

LED CENTER

Special Design For TFT / LED Body Frame Machining

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



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 machining centers, every possible resource is utilized to constantly upgrade our technological levels in manufacturing and other applications.



Hartford
innovation

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CAT. NO. LED-100215E07



Hartford care inside

The Best Buy on the Market Today!

Offering more unique features than any other competitive VMC

The judgement for a valuable vertical machining center frequently comes from 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 **LED center** 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.

- **Low inertia spindle motor**
- **Rapid traverse rate up to 40m/min. (1574.8 ipm) on x, y-axis (optional)**
- **Excellent for LCD, LED and 3C industries**
- **Designed for performance cutting**

Hartford LED Center

A superior value in speed, accuracy and stability
Spindle runs from 0 to 12,000rpm in only 0.18 sec.

Decreases tool change time up to 20%

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

Application:
LED Production
LED Display
Components
LCD Panel
LED Auto-Lamp



PATENTED NO.	NEW DESIGN
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 parameters for CNC machine tool
222994	Electric cabinet with folding door on CNC machine tool
M293113	Tool monitoring function for CNC machine tool

LG-1370

THE ULTIMATE IN VMC

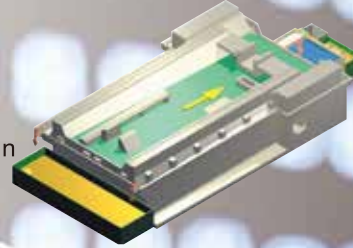
OPTIMUM STRUCTURAL DESIGN THROUGHOUT

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-1370 was designed according to the principles of the Finite Element Method (FEM). FEM provides a simulation of stress that occurs on 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.

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 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 capability.
- High efficiency machining center. Rapid traverse 30,000 mm / min. (1181.1 ipm)

IN ORDER TO ACQUIRE ACTUAL STRUCTURAL RIGIDITY DATA, STATIC RIGIDITY ANALYSIS IS CONDUCTED AFTER THE TABLE IS FULLY LOADED.

Analysis method: selects 9 positions in 3 x 3 matrix format, which is called "Nine courts diagram analysis"

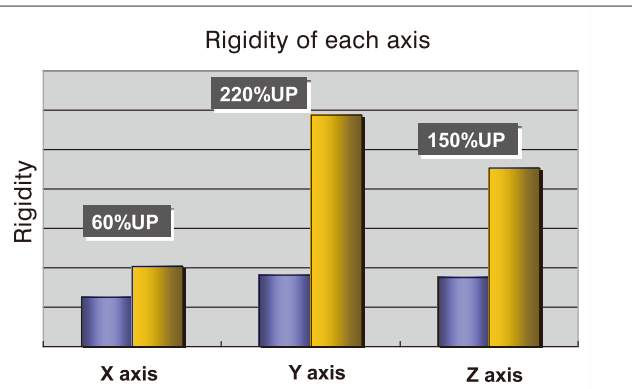
After the data is analyzed, it is re-arranged as "radar diagram analysis"

COMPARISON OF MACHINE'S STATIC RIGIDITY

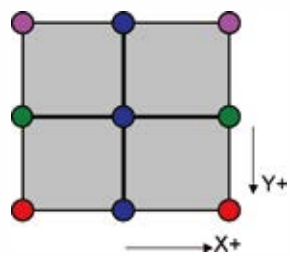
Static rigidity on 3 axes (kg / um)

LG-1370: X=4.09 \ Y=11.78 \ Z=9.07

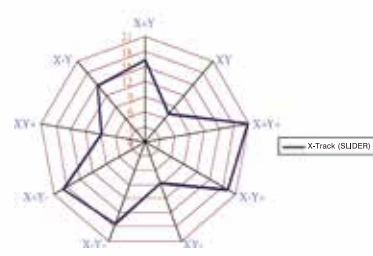
Previous model: X=2.47 \ Y=3.61 \ Z=3.51



Nine courts diagram analysis



Radar diagram analysis



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)

ONE PIECE OIL - COOLANT SEPARATION STRUCTURE

A Its unique one piece structural design to separate oil and coolant on the machine, prevent coolant contamination problems.

