



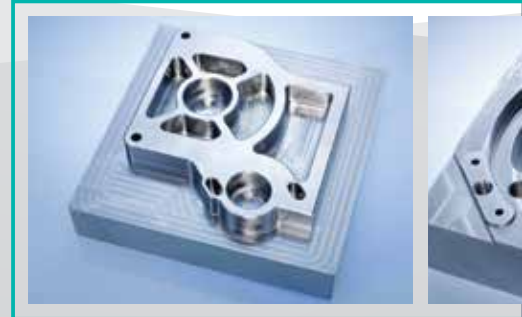
HV *SERIES*

Vertical Machining Center

FEELER HV SERIES

HV-1000

Same Level of Machining Performance and Accuracy as Japanese and European Machines. Surpassing the Competitive Models Made in Taiwan and Korea.





Creating a New Level of Parts Machining and Precision Mold Machining.

For years, FEELER has dedicated itself to the pursuit of higher efficiency and higher performance vertical machining centers to help customers stay competitive. FEELER'S HV Series was designed to integrate many innovative features into the existing models.

The HV Series features outstanding machine structure, accuracy and machining efficiency, greatly surpassing existing models. It's an excellent model especially ideal for today's high speed parts machining.

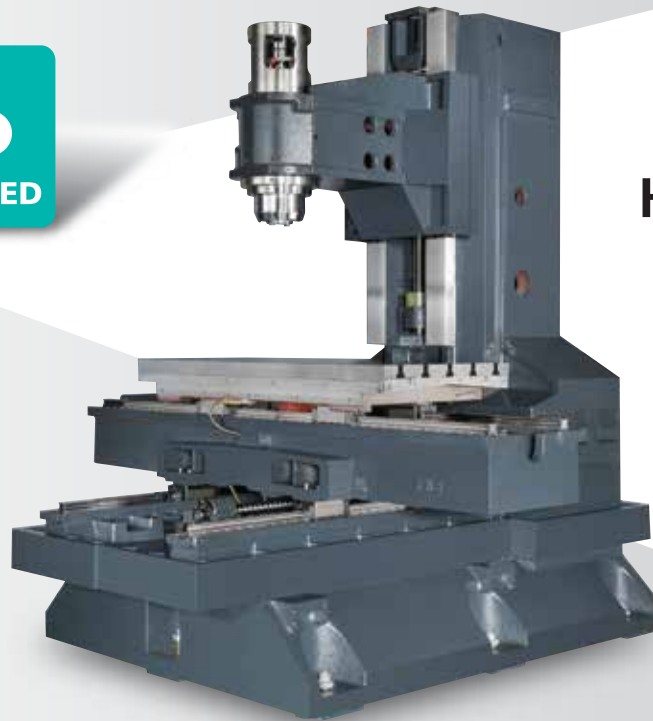
No Counter Weight on Z-axis

- ▶ No counter weight design avoids vibration of chain. This outstanding design also avoids oscillation caused by counter weight that may affect movement stability on Z-axis. Another benefit is greatly reduced vibration when performing peck-drilling operation.
- ▶ Extra powerful drive combined with brake.

HV Series Machine Structure

- ▶ The column structure is reinforced by cross ribs to upgrade torsional torque resistant capability.
- ▶ Increased saddle height increases bending resistant capability. Saddle deformation is reduced by 60%.
- ▶ Circularity accuracy on X, Z-axis increased by 38%.
- ▶ Movement accuracy on X-axis upgraded by 50%.

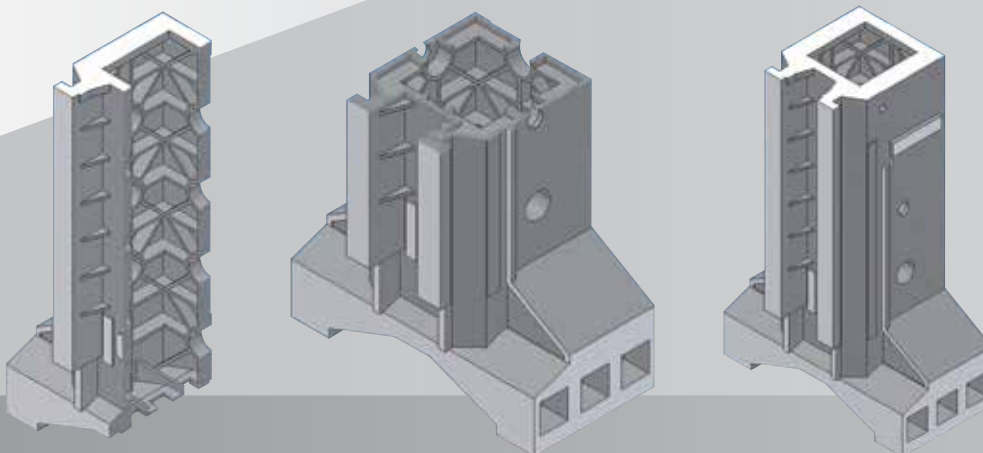
30%
RIGIDITY INCREASED



HV-1000

Honeycomb-shape Ribs Layout

The interior of column is reinforced by cross ribs. This not only upgrades structural torsional torque resistant capability, but also effectively upgrades resonance frequency of low frequency structure. As a result, you get optimal stability.



Precision Inspection Accuracy Guaranteed

At FEELER, we have a strong commitment to provide the best possible machining centers that meet or exceed customers' expectations. Over the years, we have implemented a world class quality control system and the state-of-art inspection equipment.



ZEISS 3D Coordinate Measuring Machine

FEELER utilizes the 3D Coordinate Measuring Machine (CMM) to inspect critical parts ensuring outstanding parts accuracy.



