

Intelligent Machining Center

M Series Smartcenter

- Hartrol plus controller
- 5-Year warranty on guideways
- One-piece bed design
- Oversized column design

Hartrol Plus[®]
From tradition to intelligent



Website



Facebook



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Hartford

Hartrol · Smartcenter · Robocell

We manufacture intelligent machines only

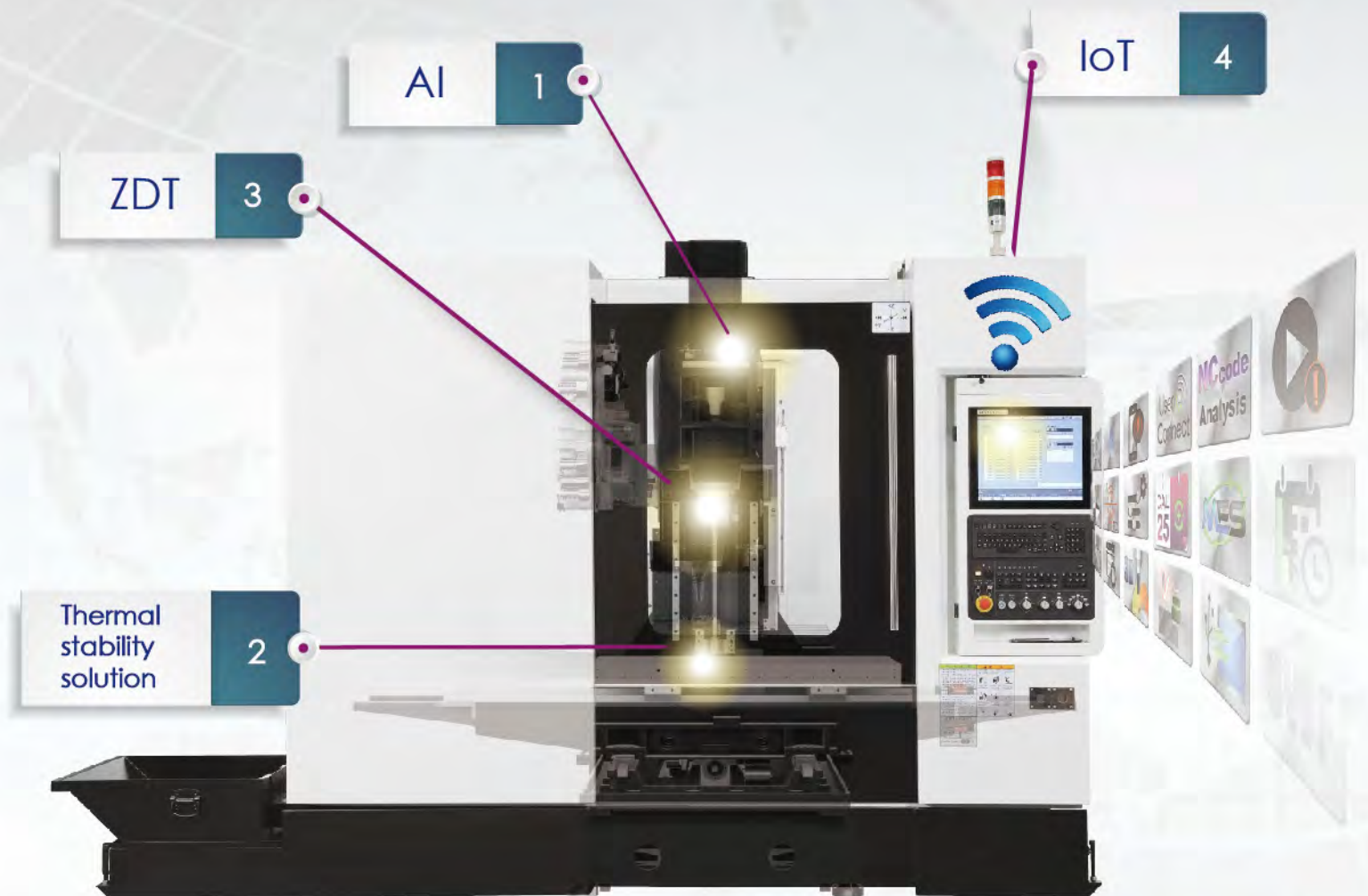
A.I. Applications inside, Hartrol Plus is the control which provides machining status with advanced features.

