

FI

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)

FI



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HARTFORD F1 The Best Buy on Market Today!

Offering more unique features than any other competitive VMC.

Unique Machine Features

These icons are a guide to the special features of this Hartford machine. Ask your 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 & guarantee accuracy.



SRA Spindle Run Out
Accuracy within 0.005m/300mm.

Electrical



SMS Short Message Sender
Management immediately aware of machine issues so they can resolve 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.

“ The judgement for a valuable vertical machining center frequently comes from constantly creative concepts and a 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. ”

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

NEW DESIGN



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

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

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

TAPPING

Feed Rate **750mm/min**
 Depth **20mm**

Ø20 Tool 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 **204mm/min**
 Depth **25mm**

Ø18
 Tool Diameter

FACE MILL

Tool Diameter **Ø80mm**
 Feed Rate **3,900 mm/min**
 Depth **2mm**

507 C.C./min
 Cutting Volume

END MILL

Tool Diameter **Ø63mm**
 Feed Rate **7,200mm/min**
 Depth **30mm**
 Width **2mm**

432 C.C./min
 Cutting Volume

FI

Dual Screen Top 10 unique feature of Dual Screen:

- 2.5D CAM
- Processing program file transmission function
- CCD monitor processing status
- Utilization management (option)
- Tool management (Graphic)
- HARTROL ON PC function
- Spindle electric current LOG function
- Remote network monitoring
- DXF file reading
- Online E-Book

Dual screen is available on Fanuc and Mistubishi controller

2.5D CAM (OPTION)

CAM software is installed and can be executed in Dual screen
 It can work with the program which is needed

HARTROL ON PC FUNCTION

You can use both NC and HARTROL without screen switch

PROCESSING PROGRAM FILE TRANSMISSION FUNCTION

Installed 30GB hard drive, it can be a temporary storage for processing program. You can load in PC anytime.

TOOL MANAGEMENT (GRAPHIC)

We can identify tool outline, and easy to manage the tools

CCD MONITOR PROCESSING STATUS

Install CCD in machining area

- The operator doesn't have to open the door then monitor the status.
- Boss can use PC to watch the status at home.

UTILIZATION MANAGEMENT (OPTION)