Spindle Dynamic Balance Test

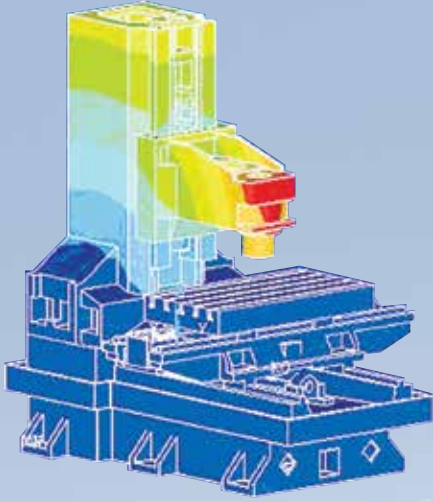
A high precision balance tester is applied to inspect the spindle dynamic balance. It is also employed to inspect the spindle chattering at high speed. Rigid CastIron.

- ▶ 4+1 Axis
- ▶ DDS Spindle: Max 12,000rpm
- ▶ Table Dia. 350mm
- ▶ A Axis: +120° ~ -120°
- ▶ Max. 48 M/min rapid
- ▶ 24" Y Axis travel
- ▶ Autocam rotary table
- ▶ A, C axis configuration
- ▶ Same standard features as the HV line



HV-1100V

Finite Element Analyzed Throughout



Finite element analyzed
throughout increases
rigidity by 30%.

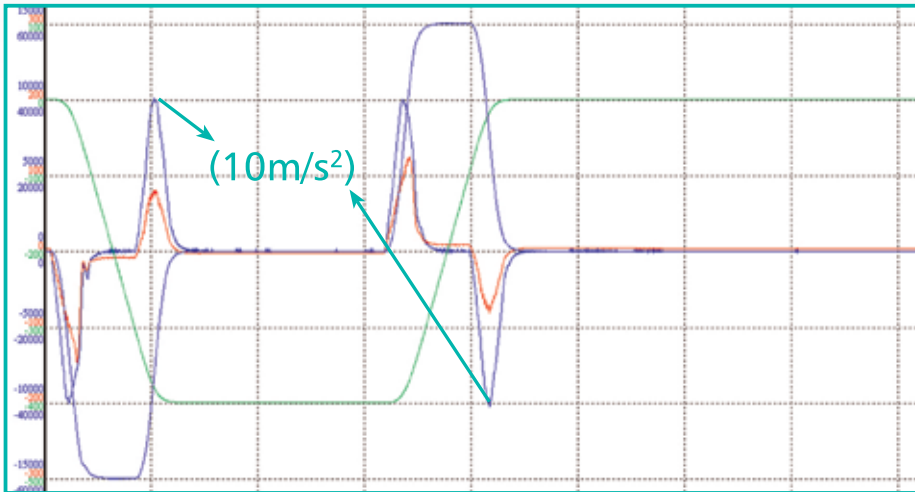


1G Acceleration (X-axis)
 (10m/s²)
HV-800/1000



3 Axis Rapid Traverse Upgraded to
60/60/30 m/min for HV-800/1000/1100
48/48/24 m/min for HV1300
36/36/24 m/min for HV-1650

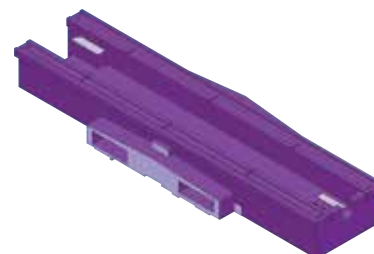
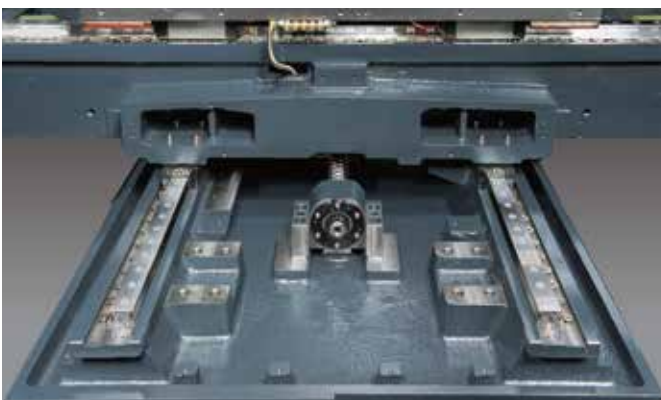
Max. acceleration on 3 axis up to 1.02G (10m/s²).
 X-axis acceleration increased by 155%.



Ballscrews in all 3-axis are pre-tensioned to increase accuracy.