Imagine what future machines ought to be outlined.

AiSmartcontrol



Hartford
redefine the future



AI

- + Remote Warm-up & Turn-on
- + Hartrol Plus Sync & Update
- + User Connect



Thermal stability solution

- + Spindle Thermal Compensation
- + Casting Thermal Compensation
- + Thermal Symmetry / Thermal Balancing



ZDT

- + Diagnosis Report on Spindle Operation
- + Alarm Report System



IoT

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



Major functions
of Hartford AI
controller



Facial
Recognition
system-Face ID



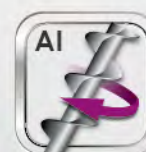
AI Environment
Thermal
Displacement
Compensation



AI Efficient
Lubrication
Management



Broken Tool
Detection
System



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

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



A most durable and stable machining center.

A perfect demonstration for machining accuracy and ability.

A valuable vertical machining center is the result of constant creative concepts and total dedication to quality. When the ambition of pursuing perfection is incorporated into the design, the result is a perfect machine. The Hartford M80 vertical machining centers are designed and built with these concepts in mind. Over the years, Hartford engineers have spent great effort designing a unique VMC that is cost-effective for our customers.



1. Honeycomb structural component



2. Mechanical part

Actual cutting tests

Model : M80
■ Spindle: 6000rpm#50 Gear type15KW ■ Cutting material : S45C



Face milling
Tool diameter Ø125 mm
Feed rate 3,600 mm/min
Cutting depth 1 mm
Cutting width 100 mm
Cutting volume 360 cc/min



End milling
Tool diameter Ø63 mm
Feed rate 3,500mm/min
Cutting depth 30 mm
Cutting width 3 mm
Cutting volume 315 cc/min



Tapping
Tool diameter M36 x 2.5 mm
Feed rate 320 mm/min
Cutting depth 36 mm



Drilling
Tool diameter Ø32 mm
Feed rate 50 mm/min
Cutting depth 50 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

