

# SP / LP SERIES

Ultra Performance Bridge Type Machining Center



## AWEA MECHANTRONIC CO., LTD.

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### CENTRAL TAIWAN SCIENCE PARK BRANCH

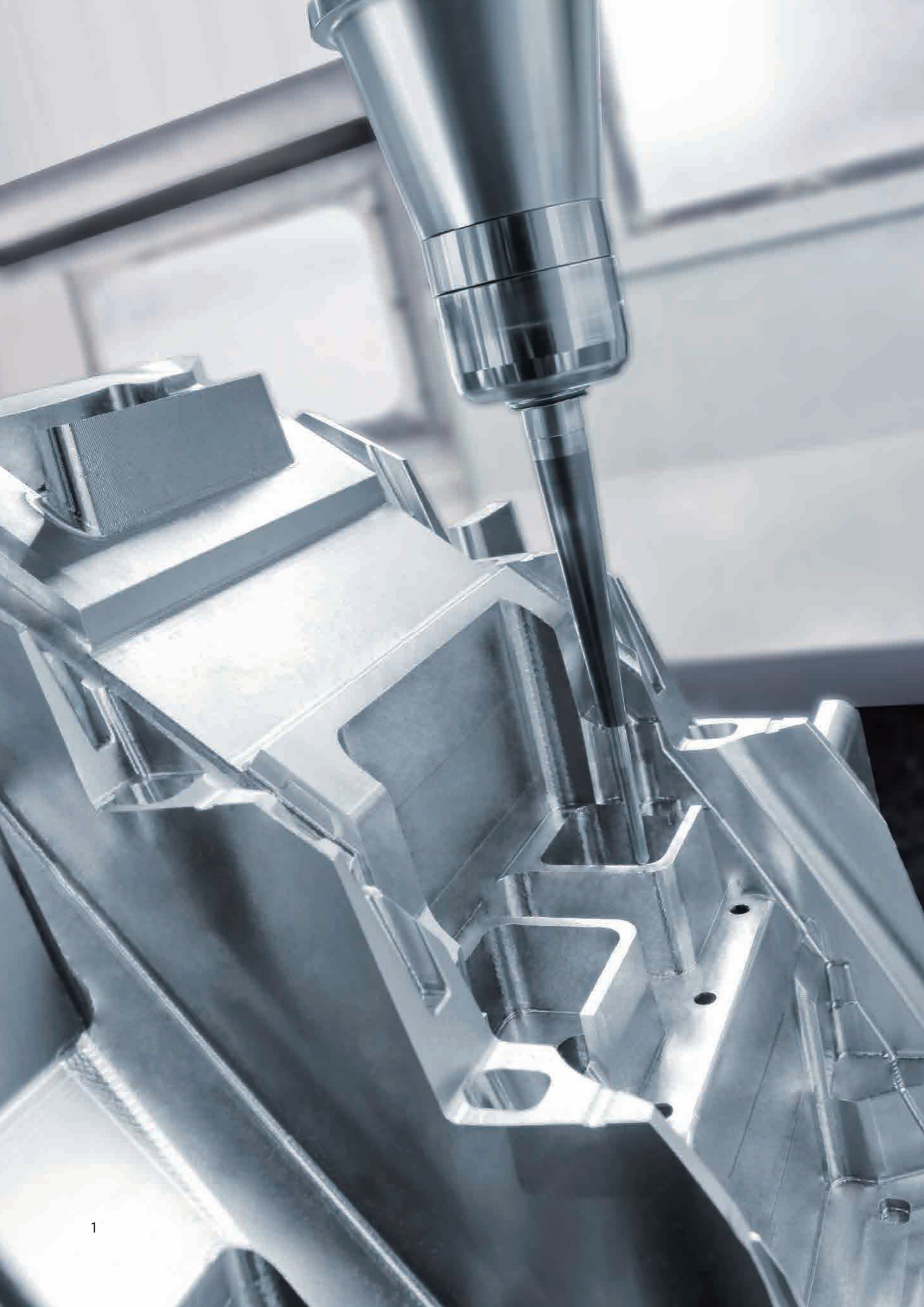
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ISO 9001



ISO 14001



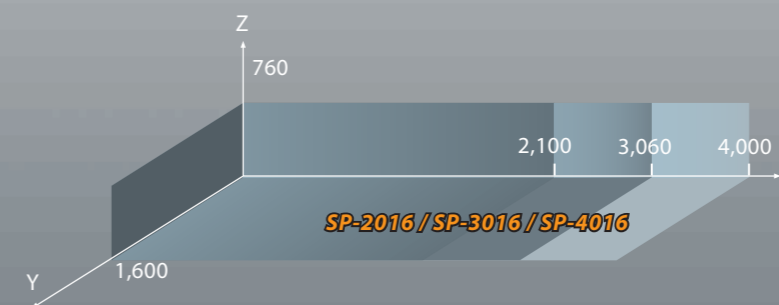


# ULTRA PERFORMANCE BRIDGE TYPE MACHINING CENTER

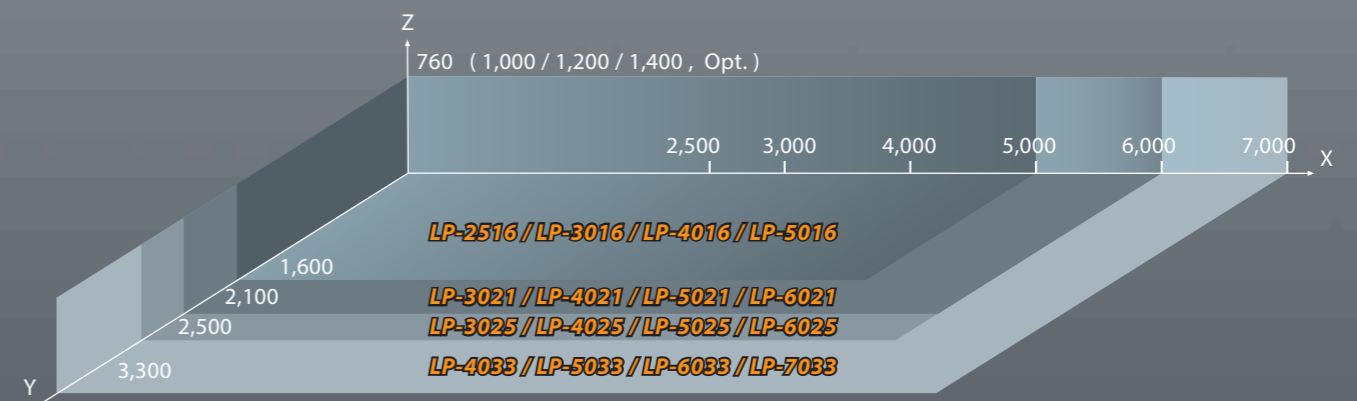
AWEA is pleased to introduce the SP/LP series bridge type vertical machining centers with advanced machining abilities and progressive technology skills. The SP and LP series bridge type vertical machining centers combine strong spindle power and a super rigid machine structure with high quality automation equipment. The full product line provides high efficiency, high productivity machining capabilities. The SP and LP series can be broadly applied in the automotive, precision mold, aerospace, and energy industries.

