

FI

Intelligent Machining Center
with **INTELLIGENT NC** (Hartrol / Hartnet)



Vertical Machining Center

High Efficiency / High Speed VMC

Increases Machining Quality with less Machining Time

- DDS speed up to 15,000rpm
- Ultra High Rapid Feed Speed up to 40,000 mm/min
- Tool Change Time 1.18 sec. (TT) (LG500)

HARTROL
HARTFORD
EXCLUSIVE

HARTFORD F1

The Best Buy on Market Today!

Offering more unique features than any other competitive VMC.

F1

Unique Machine Features

These icons are a guide to the special features of this Hartford machine. Ask our salesperson for more information.

Mechanical



FEA Finite Element Analysis
All Hartford machines are FEA analyzed to ensure optimum structural design and performance.



MQT Machine Quality Target
Right from design stage, guarantees machine performance and stable quality.



OFS Optimum Force Flow Structure
Redirects machining forces to reduce vibration and guarantee accuracy.



SRA Spindle Run-out Accuracy
Accuracy within 0.010mm/300mm.

Electrical



SMS Short Message Sender
Management is immediately aware of machine issues so they can be resolved quickly.



TMM Thread Milling Macro
Allows you to easily cut wide pitch threads.



MTM Machining Time Management
Empowers management to maximize machine efficiency.



SOD Servo Overload Detection
Detects unusual loading to avoid collisions.

NEW DESIGN

The Best Buy on the Market decreases tool change time up to **20%**. By modifying structure and adjusting parameters, the tool change time is just 1.18 secs. (Tool-to-Tool) (LG-500 only)



Field-Proven by Over **5,000** Users Around the World.

“ The judgment for a valuable vertical machining center frequently comes from 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 F1 VMC is designed and built with these concepts in mind. Over the years, Hartford engineers have spent great efforts on designing a unique VMC that is cost-effective for our customers.

”

PATENTED NO.

160723	Programmable coolant flushing device for machine tool
163779	Auto door of carousel type magazine for machine tool
213692	A CNC machine tool with multi-tool setting and two-step warning device
213743	Heat dissipation mechanism for spindle servo driver on CNC machine tool
221954	Self-setting high-speed, high-accuracy machining parameter for CNC machine tool
222994	Electric cabinet with folding door on CNC machine tool
M293113	Tool monitoring function for CNC machine tool



HARTFORD F1

FI

Model LG1000
Spindle DDS 15,000rpm, 11kw
Material S45C

TAPPING

Feed Rate 750 mm/min (29.53"/min)
Depth 20 mm (0.79")

Ø20 Tool
(0.79") Diameter
 mm

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.

DRILLING

Feed Rate 204 mm/min
 (8.03"/min)
Depth 25 mm (0.98")

Ø18 Tool Diameter
 (0.71")

FACE MILL

Tool Diameter Ø80 mm
 (3.15")
Feed Rate 3,900 mm/min
 (153.54"/min)
Depth 2 mm (0.08")

507 c.c./min
 Cutting Volume

END MILL

Tool Diameter Ø63 mm
 (2.48")
Feed Rate 7,200 mm/min
 (283.46")
Depth 30 mm (1.18")
Width 2 mm (0.08")

432 c.c./min
 Cutting Volume

Dual Screen Top 10 unique feature of Dual Screen:

- HartCAM (2.5D) (Option)
- Processing program file transmission function
- CCD monitor processing status (option)
- Utilization management
- Tool management (Graphic)
- HARTROL ON PC function
- Spindle electric current LOG function
- Remote network monitoring
- Embedded Ethernet DNC (FANUC)
- Online E-Book

Dual Screen is available on Fanuc and Mistubishi Controller

HartCAM (2.5D) (OPTION)

CAM software is installed and can be executed in dual screen.
 It can work with the program that is needed.

HARTROL ON PC FUNCTION

You can use both NC and HARTROL without switching screen.

PROCESSING PROGRAM FILE TRANSMISSION FUNCTION

The installed 30GB hard drive can be a temporary storage for processing program. You can load in PC anytime.

TOOL MANAGEMENT (GRAPHIC)

We can identify the tool outline and easily manage tools

CCD MONITOR PROCESSING STATUS (OPTION)

Install CCD in machining area

- The operator does not have to open the door for status monitoring.
- Manager can use PC to watch the status at home.

