



# VERTICAL LATHE

## VNL(S/H/ST/HT)



321

## Vertical lathe

This kind of machine especially suitable for machining large, heavy, thin deformed parts and being widely used in engineering machinery, industrial valves, military industry, aerospace and other industries.

# Contents

- 01-16 Single-column vertical lathe
- 17-22 Double-column vertical lathe
- 23 Control system
- 24 Humanization design

## Model:

Single-column VNL502S/H VNL1254S/H/ST/HT  
VNL803S/H VNL1605S/H/ST/HT  
Double-column VNL2506H



# Single-column vertical lathe

VNL502S/H  
VNL803S/H

Electromechanical integration design, compact structure, smaller floor space; the layout through finite element analysis and optimization, wide guideway design, high rigidity; infundibulate chip conveyor design is more smoothly ,the iron chips flow into device directly. Box way design equipped with ZF gear box, to get heavy cutting ability.



The floor space of Vertical CNC lathe is less 1/2 than horizontal, improve the utilization rate of workshop; Totally enclosed protection cover keep the chips and cooling liquid within machine, to provide you a safe and clean work environment. Linear guideway design is suitable for high speed cutting.

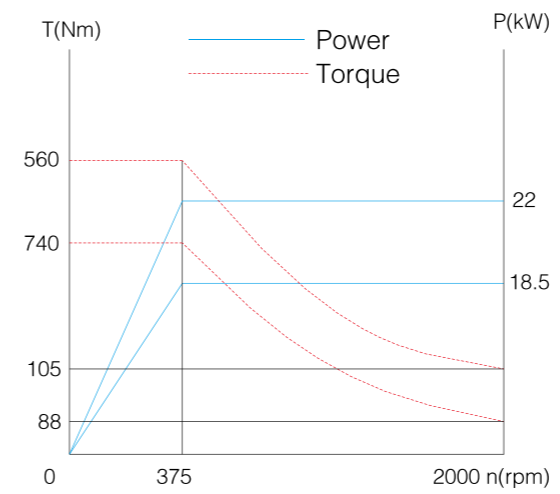


VM803H/S : spindle motor directly drive with ZF reducer with more compact structure, lower noise, more powerful, larger speed range and torque.

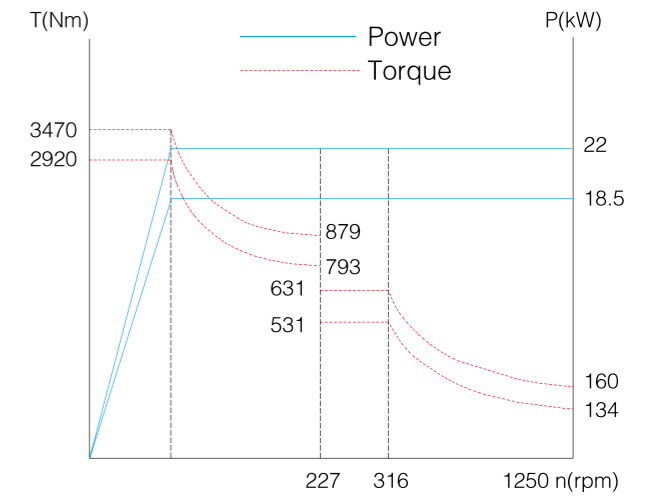
Adopted high torque of spindle motor with a power of 18.5/22 kw, so that the strong cutting can be realized, the standard configuration of ZF retarder imported from Germany realized a wide speed of spindle and large torque heavy cutting.



## Spindle power/ torque diagram



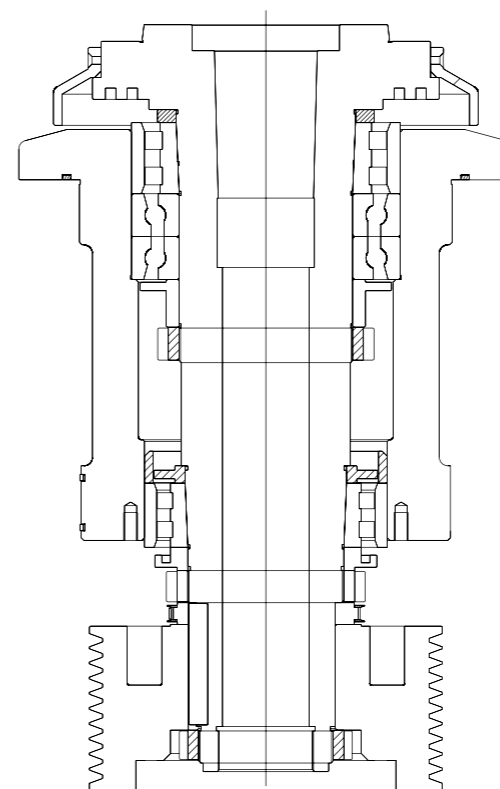
VNL502H



VNL803S/H

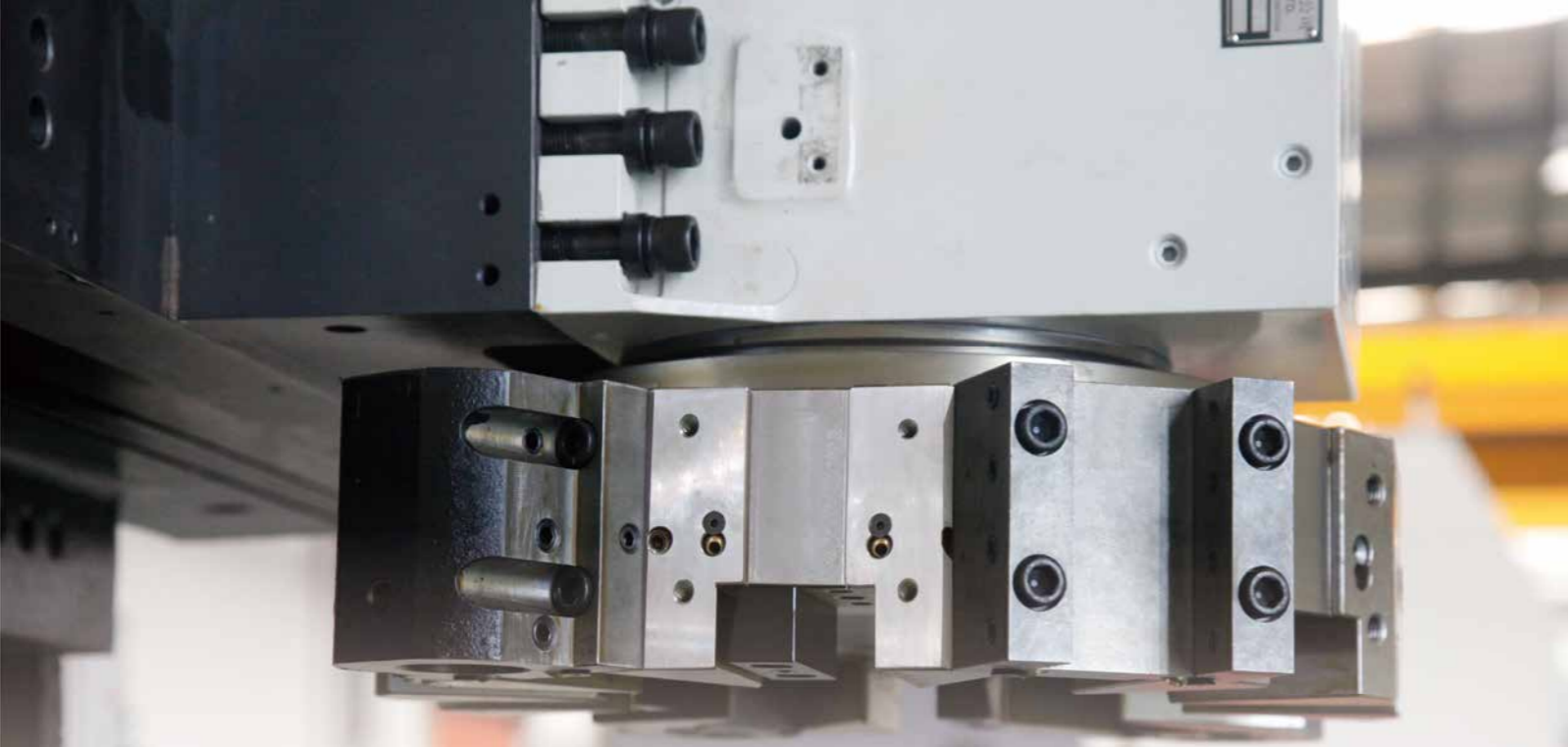
### Drive system

Imported spindle bearing with high rigidity and high precision can bear radial load, axial load and torque load, which ensured the accuracy for a long time of heavy cutting and extend the lifespan of the product effectively.



