MITSEIKI

ISO 14001

ISO 9001

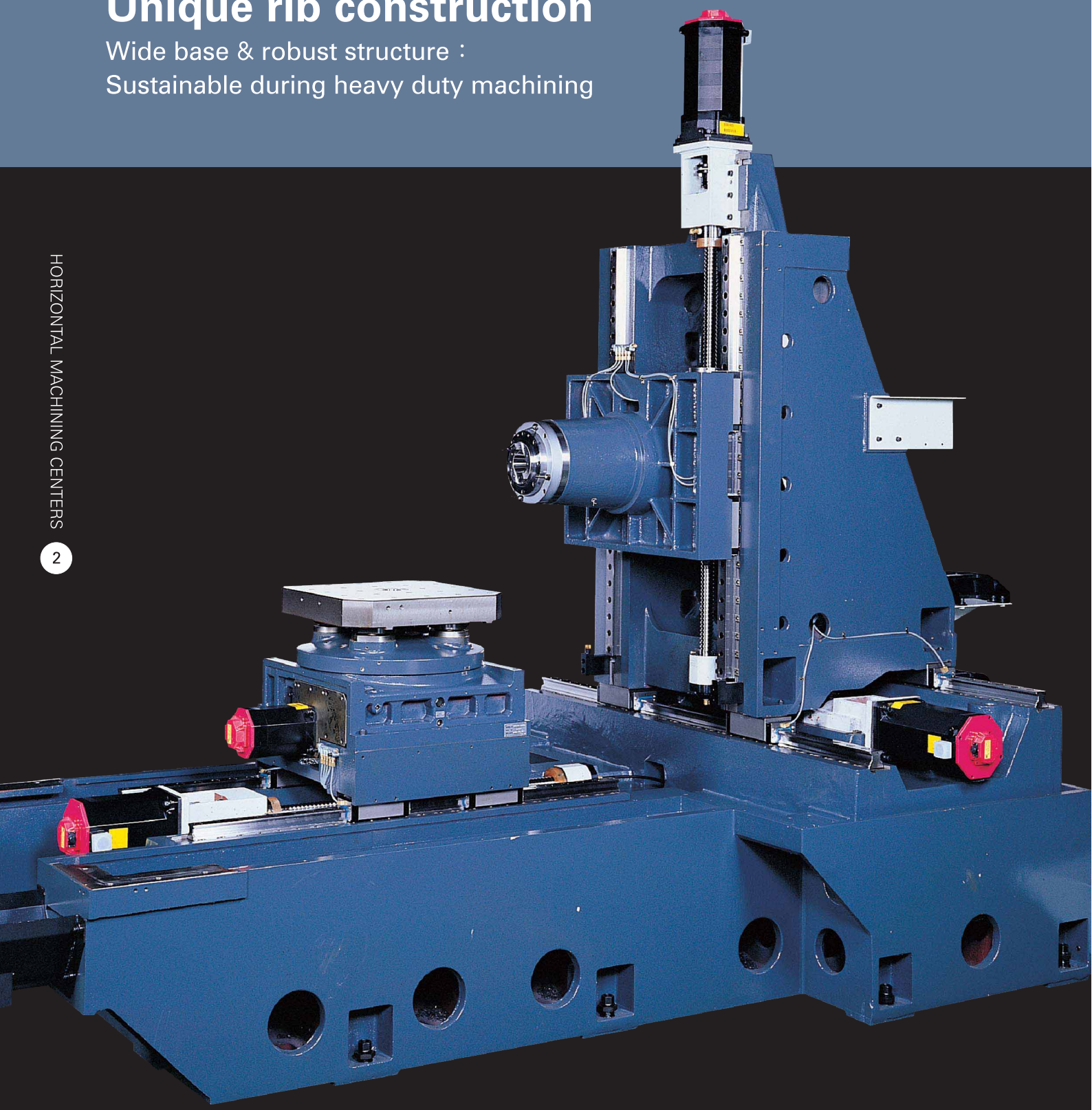
LH-500

Horizontal Machining Center

Mechanical rigidity

Unique rib construction

Wide base & robust structure :
Sustainable during heavy duty machining



Machine design

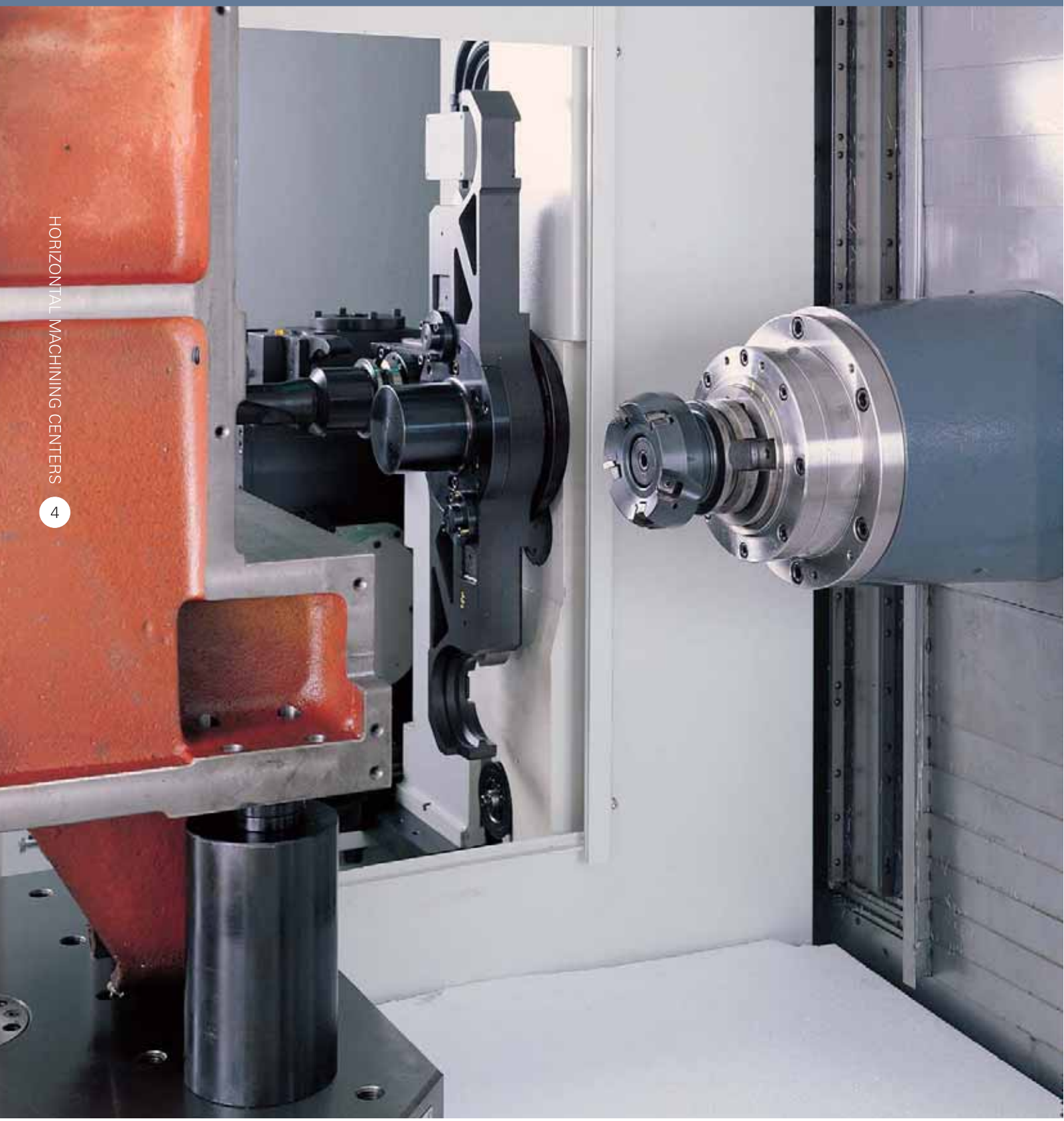
Strong & Exquisite structure

- The major construction parts are based on Meehanite cast iron. They are stable and precision-proved in structure.
- Through finite element analysis the casting is reasonable structure strength and super rigidity for heavy duty cutting.

