

# CHEVALIER®

Grinding / Turning / Milling



## FVL Series

CNC VERTICAL TURNING LATHE SERIES (BOX WAY)

FVL-8 • 12 • 20 • 24

# FVL-8 / 12 / 20 / 24

## HIGH EFFICIENCY VERTICAL TURNING LATHE (BOX WAY)

To meet the market demand for the automation operation, CHEVALIER has already developed these small-size vertical lathe series.

- **Spindle Speed**

- 4,000rpm (FVL-8 Series)
- 3,000rpm (FVL-12 Series)
- 2,000rpm (FVL-20 Series)
- 2,500rpm (FVL-24 Series) , 1500rpm (Opt.)

- **Rapid Speed (X/Y Axes)**

- X Axis: 20m/min (787IPM)
- Z Axis: 20m/min (787IPM)

2

- **The big-slanted design of bed provides the optimal coolant flow and chip outlet.**



**FVL-8**

Note: Machine shown above includes optional accessories.



**FVL-12HTL**

Note: Machine shown above includes optional accessories.

- 1 Space-saving design of machine to increase the utility of plant space.
- 2 Big-slanted bed design to equip with strong coolant device for chips flushing completely.
- 3 Special square-type hardened steel guideway design to provide the best turning rigidity.
- 4 The space position of turning lathes can be arranged in a row one to make the loading and unloading as well as operation more efficient.
- 5 The machine is assembled by using specialized assembly mold to achieve the highest accuracy and quality.
- 6 The run-out accuracy for the superior precision spindle is below 0.003mm (the accuracy is 0.002mm which is required by the assembly process of Chevalier).
- 7 Spindle uses double-row cylindrical roller bearings (NN) to provide the highest rigidity.
- 8 FVL-8/12 series which use angular contact ball bearings are used on the machining of aluminum workpiece.
- 9 Air-sealed spindle seal (high speed bearing) is used to avoid dust, mist and chips going into the spindle.
- 10 Adopts the newest and long-lasting technique for anti-worn out to have anti-vibration function and high accuracy.
- 11 Direct panel display. Machine status monitoring system can let operator to know the machine status easily.
- 12 Good circularity to avoid the oval machining resulted from the inertia.
- 13 To do the mass production of automatic production-line to meet the needs of production-line.
- 14 Heavy-turning turret designed by Japan manufacturer to provide the best dynamic turning rigidity and the stability of tool change.
- 15 Japan-patented new type roller aluminum chip conveyor to provide the best chip outlet.
- 16 To provide the jig and fixture design and operation process evaluation.
- 17 One-piece design for machine body and machine seat.



**FVL-20HT**

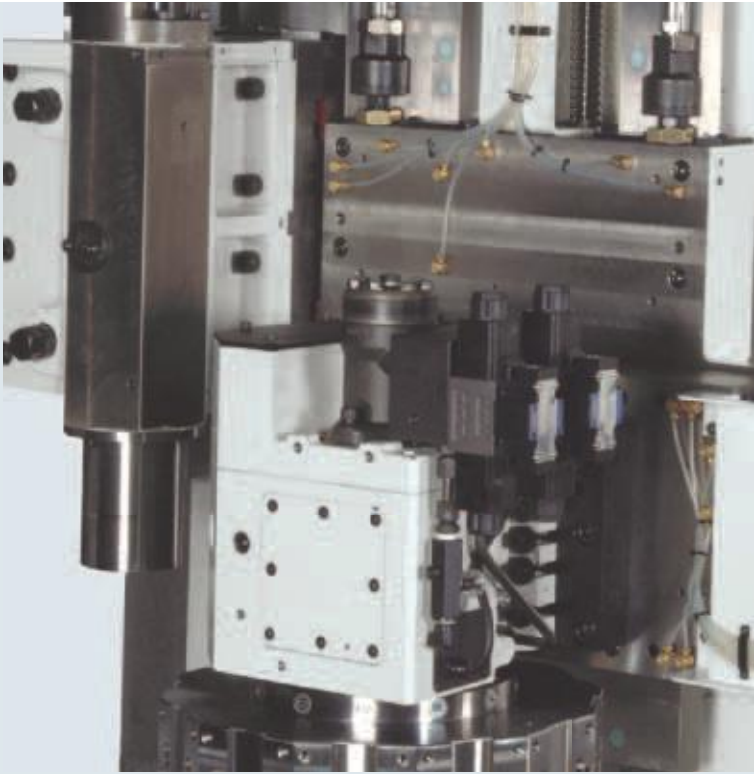
Note: Machine shown above includes optional accessories.



**FVL-24DT**

Note: Machine shown above includes optional accessories.

# MACHINE CONSTRUCTION



## Tail-stock System

- The tail-stock is programmable control. The tail-stock uses alloy steel box way to provide high rigidity and clamping characteristics.



## Solid One-piece Machine Base

- One-piece Meehanite cast-iron base and column with rigid box way construction.