B 3 axes direct transmission between servo motor and ball screws. High torque servo motors are directly coupled with ball screws, without backlash or servo lag problems caused by belt. All ball screws are center-supported plus two ends adopt precision angular bearings. The servo motors are absolute type with encoder, providing absolute position data to the system, avoiding use of limit switch and zero returning, which increases machining efficiency and reliability. (Applicable on Meldas and Fanuc controller)

C 3 axes rapid feedrate up to: X, Y=40 m/min (1574.8 ipm), Z=30 m/min (1181.1 ipm). Employs high rigidity linear guideways, the machine also uses oversized ball screws with twin nuts, displaying excellent acceleration / declaration, redvcng machining time. Especially for complicated parts machining, accurate results can be achieved.

D Extra large conjunction area between column and base, increased column rigidity in X axis direction. The extension of column base increases rigidity in Y and Z axes.

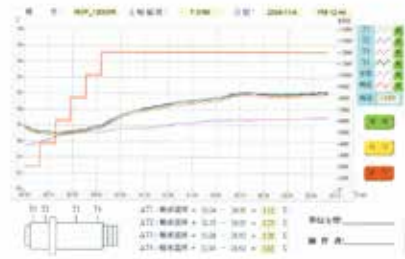
E Column rear-inclination design, reduces unnecessary mass, shifts the center of gravity forwards, and increases the damping effect on Y axis direction.



Thermal Growth Compensation Function (DDS only)

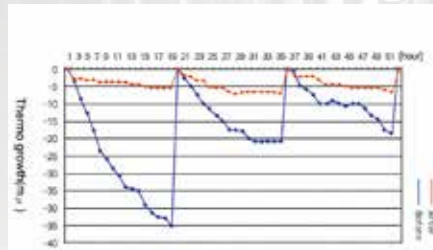
All spindles are fitted with spindle chiller to keep optimum and constant machining conditions and stable temperature.

Spindle Run-In Test Report



Each spindle is subject to tests before assembling into the machine. Accurate control for spindle temperature variation is achieved through 4-point detection on the spindle.

Thermal Growth Compensation



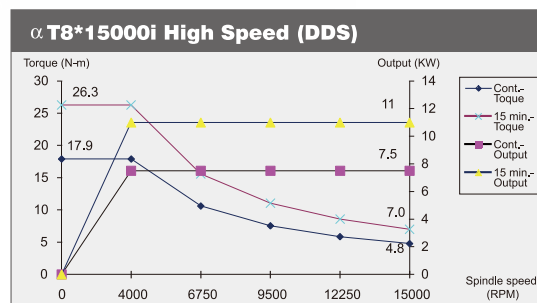
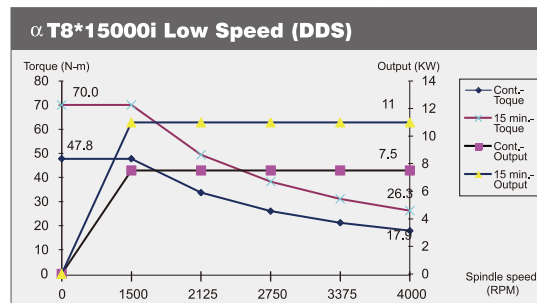
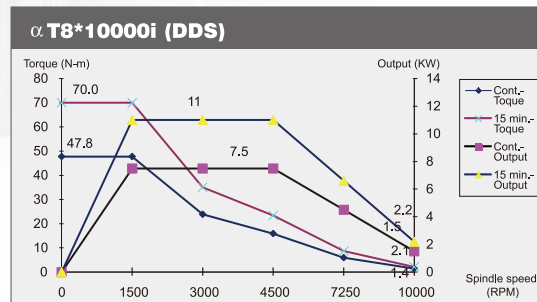
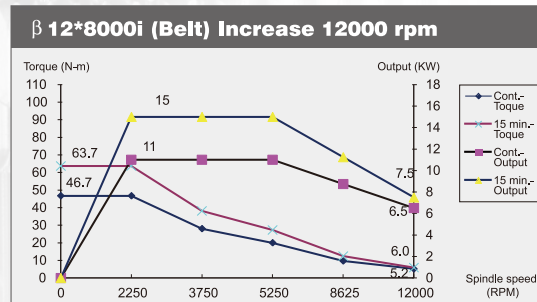
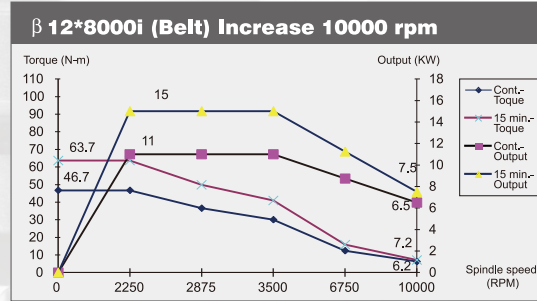
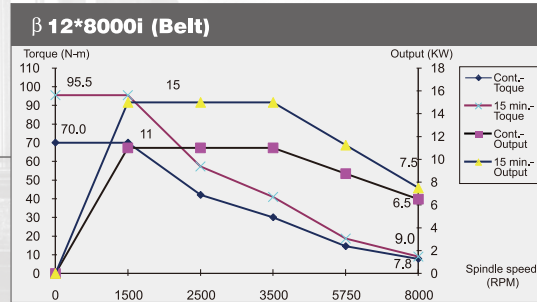
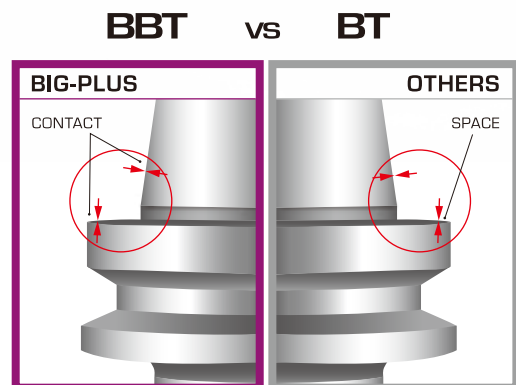
Morning, Noon, Night Spindle Thermal Growth

