

THE HEAVY-DUTY CNC VTL

MVL-12 MVL-16
MVL-20 MVL-25



Why MOMENTUM

MVL-20 Model Illustrated



10010 Houston Oaks Drive, Houston, TX 77064

Thank you for this opportunity to introduce our heavy-duty MVL-series and the company we founded to build it. We developed the MVL because nothing else offers you the specifications that it does for a reasonable price.

My co-founders in the Momentum Machine Tool Company, Bill and Tim O'Connell, also own O'Connell Machinery in Buffalo, NY. Their specialist firm has rebuilt hundreds of VTLs since 1953. Fixing iron with decades in the field shows what works and doesn't. Unfortunately, when customers asked for a recommendation, they couldn't refer a new VTL both well-built and well-priced.

The distributorship that I founded 25-years ago faced the same difficulty. Associated Machine Tool Technologies (AmTTech) supports customers in Texas, many in the oil and gas industry. Their large parts, nasty material, and scarce maintenance time demand a heavy-duty machine. Customers were disappointed that major builders paid little attention to the category, ill-serving it.

We founded Momentum to fill that void. Initially, we bought a manufacturer (Eureka, est. 2009) building the design closest to our criteria. Then, we refined that starting-point to fully-meet our standards, resulting in the MVL.

What differentiates a heavy-duty VTL from a lighter one? The video right clearly illustrates the differences. You will find it on the website of Spartan Precision Machinery / Momentum USA, which we established for support in North America.

Reasonable prices are one benefit of the factory that we own in Taichung, Taiwan. The area is the world's largest source of VTL production, and our own engineers, staff, and suppliers have collaborated on more than a hundred projects. The second benefit is that we are able to build machines tailored to your needs. That "yes is the answer" mindset is a point of pride here.

Of course, the best insight about us comes from meeting our customers. All will positively recommend us, and you will be able to personally confirm every detail and fact in this brochure. We will be pleased to introduce you. And, again, we deeply appreciate this opportunity to have you join their happy ranks.

Sincerely,



Jack Butts, Chairman and Co-owner

THREE EXCLUSIVE, SPECIAL BENEFITS:

(1) Unrivaled, Heavy-Duty Specifications

- Demonstrated to out-produce the others, thanks to unmatched power and heft
- Shown to out-last, too, with toughness proven in the demanding Texas oil patch

(2) Customized to Your Goals

- From the factory that we own, machines customized to your requirements
- Beginning to end, a 'yes-is-the-answer' approach to achieving your goals

(3) Well Supported, Not High-Priced

- American-owned, staffed, and headquartered, enabling terrific customer service
- Having a subsidiary in the world's chief VTL-building area, for reasonable costs



(1) Heavy-Duty: Discover How To Easily Identify the Best-Built VTLs -

Momentum's "Ultimate Guide to VTL Construction" shows side-by-side the differences in construction between heavy-duty and lighter VTLs. Please view it at: <http://spartanpm.com/products/momentum-mvl.html>

(2) Customized to Your Goals: An MVL Case Study -

- Workpieces – Aerospace engine components. The materials are various high temperature super-alloys.
- MVL Machines employed – Eight units of the MVL-12HD models (49" chucks, 9.44" rams, and 74 HP). In fact, our MVL-12HD specification was developed for this particular application. The first pair was installed in 2012, the latest in 2016. The configuration was so productive that it is now a standard product.
- Conditions – Described by a visiting group of senior applications engineers as among the most punishing environments they have seen. Ambient air temperature exceeds 100° F, a nearby large waterjet cell coats everything in sludge, maintenance is almost nil, and operation is 24 hours per day and 6 days weekly.
- Results – With more power and mass than anything in their class, the MVL-12HD's produce 30% faster than did the VTLs they replaced. Since 2012 and across eight machines and hundreds of thousands of hours of operation, the MVLs have delivered in excess of 99% uptime.



