

SW Series Smartcenter

Intelligent Double column machining center

- Hartrol plus controller
- 5-year warranty on guideway
- Spindle run-out: 5 micro
- Gear type 8,000rpm spindle
- Column oversized design



Website



Facebook



Hartford has sold more than 50,000 machines to all over the world, accumulated more than 37,000 customers, who absolutely affirm Hartford's manufacturing experience and ingenious machine manufacture technology. We insist on providing customers with the best quality machining centers. We will devote more carefully, in order to continuously enhance the technical level of manufacture and applications.

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Hartford

Hartrol • Smartcenter • Robocell

We manufacture intelligent machines only

What is Smartcenter?

Smartcenter is Smart machine center, an intelligent machine if put it in a simple way.

A Hartford Smartcenter has to include

1. Intelligent operating interface
2. Intelligent machining: Machining accuracy/ surface accuracy/ self learning / self optimizing
3. Intelligent quality control: Auto compensation for machining accuracy
4. Intelligent maintenance program : Active notification/ Active machine down time schedule also include other intelligent functions, help user reaching the target of Zero Down Time.

The benefits of Hartford smartcenter

- + Intelligent management : Fully aware of the machining status
- + Fully aware of the status of the machine key components.
- + Improving of the machine efficiency
- + Crash protection – Stop the machine immediately to prevent the further damage when alarm occurred .

Hartford Smartcenter will help you become an intelligent manager

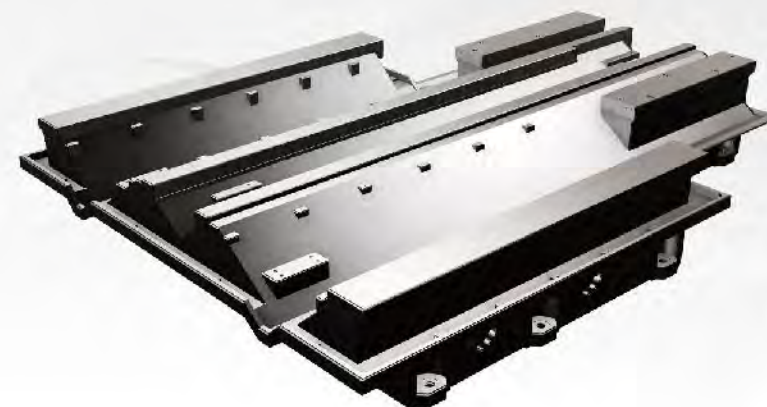
The main technologies of Hartford smartcenter include intelligent managing system, status monitoring, alarm predicting, machine status diagnosis, crash preventing, 3D program simulation, machining efficiency improving...etc.

All the intelligent functions help you control the machine status and assure the job quality.



Powerful Cutting Performance

The SWORD drastically reduces your cycle time and increase your working range with our expended working area. The new structural design delivers exceptional cutting performance.



1. Heavy cutting for large component



2. Casting iron component

Actual Cutting Test

Model: SW-426

■ Spindle: 6,000 rpm Gear type, 22kW ■ Cutting material : S45C



Face milling

Tool diameter Ø 125 mm
Feed rate 1,800 mm/min
Cutting depth 3 mm
Cutting volume 540mm



End milling

Tool diameter Ø 63 mm
Feed rate 700mm/min
Cutting depth 40 mm
Cutting width 10 mm
Cutting volume 280cc



Tapping

Tool diameter Ø 30 mm
Feed rate 350 mm/min
Depth 35 mm



Drilling

Tool diameter Ø 76 mm
Feed rate 96 mm/min
Cutting depth 50 mm

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.

