

# Intelligent Machining Center

## S-Plus Series Smartcenter

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

**Hartrol Plus**®  
From tradition to intelligent



# Hartford

Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

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CAT.No.: 20191115- E11

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Website



Facebook



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

Imagine what future machines ought to be outlined.

# AiSmartcontrol



**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

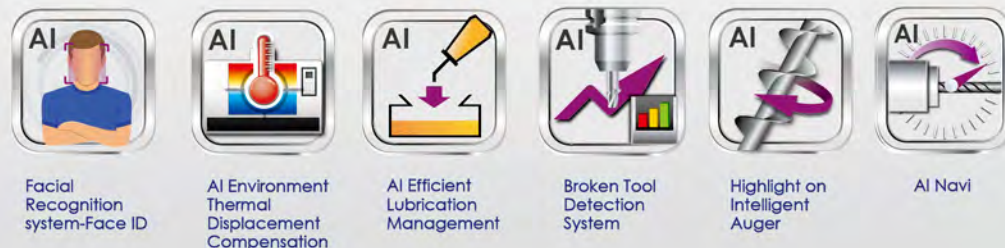
**ZDT** 3

- + 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



# How to quickly implement automation?

## Hartford Robot Production Cell

### Easy to get started

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

### Quality control monitoring

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

### Professional analysis

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

What definition of Automation interface only :



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

### 1. Automatic Door

- Pneumatic/Automatic Door System\_Operating Door
- Pneumatic/ Servo Automatic Door System\_Right Side Door

### 2. Automatic Interface

- I/O Preparation
- Profibus Link Preparation
- CC-Link Preparation
- EtherNet/IP Link Preparation

### 3. Pneumatic/ Hydraulic Interface

- 1/2/3 Cell Automatic Pneumatic/ Hydraulic Interface in the machine

### 4. Other options

- High Pressure Spray Nozzle with Automatic Preparation
- HStainless Base
- High-volume chip-removal system comprising dual side augers

# 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 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

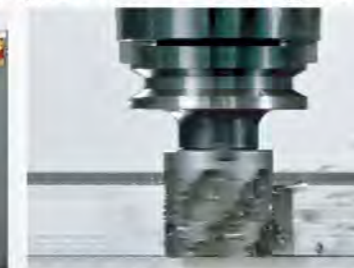
Model : S-PLUS 10

■ Spindle : 10,000 rpm DDS type 11kW ■ Cutting material : S45C



#### Face milling

Tool diameter Ø80 mm  
 Feed rate 1,500 mm/min  
 Cutting depth 2 mm  
 Cutting width 65mm  
 Cutting volume 195cc/min



#### End milling

Tool diameter Ø63 mm  
 Feed rate 2,240mm/min  
 Cutting depth 30 mm  
 Cutting width 3mm  
 Cutting volume 201 cc/min



#### Tapping

Tool diameter Ø20 mm  
 Feed rate 2,000 mm/min  
 Cutting depth 25 mm



#### Drilling

Tool diameter Ø18 mm  
 Feed rate 140mm/min  
 Cutting depth 25 mm

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

# The very first step for fully intelligent machining.

## What is Hartrol Plus?

Hartrol plus is a brand new intelligent controller Hartrol , Hartnet and Hartford electrical function together which developed and made by Hartford.

HMI and operation is user friendly, it can achieve :

1. Internet connection, collect and analyze data, monitoring by portable device
2. Intelligent control: Auto revise human error and operating basis
3. Real time update new APPs

The difference between Hartrol plus and others

Function	Hartrol Plus P1	Others
Screen Size	19"Multi-touch Panel	10.4" (OPT:15")
Look Ahead Block	2700(G5P20000)	400(1000 Max.)
Hard Drive	32GB SSD	NO
Smoothing Interpolation	SSS 4G	Option
Industry 4.0	Hartford UserConnect	NO



