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Hartford

Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

Hartford

EXCLUSIVE HartrolPlus APP

Intelligent Five-Sided
Double Column Machining Center

HSA Series
Smartcenter

- Hartrol plus controller
- 5-year warranty on guideways
- Spindle run-out : 5 micro
- Gear type 8,000rpm spindle
- Four linear guideways on Z-axis

Hartrol Plus®
From tradition to intelligent

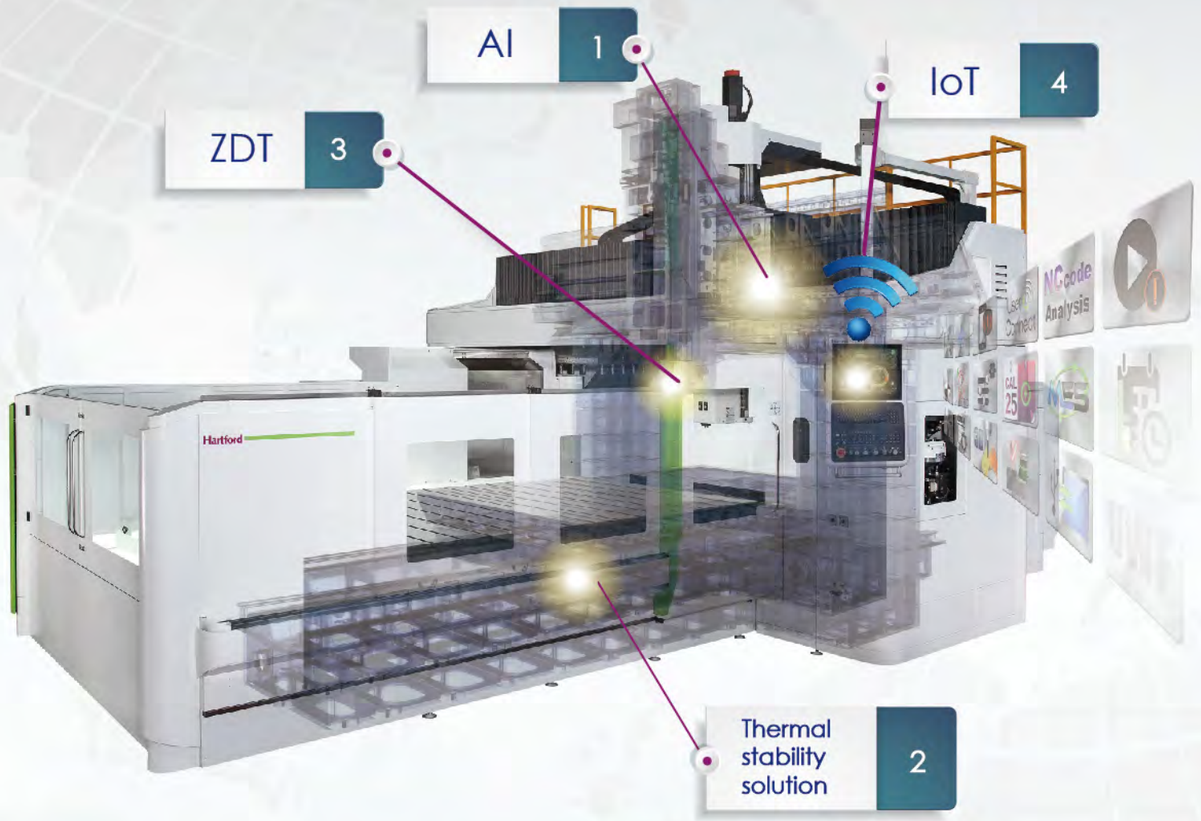
modle : HSA-X212

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



Major functions of Hartford AI controller

IoT 1
+ Remote Warm-up & Turn-on
+ 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

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.

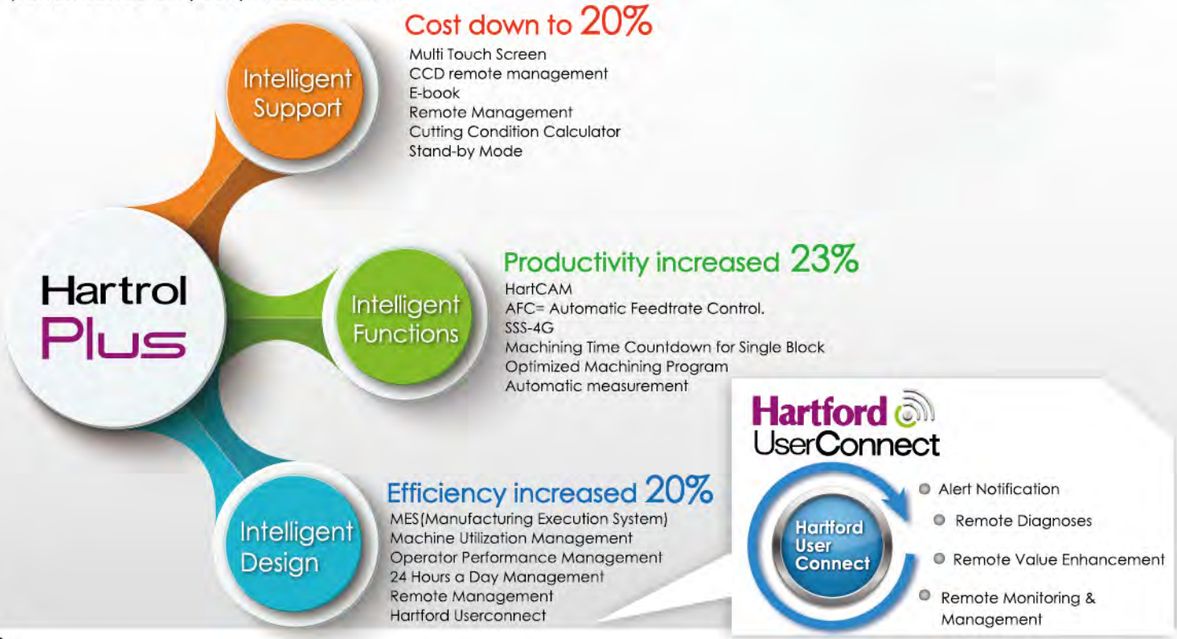
HMI and operation is user friendly, it can achieve :
1. Internet connection, collect and analyze data, monitoring by portable device
2. Intelligent control: Auto revise human error and operating basis
3. Real time update new APPs

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 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.

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

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

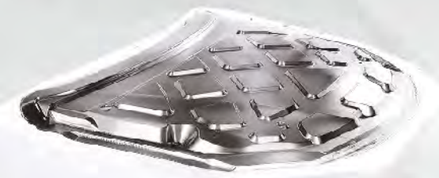
Spindle Vibration Intelligent Monitoring System (B-Safe) is ensuring spindle stability at times(opt.)

Hightlights

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.

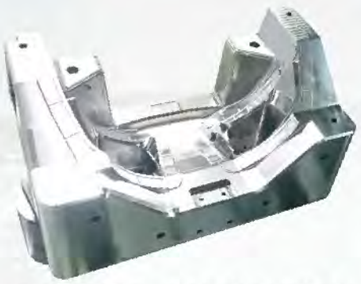
Strong cutting force; release your production potential

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



Hood

Table of vertical machining center



Automobile injection mold

Tire

Ship Propeller

Actual Cutting Test

Model: HSA-428
■ Spindle: 6,000 rpm Gear type, 26kW ■ Cutting material : S45C

Face milling

Tool diameter	Ø125 mm
Feed rate	2,050 mm/min
Cutting depth	4 mm
Cutting volume	820mm

End milling

Tool diameter	Ø63 mm
Feed rate	1,350mm/min
Cutting depth	40 mm
Cutting width	10 mm

Tapping

Tool diameter	Ø36 mm
Feed rate	480 mm/min
Cutting depth	40 mm
Spindle load	35%

Drilling

Tool diameter	Ø53 mm
Feed rate	100mm/min
Cutting depth	50 mm
Spindle load	50%

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.

