



MVF Series

VERTICAL 5-AXIS MACHINING CENTER



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MVF Series

MVF 4000
MVF 5000

Vertical 5-axis Machining Center

MVF Series

5-axis machining center ideal for mass production and high precision machining



High productivity

High rigidity Roller LM Guides applied to the X/Y/Z axes reduces the non-cutting time, while the worm gear driven revolving B/C axes that function as both rotary table and rotary encoder comes standard and enhances productivity

High performance, high precision

The LM guide rail cooling option minimizes thermal growth during long machining cycles to ensure high precision machining

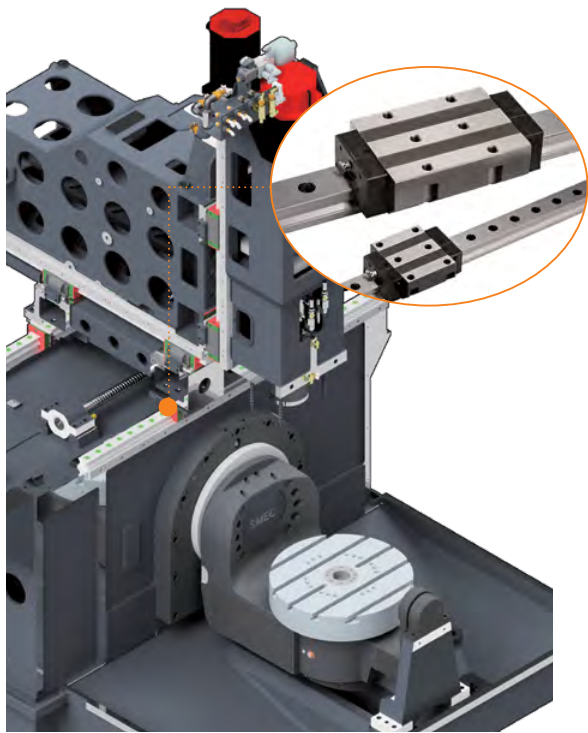
A variety of convenience features

User centered convenience features and optional functions needed for automation are available while a grease-based lubrication is used for eco-friendly operations

Various configurations available

Simultaneous 5-axis and 4+1 configurations are available to satisfy the working conditions needed to machine diverse and complex shapes and forms

High productivity



Roller type LM guide way

The use of roller type LM guide ways with excellent responsiveness minimizes the amount of noise generated during travels and greatly shortens non-cutting times.

- Enhanced speed, rigidity and durability
- Compared to ball type LM guides, it significantly improves wear resistance, thus improving travel precision and durability

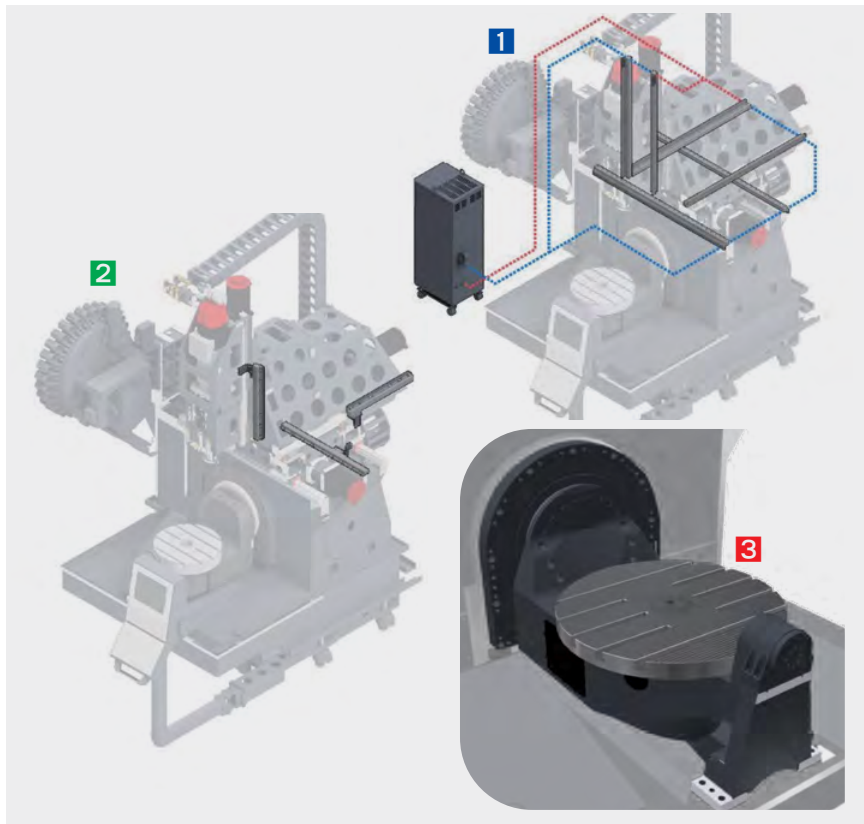
Rapid Traverse (X/Y/Z-axis)

40/40/40 m/min
(1,574.80/1,574.80/1,574.80 ipm)

Rapid traverse (B/C axis)

25/30 rpm(MVF 4000)
25/35 rpm(MVF 5000)

High performance, high precision machining



1 LM guide rail cooling (OPT)

- minimizes both thermal growth during long machining cycles and heat transfer to the structure
- minimizes thermal growth in the structure
- improves machining quality

2 Linear scale (OPT)

- minimizes the effect of thermal growth and backlash
- maintains machine precision through long operations