(3) Well Supported, Not High-Priced -

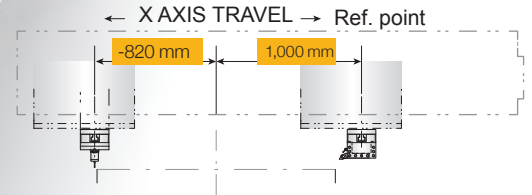
Taichung, Taiwan factory, left, and Houston, Texas headquarters and tech center, right, for "the best of both worlds" in price and support.



How the MVL's CONSTRUCTION

Out-produces and out-lasts the others

MVL-12 Model Illustrated. Features shown are common to all models unless noted.



Full Length Cross Rail

The cross rail extends fully to both sides of the spindle center. This allows probing parts on their diameters, using one tool for ID and OD work simply by reversing the spindle, and doubling the tools on a single holder by placing one on each side.

MVL-12HD

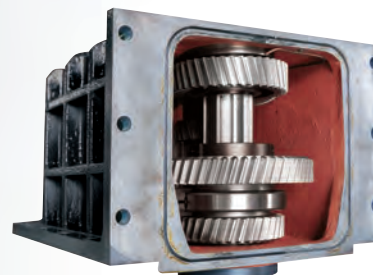
A	B	C
1,000 mm	240 mm	650 mm
D	E	F
1,025 mm	300 mm	225 mm

Massive Components

No VTL out-specs the MVL-series, and few come close, dimensionally. For example, consider ram size. The MVL-12HD's ram is 240mm (9.44 inches) square. The bigger the ram, the more rigid the base for cutting.

Heavy Duty Spindle Drive Gearbox

Power is transferred from the motor to the two-step gearbox via a reinforced belt, which during crashes may isolate and prevent damage to gears. The gearbox is proprietary and features oversize helical gears.





Hydraulic Rail Elevation

Raising the cross rail moves all of the mass of the rail, saddle, and ram. The MVL uses hydraulics for lifting and counterbalancing. Two rack and pinion sets, synchronized by a torsion bar, ensure level movement. All of this provides reliable elevation, year after year.

Robust Rail Locking System



Once the rail is in place, hydraulics clamp the guide-ways and pin vertical position. This ensures perfect perpendicularity and rigidity with every positioning.

Single piece, extended length, saddle.

The MVL's saddle is one single piece* and extra long. The saddle holds the ram, so making it from a single casting adds cutting rigidity. And extending its length well above the cross rail gives the most ram support, again, maximizing rigidity. (* Except MVL-20 / 25 sizes)



Linear Axis Gearboxes

The X and Z axis are transmitted through planetary gear reducers to increase torque for heavy cutting conditions.

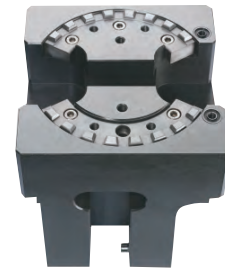


Full-Wrap Arc-Shaped Column

- The MVL features a full-wrap, arc-shaped column. Full-wrap means that it curves all of the way around the table. This maximizes mass, rigidity, and dampening. Arc-shaped refers to the face nearest to the table. This shape best absorbs cutting loads.
- All contact surfaces of the column, cross rail and saddle are hardened by high frequency induction heating and coated with Turcite B for the ultimate wear-resistance.
- An automatic lubrication system ensures smooth and reliable operation while reducing oil consumption.

Rigid Interface

The T-puller type tool holder with curvic type teeth is standard for MVL turning models.



Thrust and Radial Table Bearings

MVL had two sets of spindle bearings. A large (1,000mm for the MVL-16) thrust bearing takes the gravitational force on the workpiece and table. A separate radial bearing handles rotational and cutting forces. The entire spindle assembly is pre-tensioned to maximize spindle rigidity and life.

Floor Mounted Tool Magazine

The automatic tool changer (ATC) magazine stands bolted to the floor. This allows the longest and the heaviest tools as a standard. And it enables easier fitting of extended size options.