High speed mechanism

Shorten non-machining time substantially

The capability of spindle acceleration, deceleration, transmission and tool change time is the key of high cutting efficiency.
LH-500 shortens the machining time by enhancing major mechanism's speed.



Production efficiency

Gain extra profit by reducing non-machining lose

Max. spindle speed

10,000RPM

Rapid traverse rate

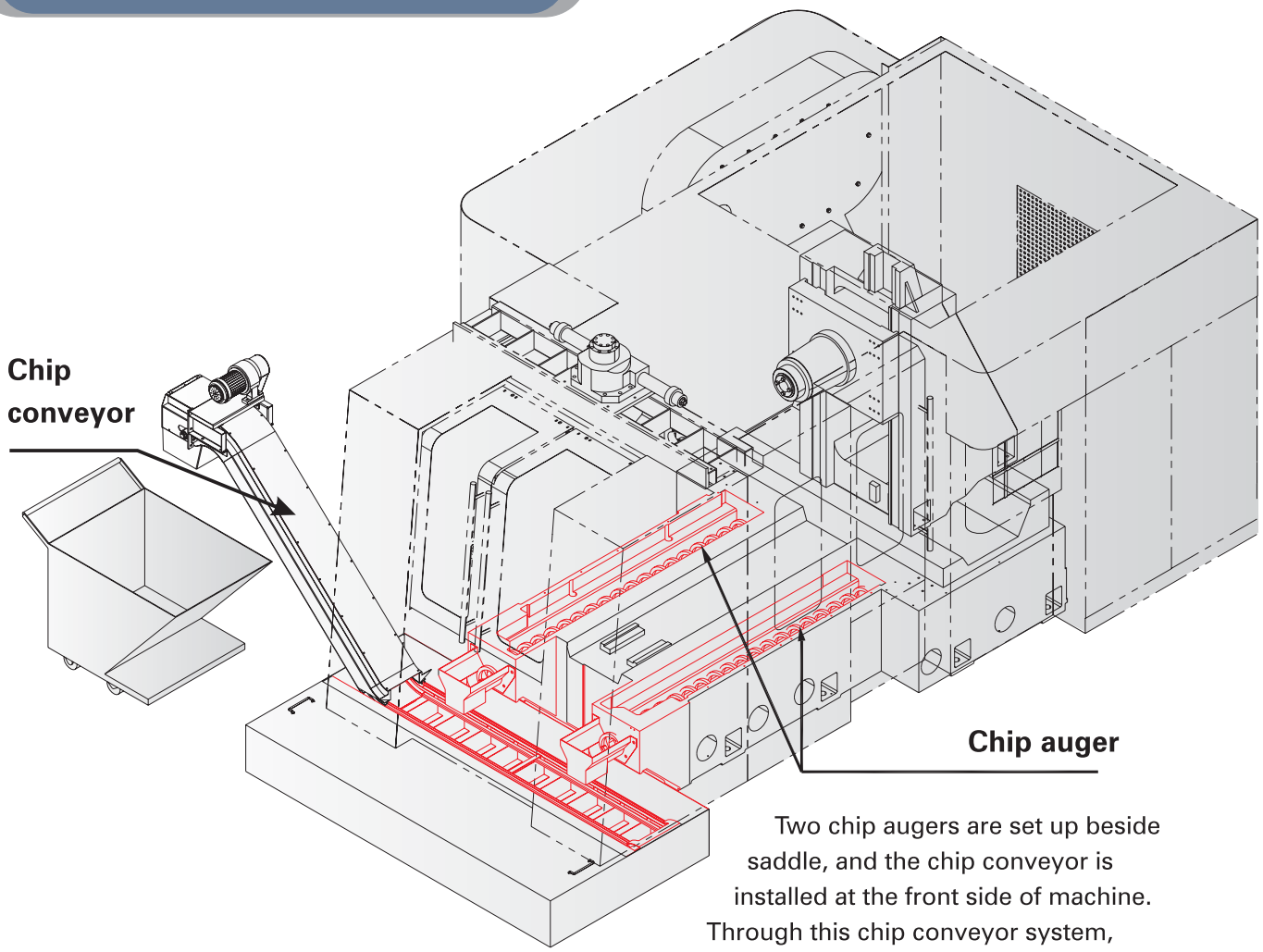
X, Y, Z : 36 m/min

Chip disposal

Increase machine activation substantially

The high efficiency chip disposal system resolves completely the chips problem of horizontal machine center. The disposal system not only increases machine activation substantially but also prevents the accuracy affection by the chips heat.

Chip conveyor system



Two chip augers are set up beside saddle, and the chip conveyor is installed at the front side of machine. Through this chip conveyor system, the large chips quantity can be handled easily.

Sharp telescopic cover design

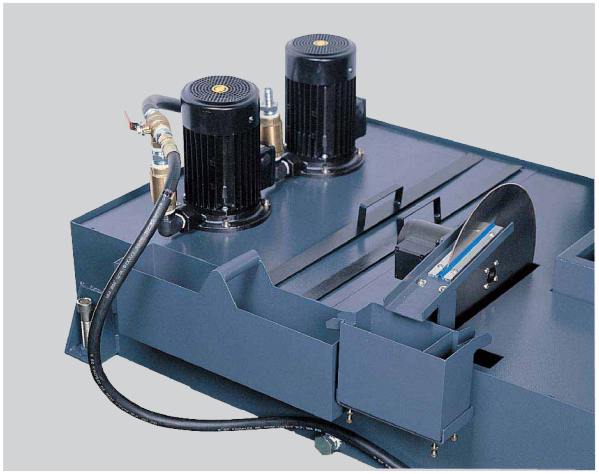
- By extra large angle design of the telescopic covers and rail covers, the chips discharge capability is ensured for dry or for semi-dry cutting.

Complete chip disposal and coolant circulation system

- The chips can flow into chip augers easily by the very large slope design then they are discharged to front chip conveyor.
- Recycle of the lube oil can be gathered by the unique oil recycle design.

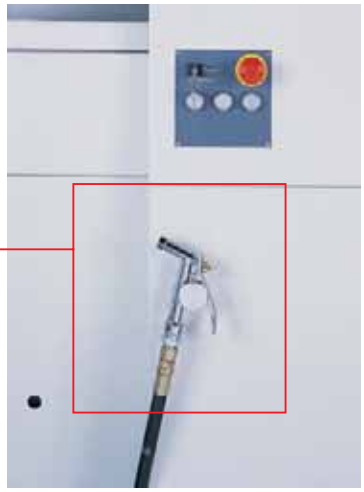
In door coolant mechanism

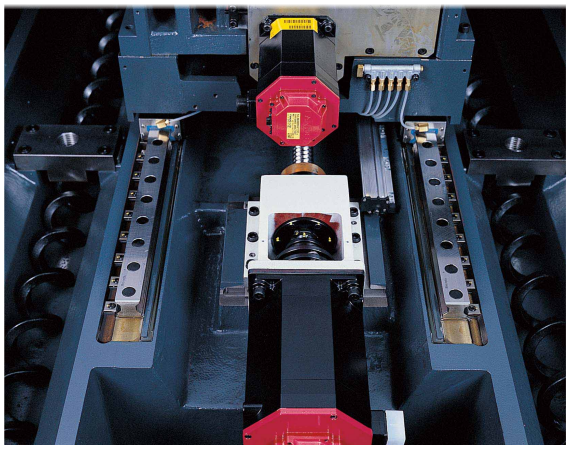
Oil-coolant separation



◀ 4 splash nozzles to prevent chips heap.

Coolant wash gun





Oil recycle machanism

- To separate oil and coolant, the unique design effectively splits the lubrication oil and the coolant. The coolant quality will last long and the machining quality will be guaranteed.
- After separation, the coolant will be recycled and oil will be centralized and disposed to meet Green environment protection regulations.