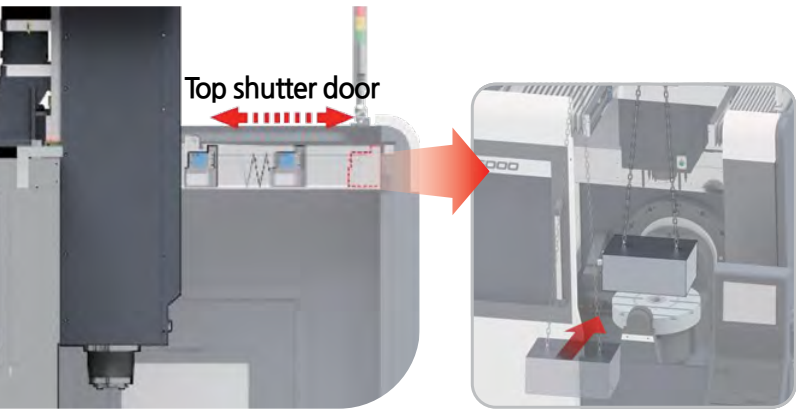
3 RGC type rotary table

- RGC (Roller Gear Cam) type rotary table
- the high rigidity design and addition of the supporter ensures stable machining
- vibration and backlash control improves machining quality

Various convenience features

Auto top shutter door (STD)

Allows access to the entire surface of the table when using a crane to move the workpiece into position making setup easier



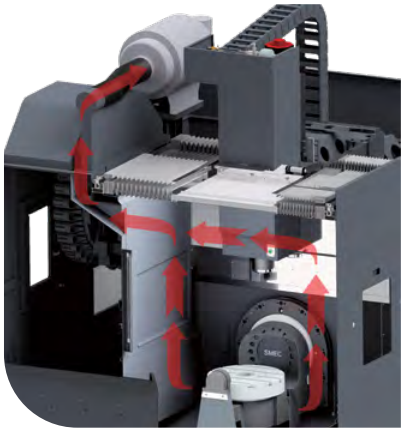
Auto Door (OPT)

For use with robots and automation solutions



Mist collector (OPT)

Collects mist generated during machining, improving the work environment

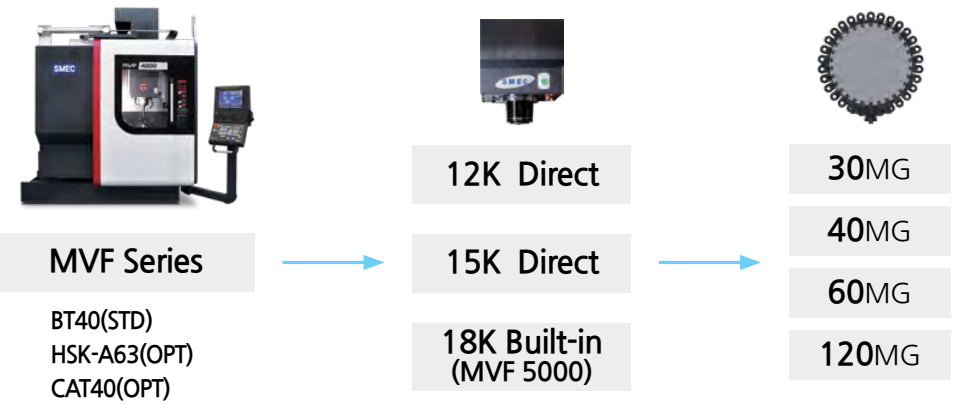


ATC Shutter (STD)

