Hartford innovation

SUPER TORNADO
Heavy Duty
Machining Center

Website

She Hong Industrial Co., Ltd.

Headquarters
No. 6, 6th Rd., Taichung Industrial Park,
Taichung 40755, Taiwan
TEL: + 886-4-2359-2747
FAX: + 886-4-2358-1793
www.machiningcenter.com.tw

EU Technical Center
Prague, Czech Republic

Distribution Center
Saint - Etienne, France / Istanbul, Turkey / Bangkok, Thailand
Caxias Do Sul, Brazil / Buenos Aires, Argentina

Sales & Service Center
Korea - Seoul, Busan, Daegu
China - Dongguan, Xiamen, Wuxi, Chongqing, Xian
Taiwan - Taipei, Hsinshu, Taichung, Kaohsiung

2015.06/1000 E01

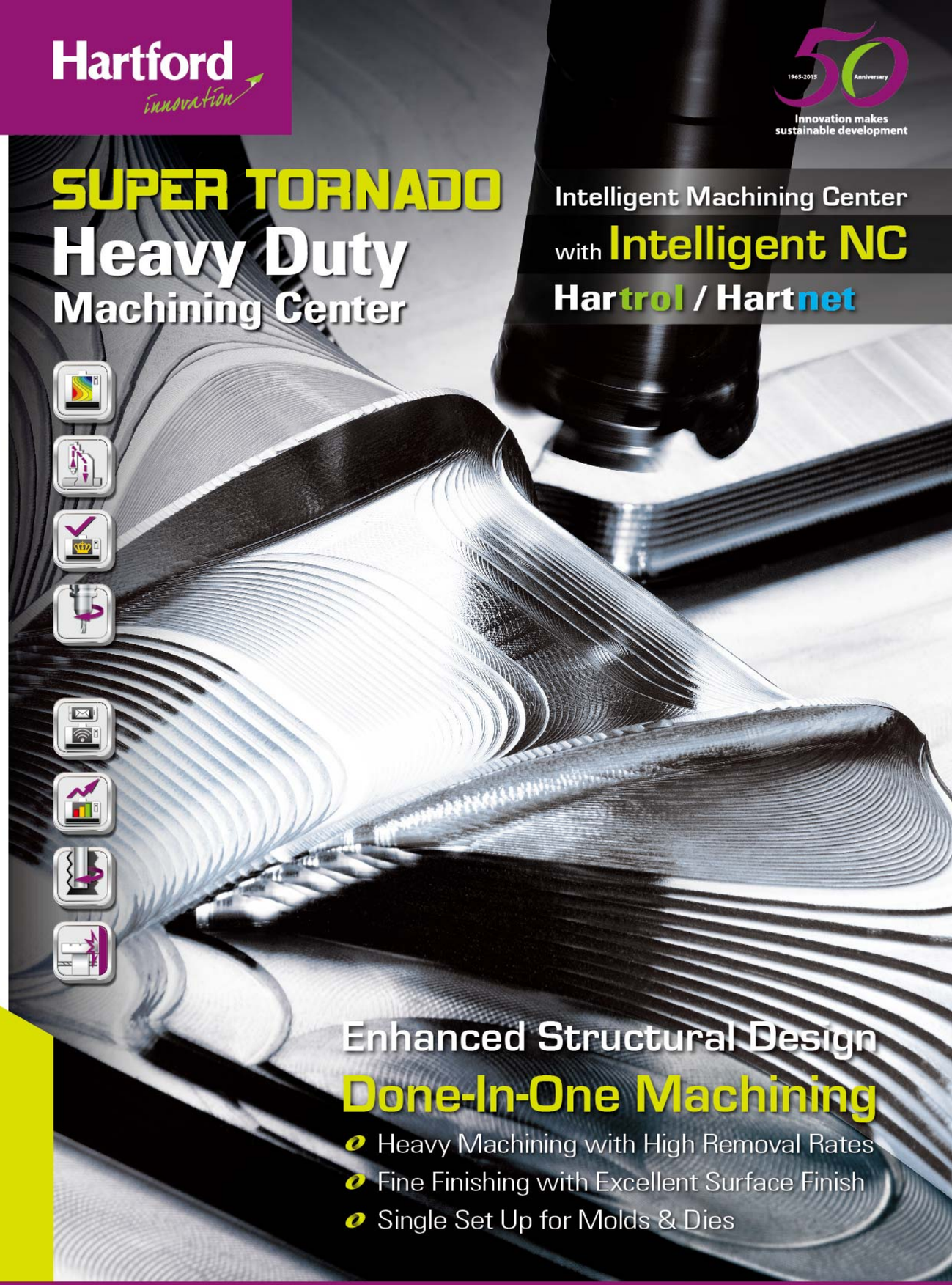
Visual Design/ SJ www.sjcorp.com.tw

Hartford innovation

1965-2015 50 Anniversary
Innovation makes sustainable development

SUPER TORNADO
Heavy Duty
Machining Center

Intelligent Machining Center
with Intelligent NC
Hartrol / Hartnet



Enhanced Structural Design
Done-In-One Machining

- Heavy Machining with High Removal Rates
- Fine Finishing with Excellent Surface Finish
- Single Set Up for Molds & Dies

Power & Versatility

Index

Unlimited Cutting from Hartford

The New Super Tornado from Hartford delivers massive cutting versatility to your workshop. Whether you need heavy cutting or fine finishing the incredible structural stability and cutting performance of the Super Tornado series of machines will exceed you expectations.

Radically new structural design components and high performance spindle options come together to deliver the ultimate cutting experience that will deliver the versatility and competitive edge you need.

Video

SUPER TORNADO
Heavy Duty Machining Center

SUPER TORNADO

Slash
Your Cycle Times

Endmill

Tool Diameter	Ø63mm (2.48")
Feed Rate	1600mm/min (62.99"/min)
Depth	40mm (1.57")
Width	10mm (0.39")

640 c.c.
Cutting Volume

Tapping

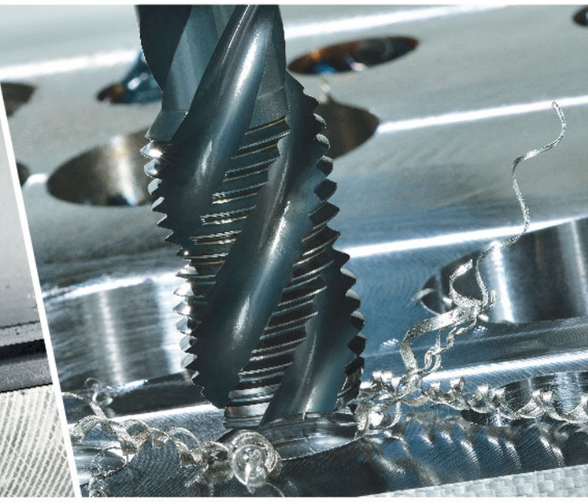
Feed Rate	315mm/min (12.4"/min)
Depth	50mm (1.97")

Ø42 mm (Ø1.65")
Tool Diameter

Facemill

Tool Diameter	Ø125mm (Ø4.92")
Feed Rate	1900mm/min (74.8"/min)
Depth	5mm (0.2")
Width	100mm (3.94")