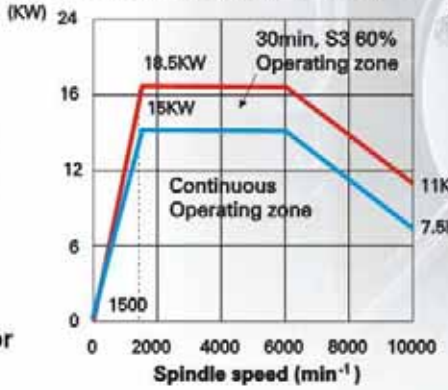
LH-500A/B spindle torque chart & character

Spindle motor : α15

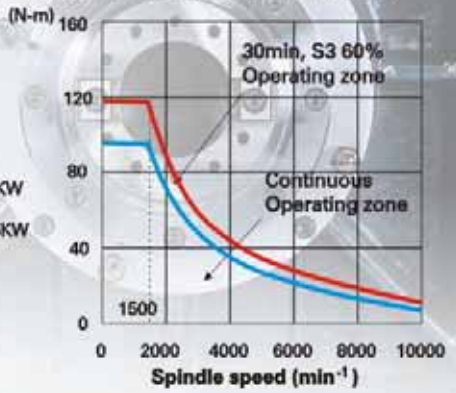
This spindle motor gives the same characteristics as gear box.

When the spindle speed is up to 2,000 RPM, the motor changes wiring connection from Y to △.

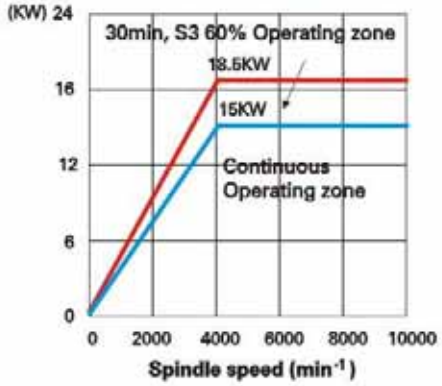
Low-speed winding output (Y connection)



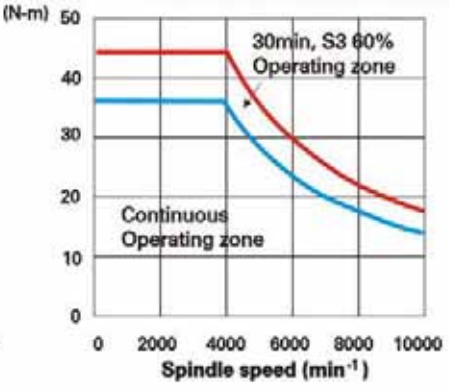
Low-speed winding torque (Y connection)



High-speed winding output (△ connection)



High-speed winding output (△ connection)



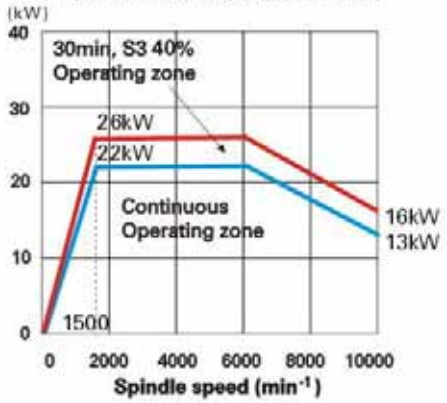
LH-630A/B spindle motor torque chart & character

Spindle motor : α T22

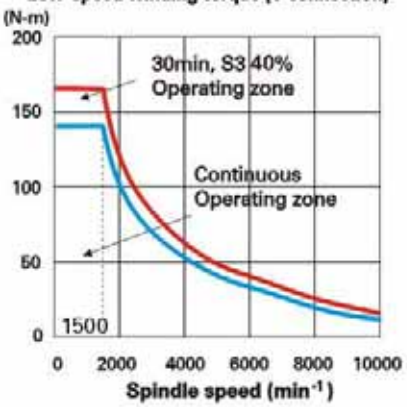
This spindle motor gives the same characteristics as gear box.

When the spindle speed is up to 2,000RPM(#50), the motor changes wiring connection from Y to △.

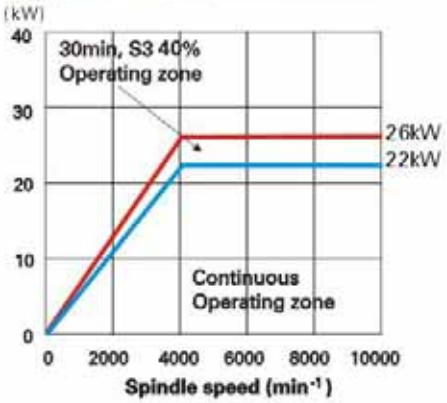
Low-speed winding torque (Y connection)



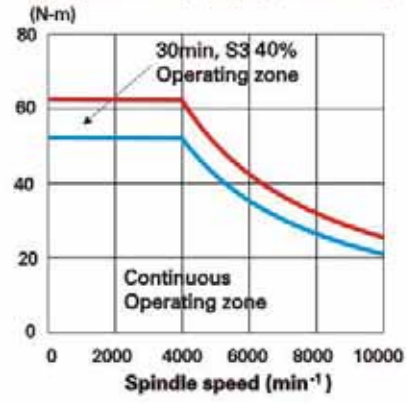
Low-speed winding torque (Y connection)



High-speed winding output (△ connection)

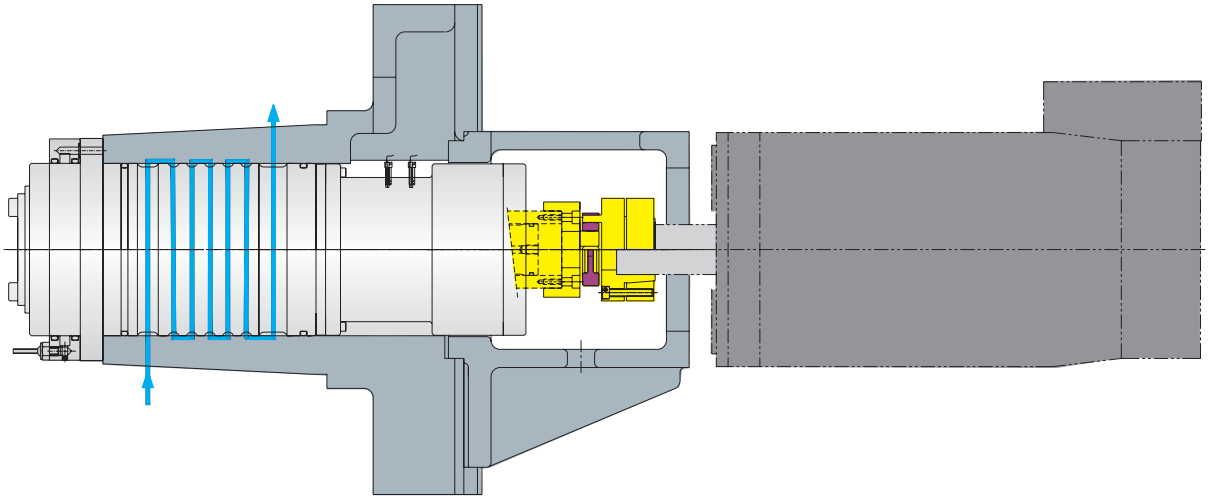


High-speed winding output (△ connection)



Spindle transmission system

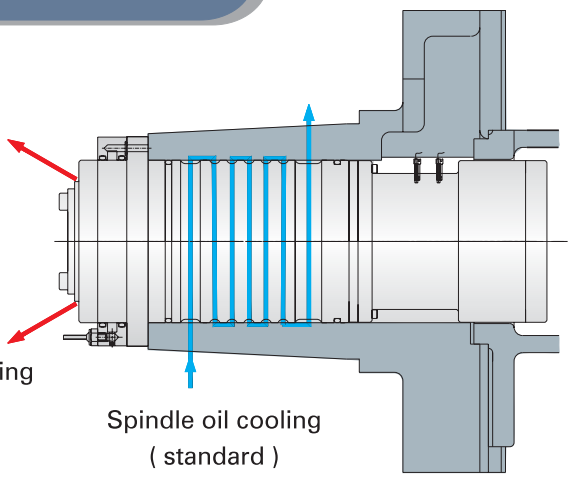
Unique IDD spindle transmission



IDD (Isolated direct drive system)

- The spindle is free from thermal effect of main motor. The thermal elongation is reduced and the spindle accuracy and service life can be ensured.
- The application of spindle oil cooling system can increase the spindle accuracy.
- The spindle is directly coupled to the main motor. No belt or gear is used. The noise, backlash and vibration effects are dramatically reduced.
- The transmission efficiency is increased due to the direct coupling. The high accuracy rigid tapping is achievable due to the direct rotation detection by the main motor.