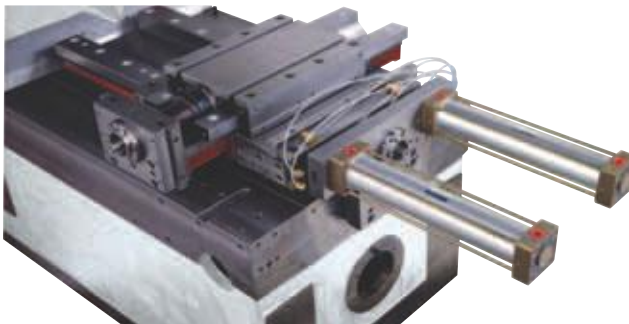
## High Precision Square Type Steel Guideway

4

- X axis and Z axis adopt alloy steel box way which the parallelism, flatness and perpendicularity are controller below 0.004mm. The FVL-8/12 series use high precision bearing (Roller Pack) and is coordinate with the specially designed gibs for better preload to reduce the friction between two planes and make the movement more smoothly.

## FVL-8 Series

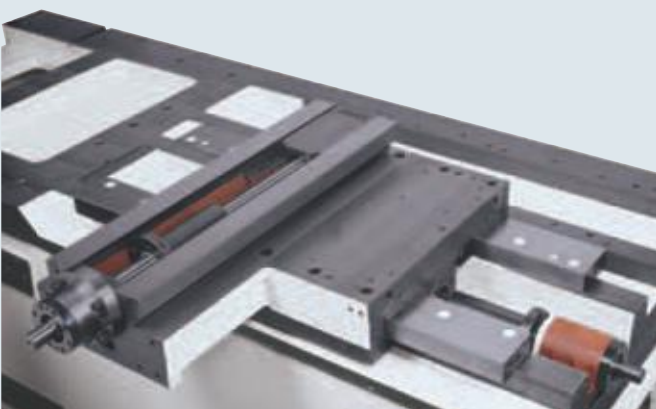
The pneumatic counterbalance technology applied on the FVL-8 series.



## FVL-8 Series



## FVL-12 Series



## FVL-12 Series

### Feeding Construction

- AC servo motor directly drives the X and Z axis to provide accurate positioning and repeatability.

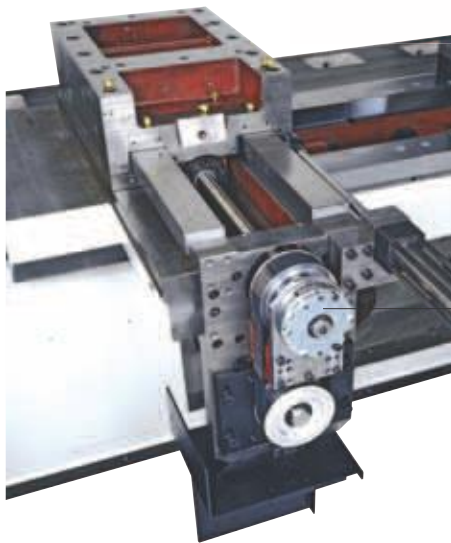


## Double Turrets (Applicable for FVL-20DT and FVL-24DT series)

- Special heavy duty turret design which is suitable for heavy machining. The left and right turret can run independently or simultaneously to shorten the cycle time and upgrade the working efficiency.

## Shorten Cycle Time

- Two slides and 4 axes are controlled independently to shorten the cycle time.

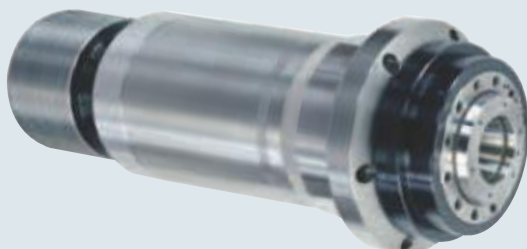


## Advanced Brake System

- Z axis brake system is separated from servo motor to avoid the accident during power interruption.

## High Rigidity Spindle

- New spindle design uses high precision bearings to maintain accuracy during long time machining. (The photo shown below is for FVL-24 spindle)



## Heavy Duty Ribbed Frame Castings

- The box type for vertical column is designed for vibration-absorption. The heavy duty ribbed frame has strong support to prevent the deformation during machining.



