

# Intelligent Machining Center

## S-Plus Series Smartcenter

- Hartrol premium controller
- 5-Year warranty on guideways
- One-piece bed design
- Tool change time: 1.38 sec
- Oversized column design

HartrolPremium®  
From tradition to intelligent



# Hartford

Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

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Website



Facebook



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

Imagine what future machines ought to be outlined.

# AI Smartcontrol



## Hartford redefine the future



**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

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



# How to quickly implement automation?

## Hartford Robot Production Cell

### Easy to get started

Hartford Robocell provides you a professional robot training and rich automation experience, to let you quickly learn and easily operate your automation systems

### Quality control monitoring

Automation systems have to pass all the strict Quality Control tests at every stage like design, assembly, testing, final inspection and shipment, complete quality control processes for all the products.

### Professional analysis

Robocell Machining optimization service, to let you be on the top by using professional machining methods

What definition of Automation interface only :



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

<h3>1. Automatic Door</h3> <ul style="list-style-type: none"> <li>Pneumatic/Automatic Door System_Operating Door</li> <li>Pneumatic/ Servo Automatic Door System_Right Side Door</li> </ul>	<h3>2. Automatic Interface</h3> <ul style="list-style-type: none"> <li>I/O Preparation</li> <li>Profibus Link Preparation</li> <li>CC-Link Preparation</li> <li>EtherNet/IP Link Preparation</li> </ul>	<h3>3. Pneumatic/ Hydraulic Interface</h3> <ul style="list-style-type: none"> <li>1/2/3 Cell Automatic Pneumatic/ Hydraulic Interface in the machine</li> </ul>
<h3>4. Other options</h3> <ul style="list-style-type: none"> <li>High Pressure Spray Nozzle with Automatic Preparation</li> <li>HStainless Base</li> <li>High-volume chip-removal system comprising dual side augers</li> </ul>		

# Increased Efficiency & Greater Productivity

A perfect demonstration for machining accuracy and ability.

Hartford S-Plus series is a high efficiency and productivity machining Center which can be used for mass production jobs and dramatically Reduce your machining center.



1. Bicycle front fork part



3. Shock absorber for motorcycle



2. Fine dragon pillar

## Actual cutting tests

Model : S-PLUS 10  
 ■ Spindle : 10,000 rpm DDS type 11kW ■ Cutting material : S45C

<p><b>Face milling</b></p> <p>Tool diameter    Ø80 mm                  Feed rate        1,500 mm/min                  Cutting depth   2 mm                  Cutting width   65mm                  Cutting volume   195cc/min</p>	<p><b>End milling</b></p> <p>Tool diameter    Ø63 mm                  Feed rate        2,240mm/min                  Cutting depth   30 mm                  Cutting width   3mm                  Cutting volume   201 cc/min</p>	<p><b>Tapping</b></p> <p>Tool diameter    M20 x 2.5 mm                  Feed rate        2,000 mm/min                  Cutting depth   25 mm</p>	<p><b>Drilling</b></p> <p>Tool diameter    Ø18 mm                  Feed rate        140mm/min                  Cutting depth   25 mm</p>

All the results featured in this catalogue were produced under strict testing condition in a special zed testing environment. Under different testing conditions and in less than ideal testing environments. That the test results may vary from those shown in this catalogue.



Automation/ Intelligent  
Application program  
Intelligentization  
Key technology  
Specification parameter

# The very first step for fully intelligent machining.

## What is Hartrol Premium ?

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 plus 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



## 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.



## The Intelligent Controller You Should Have

With three major solutions, Hartrol Plus takes you machining to the next level. Highly optimized and intelligent controls bring even more capabilities and productivity to your metal cutting processes.

With ease use, advanced automation, and smart data collection, Hartrol plus is essential tool for enhancing performance on your production floor.

### Cost down to 20%

- Multi Touch Screen
- CCD remote management
- E-book
- Remote Management
- Cutting Condition Calculator
- Stand-by Mode

### Productivity increased 23%

- HartCAM
- AFC= Automatic Feedrate Control.
- SSS-4G
- Machining Time Countdown for Single Block
- Optimized Machining Program
- Automatic measurement

### Efficiency increased 20%

- MES(Manufacturing Execution System)
- Machine Utilization Management
- Operator Performance Management
- 24 Hours a Day Management
- Remote Management
- Hartford Userconnect

### Hartford UserConnect

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

## Hartford smartcenter APP



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

# What Hartford APP can do for you?

The integrated intelligent functions of Hartrol plus could achieve your machining requirements.  
For more Hartrol Plus functions, please contact our sales person.