Separating the work area and the ATC prevents chip entry and coolant leaks



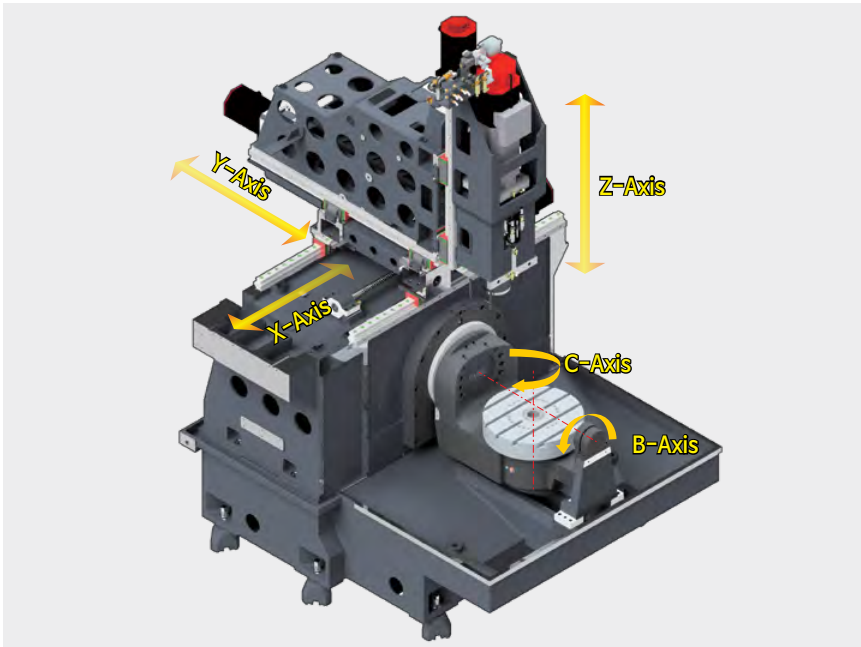
Various configurations available



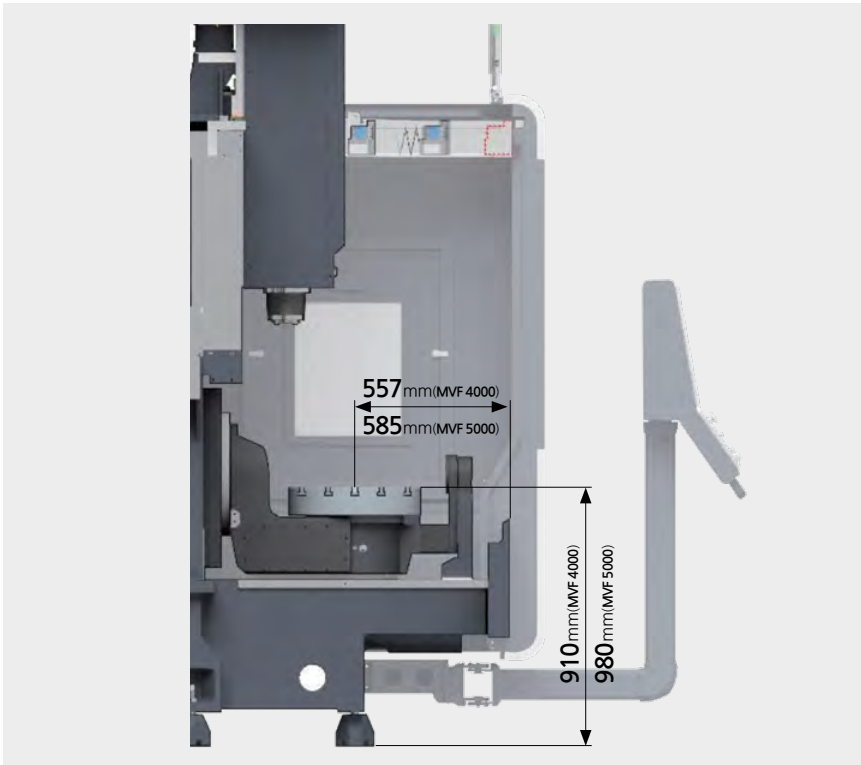
4+1 or simultaneous 5-axis

Available as 4+1 or simultaneous 5-axis configurations to meet the machining conditions required to process diverse and complex forms and shapes

Machine Design



Model	Travel				
	X-axis [mm (inch)]	Y-axis [mm (inch)]	Z-axis [mm (inch)]	B-axis(deg)	C-axis(deg)
MVF 4000	650<370+280> (25.60<14.57+11.02>)	450(17.72)	475(18.7)	-30 ~ +110	360
MVF 5000	650(400+250) (25.60<15.75+9.84>)	520(20.47)	475(18.7)	-110 ~ +45	360



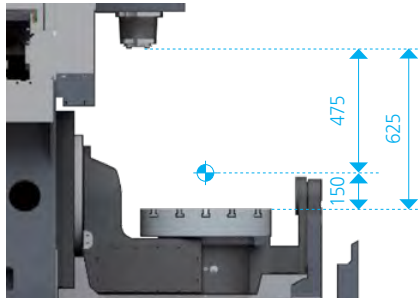
The application of Roller Type LM Guides to X and Y axes minimizes the noise created during travel and the superior accel/decel minimizes the non-cutting time

Highly Rigid Saddle
with no X-axis Overhang

The longest-in-class 1,050mm X-axis stroke (MCV 5500) and the highly rigid saddle enables reliable machining of various materials and is suitable for long materials

Z-axis High Rigidity Arched Column

The arched column ensures high rigidity and high precision machining performance



Distance between face of spindle and table top
150~625mm (5.91~24.61 inch)

Distance from front door to table edge
557mm (21.93 inch) (MVF 4000)
585mm (23.03 inch) (MVF 5000)

Distance from floor to table top
910mm (35.83 inch) (MVF 4000)
980mm (38.58 inch) (MVF 5000)

Spindle



High Efficiency Spindle
Cooling System [STD]

For long-term high speed continuous operation, an oil cooler may be installed to circulate chilled oil around the spindle bearings to prevent thermal growth in the spindle and allow high precision machining

The ultra precision spindle is supported by 4 rows of P4 class high-speed angular bearings allowing high speed, high precision machining with the direct-coupled head that minimizes thermal growth through forced heat dissipation.

12,000rpm
Spindle speed(Cont/Max)
11/18.5kW (14.75/24.81 Hp)
Power(Cont/Max)
70/117.8N·m (51.63/86.88 lbs-ft)

15,000rpm
Spindle speed(Cont/Max)
11/15kW (14.75/20.12 Hp)
Power(Cont/Max)
57.3/119N·m (42.2/87.7 lbs-ft)

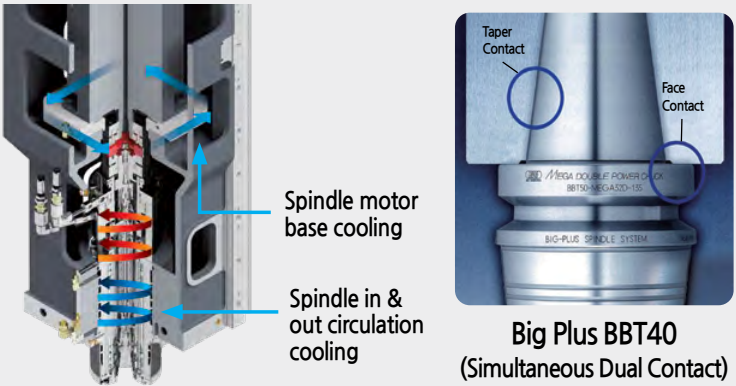
18,000rpm (MVF 5000)
Spindle speed(Cont/Max)
18.5/30kW (24.81/49.62 Hp)
Power(Cont/Max)
79.6/155.6N·m (58.71/114.76 lbs-ft)