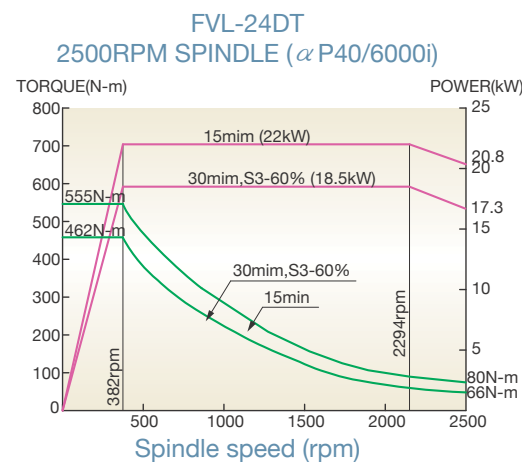
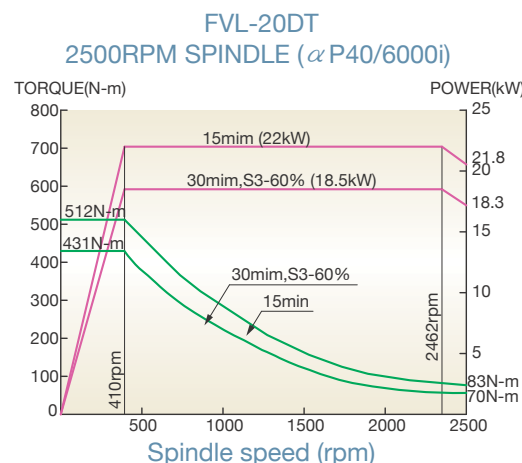
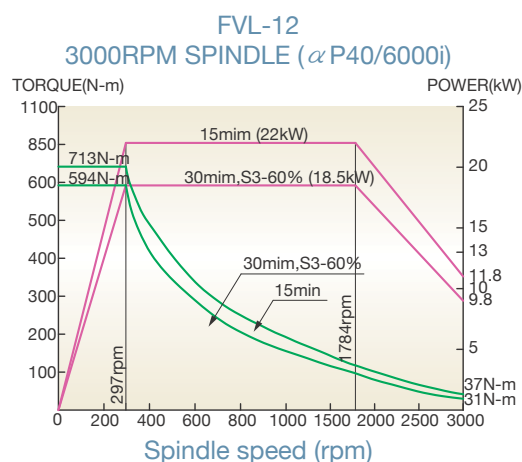
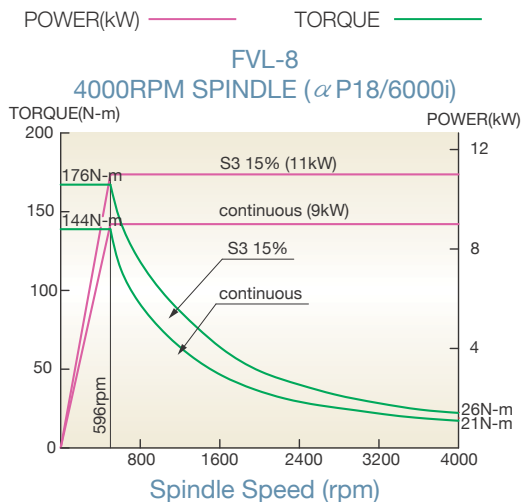
# CONTROLLER FEATURES

## OiT-D



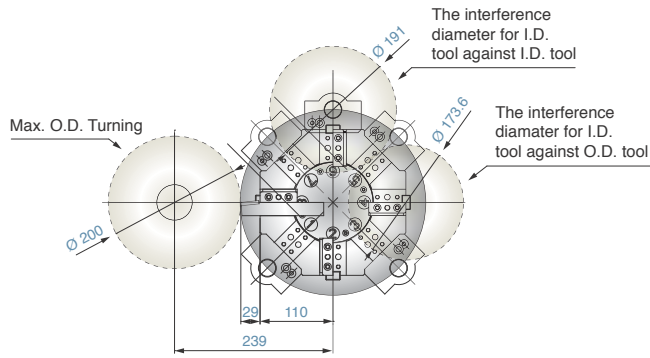
ITEM	OiT-D
Axis No.	3 axis
Min. movement	X axis: 0.001mm
Min. input unit	0.001mm
Auro.acceleration/deceleration	Standard
HRV control	Standard
Vertical speed command	Direct S4 digits command
Vertical axis rpm control	G96,G97
Spindle rpm adjustment	50~120%, 10% per scale
Feedrate adjustment	0~200%, 10% per scale
Home return	G27,G28
Manual pulse generator	0.001/0.01/0.1mm
Tool compensation	64 sets
Tool nose radius compensation	G40~G42
Tool compensation type	Tool wear & geometric separate compensation
Tool function	T4 position code command
Chamfering and arc angle function	Standard
Single canned cycle	G90,G92,G94
Complex canned cycle	G70~G76
Decimal point input type	Standard
Graphic conversation function	Standard
Dynamic graphic display	Standard
Tool life management	Standard
Absolute servo motor	Standard
Background edit	Standard
Cycle time display	Standard
Memory length	640m
Threading	Standard
Program No.	400 sets
M Function	M2 digits command
Metric/Inch switching function	G20,G21
Input code	EIA/ISO auto.read
Tape input / Output Interface	RS232C 20mA
Memory card input/output interface	Standard
MDI/CRT unit	8.4" LCD
Machine lock	Standard
Stroke limit setting	Standard
Spindle load detect	Standard
Chuck lock function	Standard
Workpiece shift auto. input	Standard
Auto. Home return	Standard