UTILIZATION MANAGEMENT

You can check utilization from dual screen.

HARTFORD F1

THE ULTIMATE IN VMC

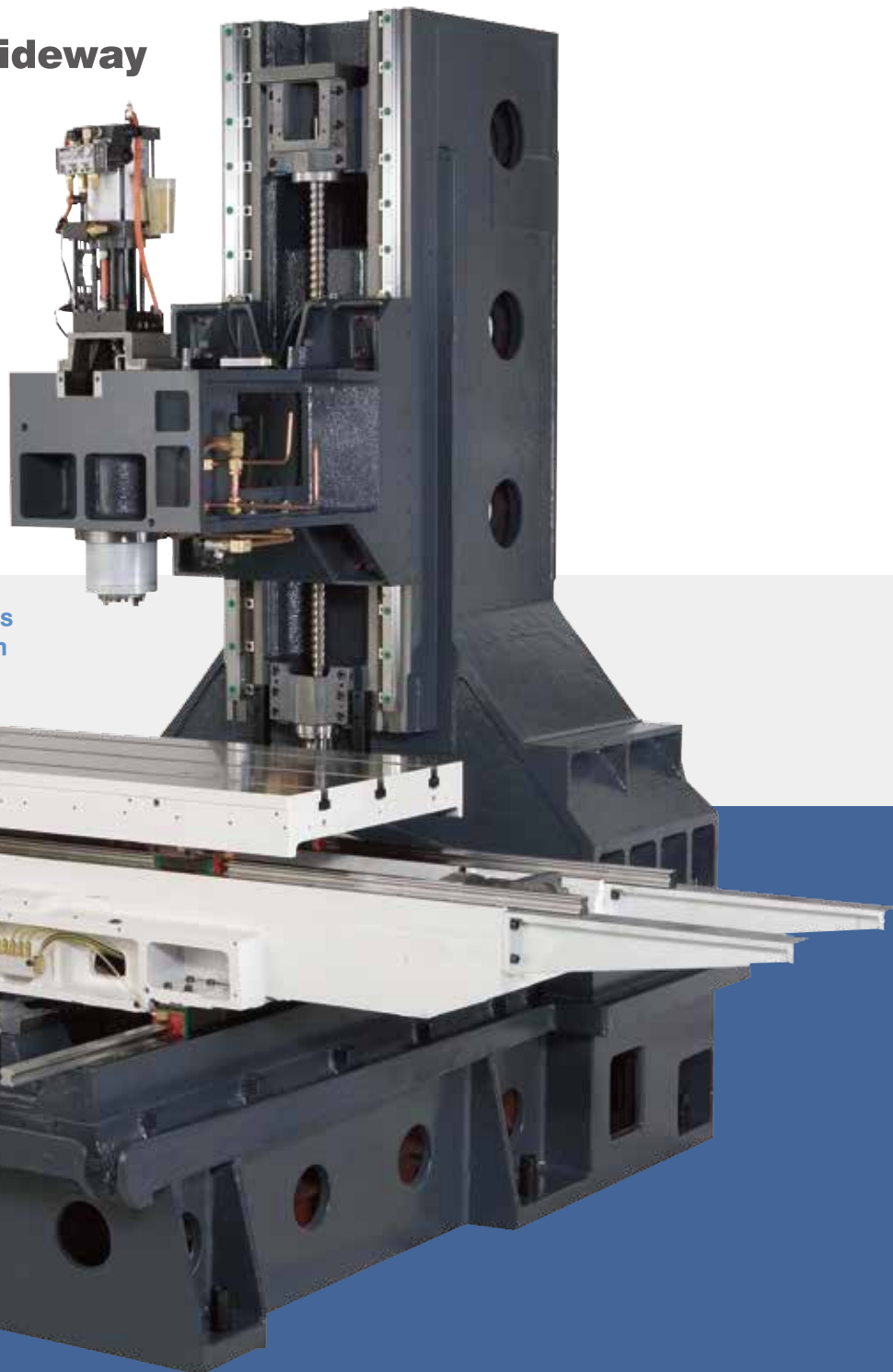
OPTIMAL STRUCTURE DESIGN THROUGHOUT

Featuring excellent dampening capability, rigidity and stability.