The LP series can be equipped with an automatic head changer and a vertical / horizontal ATC system, turning it into a 5-face machining center and providing more cutting flexibility to meet your demands of today and tomorrow.

## SP SERIES PRODUCT MAP



## LP SERIES PRODUCT MAP



Unit : mm

# SP Series 2016 / 3016 / 4016

## Ultra Performance Bridge Type Machining Center

Due to our advanced developing skills and strict assembly process, the SP series ultra performance bridge type machining center provides optimum rigidity, accuracy, and efficiency.

- The modular spindle design offers cutting flexibility for various working conditions.
- Super rigid roller type linear guide ways on the X and Y axes provide heavy-duty cutting, fast movement and low friction capabilities.
- The Z-axis is equipped with hardened and precision ground super rigid box guide ways, which are optimal for heavy-duty cutting conditions. ( Opt. : The Z-axis can be adopted with roller type linear guide ways if equipped with high speed direct driven spindle. )



( SP-2016 model shown with optional manual attachment head storage )

## Ultra Performance Bridge Type Machining Center

- The bridge and the base are cast in one piece each to provide maximum structural integrity.
- Hand scraped contact surfaces ensure optimum assembly precision, strong mechanical integrity and perfect load distribution.
- The rib reinforced work table reduces vibrations while increasing machining stability.
- Employing the Finite Element Analysis (FEA) in the design process assured optimal rigidity and helped in reducing the machine weight.



### ■ Precision Hand Scraping

All contact surfaces are meticulously hand scraped to ensure maximum precision and rigidity.



### ■ Precision Feedback System

The semi-closed loop system with encoders directly connected to the ball screws ensures high repeatability and positioning accuracy.

### ■ Axial Torque Clutch

The ball screws are equipped with mechanical torque clutches to minimize damages in case of over load issues or a crash.



**LP** Series 2516 / 3016 / 4016 / 5016 / 3021 / 4021 / 5021 / 6021  
3025 / 4025 / 5025 / 6025 / 4033 / 5033 / 6033 / 7033

## Ultra Performance Bridge Type Machining Center

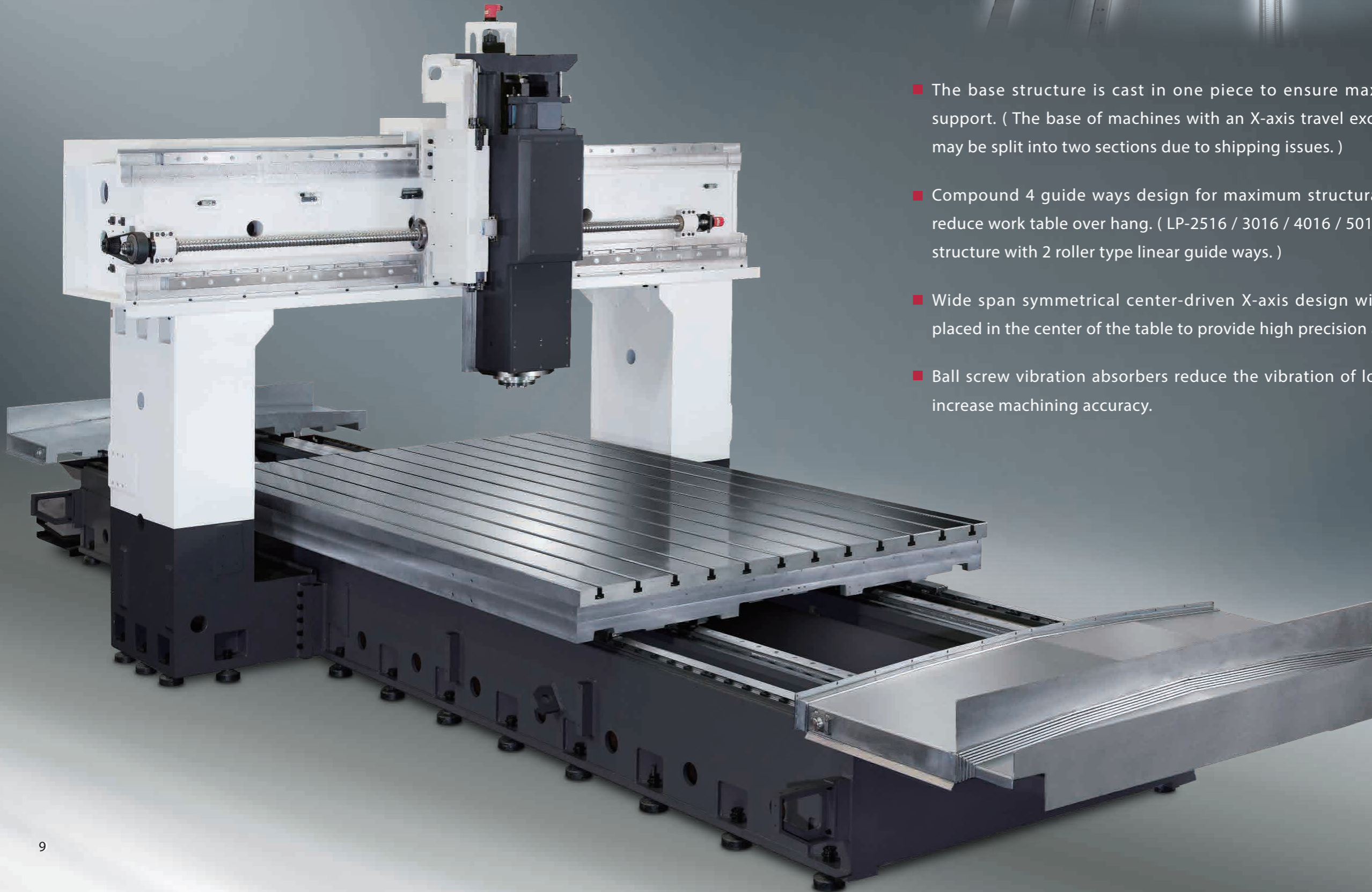
Complete product line with full range specifications, the LP series can be equipped with a high flexibility automatic head changer and a vertical / horizontal ATC system to provide full automation 5-face machining capability.

- The modular spindle design provides cutting flexibility for a wide variety of working conditions.
- The Z-axis is equipped with hardened and precision ground super rigid box guide ways, which are optimal for heavy-duty cutting conditions. ( Opt. : The Z-axis can be adopted with roller type linear guide ways if equipped with high speed direct driven spindle. )
- Super rigid roller type linear guide ways on the X and Y axes provide heavy-duty cutting, fast movement and low friction capabilities.



**LP** Series 2516 / 3016 / 4016 / 5016 / 3021 / 4021 / 5021 / 6021  
3025 / 4025 / 5025 / 6025 / 4033 / 5033 / 6033 / 7033

## Ultra Performance Bridge Type Machining Center



- The base structure is cast in one piece to ensure maximum structural support. ( The base of machines with an X-axis travel exceeding 6,000 mm may be split into two sections due to shipping issues. )
- Compound 4 guide ways design for maximum structural support and to reduce work table over hang. ( LP-2516 / 3016 / 4016 / 5016 : one-piece base structure with 2 roller type linear guide ways. )
- Wide span symmetrical center-driven X-axis design with the ball screw placed in the center of the table to provide high precision axial feeding.
- Ball screw vibration absorbers reduce the vibration of long ball screws to increase machining accuracy.