You can check utilization from dual screen

HARTFORD F1

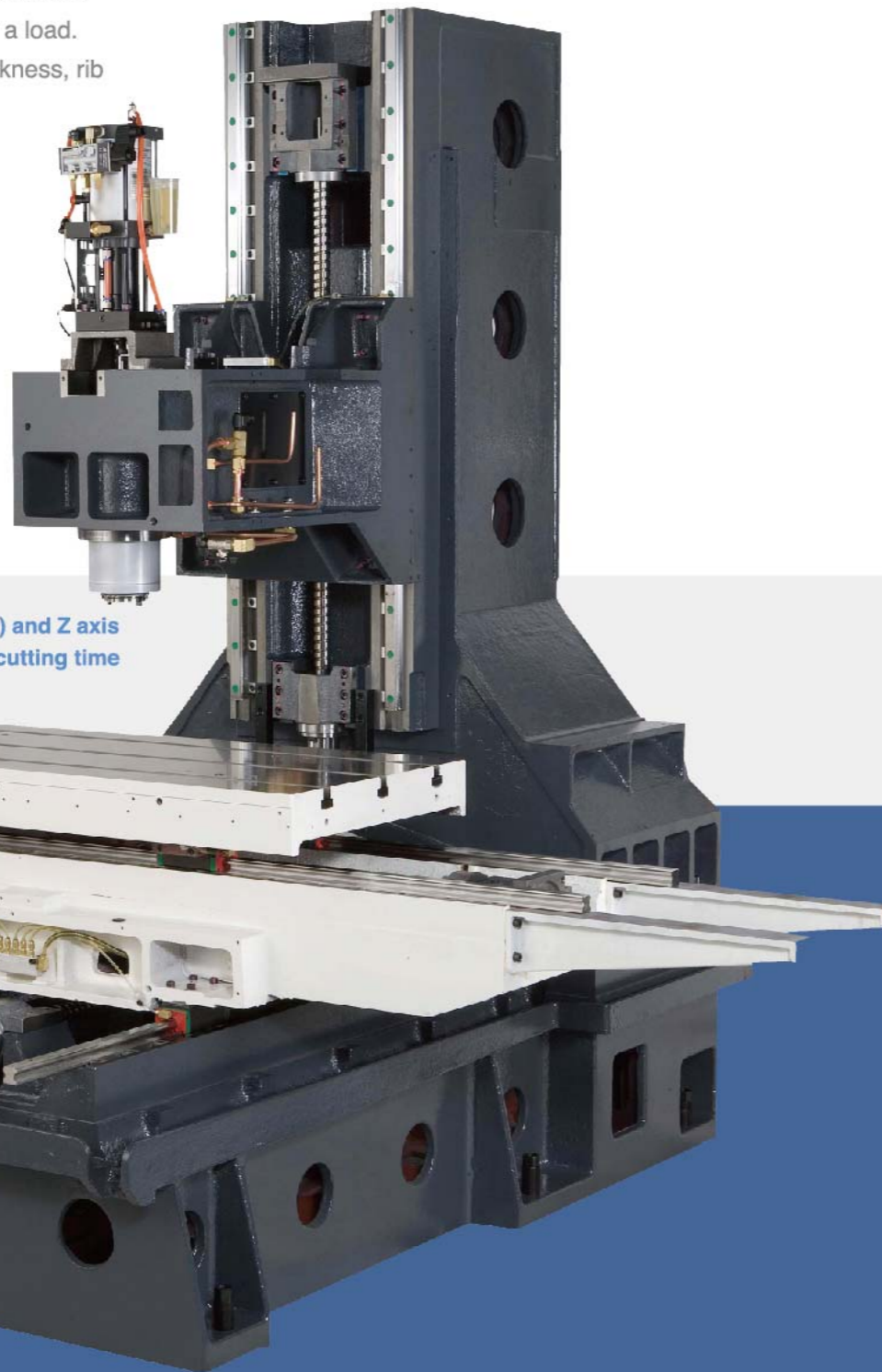


THE ULTIMATE IN VMC

OPTIMAL STRUCTURE DESIGN THROUGHOUT

Featuring excellent dampening capability, rigidity and stability.

One of the important elements that decide a machining center's accuracy and capability is body strength. LG-800 and LG-1000 were designed according to the principles of Finite Element Method (FEM). FEM 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 thickness.



The rapid federate of X and Y axis is 40 m / min.(opt.) and Z axis is 32 m / min.(opt.), such higher speed reduces non-cutting time and directly increases productivity.

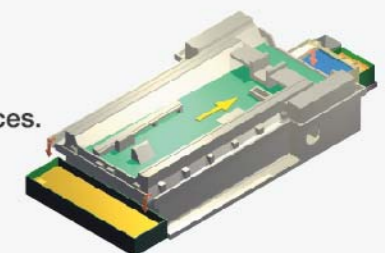


MODEL	LG-500				LG-800 / LG-1000			
	FANUC 0i-MD-PB	Mitsubishi M70 series	Heidenhain TNC 620	CTS	FANUC 0i-MD-PB	0i-MD	Mitsubishi M70 series	CTS
Pully 8000	●	●	●	●	●	●	●	●
10000	●	●	●	●	●	●	●	●
12000	●	●	●	●	★	●	●	●
DDS 10000	●	●	●	×	●	●	●	×
12000	×	●	●	×	×	●	●	×
15000	×	×	×	×	×	●	●	●
Z AXIS ONE LEVEL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

★ 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 dampening characteristics.



INCORPORATED OIL FLUID SEPARATION ON CASTING DESIGN

Eco-friendly design. Efficient oil and fluid separation incorporated on casting design prevents curring fluid deterioration.

