 10/12/12(427)	10 / 12 / 12(428) 8 / 12 / 12 (528/628) 6 / 12 / 12 (828)	8 / 12 / 12(532) 6 / 12 / 12(832)	8 /10/10(536/636/736) 6/10/10(836)
	Rapid traverse rate(X/Y/Z)	m/min	24 / 18 / 16 (220) 20 / 18 / 16 (320 / 420)	20 / 18 / 16 (323 / 423) 14 / 18 / 16 (523)	20 / 18 / 16	16 / 18 / 16 (428) 12 / 18 / 16 (528) 10 / 18 / 16 (628) 8 / 18 / 16 (828)	12 / 18 / 16(532) 8 / 18 / 16 (832)	14 / 16 / 16(536) 10 / 16 / 16(636/736) 8 / 16 / 16 (836)
ATC	Capacity	pcs	A:32 (40 / 60)	A : 32 (40 / 60)	A:32 (40 / 60)	A:32 (40 / 60)	A:32 (40 / 60)	A:32 (40 / 60)
	Max. tool weight	kg	A: 20	A: 20	A: 20	A: 20	A: 20	A: 20
	Max. tool size(dia.X length)	mm	Ø125 x 400L	Ø125 x 400L	Ø125 x 400L	Ø125 x 400L	Ø125 x 400L	Ø125 x 400L
	Tool shank		BT-50(CAT50 /DIN/BBT50)	BT50(BBT/CAT/DIN)	BT50(BBT/CAT/DIN)	BT-50/CAT50/DIN/BBT50	BT-50/CAT50/DIN/BBT50	BT50(BBT/CAT/DIN)
	Pull stub bolt		P50T-1	P50T-1	P50T-1	P50T-1	P50T-1	P50T-1
Motor	Spindle drive motor (30min/con)	kw	18.5 / 22 opt.30 / 35	18.5 / 22 opt.30 / 35	18.5 / 22 opt.30 / 35	18.5 / 22 opt.30 / 35	18.5 / 22 opt.30 / 35	18.5 / 22 opt.30 / 35
Positioning Accuracy	Positioning accuracy (VDI 3441)	mm	0.015 / 0.016 / 0.018	0.016 / 0.018 / 0.026	0.016 / 0.018	0.018 / 0.026 / 0.028 /0.030	0.026 / 0.030	0.026 / 0.028 / 0.028 / 0.030
	Repeatability(VDI 3441)	mm	0.014 / 0.014 / 0.015	0.014 / 0.015 / 0.021	0.014 / 0.015	0.015 / 0.021 / 0.024 /0.026	0.021 / 0.026	0.021/ 0.024 / 0.024 / 0.026
	Positioning accuracy (JIS B6330) , without linear scale	mm	±0.010	±0.010 / ±0.012 / ±0.012	±0.010 /±0.012	±0.012	±0.012	±0.012
	Repeatability (JIS B6330) , without linear scale	mm	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003
	Positioning accuracy (JIS B6330) , with linear scale	mm	±0.008	±0.008 / ±0.010 / ±0.010	±0.008 /±0.010	±0.010	±0.010	±0.010
	Repeatability (JIS B6330) , with linear scale	mm	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003
Other	Required air pressure	kg/cm^2	6.5	6.5	6.5	6.5	6.5	6.5
	Electric power requirement	kVA	40~65(220) 45~65(320 / 420)	45~70	45~65	45~60(428) ; 45~65 (528 / 628 / 828)	40~70(532) ; 45~75(832)	45~70
	Machine weight	kg	EA : 26000 / 29000 / 32000 EAY : 26500 / 29500 / 32500	EA : 32000/ 36000 / 40000 EAY : 33500/ 37500 / 41500	EA : 35300 / 39300 EAY : 36800 / 40800	EA : 41300 / 46300 / 51300 /61300 EAY : 42800 / 47800 / 52800 /62800	EA : 46500 (532) EAY : 48000 / 64000	EA : 58000 / 63000 / 68000 EAY : 59500 / 64500 / 69500 / 74500
	Floor space	mm	EA :10100 / 12100 /14100 x 6635 EAY:10100 / 12100 /14100 x 7055	EA : 10945 / 12940 / 14945 x 7100 EAY : 10940 / 12940 / 14940 x 7475	EA : 11490/13490 x 7600 EAY : 11490/13490 x 7850	EA : 13490 /15490 /17490 / 21490 x 7600 EAY : 13490 /15490 /17490 / 21490 x 7850	EA : 15620 x 8375 (532) EAY : 15620 / 21620 x 8625	EA : 15045 /17045 / 19045 x 8605 EAY : 15045 /17045 / 19045 / 21045 x 8855
	Machine dimension(LxWxH)	mm	(EA) Z1000 : 7755 / 9000 /11000 x 5040 x 5235 Z1200 : 7755 / 9000 /11000 x 5040 x 5635 (EAY) Z1000 : 7755 / 9000 /11000 x 5290 x 5235 Z1200 : 7755 / 9000 /11000 x 5290 x 5635	(EA) Z1000 : 9000 / 11000 /13000 x 5340 x 5235 Z1200 : 9000 / 11000 /13000 x 5340 x 5635 (EAY) Z1000 : 9000 / 11000 /13000 x 5590 x 5235 Z1200 : 9000 / 11000 /13000 x 5590 x 5635	(EA) Z1000 : 9000 / 11000 x 5840 x 5235 Z1200 : 9000 / 11000 x 5840 x 5635 (EAY) Z1000 : 9000 / 11000 x 6090 x 5235 Z1200 : 9000 / 11000 x 6090 x 5635	(EA) Z1000 : 11000 / 13000 / 15000 /19000 x 5840 x 5235 Z1200 : 11000 / 13000 / 15000 /19000 x 5840 x 5635 (EAY) Z1000 : 11000 / 13000 / 15000 /19000 x 6090 x 5235 Z1200 : 11000 / 13000 / 15000 /19000 x 6090 x 5635	(EA)(532) Z1000 : 13000 x 6490 x 5235 Z1200 : 13000 x 6490 x 5635 (EAY)(532 / 832) Z1000 : 13000 / 19000 x 6740 x 5235 Z1200 : 13000 / 19000 x 6740 x 5635	(EA) (536/636/736) Z1000 : 13000 / 15000 / 17000 x 6990 x 5235 Z1200 : 13000 / 15000 / 17000 x 6990 x 5635 (EAY)(536/636/736/836) Z1000 : 13000 / 15000 / 17000 / 19000 x 7240 x 5235 Z1200 : 13000 / 15000 / 17000 / 19000 x 7240 x 5635

VDI 3441 accuracy available upon order request.

Specification & dimension are subject to change without notice. For actual weight, shipping doc. shall prevail.