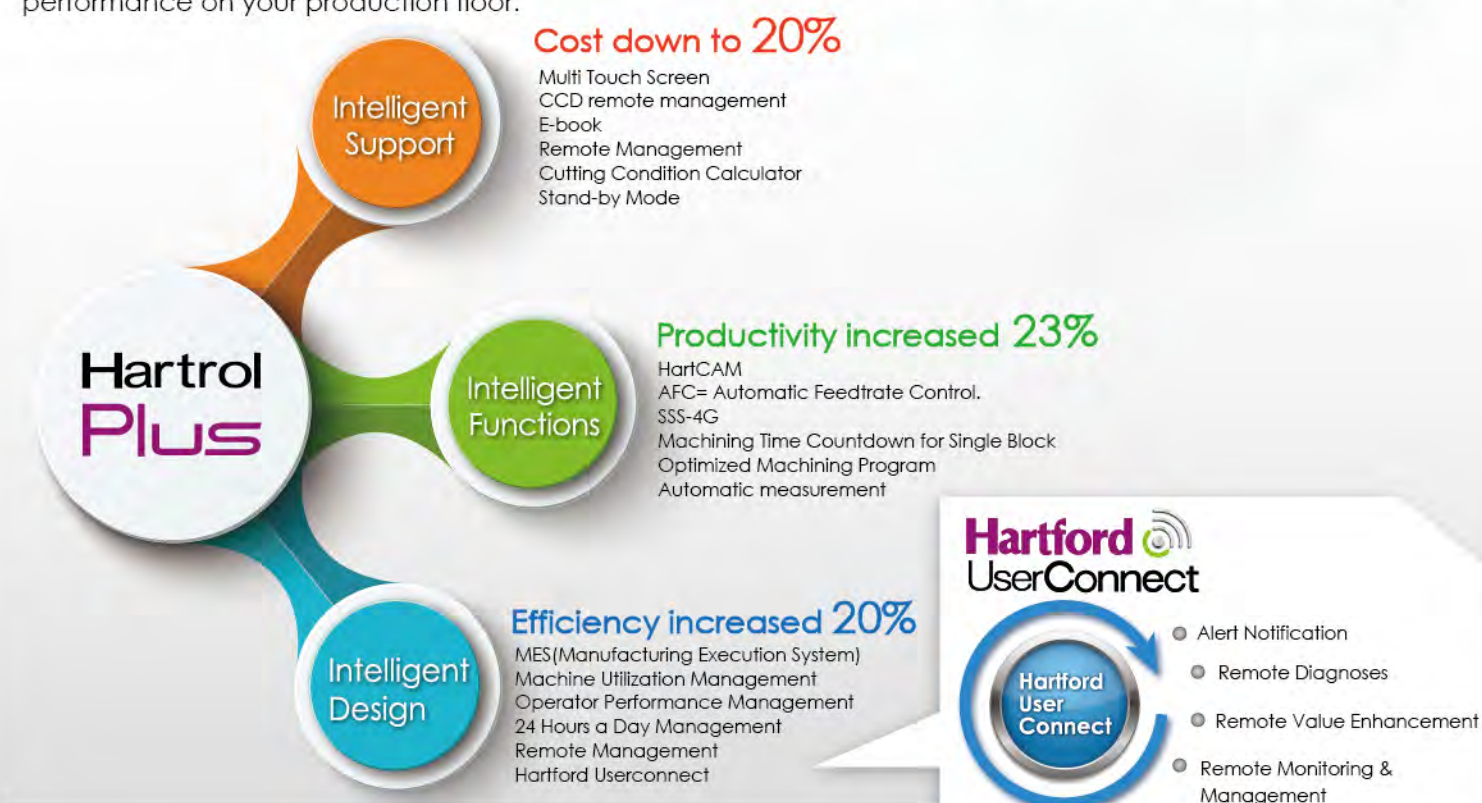
Function	Hartrol Plus P1	Others
Screen Size	19"Multi-touch Panel	10.4" (OPT:15")
Look Ahead Block	2700(G5P20000)	400(1000 Max.)
Hard Drive	32GB SSD	NO
Smoothing Interpolation	SSS 4G	Option
Industry 4.0	Hartford UserConnect	NO

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.