## High Flexibility 5-Face Machining Capability Automatic Head Changer And Vertical / Horizontal ATC system

- The LP series can be equipped with an automatic head changer and a vertical / horizontal ATC system to provide a maximum efficiency 5-face machining center.
- The optional automatic head storage magazine provides two cabinets with independent swing doors for each cabinet to avoid contamination during head changes. Linear guide ways enable quick head changes to reduce non-cutting time.
- The vertical / horizontal ATC system provides quick tool change with sensors and sequence scanning to ensure safety and reliability.
- The standard ATC magazine has a capacity of 32-tools. ( 60, 90, 120, or more capacity ATC magazines are optional ).

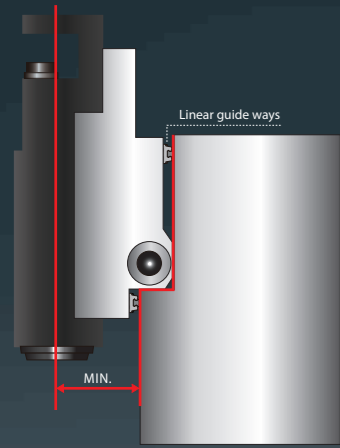


LP-7033F with 4-piece splash guard



LP-5025F fully enclosed splash guard with roof ( Opt. )

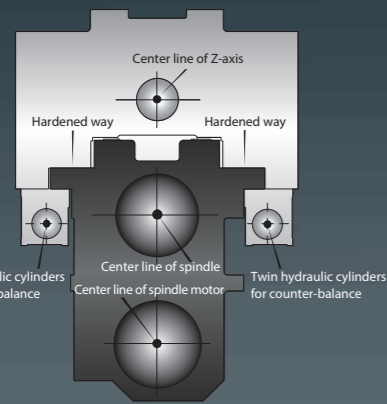
# Optimum Spindle System



- Y-axis sectional roller type guide ways design

## Powerful Cutting Capability

The embraced guide way design provides super rigidity and optimal load distribution. The Y-axis roller type linear guide ways offset increases structural rigidity and reduces the distance between spindle head and cross beam to minimize distortion and vibration issues, thereby enhancing the overall cutting performance.



- Centro-symmetric spindle head design

## Centro-symmetric Spindle Head Design

The unique spindle head design, with the main spindle, spindle motor, and ball screw all aligned along the center of the spindle head and the hydraulic counter weight cylinders placed symmetrically, prevents thermal distortion and minimizing deflection thereby assuring high accuracy and heavy cutting capability.

# 977 Nm

## Maximum Torque



## High Torque Gear Spindle

- 2-speed super heavy-duty gear box.
- A floating type hydraulic tool release device eliminates pressure on the spindle bearing when releasing a tool.
- The 4,000 rpm high torque spindle is equipped with a powerful 26 kW motor that delivers a maximum torque output of 977 Nm at 254 rpm, ideal for heavy-duty cutting conditions.
- The 6,000 rpm high torque spindle is equipped with a powerful 26 kW motor that delivers a maximum torque output of 642 Nm at 387 rpm.

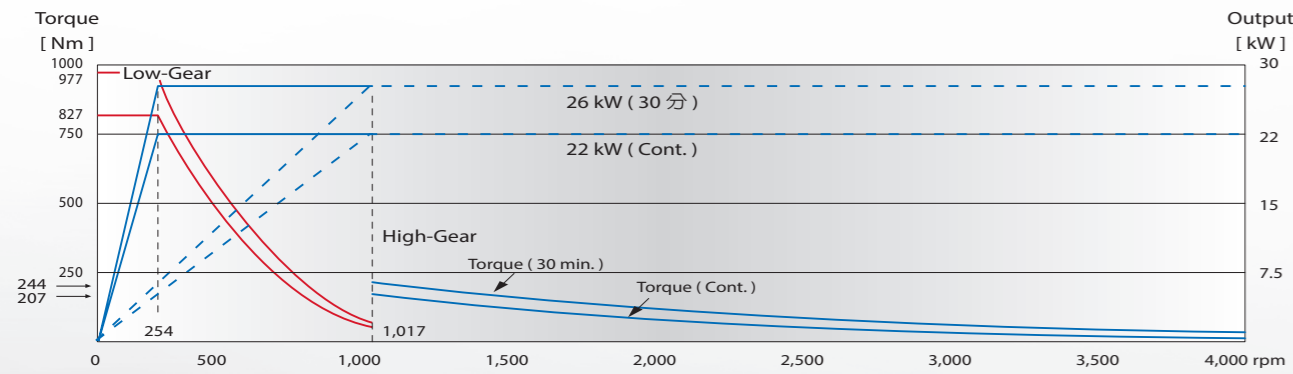
## High Speed, High Torque Built-in Motorized Spindle

- The built-in motor design reduces centrifugal force effects and minimizes spindle vibrations, which increases the spindles life span and improves long-term machining accuracy.
- A floating type hydraulic tool release device eliminates pressure on the spindle bearing when releasing a tool.
- 6,000 rpm and 8,000rpm spindles are available. Both provide a maximum torque of 600 Nm at 350 rpm to meet various working conditions.

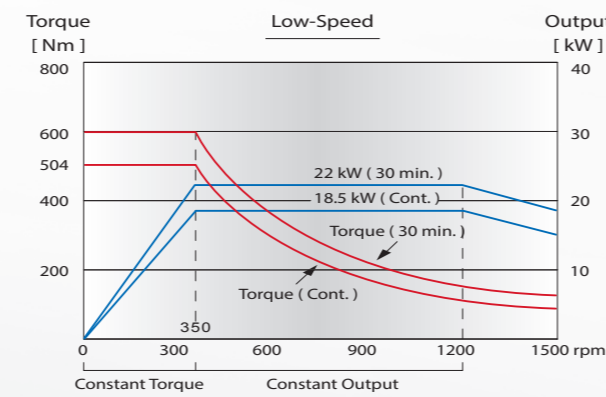
## High Speed, High Power Direct-driven Spindle

- A direct-driven spindle is efficiently separated from the heat generated by the motor, which reduces deformation, thereby increasing machining accuracy.
- A floating type hydraulic tool release device eliminates pressure on the spindle bearing when releasing a tool.
- 8,000 rpm and 10,000 rpm spindles are available. Both provide a maximum torque of 165 Nm at 1,500 rpm to meet various high speed working conditions.