JACKET Circulation Cooling

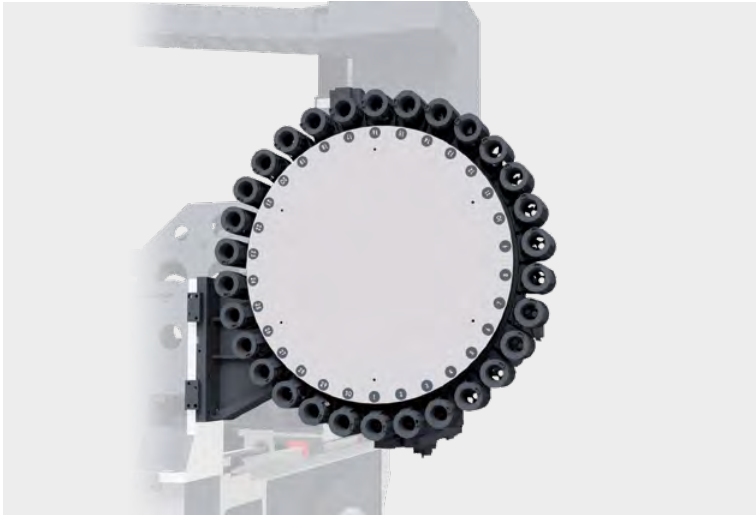
Semi-permanent grease lubrication applied to the bearings, while thermal growth is minimized using jacket circulation cooling around the bearing housing (a source of heat) via a Fan Cooler, ensuring stable performance and extending the lifetime of the spindle.

Standardized Dual-Contact Spindle

- The dual-contact system that provides taper and flange contact when tool holders are clamped into the spindle
- with both the taper and flange in contact, improved stability with reduced vibration
 - improved machining capability and surface finish under extreme conditions
 - 100% compatible with current tools.(BT40)



ATC / Magazine



ATC Magazine

Designed with a standard 30 tool magazine with short travel distance to enable quick tool changes

Fast and errorless tool changes are made possible using the memory random technique and double arm type tool changer, minimizing non-cutting time

Tool storage capacity :
30ea(40/60/120ea)

Tool-to-tool time : **1.3(60Hz)**sec

Max. tool dia. [adjacent empty] :
80[150]mm (3.15[5.91]inch)

Max. tool length : **300** mm (11.81 inch)

Max. tool weight : **8** kg (17.64 lb)



Table

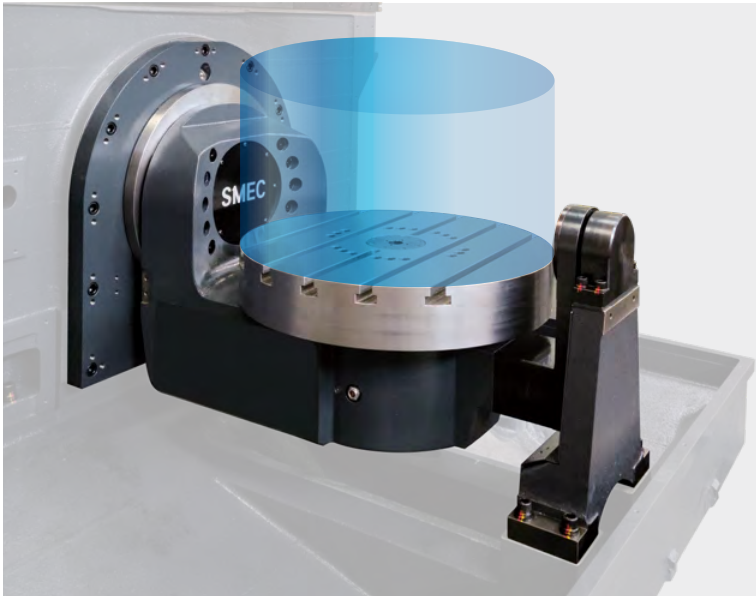


Table size and Table loading capacity were increased to support larger work area

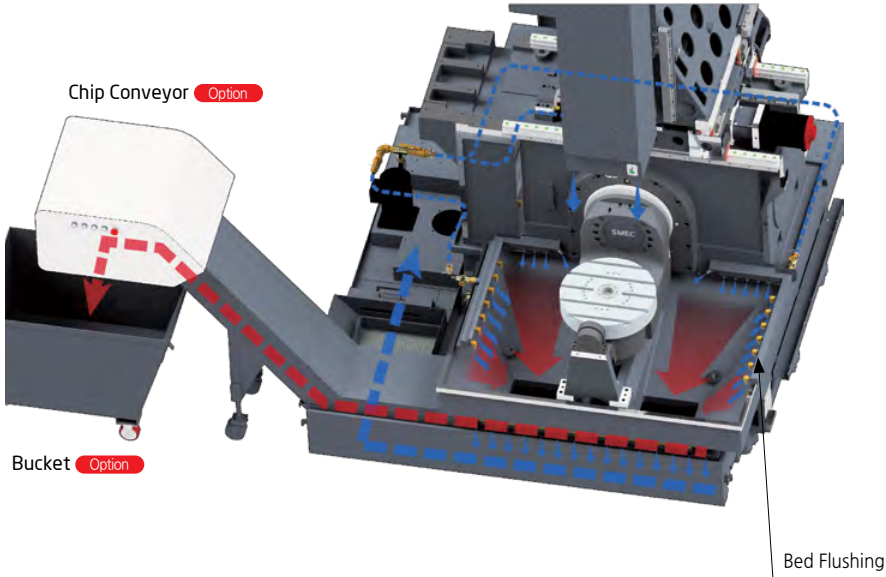
Table size :
MVF 4000 : **Ø400[Ø500]mm**
(Ø15.75[Ø19.69] inch)

MVF 5000 : **Ø650[Ø500]mm**
(Ø25.59[Ø19.69] inch)

Table surface :
MVF 4000 : **14H7×p80×5ea**
(0.55H7×p3.15×5ea)
MVF 5000 : **18H8×p100×5ea**
(0.71H8×p3.94×5ea)

Table loading capacity :
MVF 4000 : **250**kgf (551.16 lbs)
MVF 5000 : **300**kgf (661.39 lbs)

