

**Take a closer look
at the complete
high speed
solution**



Welcome to our Global Team and the world of Vibra-Free . . .



One of the most significant advances in making molds and forging dies is precision ultra-high-speed hard milling (UHSHM™). The ability to mill 3-D surfaces at 40,000 RPM and above dramatically changes the mold-making process by drastically reducing milling time. In many cases, this means starting with a block of hardened steel and milling the surfaces followed by minor polishing. No graphite milling, no EDM burning, no post hardening. When sharp corners or specific geometry mandate graphite milling, the same process is used to produce brilliant graphite electrodes.

Unique rigid-bridge machine construction, dynamic thermal and position control, high-speed contour control and ethernet link to a host are just the start. Numerous applications ranging from graphite to hardened steels have resulted in an extensive library of critical feed and speed data. These data, along with the optimum cutter path techniques from UHSHM experts, all come in one package from Compumachine.

Years of research dedicated to high-speed machining has brought together technology, quality and workmanship from Japan and unparalleled expert customer support in the United States.



Shower Valve Handle, P20 Steel, HRC40

	Rough	Finish
Cutter:	4 mm ball end-mill	3 mm ball end-mill
RPM:	28,000	36,000
IPM:	200	300
Time:	16 min.	32 min.



Vibra-Free

The Five Elements:

① Spindle



A specially designed, 42,000 RPM spindle with intelligent cooling and monitored and filtered mist lubrication keeps thermal growth in check hour after hour, month after month, year after year, while spinning at maximum speed all day and all night.

Balanced spindle housings eliminate chatter throughout the milling process. Special spindles are available for increased throughput for specialized work involving roughing. Oil-drip-free spindles are available to eliminate spotting on production and electrode graphite.

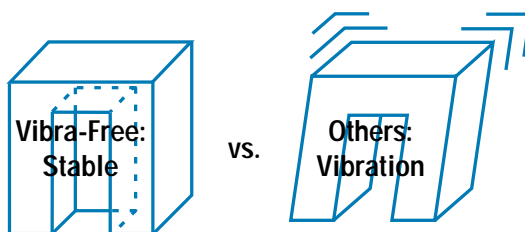
② High Performance Control System

High Precision Contour Control, a data server with more than two gigabytes of hard disk space and an ethernet link mean never having to worry about data starvation, file size or exhaustive file compression routines. Coupled with the world-renowned reliability of the Fanuc 16i system packed with options, the Vibra-Free is unmatched. But that's just the start. Unique algorithms and surfacing techniques designed to control thermal growth and maximize tool life come with the package.

We realize that there are dynamic differences from machine to machine which will alter precision cornering, overshoot, undershoot. That's why the 16i is equipped with unique parameters that allow the experienced Vibra-Free technicians to practically customize each machine for maximum performance.



③ Rigidity of Structure



Solid, specially-ribbed castings, including a massive base and a closed rigid bridge to support the suspended, moving head, ensure silk-smooth motion and virtual elimination of vibration during UHSHM.

Special precision ball-screws, special precision way-guides, unique K1-Seal™ way-wipers and way-guards all work in harmony to provide superior finish and tolerance for those parts that need them at lightening feeds and speeds.

Camera Mold, P20 Steel, HRC40

	Rough	Finish
Cutter:	3 mm ball end-mill	3 mm ball end-mill
RPM:	25,000	30,000
IPM:	125	160
Time:	87 min.	36 min.

5 Our team

Optimization of feeds and speeds is critical to the success of special tooling and tool life in UHSHM. Our Global Team of experts has a wealth of knowledge that comes with the package directly to your mold-makers and manufacturing engineers.

These are the individuals who make it their business to know your business and tie everything together to put UHSHM at your disposal. They evaluate the job, determine what 3D surfacing technique fits, select the right tooling, download the information, cut it right and very fast, the first time. Meet our UHSHM experts at Compumachine in Wilmington, Massachusetts. And when they're asleep, their counterparts far away in Niigata, Japan are only an E-mail away. They will be your global partners in UHSHM.



4 Tooling

Machining complex surfaces on hardened metals with small end mills at 42,000 RPM and lightening speeds requires meticulous cutter selection. Carefully selected tools, designed for UHSHM, produce spectacular finishes that make your polishers smile. Specially ground SKI tool holders and UHSHM cutting tools are available from a large stock at Compumachine.