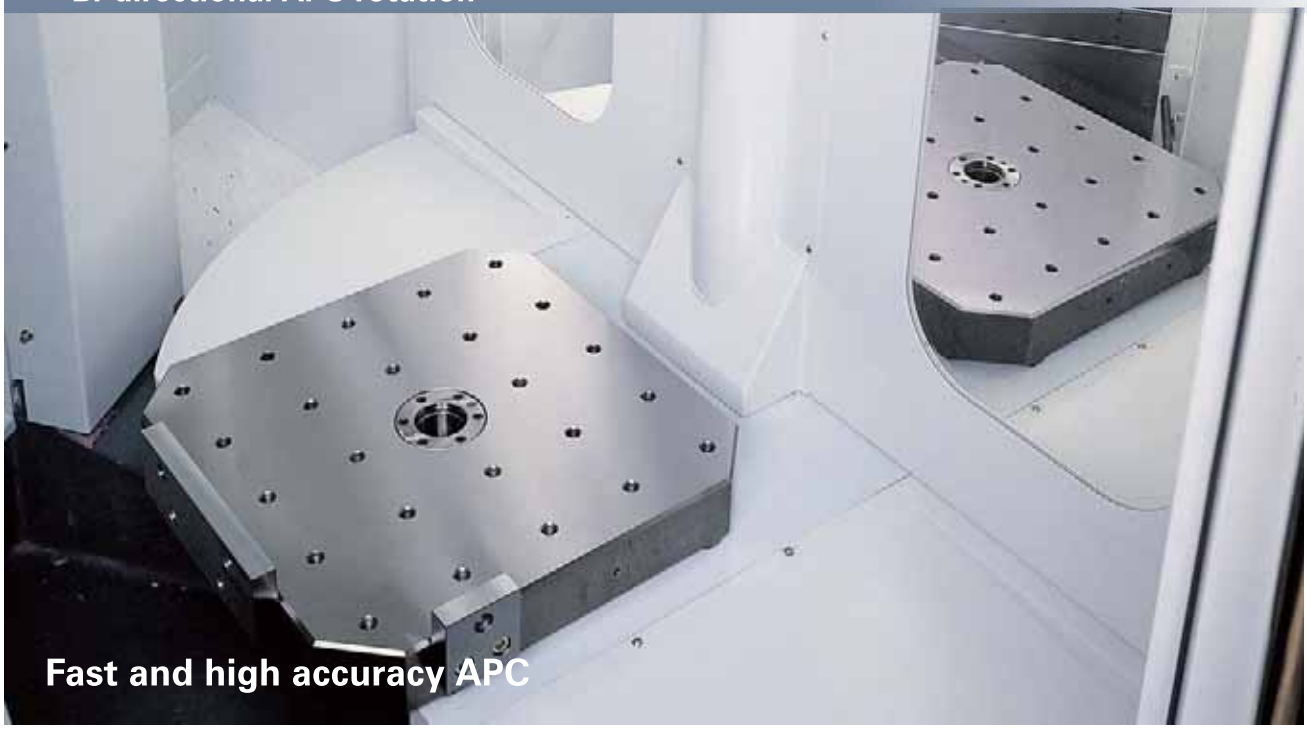
SPINDLE AIR SEALING/OIL COOLING SYSTEM



- While in high speed working condition, the spindle oil cooling system can efficiently keep a constant temperature on the spindle. This means less thermal deformation on the spindle head and much improvement of cutting accuracy.
- The spindle air sealing system prevents the vacuum pumping effect while the spindle is at very high speed. The contaminant is kept from penetrating into the spindle bearings.

APC system

Bi-directional APC rotation



Pallet

Standard indexing 1° (Standard)

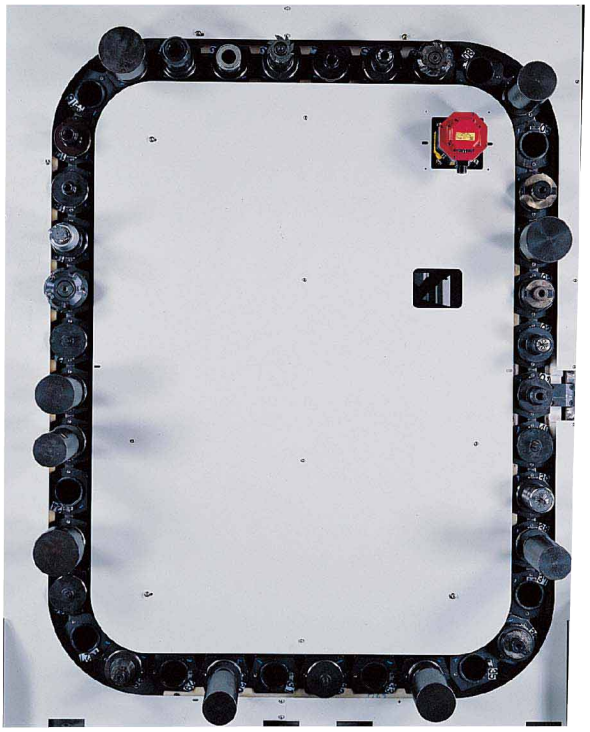
Minimum indexing 0.001° (Option)

Front pallet rotation by manual 0° → 90°

ATC

- Fast, simple, reliable and long service life tool changer system.
- The unique tool change system adopts advanced cam drive device. Tool selection can be done fast by PLC program.
- The tool system passes 1,000,000 times test which meets the reliability requirement.
- Saving non-machining time, increasing production efficiency.
- ATC tool changing is still smooth when the heavy tool is selected..

Reliable automatic tool pre-setter mechanism



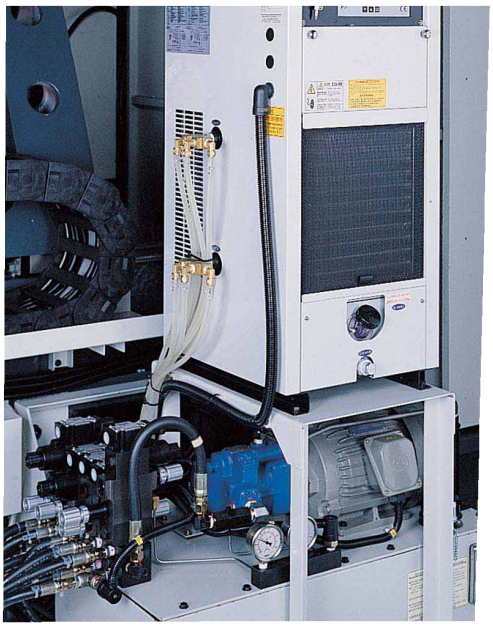
Standard tool magazine(#40) : 60 stations
Standard tool magazine(#50) : 40 stations

Maintenance

Convenient design for saving maintenance cost

Maintenance door for ATC

Piping centralized (Hydraulic system)



Maintenance door for oil cooler

4th axis rotary cables centralized


HIGH PRECISION

HIGH PRECISION

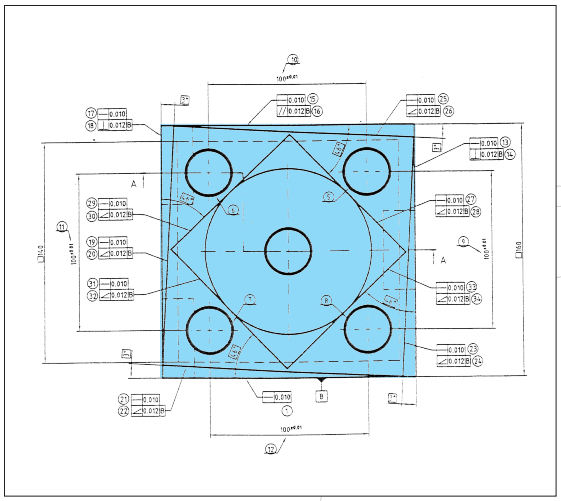
LASER INSPECTION

- The full stroke is inspected and compensated by laser measurement instrument. The motion accuracy can be ensured

SPINDLE DYNAMIC BALANCING

- The IRD dynamic balancing instrument calibrates the spindle displacement, velocity and acceleration of the full speed range.