Thermal displacement is a serious problem in high speed machining which greatly affects part accuracy, especially in long, continuous machining. Now, with the "Thermal Growth Compensation Function", spindle elongation can be minimized. Also, no warm-up before machining is required for upgrading efficiency.

Cylinder type design spindle, full support by headstock casting, enhanced rigidity.



30% rigidity up



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.

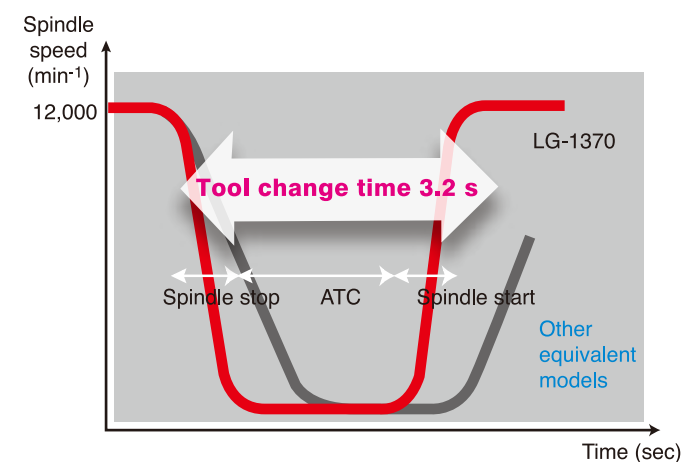
- Rapid traverse rate: 50m/min.
- X-axis acceleration: 0.3G
- Y-axis acceleration: 0.3G
- Z-axis acceleration: 0.2G