## AI Environment Thermal Displacement Compensation(opt.)

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



## AI Facial recognition system(opt.)

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



## Highlight on Intelligent Auger(opt.)

**50%** efficacy increases

- Intelligent auger automatically proceeds cleaning iron chips based on electrical current of spindle.
- Intelligent auger automatically performing reversal mode in case amount of iron chips outnumbers, preventing from machine stop. Auger is overly shielded



## AI Efficient Lubrication Management(opt.)

**50%** lubrication saved.

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



## On line update

With online updating system similar to smart phone will make sure your operating system stays the latest version with Hartford.

- 24hr** ➡ Live updating , no boundary no time zone difference.
- NEW** ➡ Synchronize with Hartford for the latest information and functions.
- Easy** ➡ One key updating, easy and fast !



The Hartrol plus NC version must be A6 or above



Graphical user interfaces for part setting, inspection, tool setting

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



**Hartford ZDT**  
Eliminate machine down time and increase efficiency.  
ZDT –

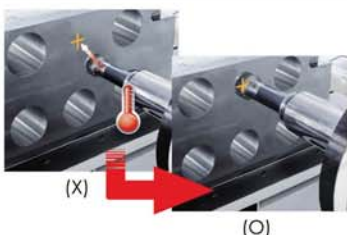
- Ease of use
- Check parts status clearly
- Eliminating unexpected down time
- Instant notification to your machine and your portable device



**AFC(opt.)**  
Machining efficiency is increased by **21%** ↑

Controls the feed rate depending on the machining situation

- Adjusting feed rate automatically
- Lengthen your tool life
- Reduce machining time



## Thermal compensation on spindle(opt.)

No worries about HEAT!!

- Machine with compensation
  - #40 spindle thermal extension is within 0.03mm
  - #50 spindle thermal extension is within 0.02mm
- Machine without compensation
  - Spindle thermal extension is around 0.10mm

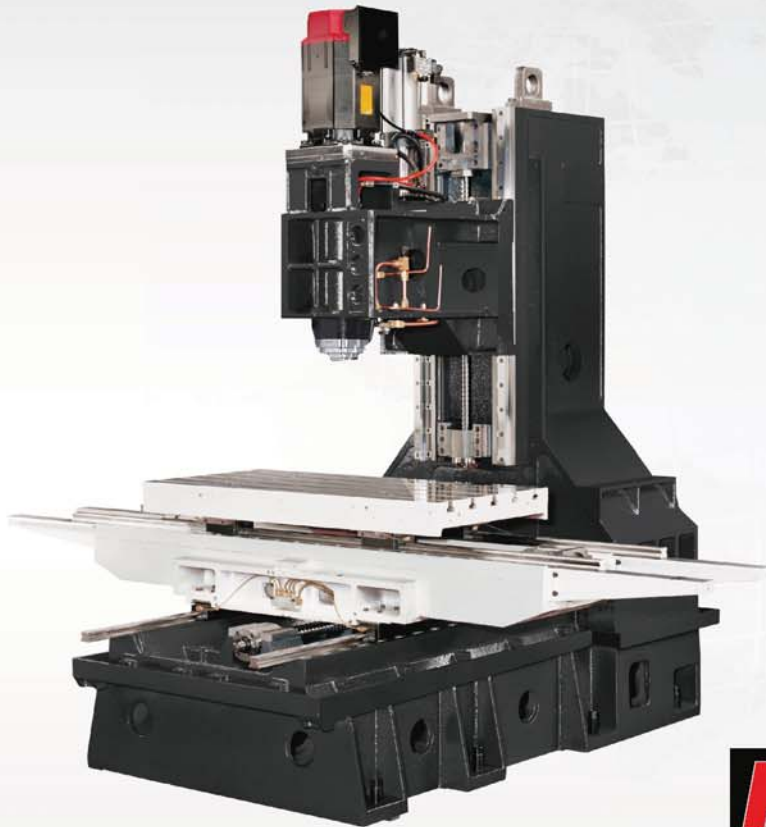
Notes: Above test is under room temperature





# A New Level of Rigidity and Stability Through a Perfectly Designed Structure

Ruggedly and precision built for years of accurate production work,  
the Hartford S-Plus is specially designed for all users who required speed and accuracy



## Full range of linear guideway five-year warranty

Warranty coverage will not apply under the following conditions,  
1.Improper operation (collision)  
2.Lack of regular cleaning of accumulated debris causing  
damaged to the linear rails&carriages.