950 c.c.
Cutting Volume



Your Key Benefits

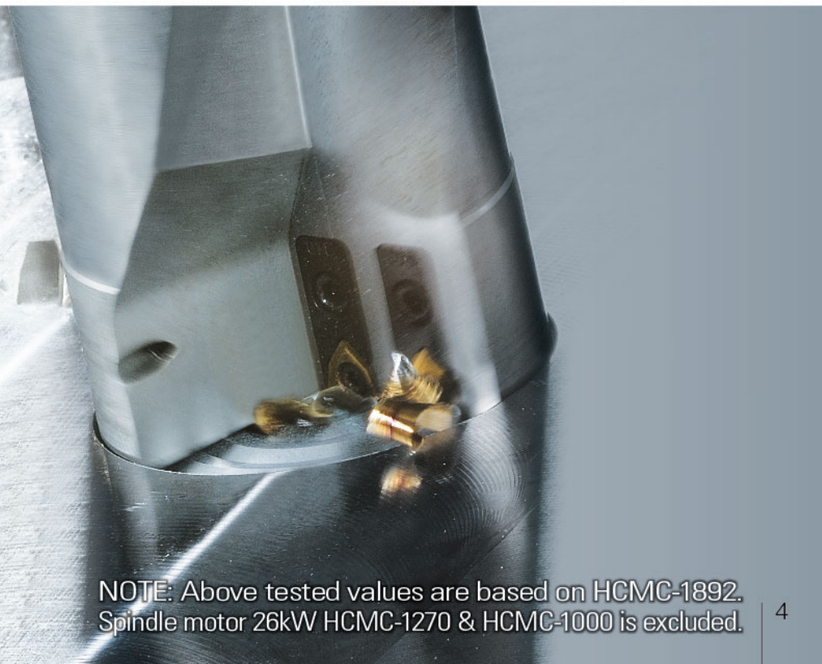
- ☑ **Expanded Working Area - Larger Work Pieces**
- ☑ **Reduced Cycle Times - Heavier Cutting**
- ☑ **Versatility - Heavy Cutting to Fine Finishing**

The new Super Tornado drastically reduces your cycle times and increases your working range with our expanded working area. The new structural design delivers exceptional cutting performance with enhanced surface finish, whether you are heavy cutting or fine finishing.

Drilling

Feed Rate	130mm/min (5.12"/min)
Depth	50mm (1.97")

Ø76 mm (Ø2.99")
Tool Diameter



NOTE: Above tested values are based on HCMC-1892.
Spindle motor 26kW HCMC-1270 & HCMC-1000 is excluded.

All the test results featured in this catalog were produced under strict testing conditions in a specialized testing environment.
Under different testing conditions and in less than ideal testing environments, the test results may vary from those shown in this catalog.

Versatile Machining
for Industry

Mold & Die Automotive

The Super Tornado offers incredible versatility for your workshop, combining High efficiency material removal for large workpieces to super fine finishing on small automotive components. The Super Tornado covers a huge range of requirements delivering excellent surface finish and the very latest operational features backed by the Hartford brand.

Material: S45C

Size: 500 x 300 x 250mm

Automotive Engine Cover Mold

Special Features: Low Vibration Machining, High Rigidity, Smooth Machining, Hard Material Cutting, Curved Surface Smoothness Ra

Material: S45C

Size: 100 x 100 x 50mm

Honeycomb Structural Component

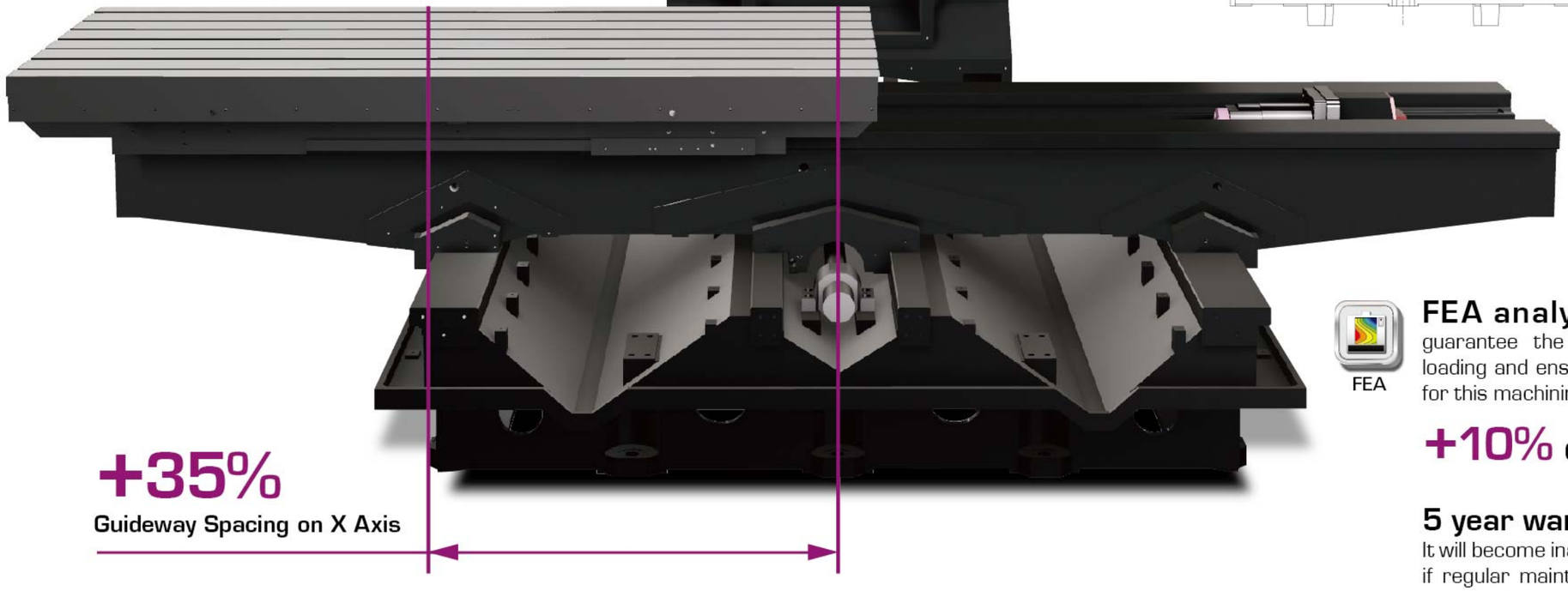
Special Features: High Efficiency Machining, Cycloid Cutting, Max. Flute Machining

Maximum Support

Zero Overhang Design for Optimum Stability

Structure

Vibration damping is key to machining hard materials whilst maintaining the tolerances and cycle times that you need. The Super Tornado structure is specially designed cast iron (meehanite), that is heavily ribbed and reinforced to absorb those vibrations and maintain the surface finish you need.

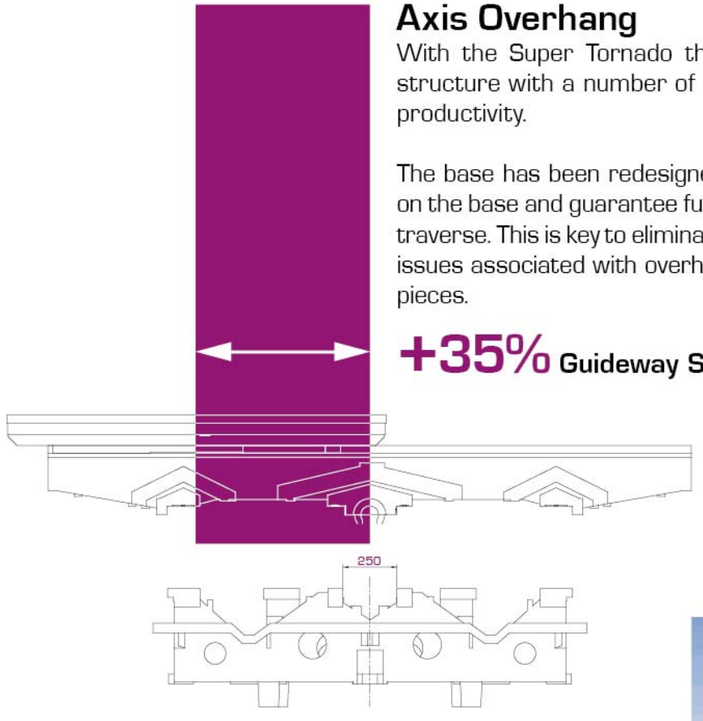


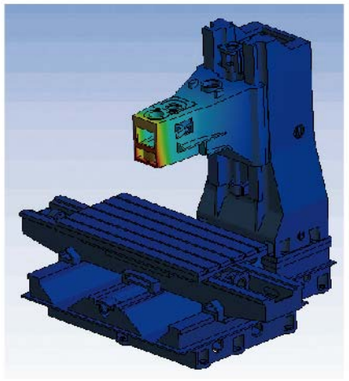
Axis Overhang

With the Super Tornado there is a radically redesigned structure with a number of new features to enhance your productivity.