STANDARD SAMPLING TESTING



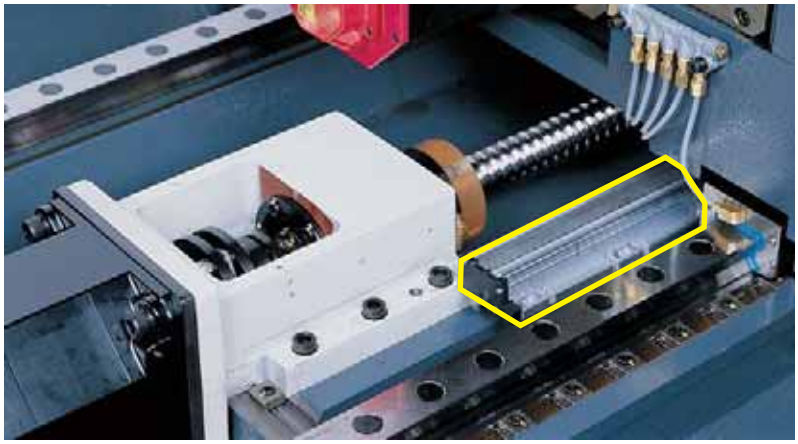
- Besides the in process inspection, the machine accuracy is guaranteed by a real cutting test.
- The ISO standard sampling test is an index for accuracy level.

BALL BAR INSPECTION

- The Reineshaw ball bar instrument calibrates the circularity and the geometrical accuracy to ensure precise three dimensional motions.

HIGH PERFORMANCE ACCESSORIES

LINEAR SCALE OP

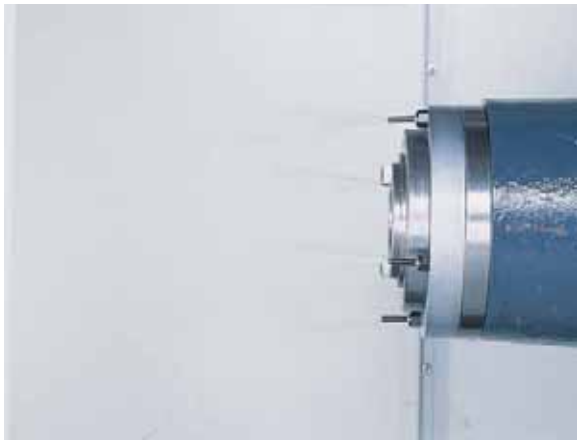


- Automatic compensation refers to linear scale feedback of thermal effect.
- Air protection of linear scale can prevent damage by dust or oil. The accuracy and service life can be ensured.

COOLANT THROUGH SPINDLE SYSTEM OP

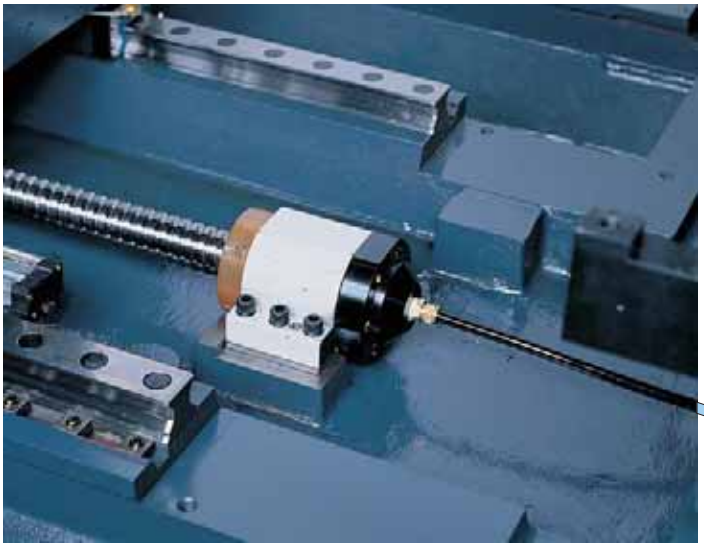
- Coolant passes through spindle center then sprays from nose of tool. The heat can be brought away by high coolant pressure to ensure machining quality. It's excellent for deep hole machining.

SPINDLE SPLASH RING



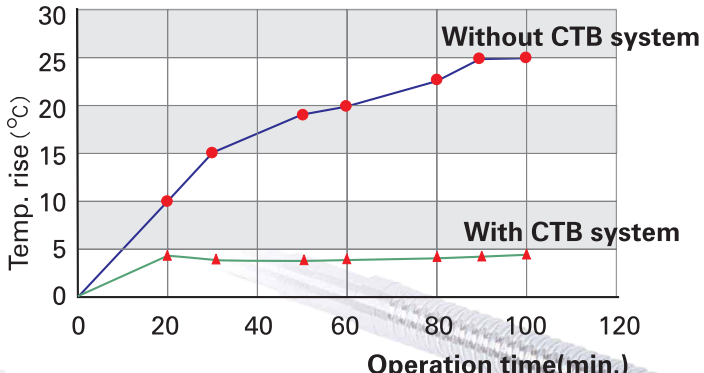
- 4 splash nozzles around spindle. Tool and workpiece can get the best cooling effect.

COOLANT THROUGH BALLSCREW SYSTEM



- Due to its unique hollow ballscrew design, the system controls the ballscrew temperature rise through an automatic lubrication unit. This enables both cutting accuracy and long operation time.

Hollow ballscrew cooling efficiency chart



Testing data

Ballscrew dia. (mm)	Rotation speed (RPM)	Oil temp. (° C)	Coolant flow L/min
∅50xP12	1000	20	2.5

New generation operation system

Close distance

Table to front door distance

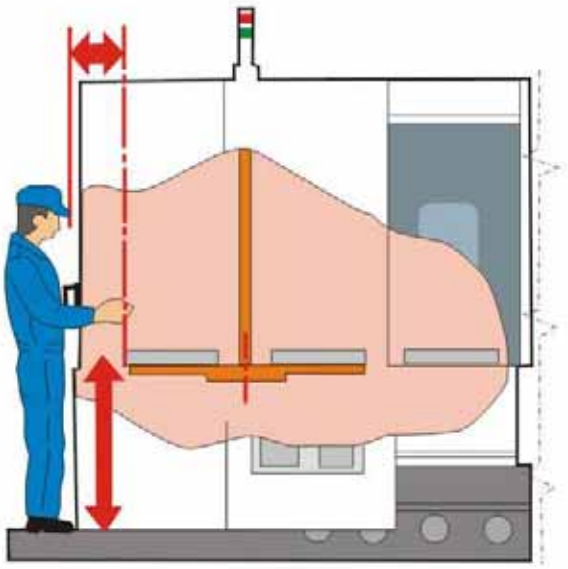
270mm(LH-500)

360mm(LH-630)

Ground to pallet height

1195mm(LH-500)

1295mm(LH-630)



■ Short distance design between operator and pallet.

Full opening front door

822mm(LH-500)

1200mm(LH-630)

■ Wide front door design to easy loading and unloading workpieces and equipments.