Eco-Friendly Chip Disposal

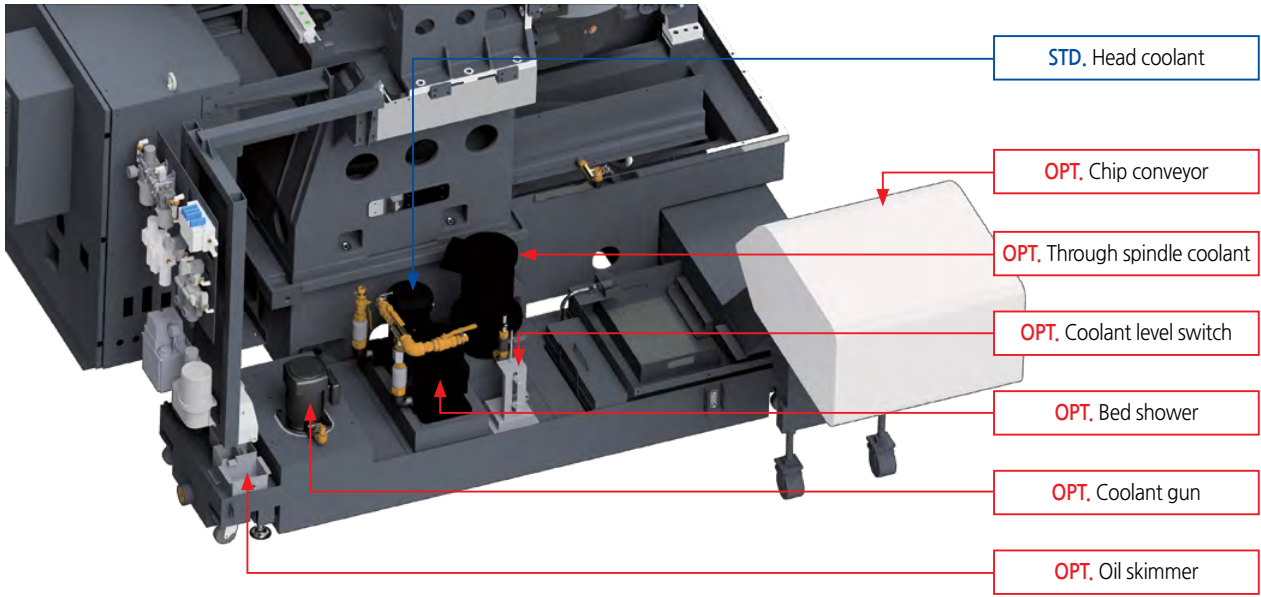


Complete chip discharge through the series of chip disposal processes by the coolant nozzle, bed flush, coil conveyor and chip conveyor

- the large, rectangular S/GUARD design and rear coolant tank ensures easy chip removal
- using bed flushing, complete chip disposal off the surface of the bed

Automated Coolant Supply

Large capacity coolant tank located to the left-side of the machine enables easy coolant exchange, tank cleaning and pump maintenance



Coolant tank capacity - MVF 4000 : **380ℓ** (100.39 gal)
- MVF 5000 : **354ℓ** (93.52 gal)

Options

AWC(Auto Work Changer)

The auto work changer ensures optimal efficiency and maximum productivity



Spin window

Allows the operator to see into the during machining by keeping the view clear from coolant spray



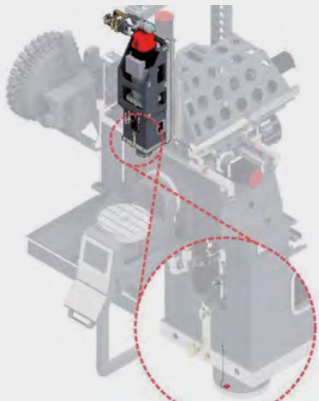
Tool measurement probe

Various automated tool diameter, length and lifetime measuring devices may be installed.



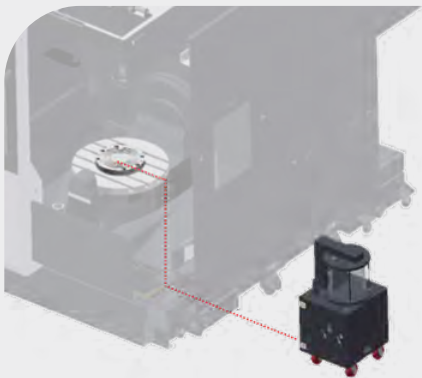
Thermal Compensation

Realtime detection of thermal growth during machining ensures minimized thermal growth and maximum machining precision.



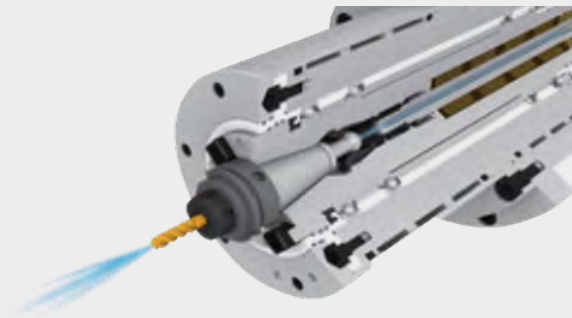
Vacuum Option

Vacuum generation options can be adapted for each machining process to provide optimized solutions for quartz/ceramic machining.