The base has been redesigned to widen the support points on the base and guarantee full support throughout the X axis traverse. This is key to eliminating the vibration and deflection issues associated with overhang, especially on heavier work pieces.

+35% Guideway Spacing on X Axis





FEA

FEA analysis of the structural design helps to guarantee the machines performance under extreme loading and ensures the excellence of the Hartford design for this machining center.

+10% Overall Rigidity

5 year warranty-box guideway

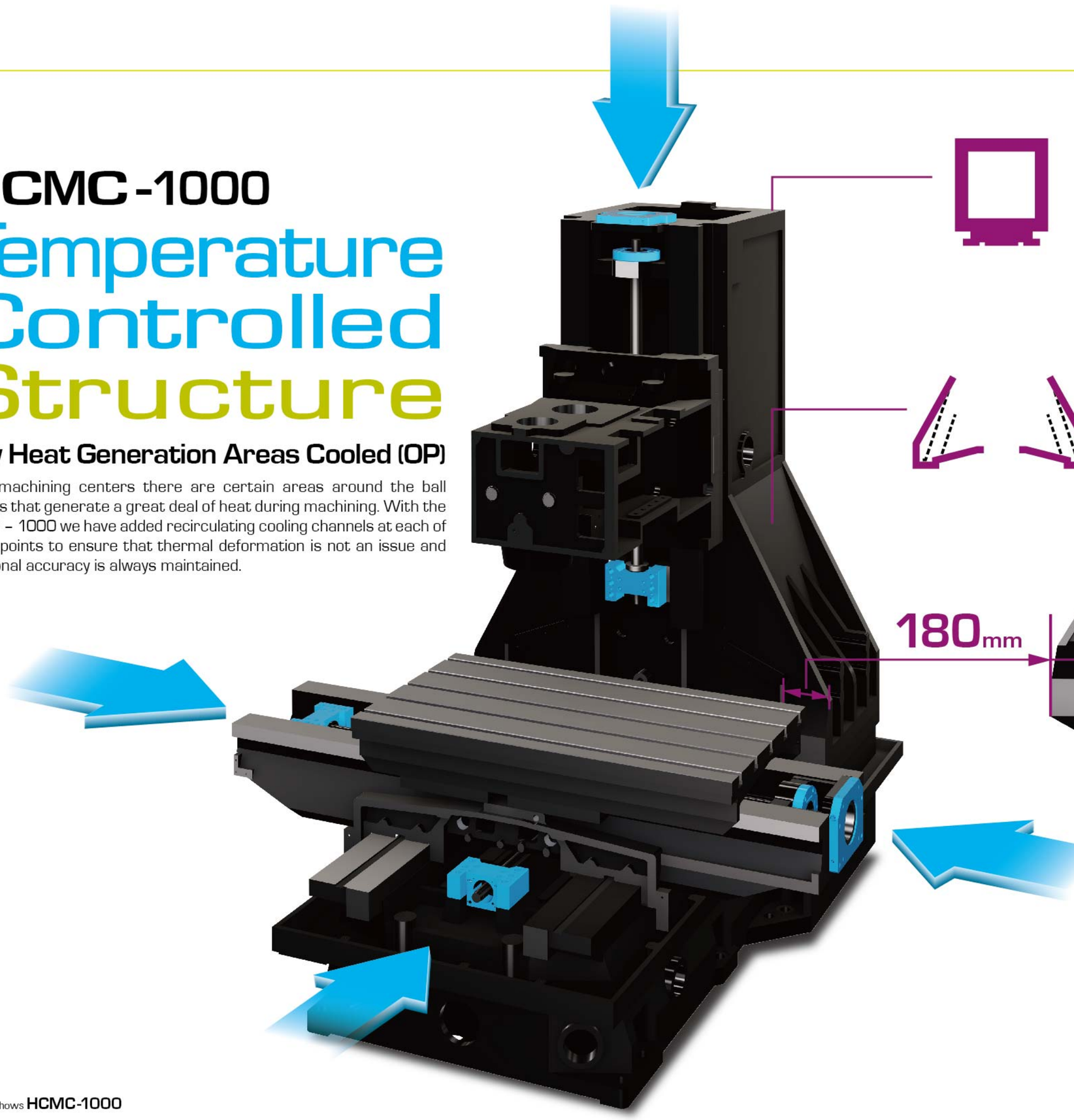
It will become inactive incase of incorrect operational use or if regular maintenance and procedures are not followed, causing damage on guideway.

HCMC-1000

Temperature Controlled Structure

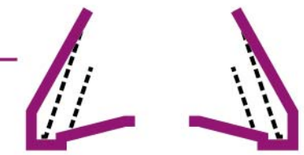
Key Heat Generation Areas Cooled (OP)

In all machining centers there are certain areas around the ball screws that generate a great deal of heat during machining. With the HCMC – 1000 we have added recirculating cooling channels at each of these points to ensure that thermal deformation is not an issue and positional accuracy is always maintained.



High Rigidity Column
New Square Section Resists Torsion

The new vertical column design for the HCMC-1000 uses a square section from top to bottom to ensure even distribution of cutting forces and enhanced resistance to torsional forces that could impact machining precision.