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

- Tool change time: 3.2 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

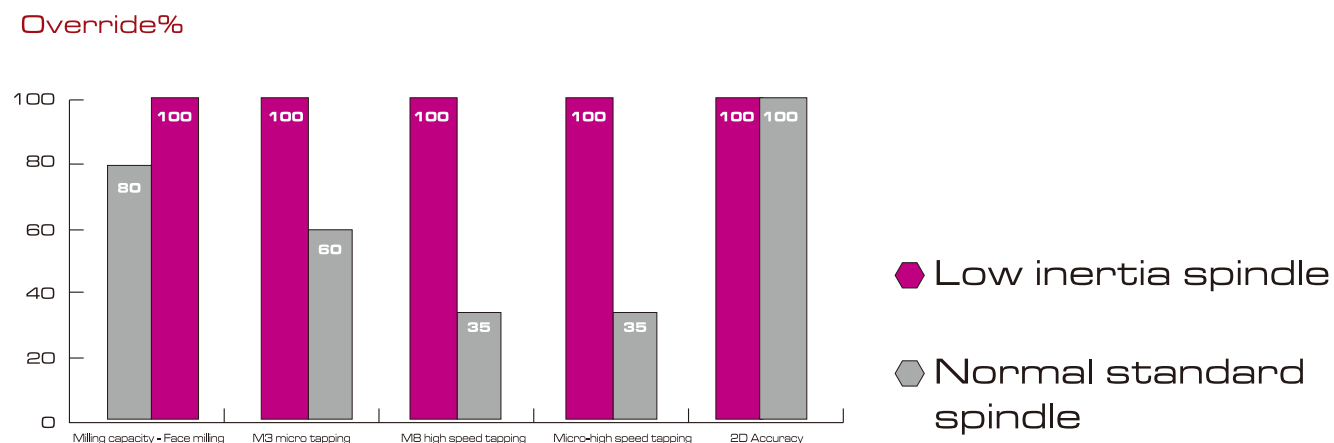


High / Low spindle speed
0 ~ 8000 ~ 0rpm

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

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

Overall Evaluation of performance on Mitsubishi low inertia spindle



PERFORMANCE OF MICRO HOLE HIGH SPEED TAPPING - M1.2 MULTIPLE HOLES CONTINUOUS TAPPING

Compared with a Mitsubishi low inertia spindle and a normal standard spindle, the low inertia spindle performs better in M1.2 micro hole high speed tapping, each hole is 1.78 second faster, the tapping efficiency is **1.25** times higher, 78 holes continuous tapping.

Machining time of Mitsubishi low inertia spindle: 111 sec / 78 holes. Average 1.42 second per hole.

Cutting tool	Diameter	Speed RPM	Coolant	Feedrate mm/min	Number of holes	Tapping depth mm	Drilling diameter mm	Drilling depth mm
M1.2 deep hole tapping	Aluminum 6061	3000	Oil based	750	78	-3	1	-5

HARTFORD LED CENTER

Model LG-1370
Spindle Material DDS 15,000 rpm, 11kW S45C

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.

FACE MILL END MILL DRILLING TAPPING

Tool Diameter	Ø80 mm (3.15")	Tool Diameter	Ø63 mm (2.48")	Feed Rate	200 mm/min (7.87"/min)	Feed Rate	375 mm/min (14.76"/min)
Feed Rate	2,000 mm/min (78.74"/min)	Feed Rate	2,860 mm/min (112.6"/min)	Depth	25 mm (0.98")	Depth	20 mm (0.79")
Depth	2 mm (0.08")	Depth	30 mm (1.18")	Width	2 mm (0.08")		