ZF double reducer with two gears speed output not only can meet the requirement of low speed and heavy cutting for large diameter workpieces, but also can machine small diameter workpieces' high speed cutting:

- Top gear (1:1)
- Low gear (1:5.5)



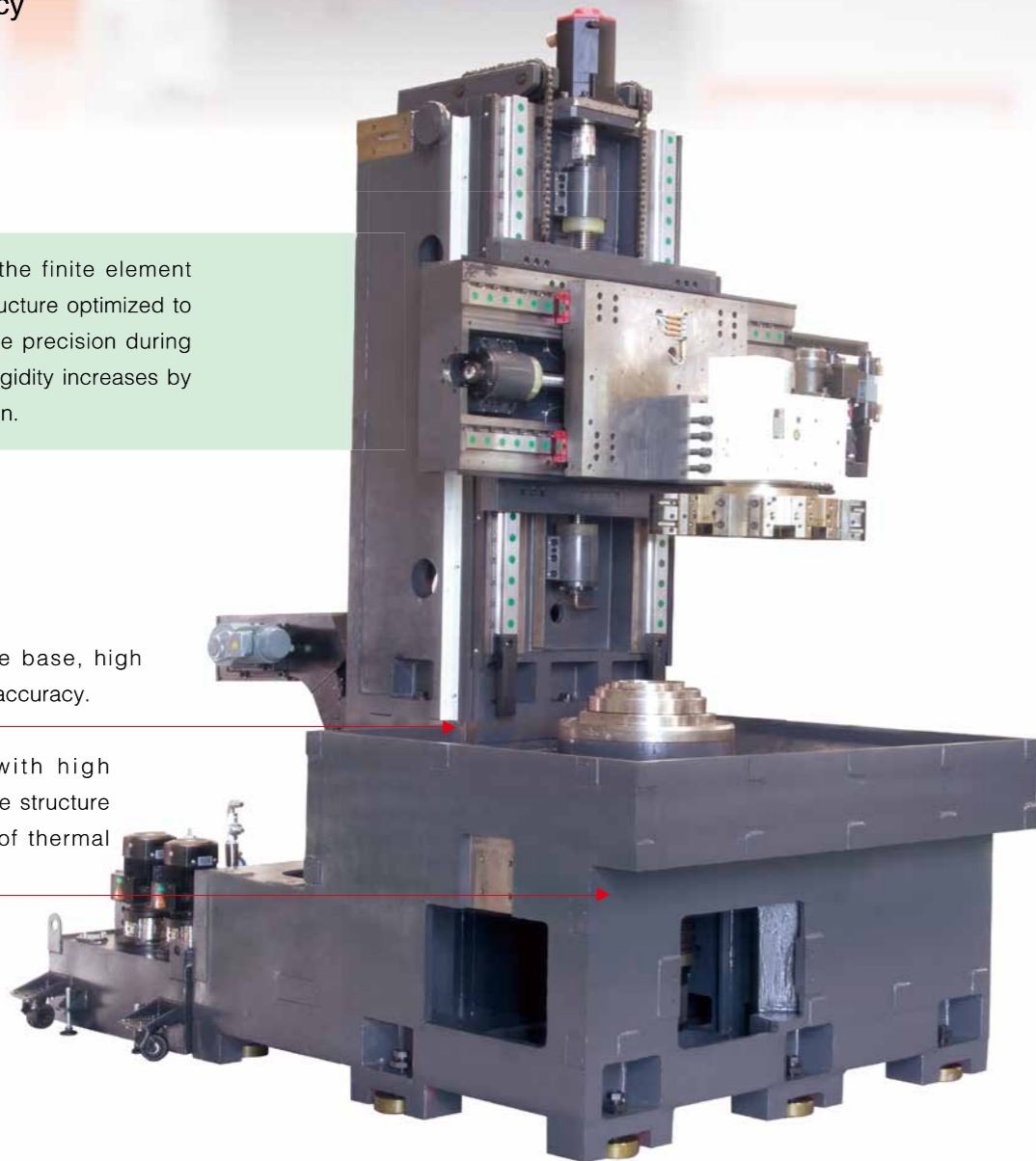
Faster tool changing, high repeated positioning accuracy

Chuck: 12T

All structures through the finite element analysis and strive to structure optimized to ensure the stability of the precision during machining, mechanical rigidity increases by 30% than traditional design.

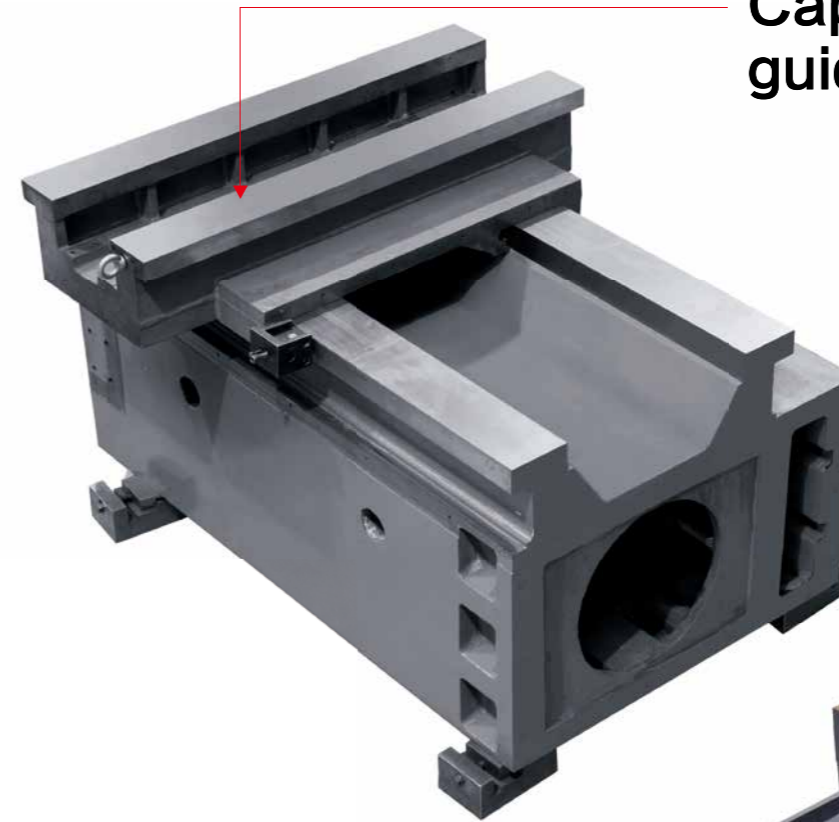
Column is fixed on the base, high rigidity, good and stable accuracy.

Subquadrate base with high rigidity design and stable structure has a minimal impact of thermal deformation vibration.



## Capacious rectangular guideway design

The surface of base combined with column, sliding seat, turret and all bearing blocks were scraped by handwork, to get the maximum contact rigidity; Base, columns, beams and other major castings after aging treatment to relieve of internal stress, box structure design makes the machine have heavy cutting ability and high stability.

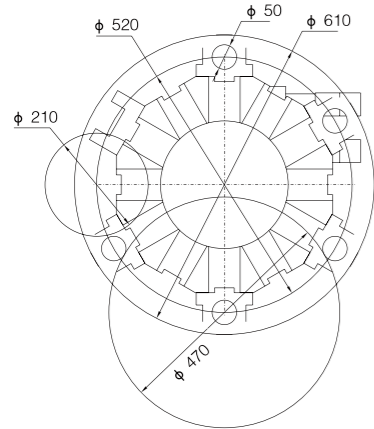


Funnel design of the base is convenient for chips flow into the chip conveyor directly.

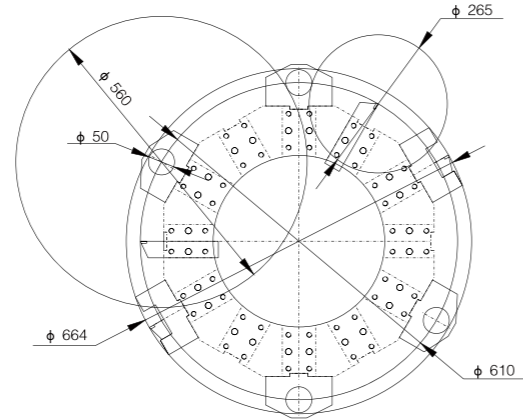
Base nearly square of high rigid design, stable structure, Subquadrate the base with high rigidity design, stable structure can minish the effect made by thermal deformation of vibration.