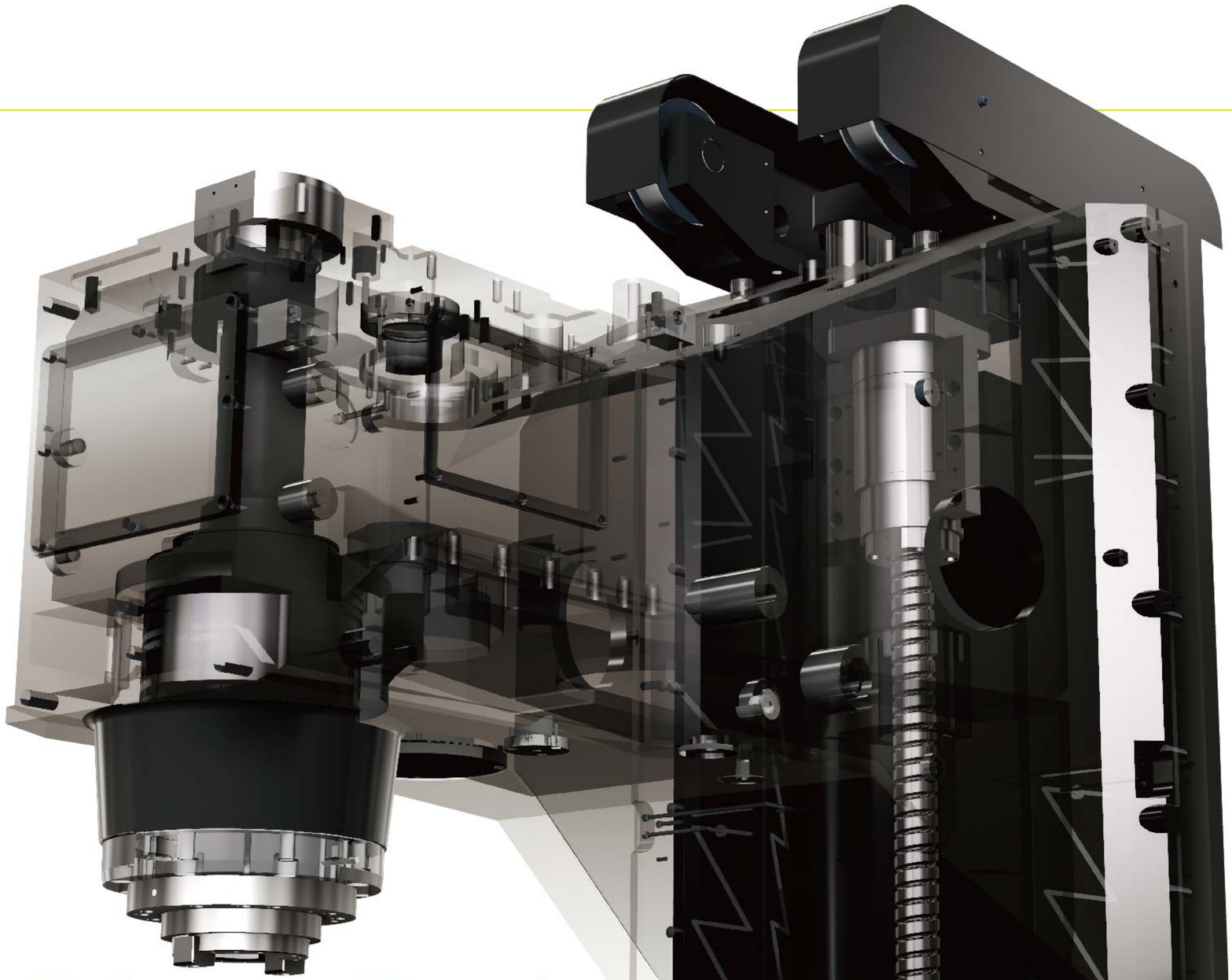


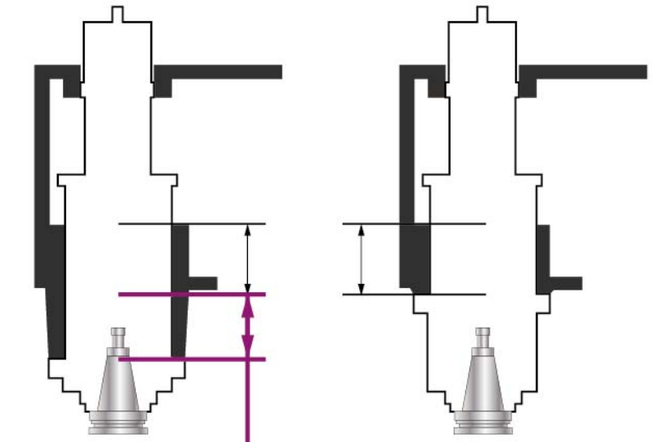
A + Structure Stability
Wider Column Base Interface

We have increased the width of the interface between the column and the base by adding our A + support sections. These deliver a wider footprint for enhanced stability and efficient force dissipation.

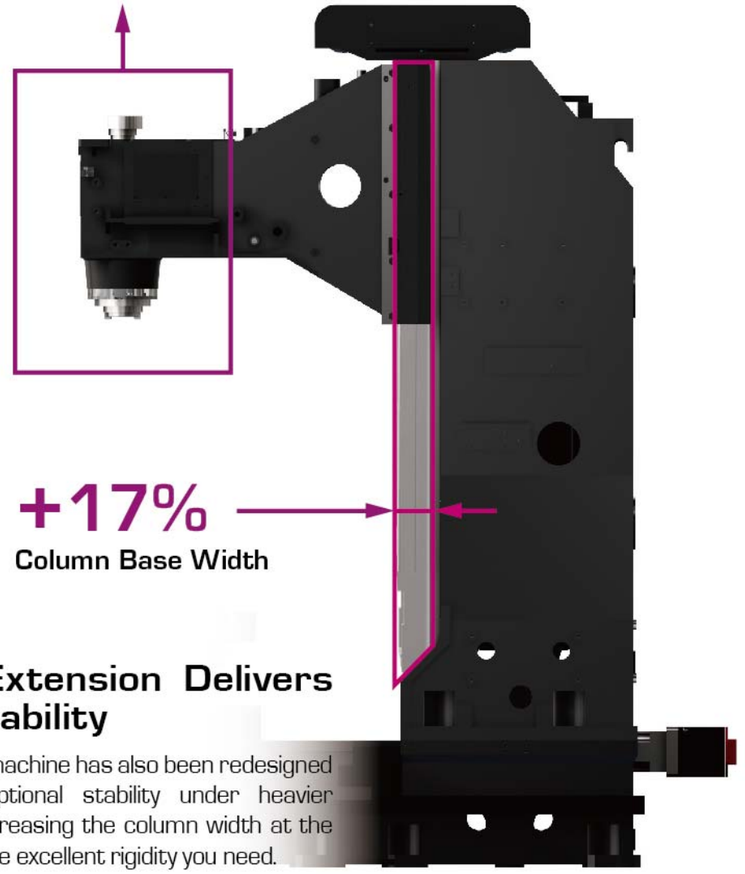
Extra Wide Stable Design
Machine Base Feet Widened

The original width of the machine feet has been widened to **180mm** now delivering a much more rigid and stable platform for heavy machining.





+59%
Spindle Holding



+17%
Column Base Width

Solid as a Rock

New Structural Design for Performance

New High Performance Head Design

The newly redesigned head on the Super Tornado series machines increases rigidity and cutting performance whilst reducing weight to reduce acceleration stresses and increase positional accuracy.

The structure of the head has been adjusted to provide additional support for the spindle to absorb the cutting forces exerted without experiencing deflection issues.

CSD

Column Extension Delivers Higher Stability

The base of the machine has also been redesigned to deliver exceptional stability under heavier cutting loads, increasing the column width at the base to deliver the excellent rigidity you need.

Patented No. **M438937** Optimized design for column fastening to base.

The picture shows **HCMC-1892**

Power Your Productivity

Hartford Spindles Maximize Cutting Efficiency

ISO 1101 Geometric Tolerance Measurement

Excellent performance with minimum run out and great torque at lower speeds is essential for your workshop to deliver the best quality parts to your customers.

For the Super Tornado, the specially designed and assembled Hartford spindle uses the very best FAG bearings to deliver a run out of 0.010mm per 300mm. If you couple this with the G0.4 class dynamic balance test, this is a highly versatile spindle that can deliver the goods whether you are heavy cutting or fine finishing.

G0.4 Dynamic Balance

0.010mm/300mm Spindle Run Out

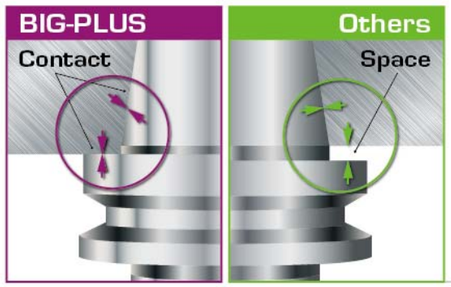
100% German FAG Bearings

Spindles

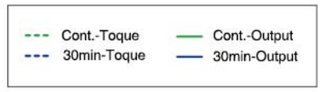
The Hartford Difference

All of our spindles are assembled in house by our expert technicians from the best raw materials in our temperature controlled facilities. We also carry out thorough testing including dynamic balance and thermal deformation tests to guarantee that each spindle performs perfectly for our customers.

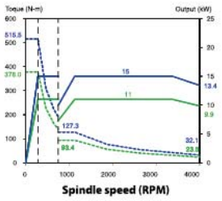
+30%
Rigidity
(BBT Optional)