Through spindle cooling (TSC)

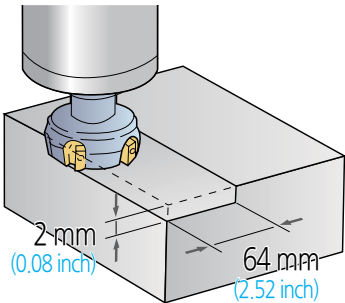
The TSC option may be added to improve machining effectiveness



Cutting performance

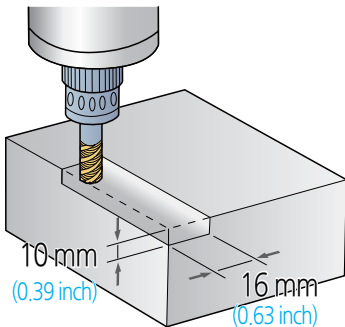
Face mill [Ø80mm (Ø3.15")] / Carbon steel (SM45C)

Chip removal rate [cm³/min (inch³/min)]	Spindle speed (r/min)	Feedrate [mm/min (ipm)]
346(21.11)	1,500	2,700(106.30)



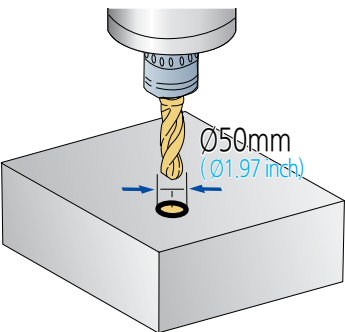
End mill [Ø25mm (Ø0.98")] / Carbon steel (SM45C)

Chip removal rate [cm³/min (inch³/min)]	Spindle speed (r/min)	Feedrate [mm/min (ipm)]
34.4(2.1)	1,528	107(4.22)



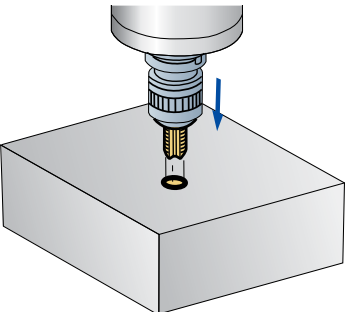
U-Drill [Ø50mm (Ø1.97")] / Carbon steel (SM45C)

Chip removal rate [cm³/min (inch³/min)]	Spindle speed (r/min)	Feedrate [mm/min (ipm)]
353(21.55)	1,500	180(7.09)



Tap / Carbon steel (SM45C)

Chip removal rate [mm/min (ipm)]	Spindle speed (r/min)	Tap size [mm (inch)]
966(38.03)	276(1.18)	M30×3.5(0.14)



TEST conditions : 12,000rpm [BBT40]

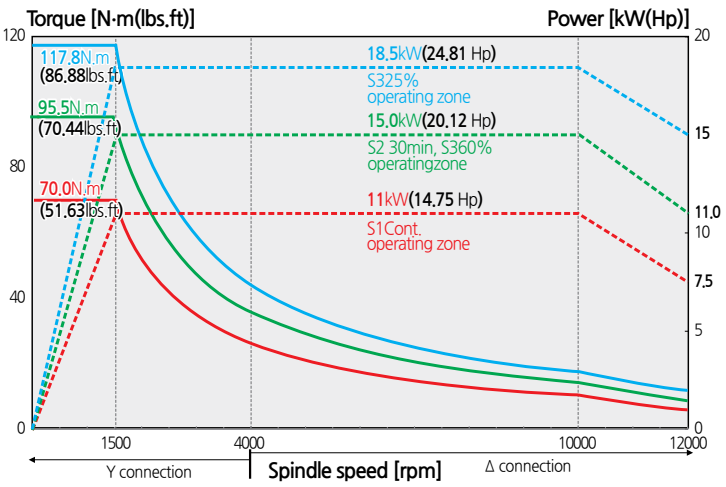
※ The above data is based on internal testing. Values may change depending on cutting conditions.

Spindle Power & Torque Diagram

12,000rpm

Power (Cont/Max)
11/18.5kW
(14.75/24.81 Hp)

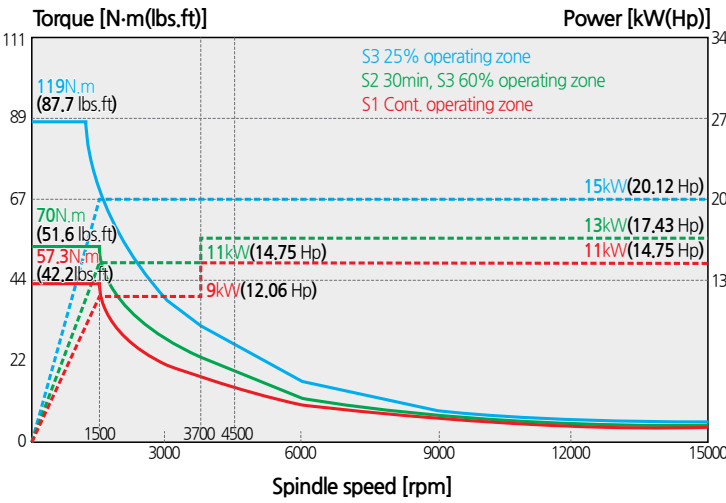
Torque (Cont/Max)
70/117.8N·m
(51.63/86.88 lbs-ft)



15,000rpm

Power (Cont/Max)
11/15kW
(14.75/20.12 Hp)

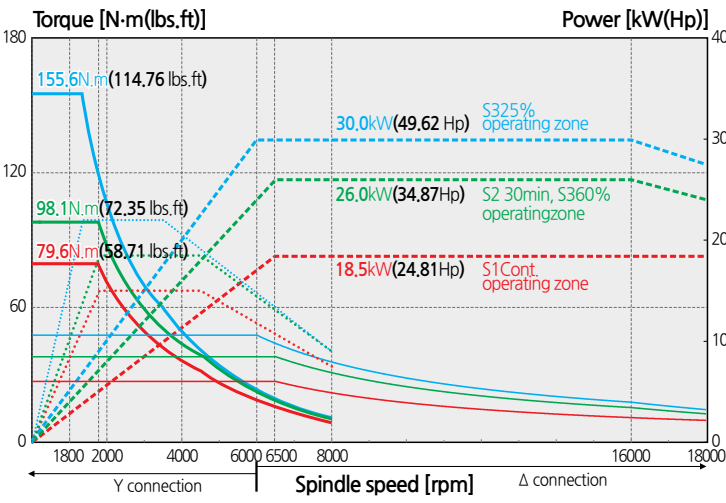
Torque (Cont/Max)
57.3/119N·m
(42.2/87.7 lbs-ft)