# THE TORQUE CHART OF SPINDLE MOTOR



# TOOLING INTERFERENCE CHART

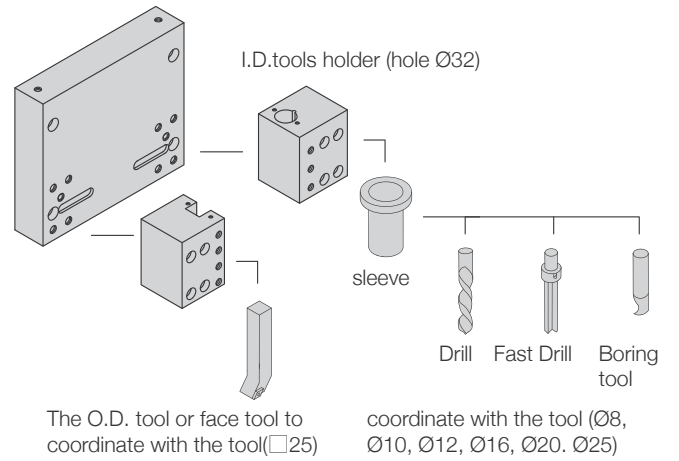
## FVL-8 Series / FVL-8HT Series



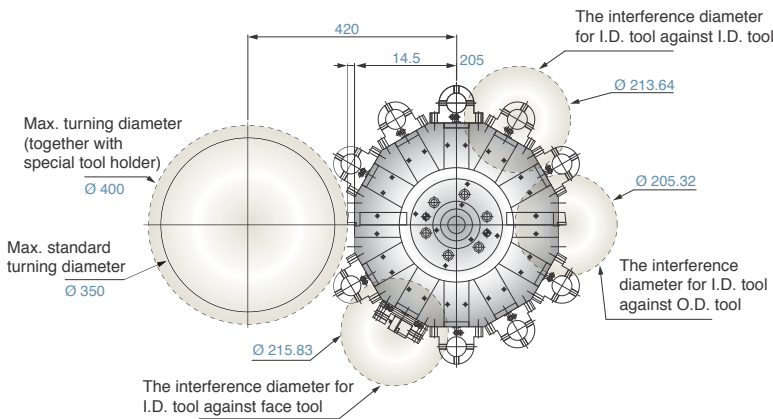
# TOOLING SYSTEM DRAWING

## FVL-8 Gang Type Tool Holder and Tooling Drawing

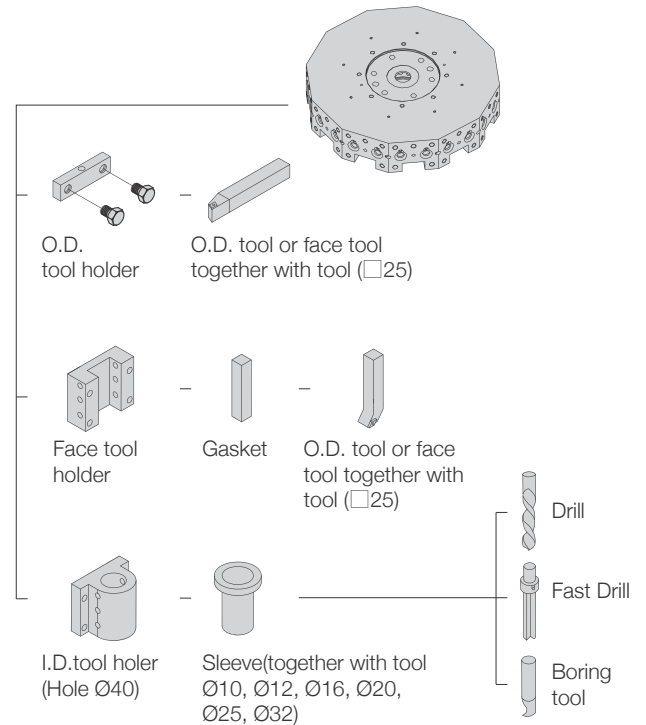
Unit: mm(″)