How the MVL-M's CONSTRUCTION

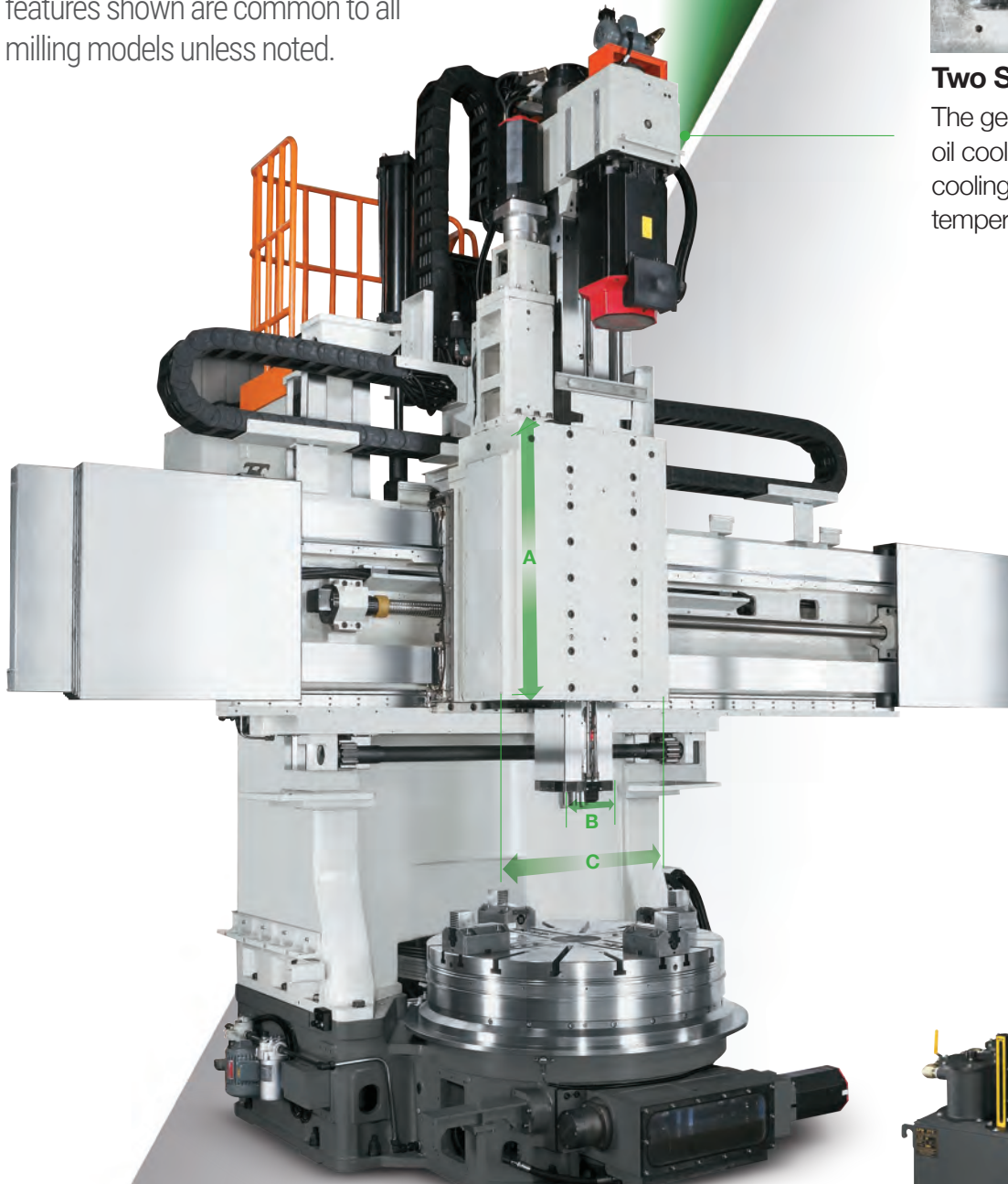
Out-produces and out-lasts the others

MVL-16M Model Illustrated. Standard features shown are common to all milling models unless noted.