# TOOL INTERFERENCE DIAGRAM

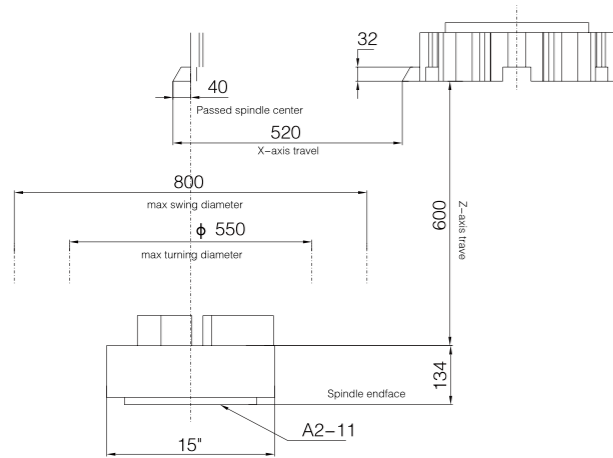


VNL502S/H

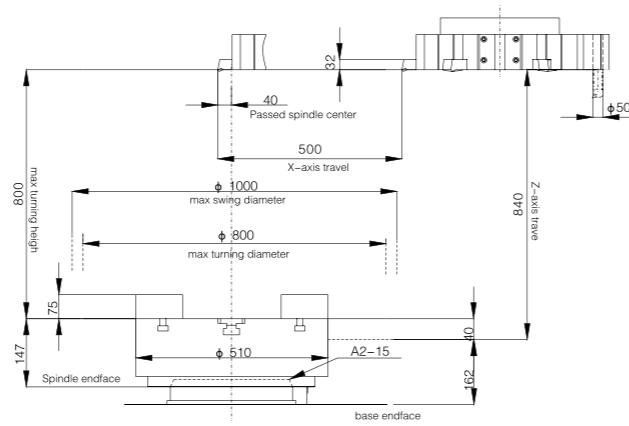


VNL803S/H

# WORKING AREA

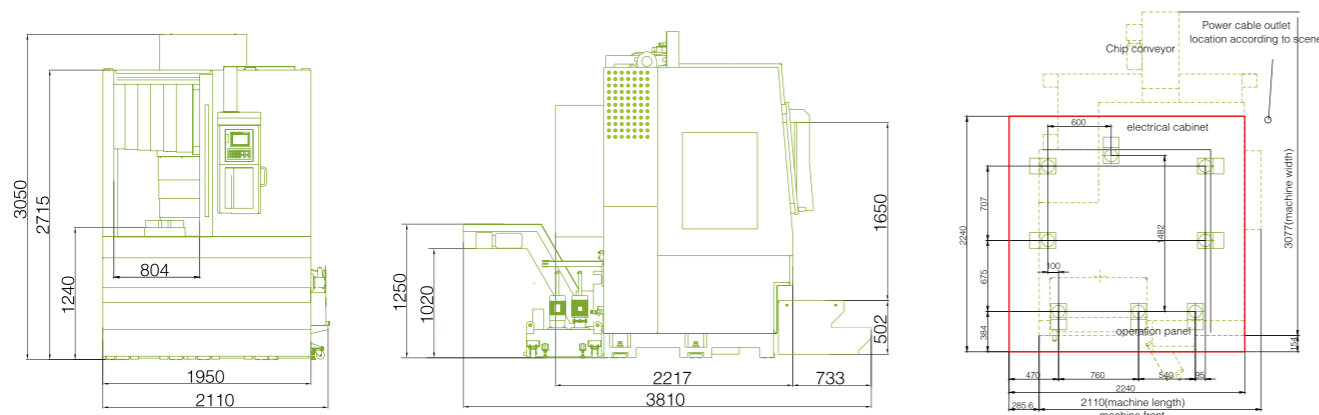


VNL502S/H



VNL803S/H

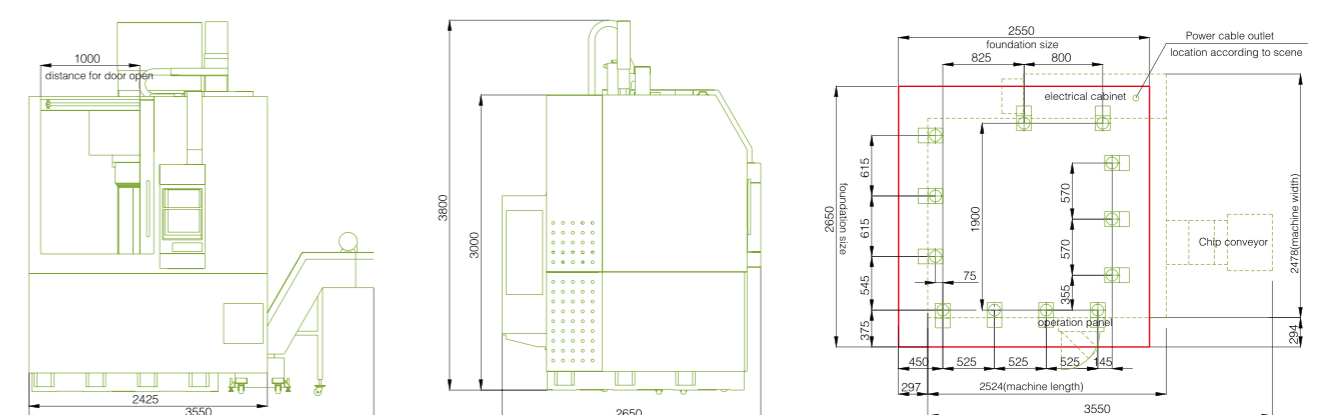
# INSTALLATION DIMENSION VNL502S/H



# TECHNICAL PARAMETERS

Item	unit	Single-column vertical CNC lathe			
		VNL502S/H	VNL502T	VNL652S/H	VNL803S/H
<b>Capability</b>					
max swing diameter	mm	800	800	900	1000
max cutting diameter	mm	550	550	650	800
max height of workpiece	mm	600	500	700	800
<b>Worktable</b>					
motor power	kW	18.5	18.5	18.5	18.5
diameter	mm	15*(live chuck)	15*(live chuck)	18*(live chuck)	21*(live chuck)
max speed	r/min	1500/2000	2000	1500	1250
<b>Turret</b>					
Number of tools		12	12	12	12
outer-round tool shank size	mm	32 × 32	32 × 32	32 × 32	32 × 32
driving mode		hydraulic	servo	hydraulic	hydraulic
<b>X&amp;Z axis</b>					
X-axis ballscrew 's diameter/lead	mm	50/8	50/8	50/8	50/8
Z-axis ballscrew 's diameter/lead	mm	50/8	50/8	50/8	50/8
max travel X/Z	mm	520/600	520/600	520/750	500/840
rapid travel X/Z	m/min	12/12 12/20	12/20	12/12	12/12
<b>Accuracy</b>					
Positioning ( X/Z )	mm	0.012/0.015			
repeatability ( X/Z )	mm	0.007/0.010			
C-axis Positioning/Repeatability of accuracy	"	/	51°/20"	/	/
auto-chip conveyor		behind or in flank		in flank	
CNC System		FANUC Oi mate-TD / FANUC Oi-TD			
Servo motor torque ( X/Z )		22/30	22/30	22/30	22/38
Total capacity		35/40	40	35/40	35/40
Net weight		10000	10000	11000	16000
Overall dimensions (L*W*H)		2100 × 3810 × 3100		2300 × 4200 × 3370	4350 × 4200 × 3800
Standard configuration		automatic lubrication system, air conditioner, signal lamp			
optional		Sseries: FANUC Oi mate-TD or SIMENS 828D basic H series; FANUC Oi-TD or SIMENS 828D special work fixtures and so on			

# INSTALLATION DIMENSION VNL803S/H



## VNL1254S/H/ST/HT VNL1605S/H/ST/HT

This kind of machines are suitable for large, heavy, thin deformed parts processing; Vertical structure avoid the roundness error lead by workpiece gravity as horizontal clamping, and make sure the parts of roundness accuracy; workpiece gravity ensures the workpiece and fixture fit closely, to make the workpieces obtained a high positioning accuracy and machining accuracy; Mechanical and electrical integration of vertical design and compact integrated layout make it easy for installation and maintenance.



# VNL1254S/H/ST/HT VNL1605S/H/ST/HT

Spindle motor with high torque can realize heavy cutting, standard equipped with ZF retarder imported from Germany, realized the spindle wide speed range and large torque heavy cutting.