Extra Rigid & Stable

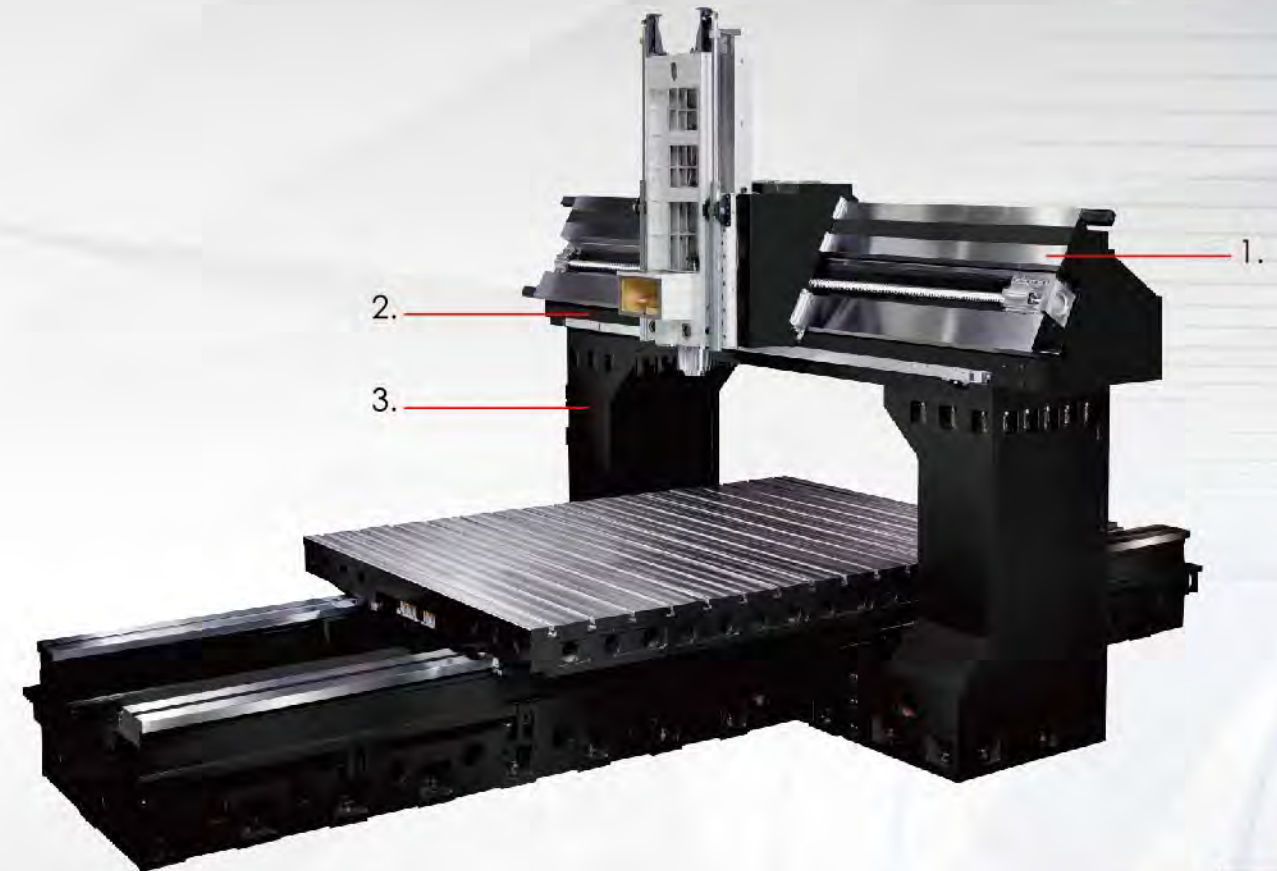
With state-of-the-art machine construction, the SWORD series double column machining center from Hartford delivers a completely new concept in structure.



Full range of box guideway five-year warranty

The following situation is not covered under warranty

1. Improper operation (collision).
2. No regular cleaning of accumulated debris causes damaged to the track.



The picture show sw-x26

1. 3 box guideways on column

- Rigidity increased by 30%.
- Three box guideways on the beam with extra wide way surface.
- Higher movement accuracy.



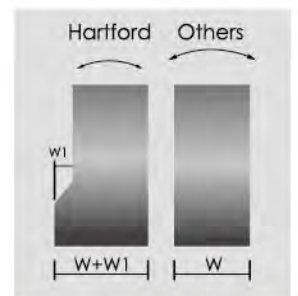
2. Slant beam structure

- Makes the machine excellent for heavy cutting.
- The gravity of Y-axis close to the column.
- Increased way width, ensure outstanding stability.
- Shortest force flow, max. rigidity.
- Max. dampening capability.