One of the important elements that determines a machining center's accuracy and capability is body strength. LG-800 and LG-1000 were designed according to the principles of Finite Element Analysis (FEA). FEA provides a simulation of stresses that occur in the machine's casting when placed under a load. Refinements were made in areas such as bed thickness, rib shape and rib position to improve machine structural design and performance.

5 year warranty-linear guideway

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



The rapid feed rate is 40m/min for X and Y axes (Opt.) and 32m/min for Z axis (Opt.). Such high speeds reduce non-cutting time and directly increase productivity.



F1

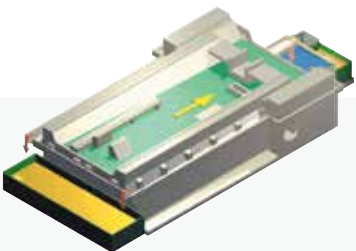


MODEL		LG-500				LG-800 / LG-1000			
SPEC / CONTROLLER		FANUC 0i-MD-PB	Mitsubishi M70 series	Heidenhain TNC 620	CTS	FANUC 0i-MD-PB	0i-MF	Mitsubishi M70 series	CTS
Pully	8000	●	●	●	●	●	●	●	●
	10000	●	●	●	●	●	●	●	●
	12000	●	●	●	●	★	●	●	●
DDS	10000	●	●	●	x	●	●	●	x
	12000	x	●	●	x	x	●	●	x
	15000	x	x	x	x	x	●	●	●
Z AXIS ONE LEVEL UPGRADE		x	x	●	-	●	●	●	-
4TH AXIS		●	●	●	-	●	●	●	-
4 or 4+1th AXIS (not for 5 axis simultaneous movement)		●	x	●	-	●	●	●	-

★ Applicable on 10000 rpm spindle motor with belt pulley ratio 1.2:1

BETTER STABILITY, HIGH ACCURACY

The rigid one-piece bed and wide column base are heavily ribbed to prevent twisting and distortion under even the most severe cutting forces. The fine grain Meehanite cast iron contributes to unparalleled damping characteristics.



INCORPORATED OIL FLUID SEPARATION ON CASTING DESIGN

Eco-friendly design. Efficient oil and fluid separation incorporated on casting design prevents cutting fluid deterioration. One-piece casting design integrates chassis and chip disposal openings with base. No abutment on chassis. Leakage-free design.

HEAVY DUTY & PRECISE LINEAR GUIDEWAYS

- The linear guides on three axes are high grade, providing stability for heavy cutting.
- High efficiency machining center. Rapid traverse 30,000mm/min.
- Acceleration/deceleration speed: DmN value reaches 180,000 and above.



PRODUCTIVITY MEANS HIGHER MACHINING SPEED

Hartford F1 is designed to significantly boost your overall machining efficiency!

Machining Efficiency Increased by 30%

Hartford F1's unmatched value sets it apart from conventional VMCs

Why is the Hartford F1 Vertical Machining Center so different from any other competing models on the market? The reason above all is our strong commitment to design and manufacture the most valuable VMC in the world. To meet this promise, Hartford R&D engineers have created many new features that fully represent the exceptional value of the Hartford F1. These exclusive or patented features make the F1 unique on the VMC market around the world.