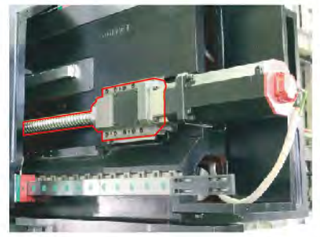
Z-axis four linear guideways three binding structure patented technology

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-X23/X27/X212 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)

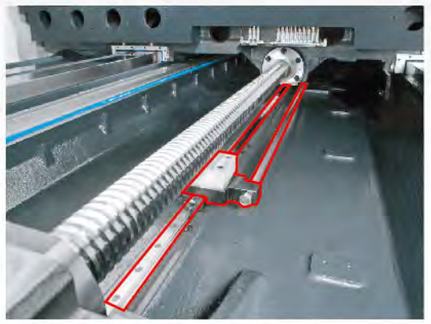
2.Lack of regular cleaningof accumulated debris causing damage to the linear rails &carriages.

Unique Machine Structure Design

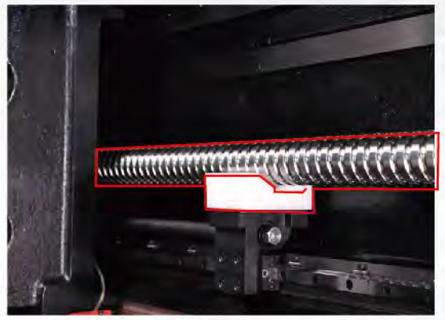
Screw support mechanism maintains excellent positioning accuracy

- 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.
- Increase 1 level of screw specification ; lift static rigidity

Model above the 5 meters X-axis is standard configuration; below 4 meters is optional configuration.
Y-axis support mechanism, X36/ 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 HSA- X23/X27/X28/X32/X36

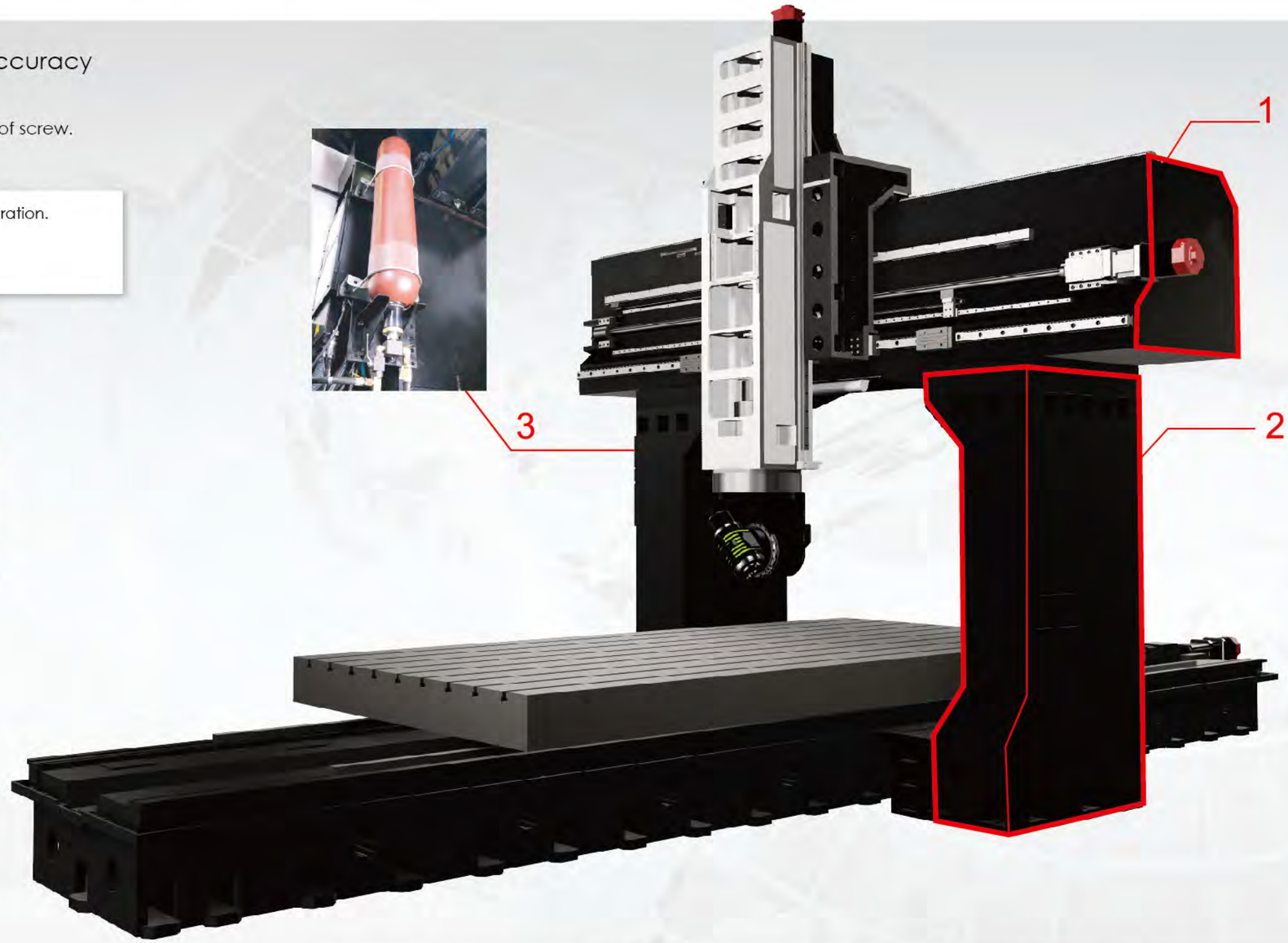
Hartford made i-Tech hybrid type 10,000 rpm spindle(optional feature)

- 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

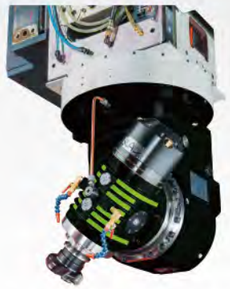
- Reduce operating noise of hydraulic tank.
- Reduce hydraulic tank oil temperature by 50%
- Effective energy-saving more than 20%

Suitable for HSA-X23/X27/X28/X32/X36 and 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°/1°)	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°	1°
	A-axis	1°	2.5°	1°	2.5°
	Remark	ST. standard feature	OPT. customized specifications		

Automatic 90° head(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.

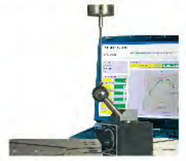
Angular head C-axis 1 degree positioning mechanism (TWC)
Angular head C-axis 1-degree indexing positioning function. Because the whole transmission system is a fully closed loop, it can still better eliminate the origin of mechanical backlash.