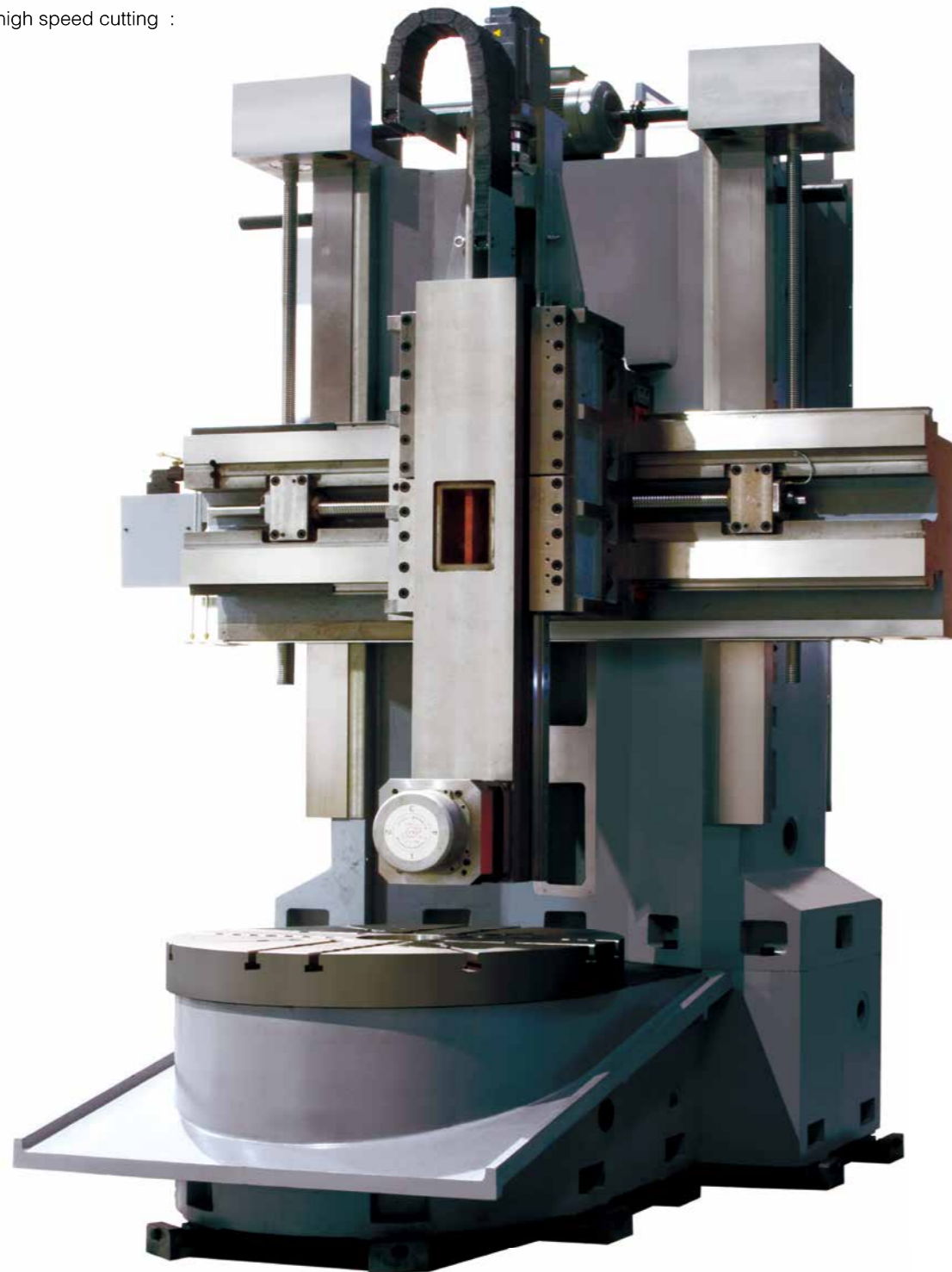
ZF double speed reducer meet the low speed and heavy cutting of large diameter workpieces and smaller diameter workpieces' high speed cutting :

- top gear (1:1)
- low gear (1:4)

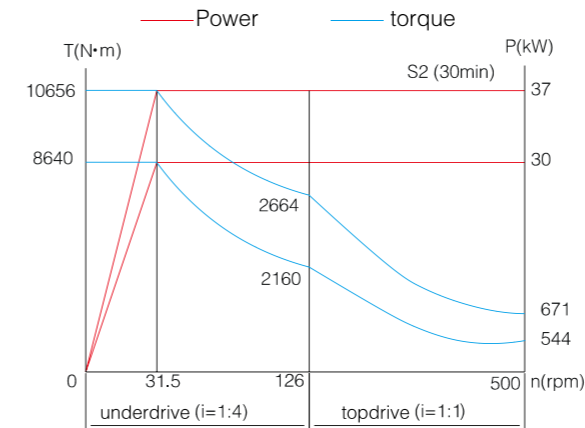
## Speed range

unit: rpm

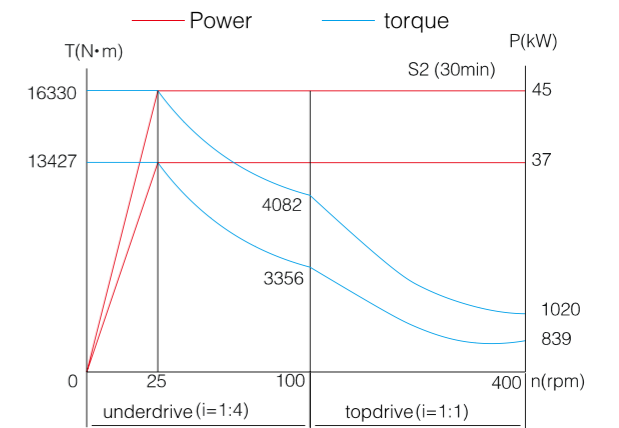
	VNL1254 series	VNL1605 series
Low gear	4-126	3.15-100
Top gear	16-500	12.6-400



## Spindle power/ torque diagram



VNL1254 series



VNL1605 series



## Beam lifting system

Through a worm gear drive ball screw to make beam to move up and down, be compact structure, enlarge transmission ratio and be more reliable.



Beam can be moved up and down, enlarged range of processing and ensured the best rigidity of processing workpieces with different height. Beam hierarchical moved positioning, controlled by PLC throughout the whole travel, with simple operation and reliable operation. Special assembly process ensured the geometry precision of beam in each position.





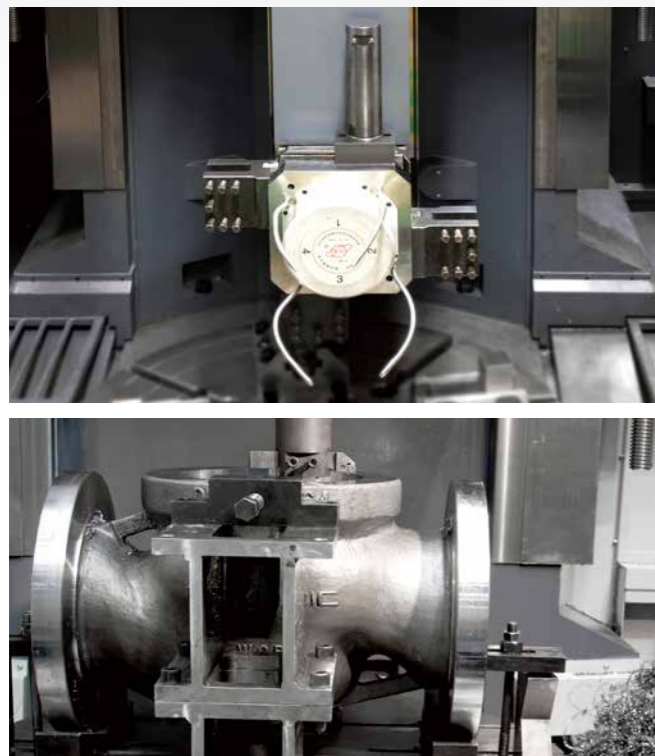
## Guideway's structure

Linear guide combined with slide guide ensures the accuracy of long term stability and heavy cutting performance. Using linear guide with oriented guideway can reduce friction force and beta ratio, to keep with a high precision when long-time processing. The plastic coated guideway has a good ant-vibration performance, large loading capacity and a smaller friction coefficient