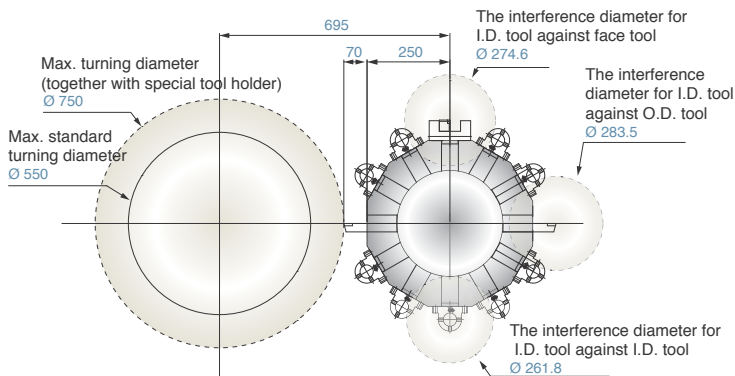
## FVL-12 HT Series



## FVL-12 Servo Turret Tooling Drawing



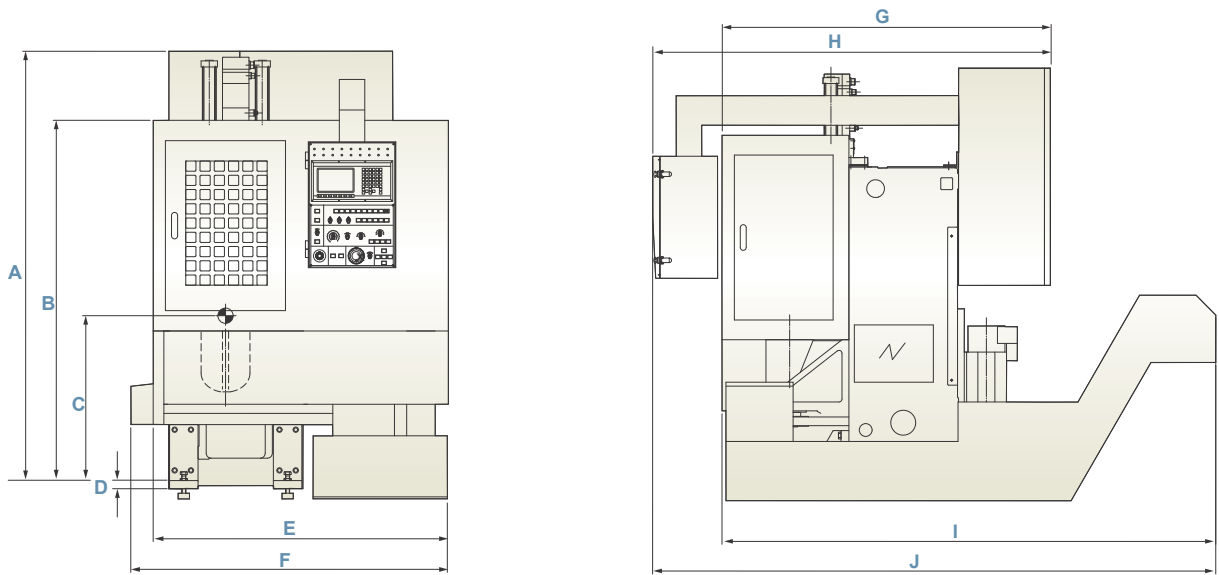
## FVL-20HT Series



# MACHINE DIMENSION

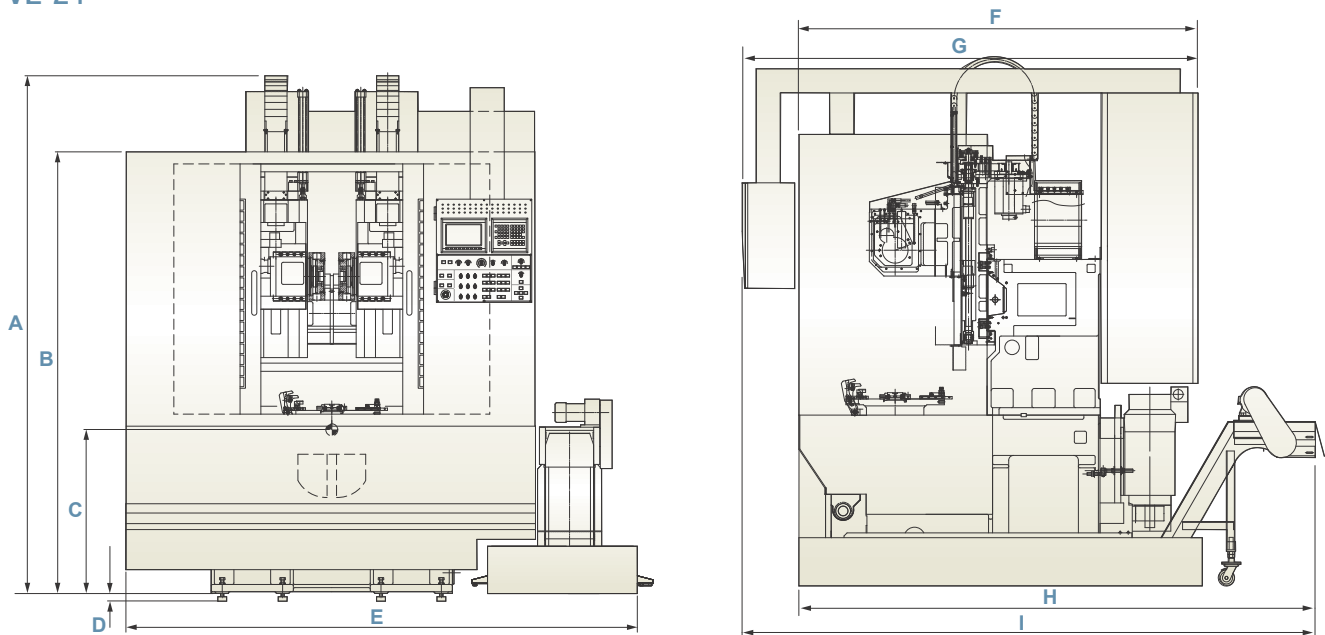
Unit: mm(")