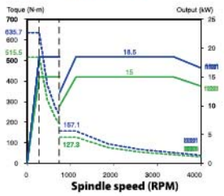
Mitsubishi



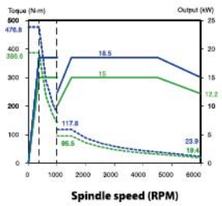
SJ-V15-01ZT*8000



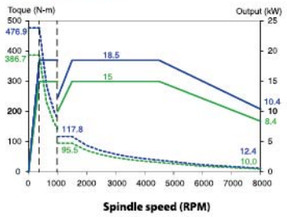
SJ-V18.5-01ZT*8000



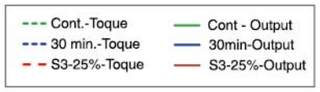
SJ-V18.5-01ZT*8000



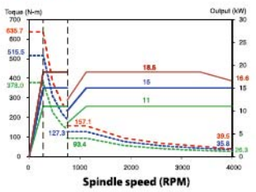
SJ-V18.5-01ZT*8000



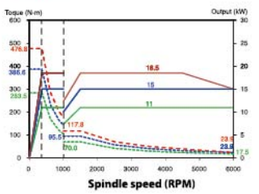
Fanuc



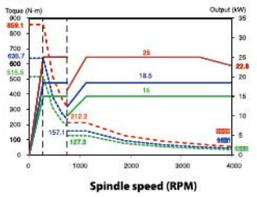
ail 12/7000



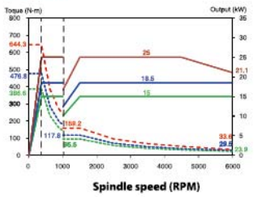
ail 12/7000



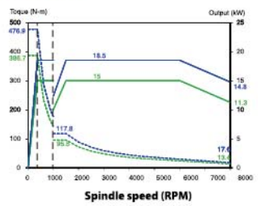
ail 15/7000



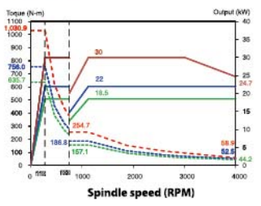
ail 15/7000



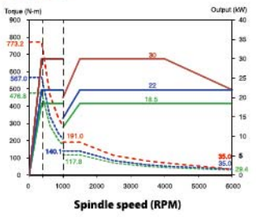
ail 15/10000



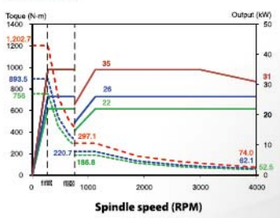
ail 18/7000



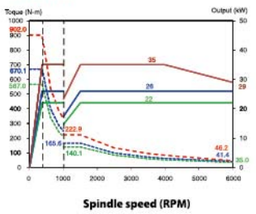
ail 18/7000



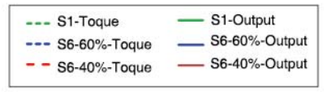
ail 22/7000



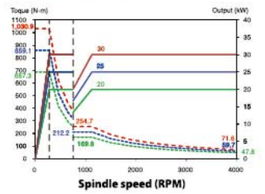
ail 22/7000



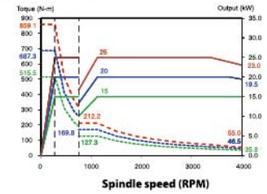
Heidenhain



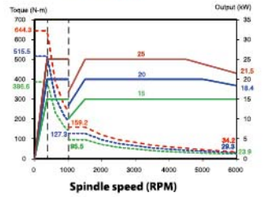
QAN260L*8000RPM



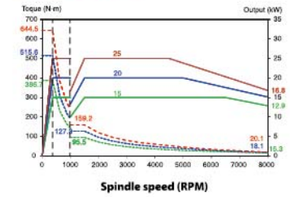
QAN260M*8000RPM



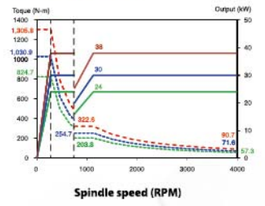
QAN260M*8000RPM



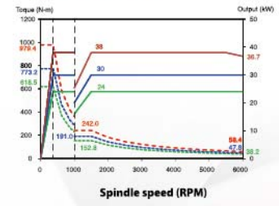
QAN260M*8000RPM



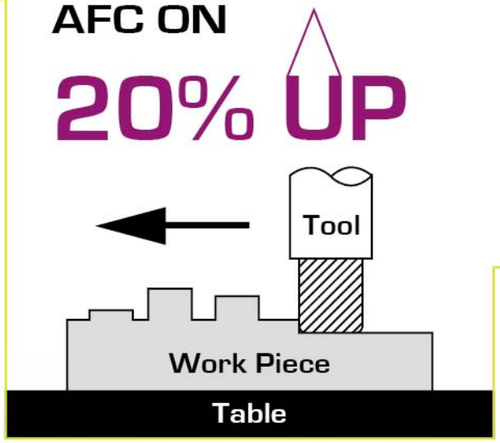
QAN260U*8000RPM



QAN260U*8000RPM



Unique
Hartford Features
Added Value
of Super Tornado



AFC Automatic Feed Rate Control

PLC Monitors spindle electric current to adjust the feed rate automatically.

- Increase cutting efficiency **20%** while heavy cutting
- Increase productivity.
- Increase the cutting versatility of your machine tools.

APS Advanced Programming Support

2.5D CAM with graphic conversation operation.

- Provides common patterns such as face milling, hole machining & more.
- From graphic conversation chart, the function can create NC CODE, Machining Procedure Simulation, Machining after saving & more.
- Operator can create and manage the NC CODE.
- No need for expert operators to adjust machining priorities.

MTM Machining Time Management

- Records operation conditions such as execution, stand-by, and alarm and stop by chart automatically.
- You can check the daily operation conditions chart to see whether there are any areas for improvement.
- Operational efficiency can be improved at **least 5%** (But it also depends on what kind of work piece you use).
- Data is **100% correct** and there is no need to hire one more person to record all data.

Added Value

Dual Screen Delivers Customizable Functions

Make sure you get the most from our Hartford machine with our dual screen customizable icons. Our added functions enhance your machine and your productivity. Functions can easily be added or removed for each customer, maintaining a clear interface for your operators.

Safety Features
CCD (OP)
Using CCD to monitor the machining operation avoids operators being to open tempted the doors while machining.

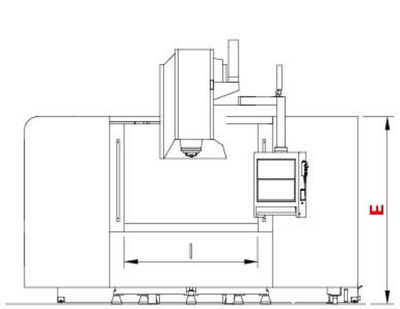
Automation
Utilization Management
Automatically records the machine state. After data collection this data be can used for management analysis.

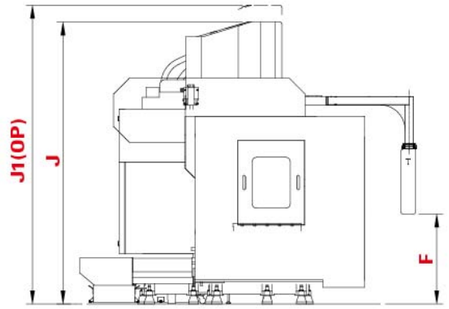
Easy Operation
HartCAM
2.5D CAM Graphic Operational Interface allows easy production of machining cycle programs.

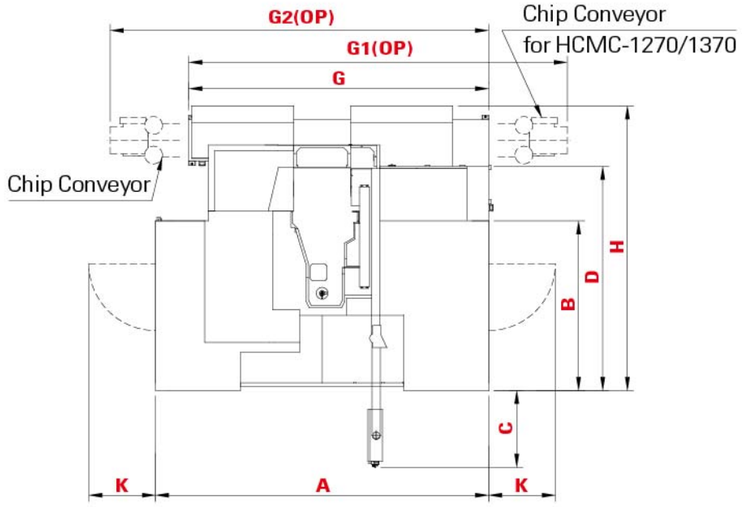
Highly Scalable
Virtual Button
It's capable to add / remove virtual button on dual screen, and it will be adjustable to different status by operator.

Rapid Fault Diagnosis
Remote Connection
Using a remote connection to the dual screen interface it is possible to analyze the machining program and parameters to rapidly diagnose issues and respond to customers.