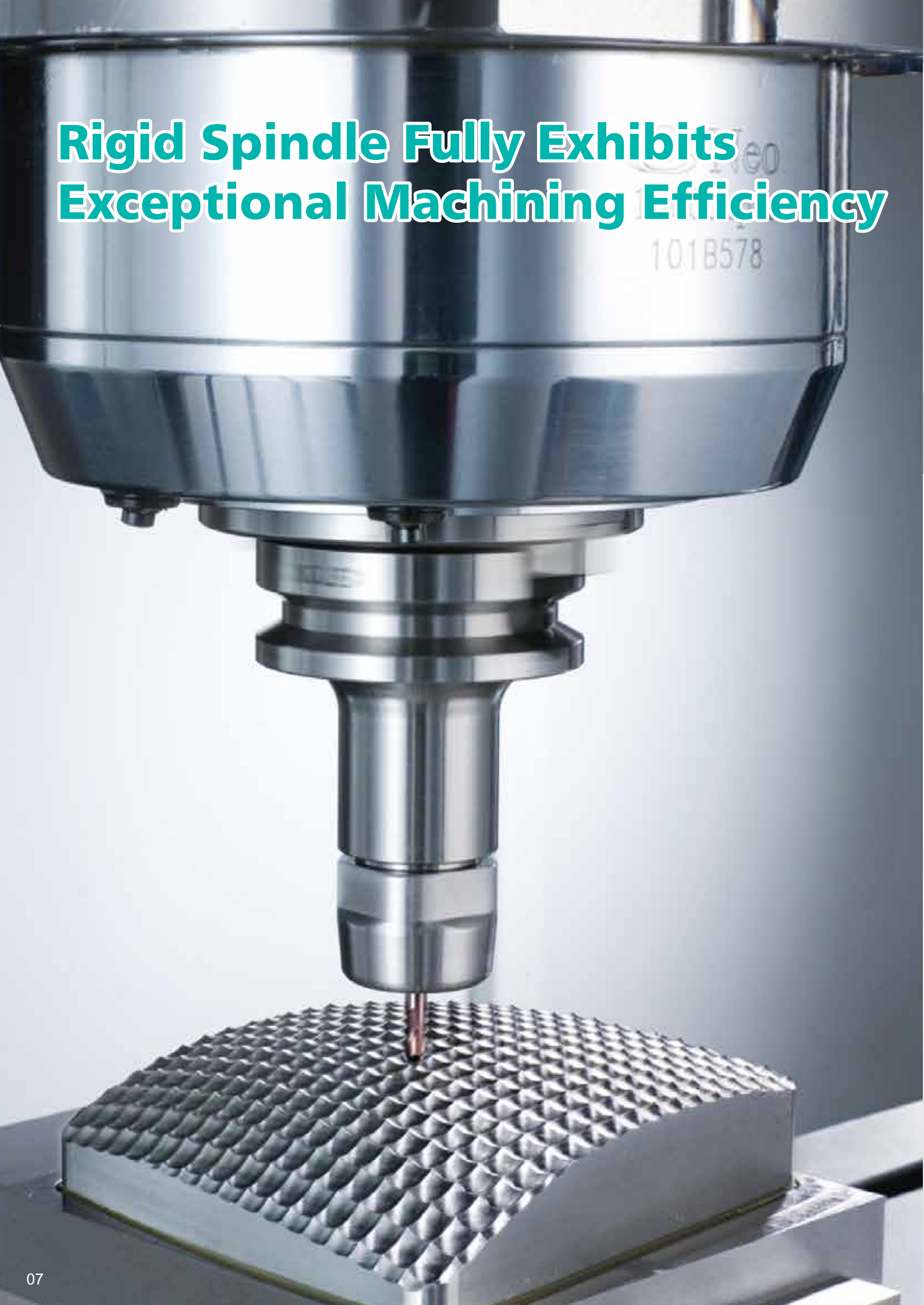
Increased Saddle Height

The HV Series vertical machining center has higher saddle than that of conventional models. This special resistant capability, movement straightness and structural rigidity. In addition, it also facilitates workpiece loading and unload on meets humanengineering theorem.



By using structural analysis technology to increase saddle height, the I value is increased and rigidity is increased by 30% than the other.

Rigid Spindle Fully Exhibits Exceptional Machining Efficiency



Rigorous Spindle Vibration Control is Unmatched by Competitors

2 μm Spindle Side

1 μm Spindle Front



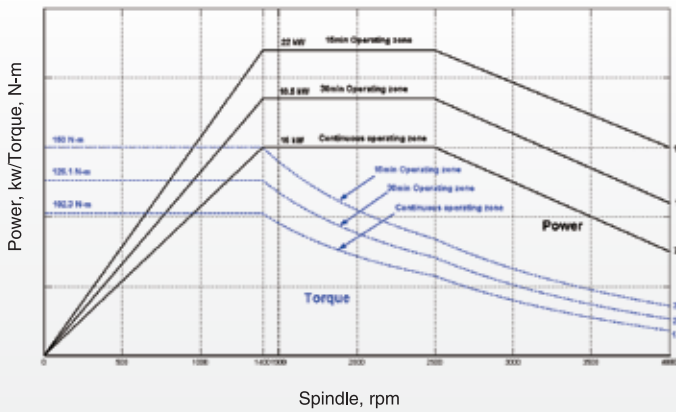
Direct Drive

Utilizing a high-rigidity spindle greatly increases the metal removal rate. FEELER's performance-proven spindle design also improves the machining accuracy and extends operational life!

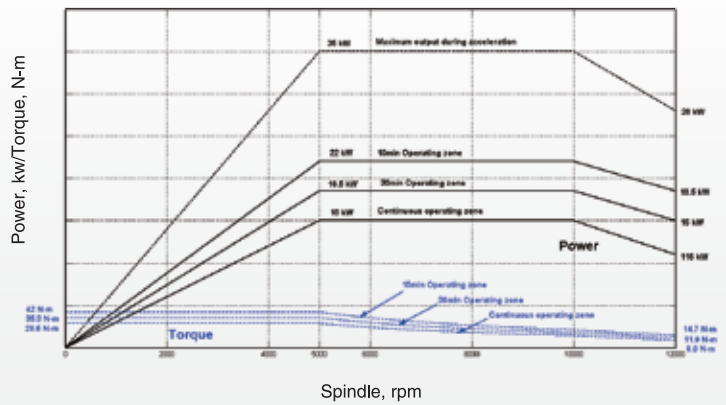
Spindle Speed / Torque Diagram

FANUC $\alpha 15/10000i$ for SPINDLE 12,000rpm

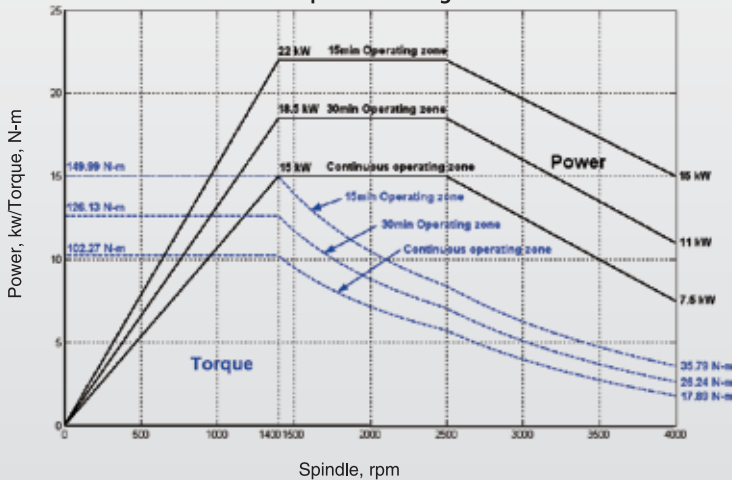
FANUC $\alpha T15/12000i$ for spindle 12000rpm
Low winding