3. Oversized column design

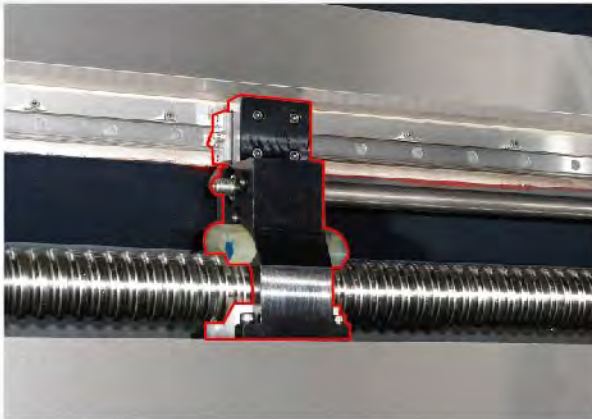
- Provide larger contact surface between column and base.
- Sustaining more cutting force from the spindle.
- Width of contact surface: 1,250mm
SW-X16: 1,050 mm



Massive Construction with Optimized Structural

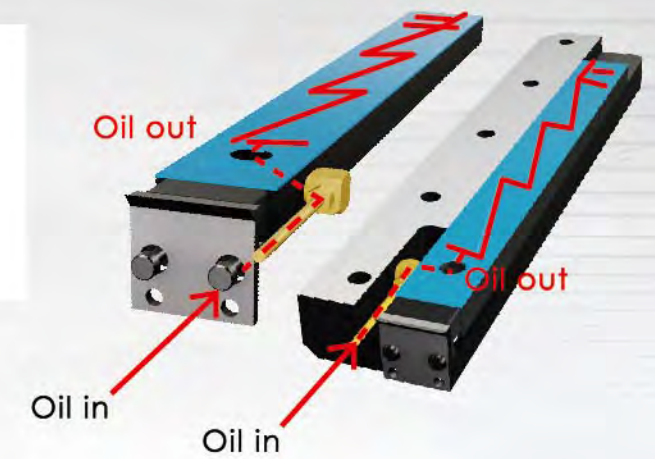
Ballscrew support mechanism maintains excellent positioning accuracy

- Improve the overhang problem at the center of ballscrew.
- Increased positioning accuracy.
- X-axis: Models above 5 meters is standard ; below 4 meters is optional.
(This feature is unavailable for machine below 3meters.)
- Y-axis: Optional.



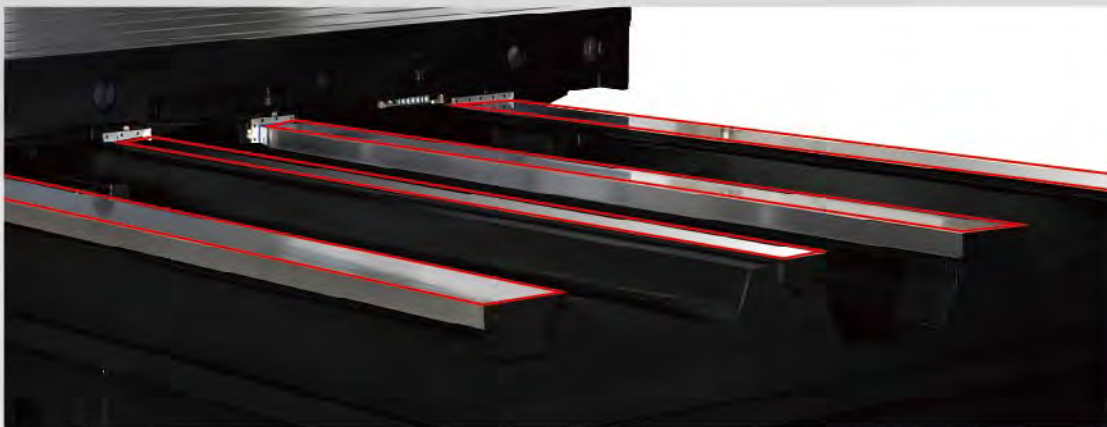
Taper gib lubrication

- Prevent against lubrication oil leaks from the contact surface between casting and gib.
- Avoid lubrication failure on the Turcite-B.
- Double gibs on Y & Z axis, increases accuracy.
- SW-X16, X20 double gibs on X & Y axis



Four box guideways design

- The base is designed with four box ways so that the machine stability can be enhanced effectively.
- SW-X26 : Four box guideways.
- SW-X16, X23: Two box guideways.