Applied Engineering Capability Operational Convenience Upgraded by 40%

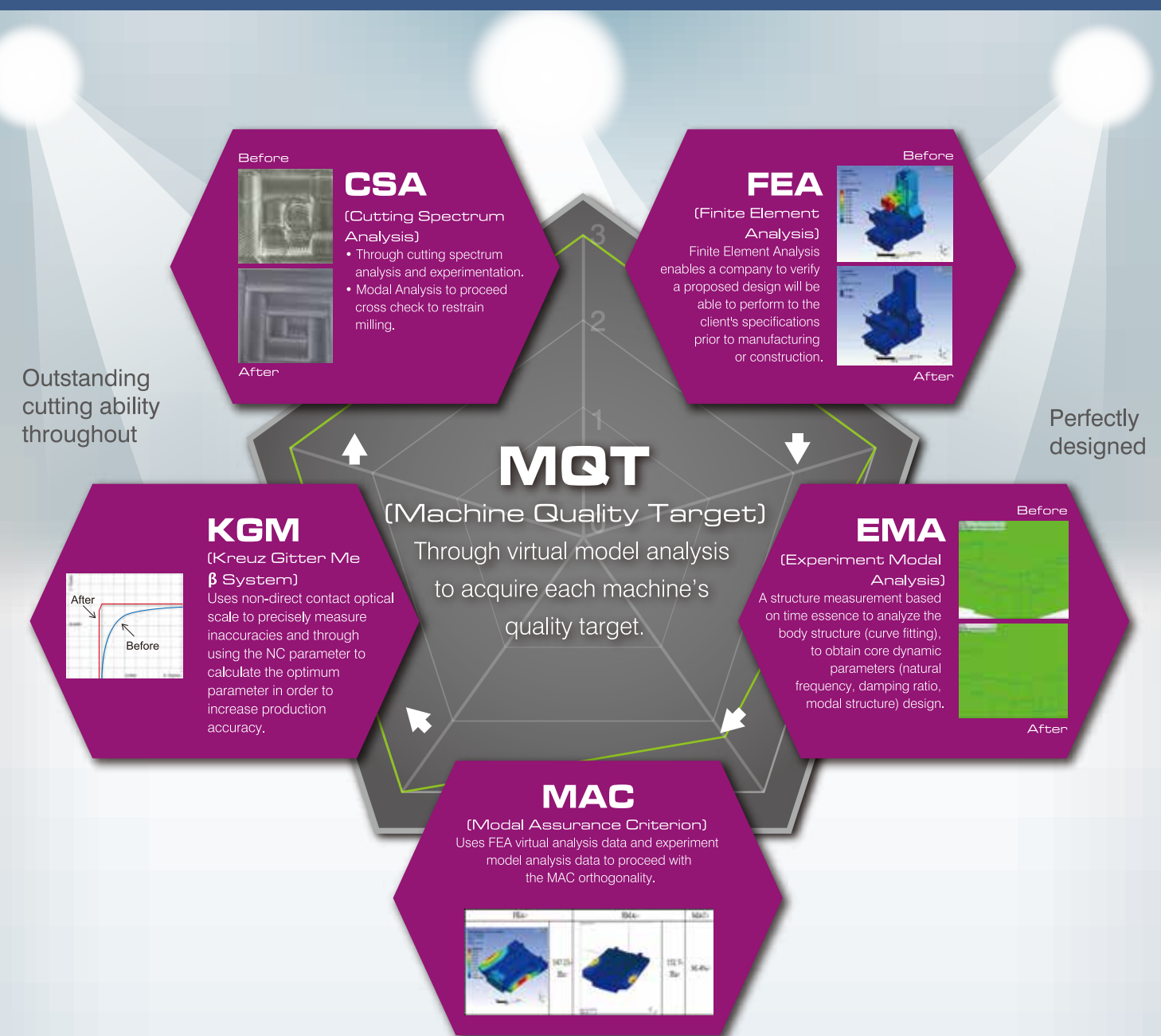
Jig and Fixture Design

Hartford applied technology department engineers provide precise jig and fixture design and also manufacture according to customer workpiece types and machining requirements. These jigs and fixtures help to enhance machining efficiency and ensure machining accuracy.



• The jig and fixture pictures are provided by Sheng Yu Precision Machine Co., Ltd.

HARTFORD PROFESSIONAL RESEARCH AND DEVELOPMENT PROCESS MANAGEMENT



A Dependable Guarantee for R&D and Cutting Rigidity through **MQT**
Hartford machines are designed through the comprehensive MQT process.

COMMITMENT TO QUALITY

JIS B6338, VDI3441 ARE OUR STANDARDS.

GUARANTEED PERFORMANCE THROUGH RIGOROUS QUALITY INSPECTIONS

100% inspection by coordinate measuring machine.

Critical components: machine head/spindle/ATC unit.

100% inspection before entering assembly line-all components.

100% laser inspection before shipment.

100% ball bar inspection before shipment.

SPINDLE BALANCE TESTING

Eliminates vibration on rotating parts to improve spindle rotational accuracy.

The machine is built to ensure perfection at the end of pre-shipment QC inspection, but also all the way through production. We place a strong emphasis on every detail at each step. Only qualified components or parts can be used on the production line.