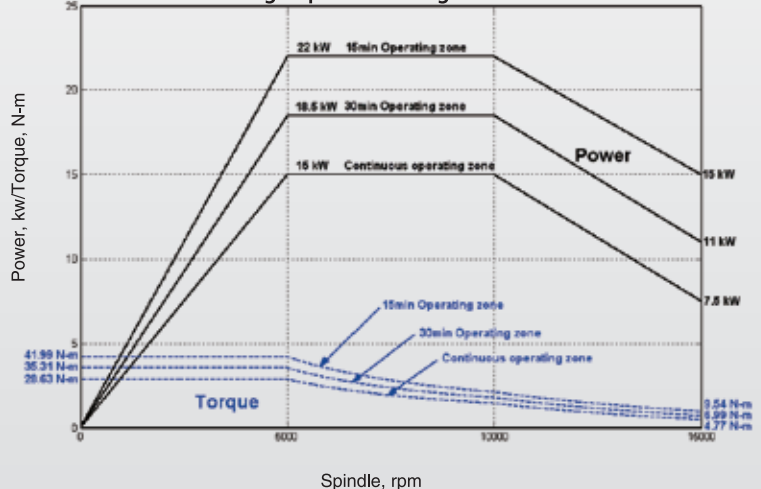
FANUC $\alpha T15/12000i$ for spindle 12000rpm
High winding



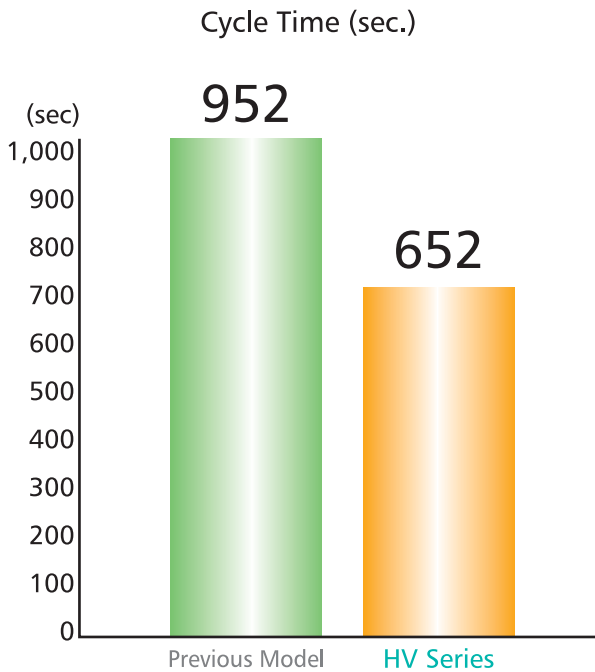
FANUC $\alpha IT 15/15000$ for SPINDLE 15,000rpm
Low-speed winding



FANUC $\alpha IT 15/15000$ for SPINDLE 15,000rpm
High-speed winding



Total Machining Efficiency Upgraded by Max. **31.5%**



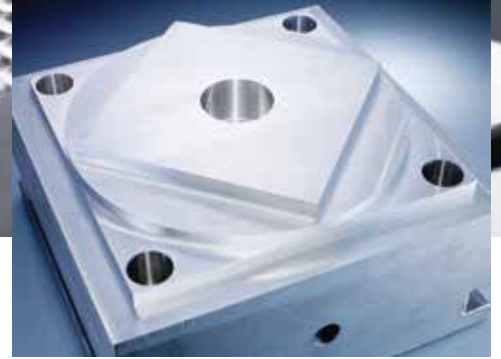
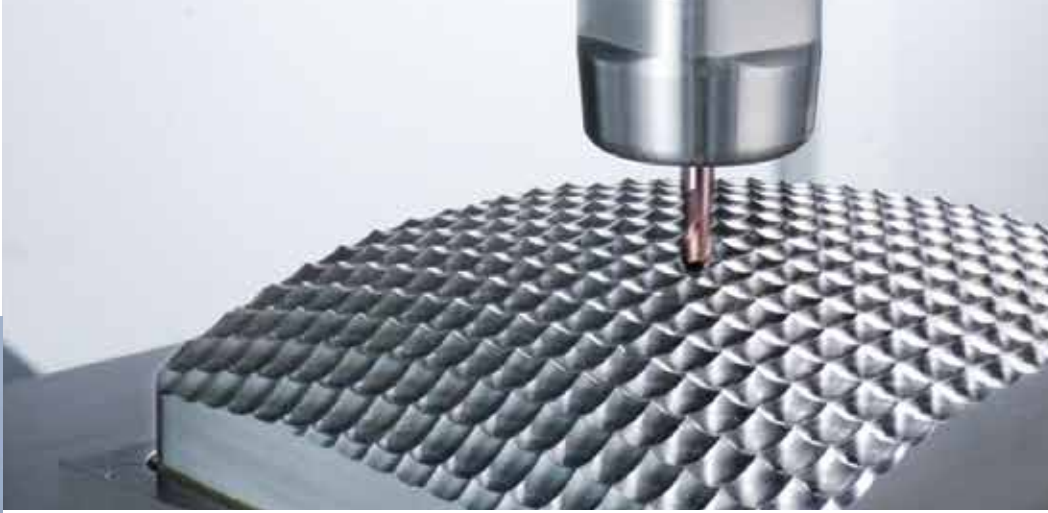
Cutting Efficiency Comparison

Cutting Method	End Milling on 3 Cavities Mold. Material: S45C			Parts Machining by 10 Tools. Material: S45C		
	Model	Machining Time (sec)	Difference (Efficiency)	Roughness Ra (μm)	Machining Time (sec)	Difference (Efficiency)
Previous Model		952	---	0.67	143.26	---
HV-1000		652	31.5%	0.52	114.96	19.8%

Cutting Capacity Example

Workpiece Material: Medium Carbon Steel (S45C)