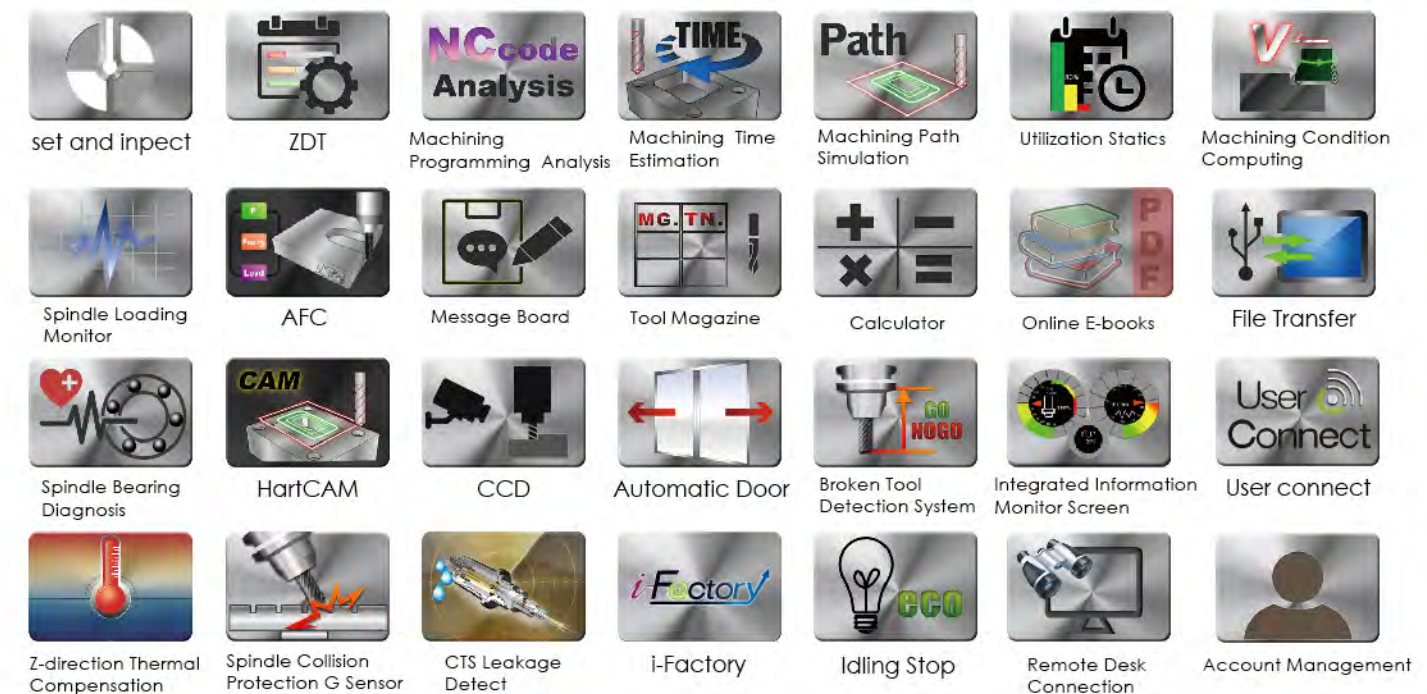


Hartford APP Store

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.

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



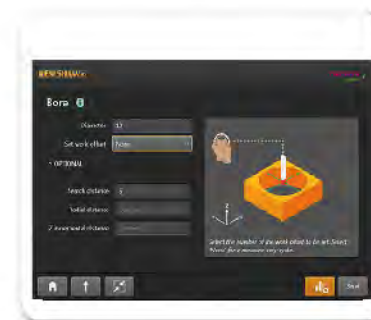
On line update

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



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.)

Highlights

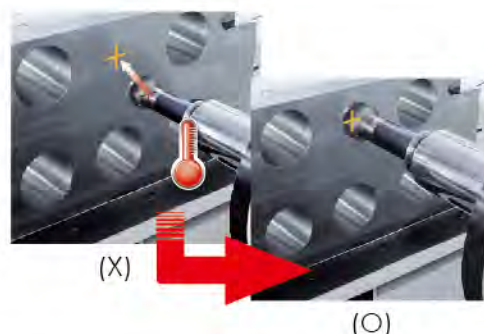
1. APP Vibration function is handy to set up manually.
2. Alert status on crash protection.
3. Responsive graphic is available for diagnosis by user, and analytic information is just-in-time served.



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



Stable support structure, lead cutting to a new level.



Unique design provided higher structural rigidity

For the processing of hard materials, the seismic resistance of the machine is a key factor affecting the accuracy and time of processing. The body structure of the M series is carefully designed and made of Mihana cast iron. With the perfect rib strengthening design inside the casting, it can completely absorb the vibration generated during processing to achieve the most delicate cutting surface



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.

High rigidity structure

Extra wide stable design

- The original width of the machine feet has been widened to 140mm.
- Delivering a much more rigid and stable platform for heavy machining.



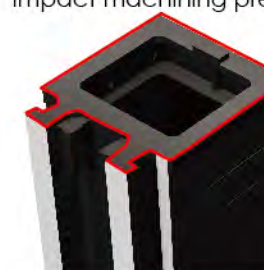
A+ structural stability

- The increased width of the interface between the column and base by adding A+ support sections.
- Enhanced stability and efficient force dissipation.



New square section resists torsion

- Higher rigidity column.
- Ensure even distribution of cutting forces.
- Enhanced resistance to torsional forces that could impact machining precision.



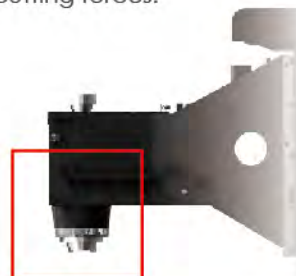
Self-made gear driven spindle head

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



One-piece design for spindle housing and casting iron

- Increases rigidity and cutting performance.
- Reducing weight to reduce acceleration stresses and increase positional accuracy.
- The structural of the head has been adjusted.
- Provide additional support for the spindle to absorb the cutting forces.