Rigid quality control procedures by coordinate measuring machine, high-tech laser measurement systems and many other sophisticated inspection instruments are utilized again and again all the way through production to delivery.

It is an absolute commitment from Hartford to assure that the machine you ordered has passed through the most critical and rigorous inspection under our continuous internal auditing process. The purpose of this unprecedented care and effort is to deliver a quality, drawback-free VMC to you.

3D COORDINATE MEASUREMENT TESTING

Precision measurement to assure component accuracy and machine quality.

CIRCULAR ACCURACY IS INSPECTED WITH A HIGH-PRECISION BALL BAR TESTER.

Ball bar testing: identification of accuracy, servo and geometric errors statistically and dynamically.

HIGH-TECH LASER MANAGEMENT SYSTEM FOR PRECISION INSPECTION

Precision measurement to assure component accuracy.

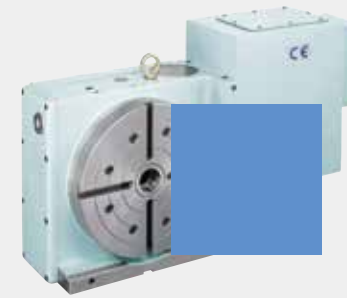
Laser tested for surface accuracy before shipment.

It can measure all the standard geometric properties of a machine (Linear positioning accuracy, pitch error, etc...)

OPTIONAL ACCESSORIES

COOLANT JETS AROUND SPINDLE (STANDARD)

The coolant nozzle can be adjusted to spurt coolants on the tool edge.



ROTARY TABLE (OPTIONAL)

- Worktable diameter: maximum 300mm.
- Motor is mounted on the right side. (Vertical and horizontal applications)
- Exclusive dual lead worm drive.
- Wholly circular hydraulic locking system.



LINEAR SCALE POSITIONING SYSTEM (OPTIONAL)

Closed loop linear scale can improve the accuracy.



LINK TYPE CHIP CONVEYORS (OPTIONAL)

Effectively ensures the full removal of all metal fragments.

20/25/70 BAR COOLANT THROUGH SPINDLE (OPTIONAL)

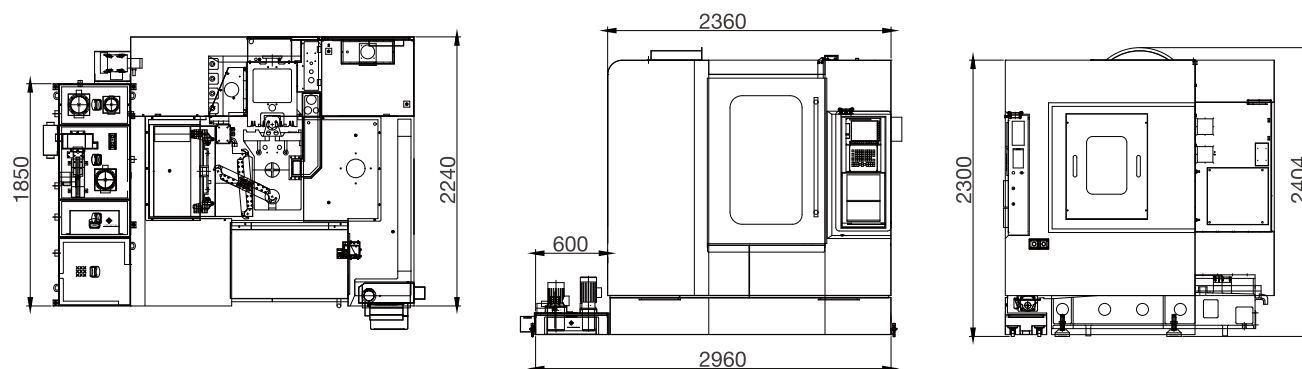
The 20 bar coolant through spindle system integrates a filter and high pressure coolant pump in a compact structure. It delivers high pressure coolant to the cutting edge improving tool life while allowing higher speed machining, deep hole drilling and pocket milling.

- The coolant pressure reaches its maximum at the output of coolant pump outlet.