Two Speed Gearbox

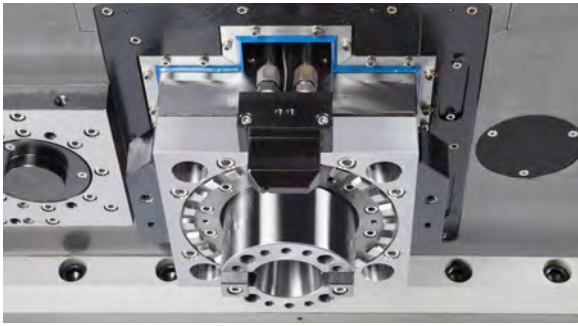
The gearbox employs an oil cooler for lubrication and cooling, ensuring a constant temperature in the gearbox.



Coolant Through Spindle (CTS)

The CTS is applied when performing milling operations. The standard system delivers coolant at 20 bars of pressure to the cutting edge, allowing the machine to perform deep hole drilling. Higher pressures are optional.





Heavy-duty Ram Head and BT-50 / CAT-50 Clamping System

- For all MVLs, the head type is a square ram. This provides maximum stability during heavy cutting.
- Rams are balanced by a hydraulic counter balance and protected against drop in the event of power failure by both a Z-axis magnetic servo break and also a pilot check valve.



Rigid Turning Toolholder Interface

In addition to the BT-50 / CAT-50 tool pulling design, four (4) additional auxiliary pulling studs increase stability during heavy cutting.

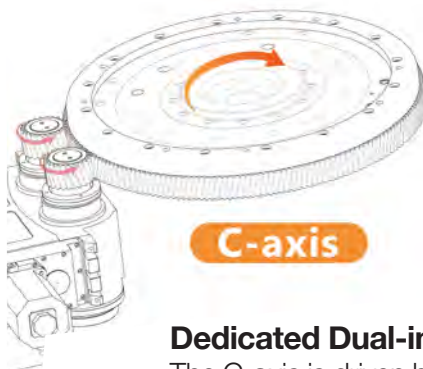


Massive Components

Like all MVLs, the MVL milling models feature components unmatched dimensionally. As an example, the MVL-16M's ram size is 240mm (9.44-inches) square, and larger rams are optional.

MVL-16M

A	B	C
1,100 mm	240 mm	850 mm
D	E	F
1,305 mm	300 mm	225 mm



Dedicated Dual-input C-axis Gearbox

The C-axis is driven by dedicated servo motor and combined with a transmission using double worms and input pinions for smooth rotation and minimal backlash



Integral Rotary Encoder

The C-axis is equipped with a rotary encoder, enabling superb positioning accuracy and repeatability for precision machining.

What SPECIFICATIONS

Set the bar for VTLs

Highly Customizable

Standard specifications are shown. However, we deliver MVLs built to specific customer requirements, on short lead-time, as often as from stock. Please inquire about your specific needs.