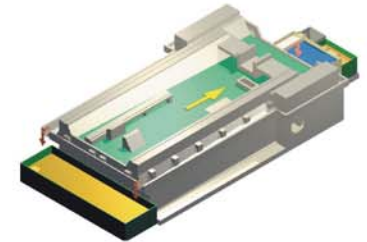
## High accuracy linear guideway design

- The line guideways on all 3- axes are high grade, providing stability for heavy cutting.
- High efficiency machining center.
- Maximum rapid traverse rate of **32** m/min.



## One-piece bed design

- The bed is one-piece design.
- The column is wider.
- Prevents twisting and distortion under even the most severe cutting forces.
- The fine grain Meehanite cast iron contributes to unparalleled damping characteristics.



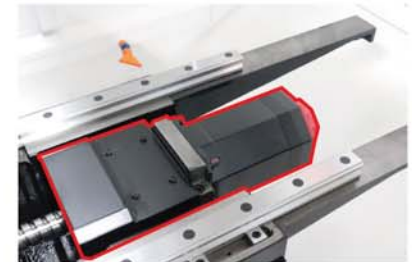
## Excellent tool change time(opt.)

- Minimum tool change time is **1.38** sec (tool - to - tool)



## 3-axis direct transmission between servo motor and ballscrew

- High torque servo motors are directly coupled with ballscrews.
- With out backlash or servo lag problem caused by a belt.
- All ballscrews are center-supported plus both ends utilize precision angular contact bearing
- Boosts machining efficiency and reliability.



# Spindles Manufactured by Hartford Offer Quality Assurance

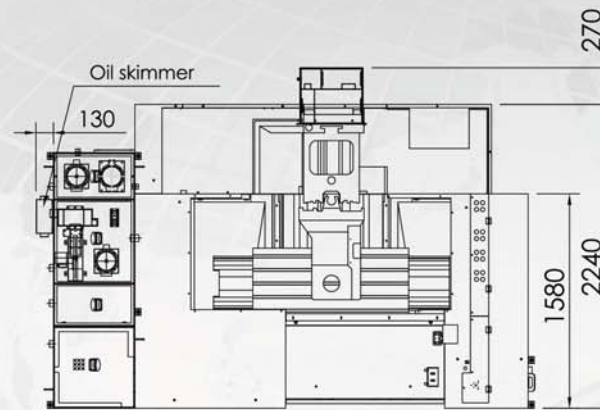
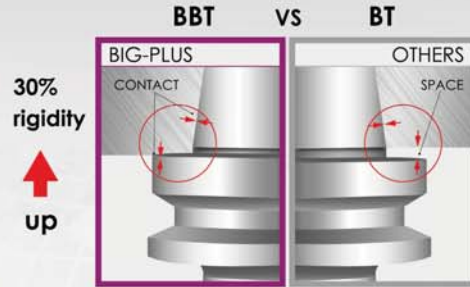
## Machine Dimensions

### Spindle type

- #40 belt - drive 12000 rpm (8000/10000 rpm)
- #40 direct-drive 15.000 rpm(10000/12000 rpm)

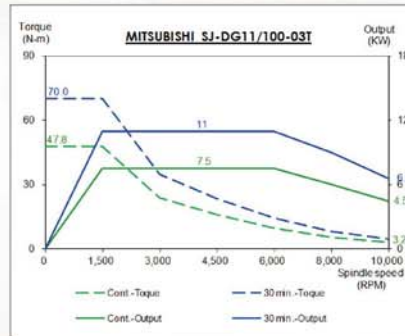
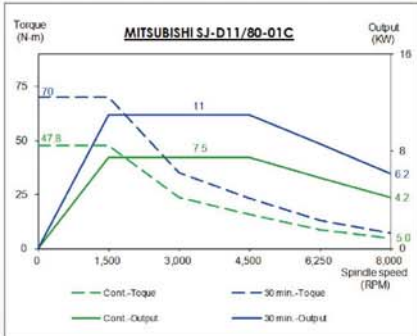
### BBT SPINDLE TYPE (OPTIONAL)