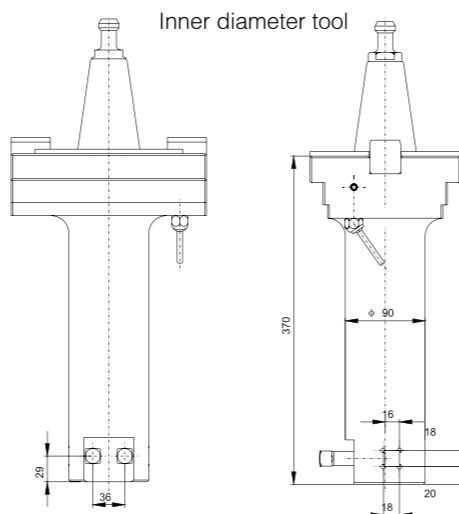
### Electrical square turret

## VNL1254S/H、VNL1605S/H

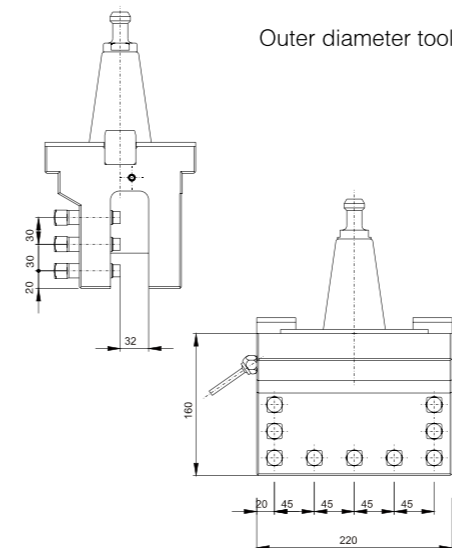
High positioning accuracy, tight clamping force, large loading capacity, more stable and reliable.



## Tool system BT50



## Tool system BT50



## Integrated casting ,stable foundation

With a thermal symmetric structure of the base overcomes the effect on the machining accuracy made by spindle temperature rising. The base after the finite element analysis optimized design makes the machine with a high rigidity. The material of the casting is cast iron with high density, high strength and well shock absorption. The ZF reducer and motor adopted back-type installation, easy for maintenance.



### Hat-type tool magazine

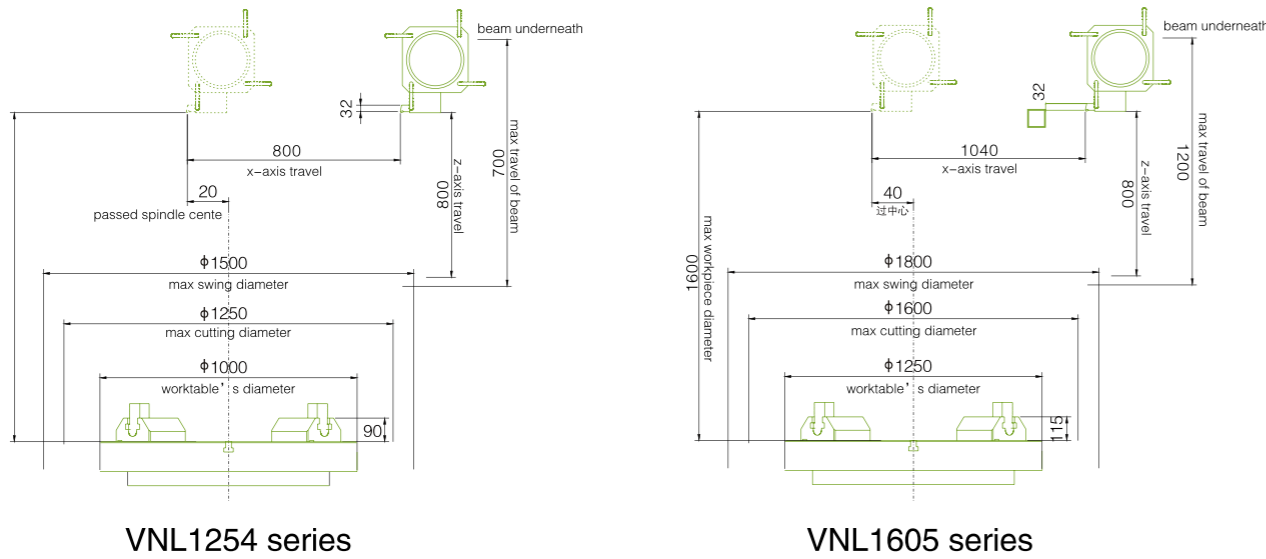
## VNL1254ST/HT、VNL1605ST/HT

Instead of electric square turret can automatically tools change, improve machining efficiency.

VNL1605Ht with BT50 included 4 tool holder: three is for turning, one is for boring.



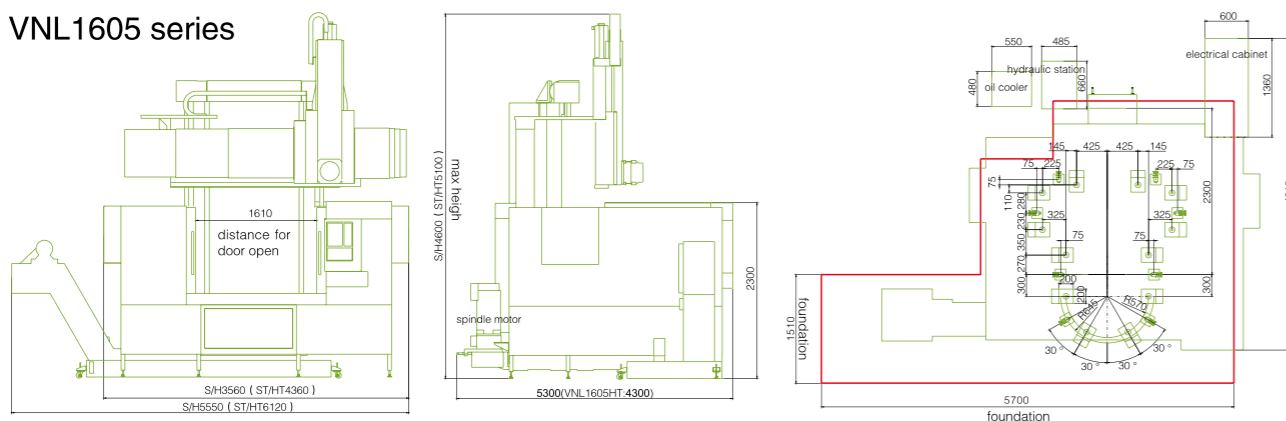
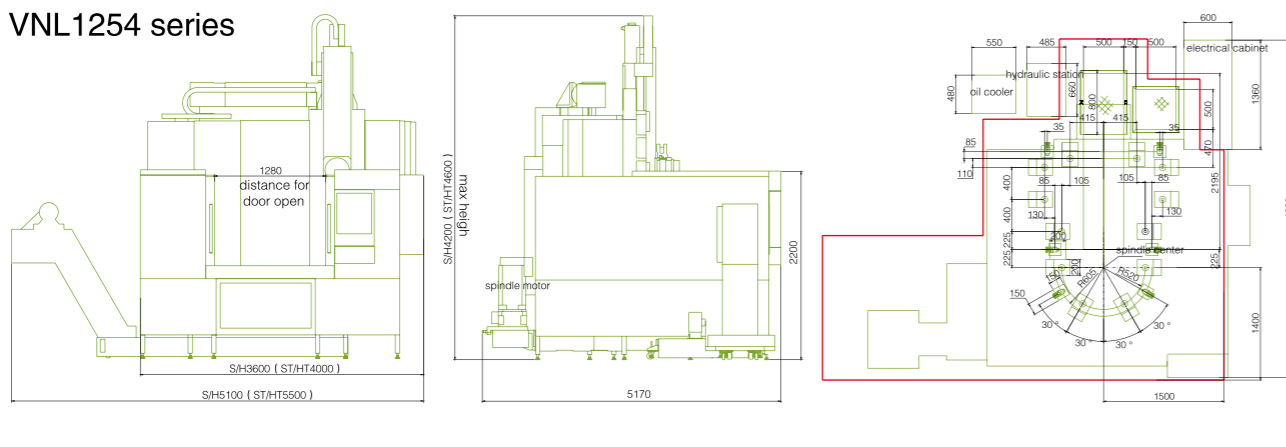
# WORKING AREA