## 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.

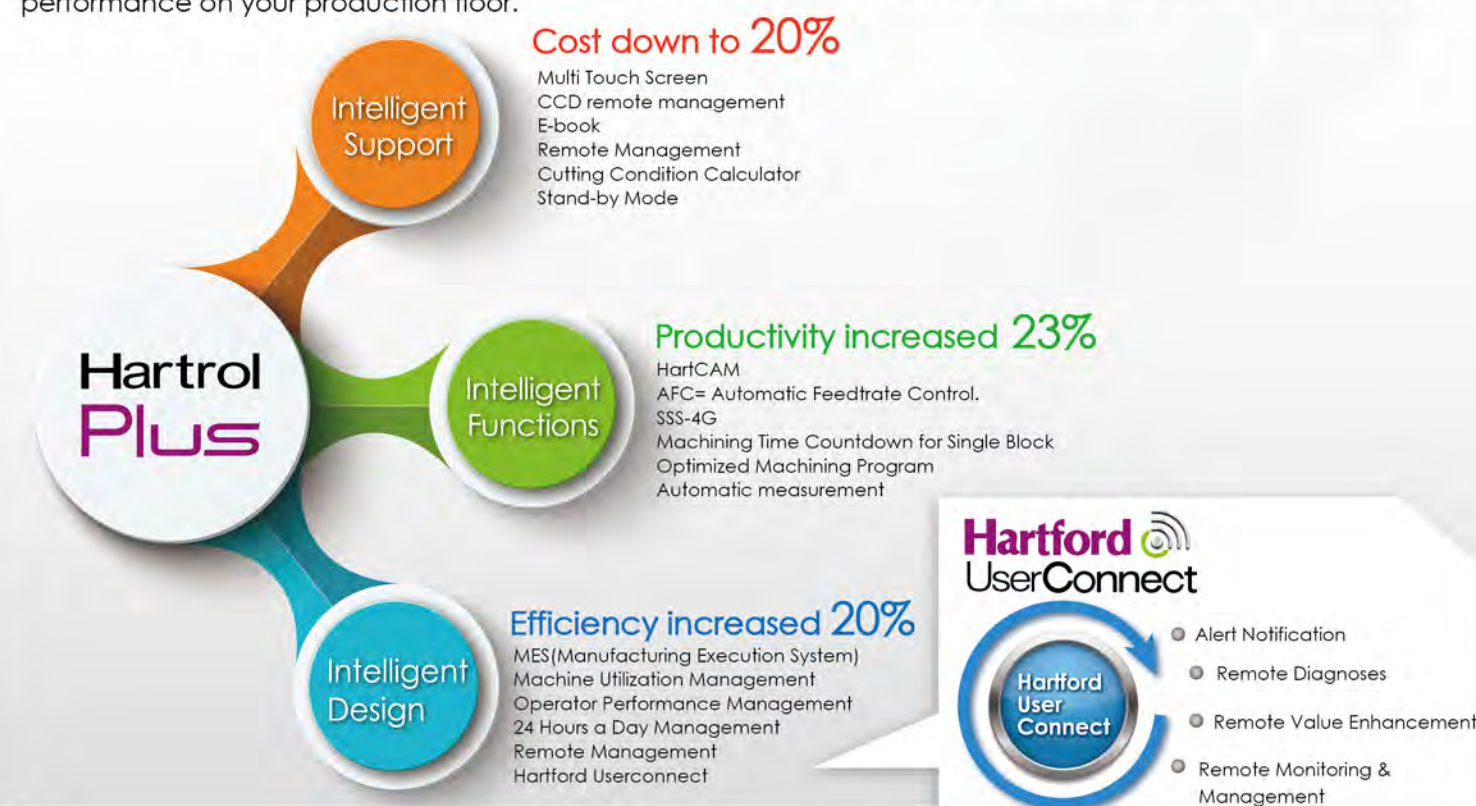


## The Intelligent Controller You Should Have

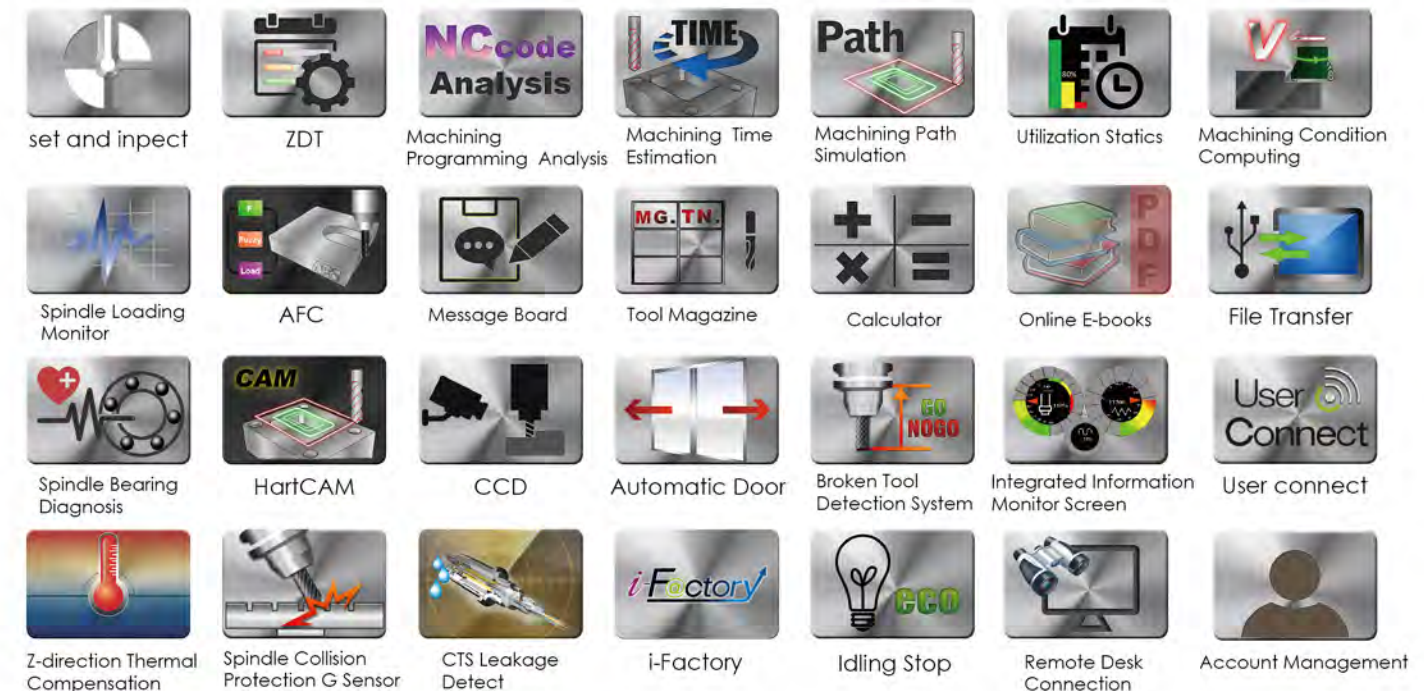
With three major solutions, Hartrol Plus takes you machining to the next level.

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.



## Hartford smartcenter APP



The fuctions 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%**



## 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%** 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
- Instand notification to your machine and your probable device



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

**Highlights**  

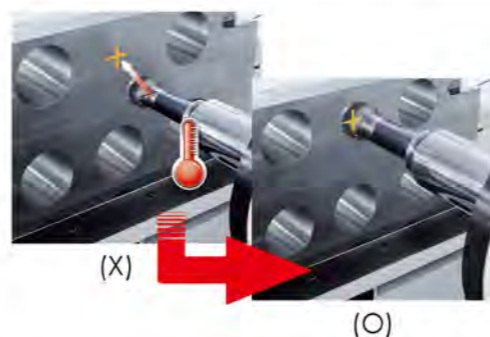
- APP Vibration function is handy to set up manually.
- Alert status on crash protection.
- Responsive graphic is available for diagnosis by user, and analytic information is just-in-time served.



## AFC(opt.)

Machining efficiency is increased by **21%** ↑  
Controls the feed rate depending on the machining situation

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



## Thermal compensation on spindle(opt.)

No worries about HEAT!!  