MACHINE DIMENSIONS

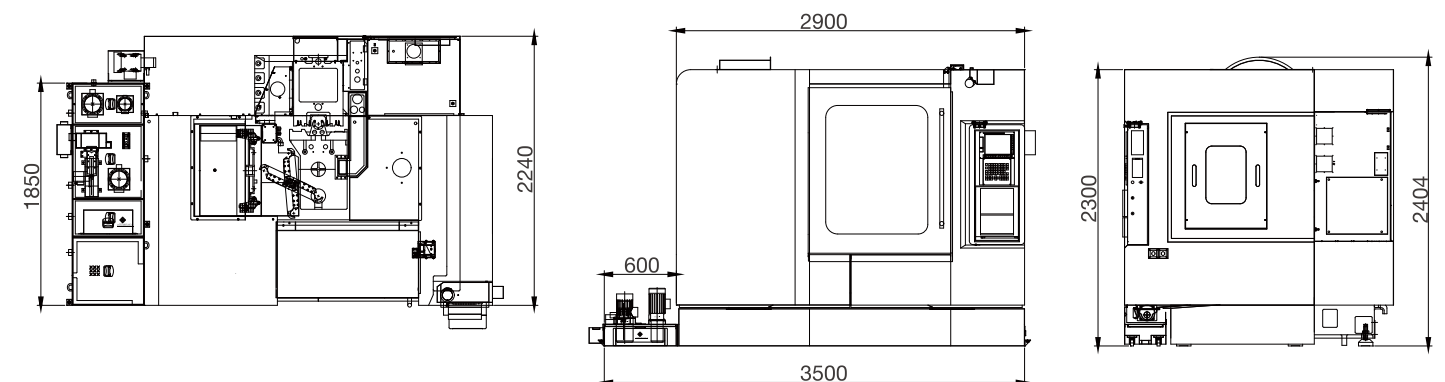
LG800

Chip collecting tank type profile drawing



LG1000

Chip collecting tank type profile drawing



MACHINE SPECIFICATIONS

Table	Unit	LG-500	LG-800	LG-1000
Working surface	mm(inch)	620 x 420 (24.41 x 16.54)	950 x 510 (37.4 x 20.08)	1,150 x 510 (45.28 x 20.08)
T-slot (size x number x pitch)	mm(inch)	18 x 3 x 130 (0.71 x 3 x 5.12)	18 x 3 x 160 (0.71 x 3 x 6.3)	18 x 3 x 160 (0.71 x 3 x 6.3)
Max. table load	KG(lbs.)	300 (661.39)	500 (1102.31)	700 (1543.24)
Travel				
Longitudinal travel (X-axis)	mm(inch)	520 (20.47)	800 (31.5)	1,000 (39.37)
Cross travel (Y-axis)	mm(inch)	420 (16.54)	510 (20.08)	510 (20.08)
Vertical travel (Z-axis)	mm(inch)	450 (17.72)	630 (24.8)	630 (24.8)
Distance from spindle to table	mm(inch)	100~550 (3.94~21.65)	100~730 (3.94~28.74)	100~730 (3.94~28.74)
Distance from spindle center to column	mm(inch)	460 (18.11)	562.5 (22.15)	562.5 (22.15)
Spindle				
Spindle nose taper		#40	#40	#40
Spindle speed (pulley)	rpm	8,000 (10,000 / 12,000 opt)	8,000 (10000 / 12000 opt)	8,000 (10,000 / 12,000 opt)
Spindle speed (DDS)	rpm	10,000 (12,000 opt)	10,000 (12000 / 15000 opt)	10,000 (12,000 / 15,000 opt)
Feedrate				
Cutting feedrate (X, Y, Z-axes)	m/min(ipm)	1~10 (39.37~393.7)	1~12 (39.37~427.44)	1~12 (39.37~427.44)
Rapid traverse rate (X, Y-axes)	m/min(ipm)	32 (1259.84) OPT: 40 (1574.8)	30 (1181.1) OPT: 40 (1574.8)	30 (1181.1) OPT: 40 (1574.8)
Rapid traverse rate (Z-axes)	m/min(ipm)	32 (1259.84)	24 (944.88) OPT: 32 (1259.84)	24 (944.88) OPT: 32 (1259.84)
ATC				
Tool storage	pcs	A: 24	A: 24, OPT S: 20	A: 24, OPT S: 20
Tool change type		Random	Random	Random
Max. tool weight kgs	KG(lbs.)	6 (13.23)	7 (15.43)	7 (15.43)
Max. tool size (dia. x length)	mm(inch)	A: Ø80 x 200L (Ø3.15 x 7.87)	A: Ø75 x 300L (Ø2.95 x 11.81) OPT S: Ø90 x 250L (Ø3.54 X 9.84)	A: Ø75 x 300L (Ø2.95 x 11.81) OPT S: Ø90 x 250L (Ø3.54 X 9.84)
Tool shank		BT-40 (BBT / CAT / DIN)	BT-40 (BBT / CAT / DIN)	BT-40 (BBT / CAT / DIN)
Pull stud bolt		P40T-1 / CAT-40 / DIN69872	P40T-1 / CAT-40 / DIN69872	P40T-1 / CAT-40 / DIN69872
Motor				
Spindle drive motor (30 min)	kW(HP)	5.5 (7.38)	7.5 (10.06) OPT: 11 (14.75)	7.5 (10.06) OPT: 11 (14.75)
Sitioning accuracy				
3 axes laser positioning accuracy (JIS B6338)				
Positioning accuracy / full travel	mm	±0.008	±0.008	±0.008
Repetitive positioning accuracy	mm	±0.002	±0.002	±0.002
3 axes laser positioning accuracy (VDI 3441)/repeated 5 times				
Positioning accuracy	mm	0.010	0.010	0.010
Repetitive positioning accuracy	mm	0.006	0.006	0.006
VDI 3441 accuracy available upon order request				
Other				
Required air pressure	kg / cm²(PSI)	6.5 (92.45)	6.5 (92.45)	6.5 (92.45)
Electric power requiremet	KVA	15	20	20
Machine weight	KG(lbs.)	3,330 (7341.39)	A: 4,300 (9479.88) OPT S: 4,270 (9413.74)	A: 4,530 (9986.94) OPT S: 4,410 (9722.39)
Floor space (full guarding)	mm(inch)	2,150 x 2,155 (84.65 x 84.84)	2,960 x 2,470 (116.54 x 97.24)	3,500 x 2,470 (137.8 x 97.24)
Collant tank (Standard)	L(gal)	237 (62.61)	279 (73.71)	306 (80.84)