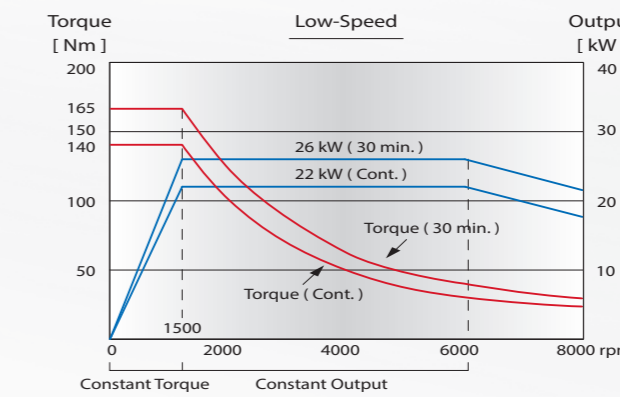
### 4,000 rpm Gear Spindle



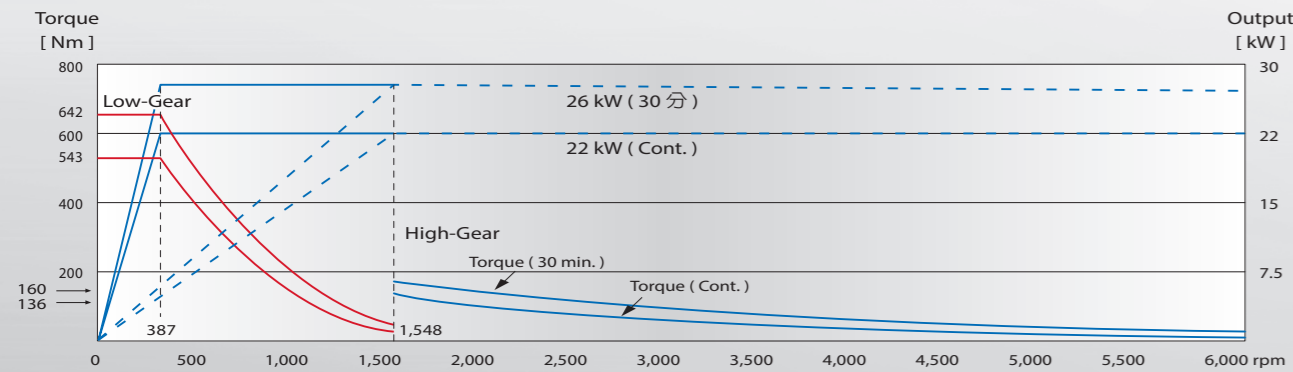
### 6,000 rpm Built-in Motorized Spindle



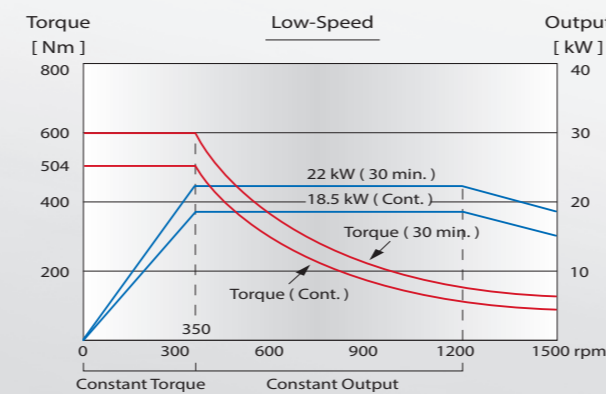
### 8,000 rpm Direct-driven Spindle



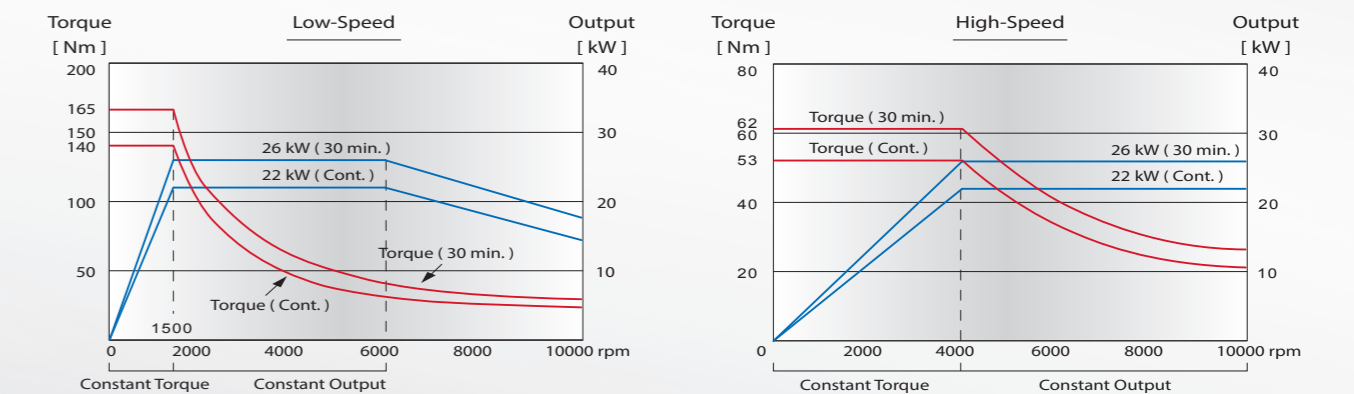
### 6,000 rpm Gear Spindle



### 8,000 rpm Built-in Motorized Spindle



### 10,000 rpm Direct-driven Spindle





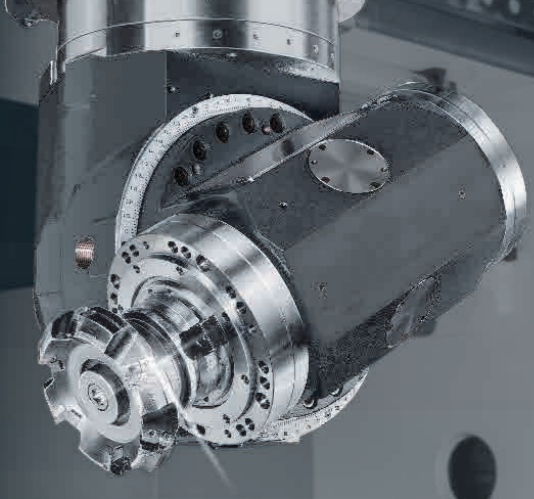
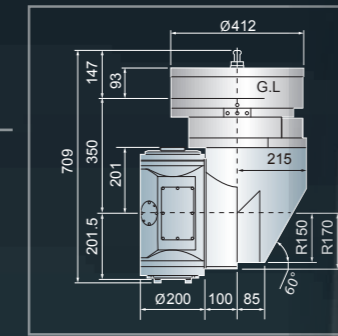
# Milling Head Options

- All milling heads are self developed and assembled.
- The contact surface of all milling heads and covers are precisely hand scraped while using the Japanese 2-piece curvic coupling for precision positioning.

## Brand New

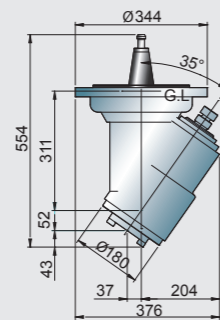
### Automatic Universal Head

Automatic head clamp / tool clamp  
 A / C axes automatic 5° / 2.5° ( opt. ) indexing  
 Max. speed : 3,000 rpm / 4,500 rpm ( opt. )  
 Max. output : 22 kW ( 30 HP )  
 Optional CTS



### Optional Milling Head ( Manual )

( Unit : mm )

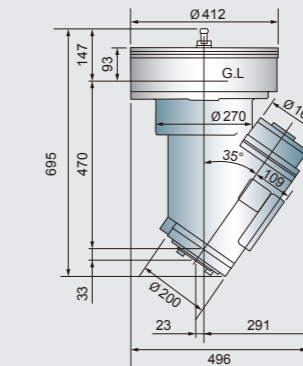


#### 35° Head

Manual head clamp / tool clamp  
 Manual 90° indexing  
 Max. speed : 2,000 rpm  
 Max. output : 22 kW ( 30 HP )