Machine Dimensions

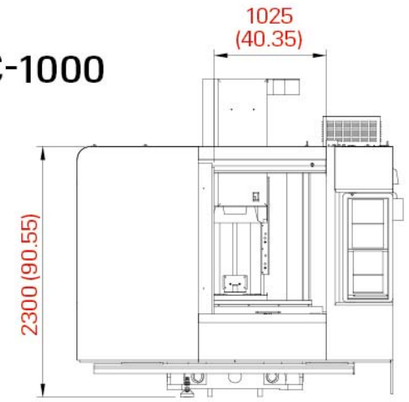


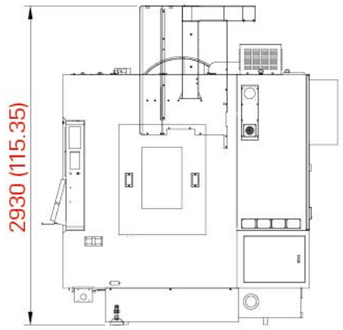


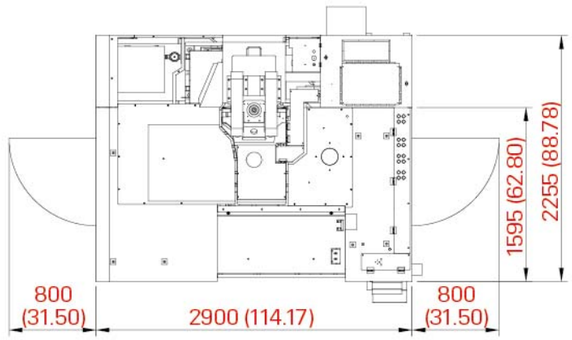


Model	Unit	A	B	C	D	E	F	G	(OP) G1	(OP) G2	H	I	J	(OP) J1	K
HCMC-1270 (#40)	mm	3300	1655	830	2265	2210	1080	3450	4360	–	3060	1350	3000	3200	800
HCMC-1270 (#50)		3300	1655	830	2265	2210	1080	3450	4360	–	3060	1350	3300	3500	800
HCMC-1370		3300	1609	925	2265	2340	1080	3450	4243	–	3215	1300	3425	3625	800
HCMC-1682		4000	2037	921	2692	2340	1080	3600	–	4437	3417	1613	3380	3590	800
HCMC-2082		5000	2037	921	2692	2340	1080	3600	–	4437	3417	2160	3380	3590	800
HCMC-1692		4000	2244	702	2899	2372	1080	3600	–	4437	3609	1640	3620	3820	800
HCMC-1892		4500	2244	702	2899	2372	1600	3600	–	4437	3609	1840	3620	3820	800
HCMC-2110		5000	2503	942	3158	2425	1080	3700	–	4720	4009	2100	3625	3825	1000
HCMC-3110		7400	2503	942	3158	2361	1080	5370	–	6370	4009	3100	3625	3825	1000
HCMC-1270 (#40)	inch	129.92	65.16	32.68	89.17	87.01	42.52	135.83	171.65	_	120.47	53.15	118.11	125.98	31.50
HCMC-1270 (#50)		129.92	65.16	32.68	89.17	87.01	42.52	135.83	171.65	_	120.47	53.15	129.92	137.80	31.50
HCMC-1370		129.92	63.35	36.42	89.17	92.13	42.52	135.83	167.05	_	126.57	51.18	134.84	142.72	31.50
HCMC-1682		157.48	80.20	36.26	105.98	92.13	42.52	141.73	_	174.69	134.53	63.50	133.07	141.34	31.50
HCMC-2082		196.85	80.20	36.26	105.98	92.13	42.52	141.73	_	174.69	134.53	85.04	133.07	141.34	31.50
HCMC-1692		157.48	88.35	27.64	114.13	93.39	42.52	141.73	_	174.69	142.09	64.57	142.52	150.39	31.50
HCMC-1892		177.17	88.35	27.64	114.13	93.39	62.99	141.73	_	174.69	142.09	72.44	142.52	150.39	31.50
HCMC-2110		196.85	98.54	37.09	124.33	95.47	42.52	145.67	_	185.83	157.83	82.68	142.72	150.59	39.37
HCMC-3110		291.34	98.54	37.09	124.33	92.95	42.52	211.42	_	250.79	157.83	122.05	142.72	150.59	39.37

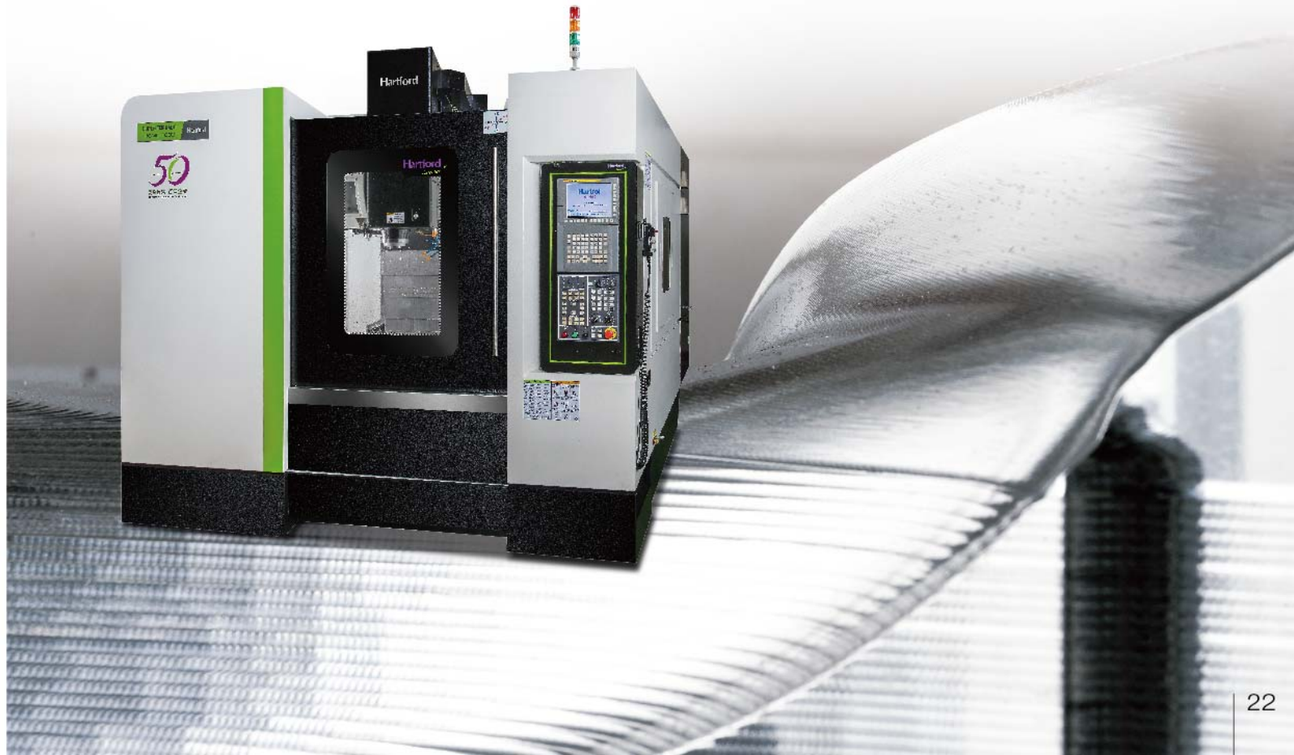
HCMC-1000







Unit: mm (inch)



Specifications of the machine are subject to be modified without prior notice. (Please check sales for detail dimension.)