One piece casting design incorporates 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 and heavy cutting.
- High efficiency machining center. Rapid traverse 30,000 mm / min.
- Acceleration / deceleration speed DmN value reach 180,000 and above.



• Positioning $\pm 0.005\text{mm}$ (thru whole stroke) • Repeatability $\pm 0.004\text{mm}$

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 commitment, Hartford R&D engineers have created many new features that fully represent the unique value on 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 also provide precise jig and fixture design and manufacture according to customer workpiece types and machining requirements. These jigs and fixtures help upgrade machining efficiency and ensure machining accuracy.



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

Low inertia, High speed acceleration / deceleration spindle motor

A new spindle motor is added to the lineup for faster drilling and tapping. Its low inertia can shorten acceleration / deceleration time and assure higher productivity. In addition, further downsizing and energy saving are possible. This motor is driven by multi-hybrid drive.

INCREASE MACHINING EFFICIENCY

It dramatically upgrades rapid traverse rate and acceleration / deceleration, that reduces non-cutting time while increasing machining efficiency.

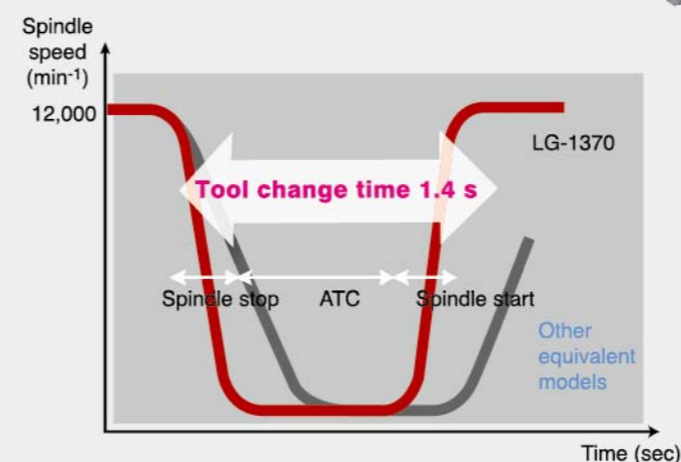
- Rapid traverse rate: 50m/min.
- X-axis acceleration: 1.4G
- Y-axis acceleration: 1.4G
- Z-axis acceleration: 1.2G

Shortened spindle orientation time.
Increased spindle acceleration.
Shortened tool change time.

- Tool change time: 1.4 sec. (T to T)
- Acceleration time: 1.5 sec. (S0 → S12000)
- Deceleration time: 2.2 sec. (S12000 → S0)
- Spindle orientation: 3.9S (S12000 → M19)
- Test conditions: BT40 spindle



REAL SPEED NOT EXPRESSED BY C-C



High / Low spindle speed 0~8000~0 rpm

RPM	SJ-V5.5-01ZT(standard)
0~8000	1.8 second
8000~0	2.2 second

RPM	SJ-VL11-27ZT(Low inertia)
0~8000	1.1 second
8000~0	1.5 second

COMMITMENT TO QUALITY

JIS 6338, VDI3441 ARE OUR STANDARDS.

GUARANTEED PERFORMANCE THROUGH RIGOROUS QUALITY INSPECTIONS

100% inspection by coordinated 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.

QUADRANT PROTRUSION CORRECTION SPINDLE BALANCE TESTING

Eliminate vibration on rotating parts to improve spindle rotational accuracy.

The machine is built ensuring perfection-not only at the end of pre-shipment QC inspection, but also all the way through production. We place a strong emphasis on every detail of every step. Only qualified components or parts can be employed in the production line.

Rigid quality control procedures by coordinated measuring machine during production, 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 absolute that Hartford does not spare any effort in assuring that the machine you are ordering has passed through the most critical and rigorous inspection through our constant interior auditing process. The purpose of this unprecedented care and effort is to deliver to you a quality, drawback-free VMC- the best in the world.

QUADRANT PROTRUSION CORRECTION

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 at the right. (Vertical and horizontal applications)
- Exclusive dual lead worm drive.
- Wholly circular hydraulic locking system.