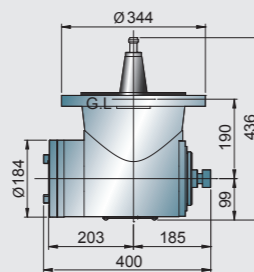
### Optional Milling Head ( Automatic )

( Unit : mm )



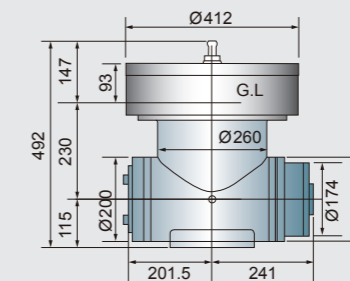
#### 35° Head

Automatic head clamp / tool clamp  
 C-axis automatic 5° / 2.5° ( opt. ) indexing  
 Max. speed : 3,000 rpm  
 4,500 rpm ( opt. )  
 Max. output : 22 kW ( 30 HP )  
 Optional CTS



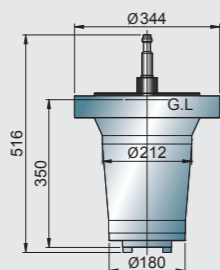
#### 90° Head

Manual head clamp / tool clamp  
 Manual 90° indexing  
 Max. speed : 2,000 rpm  
 Max. output : 22 kW ( 30 HP )



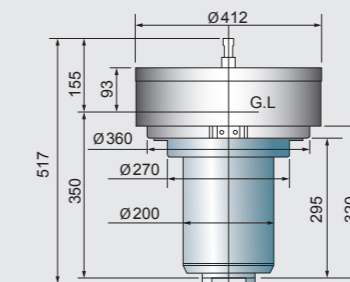
#### 90° Head

Automatic head clamp / tool clamp  
 C-axis automatic 5° / 2.5° ( opt. ) indexing  
 Max. speed : 2,000 rpm  
 3,000 rpm / 4,500 ( opt. )  
 Max. output : 22 kW ( 30 HP )  
 Optional CTS



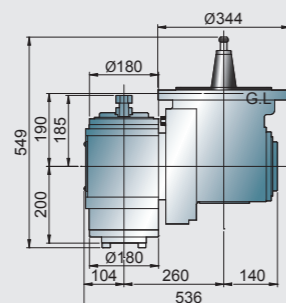
#### Extension Head

Manual head clamp / automatic tool clamp  
 No index function  
 Max. speed : 3,000 rpm  
 Max. output : 22 kW ( 30 HP )



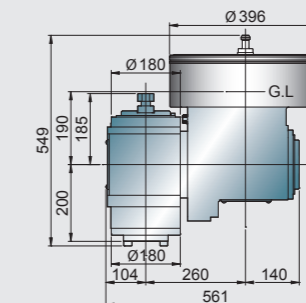
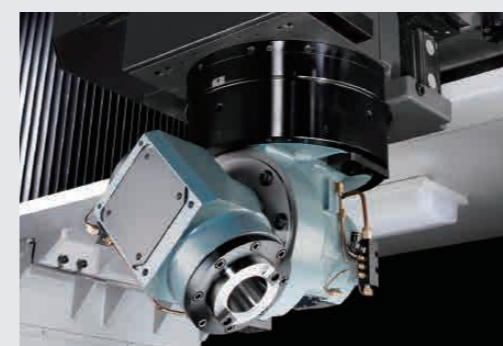
#### Extension Head

Automatic head clamp / tool clamp  
 No index function  
 Max. speed : 3,000 rpm  
 6,000 rpm ( opt. )  
 Max. output : 22 kW ( 30 HP )  
 Optional CTS



#### Universal Head

Manual head clamp / tool clamp  
 C-axis manual 90° indexing  
 A-axis manual 5° indexing  
 Max. speed : 2,000 rpm  
 Max. output : 22 kW ( 30 HP )

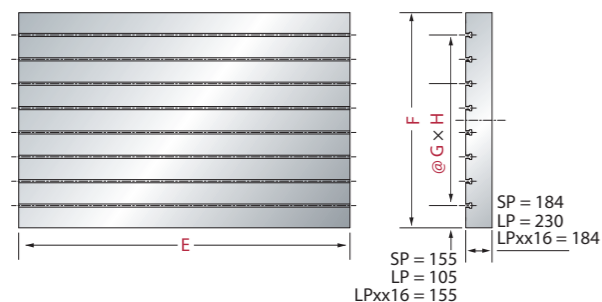


#### Universal Head

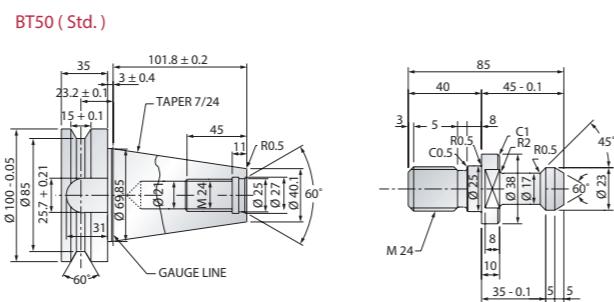
Automatic head clamp / manual tool clamp  
 C-axis automatic 5° indexing  
 A-axis manual 5° indexing  
 Max. speed : 2,000 rpm  
 Max. output : 22 kW ( 30 HP )