Machine Specifications (Metric)

Model	Unit	HCMC-1000	HCMC-1270	HCMC-1370	HCMC-1682	HCMC-2082	HCMC-1692	HCMC-1892	HCMC-2110	HCMC-3110
Table										
Working Suface	mm	1150 x 600	1370 x 650	1450 x 700	1750 x 820	2150 x 820	1750 x 920	1950 x 920	2250 x 1020	3250 x 1020
T-slot (Size x Number x Pitch)	mm	18 x 5 x 120	18 x 5 x 130	18 x 5 x 130	18 x 5 x 150	18 x 5 x 150	20 x 7 x 125	20 x 7 x 125	20 x 7 x 150	20 x 7 x 150
Max Table Load	kg	1000	1200	1500	2200	2600	2500	3000	3000	4000
Travel										
Longitudinal Travel (X-axis)	mm	1000	1270	1300	1600	2060	1600	1800	2100	3100
Gross Travel (Y-axis)	mm	600	650	700	820	820	920	920	1020	1020
Vertical Travel (Z-axis)	mm	630	630	660	660 820 (OP)	660 820 (OP)	820	820	820	820
Distance From Spindle End to Table Center	mm	100~730	120 ~ 750	120 ~ 780	150 ~ 810 200 ~ 1020 (OP)	150 ~ 810 200 ~ 1020 (OP)	200 ~ 1020 400 ~ 1220 (OP)	200 ~ 1020 400 ~ 1220 (OP)	200 ~ 1020	200 ~ 1020
Distance From Spindle Center to Column	mm	645	695	745	865	865	965	965	1080	1080
Spindle										
Spindle Nose Taper	mm	#40	#40, #50	#50	#50	#50	#50	#50	#50	#50
Spindle Speed	rpm	Pulley: 8000 (10000/12000) Gear 6000 (8000)	#40 Pulley 8000 (10000/12000) Gear 6000 (8000) DDS 10000 (15000) #50 Gear 6000 (8000) DDS 10000	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000(6000/8000) (DDS 10000/12000)
Feed										
Cutting Feedrate	M / min	12	12	12	12	12	10	10	10	7
Rapid Traverse (X, Y, Z Axes)	M / min	24 / 24 / 20	#40 24 / 24 / 20 #50 24 / 24 / 18	24 / 24 / 20	20 / 20 / 18	18 / 18 / 18	20 / 18 / 18	18 / 18 / 18	15 / 15 / 15	15 / 15 / 15
ATC										
Tool Storage Capacity	pcs	S:16, A:24	#40 S: 16, A: 24 (30 / 40) #50 A: 24 (32)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)
Max. Tool Weight	kg	7	#40 7 #50 15	20	20	20	20	20	20	20
Max. Tool Size (Diameter x Length)	mm	S: Ø90 x 250L A: Ø75 x 300L	#40 S: Ø90 x 250L A: Ø75 x 300L #50 A: Ø105 x 350L	Ø125 x 350L	Ø125 x 350L	Ø125 x 350L	Ø125 x 350L	Ø125 x 350L	Ø125 x 350L	Ø125 x 350L
Tool Shank		BT-40(CAT40/DIN69871/	BT-40(CAT40/DIN69871/ BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)
Pull Stud Bolt		BBT40 not for #40 G8K) P40T-1/CAT40/DIN69872	BBT40 not for #40 G8K) P40T-1/CAT40/DIN69872 P50T-1/CAT50/DIN69872	P50T-1/CAT50/DIN69872	P50T-1/CAT50/DIN69872	P50T-1 / CAT50 / DIN69872	P50T-1 / CAT50 / DIN69872	P50T-1 / CAT50 / DIN69872	P50T-1 / CAT50 / DIN69872	P50T-1 / CAT50 / DIN69872
Motor										
Spindle Drive Motor (Fanuc)	kW (Cont / 30min)	5.5 / 7.5 OPT: 7.5/11, 11/15, 15/18.5	#40 7.5 / 11 OPT: 11/15, 15/18.5 #50 11 / 15 OPT: 15/18.5	11 / 15 OPT: 15/18.5	11 / 15 OPT: 15/18.5	11 / 15 OPT: 15/18.5	11 / 15 OPT: 15/18.5	11 / 15 OPT: 15/18.5	15 / 18.5 OPT: 18.5/22	15 / 18.5 OPT: 18.5/22
X, Y, Z Axis Drive Motor (Fanuc)	kW	3/3/3	#40 3/3/3 #50 3/3/4	4/4/4	4/4/4	4/4/4	4/4/4	7/4/4	4/4/4	4/7/4
Positioning Accuracy										
3 Axes Laser Positioning Accuracy (JIS 6338)										
Positioning Accuracy / Full Travel	mm	±0.010	±0.010	±0.010	±0.010	±0.012	±0.010	±0.010	±0.012	±0.012
Repetitive Positioning Accuracy	mm	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003
3 Axes Laser Positioning Accuracy (VDI 3441)/Repeated 5 Times										
Positioning Accuracy	mm	0.022	0.024	0.024	0.024	0.030	0.024	0.024	0.030	0.030
Repetitive Positioning Accuracy	mm	0.010	0.012	0.012	0.012	0.016	0.012	0.012	0.016	0.016
VDI 3441 accuracy available upon order request										
Other										
Required Air Pressure	kg / cm²	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Electric Power Consumption	KVA	25	#40 25 #50 30	30	30	30	30	35	35	35
Machine Weight	kg	7700	7350	9000	11100	11700	13500	14100	16000	20000
Machine Dimension (L x W x H)	mm	2900 x 2714 x 2930	#40 3450 x 3890 x 3000 #50 3450 x 3890 x 3150	3450X4140X3425	4000 x 4310 x 3380 (OP: 3590)	5000 x 4310 x 3380 (OP: 3590)	4000 x 4472 x 3620	4500 x 4472 x 3620	5000 x 4950 x 3625	7400 x 4950 x 3625
For Other Specs Please Ask Sales.										

Standard & Optional Electrical Functions

Hartrol / Standard

- Workpiece Calibration by MPG Directly
- Tool Magazine Display
- Pop-up Calculator (In Hartrol Screen)
- Parameter Package
- Utilization Rate of Machining (Only for Fanuc Controller)
- Machining Time Countdown (Only for Fanuc Controller)
- Threading Cutting (Only for 0i and 31i)
- Tool Type Display on Magazine Display Screen
- (Only for 0i and 31i)
- Monitoring of Tool Status (Only for 0i and 31i)
- Character Carving Macro

Hartnet / Optional

- 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

- Full-enclosed Splash Guard
- Cooling System
- Centralized Automatic Lubrication System
- Two Side Chip of the Chassis (Screw Type)
- Coolant Tank (With Chip Bucket)
- Operation Manual & Electric Drawing Equipment
- Fluorescent Lamp x 1
- Air Blast Through Spindle
- Leveling Bolts and Blocks
- Remote Manual Pulse Generator
- Convection Heat Exchanger in Control
- Auto Power Off
- Operation Finish Lamp
- RS-232 Interface
- Tool Package
- Suspension Operator Box
- Coolant Jets around Spindle
- Fluore Sceut Lamp x 2 (HCMC-2110, HCMC-3110)
- Spindle Oil Cooler

Optional

- 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
- Closed Loop Linear Scale Positioning System
- Auto Tool Length and Diameter Measurement
- Oil Mist Collector System
- Auto Tool Length Measurement
- Fluorescent Lamp x 2
- NC Rotary Table
- DNC Software
- 90º Angle Head (Tool Type)
- Link Type Chip Conveyor & Protable Chip Bucket (1 EA)
- Spindle Oil Cooler (HCMC-1270 #40 Pulley 8000 rpm)
- Auto Work Piece Measurement
- Coolant Flushing Device
- Water Gun
- Air Gun
- Oil Fluid Separator

Specifications of the machine are subject to be modified without prior notice. (Please refer to the shipping document for the precise machine weight)

Machine Specifications (Imperial)