		UNIT	MVL-12	MVL-12M	MVL-12HD
Capacity	Max. Swing Diameter	mm (inch)	Ø1,600 (62.99)		
	Max. Turning Diameter	mm (inch)	Ø1,600 (62.99)		
	Distance from Std. Turning Holder Insert to Table Surface	mm (inch)	0 ~ 1,205 (0 ~ 47.44)	0 ~ 1,155 (0 ~ 45.47)	0~1,175 (0 ~ 45.25)
	Max. Turning Height	mm (inch)	1,200 (47.24)	1,150 (45.27)	1150 (45.27)
	Max. Workpiece Weight	kg (lb)	8,000 (17,630)		
Table	Table Diameter (Manual Chuck)	mm (inch)	Ø1,250 (49.21)		
	Range of Table Speed (Low)	rpm	34 ~ 103		26 ~ 80
	Range of Table Speed (High)	rpm	104 ~ 312		81 ~ 312
	Max. of Table Torque	N.m (ft-lbs)	Std. 12,400 (9,151) / Opt. 19,000 (14,022)		19,000 (14,022)
ATC	Tool Size	mm (inch)	□ 25 / 32 / 40 (1" / 1.25" / 1.5") x 600 max. length		
	Tool Type	-	T - Puller	BT - 50 / CAT-50	T - Puller
	Number of Tool Stations	-	12 (Random)	12 (6 Turning + 5 Milling + 1 Cover)	12 (Random)
Travel	Cross-Section Of Ram	mm (inch)	200 x 200 (7.87 x 7.87)	240 x 240 (9.44 x 9.44)	
	Horizontal Travel (X-Axis)	mm (inch)	-820+1,000 (-32.28+39.37)		
	Vertical Travel (Z-Axis)	mm (inch)	900 (35.43)	1,000 (39.37)	
	Cross-Rail Travel	mm (inch)	500 (19.68), 2 steps (3 positions)		500 (19.68), 2 steps (3 positions)
Feed Rates	Rapid Rate (X & Z Axis)	m/min	1 0		
	Cutting Feed Rate	mm/min	1 ~ 2,000		
	Feed Override	%	0 ~ 150		
Motor	Main Spindle	kW (HP)	Std. α40i, 37 / 45 kW (49.6 / 60.3 HP) /		α50i, 45 / 55 kW
			Opt. α50i, 45 / 55 kW (60 .3 / 73.7 HP)		(60.3 / 73.7 HP)
	Feed Servo Motor (X & Z Axis)	kW (HP)	α30i, 7 kW (9.4 HP)		
	Milling Spindle Motor	kW (HP)	N/A	α P30i (15/18.5 kW)	N/A
Cf Axis Servo Motor	kW (HP)	N/A	α 30i, 7 kW (9.4HP)	N/A	
Dimensions	Floor Space (L X W)	mm (inch)	7,700 x 5,450 (303.149 x 214.566)	5,650 x 6,000 (222.441 x 236.220)	6,650 x 6,450 (261.811 x 253.937)
	Machine Max. Height (H)	mm (inch)	5,100 (200.787)	5,700 (224.409)	5,260 (207.086)
	Machine Net Weight	kg (lb)	23,500 (51,800)	28,850 (63,600)	25,400 (55,880)

For Easy Comparison: specifications distinguishing heavy-duty VTLs are shaded below

More Workpiece Capacity

For example, the MVL-16's heavy duty spindle is able to handle a workpiece up to 10,000 kg (22,000 lbs). Even if you will never run a part that heavy, it means a long-lasting machine.

More Machine Mass

The MVL-16 weighs more than 33,750 kg (74,400 lbs.). All of that iron resists cutting forces in a way that lighter designs simply cannot.

More Power

The MVL-16's standard Fanuc motor is rated at 45 kW continuous and 55 kW (74HP) for 30 minutes. Larger motors are optional. More power means faster metal removal.

MVL-16		MVL-16M		MVL-20		MVL-20M		MVL-25		MVL-25M	
Ø2,000 (78.74)				Ø2,500 (98.42)				Ø2,800 (110.23)			
Ø2,000 (78.74)				Ø2,500 (98.42)				Ø2,800 (110.23)			
0 ~ 1,605 (0 ~ 63.18)				0 ~ 1,830 (0 ~ 72.05)		0 ~ 1,810 (0 ~ 71.26)		0 ~ 1,750 (0 ~ 68.9)			
1,600 (62.99)				1,800 (70.86)				1,700 (66.93)			
10,000 (22,040)				15,000 (33,060)				20,000 (44,090)			
Ø1,600 (62.99)				Ø2,000 (78.74)				Ø2,500 (98.42)			
22 ~ 85				13 ~ 50				8 ~ 30			
65 ~ 255				51 ~ 200				31 ~ 120			
24,000 (17,700)				55,800 (41,150)				90,000 (66,370)			
□ 25 / 32 / 40 (1" / 1.25" / 1.5") x 600 max. length											
T - Puller		BT - 50 / CAT-50		T - Puller		BT - 50 / CAT-50		T - Puller		BT - 50 / CAT-50	
12 (Random)		12 (6 Turning + 5 Milling + 1 Cover)		12 (Random)		12 (6 Turning + 5 Milling + 1 Cover)		12 (Random)		12 (6 Turning + 5 Milling + 1 Cover)	
240 x 240 (9.44 x 9.44)				254 x 254 (10 x 10)				300 x 300 (11.81 x 11.81)			
-1,020+1,220 (-40.15+48.03)				-1,300+1,500 (-51.18+59.05)				-1,450+1,700 (-57.08+66.93)			
1,000 (39.37)				1,250 (49.2)							
750 (29.52), 3 steps (4 positions)				1,120 (40.55), 4 steps (5 positions)		1,030 (44.09), 4 steps (5 positions)		840 (33.07), 3 steps (4 positions)			
10											
1 ~ 2,000											
0 ~ 150											
α 50i, 45 / 55 kW (60.3 / 73.7 HP)						α60HVi, 60 / 75 kW					
OPT. α 60HVi, 60/75 kW (80.4 / 100.5 HP)						(80.4 / 100.5 HP)					
α30i, 7 kW (9.4 HP)				α30i, 7 kW (9.4 HP)							
N/A		α P40i (18.5/22 kW)		N/A		αP50i (22/30 kW)		N/A		α P50i (22 / 30 kW)	
N/A		α 30i, 7 kW (9.4HP)		N/A		α30i, 7kW (9.4HP)		N/A		α 30i, 7 kW (9.4HP)	
7,600 x 6,300 (299.212 x 248.031)		6,200 x 6,400 (244.094 x 251.968)		8,200 x 7,000 (322.84 x 275.60)				9,600 x 7,200 (377.96 x283.47)			
5,810 (228.740)		6,250 (246.062)		6,650 (261.81)		7,070 (278.35)		7,330 (288.60)		7,750 (305.11)	
33,750 (74,400)		36,800 (81,120)		50,000 (110,230)		54,000 (119,000)		55,000 (121,250)		60,000 (132,270)	