# Dimensions

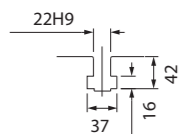
## Table Dimensions



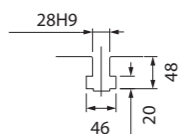
## Tool Shank and Pull Stud Dimensions



## T-slot Dimensions

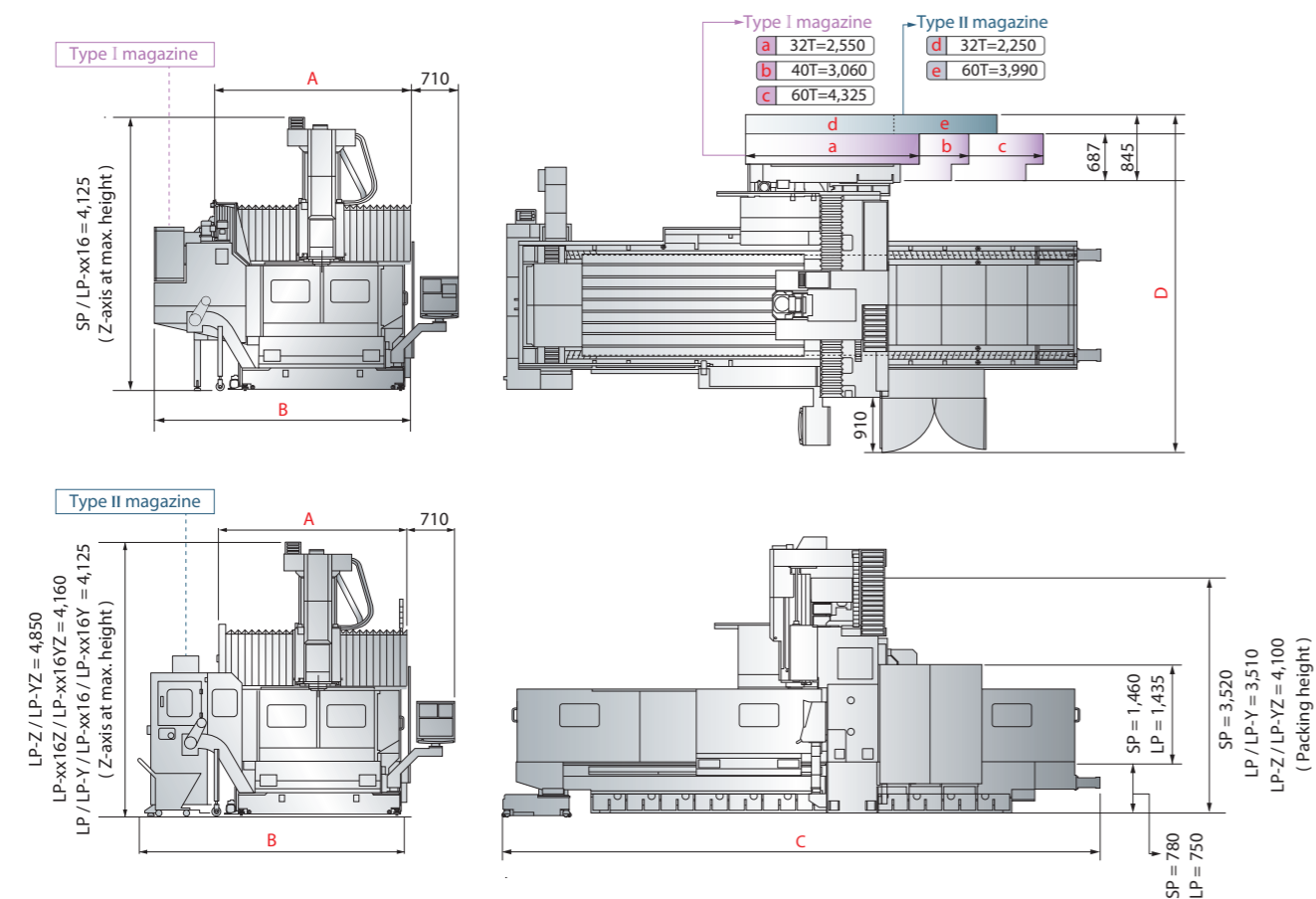


( SP / LPxx16 Series )



( LP Series )

## Machine Dimensions



Models	A	B	C	D	E	F	G	H	
SP	2016	2,970	3,860	6,750	4,680	2,310	1,500	170	7
	3016	2,970	3,860	8,760	4,680	3,260	1,500	170	7
	4016	2,970	3,860	10,760	4,680	4,200	1,500	170	7
LP	2516	3,170	3,950	8,210	4,580	2,310	1,500	170	7
	3016	3,170	3,950	8,960	4,580	3,260	1,500	170	7
	4016	3,170	3,950	10,710	4,580	4,200	1,500	170	7
	5016	3,170	3,950	12,710	4,580	5,000	1,500	170	7
	3021	3,650	4,550	8,580	5,375	3,020	2,010	200	9
	4021	3,650	4,550	10,580	5,375	4,020	2,010	200	9
	5021	3,650	4,550	12,680	5,375	5,020	2,010	200	9
	6021	3,650	4,550	14,680	5,375	6,020	2,010	200	9
	3025	4,050	4,950	8,580	5,775	3,020	2,400	200	11
	4025	4,050	4,950	10,580	5,775	4,020	2,400	200	11
	5025	4,050	4,950	12,680	5,775	5,020	2,400	200	11
	6025	4,050	4,950	14,680	5,775	6,020	2,400	200	11
4033	4,850	5,750	10,580	6,575	4,020	2,400	200	11	
5033	4,850	5,750	12,680	6,575	5,020	2,400	200	11	
6033	4,850	5,750	14,680	6,575	6,020	2,400	200	11	
7033	4,850	5,750	16,630	6,575	7,020	2,400	200	11	

Models	A	B	C	D	E	F	G	H	
LP	3021Y	4,050	4,950	8,580	5,375	3,020	2,010	200	9
	4021Y	4,050	4,950	10,580	5,375	4,020	2,010	200	9
	5021Y	4,050	4,950	12,680	5,375	5,020	2,010	200	9
	6021Y	4,050	4,950	14,680	5,375	6,020	2,010	200	9
	4025Y	4,850	5,750	10,580	5,775	4,020	2,400	200	11
	5025Y	4,850	5,750	12,680	5,775	5,020	2,400	200	11
	6025Y	4,850	5,750	14,680	5,775	6,020	2,400	200	11
	5033Y	5,490	5,750	12,680	6,575	5,020	2,400	200	11
6033Y	5,490	5,750	14,680	6,575	6,020	2,400	200	11	
7033Y	5,490	5,750	16,630	6,575	7,020	2,400	200	11	

Models	A	B	C	D	E	F	G	H	
LP	3021Z	4,160	4,850	8,580	5,375	3,020	2,010	200	9
	4021Z	4,160	4,850	10,580	5,375	4,020	2,010	200	9
	5021Z	4,160	4,850	12,680	5,375	5,020	2,010	200	9
	3025Z	4,560	5,250	8,580	5,775	3,020	2,400	200	11
	4025Z	4,560	5,250	10,580	5,775	4,020	2,400	200	11
	5025Z	4,560	5,250	12,680	5,775	5,020	2,400	200	11
	6025Z	5,730	5,250	14,680	5,775	6,020	2,400	200	11
	4033Z	5,370	6,050	10,580	6,575	4,020	2,400	200	11
	5033Z	5,370	6,050	12,680	6,575	5,020	2,400	200	11
6033Z	5,370	6,050	14,680	6,575	6,020	2,400	200	11	
7033Z	5,370	6,050	16,630	6,575	7,020	2,400	200	11	

\* This chart is based on 1,000 mm Z travel; please contact AWEA for 1,200 or 1,400 mm dimensions.

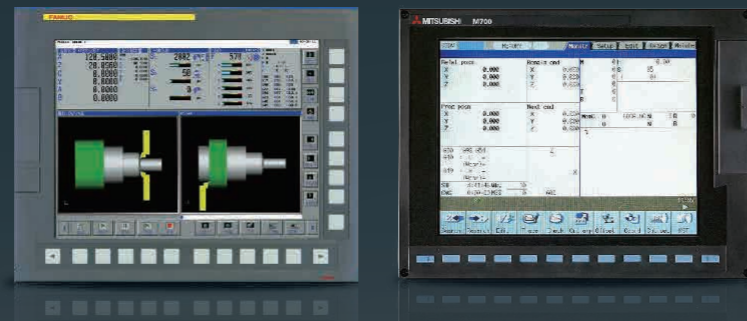
Models	A	B	C	D	E	F	G	H	
LP	3025YZ	5,235	6,050	8,580	6,175	3,020	2,400	200	11
	4025YZ	5,235	6,050	10,580	6,175	4,020	2,400	200	11
	5025YZ	5,235	6,050	12,680	6,175	5,020	2,400	200	11
	6025YZ	5,235	6,050	14,680	6,175	6,020	2,400	200	11
	4033YZ	6,060	6,750	10,580	6,735	4,020	2,400	200	11
	5033YZ	6,060	6,750	12,680	6,735	5,020	2,400	200	11
	6033YZ	6,060	6,750	14,680	6,735	6,020	2,400	200	11
7033YZ	6,060	6,750	16,630	6,735	7,020	3,010	200	14	

\* This chart is based on 1,000 mm Z travel; please contact AWEA for 1,200 or 1,400 mm dimensions.