- Two faces binding design for increasing cutting capability and machining accuracy
- Dramtucally redyce errs and vibration

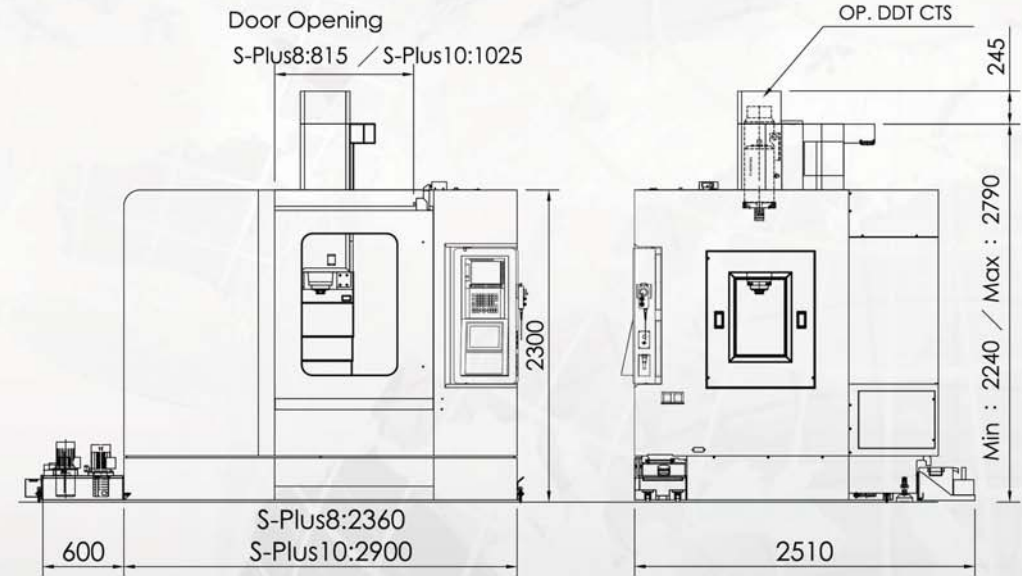
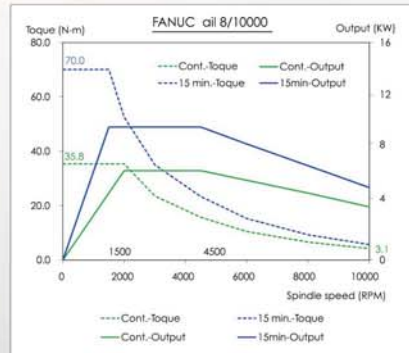
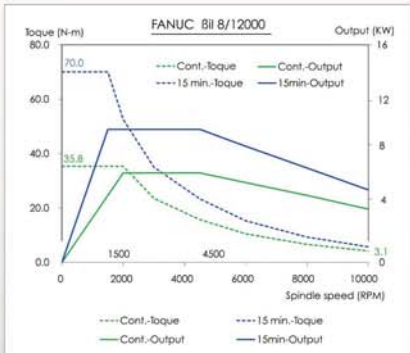