Angular head center coolant mechanism (UAC)
All automatic head classes have 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)

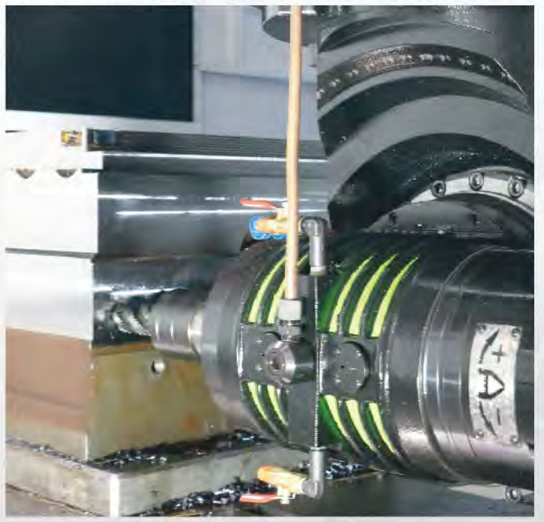
Auto angular head travel intelligent switching
Solves the problems of switching between travel and protected areas so that the travel limit (Y-axis & Z-axis) is autimatically adjusted according to the universal head angular.(Standard accessory)



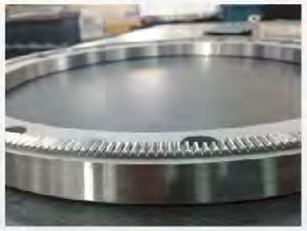
AC universal head rotstion center + Tool tip automatic error measurement function
Raises processing accuracy, reduces manual measurement error, and shortens the measurement time. In time of measured comprising a heat deflection of the angle head, so it is possible to improve accuracy errors. (Optional 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

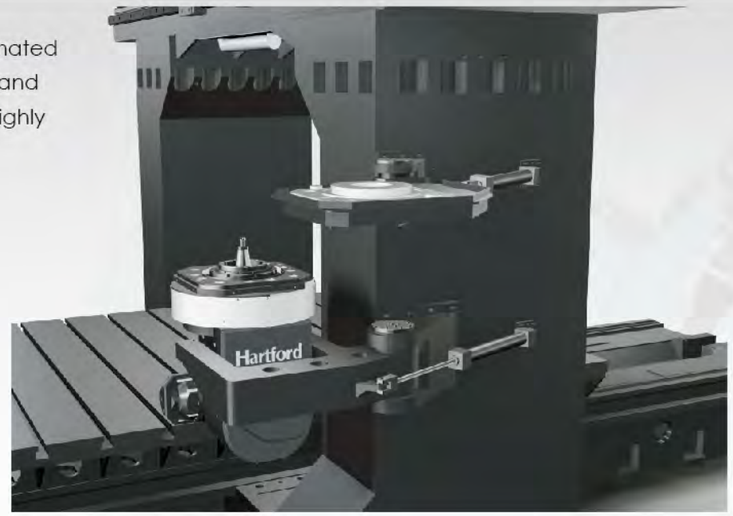


• Check gear

• 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°	-

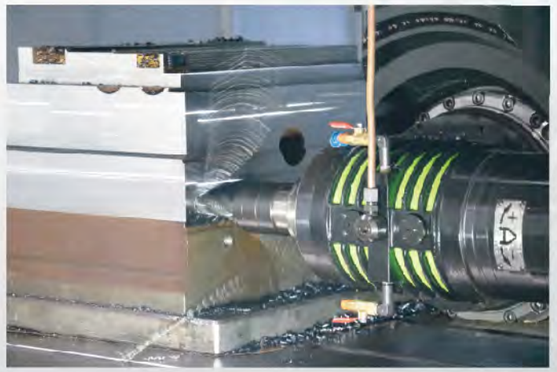
Application of automatic 90° head

Angular head cutting ability actual test data

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

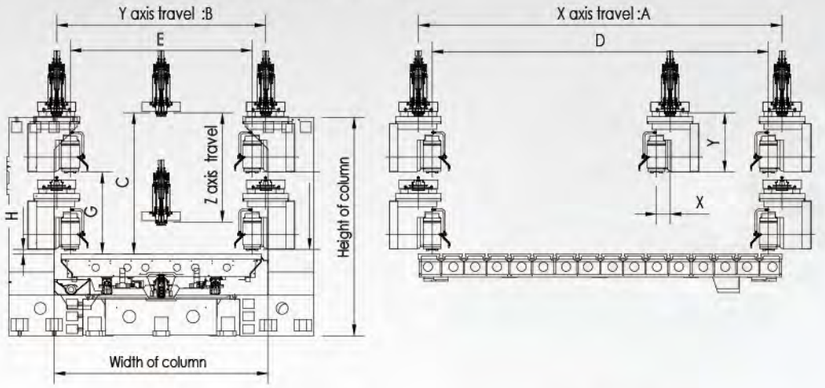
Angle head	Auto AC universal axis (1°)		
Test models	HSA-428EAY	HSA-428EAY	HSA-428EAY
Angle	A-90/C90	C0/A90	C0/A0
Test item	Face milling/end milling	Face milling/end milling	Face milling/end milling
Test Results	1200(32.4cc/kw)/792(21.4cc/kw)	1200(32.4cc/kw)/792(21.4cc/kw)	1200(32.4cc/kw)/456(12.3cc/kw)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

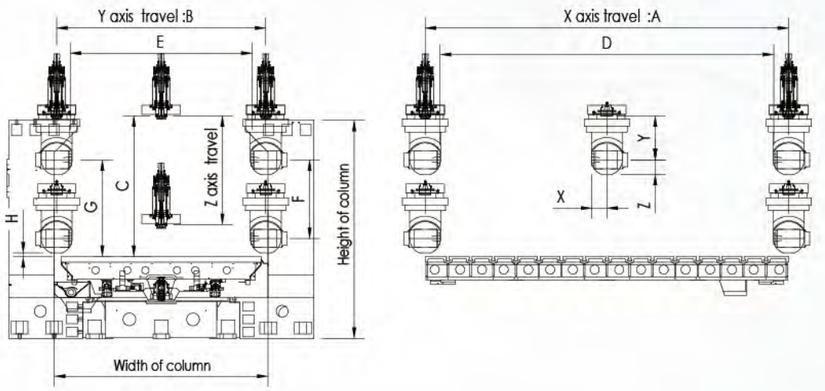
Test item	The maximum test size (mm)	Spindle current ratio(%)
Drilling (violent drilling)	ø76	38
Tapping	M32	16



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

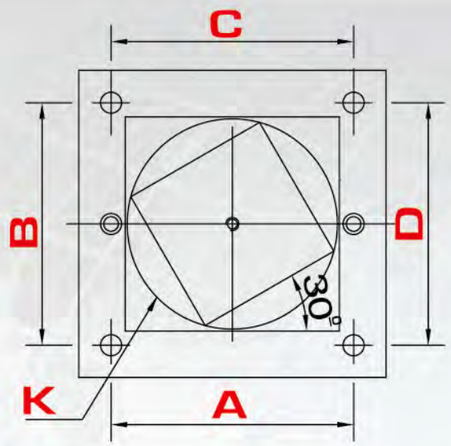
ALL NEW INFINITY ser ies models providing increased Y-axis travel design, you can upgrade you range of processing through the increase of Y-axis travel. We have achieved our purpose to process the widest range with the minimum cost.