18,000rpm (MVF 5000)

Power (Cont/Max)
18.5/30kW
(24.81/49.62 Hp)

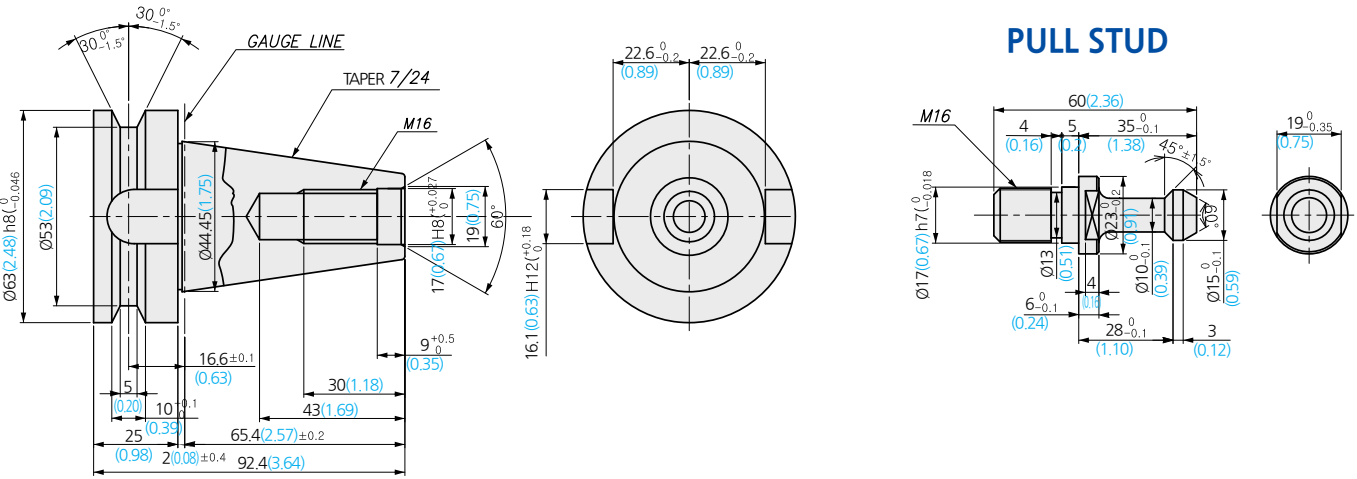
Torque (Cont/Max)
79.6/155.6N·m
(58.71/114.76 lbs-ft)



Tool Shank

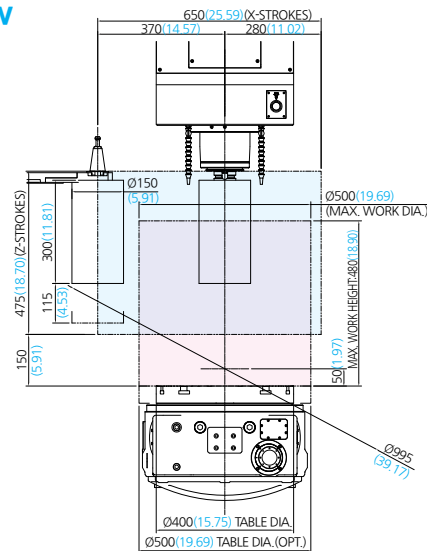
Unit : mm(inch)

BT40/BBT40, BIG PLUS



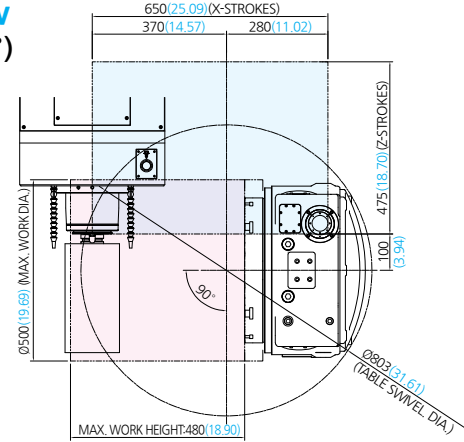
MVF 4000

Front view
(B-Axis 0°)

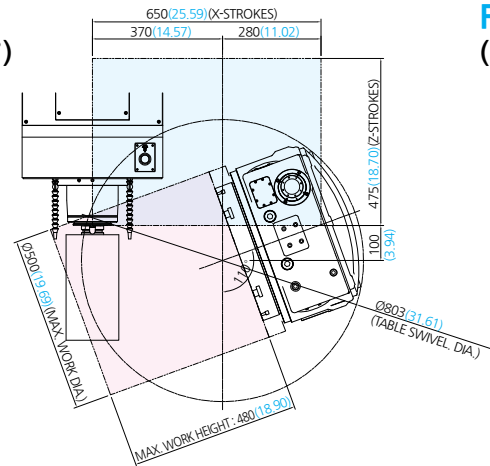


Unit : mm(inch)

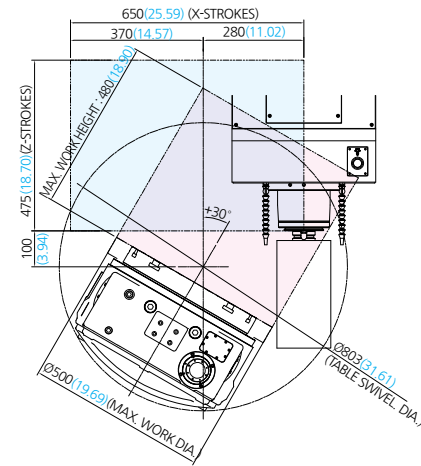
Front view
(B-Axis -90°)