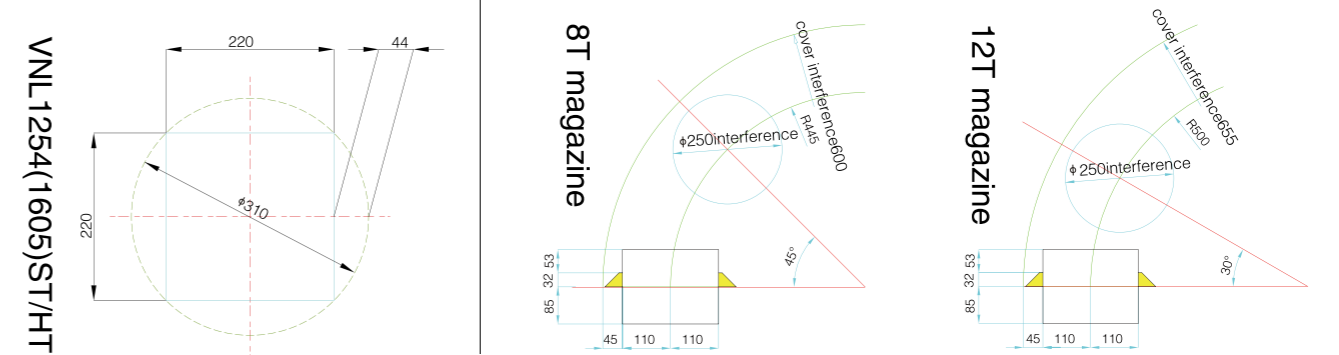
# TECHNICAL PARAMETERS

Item	Unit	Single-column vertical CNC lathe			
		VNL1254S/H	VNL1254ST/HT	VNL1605S/H	VNL1605ST/HT
<b>Capability</b>					
max swing diameter	mm	1500	1500	1800	1800
max cutting diameter	mm	1250	1250	1600	1600
max height of workpiece	mm	1000	1000	1600	1600
max weight of workpiece	kg	5000	5000	8000	8000
<b>worktable</b>					
motor power	kW	30	30	37	37
dimeter	mm	1000/1250	1000/1250	1250/1600	1250/1600
max speed	r/min	500/400	500/400	400/300	400/300
max torque	N · m	6000	6000	14000	14000
<b>Turret</b>					
tools NO.		4/5/6	8	4/5/6	8/12
outer-round tool shank size	mm	32 × 32	32 × 32	32 × 32	32 × 32
driving mode		electric	electric	electric	electric
<b>X&amp;Z axis</b>					
X-axis ballscrew 's diameter/lead	mm	63/10	63/10	63/10	63/10
Z-axis ballscrew 's diameter/lead	mm	63/10	63/10	63/10	63/10
Max travel X/Z	mm	800/620	800/620	1040/800	1040/800
rapid speed X/Z	m/min	12/12	12/10	12/12	12/10
<b>Accuracy</b>					
Positioning ( X/Z )	mm	0.03/0.03	0.03/0.03	0.03/0.03	0.03/0.03
Repeatability ( X/Z )	mm	0.015/0.015	0.015/0.015	0.015/0.015	0.015/0.015
<b>auto-chip conveyor</b>					
		in flank	in flank	in flank	in flank
<b>CNC System</b>					
		FANUC Oi TD			
Servo motor torque ( X/Z)	N · m	36/36	36/27	36/36	36/27
Total capacity	kVA	55	55	65	65
Net weight	kg	16000	17000	25000	26000
Overall dimintions (L*W*H)	mm	5100 × 5170 × 4200	5500x5170x4600	5500 × 5315 × 4600	6120x5315x5100
<b>Standard configuration</b>					
		automatic lubrication system,air conditioner,signal lamp			
<b>Optional</b>					
		Sseries: FANUC Oi mate-TD or SIMENS 828D basic H series: FANUC Oi-TD or SIMENS 828D linear scale,special work fixtures and so on			

# INSTALLATION DIMENSION

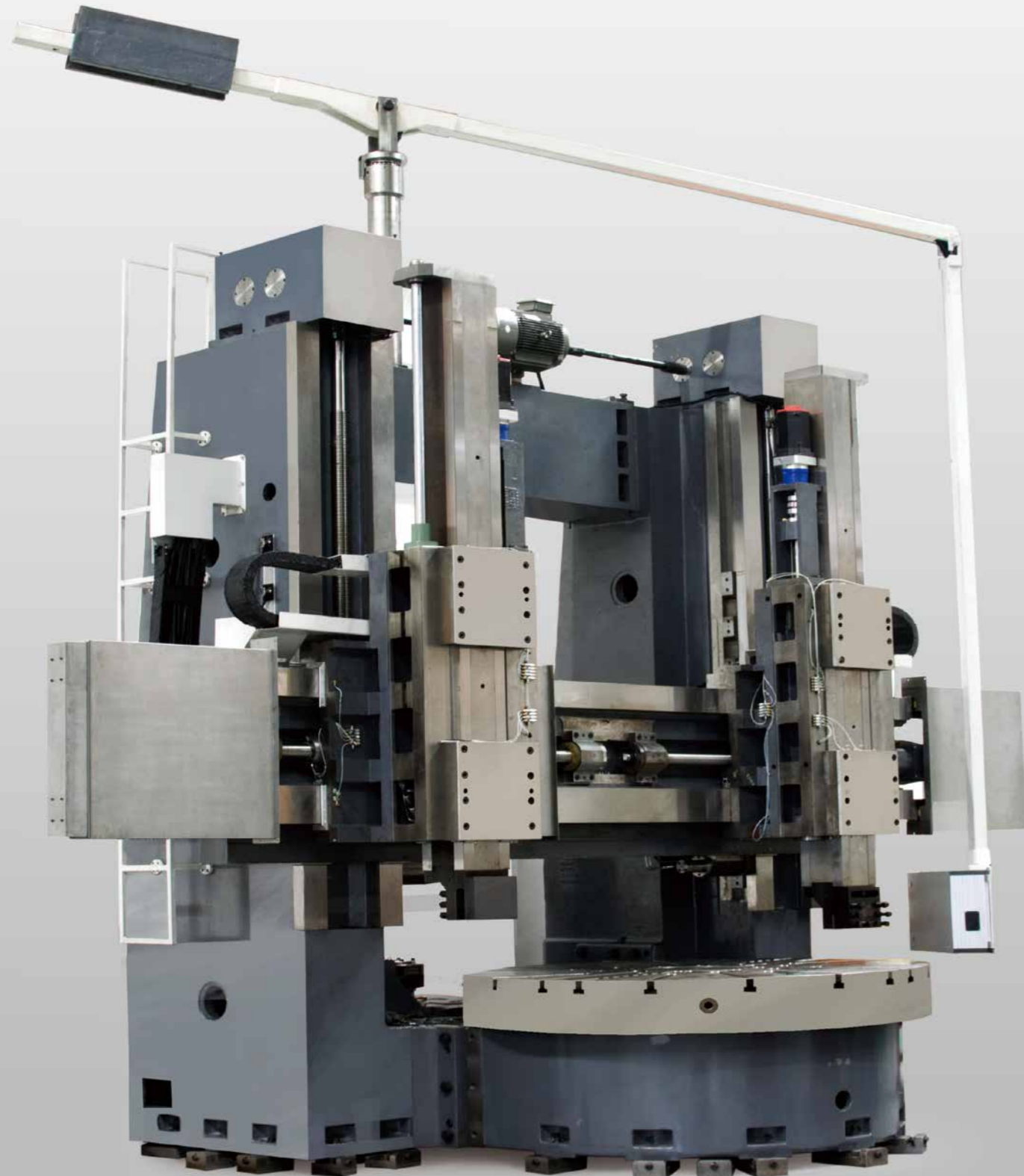


# INTERFERENCE MAX TOOL SIZE



# Double column vertical lathe

VNL2506H

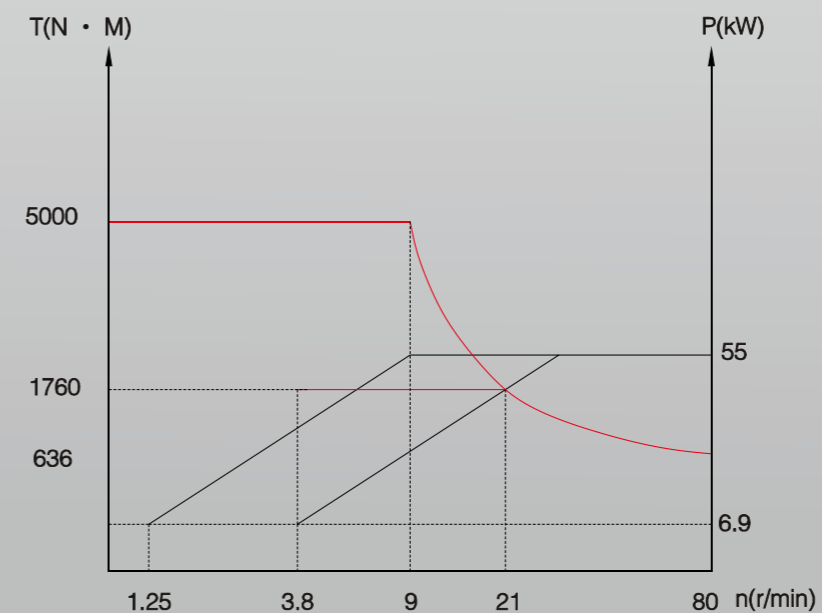


Gantry-type column with a whole casting structure design makes products' stability be more better; Double turret, double machining efficiency, Under the same machining capacity, covers an area of a half; Used FANUC dual channel CNC system, control two turret respectively, rough and finish machining processed simultaneously; A symmetrical layout reduced the influence of the spindle temperature rising to the precision; column is fixed on the base and foundation, with a better rigidity; Beam' s movement adopts hierarchical position, guaranteed to realize heavy cutting within the ram out of the shortest Length.