Shower Valve Handle EDM Electrode, Graphite

	Rough	Finish
Cutter:	3/8" flat end-mill	1/8" flat end-mill
RPM:	32,000	40,000
IPM:	250	300
Time:	15 min.	23 min.



Brilliant Finishes, Unmatched Tolerances, Lightning Speed

Why 42,000 RPM?

Hard milling means using small end mills with special chemistry and geometry to achieve superlative finish and tolerance. Maximizing productivity includes extending tool life which is sacrificed with compromised feeds and speeds. Hard milling will not produce the desired results at 20,000 RPM, 25,000 RPM and, in many cases, even 30,000 RPM. Take a close look below. Surface finish is more than meets the eye.



Wavy Surface, 420 Stainless Steel, HRC54

Operation:	Rough	Finish
Cutter:	3 mm ball end-mill	3 mm ball end-mill
RPM:	20,000	20,000
IPM:	315	60
Time:	24 min.	41 min.



Wavy Surface, 420 Stainless Steel, HRC54

Operation:	Rough	Finish
Cutter:	3 mm ball end-mill	3 mm ball end-mill
RPM:	30,000	30,000
IPM:	315	60
Time:	24 min.	41 min.



Wavy Surface, 420 Stainless Steel, HRC54

Operation:	Rough	Finish
Cutter:	3 mm ball end-mill	3 mm ball end-mill
RPM:	40,000	40,000
IPM:	315	60
Time:	24 min.	41 min.

Vibra-Free Specifications

Major Specifications:

X Axis Travel	23.62 in (600 mm)
Y Axis Travel	15.75 in (400 mm)
Z Axis Travel	15.75 in (400 mm)
Table to Spindle End	2 to 17.72 in (50 to 450 mm)
Table to Column End	16.14 in (410 mm)
Table Size	27.56 x 17.72 in (700 x 450 mm)
Table Mounting Holes	M16, 50 mm spacing
Load Capacity	800 lb (360 kg)
Spindle Speed	5,000 to 42,000 rpm
Peak Power	12 hp (9 kW)
Rapid Traverse Rate	1180 in/min (30,000 mm/min)
Maximum Feedrate	472 in/min (12,000 mm/min)
Acceleration	1 G
Tool Magazine	18 Tools, bi-directional
Tool Holders	SKI 25
Maximum Tool Diameter	2 in (50 mm)
Control	Fanuc 16i-MA



Machine Accuracy:

Positioning	0.0001 (0.003 mm) over full stroke
Repeatability	0.00004 (0.001 mm)

Motors:

Axis Drives (X & Y)	1.4 hp. (Fanuc Alpha 6)
(Z)	2.8 hp. (Fanuc Alpha 12)

Dimensional Data:

Machine Height	107 in (2,710 mm)
Floor Space	79 x 91 in (2,000 x 2,300 mm)
Net Weight	11,000 lb (5,000 kg)

Service Requirements:

Air	80 PSI, 26 cfm, dry air required
Electrical Input Power Source	220 VAC +10 % -15%
	60 Hz \pm 1 Hz
	Total connected power, 20 kVA
	50 Amp service recommended

Standard Equipment:

Mist coolant system	Fully integrated bed design
Full chip and coolant enclosure	Operator work lights
Leveling screws & washers	Hand tool kit
Fully enclosed tool changer	Operator & maintenance manuals
SKI tooling system	

Machine Options and Accessories:

Flood coolant system	3,000 to 30,000 rpm, 11 kW spindle
Fourth axis	Fifth axis
Special way covers for graphite	UHSHM cutters

Vibra-Free is the result of research and development by FMC in Niigata, Japan and is manufactured in Japan by CKM (Compumill-Kasahara Machine), a joint venture company with facilities in Wilmington, Massachusetts, USA and Sanjo City, Niigata, Japan. UHSHM is a trademark of Compumachine, Inc. All rights are reserved.

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The machine photograph shows the guards open for clarity.

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Specifications are subject to change.

Exclusive sales, service and applications in your area:

Project Assistance:

Qualified application engineers are ready to assist you with special fixturing, programming and cycle time reduction.

Training:

Complete programmer and operator training by qualified distributors located throughout the USA and Canada.



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