LINK TYPE CHIP CONVEYORS (OPTIONAL)

Effectively ensures the full removal of all metal fragments.



LINEAR SCALE POSITIONING SYSTEM (OPTIONAL)

Closed loop linear scale can improve the accuracy.

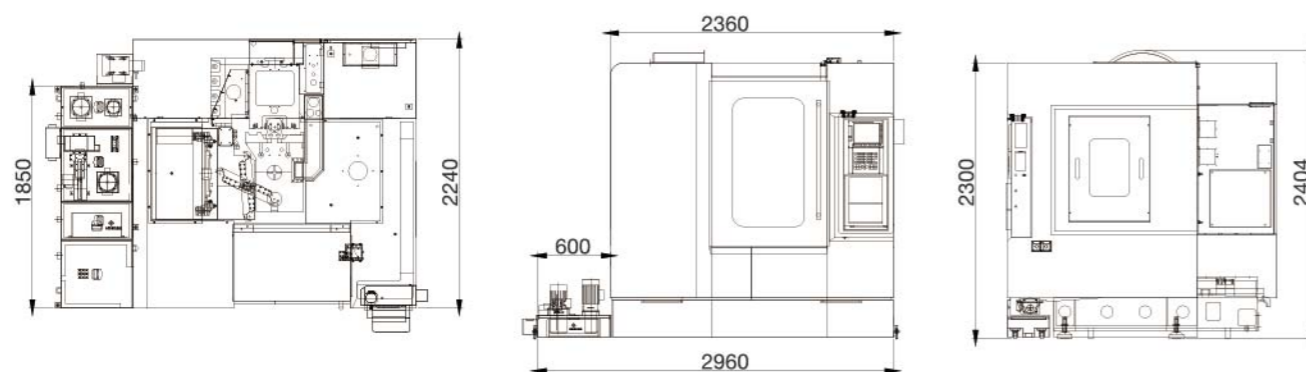
20/25/70/ BAR COOLANT THROUGH SPINDLE (OPTIONAL)

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 to improve tool life and permits higher speeds, deep hole drilling and pocket milling.

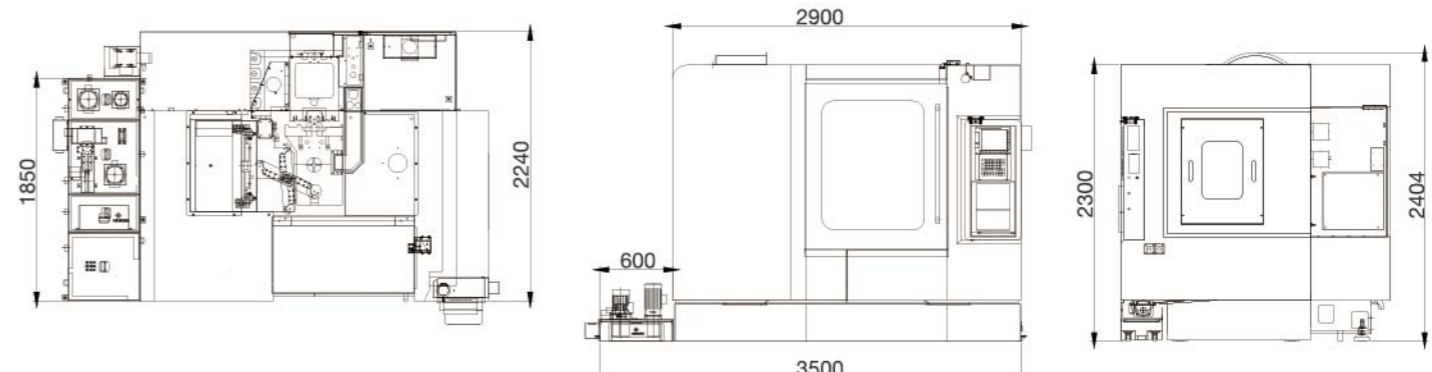
- The coolant pressure in the max, output at the coolant pump outlet.