## FVL-8 / 12 / 20



## FVL-24

8



ITEM	FVL-8	FVL-12	FVL-20HT	FVL-24DT	FVL-20DT	FVL-24VT
A	2,548mm(100.3")	3,100mm(122")	3,447mm(135.7")	3,345mm(131.6")	3,345mm(131.6")	3,345mm(131.6")
B	1,977mm(77.8")	2,300mm(90.5")	2,872mm(113")	2,850mm(112.2")	2,850mm(112.2")	2,850mm(112.2")
C	864mm(34")	886mm(34.8")	949.5mm(37.4")	1,026.5mm(40.4")	1026.5mm(40.4")	1026.5mm(40.4")
D	50mm(1.9")	100mm(3.9")	10mm(0.4")	100mm(3.9")	100mm(3.9")	100mm(3.9")
E	1,520mm(59.8")	1,890mm(74.4")	NA	3,780mm(148.8")	3,630mm(142.9")	3,145mm(123.8")
F	1,623mm(63.9")	1,980mm(77.9")	2,078.5mm(81.8")	2,512mm(98.9")	2,512mm(98.9")	2,512mm(98.9")
G	1,800mm(70.9")	2,030mm(79.9")	2,015mm(79.3")	2,895mm(113.9")	2,895mm(113.9")	2,895mm(113.9")
H	2,025mm(79.7")	2,250mm(88.6")	2,370mm(93.3")	4,465mm(175.8")	4,465mm(175.8")	4,465mm(175.8")
I	2,930mm(115.3")	2,630mm(103.5")	2,780mm(109.4")	4,765mm(187.6")	4,765mm(187.6")	4,765mm(187.6")
J	2,955mm(116.3")	2,850mm(112.2")	3,067mm(120.7")	NA	NA	NA

Notice: All content is for reference only and may be subject to change without notice or obligation.



# STANDARD ACCESSORIES / OPTIONAL ACCESSORIES

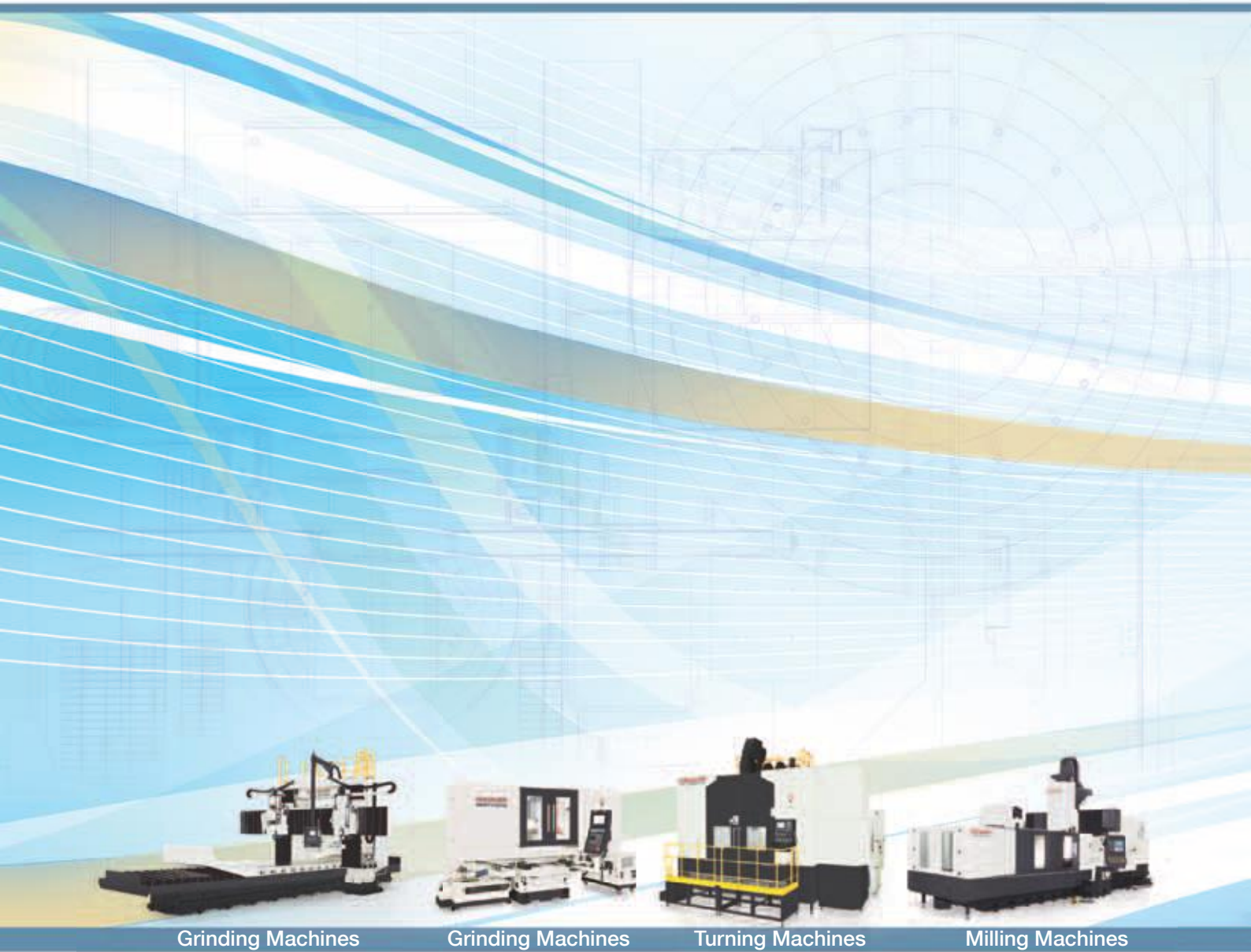
FVL	8	8HT	12	12HT	12HTL	12MC	20HT	20DT	24DT	24VT
3 jaw hydraulic chuck	●	● (8")			● (12")		● (15")		● (15")	
Tool holder(I.D. tool holder x2, O.D. tool holder x2)	●	●			-		-		-	
Tool holder(I.D. tool holder x2, Facing tool holder x3)	-	-	-	●	◎		●	-	-	
Tool holder(I.D. tool holder x1, O.D. tool holder x1, Facing tool holder x1)	-				-		-		-	●
Tool holder(I.D. tool holder x2, O.D. tool holder x2, Facing tool holder x2)	-				-		-	●	●	-
I.D. Sleeve(6 pieces)(YC32-A,8A,10A,12A,16A,20A)	●				-		-		-	
I.D. Sleeve(YC40-10A,12A,16A,20A,25A,32A)	-				●		●	-	-	
Drill Sleeve(2 pieces)(MT2,MT3)	●				●		● (MT3,MT4)	-	-	
Chip conveyor with coolant tank	●				●		●		●	
Work lamp	●				●		●		●	
Hydraulic unit	●				●		●		●	
Electric cabinet with heat exchanger	●				●		●		●	
Automatic lubrication system	●				●		●		●	
Oil skimmer	●				●		●		●	
Fanuc controller	●				●		●		●	
Levelling adjust screw and pads	●				●		●		●	
Ground bolt	●				●		●		●	
Operation and maintenance manual	●				●		●		●	
Tool box with tools	●				●		●		●	
3 jaw hydraulic jaw	◎ (10")				◎ (15")		◎ (18")		◎ (18")	◎ (21")
2 step speed gear box(ZF-made in Germany)	◎				◎		◎		◎	
Air conditioner for electric box	◎				◎		◎		◎	
Heavy cutting spindle(1,500rpm)	-				-		-		◎	
Coolant through type of the tool holder	◎				◎		◎		◎	
V.D.I. tool holder	-				-	◎	-		-	
90 degree V.D.I. tool holder	-				-	◎	-		-	
Dust collector	◎				◎		◎		◎	
Oil mist collector	◎				◎		◎		◎	
Clean gun device for workpiece	◎				◎		◎		◎	
Clean water gun for working area(shared pump)	◎				◎		◎		◎	
Clean water gun for working area(independent pump)	◎				◎		◎		◎	
Transformer	◎				◎		◎		◎	
Air clean gun	◎				◎		◎		◎	
Automation device	◎				◎		◎		◎	
Other type controller	◎				◎		◎		◎	
Spindle chiller device	◎				◎		◎		◎	
Roller-type chip conveyor(include water machine)	◎				◎		◎		◎	
Crane	◎				◎		◎		◎	
Color designated by customer	◎				◎		◎		◎	
CE specification	◎				◎		◎		◎	
Chuck used for aluminium wheel	-				-		-	◎	◎	
Chip cart	●				●		●	◎	◎	
Air-blow device	-				-		◎		-	
Multiple chip conveyor for aluminium chip	-				-		◎		◎	