## Powerful cutting capacity

The motor is with 55 kw ac frequency conversion and a rated speed 750rpm can realize heavy cutting within lower speed; After a multistage gear box slowing down make the maximum torque of worktable reach to 50000N · m total cutting is 50000N.

## Spindle power/torque diagram





### Beam lifting system

Beam can be moved up and down, enlarged the range of processing and ensured that process workpieces with different height of a high rigidity; Beam hierarchical move positioning completely controlled by PLC to make the operation be simple and reliable; Special assembly process ensured that the geometry precision of beams in each position.

## Integrated structure

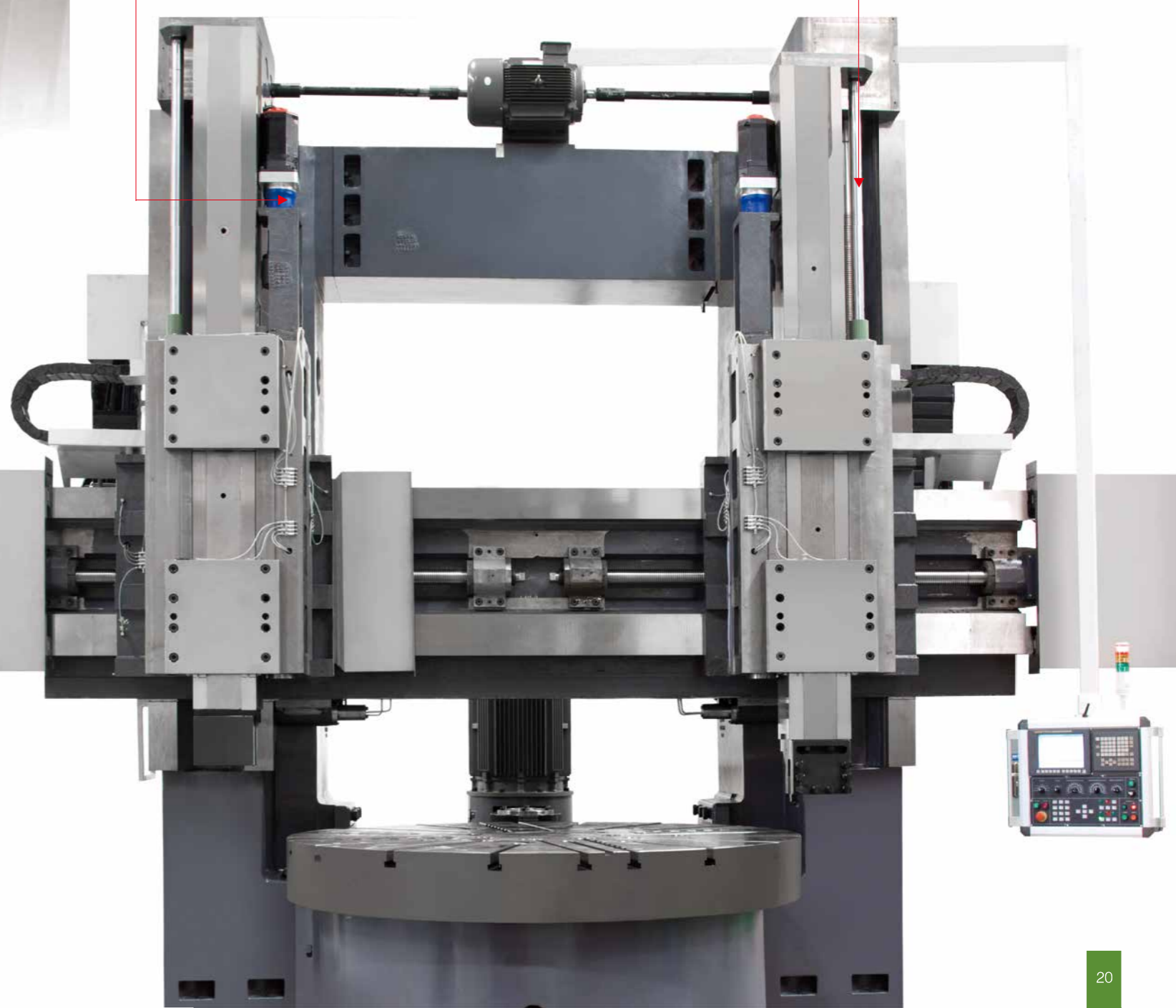
The machine adopted gantry structure of a full symmetry from left to right can control the effect on machine's accuracy of thermal deformation. Column is fixed on the base and foundation to improve the whole rigidity of machine. Columns with four large cross-section rectangular guideway design guarantees the high precision and stability. Main components such as base, worktable, column, and beam adopt high strength cast iron and guarantee the stability, rigidity and precision retainability.

### X, Z axis drive reducer

Adopt imported gear reducer (ratio 1:4), reverse clearance < 3 arcmin, transmission efficiency > 97%, quick dynamic response, high torsional rigidity.

### Hydraulic counterweight system

Effectively balance gravity load, which guarantee the machine in any state can rapid response and keep good geometric accuracy.