Machining Types		
Drilling	Tapping	Face Milling
Tool Diam.(inch) x Feed(inch/rev)	Tool Diam.(mm) x Pitch(mm/rev)	Width(inch) x Depth(inch) x Feed(inch/min)
Ø1.58 x 0.004	1½ - 12	308c.c 3.15x0.14x43.31



Rigorous Quality Control and Inspection System

8 μm

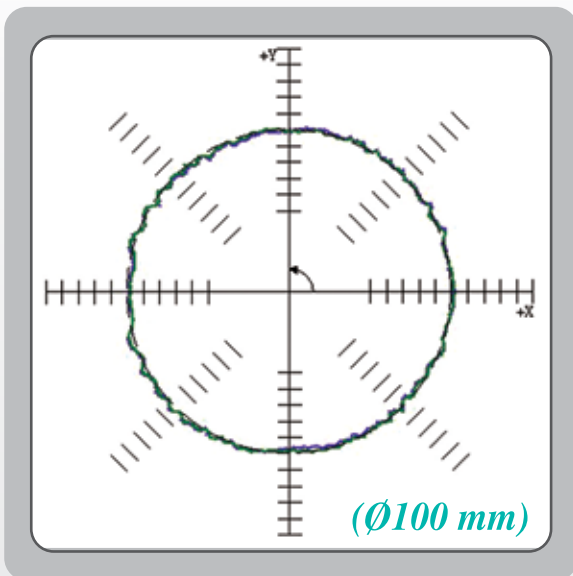
Positioning Accuracy

4 μm

Repeatability

Circularity Accuracy

2.7 μm



Static Accuracy

	Measured Plane	Permissible (mm / 300mm)	Measured (mm / 300mm)
Perpendicularity	X - Y	0.012	0.005
	Y - Z	0.012	0.004
	Z - X	0.012	0.005
	Measured Plane	Permissible (mm / Full Stoke)	Measured (mm / Full Stoke)
Positioning Accuracy	X	0.01	0.005
	Y	0.01	0.003
	Z	0.01	0.006
	Measured Plane	Permissible (mm)	Measured (mm)
Repeatability	X	0.006	0.003
	Y	0.006	0.002
	Z	0.006	0.004
	Measured Plane	Permissible (mm)	Measured (mm)
Circularity	X - Y	0.015	0.008
	X - Z	0.015	0.006



Chips Removal System

High efficiency chip removal system with dual augers and lift up chip conveyor.

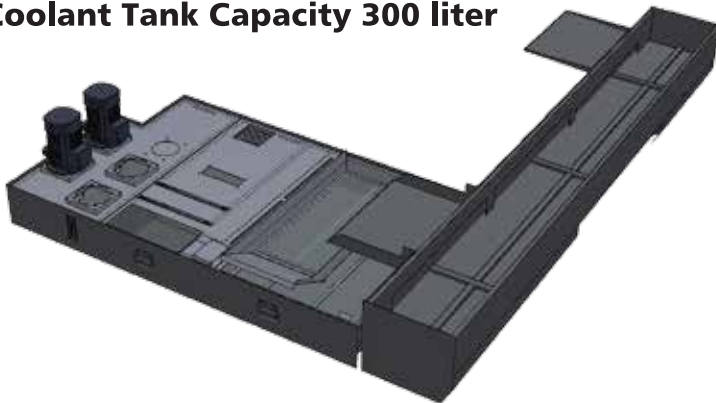


"V" shaped chip guard improves chip evacuation.

Multiple Layers Of Filtration Greatly Extends Coolant Service Life.

Integrated sheet metal fabrication, with large chip disposal openings, contributes to convenient chip cleaning.

Coolant Tank Capacity 300 liter



Chamfered bed facilitates chips removing.



Powerful flushing system can quickly and efficiently remove metal chips.(STD.)



Standard coolant wash down included



2 sided chip augers. (STD.)

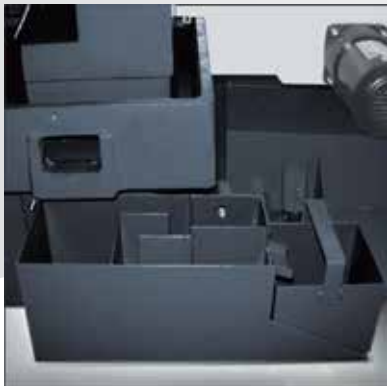




Rear installation of the Y-axis servomotor provides a convenient maintenance space.



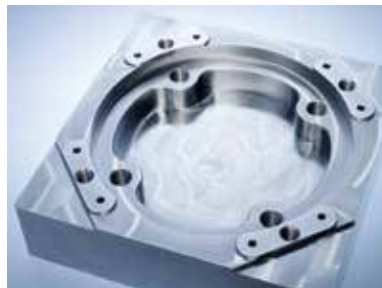
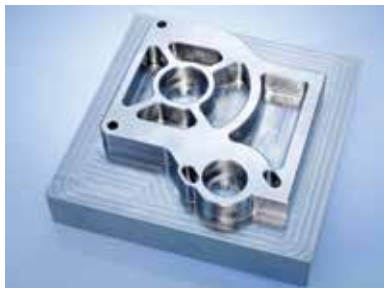
Oversized side-window opening for convenient cleaning and work piece set up.



Oil/coolant separation device is attached to the base.No separate leveling adjustment is required.



Auto Lubrication for the bearings of transmission axes



Pragmatic Operational Features





**FANUC OI-MF
10.4" LCD + Manual guide I**

Crystal Scanning Type Control Panel

The self-illuminated crystal scanning control panel allows easy identification for operator in poor environments. The keys are water-proof, bumping-resistant and oil-proof and are interchangeable.

Ergonomically Designed Control Box

The control box design meets human engineering theorem. It can be swiveled 0° ~ 75° for added convenience of operation. The control box is equipped with a M.P.G. handwheel for increasing convenience of set up.



Transparent side window on headstock cover enables convenient inspection and maintenance.