Model	Z - TRAVEL	COLUMN - HIGH	COLUMN - WIDTH	B	C	E(V) B-(X*2)	F(V) C-(Y+H)	G(V)	E(H) B-(X*2)	F(H) C-(Y+H)	G(H)	H
HSA-X23EA	1000	2200	2300	2300	1350	2000	650	700	1970	655	865	50
HSA-X23EAY				3100		2800			2770			
HSA-X27EA			2700	2700	1350	2400	650	700	2370	655	865	
HSA-X27EAY				3500		3200			3170			
HSA-X28EA			2800	2800	1310	2500	610	660	2470	615	825	
HSA-X28EAY				3600		3300			3270			
HSA-X32EA			3200	3200	1310	2900	610	660	2870	615	825	
HSA-X32EAY				4000		3700			3670			
HSA-X36EA			3600	3600	1310	3300	610	660	3270	615	825	
HSA-X36EAY				4400		4100			4070			

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

2.Manual position head (manually fixed) applicable to general model HSA

Universal head (manual/semi-automatic)		Manual universal head	Semi-automatic universal head
A-axis : ±110°,C-axis : ±180° Maximum speed:2,500rpm Maximum power:18.5kw The maximum torque to withstand: 650N-m	Binding mechanism	Manual	Manual
	Unclamping mechanism	Manual	Automatic
	C-axis rotation	Manual	Manual

90° side milling head (manual / semi-automatic)		Manual 90° head	Semiautomatic 90° head
Manual tool change(manual / hydraulic lock release tool.) Maximum speed:2,000rpm Maximum power:18.5kW The maximum torque to withstand: 650N-m	Binding mechanism	Manual	Manual
	Unclamping mechanism	Manual	Automatic
	C-axis rotation	Manual	Manual

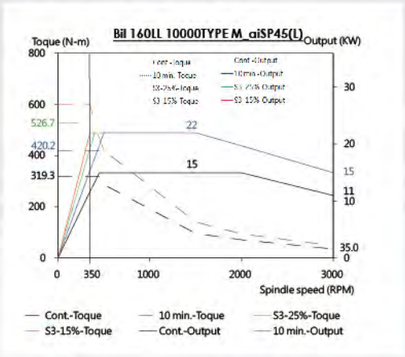
Extension head (350/500mm)
Maximum speed : 4,000rpm
Maximum power : 18.5kW
The maximum torque to withstand : 650N-m

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)
- 10,000rpm direct-connected spindle(optional configuration)
- 12,000rpm direct-connected spindle(optional configuration)
- 15,000rpm direct-connected spindle(optional configuration)
- Hybrid 10,000rpm spindle (optional configuration is applicab to EA/EAY)

Hybrid 10,000RPM(opt.)



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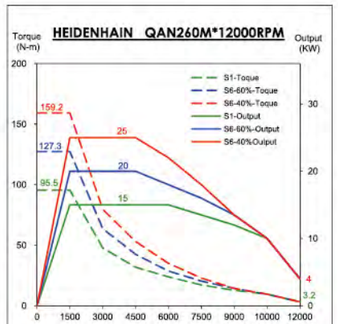
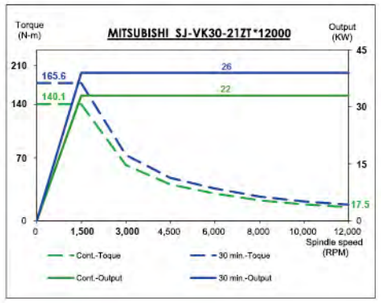
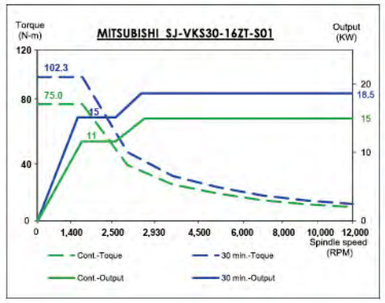
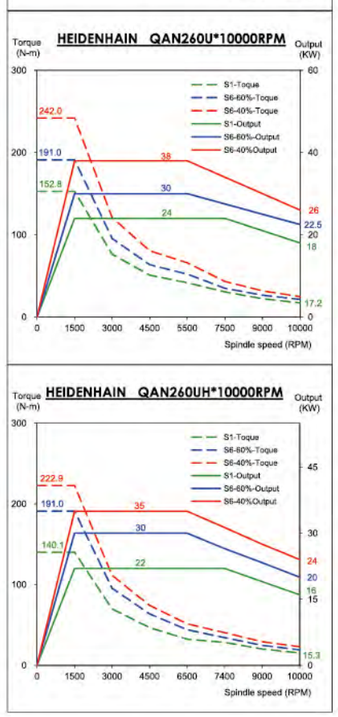
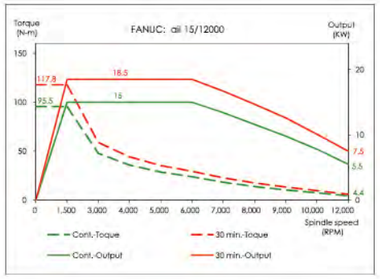
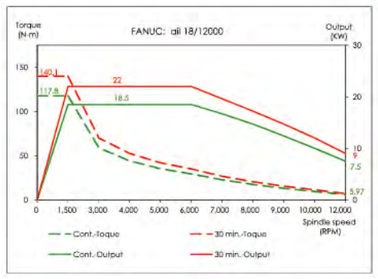