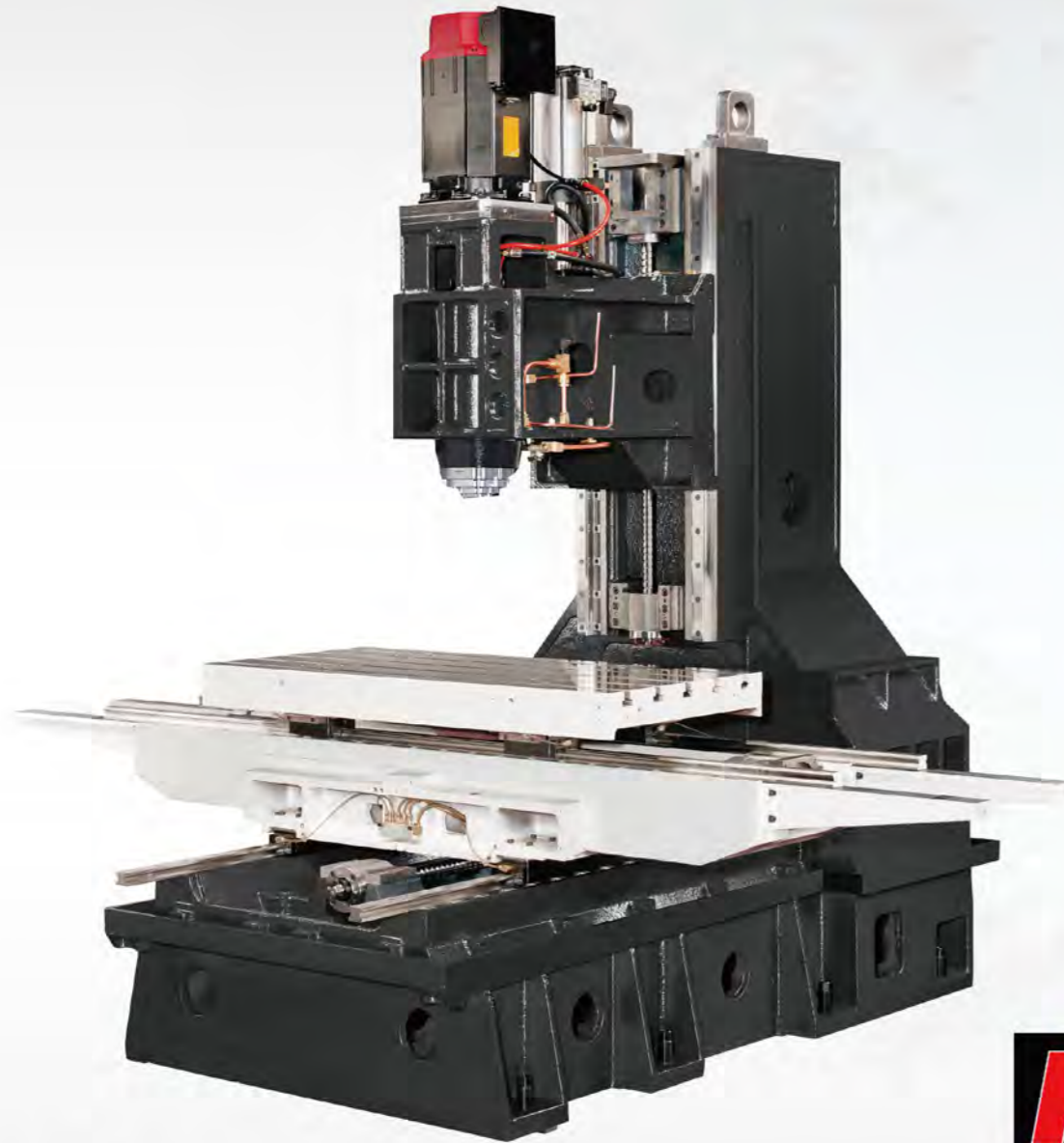
- Machine with compensation  
#40 spindle thermal extension is within 0.03mm  
#50 spindle thermal extension is within 0.02mm
- Machine without compensation  
Spindle thermal extension is around 0.10mm

Notes: Above test is under room temperature



# 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.

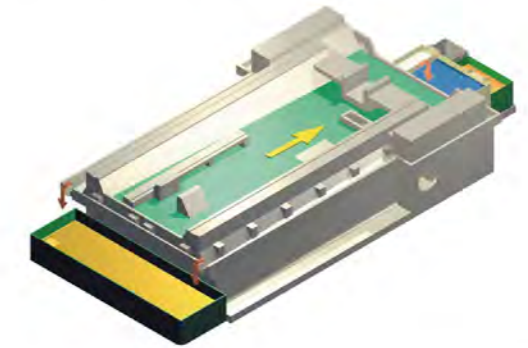
### High accuracy linear guideway design

- The line guideways on all 3- axes are high grade, providing stability for heavy cutting.
- High efficiency machining center.
- Maximum rapid traverse rate of **30** 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