MACHINE DIMENSIONS

LG800



LG1000



MACHINE SPECIFICATIONS

Table	Unit	LG-500	LG-800	LG-1000
Working surface	mm	620 x 420	950 x 510	1,150 x 510
T slot (size x number x pitch)	mm	18 x 3 x 130	18 x 3 x 160	18 x 3 x 160
Max. table load	KG	300	500	700
Travel				
Longitudinal travel (X-axis)	mm	520	800	1,000
Cross travel (Y-axis)	mm	420	510	510
Vertical travel (Z-axis)	mm	450	630	630
Distance from spindle to table	mm	100~550	100~730	100~730
Distance from spindle center to column	mm	460	562.5	562.5
Spindle				
Spindle nose taper		#40	#40	#40
Spindle speed (pulley)	rpm	8,000 (10,000 / 12,000 opt)	8,000 (10,000 / 12,000 opt)	8,000 (10,000 / 12,000 opt)
Spindle speed (DDS)	rpm	10,000 (12,000 opt)	10,000 (12,000 / 15,000 opt)	10,000 (12,000 / 15,000 opt)
Feedrate				
Cutting feedrate (X, Y, Z-axis)	mm/min	1~10,000	1~10,000	1~10,000
Rapid traverse rate (X, Y-axis)	mm/min	32,000(40,000 OPT)	30,000(40,000 OPT)	30,000(40,000 OPT)
Rapid traverse rate (Z-axis)	mm/min	32,000	24,000(32,000 OPT)	24,000(32,000 OPT)
ATC				
Tool storage	pcs	24(A)	20(S) / 24(A)	20(S) / 24(A)
Tool change type		Random	Random	Random
Max. tool weight kgs	KG	6	6	6
Max. tool size (dia. x length)	mm	80 x 200(A) mm	90 x 250(S) / 75 x 300(A) mm	90 x 250(S) / 75 x 300(A) mm
Tool shank		BT-40 / CAT-40 / DIN69871	BT-40 / CAT-40 / DIN69871	BT-40 / CAT-40 / DIN69871
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	5.5	7.5	7.5
Other				
Positioning / 300mm	mm	±0.006	±0.006	±0.006
Repeatability	mm	±0.005	±0.005	±0.005
Required air pressure	kg / cm ²	6.5	6.5	6.5
Electric power requiremet	KVA	15	20	20
Machine weight	KG	3,330	4,270 / 4,300	4,410 / 4,530
Floor space (full guarding)	mm	2,150 x 2,045	2,960 x 2,470	3,500 x 2,470

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

STANDARE 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 0i and 31i)
- Tool type display on magazine display screen (only for 0i and 31i)
- Monitoring of tool status (only for 0i and 31i)
- Barcoke factory management (only for fanuc controller)
- Character carving macro

B.HARNET

(OPTION)

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

C.ELECTRICAL FUNCTION

(OPTION)

- Compensation of temperature displacement
- Lifring Function Against Gravity
- Retraction for Rigid tapping
- Intrlligrnt MPG
- HMI for tool magazine

2.MECHANICAL ACCESSORIES

(STANDARD)

- Full splash guard
- Automatic lubrication system
- Work lamp
- Air blasr through spindle
- Leveling bolts and blocks
- Automatic power off
- Operation finish lamp
- Operation manual and electric drawing
- Collant tank
- #408,000 rpm pulley head
- Coolant jets around spindle
- more...

(OPTION)

- Full enclosed splash guard (CTS)
- NC rotary table
- Front mounted screw type chip conveyor
- Link type chip conveyor
- Coolant flushing device
- #40 10,000 & 12,000 rpm pulley head (Ref. page 6)
- LG-500 #40 12,000 rpm DDS.
(Only available on Mitsubishi or Heidenhain Motor)
- LG-800 10,000 rpm #40 DDS
- 20 bar coolant through spindle
- Handy coolant gun
- Spindle air curtain
- Spindle oil cooler
- more...