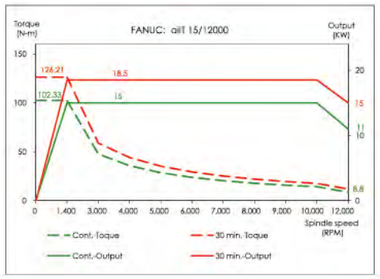


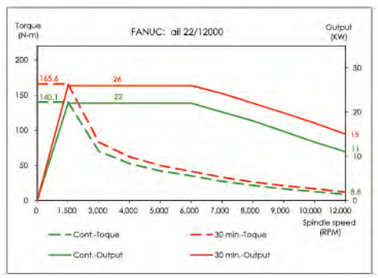




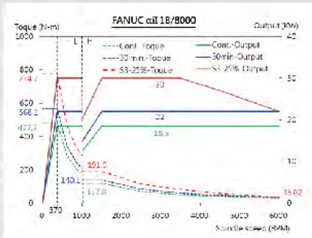


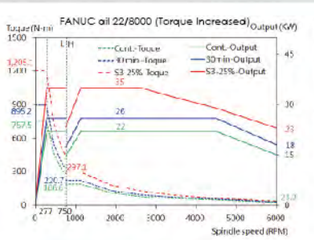


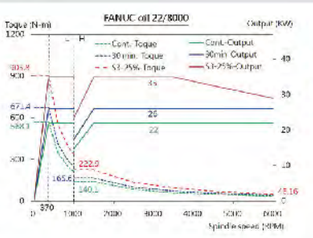


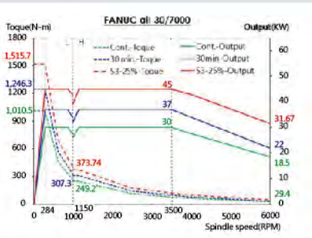


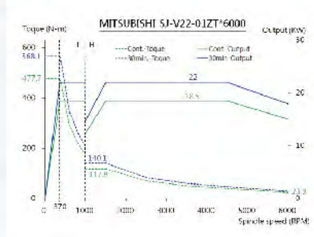
Gear type 6,000RPM

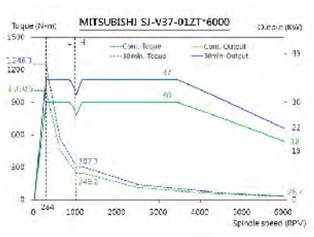


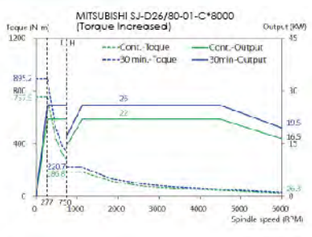


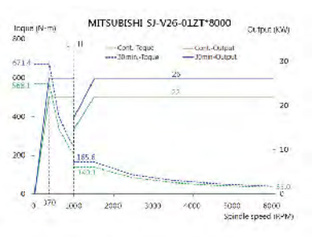


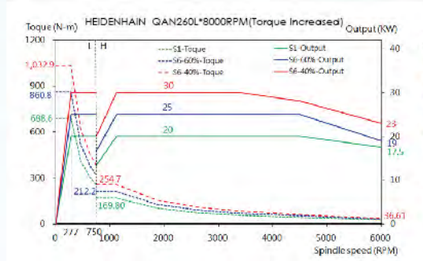


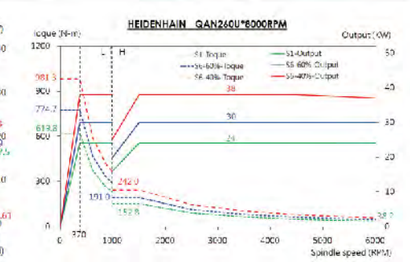


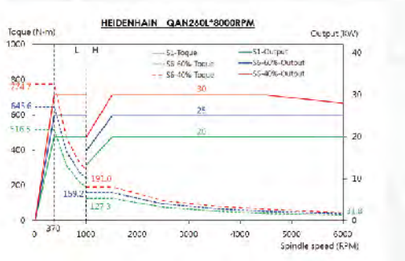




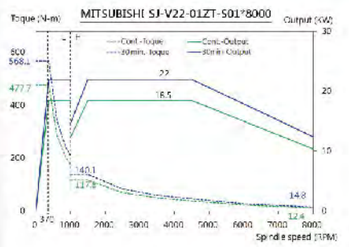


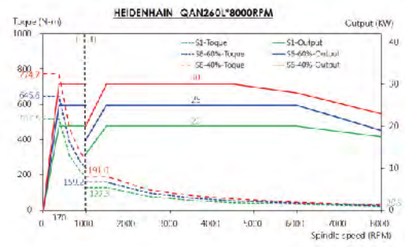


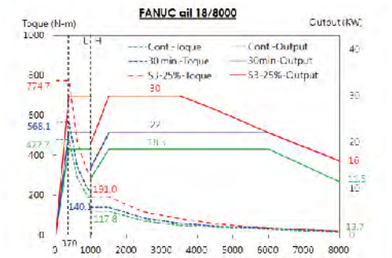


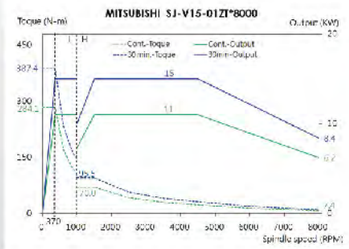


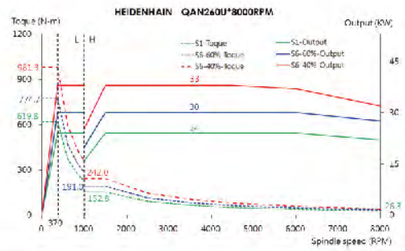
Gear type 8,000RPM

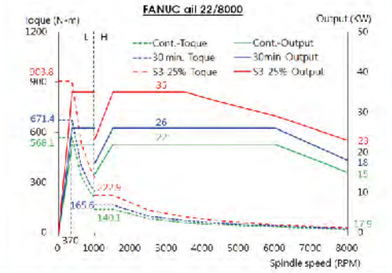




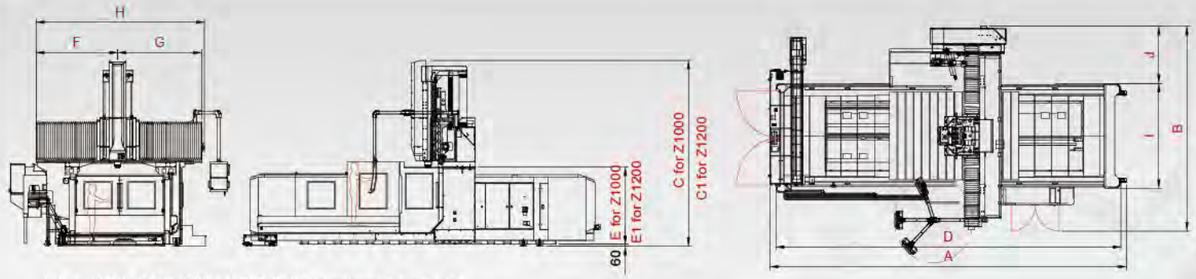






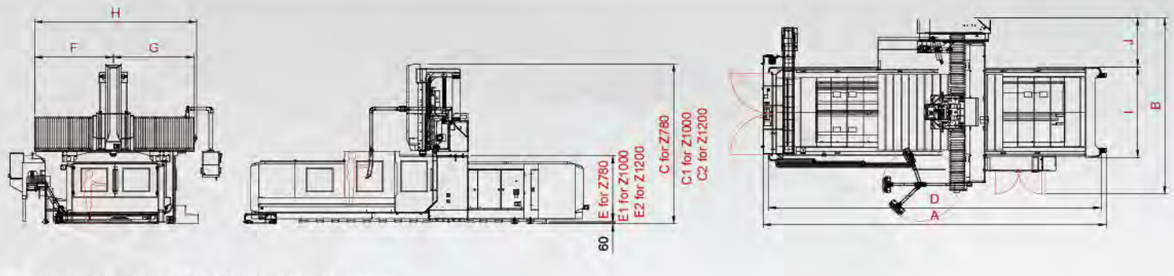


Machine Dimension



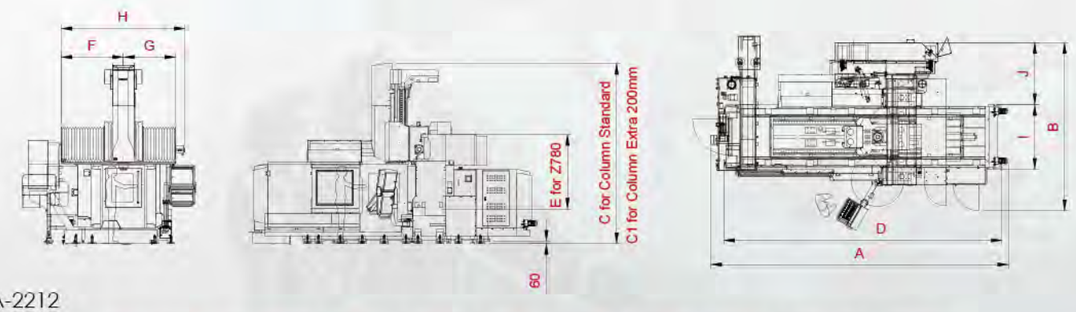
HSA-X23/X27/X28/X32/X36 series(EA/EAY)

Model	A	B	C	C1	D	E	E1	F	G	H	I	J
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-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-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	15000	5840	5235	5635	14795	2200	2400	2525	2585	5195	2994	1630
HSA-728EA	17000	5840	5235	5635	16795	2200	2400	2525	2585	5195	2994	1630
HSA-828EA	19000	5840	5235	5635	18795	2200	2400	2525	2585	5195	2994	1630
HSA-532EA	13000	6490	5235	5635	12795	2200	2400	2750	2810	5670	3394	1630
HSA-732EA	17000	6490	5235	5635	16795	2200	2400	2750	2810	5670	3394	1630
HSA-832EA	19000	6490	5235	5635	18795	2200	2400	2750	2810	5670	3394	1630
HSA-536EA	13000	6990	5235	5635	12795	2200	2400	3025	3085	6195	3794	1715
HSA-736EA	17000	6990	5235	5635	16795	2200	2400	3025	3085	6195	3794	1715
HSA-836EA	19000	6990	5235	5635	18795	2200	2400	3025	3085	6195	3794	1715
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-623EAY	15000	5590	5235	5635	14795	2200	2400	2625	2535	5225	2494	1880
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-527EAY	13000	6090	5235	5635	12795	2200	2400	2875	2785	5725	2994	1880
HSA-627EAY	15000	6090	5235	5635	14795	2200	2400	2875	2785	5725	2994	1880
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	15000	6090	5235	5635	14795	2200	2400	2875	2785	5725	2994	1880
HSA-728EAY	17000	6090	5235	5635	16795	2200	2400	2875	2785	5725	2994	1880
HSA-828EAY	19000	6090	5235	5635	18795	2200	2400	2875	2785	5725	2994	1880
HSA-532EAY	13000	6740	5235	5635	12795	2200	2400	3100	3010	6220	3394	1880
HSA-732EAY	17000	6740	5235	5635	16795	2200	2400	3100	3010	6220	3394	1880
HSA-832EAY	19000	6740	5235	5635	18795	2200	2400	3100	3010	6220	3394	1880
HSA-536EAY	13000	7240	5235	5635	12795	2200	2400	3275	3185	6525	3794	1965
HSA-736EAY	17000	7240	5235	5635	16795	2200	2400	3275	3185	6525	3794	1965
HSA-836EAY	19000	7240	5235	5635	18795	2200	2400	3275	3185	6525	3794	1965