Self-made gear driven spindle head

- Two-step speed for transmit
- Low speed with great force output
- Perfect for heavy cutting
- High speed for die & mold industry



Intelligent Controller- Hartrol Plus

What is Hartrol Plus?

- 19" multi- point touch screen
- IPC with windows operation system
- HartCAM graphical conversational operation programs

The Hartrol Plus user the open architecture to enter into a new era of intelligent machining. In addition to the existing basic functions, we also add Hartford self-developed hardware and software. The Hartrol Plus also allows for adding or updating various functions as desired.

The Intelligent Controller You Should Have

With three major solutions, Hartrol plus takes your machining to the next level. Highly optimized and intelligent controls bring even more capabilities and productivity to your metal cutting process. With ease of use, advanced automation, and smart data collection, Hartrol plus is the tool you want for doubling performance on your production floor.

The difference between Hartrol plus and others

Function	Hartrol plus 1	Others
Screen Size	19" Multi-touch Panel	10.4"(OPT:15")
Hard Drive	32GB SSD	NO
Smoothing Interpolation	SSS-4G	Option
Look Ahead Block	2700	400(1000 Max.)



Variety of Hartford Made Spindle Have Quality Assurance

Efficient angular heads increase your cutting productivity

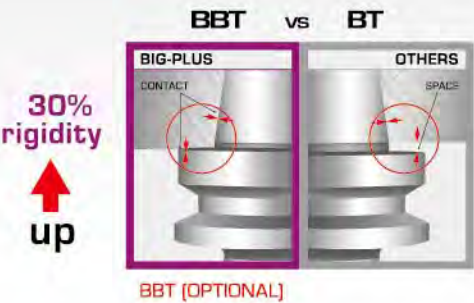
Spindle type

Available with gear-drive or direct-drive spindle head for efficient and powerful machining capability.

- #50 Gear type: 4000/6000/8000 rpm
- #50 DDS type: 10000/12000 rpm

BBT for optional

- With simultaneously fit of taper and flange to spindle dace contact.
- Improve the rigidity, accuracy, speed and performance.
- The radial deflection, vibration, deviation all are significantly reduced.



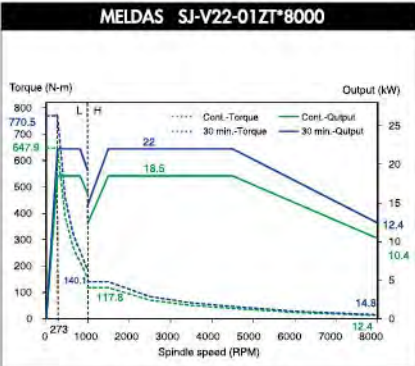
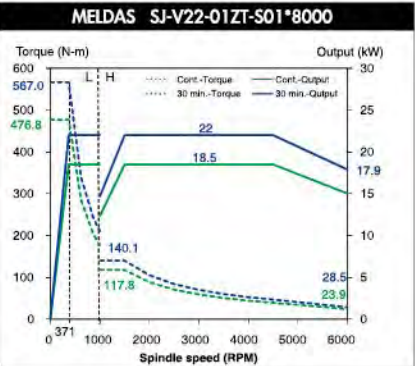
Manual position head applicable to general model SWORD



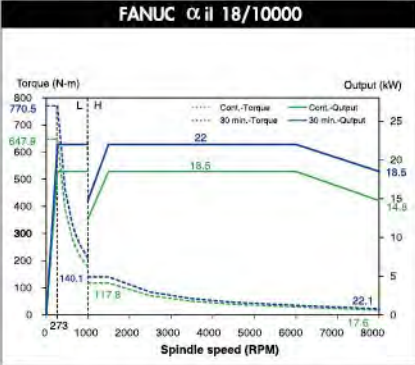
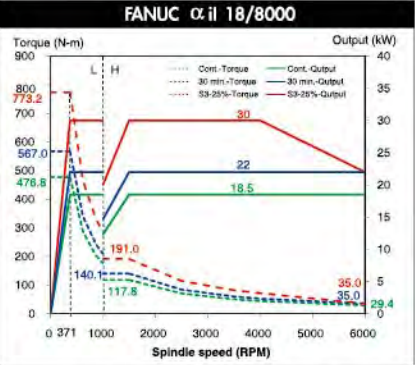
Universal head (manual / semi-automatic)		Manual universal head	Semi-automatic universal head
A axis: $\pm 110^\circ$, C-axis: $\pm 180^\circ$ Maximum speed: 2,500 rpm Maximum power: 18.5 kW The maximum torque to withstand: 650 N-m	Binding mechanism	Manual	Manual
	clamp/unclamping mechanism	Manual	Manual(Hydraulic clamp/unclamp)
	C-axis rotation	Manual	Manual