\* The symbol meaning indicated on the above list: ● for standard accessory ◎ for optional accessory

# MACHINE SPECIFICATION

ITEM	FVL-8	FVL-8HT	FVL-12	FVL-12HT	FVL-12HTL
Cutting Capabilities					
Max. Swing Dia.	Ø400mm(15.74")		Ø550mm(21.65")		
Max. Cutting Dia.	Ø220mm(8.66")	Ø200mm(7.87")	Ø350mm(13.77")		
Max. Turning Height	430mm(16.92")		550mm(21.65")		
Spindle					
Spindle Speed	4,000rpm		50~3,000rpm		
Chuck Size(Standard Accessories)	8"		12"		
Spindle Nose	A2-6		A2-8		
Spindle Bearing I.D.	Ø100mm(3.93")		Ø130mm(5.11")		
The distance from spindle nose to floor	864mm(34.01")		886mm(34.88")		
The distance from center of spindle to the front cover of machine	340mm(13.38")		400mm(15.74")		
V.D.I spindle speed	NA				
Turret					
Turret type	Gang	Horizontal	NA	Horizontal	
Tool Amount	2	8	2	12	
Turret Amount	NA	1	NA	1	
O.D.Tool Shank Size	20 x 20		25 x 25		
I.D. Tool Shank Size	Ø32	Ø25	Ø32	Ø40	
Stroke					
X-axis Stroke	235mm(9.25")		200mm(7.87")		
Z-axis Stroke	430mm(16.92")		550mm(21.65")		
Feeding Speed					
The balancing device for vertical axis	Pneumatic balance				
X-axis rapid speed	20m/min.		20m/min.		
Z-axis rapid speed	20m/min.		20m/min.		
Ball Screw Dia. / Lead Pitch	Ø28mm / 6mm(1.1" / 0.23")		Ø36mm / 10mm(1.41" / 0.39")		
Motor					
Spindle motor	9/11kW( $\alpha$ P18)		18.5/22kW( $\alpha$ P40)		
V.D.I. spindle motor	NA		NA		
Feeding motor (X/Z)	1.6kW( $\alpha$ 8i) / 1.6kW( $\alpha$ 8i)		3kW( $\alpha$ 12i) / 3kW( $\alpha$ 12i)		
Drilling and tapping motor	NA		NA		
Turret motor	NA	0.4 kW	NA	1.2kW( $\beta$ 8i)	
Lubrication motor	0.08kW(0.11HP)				
Hydraulic motor	1.5kW(2HP)				
Coolant motor	NA				
Chip disposal motor	1.1kW(1.5HP)				
Water gun motor	0.75kW(1HP)				
Tailstock					
Tailstock stroke	NA		NA		444mm(17.48")
Quill stroke	NA		NA		120mm(4.72")
Quill taper	NA		NA		MT5
Quill driving system	NA		NA		Hydraulic
The indexing way of tailstock	NA		NA		Manual
Power					
Power capacity	20Kva		35Kva		
Voltage	220v				
Penumatic(pressure)	5.5kg/cm <sup>2</sup>				
Storage tank					
Hydraulic tank capacity	NA		30L		
Lubrication tank capacity	NA		3L		
Coolant tank capacity	NA		300L		
Machine Size					
Height	2,548mm(103.3")		3,100mm(122")		
Length x Width	1,623mm x 2,955mm(63.9" x 116.3")		1,980mm x 2,850mm(77.9" x 112.2")		
Net Weight	3,600kg(7,920 lbs)		5,000kg(11,000 lbs)	5,650kg(12,430 lbs)	
Accuracy					
Positioning Accuracy	X	0.007mm(0.00027")		0.010mm(0.00039")	
	Z	0.007mm(0.00027")		0.010mm(0.00039")	
Repeat Accuracy	X	0.005mm(0.00019")		0.007mm(0.00027")	
	Z	0.005mm(0.00019")		0.007mm(0.00027")	
Accuracy Inspection	ISO3655				