HSA-X20/X23/X27/X28/X32/X36 series

Model	A	B	C	C1	C2	D	E	E1	E2	F	G	H	I	J
HSA-320	9000	5040	4800/4900	5300	5700	8795	1900/2000	2200	2400	2130	2190	4400	2194	1630
HSA-420	11000	5040	4800/4900	5300	5700	10795	1900/2000	2200	2400	2130	2190	4400	2194	1630
HSA-323	9000	5340	4800/4900	5300	5700	8795	1900/2000	2200	2400	2205	2265	4625	2494	1630
HSA-423	11000	5340	4800/4900	5300	5700	10795	1900/2000	2200	2400	2205	2265	4625	2494	1630
HSA-523	13000	5340	4800/4900	5300	5700	12795	1900/2000	2200	2400	2205	2265	4625	2494	1630
HSA-327	9000	5840	4800/4900	5300	5700	8795	1900/2000	2200	2400	2525	2585	5195	2994	1630
HSA-427	11000	5840	4800/4900	5300	5700	10795	1900/2000	2200	2400	2525	2585	5195	2994	1630
HSA-627	15000	5840	4800/4900	5300	5700	14795	1900/2000	2200	2400	2525	2585	5195	2994	1630
HSA-328	9000	5840	4900	5300	5700	8795	2000	2200	2400	2525	2585	5195	2994	1630
HSA-428	11000	5840	4900	5300	5700	10795	2000	2200	2400	2525	2585	5195	2994	1630
HSA-528	13000	5840	4900	5300	5700	12795	2000	2200	2400	2525	2585	5195	2994	1630
HSA-628	15000	5840	4900	5300	5700	14795	2000	2200	2400	2525	2585	5195	2994	1630
HSA-728	17000	5840	4900	5300	5700	16795	2000	2200	2400	2525	2585	5195	2994	1630
HSA-828	19000	5840	4900	5300	5700	18795	2000	2200	2400	2525	2585	5195	2994	1630
HSA-432	11000	6240	4900	5300	5700	10795	2000	2200	2400	2750	2810	5670	3394	1630
HSA-532	13000	6240	4900	5300	5700	12795	2000	2200	2400	2750	2810	5670	3394	1630
HSA-832	19000	6240	4900	5300	5700	18795	2000	2200	2400	2750	2810	5670	3394	1630
HSA-536	13000	6740	4900	5300	5700	12795	2000	2200	2400	3025	3085	6195	3794	1730
HSA-636	15000	6740	4900	5300	5700	14795	2000	2200	2400	3025	3085	6195	3794	1730
HSA-736	17000	6740	4900	5300	5700	16795	2000	2200	2400	3025	3085	6195	3794	1730
HSA-836	19000	6740	4900	5300	5700	18795	2000	2200	2400	3025	3085	6195	3794	1730



HSA-2212

Model	A	B	C	C1	D	E	F	G	H	I	J
HSA-2212	6800	3855	4120	4320	6355	1700	1423.5	1193.5	2832.5	1480	1425

Mechanical Specifications Table

Model		Unit	HSA-323/423/523(EA)	HSA-327/427(EA)	HSA-328/428/528/628/728/828(EA)	HSA-532(EA)	HSA-536/736/836(EA)
Workbench	Workbench size	mm	3000/4000/5000 x2200	3000/4000 x2200	3000/4000/5000/6000/7000/8000 x2500	5000 x2500	5000/7000/8000 x3000
	T-shaped slot (slot frame x slot number x slot distance)	mm	28 x 11/15/19 x250	28 x 11/15 x250	28 x 11/15/19/23/27/31 x250	28 x 19x250	28 x 19/27/31 x250
	Maximum load	kg	10000/12000/15000	10000/12000	15000/18000/20000/23000/25000/27000	20000	21000/27000/30000
Travel	X-axis travel	mm	3000/4000/5000	3000/4000	3000/4000/5000/6000/7000/8000	5000	5000/7000/8000
	Y-axis travel	mm	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)
	Spindle nose to workbench	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)	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 center to column	mm	450	450	450	450	450
	Door width	mm	2300	2800	2800	3200	3600
Spindle	Gear type speed	rpm	6000(8000)	6000(8000)	6000(8000)	6000(8000)	6000(8000)
	Hybrid speed	rpm	10000	10000	10000	10000	10000
	Nose taper		ISO50	ISO50	ISO50	ISO50	ISO50
Speed	Cutting feedrate (X / Y / Z axis)	mm/min	12000/12000/12000(323) 10000/12000/12000(423) 8000/12000/12000(523)	12000/12000/12000(327) 10000/12000/12000(427)	10000/12000/12000(328) 10000/12000/12000(428) 8000/12000/12000(528) 8000/12000/12000(628) 8000/12000/12000(728) 6000/12000/12000(828)	8000/12000/12000(532)	8000/12000/12000(536) 8000/12000/12000(736) 6000/12000/12000(836)
	Rapid Traverse feedrate (X / Y / Z axis)	mm/min	20000/18000/16000(323) 20000/18000/16000(423) 14000/18000/16000(523)	20000/18000/16000(327) 20000/18000/16000(427)	20000/18000/16000(328) 16000/18000/16000(428) 12000/18000/16000(528) 10000/18000/16000(628) 10000/18000/16000(728) 8000/18000/16000(828)	12000/18000/16000(532)	14000/16000/16000(536) 10000/16000/16000(736) 8000/18000/16000(836)
Automatic Tool Changer	Tool number	pcs	32(40/60/90) A-type	32(40/60/90) A-type	32(40/60/90) A-type	32(40/60/90) A-type	32(40/60/90) A-type
	Maximum tool weight	kg	20	20	20	20	20
	Tool size (diameter x length)	mm	Ø125 x 400	Ø125 x 400	Ø125 x 400	Ø125 x 400	Ø125 x 400
	Tool holder		BT50/BBT50/CAT50/DIN	BT50/BBT50/CAT50/DIN	BT50/BBT50/CAT50/DIN	BT50/BBT50/CAT50/DIN	BT50/BBT50/CAT50/DIN
	Pulling bolt		P50T-1	P50T-1	P50T-1	P50T-1	P50T-1
Motor	Spindle power(Fanuc) (30min/con)	kw	22/18.5 35/30(Hybrid for Fanuc)	22/18.5 35/30(Hybrid for Fanuc)	22/18.5 35/30(Hybrid for Fanuc)	22/18.5 35/30(Hybrid for Fanuc)	22/18.5 35/30(Hybrid for Fanuc)
Positioning accuracy	3-axis laser positioning accuracy(JIS B						
	Positioning accuracy / full travel	mm	±0.010/0.010/0.012	±0.010/0.010	±0.010/0.010/0.012/0.012/0.012/0.012	±0.012	±0.012
	Repeated positioning accuracy	mm	±0.003	±0.003	±0.003	±0.003	±0.003
	3-axis laser positioning accuracy(VDI						
	Positioning accuracy	mm	0.016/0.018/0.026	0.016/0.018	0.016/0.018/0.026/0.028/0.028/0.030	0.026	0.026/0.028/0.030
	Repeated positioning accuracy	mm	0.014/0.015/0.021	0.014/0.015	0.014/0.015/0.021/0.024/0.024/0.026	0.021	0.021/0.024/0.026
Other	Required air pressure	kg/cm²	6.5	6.5	6.5	6.5	6.5
	Required power	kVA	45~70	45~65	45~60(328/428) 45~65(528/628/728/828)	40~70	45~70
	Covering area	mm	11000/13000/15000 x 6800(EA) 11000/13000/15000 x 7050(EAY)	11000/13000x7300(EA) 11000/13000X7550(EAY)	11000/13000/15000/17000/1900/2100x7300(EA) 11000/13000/15000/17000/1900/2100X7550(EAY)	15000x7700(EA) 15000X7950(EAY)	15000/1900/2100x8400(EA) 15000/1900/2100X8650(EAY)
	Net weight	kg	32000/36000/40000 (EA) 33500/37500/41500(EAY)	35300/39300(EA) 36800/40800(EAY)	36300/41300/43600/51300/56300/61300(EA) 37800/42800/47800/52800/57800/62800(EAY)	46500(EA) 48000(EAY)	58000/68000/73000(EA) 59500/69500/74500(EAY)