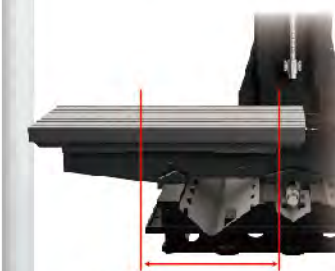
8,000 rpm Gear type spindle

- Two-step gear transmission.
- Spindle run-out : 5 micro Available for M all models.



Axis overhand

- The base has been redesigned to widen the support points on the base.
- Guarantee full support throughout the X axis traverse.
- Eliminating with overhand, especially on heavier work piece.



+35% guideway spacing on X-axis

Spindles Manufactured by Hartford OfferQuality Assurance

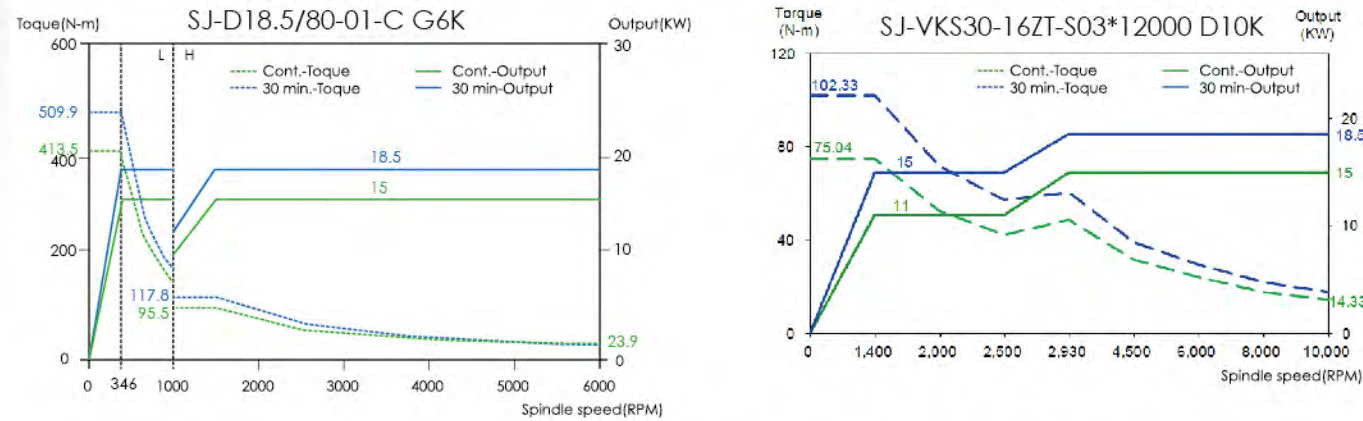
Machine Dimensions