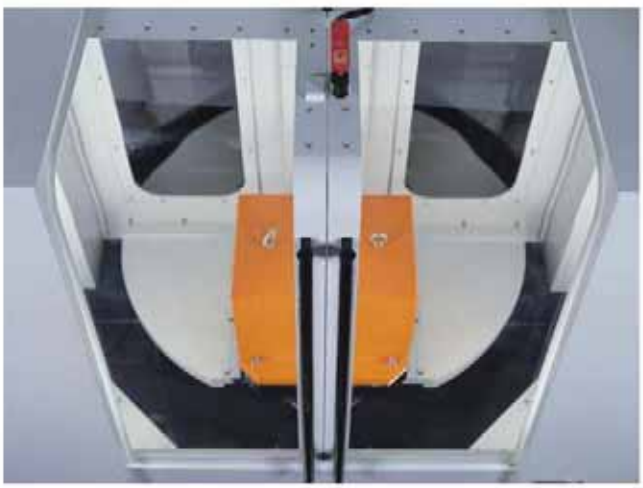
The least floor space

Compact machine design saving floor space

The floor space : 3210mm x 5200mm x 2904mm (LH-500)

3550mm x 6000mm x 3440mm (LH-630)

Excellent front door transparency



Excellent operation door transparency

■ Wide and transparent acrylic windows of front door and operation door come with high brightness work light which contributes to the best monitoring of machine operation.

Cutting performance

Face mill Ø80mm

LH-500B	LH-630B
Chips removal rate	Chips removal rate
334mL/min	**400mL/min**
Spindle speed	Spindle speed
1000 rpm	1000 rpm
Feedrate	Feedrate
1200 mm/min	1300 mm/min

End mill Ø40mm

Chips removal rate	Chips removal rate
150mL/min	**197mL/min**
Spindle speed	Spindle speed
500 rpm	640 rpm
Feedrate	Feedrate
175 mm/min	230 mm/min

Drill Ø50mm

Chips removal rate	Chips removal rate
177mL/min	**220mL/min**
Spindle speed	Spindle speed
900 rpm	900 rpm
Feedrate	Feedrate
90 mm/min	113 mm/min

Tapping

Tool	Tool
M36xP4.0	**M40xP4.0**
Spindle speed	Spindle speed
88 rpm	88 rpm
Feedrate	Feedrate
352 mm/min	352 mm/min

Controller specification

(FANUC 18i)

STANDARD	
Controlled axis	
Controlled axes	X,Y,Z,B
Simultaneously controlled axes (each path)	Positioning/Linear interpolation/circular interpolation 3/3/2
Program input	
Least input increment	0.001 mm
Least displacement	0.001 mm
Max. programmable dimension	±99,999.999 mm
Absolute/incremental programming	Combined use in the same block. G90,G91
Decimal point programming	
Inch/metric conversion	G20/G21
Tape code	EIA RS244/ISO840
Interpolation function	
Positioning	G00
Linear interpolation	G01
Circular interpolation	G02/G03
Helical interpolation	
Linear acceleration / deceleration after cutting feed interpolation	
Feed function	
Feed per revolution	1～10,000 mm/min
Feed stop temp.	G04
Manual handle feed	1 unit/each path 1x1,x10,x100skip
Automatic acceleration/ deceleration	Rapid traverse¡linear Cutting feed¡exponential
Rapid traverse override	FO 25/50/100% or 0～100% (1% Step)
Feedrate override	0～254%
Override cancel	
Spindle orientation	
Jog feed	0～1,269 mm/min
Feed per min.	
Program storage and editing	
Part program storage length	Tape 20 m, around 8kbyte
Program editing	
Searching function	Program No. Serial No. Address
Number of registerable programs	63
Program No./Program name	4 rows/ 48 letters
Operation - display	
Control unit incorporated type display unit	With type 10.4" color TFT
Input/output data	
Input/output interface	RS232-C/PCMCIA(tape I - II)
RS232-C tape running *2	
Spindle speed function	S5 digit, binary output
Spindle speed ratio	50～120%(10% increment)
Tool function	T8-digits *3
Auxiliary function	M8-digits
Tool offset	
Tool compensation	G45～G48
Tool radius compensation	G40～G42
Tool offset pairs	64 pairs
Tool offset memory C	Distinction between geometry and wear or between cutter and tool length compensation
Direct input of tool offset value measured	
Coordinate system	
Manual reference position return	G10
Automatic reference position return	G28
reference position return	G30
Reference position return	G27
Automatic coordinate setting	
Coordinate setting	G92
Workpiece coordinate setting	G54～G59
Partial coordinate setting	G52
Area coordinate setting	G53
Operation supporting function	
Single block	
Select stop	
Skip	
Dry run interlock	
Auxiliary function lock	
Mirror image	
Manual absolute value	
Z axis lock	
Run time and parts count display	
Extended part program editing	
Background editing	
Dynamic graphic display	
Clock function	
Tool length measurement	
Load monitor function	
Program supporting function	
Radius indicted	G73,G74,G76,G80～89, G98,G99
Drill cycle	Max. 4 duplicates
Subprogram	
Custom macro B	
One direction position check	
Rigid tapping	
NC program output *5	Conversational function

Advanced preview control	
Conversational programming	
Mechanical system precision compensation	
Backlash offset	
Single direction positioning	
Rapid movement/feed rate backlash compensation	
Auxiliary function	
Axes chain reaction	
Automation supporting function	
Skip function	
Security - maintenance	
Diagnosis function	
Alarm history display	
Operation history display	
Display of software status	

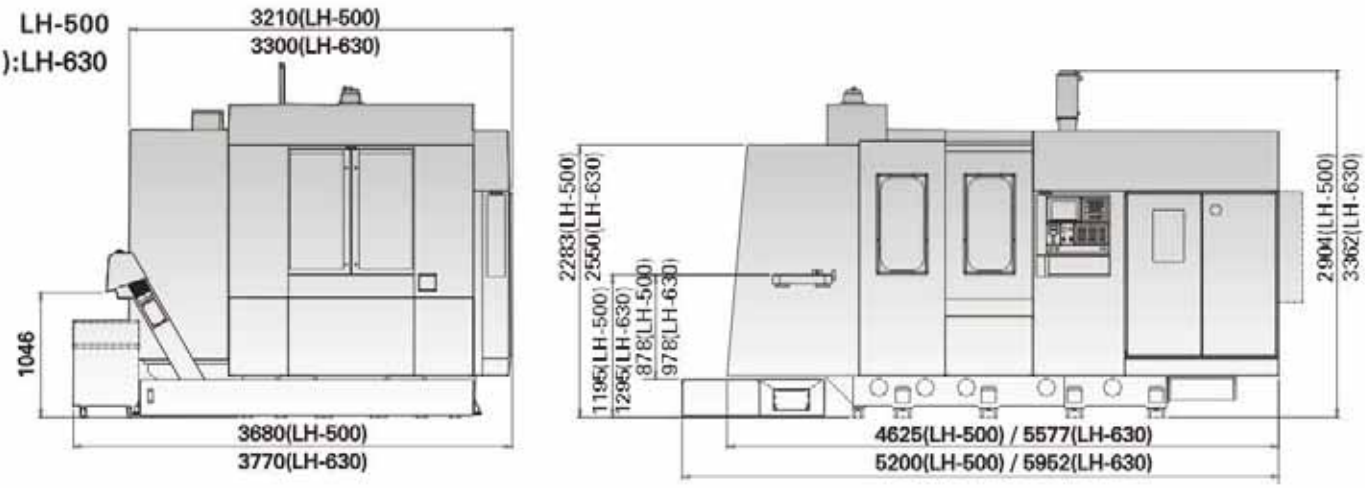
Options	
Addition of part program length	640/1,280/2560m
Addition of registerable program numbers	120/200/400/1000
Addition of tool length compensation pairs	32/99/200/400/499/999
Tool length offset	G43,G44,G49
□ Increment unit 1/10 *7	
□ Hypothetical axis interpolation	
□ Polar coordinate interpolation	
□ NURBS interpolation	
□ Smooth interpolation	
□ Cylindrical interpolation	
□ Exponential interpolation	
□ Involute interpolation	
□ Bell-type acceleration /deceleration after cutting feed Interpolation	
□ Conical/spiral interpolation	
□ One-digit F code feed	
□ Inverse time feed	
□ Feed per revolution	
□ Remote buffer *2	
□ High speed remote buffer *2	
□ Data servo (ATA)	
□ F15 format	
□ Rotary control	
□ Tool offset (G45～G48)	
□ Three dimensional cutter compensation	
□ Three dimensional coordinate conversion	