### SPINDLE TORQUE DIGRAM

#### Mitsubishi



#### Fanuc





## Machine Specifications

Model		unit	S plus-8	S plus-10
Table	Working surface	mm	950 x 520	1150 x 520
	T-slot Width x pitch(number)	mm	18 x 100(5)	18 x 100(5)
	Max. load (Average)	kg	500	700
Travel	X -axis travel	mm	800	1020
	Y -axis travel	mm	520	520
	Z -axis travel	mm	550	550
	Distance from spindle to table	mm	100~650 opt. 300~850	100~650 opt. 300~850
	Distance from spindle center to column	mm	569	569
Spindle	Spindle nose taper	rpm	#40	#40
	Spindle speed(Pulley)	rpm	8000/10000/12000	8000/10000/12000
	Spindle speed(DDS)	rpm	10000/12000/15000	10000/12000/15000
Feed	Cutting feedrate (X / Y / Z)	m/min	12/12/12	12/12/12
	Rapid traverse rate (X / Y / Z)	m/min	40/40/32	40/40/32
ATC	Capacity	pcs	A:24(30)	A:24(30)
	Max. tool weight	kg	7	7
	Max. tool size(dia.x length)	mm	A: Ø 75x300L	A: Ø 75x300L
	Tool shank		BT40(BBT/CAT/DIN)	BT40(BBT/CAT/DIN)
	Pull stub bolt		P40T-1 (CAT-40/DIN 69872)	P40T-1 (CAT-40/DIN 69872)
Motor	Spindle drive motor (cont./30 min)	kw	5.5/7.5 opt. 7.5/11, 11/15, 15/18.5	5.5/7.5 opt. 7.5/11, 11/15, 15/18.5
Positioning Accuracy	Positioning accuracy (JIS B6330) , without linear scale	mm	±0.008	±0.008
	Repeatability (JIS B6330) , without linear scale	mm	±0.002	±0.002
	Positioning accuracy (JIS B6330) , with linear scale	mm	±0.006	±0.006
	Repeatability (JIS B6330) , with linear scale	mm	±0.002	±0.002
	Positioning accuracy (VDI 3441)	mm	0.010 / MGPS:0.005	0.010 / MGPS:0.008
	Repeatability(VDI 3441)	mm	0.006 / MGPS:0.005	0.006 / MGPS:0.005
Other	Required air pressure	kg/cm <sup>2</sup>	6.5	6.5
	Electric power requirement	KVA	15~40	15~40
	Machine weight	kg	4700	5000
	Coolant tank(standard)	L	260	285
	Machine dimension(LxWxH)	mm	2360 x 2240x 2790	2900 x 2240x 2790
	Floor space (standard tank)	mm	2960 x 2510	3500 x 2510

VDI 3441 accuracy available upon order request.

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

## Accessories

item	model	Standard : ● Optional : ★	
		S Plus-8	S Plus-10
1.Full-Enclosed Splash Guard		●	●
2.Full-enclosed splash guard & top cover		★	★
3.Automatic door system_Operating door		★	★
4.Chip collecting tank type		●	●
5.Front Mounted Screw Type Chip Conveyor		★	★
6.Link Type Chip Conveyor & Portable chip bucket		★	★
7.Link type chip conveyor & portable chip bucket (with Two side screw type chip)		★	★
8.Coolant Flushing Device		★	★
9.Chassis on both sides of the stainless steel plate		★	★
10.Coolant System_Coolant Pump Motor, Standard		●	●
11.Coolant System_Coolant Pump Motor, Upgrade		★	★
12.Spray Around Spindle		●	●
13.Spindle Air Curtain		●	●
14.Air Blast Through Spindle		●	●
15.Air blast through spindle		★	★
16.Lubrication System		●	●
17.Spindle Oil Cooler_Pulley Spindle		★	★
18.Spindle Oil Cooler_Direct Drive Spindle		●	●
19.Pulley Spindle 8000RPM		●	●
20.Pulley Spindle 10000/12000RPM		★	★
21.Direct Drive Spindle 10000 / 12000 / 15000 RPM		★	★
22.Disk Type Tool Magazine 24T		●	●
23.Disk Type Tool Magazine 30T		★	★
24.Intelligent tool change system(T to T)_1.38 sec.		★	★
25.Oil Skimmer		★	★
26.Oil Mist Collector System		★	★
27.X, Y, Z-Axis Ball Screw Enforce Pressure		●	●
28.Foundation bolt, General		●	●
29.Foundation bolt, Concrete		★	★
30.Table side air blast		●	●
31.Tool Package		●	●
32.Coiling Tube Coolant gun		★	★
33.Hydraulic Hose Coolant gun		★	★
34.Air Gun		★	★
35.X, Y, Z axis linear scale system		★	★
36.Machine head guard + Fan (For DDT. spindle)		★	★
37.Coolant through spindle, Prepare, without water cart		★	★
38.Coolant Through Spindle_20BAR Without Water Cart		★	★
39.Coolant Through Spindle_20BAR With Water Cart		★	★
40.Coolant Through Spindle_25/40/70 BAR With Water Cart		★	★
41.Fluorescent Lampx1		●	●
42.Fluorescent Lampx2		★	★
43.Hartford Manual x1		●	●
44.Operation Finish Lamp		★	★
45.Convection Heat Exchanger in Control		●	●
46.Rs-232 Interface		●	●
47.Auto Tool Length Measurement		★	★
48.Auto Work Piece Measurement		★	★

### Standard & Optional Electrical Function

#### Hartrol / Standard

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

#### Hartnet / Optional

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

#### Electrical Function / Optional

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