Spindle torque

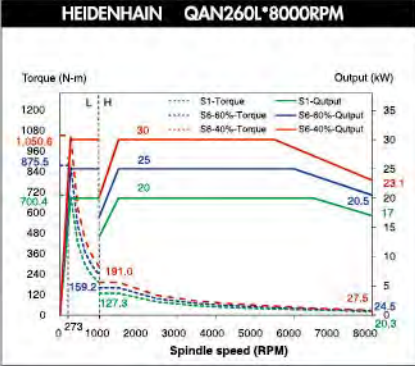
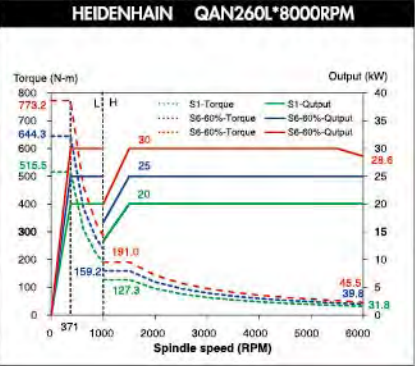
Mitsubishi



Fanuc



Heidenhain



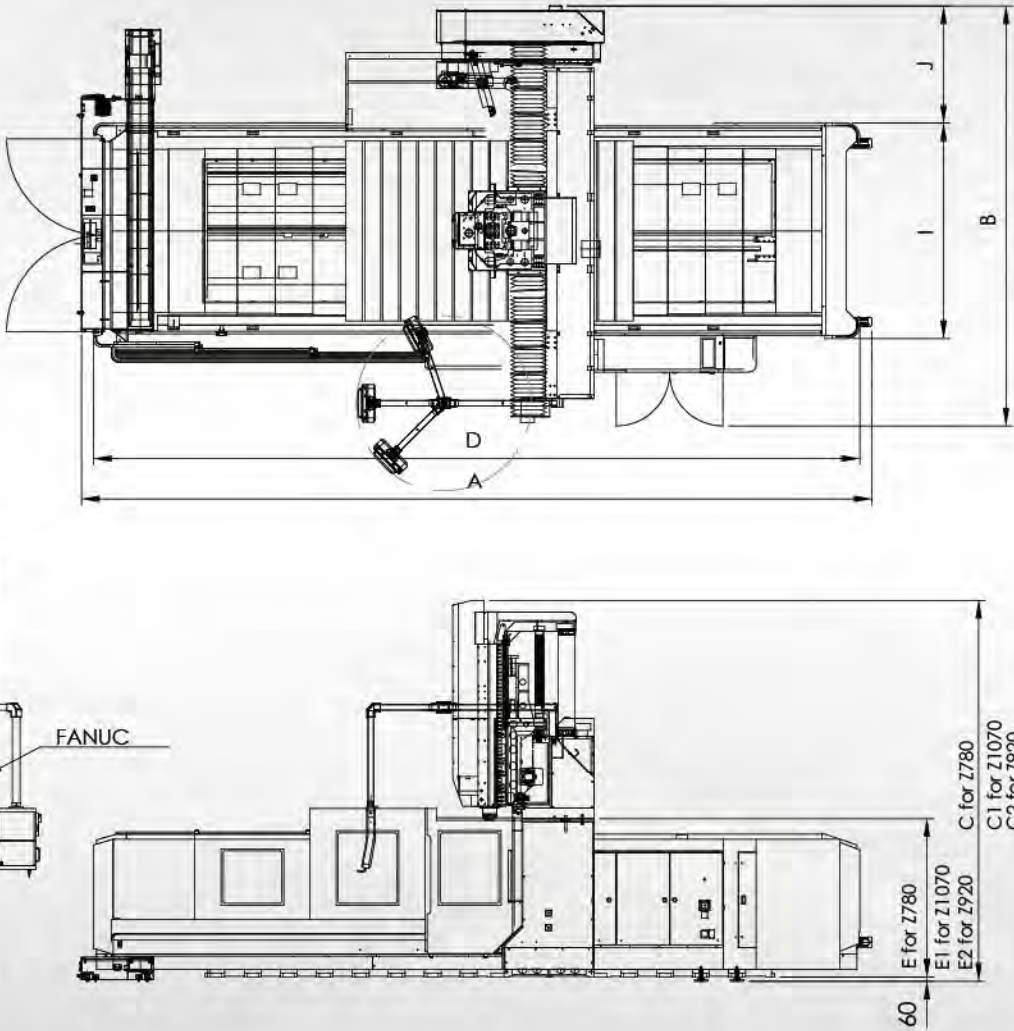
90° side milling head (manual / semi-automatic)		Manual 90° head	Semiautomatic 90° head
Manual tool change (manual / hydraulic lock release tool.) Maximum speed: 2,000rpm Maximum power: 18.5 kW The maximum torque to withstand: 650 N-m	Binding mechanism	Manual	Manual
	clamp/unclamping mechanism	Manual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