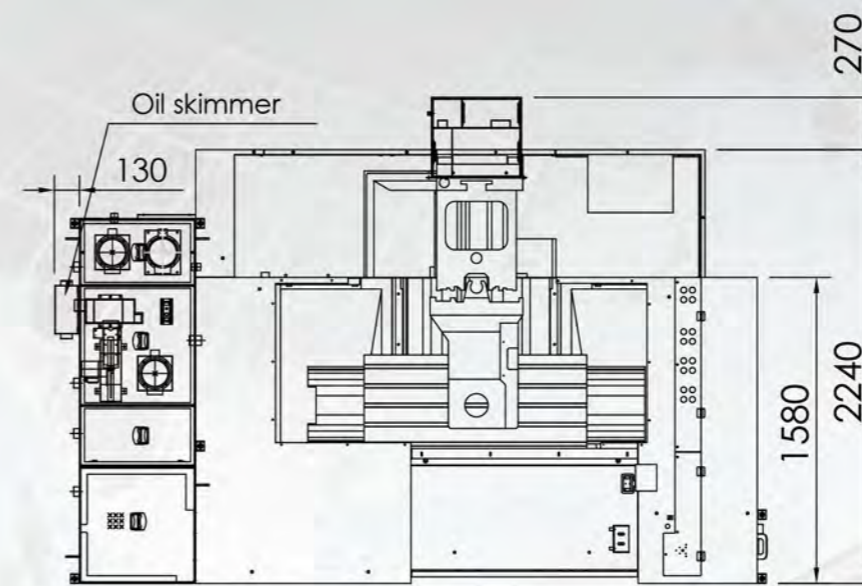
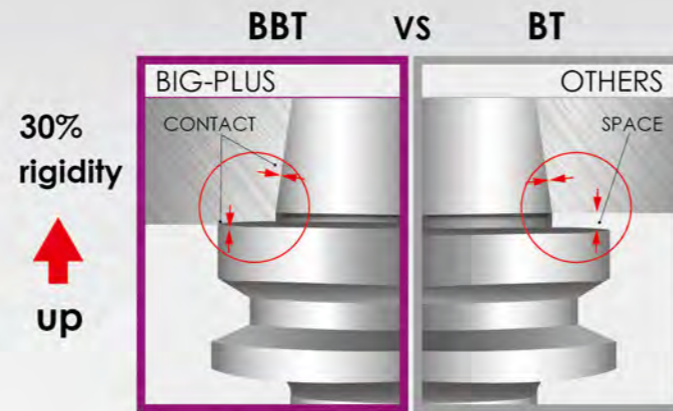
## Machine Dimensions

### Spindle type

- #40 belt - drive 8,000rpm opt. 10000 / 12000 rpm
- #40 direct-drive opt. 10,000 / 12,000 / 15,000 rpm

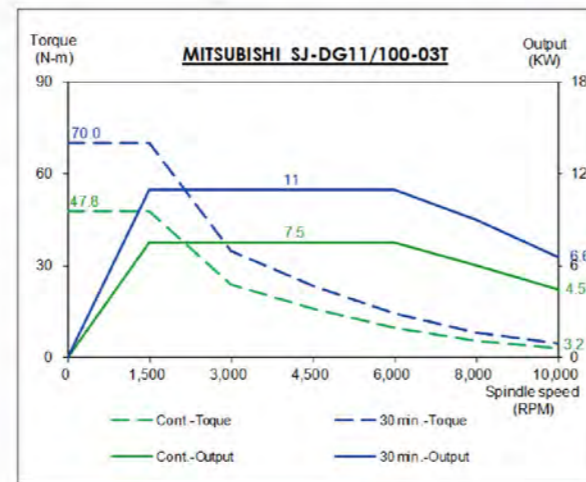
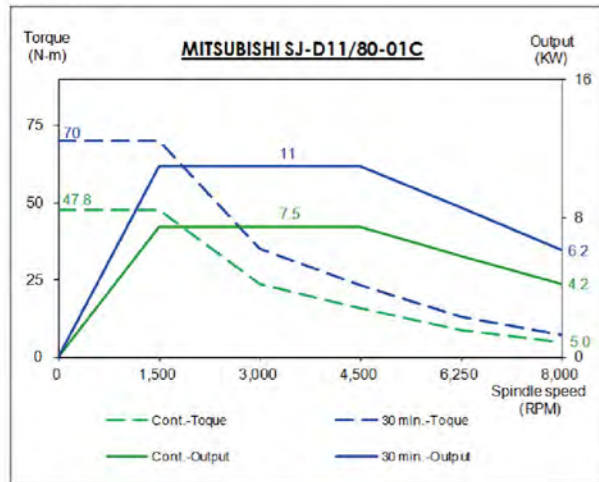
### BBT SPINDLE TYPE (OPTIONAL)