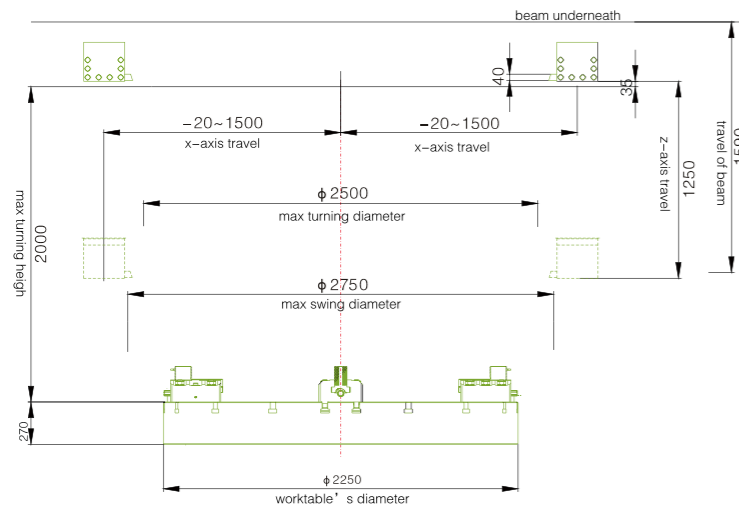


## Main transmission structure

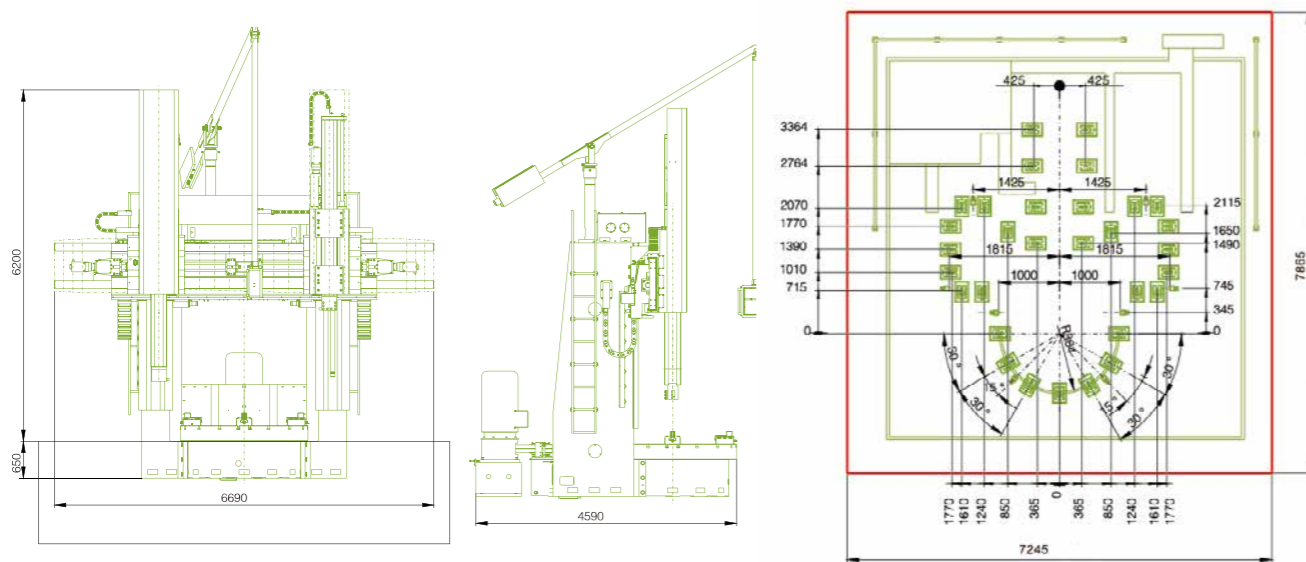
With a symmetrical structure, effectively control the influence of thermal deformation to machine tool accuracy. Big gear is made of advanced alloy steel, after a proper heat treatment and high precision grinding machining make the noise of spindle running to a minimum. Thrust ball bearing with outer diameter 1250 mm makes the loading capacity of machine up to 16 tons. Driving wheel after dynamic balance test makes the machine at high-speed machining reduce the vibration, ensured the roughness of workpieces.



## WORKING AREA



## INSTALLATION DIMENSION



## APPLICATION FIELDS

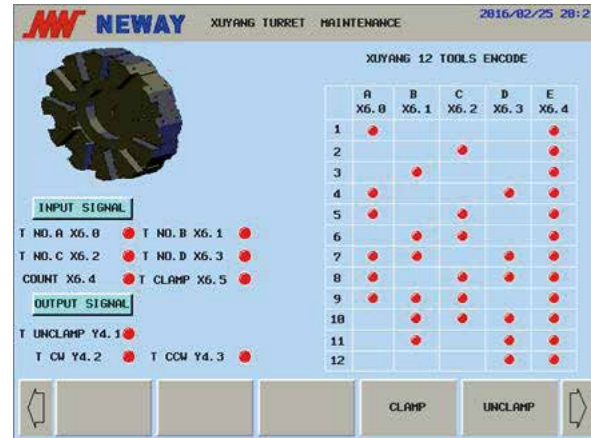


## TECHNICAL PARAMETERS

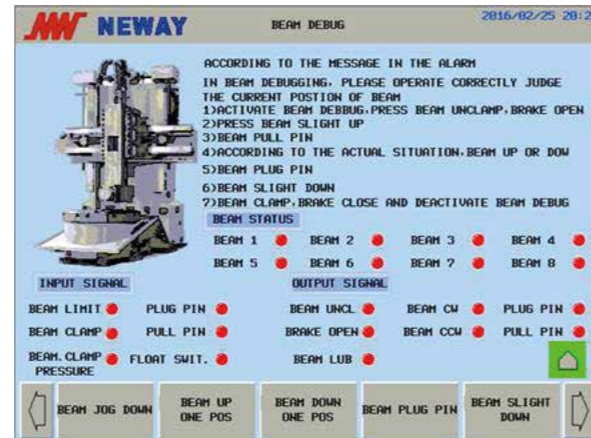
Item	Unit	Double-column vertical CNC lathe	
		VNL2506H	
<b>Capability</b>			
max swing diameter	mm	2750	
max cutting diameter	mm	2500	
max height of workpiece	mm	2000	
max weight of workpiece	kg	16000	
<b>worktable</b>			
motor power	kW	55	
diameter	mm	2250	
max speed	r/min	80	
max torque	N·m	50000	
<b>Turret</b>			
tools NO.		1	
outer-round tool shank size	mm	40 × 40	
driving mode		N/V	
<b>X&amp;Z axis</b>			
X-axis ballscrew's diameter/lead	mm	80/10	
Z-axis ballscrew's diameter/lead	mm	80/10	
Max travel X/Z	mm	1520/1250	
rapid speed X/Z	m/min	6.5/6.5	
<b>Accuracy</b>			
Positioning ( X/Z )	mm	0.03/0.03	
Repeatability ( X/Z )	mm	0.015/0.015	
auto-chip conveyor		/	
CNC System		FANUC Oi-TD ( Double channel )	
Servo motor torque ( X/Z )		22/22	
Total capacity		140	
Net weight		42000	
Overall dimensions (L*W*H)		6690 × 4590 × 6850	
Standard configuration		automatic lubrication system,air conditioner,signal lamp Oil tank with constant temperature	
Optional		SIEMENS 828D linear scale,special work fixtures and so on	

# CNC system

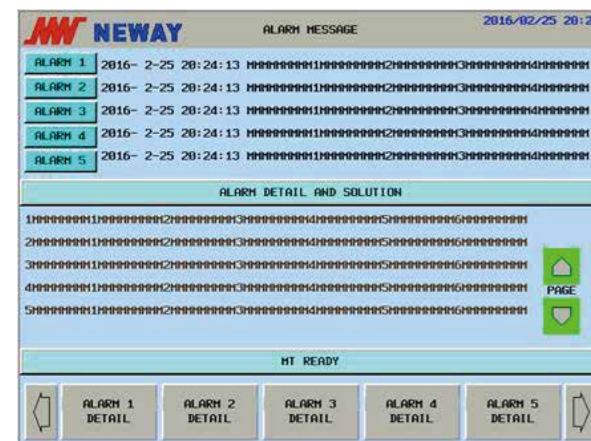
we have on a secondary development of some friendly man-machine interface by using of PICTURE function system.



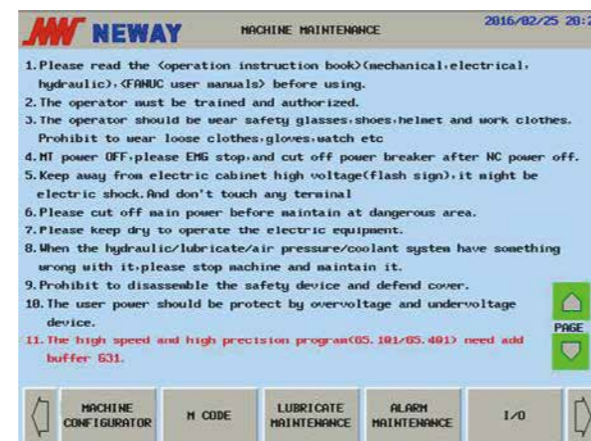
Turret display interface (the tool location's display of present and target, application notice)



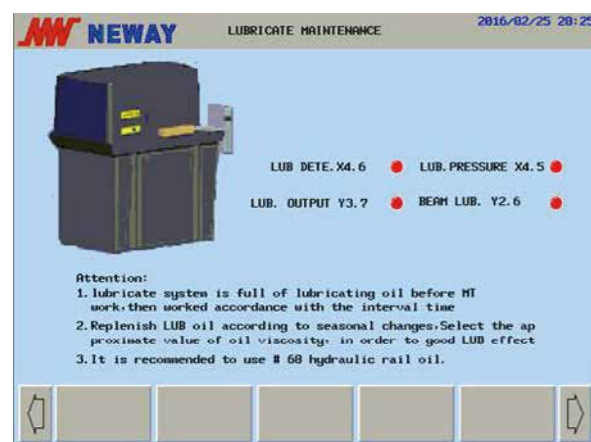
beam shift interface (display for the steps and requirement of shift)



alarm message interface (the alarm message and solution)



daily maintenance interface: introduced maintenance's notice.)



Time-setting of lubrication: according to customer's need to set the time of oil injection and interval)



M code interface (introduced the M code functions)

# Humanized design



Swing operation panel and handwheel are convenient for the operator to operate. Super wide sliding door is larger than the max processing diameter + 10.



Ladder fence with a wide inside space is easy and safe for up and down. wide internal space and sliding door easy for the workpieces' loading and unloading.



The left: the electric cabinet arranged orderly, the cable and wire are marked with serial number, easy to maintain and solve in time.



The right : reasonable work lamp can make the light light to everywhere of processing zone.

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