Extension head (350 / 500 mm)

Maximum speed: 4,000 rpm
Maximum power: 18.5 kW
The maximum torque to withstand: 650
N-m

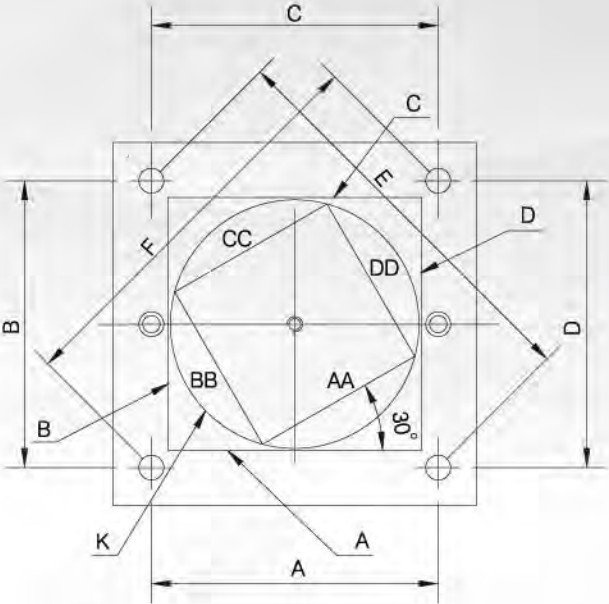
Machine Dimensions



Unit : mm

MODEL	A	B	C	C1	C2	D	E	E1	E2	F	G	H	I	J
SW-220	7237	5068	4303	5243	4713	6865	1900	2200	2000	2001	2269	4270	2282	1610
SW-320	9237	5068	4303	5243	4713	8865	1900	2200	2000	2001	2269	4270	2282	1610
SW-420	11237	5068	4303	5243	4713	10865	1900	2200	2000	2001	2269	4270	2282	1610
SW-323	9081	5224	4303	5243	-	8796	1900	2200	-	2101	2161	4470	2482	1610
SW-423	11081	5224	4303	5243	-	10796	1900	2200	-	2101	2161	4470	2482	1610
SW-523	13081	5224	4303	5243	-	12796	1900	2200	-	2101	2161	4470	2482	1610
SW-623	15071	5624	4303	5243	-	14796	1900	2200	-	2101	2161	4470	2482	1610
SW-326	9076	5624	4343	5283	-	8796	1900	2200	-	2311	2361	4939	2882	1610
SW-426	11076	5624	4343	5283	-	10796	1900	2200	-	2311	2361	4939	2882	1610
SW-526	13076	5624	4343	5283	-	12796	1900	2200	-	2311	2361	4939	2882	1610
SW-626	15076	5624	4343	5283	-	14796	1900	2200	-	2311	2361	4939	2882	1610

Cutting Test



SW-426A CUTTING TEST
WITH-2D-NASA STANDARD TESTING PART(LINEAR SCALE OFF)