□ Addition of workpiece coordinate system pair.
□ Floating reference position return
□ manual handle feed
□ Program restart
□ Sequence number comparison and stop
□ Interruption or addition of part program
□ Machine time stamp
□ Tool dodge and return
□Optional hamfering/corner R
□ Custom macro
□ Programmable mirror image
□ Automatic corner feed control
□ Repetitive cycle
□ Addition custom macro common variables
□ Scaling
□ Coordinate system rotation
□ Polar coordinate command
□ M code group check
□ AI contour control
□ AI nano contour control
□ High precision contour control
□ AI high precision contour control
□ AI nano high precision contour control
□ Small hole peck drilling cycle
□ High speed skip
□ Multi step skip
□ Tool life management
□ Addition of tool pairs for tool life management
□ Store stroke limit 2
□ Rotary table dynamic fixture offset
*1. The condition is under Advanced preview control function. Non advanced preview function 5,000 mim/min. According to machining conditions it could to get max. cutting speed.
*2. Must be discussed when need APC and sequence number searching function.
*3. Tool data is 4 lines under conversational function.
*4. Used on ATC - APC
*5. Could be access inside controller only.
*6. Variation according to the tool tool length compensation pairs
*7 Max. value ±9,999,9999 mim

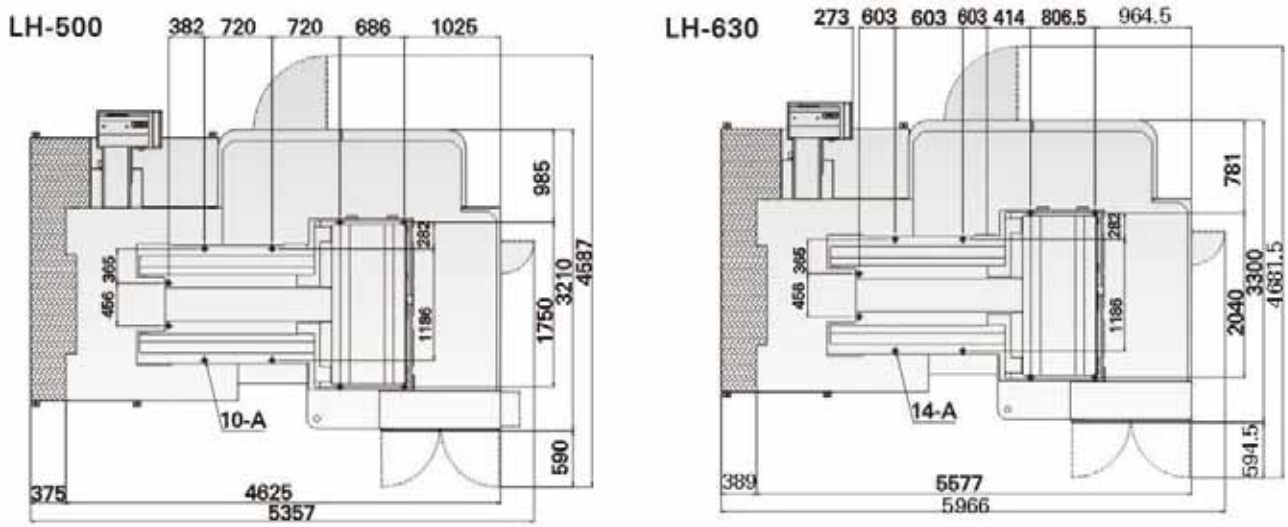
Machine dimension diagrams

Outline

LH-500
( ):LH-630



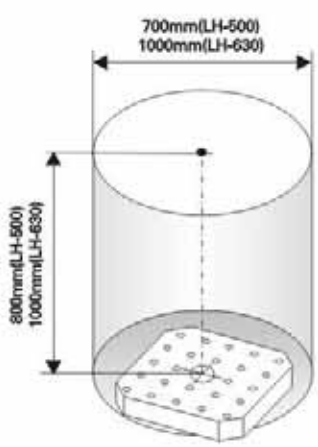
Floor space

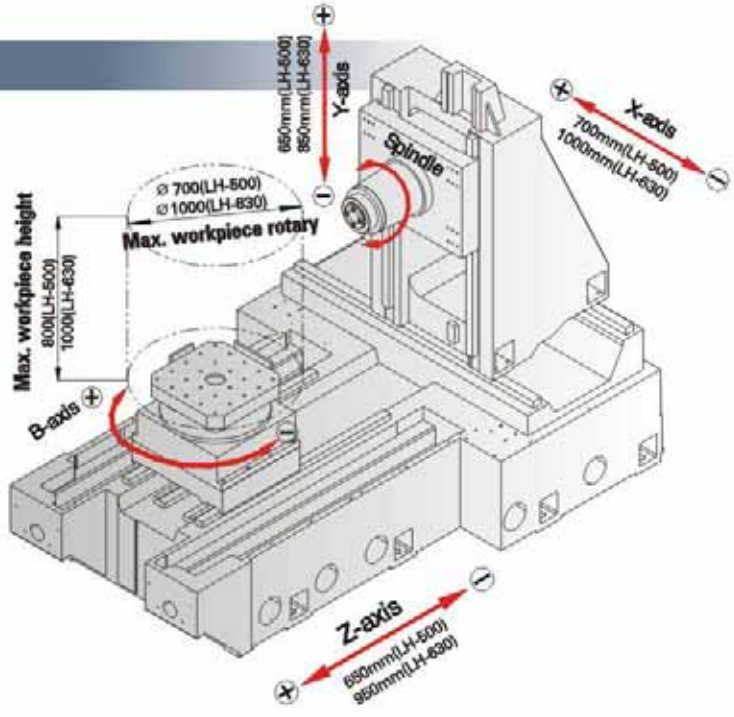


Traverse diagrams

LH-500
( ):LH-630

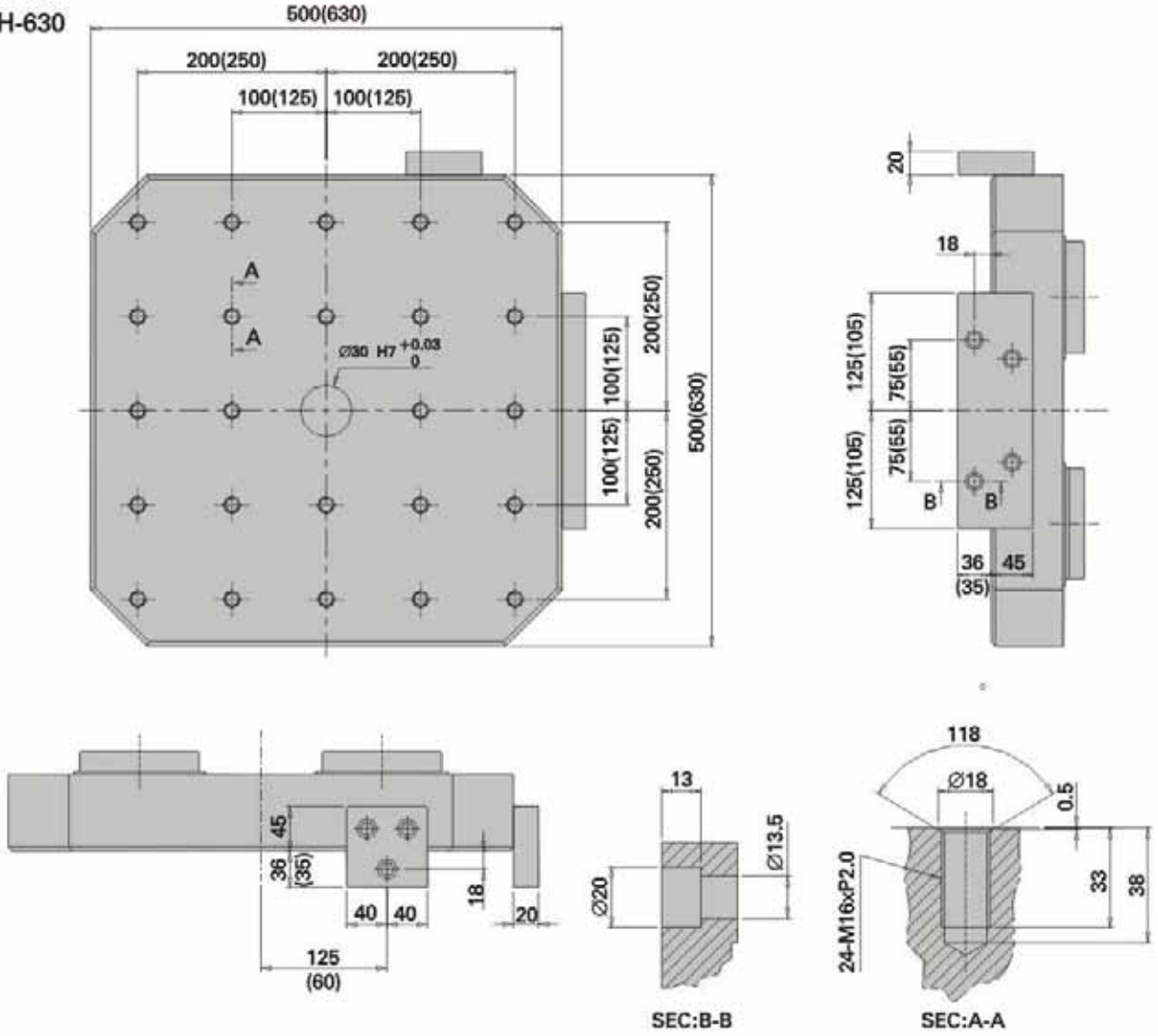
mm(in)