Heat exchanger is included as a standard accessory.

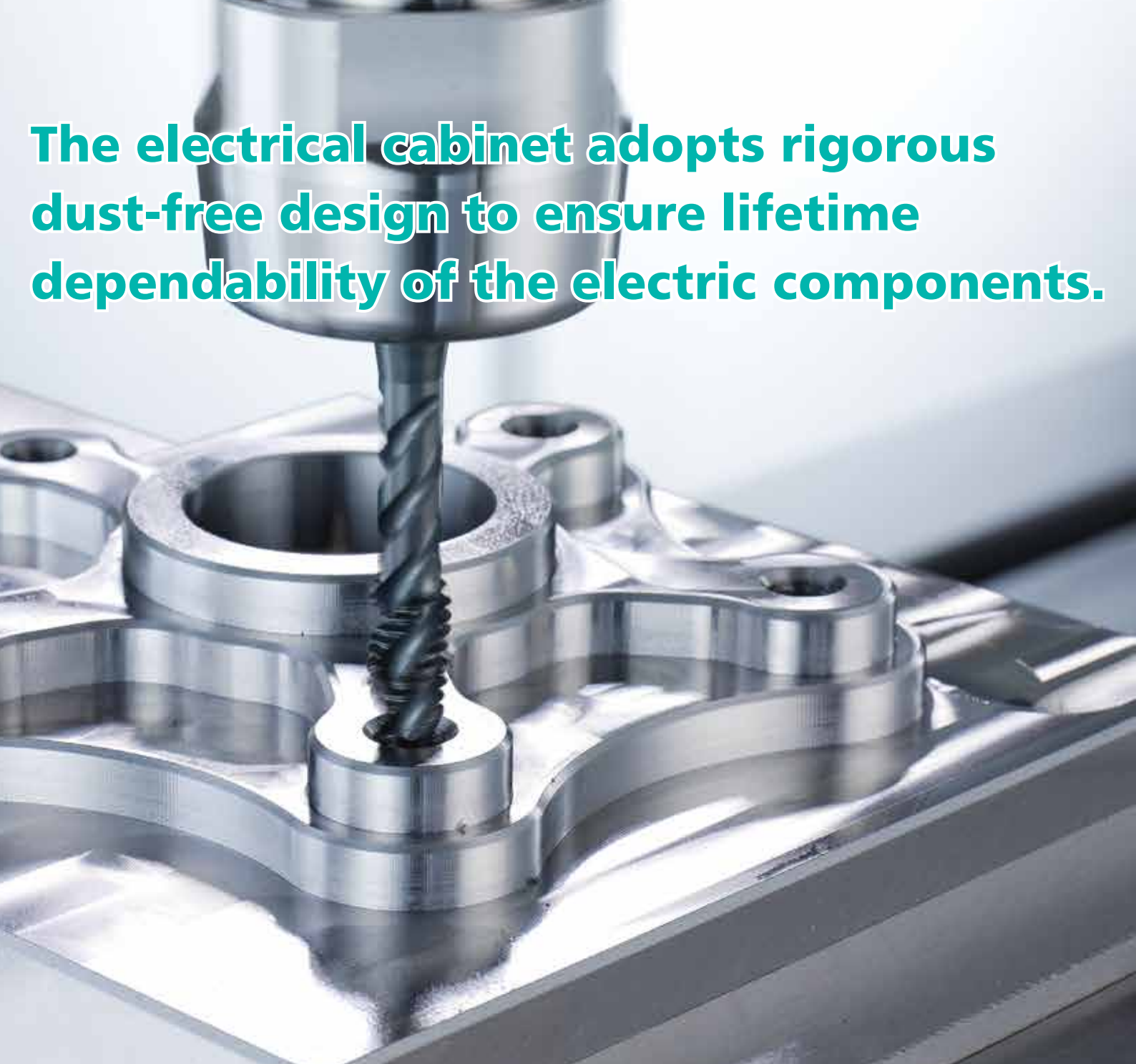


Rubber seals are mounted at the EC cabinet door for optimal enclosure.



Water-proof fittings are mounted at the openings for wires to avoid invasion of oil mist.

The electrical cabinet adopts rigorous dust-free design to ensure lifetime dependability of the electric components.