No.	Insp.Item			Deviation	Test result	Note
1	Pitch	Position Accuracy	A(300mm)	0.025 mm	0.0057	(⊕)
2			B(300mm)	0.025 mm	0.0068	(⊕)
3			C(300mm)	0.025 mm	0.0055	(⊕)
4			D(300mm)	0.025 mm	0.0049	(⊕)
5			E	0.035 mm	0.0012	(⊕)
6			F	0.035 mm	0.0017	(⊕)
7	Cutting	Geometric Accuracy	K	0.04 mm	0.0017	(○)
8	End Milling Accuracy		A	0.015 mm	0.0058	(—)
9			B	0.015 mm	0.0037	(—)
10			C	0.015 mm	0.0011	(—)
11			D	0.015 mm	0.0016	(—)
12			A&B	0.03 mm	0.0093	(⊥)
13			B&C	0.03 mm	0.013	(⊥)
14			C&D	0.03 mm	0.0043	(⊥)
15			D&A	0.03 mm	0.0056	(⊥)
16			A&C	0.03 mm	0.0037	(//)
17			B&D	0.03 mm	0.0086	(//)
18			Linear Interpolation Accuracy	AA	0.02 mm	0.0054
19	BB			0.02 mm	0.0026	(—)
20	CC			0.02 mm	0.0025	(—)
21	DD			0.02 mm	0.0024	(—)
22	AA&BB			0.04 mm	0.0073	(⊥)
23	BB&CC			0.04 mm	0.0018	(⊥)
24	CC&DD			0.04 mm	0.0040	(⊥)
25	DD&AA			0.04 mm	0.0095	(⊥)
26	AA&CC			0.04 mm	0.0055	(//)
27	BB&DD			0.04 mm	0.0022	(//)

Machine Specifications

MODEL	UNIT	SW-216/2616/316/416	SW-220/320/420	SW-323/423/523/623	SW-326/426/526/626
TABLE					
Working surface	mm	2000/2500/3000/4000x1450	2000/3000/4000x1830	3000/4000/5000/6000x2200	3000/4000/5000/6000x2500
T-slot(size x number x pitch)	mm	22x11/13/17/21x180	22x8/12/16x250	28x12/16/20/24x250	28x12/16/20/24x250
Max.table load	kg	7000/7500/8000/9000	8000/10000/12000	10000/12000/14000/16000	12000/13500/15000/16500
TRAVEL					
Longitudinal travel(X-axis)	mm	2100/2600/3100/4100	2100/3100/4100	3000/4000/5000/6000	3000/4000/5000/6000
Cross travel(Y-axis)	mm	1600	2000	2300	2600
Vertical travel(Z-axis)	mm	780(1070 opt.)	920(780/1070 opt.)	780(1070 opt.)	780(1070 opt.)
Distance from spindle end to table	mm	220~1000(230~1300 opt.)	150~1070(200~980 opt.)(200~1270 opt.)	200~980(200~1270 opt.)	160~940(160~1230 opt.)
Distance from spindle center to column	mm	430	430	430	430
Width between column	mm	1600	2100	2300	2700
SPINDLE					
Spindle speed (Gear)	rpm	6000	6000	6000(4000)	6000(4000)
Spindle nose taper		ISO50	ISO50	ISO50	ISO50
ATC					
Tool storage capability	pcs	20(S type)/OPT.32,40,60(A type)	20(S type)/OPT.32,40(A type)	20(S type)/OPT.32,40,60(A type)	20(S type)/OPT.32,40,60(A type)
Max tool weight	kg	15	15	S:15 A:20	S:15 A:20
Max tool size(Diameter x length)	mm	Ø125x350L	Ø125x350L	S:Ø125x350L A:Ø125x400L(Opt.)	S:Ø125x350L A:Ø125x400L(Opt.)
Tool shank		BT50(BBT/CAT/DIN)	BT50(BBT/CAT/DIN)	BT50(BBT/CAT/DIN)	BT50(BBT/CAT/DIN)
Pull stud bolt		P50T-1	P50T-1	P50T-1	P50T-1
FEED					
Cutting feedrate(X,Y,Z-axis)	mm/min.	1~7000	1~7000	SW-323/423:X/Y/Z=1~7000 SW-523/623:X=1~5000 Y,Z=1~7000 X=12/12/8/6,Y=12,Z=12	X,Y,Z=1~5000
Rapid Traverse(X,Y,Z-axis)	m/min.	12/12/15	12/12/12		X=10/10/8/6,Y=10,Z=12
MOTOR					
Spindle drive motor-Fanuc 30 min	kW	18.5(22/26 opt.)	18.5(22/26 opt.)	22(26/37 opt.)	22(26/37 opt.)
X-axis drive motor(Fanuc)	Nm	α iF22(22Nm)/ α iF22(22Nm)/ α iF30(30Nm)/ α iF30(30Nm)	α iF22(22Nm)/ α iF30(30Nm)/ α iF30(30Nm)	SW-323/423: α iF30(30Nm), SW-523: α iF40+F(53Nm),SW-623: α iS60+F(95Nm)	SW-326/426: α iF30(30Nm), SW-526: α iF40+F(53Nm),SW-626: α iF60+F(95Nm)
Y-axis drive motor(Fanuc)	Nm	α iF22(22Nm)	α iF22(22Nm)	α iF22(22Nm)	α iF22(22Nm)
Z-axis drive motor(Fanuc)	Nm	α iF30+B(30Nm)	α iF30+B(30Nm)	α iF30+B(30Nm)	α iF30+B(30Nm)
POSITIONING ACCURACY					
3-axis laser positioning accuracy(JIS B6338)					
Positioning accuracy/full travel	mm	±0.014	±0.014	±0.014/±0.015/±0.015/±0.015	±0.014/±0.015/±0.015/±0.015
Repetitive positioning accuracy	mm	±0.003	±0.003	±0.003	±0.003
3-axis laser positioning accuracy(VDI 3441)/repeated 5 times					
Positioning accuracy	mm	0.020/0.023/0.026/0.028	0.023/0.026/0.028	0.026/0.028/0.028/0.030	0.026/0.028/0.028/0.030
Repetitive positioning accuracy	mm	0.016/0.019/0.022/0.024	0.019/0.022/0.024	0.022/0.024/0.024/0.026	0.022/0.024/0.024/0.026
VDI 3441 accuracy available upon order request					
OTHERS					
Required air pressure	kg/cm ²	6.5	6.5	6.5	6.5
Electric power consumption	KVA	50	55	55/55/55/60	60/60/60/60
Machine weight	kg	19500/21000/22500/25500	24000/27500/31500	26500/30500/35000/40000	30900/34900/38900/42900
Floor space-full guarding	mm	8370/9660/10950/13530x5755	9140/11140/13140x6600	11161/13161/15161/17161x6920	11500/13500/15500/17500 x 7800