Pallet dimensions

LH-500
( ):LH-630

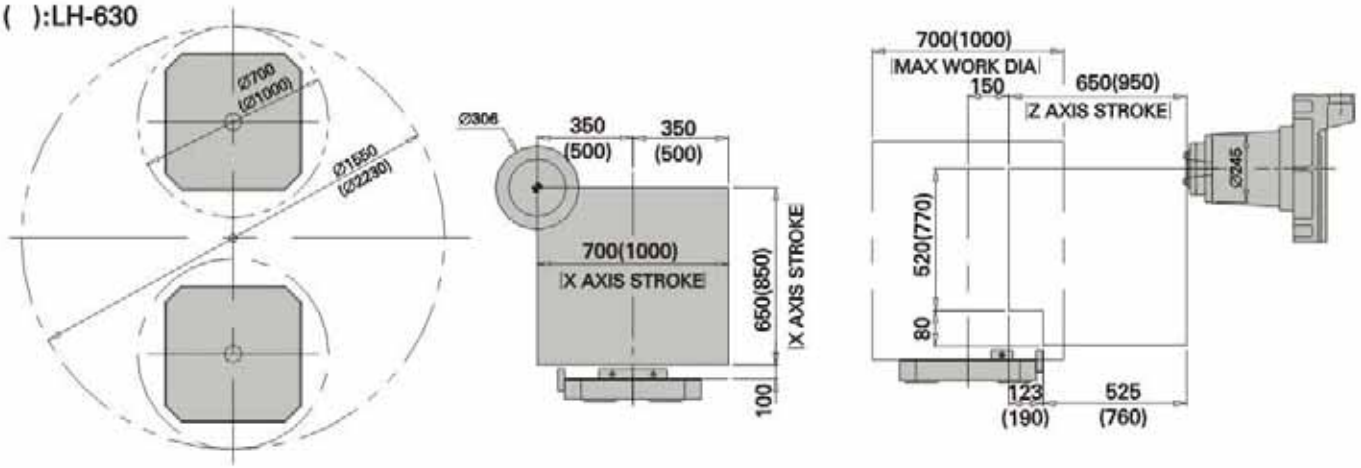


SEC:B-B

SEC:A-A

Machining range

LH-500
( ):LH-630



Machine specification

		LH-500A	LH-500B	LH-630A	LH-630B
Traverse					
Travers X/Y/Z	mm(inch)	700/650/650 (27.6/25.6/25.6)		1000/850/850 (39.4/33.5/33.5)	
Spindle center to pallet	mm(inch)	50-700 (1.97-27.5)		100-950 (3.94-37.4)	
Spindle nose to pallet center	mm(inch)	150-800 (5.9-31.5)		150-1100 (5.9-43.3)	
Pallet					
Pallet size	mm(inch)	500x500 (19.7x19.7)		630x630 (24.8x24.8)	
Maximum pallet capacity	kg(lb)	500(1100)		1000(2200)	
Maximum workpiece size	mm(inch)	∅700 (27.6)		∅1000 (39.4)	
Maximum workpiece height	mm(inch)	800 (31.5)		1000 (39.4)	
Pallet surface configuration	mm(inch)	24-M16 tapped holes, Pitch 100		24-M16 tapped holes, Pitch 125	
Pallet indexing		1°		1°	
Spindle					
Spindle taper		7/24 Taper, No. 40	7/24 Taper, No. 50	7/24 Taper, No. 40	7/24 Taper, No. 50
Spindle speed	RPM	10000	6000	10000	6000
Hi/Low wind conversion	RPM	2000	1200	1200	1200
Spindle bearing inner dia.	mm(inch)	70 (2.76)	100 (3.94)	70 (2.76)	100 (3.94)
Drive					
Rapid speed X/Y/Z	mm/min(fpm)	36000 (118)		32000 (105)	
Cutting federate	mm/min(ipm)	1-10000 (0.04-394)		1-10000 (0.04-394)	
Jog federate	mm/min(ipm)	1260 (50)		1260 (50)	
Automatic tool changer (ATC)					
Magazine stations		60	40	60	40
Maximum tool dia. / No adjacent tool	mm(inch)	95/190(3.74/7.5)	120/230(4.7/9.1)	95/190(3.74/7.5)	120/230(4.7/9.1)
Maximum tool length	mm(inch)	350 (13.8)	350 (13.8)	400 (15.7)	400 (15.7)
Maximum tool weight	kg(lb)	8 (17.6)	20 (44)	8 (17.6)	20 (44)
Tool selection		Fixed address		Fixed address	
Automatic pallet changer (APC)					
Pallet No.		2		2	
Pallet exchange type		Rotary		Rotary	
Pallet change time	sec	18		18	
Controller					
FANUC		18iMB		18iMB	

		LH-500A	LH-500B	LH-630A	LH-630B
Motor					
Spindle motor	KW(HP)	15/18.5 (20 / 25)		22/26 (30 / 35)	
Axes motor X/Y/Z/B	KW	5/5/4/1.6		5/5/5/4	
Hydraulic motor	KW	2.2		2.2	
Coolant motor	KW	1.6		1.6	
Power					
Power requirement	KVA	42		42	
Tank capacity					
Hydraulic system	L	60		60	
Oil lubrication system	L	4		4	
Coolant system	L	760		850	
Air source	Kg/cm	6(85)		6(85)	
Machine size					
Height	mm(inch)	2970 (117)		3362	
Floor space	mm(inch)	3310 x 5200 (127x205)		3400 x 5966 (158x235)	
Weight	Kg(lb)	15000 (33000)		19000 (41900)	

Standard accessories

Chip conveyor & chips cart
Coolant through ballscrew system
Spindle oil cooling unit
Base bolt and pad
Chip augers (2 sets)
Coolant system
Tool box
In door coolant flash system
IDD spindle transmission
Y axis brake system
Oil/coolant separation system
Work light
Alarm light
Interlock door

Optional accessories

Tool length measurement system
Linear scale
Coolant through spindle system 18bar,42bar
Pallet indexing 0.001°
Controller : FANUC / MITSUBISHI / SIEMENS / HEDENHAIN
High torque spindle motor
60.100 Tools magazine
Work piece measurement system
Coolant cooling system
Spindle speed 8000 rpm (LH500B,LH630B)

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