260 c.c./min
Cutting Volume

172 c.c./min
Cutting Volume

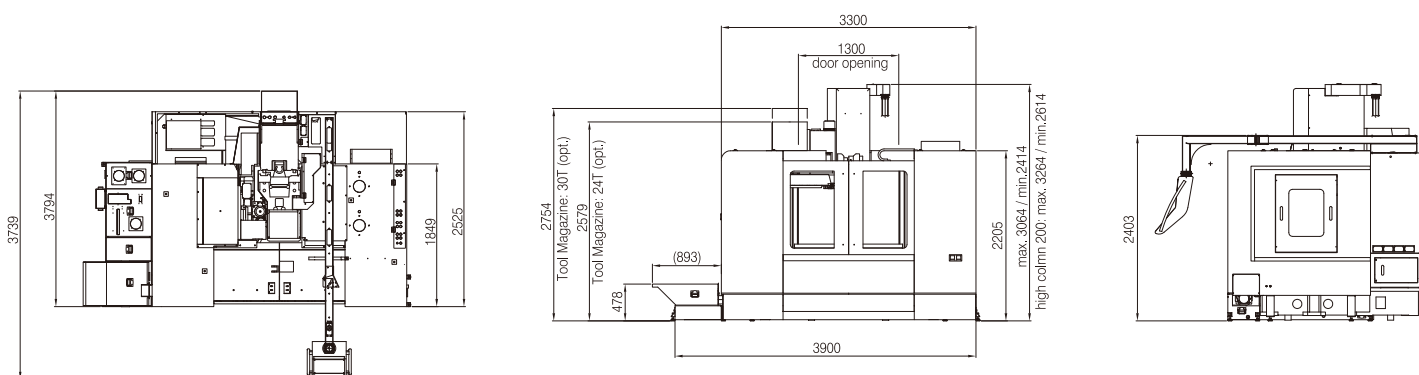
Ø18 (0.71")
Tool Diameter

M20x2.5 mm
(0.79"x0.10")
Tool Diameter

MACHINE DIMENSIONS

	Unit	LG-1370
Table		
Working surface	mm (inch)	1400 x 650 (55.12 x 25.59)
T-slot(size×number×pitch)		18 x 5 x 125 (0.71 x 5 x 4.92)
Max table load	Kg (lbs)	1000 (2204.62)
Travel		
Longitudinal Travel(X-axis)	mm (inch)	1300 (51.18)
Cross travel(Y-axis)	mm (inch)	700 (27.56)
Vertical travel(Z-axis)	mm (inch)	650 (25.59)
Distance from spindle end to table center	mm (inch)	150~800 (350 ~ 1000 opt.) (5.91~31.50)(13.78~39.37 opt.)
Spindle		
Spindle nose taper		ISO40
Spindle speed	r.p.m.	Belt: 8000 (10000 / 12000 opt.) DDS: 10000 (15000 opt.)
Feed		
Cutting feedrate	mm/min (ipm)	1~12000 (472.44)
Rapid traverse(X,Y,Z axes)	M/min (ipm)	X=30, Y=30, Z=24 (X=40, Y=40, Z=30 opt.) (1181.1 / 1181.1 / 944.88) (1574.8 / 1574.8 / 1181.1 opt.)
ATC		
Tool storage capacity	PCS	S=20 A=24 (30 opt.)
Max.tool weight	KG (lbs)	6
Max.tool size(diameter*length)	mm (inch)	S=Ø90 x 250L (Ø3.54 x 9.84) A=Ø75 x 300L (Ø2.95 x 11.81)
Tool selection		Carousel Type ATC / Arm Type ATC
Tool shank		BT40 (BBT/CAT/DIN)
Pull stud bolt		P40T-1 / CAT40/DIN69872
Motor		
Spindle drive motor(FANUC)(Cont/30 min)	KW (HP)	11 / 15 (15 / 18.5 opt.) (14.75 / 20.12)(20.12 / 24.81 opt.)
X、Y、Z axis drive motor(FANUC)		β 22 / 3000i
Positioning Accuracy		
3 axes laser positioning accuracy (JIS B6330)		
Positioning accuracy / full travel	mm	±0.08
Repetitive positioning accuracy	mm	±0.003
3 axes laser positioning accuracy (VDI 3441)/repeated 5 times		
Positioning accuracy	mm	0.014
Repetitive positioning accuracy	mm	0.008
Other		
Required air pressure	Kg/cm ² (PSI)	6.5 (92.45)
Electric power consumption	KVA	34
Machine weight	Kg (lbs)	8300 (18298.37)
Floor space (Full Guarding)	mm (inch)	3900 x 2930 x 3020 (153.54 x 115.35 x 118.90)
<ul style="list-style-type: none"> Specifications of the machine are subject to be modified without prior notice. (Please refer to the shipping document for the precise machine weight) Laser inspection before shipment is conducted according to JIS B6330 standard. VDI 3441 standard is available upon request. 		

LG-1370 Chip collecting tank type Profile Drawing



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 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

B. HARTNET (OPTION)

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

C. ELECTRICAL FUNCTION (OPTION)

- Compensation of temperature displacement
- 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
- Air blast through spindle
- Leveling bolts and blocks
- Automatic power off
- Operation finish lamp
- Operation manual and electric drawing
- Coolant tank
- #40 8,000 rpm pulley head
- Coolant jets around spindle
- Workpiece calibration (manually) spindle load monitor
- M code display
- PLC bit setting screen
- Tool comment
- Hole pattern
- Face milling cycle
- Side milling cycle
- Pocketing cycle
- True circle cutting
- more...

(OPTION)

- Full enclosed splash guard (CTS)
- NC rotary table
- DNC software
- Linear scale positioning system
- Front mounted screw type chip conveyor
- Link type chip conveyor
- Coolant flushing device
- Automatic tool measurement system
- Automatic workpiece measurement system
- #40 10,000 & 12,000 rpm pulley head (Ref. page 6)
- 20 bar coolant through spindle
- 25 bar coolant through spindle
- 70 bar high pressure coolant system
- Handy coolant gun
- Spindle air curtain
- Spindle oil cooler
- Large diameter tool
- Program scheduling
- Machining time stamp
- more...