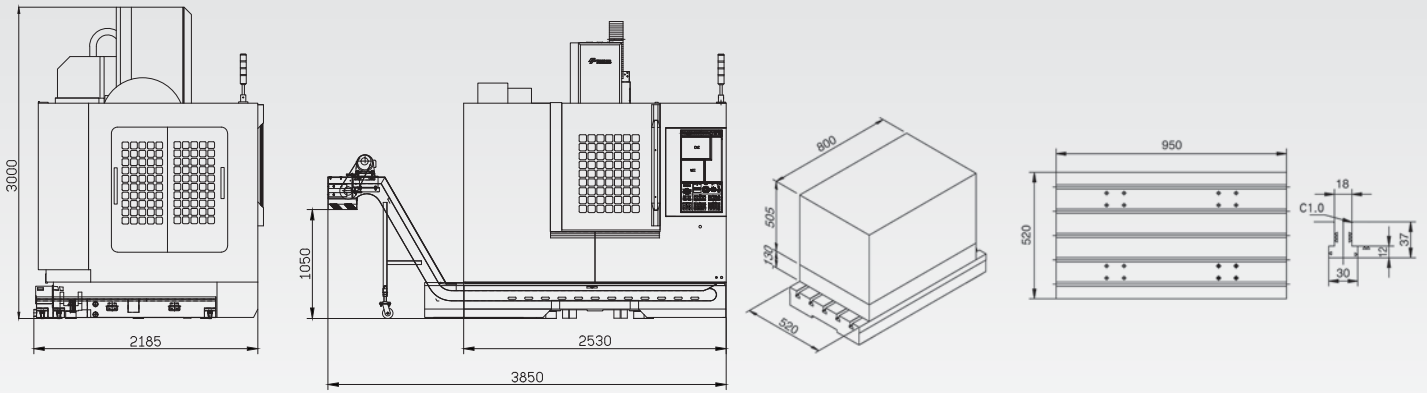


**Dust-Proof
Electrical
Cabinet And
Modern
Appearance
Rear Design**

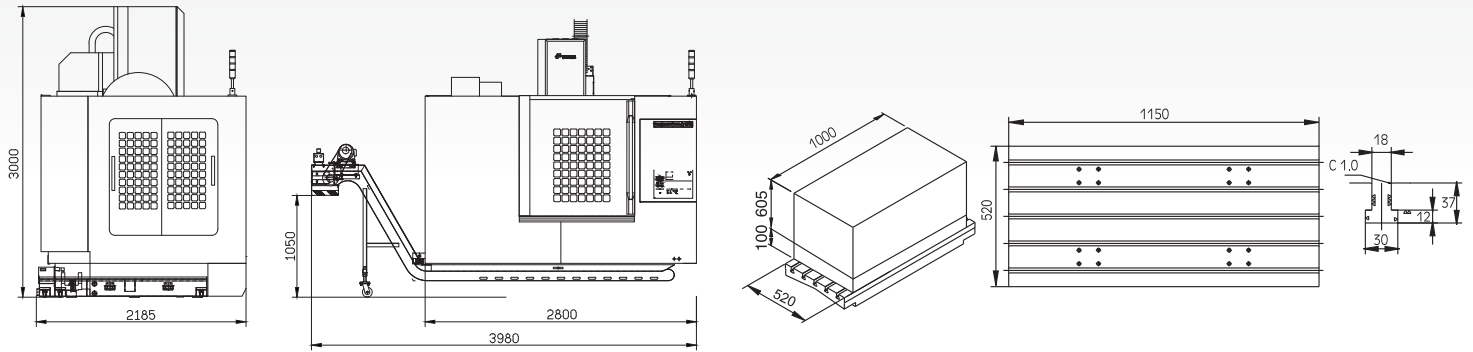


Machine Dimensions, Table Dimensions, and Working Capacity

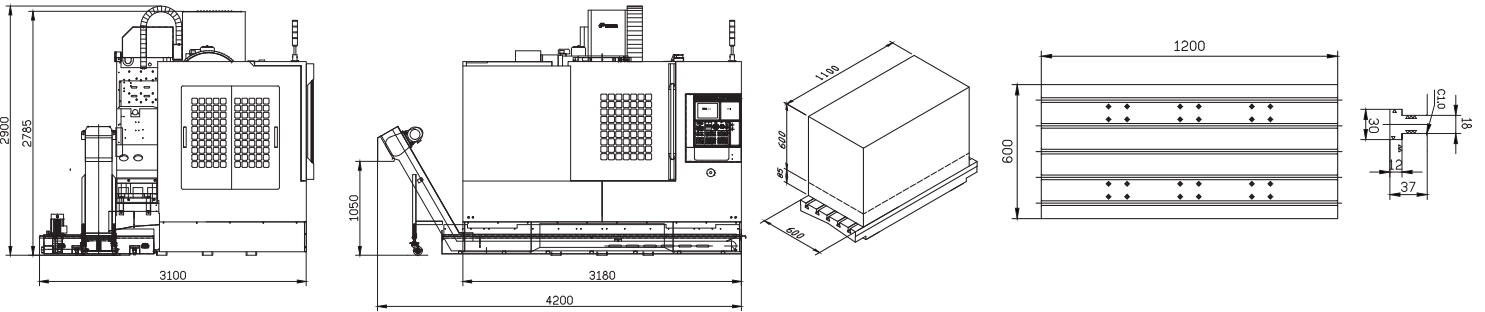
HV-800



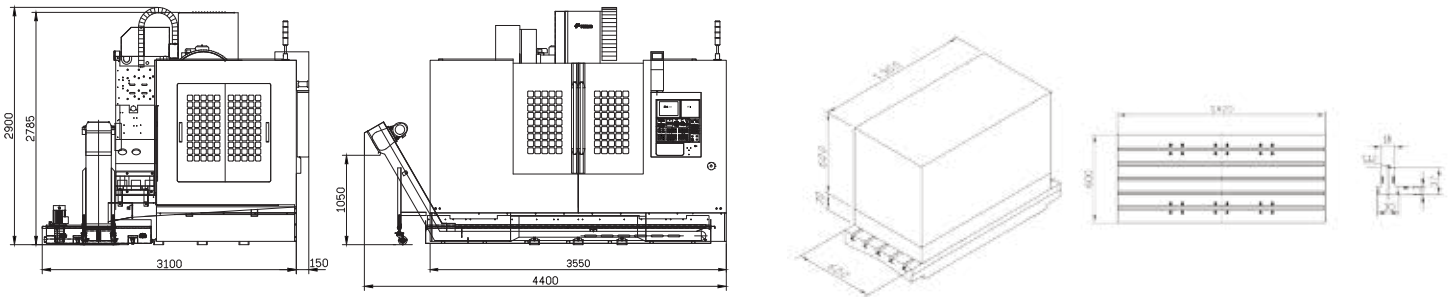
HV-1000



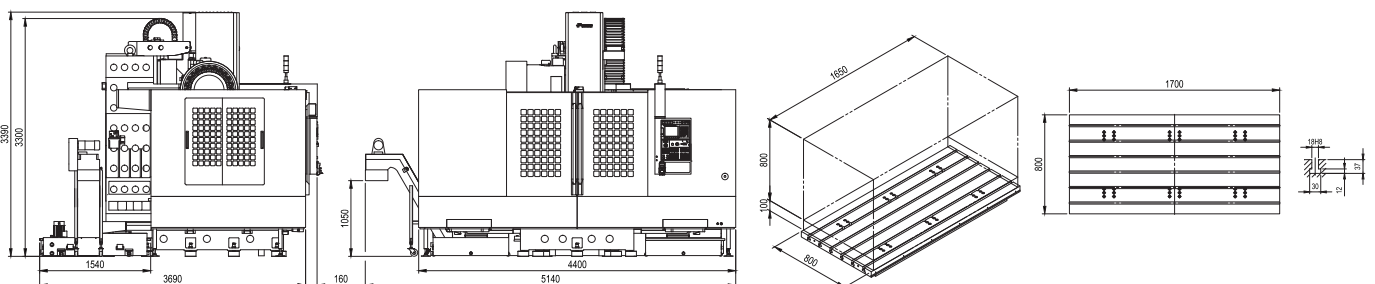
HV-1100



HV-1300



HV-1650



Machine Specifications

MODEL	Unit	HV-800	HV-1000	HV-1100	HV-1300	HV-1650
Travel						
X axis travel	In(mm)	31.5"(800)	39.4"(1,000)	43.3"(1,100)	51.2"(1,300)	65"(1,650)
Y axis travel	In(mm)	20.1"(520)	20.1"(520)	24"(610)	24"(610)	31.5"(800)
Z axis travel	In(mm)	19.9"(505)	19.9"(505)	23.6"(600)	23.6"(600)	31.5"(800)
Spindle nose to table surface	In(mm)	5.1"-25" (130-635)	3.4"-23.8" (100-605)	2.6"-26.7" (65-685)	2.8"-26.4" (70-670)	3.4"-35.4" (100-900)
Spindle center to column surface	In(mm)	22"(560)	22"(560)	26"(660)	26"(660)	33.5"(850)
Table surface to floor	In(mm)	37"(940)	38.2"(970)	39.8"(1,010)	40.4"(1,025)	41.3"(1,050)
Table center to column surface	In(mm)	11.8"-32.3" (300-820)	11.8"-32.3" (300-820)	14.6"-38.6" (370-980)	14.6"-38.6" (370-980)	17.7"-49.2" (450-1,250)
Table						
Table dimension	In(mm)	37.4"X20.5" (950X850)	45.3"X20.5" (1,150X500)	47.2"X23.6" (1,200X600)	55.9"X23.6" (420X600)	66.9"X31.5" (1,700X800)
Max .loading weight	kg	800	800	1,500	1,500	1,500
T slot(W*NO*P)	In(mm)	0.7"X0.2"X3.9" (18x5x100)	0.7"X0.2"X3.9" (18x5x100)	0.7"X0.2"X3.9" (18X5X100)	0.7"X0.2"X3.9" (18X5X100)	0.7"X0.2"X4.9" (18X6X125)
Spindle						
Spindle speed	rpm	12,000/15,000	12,000/15,000	12,000/15,000	12,000/15,000	12,000/15,000
Spindle taper	type	BIG-PLUS 40 taper	BIG-PLUS 40 taper	BIG-PLUS 40 taper	BIG-PLUS 40 taper	BIG-PLUS 40 taper
Spindle motor	kw	7.5/11	7.5/11	15/18.5	15/18.5	15/18.5
Feedrate						
Rapid traverse X axis	ipm(m/min)	2362.2(60)	2362.2(60)	1889.8(48)	1889.8(48)	1417.3(36)
Rapid traverse Y axis	ipm(m/min)	2362.2(60)	2362.2(60)	1889.8(48)	1889.8(48)	1417.3(36)