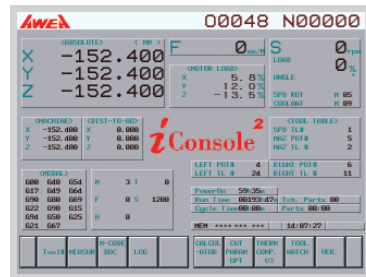
# i Console

AWEA's self-developed *i Console* intelligent software enhancement system provides you with a user-friendly interface, real-time machine status information and diagnosis functions. It not only effectively reduces complex working processes but also enables intelligent machining abilities. **Option**

(For 10.4" LCD only)

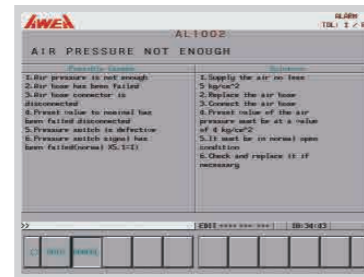


## Multiple Functions Status Display



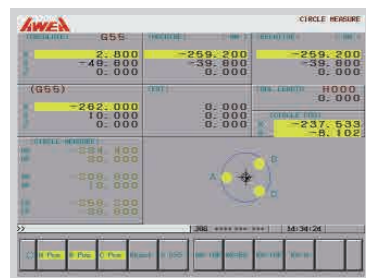
- Real time operation information
- Tool list
- Work piece measurement
- M code illustration
- PLC function
- Calculator
- CNC optimize parameter (Opt.)
- Spindle thermal compensation (Opt.)

## Trouble Shooting



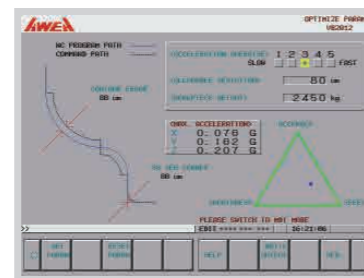
When an alarm appears, the program will display the cause for the alarm and a suitable troubleshooting procedure. Users can easily troubleshoot minor problems to avoid down time.

## Circular Work Piece Measurement



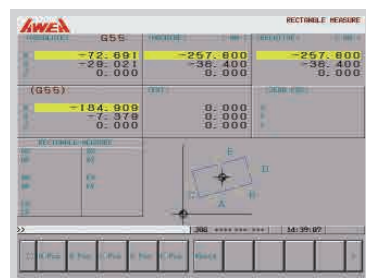
The circular work piece program can calculate the center coordinate of a work piece by measuring the point A, B and C coordinates. The calculated center coordinate can be transferred to the work piece coordinate system (G54 ~ G59).

## CNC Optimized Parameter



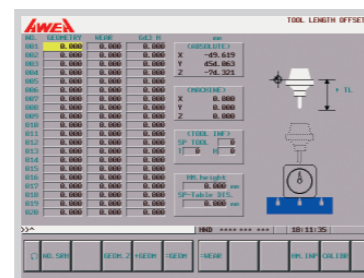
From rough cutting to fine machining, users can select different work modes, define the allowable tolerances and enter the weight of the work piece. Based on this input the *i Console* program will modify machining parameters to reduce machining time.

## Rectangular Work Piece Measurement



The rectangular work piece program can calculate the center coordinate and the slant angle of a work piece by measuring the point A, B, C, D and E coordinates; the calculated center coordinate can be transferred to the work piece coordinate system (G54 ~ G59).

## Manual Tool Length Measurement



After manually measuring the tool length, the controller will automatically calculate the tool tip position and input the data into the tool length offset table.

	SP-2016	SP-3016	SP-4016	LP-2516	LP-3016	LP-4016	LP-5016
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## SPECIFICATIONS

X-axis travel	mm	2,100	3,060	4,000	2,500	3,000	4,000	5,000
Y-axis travel	mm	1,600						
Z-axis travel	mm	760						
Distance from spindle nose to table top	mm	200 ~ 960						
Distance between columns	mm	1,700						

## WORK TABLE

Table size ( X direction )	mm	2,310	3,260	4,200	2,310	3,260	4,200	5,000
Table size ( Y direction )	mm	1,500						
Table load capacity	kg	8,000	10,000	12,000	8,000	10,000	12,000	14,000

## SPINDLE

Spindle taper		BT50 / DIN50 ( Opt. ) / CAT50 ( Opt. )					
Spindle motor ( cont. / 30 min. )	kW ( HP )	22 / 26 ( 30 / 35 )					
Spindle speed	rpm	6,000					

## FEED RATE

X-axis rapid feed rate	mm/min	20,000	20,000	15,000	20,000	20,000	15,000	10,000
Y / Z axes rapid feed rate	mm/min	20,000 / 15,000						
Cutting feed rate	mm/min	1 ~ 10,000						

## TOOL MAGAZINE

Tool magazine capacity	T	32 ( 24 / 40 / 60 Opt. )			32 ( 40 Opt. )		
Max. tool diameter / adj. pocket empty	mm	Ø125 / Ø215			Ø127 / Ø215		
Max. tool length ( from gauge line )	mm	400			400		
Max. tool weight	kg	20					

## ACCURACY

Positioning accuracy ( JIS B 6338 )	mm	± 0.015 / Full Travel						
Positioning accuracy ( VDI 3441 )	mm	P ≤ 0.020 / Full Travel	P ≤ 0.025 / Full Travel	P ≤ 0.030 / Full Travel	P ≤ 0.025 / Full Travel	P ≤ 0.025 / Full Travel	P ≤ 0.030 / Full Travel	P ≤ 0.040 / Full Travel
Repeatability ( JIS B 6338 )	mm	± 0.003						
Repeatability ( VDI 3441 )	mm	Ps ≤ 0.020	Ps ≤ 0.020	Ps ≤ 0.025	Ps ≤ 0.020	Ps ≤ 0.020	Ps ≤ 0.025	Ps ≤ 0.030

## GENERAL

Power requirement	V	220 ± 10 %						
Pneumatic pressure requirement	kg/cm <sup>2</sup>	5 ~ 8						
Hydraulic unit tank capacity ( pump )	liter ( HP )	120 ( 7.5 )						
Lubrication oil tank capacity	liter	6						
Coolant tank capacity ( pump )	liter ( HP )	420 ( 2 HP )			520 ( 2 HP )			
Machine weight	kg	19,000	23,000	28,000	26,000	29,000	33,000	36,000

## Standard Accessories

- Spindle cooling system
- Centralized automatic lubricating system
- Fully enclosed splash guard w/o roof ( SP series )
- Extension operator door ( LPXX16 series )
- Coolant system with pump and tank
- Twin screw type chip auger
- Caterpillar type chip conveyor and bucket
- Foundation bolt kit
- Tool box
- Alarm light
- Water gun
- Automatic power-off system
- Tool magazine : 32 T