Model	Unit	HCMC-1000	HCMC-1270	HCMC-1370	HCMC-1682	HCMC-2082	HCMC-1692	HCMC-1892	HCMC-2110	HCMC-3110
Table										
Working Suface	inch	45.28 x 23.62	53.94 x 25.59	57.09 x 27.56	68.9 x 32.28	84.65 x 32.28	68.9 x 36.22	76.77 x 36.22	88.58 x 40.16	127.95 x 40.16
T-slot (Size x Number x Pitch)	inch	0.71 x 5 x 4.72	0.71 x 5 x 5.12	0.71 x 5 x 5.12	0.71 x 5 x 5.91	0.71 x 5 x 5.91	0.79 x 7 x 4.92	0.79 x 7 x 4.92	0.79 x 7 x 5.91	0.79 x 7 x 5.91
Max Table Load	lbs	2204.62	2645.55	3306.93	4850.17	5732.02	5511.56	6613.87	6613.87	8818.49
Travel										
Longitudinal Travel (X-axis)	inch	39.37	50	51.18	62.99	81.1	62.99	70.87	82.68	122.05
Gross Travel (Y-axis)	inch	23.62	25.59	27.56	32.28	32.28	36.22	36.22	40.16	40.16
Vertical Travel (Z-axis)	inch	24.8	24.80	25.98	25.98 32.28 (OP)	25.98 32.28 (OP)	32.28	32.28	32.28	32.28
Distance From Spindle End to Table Center	inch	3.94 ~ 28.74	4.72 ~ 29.53	4.72 ~ 30.71	5.91 ~ 31.89 7.87 ~ 40.16	5.91 ~ 31.89 7.87 ~ 40.16(OP)	7.87 ~ 40.16 15.75 ~ 48.03 (OP)	7.87 ~ 40.16 15.75 ~ 48.03 (OP)	7.87 ~ 40.16	7.87 ~ 40.16
Distance From Spindle Center to Column	inch	25.39	27.36	29.33	34.06	34.06	37.99	37.99	42.52	42.52
Spindle										
Spindle Nose Taper	inch	#40	#40, #50	#50	#50	#50	#50	#50	#50	#50
Spindle Speed	rpm	Pulley: 8000 (10000/12000) Gear 6000 (8000)	#40 Pulley 8000 (10000/12000) Gear 6000 (8000) DDS 10000 (15000) #50 Gear 6000 (8000) DDS 10000	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000 (6000/8000) (DDS 10000/12000)	Gear 4000(6000/8000) (DDS 10000/12000)
Feed										
Cutting Feedrate	ipm	472.44	472.44	472.44	472.44	472.44	393.7	393.7	393.7	275.6
Rapid Traverse (X, Y, Z Axes)	ipm	944.88/944.88/787.4	#40 944.88/944.88/787.4 #50 944.88/944.88/708.7	944.88/944.88/787.4	787.4/787.4/708.66	708.66/708.66/708.66	787.4/708.66/708.66	708.66/708.66/708.66	590.55/590.55/590.55	590.55/590.55/590.55
ATC										
Tool Storage Capacity	pcs	S:16, A:24	#40 S: 16, A: 24 (30 / 40) #50 A: 24 (32)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)	24 (32 / 40)
Max. Tool Weight	lbs	15.43	#40 15.43 #50 33.07	44.09	44.1	44.1	44.1	44.1	44.1	44.1
Max. Tool Size (Diameter x Length)	inch	S: Ø3.54 x 9.84 A: Ø2.95 x 11.81	#40 S: Ø3.54 x 9.84 A: Ø2.95 x 11.81 #50 A: Ø4.92 x 13.78	Ø4.92 x 13.78	Ø4.92 x 13.78	Ø4.92 x 13.78	Ø4.92 x 13.78	Ø4.92 x 13.78	Ø4.92 x 13.78	Ø4.92 x 13.78
Tool Shank		BT-40(CAT40/DIN69871/	BT-40(CAT40/DIN69871/ BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)	BT-50(CAT50/DIN69871/BBT50)
Pull Stud Bolt		BBT40 not for #40 G8K) P40T-1/CAT40/DIN69872	BBT40 not for #40 G8K) P40T-1/CAT40/DIN69872 P50T-1/CAT50/DIN69872	P50T-1/CAT50/DIN69872	P50T-1/CAT50/DIN69872	P50T-1 / CAT50 / DIN69872	P50T-1 / CAT50 / DIN69872	P50T-1 / CAT50 / DIN69872	P50T-1 / CAT50 / DIN69872	P50T-1 / CAT50 / DIN69872
Motor										
Spindle Drive Motor (Fanuc)	HP (Cont / 30min)	7.38/10.06 OPT: 10.06/14.75, 14.75/20.12, 20.12/24.81	#40 10.06/14.75 #50 14.75/20.12 OPT: 14.75/20.12, 20.12/24.81 OPT: 20.12/24.81	14.75/20.12 OPT: 20.12/24.81	14.75/20.12 OPT: 20.12/24.81	14.75/20.12 OPT: 20.12/24.81	14.75/20.12 OPT: 20.12/24.81	14.75/20.12 OPT: 20.12/24.81	20.12/24.81 OPT: 24.81/29.5	20.12/24.81 OPT: 24.81/29.5
X, Y, Z Axis Drive Motor (Fanuc)	HP	4.02/4.02/4.02	#40 4.02/4.02/4.02 #50 4.02/4.02/5.36	5.36/5.36/5.36	5.36/5.36/5.36	5.36/5.36/5.36	5.36/5.36/5.36	9.39/5.36/5.36	5.36/5.36/5.36	5.36/9.39/5.36
Positioning Accuracy										
3 Axes Laser Positioning Accuracy (JIS 6338)										
Positioning Accuracy / Full Travel	mm	±0.010	±0.010	±0.010	±0.010	±0.012	±0.010	±0.010	±0.012	±0.012
Repetitive Positioning Accuracy	mm	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003	±0.003
3 Axes Laser Positioning Accuracy (VDI 3441)/Repeated 5 Times										
Positioning Accuracy	mm	0.022	0.024	0.024	0.024	0.030	0.024	0.024	0.030	0.030
Repetitive Positioning Accuracy	mm	0.010	0.012	0.012	0.012	0.016	0.012	0.012	0.016	0.016
VDI 3441 accuracy available upon order request										
Other										
Required Air Pressure	PSI	92.45	92.45	92.45	92.45	92.45	92.45	92.45	92.45	92.45
Electric Power Consumption	KVA	25	#40 25 #50 30	30	30	30	30	35	35	35
Machine Weight	lbs	16975.59	16203.98	19841.6	24471.31	25794.08	29762.41	31085.18	35273.96	44092.45
Machine Dimension (L x W x H)	inch	114.17 x 106.85 x 115.35	#40 135.83 x 153.15 x 118.11 #50 135.83 x 153.15 x 124.02	135.83 x 162.99 x 134.84	157.48 x 169.69 x 133.07 (OP: 141.34)	196.85 x 169.69 x 133.07 (OP: 141.34)	157.48 x 176.06 x 142.52	177.17 x 176.06 x 142.52	196.85 x 194.88 x 142.72	291.34 x 194.88 x 142.72
For Other Specs Please Ask Sales.										

Standard & Optional Electrical Functions

Hartrol / Standard

- Workpiece Calibration by MPG Directly
- Tool Magazine Display
- Pop-up Calculator (In Hartrol Screen)
- Parameter Package
- Utilization Rate of Machining (Only for Fanuc Controller)
- Machining Time Countdown (Only for Fanuc Controller)
- Threading Cutting (Only for 0i and 31i)
- Tool Type Display on Magazine Display Screen
- (Only for 0i and 31i)
- Monitoring of Tool Status (Only for 0i and 31i)
- Character Carving Macro

Hartnet / Optional

- 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

- Full-enclosed Splash Guard
- Cooling System
- Centralized Automatic Lubrication System
- Two Side Chip of the Chassis (Screw Type)
- Coolant Tank (With Chip Bucket)
- Operation Manual & Electric Drawing Equipment
- Fluorescent Lamp x 1
- Air Blast Through Spindle
- Leveling Bolts and Blocks
- Remote Manual Pulse Generator
- Convection Heat Exchanger in Control
- Auto Power Off
- Operation Finish Lamp
- RS-232 Interface
- Tool Package
- Suspension Operator Box
- Coolant Jets around Spindle
- Fluore Sceut Lamp x 2 (HCMC-2110, HCMC-3110)
- Spindle Oil Cooler

Optional

- 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
- Closed Loop Linear Scale Positioning System
- Auto Tool Length and Diameter Measurement
- Oil Mist Collector System
- Auto Tool Length Measurement
- Fluorescent Lamp x 2
- NC Rotary Table
- DNC Software
- 90º Angle Head (Tool Type)
- Link Type Chip Conveyor & Protable Chip Bucket (1 EA)
- Spindle Oil Cooler (HCMC-1270 #40 Pulley 8000 rpm)
- Auto Work Piece Measurement
- Coolant Flushing Device
- Water Gun
- Air Gun
- Oil Fluid Separator

Specifications of the machine are subject to be modified without prior notice. (Please refer to the shipping document for the precise machine weight)