Rapid traverse Z axis	ipm(m/min)	1181.1(30)	1181.1(30)	944.9(24)	944.9(24)	944.9(24)
Automatic tool changer						
Tool changer		ARM	ARM	ARM	ARM	ARM
No of tools	T	24/30	24/30	24/30	24/30	24/30
Pool stud		JISB6339	JISB6339	JISB6339	JISB6339	JISB6339
Max .tool weight	lb(kg)	17.64(8)	17.64(8)	17.64(8)	17.64(8)	17.64(8)
Max tool length	In(mm)	11.8"(300)	11.8"(300)	11.8"(300)	11.8"(300)	11.8"(300)
Max dim of tool	In(mm)	3.1"(80)	3.1"(80)	3.1"(80)	3.1"(80)	3.1"(80)
Max dim of tool (no adjacent tool)	In(mm)	5.9"(150)	5.9"(150)	5.9"(150)	5.9"(150)	5.9"(150)
Tool changing time(tool to tool)	sec	1.7/60 Hz	1.7/60 Hz	1.7/60 Hz	1.7 /60 Hz	1.7 /60 Hz
Others						
Floor space (LxW)	In(mm)	151.6"X86" (3,850 X 2,185)	156.7"X86" (3,980 X 2,185)	165.4"X122" (4,200 X 3,100)	173.2"X122" (4,400 X 3,100)	202.4"X145.3" (5,140 X 3,690)
Machine weight (NW)	lb(kg)	15101.7(6,850)	15763.1(7,150)	14991.4(6,800)	16093.7(7,300)	-
Max height of machine	In(mm)	118.1"(3,000)	118.1"(3,000)	114.2"(2,900)	114.2"(2,900)	133.5"(3,390)
Water tank Capacity	gal(liter)	66(300)	66(300)	103.4(470)	103.4(470)	198(900)
Power capacity	KVA	25	25	25	25	25

* Specifications are subject to change without prior notice.

Standard Accessories

- * Heat exchanger *
- * 3-axis pre-tensioned ballscrew
- * Automatic lubrication system
- * Fully enclosed splash guard
- * Dust-proof electrical cabinet
- * Spindle air sealing
- * Spindle coolant nozzle
- * Spindle oil cooler
- * 3-color signal light
- * Rigid tapping
- * Leveling bolts and blocks
- * 2-sided chip screws on Y Axis
- * Rear flushing + coolant gun
- * Fanuc OI-MF 10.4" LCD
- * Manual guide i
- * AICC II

Optional Accessories

- * 3-axis linear scales
- * Coolant through spindle
- * Tool measuring system
- * Workpiece measurement
- * 12,000 rpm DDS spindle
- * 15,000 rpm DDS spindle
- * X / Y / Z axis roller type linear guide
- * 30 / 40 / 50 ATC
- * Air gun
- * Top roof
- * 4th axis rotary table.



FFG Headquarter



Technology Center

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