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

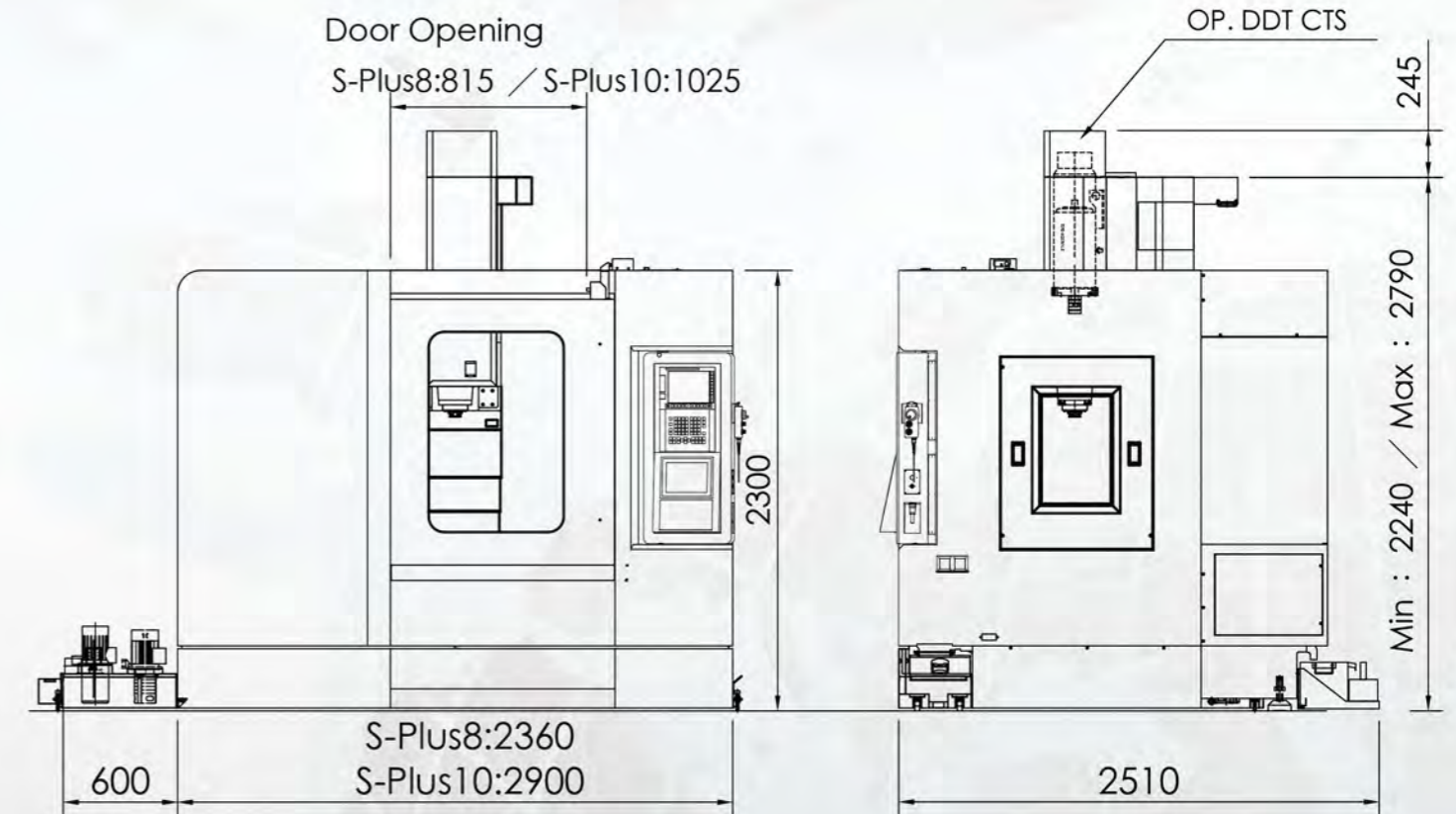
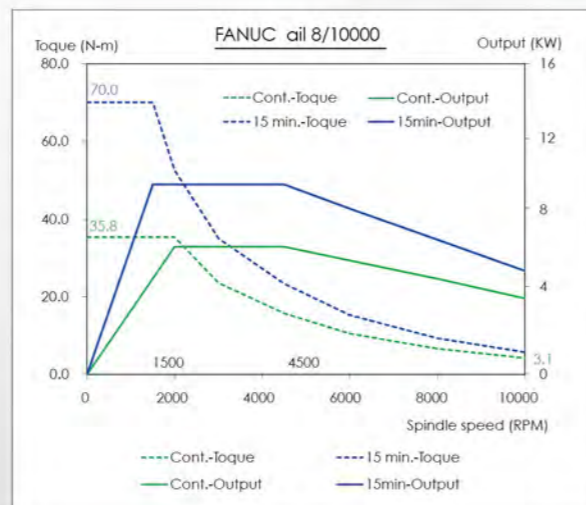
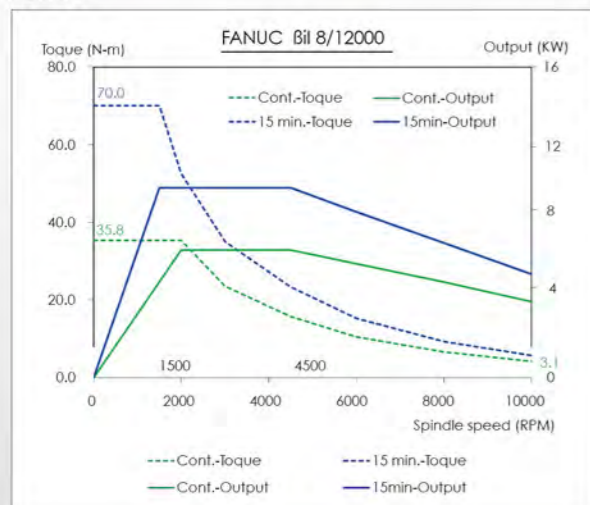