VDI 3441 accuracy available upon order request.

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

Mechanical Specifications Table

Model		Unit	HSA-2212	HSA-320/420	HSA-323/423/523	HSA-327/427/627	HSA-328/428/528/628/728/828	HSA-432/532/832	HSA-536/636/736/836
Workbench	Workbench size	mm	2000 x1100	3000/4000 x1800	3000/4000/5000 x2200	3000/4000/6000 x2200	3000/4000/5000/6000/7000/8000 x2500	4000/5000/8000 x2500	5000/6000/7000/8000 x3000
	T-shaped slot (slot frame x slot number x slot distance)	mm	22 x 6 x160	22 x 11/15 x250	28 x 11/15/19 x250	28 x 11/15/23 x250	28 x 11/15/19/23/27/31 x250	28 x 15/23/31 x250	28 x 19/23/27/31 x250
	Maximum load	kg	3500	10000/12000	10000/12000/15000	10000/12000/18000	15000/18000/20000/23000/25000/27000	18000/20000/27000	21000/24000/27000/30000
Travel	X-axis travel	mm	2250	3000/4000	3000/4000/5000	3000/4000/6000	3000/4000/5000/6000/7000/8000	4000/5000/8000	5000/6000/7000/8000
	Y-axis travel	mm	1200	2000	2300	2700	2800	3200	3600
	Z-axis travel	mm	780	780(1000/1200)	780(1000/1200)	780(1000/1200)	780(1000/1200)	780(1000/1200)	780(1000/1200)
	Spindle nose to workbench	mm	180~960(Z:780_Column 1700)#40 380~1160(Z:780_Column 1900)#40 120~900(Z:780_Column 1700)#50 320~1100(Z:780_Column 1900)#50	260~1040(Z:780_Column 1900)#40 340~1340(Z:1000_Column 2200)#40 340~1540(Z:1200_Column 2400)#40 200~980(Z:780_Column 1900)#50 280~1280(Z:1000_Column 2200)#50 280~1480(Z:1200_Column 2400)#50	260~1040(Z:780_Column 1900)#40 340~1340(Z:1000_Column 2200)#40 340~1540(Z:1200_Column 2400)#40 200~980(Z:780_Column 1900)#50 280~1280(Z:1000_Column 2200)#50 280~1480(Z:1200_Column 2400)#50	200~980(Z:780_Column 1900) 280~1280(Z:1000_Column 2200) 280~1480(Z:1200_Column 2400)	260~1040(Z:780_Column 2000) 240~1340(Z:1000_Column 2200) 240~1540(Z:1200_Column 2400)	260~1040(Z:780_Column 1900) 240~1340(Z:1000_Column 2200) 240~1440(Z:1200_Column 2400)	260~1040(Z:780_Column 2000) 240~1240(Z:1000_Column 2200) 240~1440(Z:1200_Column 2400)
	Spindle center to column	mm	450	450	450	450	450	450	450
	Door width	mm	1300	2000	2300	2800	2800	3200	3600
Spindle	Gear type speed	rpm	6000	6000(8000)	6000(8000)	6000(8000)	6000(8000)	6000(8000)	6000(8000)
	Direct-connected type speed	rpm	10000/12000(15000 only on#40)	#50:10000/12000 #40:15000/20000	#50:10000/12000 #40:15000/20000	10000/12000	10000/12000	10000/12000	10000/12000
	Nose taper		ISO50/40	ISO50	ISO50	ISO50	ISO50	ISO50	ISO50
Speed	Cutting feedrate (X / Y / Z axis)	mm/min	10000	10000	12000/12000/12000(323) 10000/12000/12000(423) 8000/12000/12000(523)	12000/12000/12000(327) 10000/12000/12000(427) 8000/12000/12000(627)	10000/12000/12000(328) 10000/12000/12000(428) 8000/12000/12000(528) 8000/12000/12000(628) 8000/12000/12000(728) 6000/12000/12000(828)	10000/12000/12000(432) 8000/12000/12000(532) 6000/12000/12000(832)	8000/10000/10000(536) 8000/10000/10000(636) 8000/10000/10000(736) 6000/10000/10000(836)
	Rapid Traverse feedrate (X / Y / Z axis)	mm/min	24000/24000/20000	20000/18000/16000(320) 20000/18000/16000(420)	20000/18000/16000(323) 20000/18000/16000(423) 14000/18000/16000(523)	20000/18000/16000(327) 20000/18000/16000(427) 10000/18000/16000(627)	20000/18000/16000(328) 16000/18000/16000(428) 12000/18000/16000(528) 10000/18000/16000(628) 10000/18000/16000(728) 8000/18000/16000(828)	16000/18000/16000(432) 12000/18000/16000(532) 8000/18000/16000(832)	14000/16000/16000(536) 10000/16000/16000(636) 10000/16000/16000(736) 8000/16000/16000(836)
Automatic Tool Changer	Tool number	pcs	24/32 A-type, 40A-type Only on #50	32/40/60 A-type	32/40/60 A-type	32/40/60 A-type	32/40/60 A-type	32 A-type	32/40/60 A-type
	Maximum tool weight	kg	18(#50),7(#40)	20(#50) • 7(#40)	20(#50) • 7(#40)	20A-type	20A-type	20A-type	20A-type
	Tool size (diameter x length)	mm	Ø110 x 350L(24)/Ø125X350L(32/40) (Ø75x 300L Only on #40)	Ø125 x 400L(A-type) (Ø75x 300L Only on #40)	Ø125 x 400L(A-type) (Ø75x 300L Only on #40)	Ø125 x 400L(A-type)	Ø125 x 400L(A-type)	Ø125 x 400L(A-type)	Ø125 x 400L(A-type)
	Tool holder		BT50(BBT40,50/CAT40,50/DIN)	BBT/BT/CAT/DIN69871(#40/#50) • HSK-A63(#40)	BBT/BT/CAT/DIN69871(#40/#50) • HSK-A63(#40)	BBT/BT/CAT/DIN69871	BBT/BT/CAT/DIN69871	BT50/BBT50/CAT50/DIN	BBT/BT/CAT/DIN69871
	Pulling bolt		P50T-1/CAT-50/DIN, MAS-P40T-1/CAT-40/DIN	MAS-P50T-1(#50)/ MAS-P40T-1(#40)/DIN69872	MAS-P50T-1(#50)/ MAS-P40T-1(#40)/DIN69872	MAS-P50T-1/DIN69872	MAS-P50T-1/DIN69872	P50T-1	MAS-P50T-1/DIN69872
Motor	Spindle power(Fanuc) (30min/con)	kw	#50:18.5/15(22/26 DDS for Fanuc) #40:11/7.5 DDS for Fanuc	#50:18.5/22(15/18.5 DDS for Fanuc) #40:7.5/11 DDS for Fanuc	#50:18.5/22(15/18.5 DDS for Fanuc) #40:7.5/11 DDS for Fanuc	MAS-P50T-1/DIN69872	MAS-P50T-1/DIN69872	22/18.5	MAS-P50T-1/DIN69872
Positioning accuracy	3-axis laser positioning accuracy(JIS B6330)								
	Positioning accuracy / full travel	mm	±0.010	±0.010	±0.010/0.010/0.012	±0.010/0.010/0.012/0.012	±0.010/0.010/0.012/0.012/0.012/0.012	±0.012	±0.012
	Repeated positioning accuracy	mm	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003
	3-axis laser positioning accuracy(VDI3441)repeat 5 time								
	Positioning accuracy	mm	0.015	0.016/0.018	0.016/0.018/0.026	0.016/0.018/0.028	0.016/0.018/0.026/0.028/0.028/0.030	0.018/0.026/0.030	0.026/0.028/0.028/0.030
	Repeated positioning accuracy	mm	0.014	0.014/0.015	0.014/0.015/0.021	0.014/0.015/0.024	0.014/0.015/0.021/0.024/0.024/0.026	0.015/0.021/0.026	0.021/0.024/0.024/0.026
Other	Required air pressure	kg/cm²	6.5	6.5	6.5	6.5	6.5	6.5	6.5
	Required power	kVA	25~65(#40)/35~65(#50)	40-70	40-75(323/423/523)	40-75(327/427) 45~75(627)	40-75(328/428/528) 45~75(628/728/828)	40-70(432) 45~70(532)45~75(832)	45~75
	Covering area	mm	8535x5745	11000/13000x6600	11000/13000/15000x6900	11000/13000/17000x7400	11000/13000/15000/17000/19000/21000x7500	13440/15440/21440x7680	15000/17000/19000/21000x8300
	Net weight	kg	14720	24500/27500/30500(Z-axis 780) 25500/28500/31500(Z-axis 1000) 26500/29500/32500(Z-axis 1200)	30100/34100/38100(Z-axis 780) 31420/35420/39420(Z-axis 1000) 32000/36200/40200(Z-axis 1200)	33370/37370/45370(Z-axis 780) 34690/38690/46900(Z-axis 1000) 35470/39470/47470(Z-axis 1200)	34000/39000/44000/50000/55000/60000(Z-axis 780) 34500/39500/44500/50500/55500/60500(Z-axis 1000) 35000/40000/45000/51500/56500/61500(Z-axis 1200)	41000/52000/62000(Z-axis 780) 41500/52500/62500(Z-axis 1000) 42000/53500/63000(Z-axis 1200)	56000/62000/67000/72000(Z-axis 780) 56500/62500/72500(Z-axis 1000) 57000/63000/68000/73000(Z-axis 1200)