Standard&Optional Electrical Functions

Hartrol/Standard	Hartnet/Optional
- Workpiece calibration by mpg directly - Tool magazine display - Pop-up calculator (in hartrol screen) - Parameter package - Threading cutting (only for 0i and 31i) - Tool type display on (only for 0i and 31i) - Monitoring of tool status (only for 0i and 31i) - Character carving macro	- Management system of utilization - Machining time countdown - Convenient file transfer - Production management
Electrical Function/Optional	
- Compensation of temperature displacement - Lifting Function Against Gravity - Retraction for Rigid tapping - Intelligent MPG - HMI for tool magazine	

Standard&Optional Mechanical Accessories

Standard	Optional
- Full-enclosed splash guard - Spindle oil cooler - Centralized automatic lubrication system - Oil fluid separator - Fluorescent lamp - Rs-232 interface - Air blast through spindle	- Leveling bolts and blocks - Remote manual pulse generator - Convection heat exchanger in control - Auto power off - Operation finish lamp - Stand operator box (SW-X16) - Operation manual & electric drawing equipment
- Coolant through spindle 20 bar without water cart - Coolant through spindle 20 bar with water cart - Coolant through spindle 25 bar with water cart - Coolant through spindle preparation only - Fluorescent lamp x 2 - Nc rotary table - Dnc software - cooling system	90 Angle head(tool type) - Closed loop linear scale positioning system - Auto tool length measurement - Auto tool length and diameter measurement - Auto workpiece measurement - Water gun - Air gun #50 4000rpm gear spindle
#50 10000rpm direct spindle #50 12000rpm direct spindle	

*Specifications of the machine are subject to be modified without prior notice, please refer to the shipping document for the precise machine weight.