	FVL-12MC	FVL-20HT	FVL-20DT	FVL-24DT	FVL-24VT
	Ø550mm(21.65")	Ø750mm(29.52")	Ø670mm(26.37")	Ø850mm(33.46")	
	Ø350mm(13.77")	Ø550mm(21.65")	Ø558mm(21.96")	Ø750mm(29.52")	
	400mm(15.74")	600mm(23.62")	400mm(15.74")	400mm(15.74")	
	50~3,000rpm	20~2,000rpm	50~2,500rpm	50~2,500rpm	
	12"				15"
	A2-8				A2-11
	Ø130mm(5.11")				Ø160mm(6.29")
	886mm(34.88")	950mm(37.4")		1,040mm(40.94")	
	400mm(15.74")	430mm(16.92")	550mm(21.65")	620mm(24.4")	
	4,000rpm	NA			
	V.D.I	Horizontal	Vertical		
	8	12	6+6	6+6	6
	1	1	2		1
	Opt.	32 x 32			
	Opt.	Ø40			
	300mm(11.81")	-30mm(-1.1"), +405mm(-15.9")	+75.5mm(+2.97"), -312mm(-12.2") (L) -75.5mm(-2.97"), +312 mm(+12.2") (R)	+60mm(+2.3"), -400mm(-5.7")(L), -60mm(-2.3"), +400mm(+15.7")(R)	-60mm(-2.3"), +400mm(+15.7")
	550mm(21.65")	600mm(23.62")	415mm(16.33")		
	Pneumatic balance	Hydraulic balance			
		20m/min.			
		20m/min.			
		Ø36mm / 10mm(1.41" / 0.39")			
	18.5 / 22kW(α P40)				
	2.2kW(5HP)				NA
	3kW(α 12i) / 3kW(α 12i)	3kW(α 12i) / 4kW(α 22i)	4kW(α 22i) / 4kW(α 22i)		
	Ø16/M14	NA			
	1.2kW(β 8i)	1.6kW(α 8i)			
	0.08kW(0.11HP)	0.08kW(0.11HP)			
	1.5kW(2HP)	3.7kW(5HP)	5.5kW(7.5HP)		3.7kW(5HP)
	NA	0.75kW(1HP)			
	1.1kW(1.5HP)	1.1kW(1.5HP)	1.1kW(1.5HP) / 4.0kW(5.5HP)		
	0.75kW(1HP)				
	NA				
	NA				
	NA				
	NA				
	NA				
	35Kva	50Kva	60Kva	75Kva	50Kva
	220v	220v		220v	
	5.5kg/cm <sup>2</sup>	5.5kg/cm <sup>2</sup>		5.5kg/cm <sup>2</sup>	
	30L	50L	100L		60L
	300L			1050L	
	3,100mm(122")	3,447mm(135.7")	3,345mm(131.6")		
	1,980mm x 2,850mm (77.9" x 112.2")	2,078.5mm x 3,067mm (81.8" x 120.7")	3,630mm x 4,765mm (142.9" x 187.5")	2,512mm x 4,765mm (98.9" x 187.6")	3,145mm x 4,765mm (123.8" x 187.5")
	5,950kg(13,090 lbs)	9,000kg(19,800 lbs)	13,000kg(28,600 lbs)	13,000kg(28,600 lbs)	11,000kg(24,200 lbs)
	0.010mm(0.00039")				
	0.010mm(0.00039")				
	0.007mm(0.00027")				
	0.007mm(0.00027")				
	ISO3655				



Grinding Machines

Grinding Machines

Turning Machines

Milling Machines

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