VDI 3441 accuracy available upon order request.

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

Accessories

Standard : ● Optional : ★

item \ model	HSA-x23(EA)	HSA-x27(EA)	HSA-x28(EA)	HSA-x32(EA)
1.5 Years Warranty_Linear Guide Way	●	●	●	●
2.Spindle Air Curtain	●	●	●	●
3.Air Blast Through Spindle	●	●	●	●
4.Table Side Air Blast (1 tube)	●	●	●	●
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.No bottom cover	★	★	★	★
36.Hybrid Spindle 10000RPM	★	★	★	★
37.ARM Type ATC	★	★	★	★
38.Coolant through spindle_Prepare	★	★	★	★
39.Coolant through spindle	★	★	★	★
40.TOUCH PROBE	★	★	★	★
41.Imitative Mold Cutting System	★	★	★	★
42.Closed Loop Linear Scale Positioning System	★	★	★	★
43.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

item \ Model	HSA-2212	HSA-X20	HSA-X23	HSA-X27	HSA-X28	HSA-X32	HSA-X36
1.Full-Enclosed Splash Guard _Multi-piece Door	●	●	●	●	●	●	●
2.Spindle Air Curtain	●	●	●	●	●	●	●
3.Air Blast Through Spindle	●	●	●	●	●	●	●
4.Table Side Air Blast (1 tube)	●	●	●	●	●	●	●
5.Lubrication system	●	●	●	●	●	●	●
6.Fluorescent lampx1	●	●	●	●	●	●	●
7.Spindle Cooler	●	●	●	●	●	●	●
8.Foundation bolt, Concrete	●	●	●	●	●	●	●
9.Portable Chip Bucket	●	●	●	●	●	●	●
10.Screw Type Chip Conveyer	●	●	●	●	●	●	●
11.Oil Fluid Separator	●	●	●	●	●	●	●
12.Cooling System	●	●	●	●	●	●	●
13.Tools package	●	●	●	●	●	●	●
14.Hartford Manual x1	●	●	●	●	●	●	●
15.Auto Power off	●	●	●	●	●	●	●
16.Operation Finish Lamp	●	●	●	●	●	●	●
17.Foot Switch For Spindle Clamp/Unclamp	●	●	●	●	●	●	●
18.Remote Manual Pulse Generator	●	●	●	●	●	●	●
19.RS232 Interface	●	●	●	●	●	●	●
20.Convection Heat Exchanger in Control Box	●	●	●	●	●	●	●
21.Armless Type Tool Magazine(20 pcs)	-	●	●	●	●	●	●
22.6000 rpm Gear Spindle	●	●	●	●	●	●	●
23.Semi-enclosed splash guard	-	★	★	★	★	★	★
24.CTS Full splash guard with top cover	★	★	★	★	★	★	★
25.Fluorescent Lamp x2	★	★	★	★	★	★	★
26.Link Type Chip Conveyor & Portable Chip Bucket(1 EA)	★	★	★	★	★	★	★
27.Coolant Through Spindle, 20BAR, with Secondary Tank	★	★	★	★	★	★	★
28.Coolant Through Spindle, 25BAR, with Secondary Tank	★	★	★	★	★	★	★
29.Hydraulic Hose Coolant gun	★	★	★	★	★	★	★
30.Air Gun	★	★	★	★	★	★	★
31.Hartford Manual x2/3	★	★	★	★	★	★	★
32.X/Y/Z-axis linear scale system_HEIDENHAIN	★	★	★	★	★	★	★
33.Without Tool Magazine	★	★	★	★	★	★	★
34.Tool ARM Type Tool Magazine	★	★	★	★	★	★	★
35.10000/12000 rpmDirect Drive Spindle	★	★	★	★	★	★	★
36.NC Rotary Table	★	★	★	★	★	★	★
37.Angular Head(HF-M90L)	★	★	★	★	★	★	★
38.Extend Head (Hartford)	★	★	★	★	★	★	★
39.Mutiangular Milling Head (HF-MU360L)	★	★	★	★	★	★	★
40.Semi-Automatic Angular Head ((HF-S90L)	★	★	★	★	★	★	★
41.Semi-Automatic Multangular Milling Head (HF-SU360L)	★	★	★	★	★	★	★
42.Automatic Angular Head(G.Y)	★	★	★	★	★	★	★
43.Extend Head (GY-E73N or GY-E75N)	★	★	★	★	★	★	★
44.Rotary ARM Seat of Angular Head	★	★	★	★	★	★	★
45.Auto Tool Length Measurement	★	★	★	★	★	★	★
46.Imitative Mold Cutting System	★	★	★	★	★	★	★
47.Speed Increaser	★	★	★	★	★	★	★
48.DNC Software	★	★	★	★	★	★	★