### SPINDLE TORQUE DIGRAM

#### Mitsubishi



#### Fanuc



# Machine Specifications

# Accessories

Model	S-plus 8	S-plus 10
<b>Table</b>		
Working Surface	950 x 520	1150 x 520
T-slot (Size x Number x Pitch)	18 x 5 x 100	18 x 5 x 100
Max Table Load	500	700
<b>Travel</b>		
X-axis travel	800	1020
Y-axis travel	520	520
Z-axis travel	550	550
Distance From Spindle End to Table Center	100-650 (300-850 opt.)	100-650 (300-850 opt.)
<b>Spindle</b>		
Spindle Speed (Pulley)	8000(10000 / 12000 opt.)	8000(10000 / 12000 opt.)
Spindle Speed (DDS)	10000(12000 / 15000 opt.)	10000(12000 / 15000 opt.)
Spindle Nose Tape	#40	#40
<b>Feed</b>		
Cutting feedrate (X/Y / Z Axes)	10 / 10 / 10	10 / 10 / 10
Rapid Traverse feedrate (X/Y / Z Axes)	30/30/24 (40/40/32 opt.)	30/30/24 (40/40/32 opt.)
<b>ATC</b>		
Tool Storage Capacity	A:24/30	A:24/30
Max. Tool Weight	7	7
Max. Tool Size (Diameter x Length)	A:Ø75x300L	A:Ø75x300L
Tool Shank	BT40 ( BBT / CAT / DIN)	BT40 ( BBT / CAT / DIN)
Pull Stud Bolt	P40T-1 / CAT-40 / DIN69872	P40T-1 / CAT-40 / DIN69872
<b>Motor</b>		
Spindle Drive Motor (30min/Con)	11	11
<b>Positioning Accuracy</b>		
3 axes laser positioning accuracy (JIS B6338)		
Positioning accuracy/Full travel	±0.008	±0.008
Repetitive positioning accuracy	±0.002	±0.002
3 axes laser positioning accuracy (VDI 3441)/ Repeated 5 times		
Positioning accuracy	0.010	0.010
Repetitive positioning accuracy	0.006	0.006
<b>Other</b>		
Required Air Pressure	6.5	6.5
Electric Power Consumption	15~40	15~40
Floor Space(Full Guarding)	2960 x 2510	3500 x 2510
Net Weight	4700	5000
Coolant tank(Standard)	260	285

VDI 3441 accuracy available upon order request.

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

Standard : ● Optional : ★

item	model	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