▪ ALL specification, design and characteristics shown on this catalogue are subject to change without prior notice.

Turn your project GOALS TO RESULTS

With a few easy, next actions...



STANDARD ACCESSORIES

1. Complete splash guard and safety door
2. Hydraulic unit
3. Independent jaw manual chuck
4. Automatic lubrication system
5. LED Work light
6. Three color warning light (R/Y/G)
7. Workpiece counter (FANUC)
8. Coolant through tool holder (for turning)
9. Heat exchanger for electrical cabinet
10. Gear / bearing lubrication and oil chiller
11. Service tool box & tool kits
12. Adjustable leveling block (without J type blots)
13. Chip conveyor
14. Oil chiller for milling spindle (-M models)
15. Moveable vertical crossrail and mechanism
16. Coolant system with tank

OPTIONS (Partial List)

1. Air conditioner for electrical cabinet
2. Transformer
3. Oil skimmer
4. Special tool holders
5. Tool measuring device
6. Linear scale for X & Z axis
7. Auto door
8. Coolant level readout
9. Flushing chip system
10. Grinding function
11. Extended tool lengths
12. 90-degree milling attachment
13. Dual ram head configuration
14. Full sheet metal enclosures
15. High pressure coolant
16. Larger tool magazine capacity

TO ENJOY THESE TERRIFIC BENEFITS -

- Heavy duty machines -

"We were referred by a fellow user. A major machine brand had brought us to see its equipment in a Fortune 500 company's facility. During our visit, that plant manager pulled us aside and said: "For what you want to do, you really ought to look at this Momentum." Then, he showed us their MVL-16 and strongly praised its performance. We quickly recognized that it had the construction we sought."

- Customized to your goals -

"Momentum developed a machine specification for our needs, and it has been so successful that we became a loyal customer. We run them hard. Nothing but high temp alloy forgings and 24-hours a day, six days a week. They are heavy duty, rigid, and we get great surface finishes even on these tough materials."

- Well supported -

"Some project parameters changed after our machine was installed, and Momentum came back and helped us adapt the machine to accommodate. We feel that they are committed to our success over the long haul. Even the best plans can change, so that really helps to ensure a return on investment."

JUST TAKE THESE EASY STEPS -

- ❑ **Ask your distributor for an MVL investment summary customized to your needs.**
- ❑ **View our "Ultimate Guide to VTL Construction" video to see what's in the best-built VTLs.**
- ❑ **Compare specifications side-by-side. Or, give us your candidate list; we'll do it for you!**
- ❑ **Visit or speak with one or more MVL users, to confirm first-hand their extraordinary experiences.**
- ❑ **Then, join their happy ranks, and enjoy your improved competitiveness!**



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