Spindle type

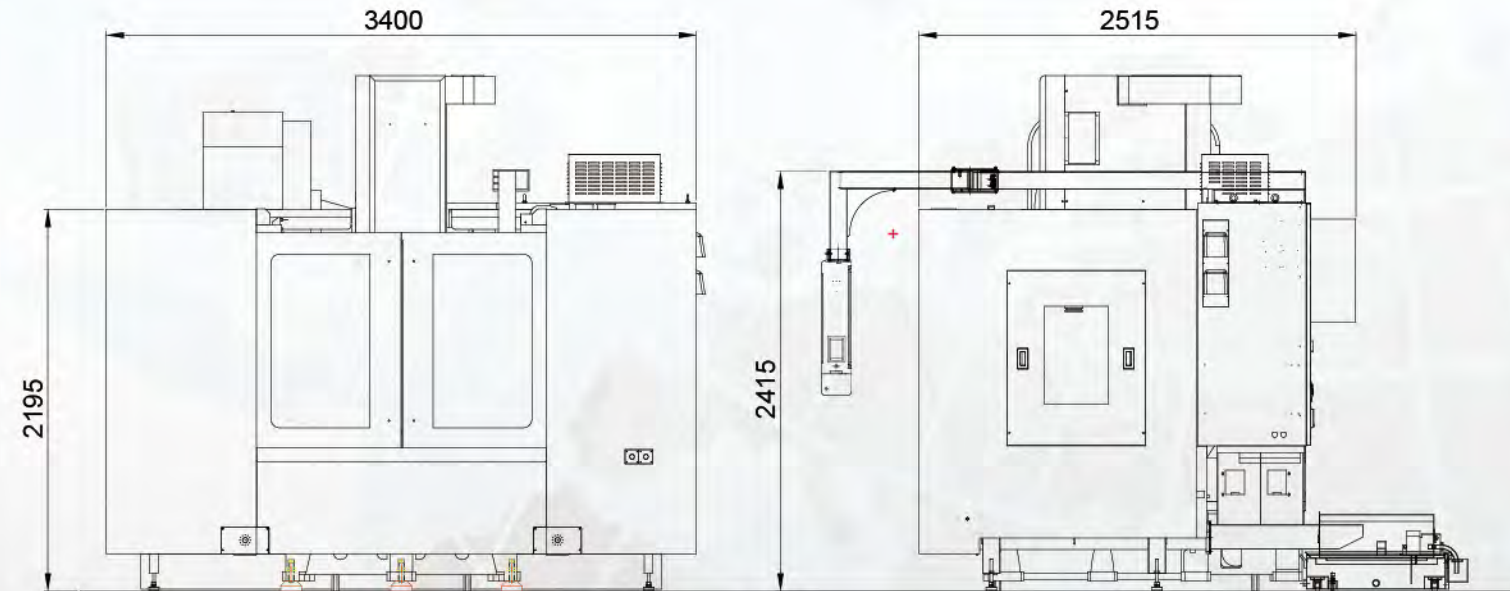
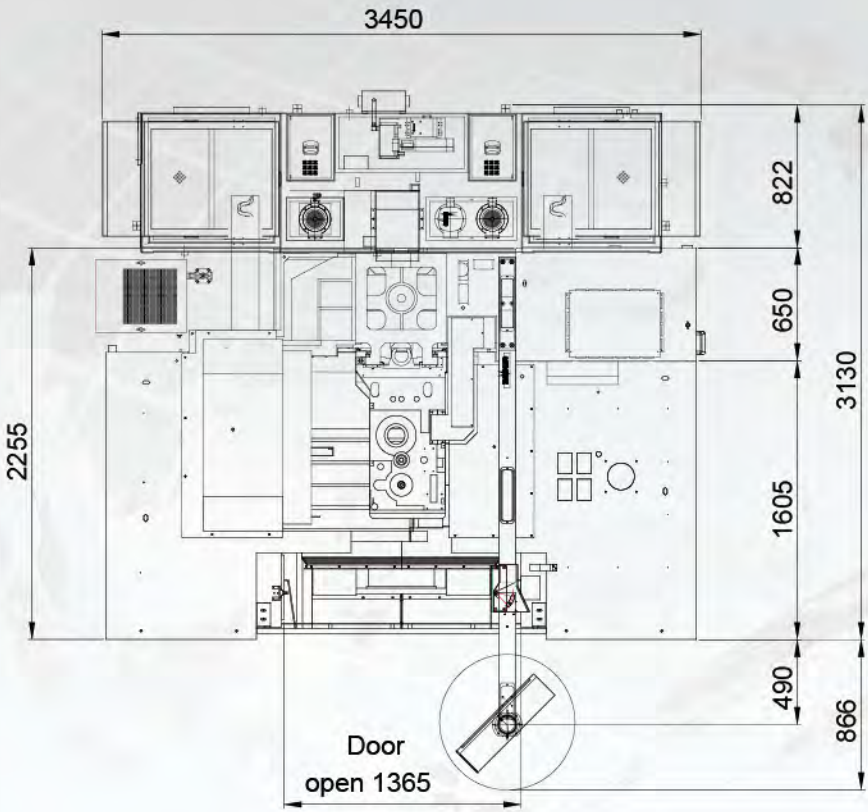
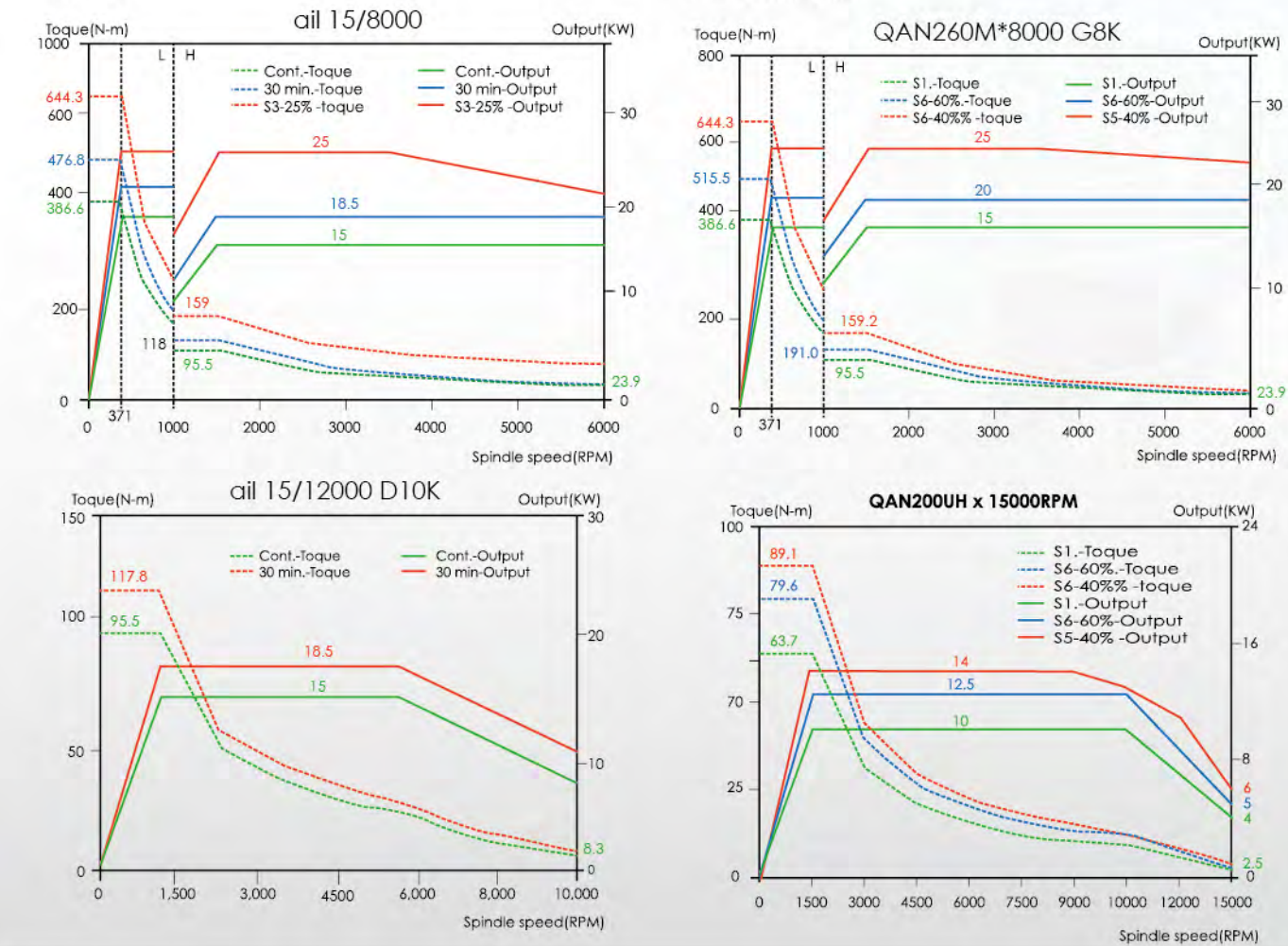
- #40 Pulley 8000 rpm
- #40 Grar 6000 rpm opt. 8000
- #40 DDS 10000rpm opt. 15000
- #50 Grar 6000 rpm opt. 8000
- #50 DDS opt. 10000