## Optional Accessories

- Spindle: 4,000 rpm gear spindle  
8,000 / 10,000 / 12,000 rpm direct-driven spindle  
6,000 / 8,000 rpm built-in motorized spindle
- Spindle taper : DIN50 / CAT50 ( LPXX16 series )
- Z travel extension : 1,000 mm
- Column raiser : 200 / 300 / 400 / 500 mm
- Attachment head ( Manual ) : 35° / 90° / Extension / Universal Head
- Attachment head ( Automatic ) : 35° / 90° / Extension / Universal Head
- Tool magazine : 40 / 60 / 90 / 120 T
- X / Y / Z axes optical linear scale ( HEIDENHAIN )
- Spindle thermal compensation
- Coolant through the tool adapter
- Coolant through the spindle ( Form A )
- Automatic tool length measurement
- Automatic work piece measurement
- CNC rotary table
- Oil skimmer
- Oil mist cooling system

		LP-3021	LP-4021	LP-5021	LP-6021	LP-3025	LP-4025	LP-5025	LP-6025	LP-4033	LP-5033	LP-6033	LP-7033	
<b>SPECIFICATIONS</b>														
X-axis travel	mm	3,000	4,000	5,000	6,000	3,000	4,000	5,000	6,000	4,000	5,000	6,000	7,000	
Y-axis travel	mm	2,100 ( 2,800 Opt. )				2,500 ( 3,200 Opt. )				3,300 ( 4,000 Opt. )				
Z-axis travel	mm	760 ( 1,000 / 1,200 / 1,400 Opt. )												
Distance from spindle nose to table top	mm	200 ~ 960				( 200 ~ 1,200 / 200 ~ 1,400 / 200 ~ 1,600 Opt. )								
Distance between columns	mm	2,300				2,700				3,500				
<b>WORK TABLE</b>														
Table size ( X direction )	mm	3,020	4,020	5,020	6,020	3,020	4,020	5,020	6,020	4,020	5,020	6,020	7,020	
Table size ( Y direction )	mm	2,010				2,400				2,400 ( 3,010 Opt. )				
Table load capacity	kg	10,000	12,000	15,000	18,000	12,000	15,000	18,000	20,000	15,000	18,000	20,000	20,000	
<b>SPINDLE</b>														
Spindle taper		BT50 / DIN50 ( Opt. ) / CAT50 ( Opt. )												
Spindle motor ( cont. / 30 min. )	kW ( HP )	22 / 26 ( 30 / 35 )												
Spindle speed	rpm	Z-axis : 1,000 / 1,200 / 1,400 mm ; 4,000 / 5,000 / 6,000 Gear Spindle ( Opt. ) : 6,000 ( Std. ) 6,000 / 8,000 Built-in Spindle ( Opt. ) : 8,000 / 10,000 / 12,000 Direct-driven Spindle ( Opt. )												
<b>FEED RATE</b>														
X-axis rapid feed rate	mm/min	20,000	15,000	10,000	10,000	20,000	15,000	10,000	10,000	15,000	10,000	10,000	7,500	
Y / Z axes rapid feed rate	mm/min	15,000 ( Std. ) Y : 10,000 ( Y-axis : 4,000mm Opt. ) *1 Z : 10,000 ( Z-axis : 1,000 / 1,200 / 1,400mm Opt. ) *1												
Cutting feed rate	mm/min	1 ~ 10,000	1 ~ 10,000	1 ~ 8,000	1 ~ 5,000	1 ~ 10,000	1 ~ 10,000	1 ~ 8,000	1 ~ 5,000	1 ~ 10,000	1 ~ 8,000	1 ~ 5,000	1 ~ 5,000	
<b>TOOL MAGAZINE</b>														
Tool magazine capacity	T	32 ( 40 / 60 / 90 / 120 Opt. )												
Max. tool diameter / adj. pocket empty	mm	Ø127 / Ø215												
Max. tool length ( from gauge line )	mm	350 ( 400 Opt. )												
Max. tool weight	kg	20												
<b>ACCURACY</b>														
Positioning accuracy ( JIS B 6338 )	mm	± 0.015 / Full Travel												± 0.010 / Full Travel
Positioning accuracy ( VDI 3441 )	mm	P ≤ 0.025 / Full Travel	P ≤ 0.030 / Full Travel	P ≤ 0.040 / Full Travel	P ≤ 0.050 / Full Travel	P ≤ 0.025 / Full Travel	P ≤ 0.030 / Full Travel	P ≤ 0.040 / Full Travel	P ≤ 0.050 / Full Travel	P ≤ 0.030 / Full Travel	P ≤ 0.040 / Full Travel	P ≤ 0.050 / Full Travel	P = 0.040 / Full Travel	
Repeatability ( JIS B 6338 )	mm	± 0.003												
Repeatability ( VDI 3441 )	mm	Ps ≤ 0.020	Ps ≤ 0.025	Ps ≤ 0.030	Ps ≤ 0.035	Ps ≤ 0.020	Ps ≤ 0.025	Ps ≤ 0.030	Ps ≤ 0.035	Ps ≤ 0.025	Ps ≤ 0.030	Ps ≤ 0.035	Ps = 0.030	
<b>GENERAL</b>														
Power requirement	V	220 ± 10 %												
Pneumatic pressure requirement ( min. )	kg/cm <sup>2</sup>	5 ~ 8 ( 5 )												
Hydraulic unit tank capacity ( pump )	liter	120 ( 10 HP )												
Lubrication oil tank capacity	liter	6												
Coolant tank capacity ( pump )	liter	650 ( 2 HP )				750 ( 2 HP )				1,000 ( 2 HP )				
Machine weight	kg	33,000	38,000	41,000	45,000	36,000	40,000	44,000	50,000	47,000	50,000	58,000	75,000	

\*1 Please check with our sales representative the possibility for machine sizes other than listed in this catalog, as well as additional options.

Specifications are subject to change without notice.

### Standard Accessories

- Spindle cooling system
- Centralized automatic lubricating system
- 4 pcs splash guard ( LP series )
- Tool magazine : 32 T
- Coolant system with pump and tank
- Twin screw type chip auger

- Caterpillar type chip conveyor and bucket
- Foundation bolt kit
- Tool box
- Alarm light
- Air gun
- Automatic power-off system

### Optional Accessories

- Spindle :  
4,000 / 5,000 / 6,000 rpm gear spindle  
8,000 / 10,000 / 12,000 rpm direct-driven spindle  
6,000 / 8,000 rpm built-in motorized spindle
- Spindle taper : DIN50 / CAT50
- Y travel extension : 2,800 / 3,200 / 4,000 mm
- Z travel extension : 1,000 / 1,200 / 1,400 mm
- Column raiser : 200 / 300 / 400 / 500 mm

- Attachment head ( Manual ) :  
35° / 90° / Extension / Universal Head
- Attachment head ( Automatic ) :  
35° / 90° / Extension / Universal Head
- Tool magazine : 40 / 60 / 90 / 120 T
- X / Y / Z axes optical linear scale ( HEIDENHAIN )
- Spindle thermal compensation
- Coolant through the tool adapter

- Coolant through the spindle ( Form A )
- Automatic tool length measurement
- Automatic work piece measurement
- CNC rotary table
- Oil skimmer
- Oil mist cooling system