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

STANDARD AND OPTION

1. ELECTRICAL FUNCTION

A. 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 Oi and 31i)
- Character carving macro

B. HARTNET (OPTION)

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

C. ELECTRICAL FUNCTION (OPTION)

- Lifting function against gravity
- Retraction for rigid tapping
- Intelligent MPG
- HMI for tool magazine

2. MECHANICAL ACCESSORIES

(STANDARD)

- Full splash guard
- Automatic lubrication system
- Work lamp x 1
- Air blast through spindle
- Leveling bolts and blocks
- Automatic power off
- Operation finish lamp
- Operation manual and electric drawing
- Collant tank
- #40 8,000 rpm pulley head
- Coolant jets around spindle
- Spindle air curtain
- More...

(OPTION)

- Fully enclosed splash guard (CTS)
- NC rotary table
- Front mounted screw type chip conveyor
- Link type chip conveyor
- Coolant flushing device
- #40 10,000 & 12,000rpm pulley head (Ref. page 6)
- Tool change time: 1.38 sec. (T-T)(LG-800 / LG-1000)
- LG-500 #40 12,000rpm DDS
(Only available on Mitsubishi or Heidenhain motor)
- LG-800 10,000rpm #40 DDS
- 20 bar coolant through spindle
- Handy coolant gun
- Spindle oil cooler
- More...





Vertical Machining Center

High Efficiency / High Speed VMC

Increases Machining Quality with less Machining Time

- DDS speed up to 15,000rpm
- Ultra High Rapid Feed Speed up to 40,000 mm/min
- Tool Change Time 1.18 sec. (T-T) (LG500)

Website



Hartford has sold over 46,000 machines globally, resulting in over 37,000 satisfied customers and a wealth of feedback that has added to our arsenal of experience and fine craftsmanship. In accordance with our insistence on providing only the highest quality of machining centers, every possible resource is utilized to constantly upgrade our technological levels in manufacturing and other applications.

She Hong Industrial Co., Ltd.

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