Spindle torque diagram

Mitsubishi



Fanuc



unit:mm

Specifications of the machine are subject to be modified without prior notice, please check with sales staff for detail information.

Machine Specifications

Model		unit	M80	
Table	Working Surface	mm	1400 x 650	
	T-slot (Size x Number x Pitch)	mm	18 x 5 x 130	
	Max Table Load	kg	1200	
Travel	X-axis travel	mm	1300	
	Y-axis travel	mm	650	
	Z-axis travel	mm	630	
	Distance From Spindle End to Table Center	mm	120~750	
	Distance From Spindle Center to Column	mm	695	
Spindle	Spindle Nose Tape		ISO50	
	Spindle Speed (Pulley)	rpm	#40 8000	
	Spindle Speed(Gear)	rpm	#40/50 6000(8000 opt.)	
	Spindle Speed (DDS)	rpm	#40 10000(15000) ; #50 10000	
Feed	Cutting feedrate (X/Y/ Z Axes)	m/min	12/12/12	
	Rapid Traverse feedrate (X/Y/ Z Axes)	m/min	#40 24/24/20 ; #50 24/24/18	
ATC	Tool Storage Capacity (A type)	pcs	#40 24/30/40 #50 24(32)	
	Max. Tool Weight	kg	#40 : 7 #50 : 15	
	Max. Tool Size (Diameter x Length)	mm	ø105 x 300L	
	Tool change time (A type)	sec.	#40 : 3 #50 : 4.8(T-T)	
	Tool Shank		BT40(CAT40/DIN69871/BBT40) BT50(CAT50/DIN69871/BBT50)	
Motor	Pull Stud Bolt		MAS-P40T /CAT40/DIN69872MAS-P50T/DIN69872	
	Spindle Drive Motor(30min)	Mitsubishi	11/15(15/18.5)	
		Fanuc	11/15(15/18.5)	
		Heidenhain	15/ 20	
	X/Y/Z axis drive motor	Mitsubishi	2/2/2(3.5)	
		Fanuc	3/3/3(4)	
		Heidenhain	4.5/4.5/4.5(5.1)	
Positioning Accuracy	3 axes laser positioning accuracy (JIS B6338)			
	Positioning accuracy/Full travel	mm	±0.010	
	Repetitive positioning accuracy	mm	±0.003	
	3 axes laser positioning accuracy (VDI 3441)/Repeated 5 times			
	Positioning accuracy/Full travel	mm	0.024	
Other	Required Air Pressure	kg/cm²	6.5	
	Electric Power Consumption	kVA	#40 : 20~40 #50 : 25~40	
	Floor Space(Full Guarding)	mm	3450 x 4000	
	Net Weight	kg	#40 7350 ; #50 7600	
	Coolant tank(Standard)	L	340	

Accessories

Standard : ● Optional : ★

Item	Model	M80
1.Full-Enclosed Splash Guard		●
2.Full-enclosed splash guard & top cover		★
3.Coolant system_Coolant Pump Motor, Standard 0.56 KW		●
4.Coolant system_Coolant Pump Motor, Upgrade 0.75 KW		★
5.Spray around spindle		●
6.Spindle Air Curtain		●
7.Air Blast Through Spindle		●
8.Air Blast Through Spindle		●
9.Spindle Oil Cooler HBO-250/600/C0-04		★
10.X, Y, Z axis linear scale system		★
11.Lubrication system		●
12.4th/5th axis rotary table		★
13.Fluorescent lampx1		●
14.Fluorescent lampx2		★
15.Foundation bolt, General		●
16.Foundation bolt, Concrete		★
17.Oil skimmer		★
18.Oil Mist Collector System		★
19.Two side chip of the chassis (screw type)		●
20.Link type chip conveyor & portable chip bucket		★
21.Coolant Flushing Device 1.12 KWx1EA		★
22.Coolant Flushing Device 1.12 KWx2EA		★
23.Coiling Tube Coolant gun		★
24.Hydraulic Hose Coolant gun		★
25.Air gun		★
26.Tool Package		●
27.Operation manual & electric drawing equipment		●
28.Remote manual pulse generator		●
29.Convection Heat Exchanger in Control		●
30.Auto Power off		●
31.RS232 Interface		●
32.Operator Panel, Pendent type		●
33.Auto Tool Length Measurement		★
34.Auto Work Piece Measurement		★
35.Coolant through spindle, Prepare, without Secondary Tank		★
36.Coolant Through Spindle_20BAR without Secondary Tank		★
37.Coolant Through Spindle _20BAR with Secondary Tank		★
38.Coolant Through Spindle _25BAR with Secondary Tank		★
39.X, Y, Z-axis Ball Screw Enforce Pressure		●

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)
- Special engraving 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