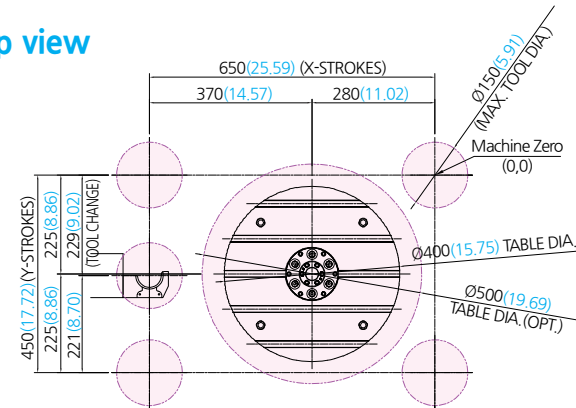
Front view
(B-Axis -110°)



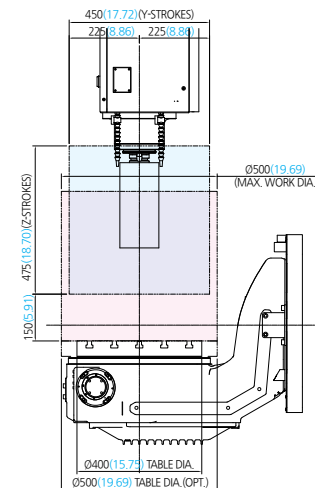
Front view
(B-Axis +30°)



Top view

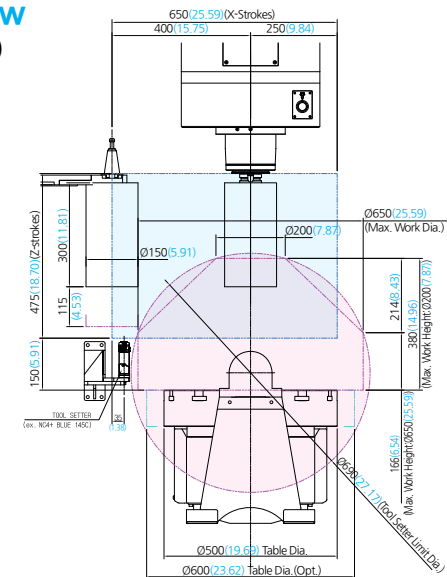


Right view



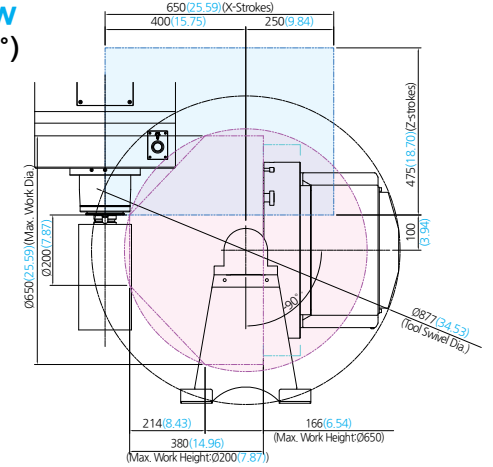
MVF 5000

Front view
(B-Axis 0°)

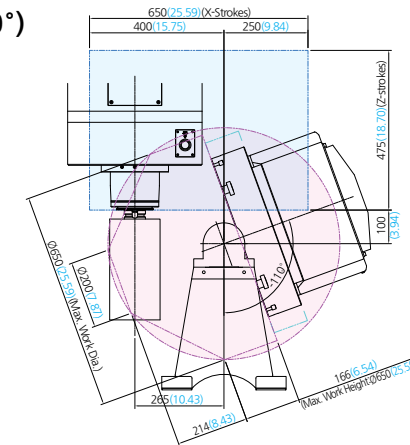


Unit : mm(inch)

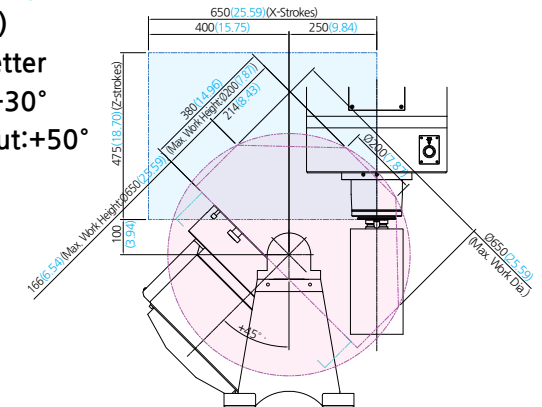
Front view
(B-Axis -90°)



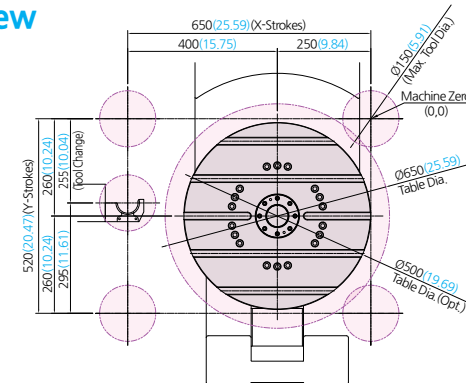
Front view
(B-Axis -110°)



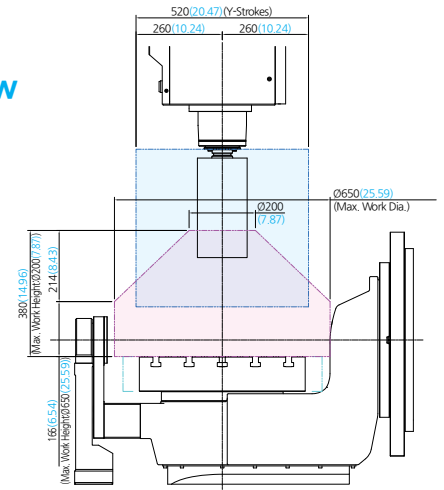
Front view
(B-Axis)
Tool setter
With: +30°
Without: +50°



Top view

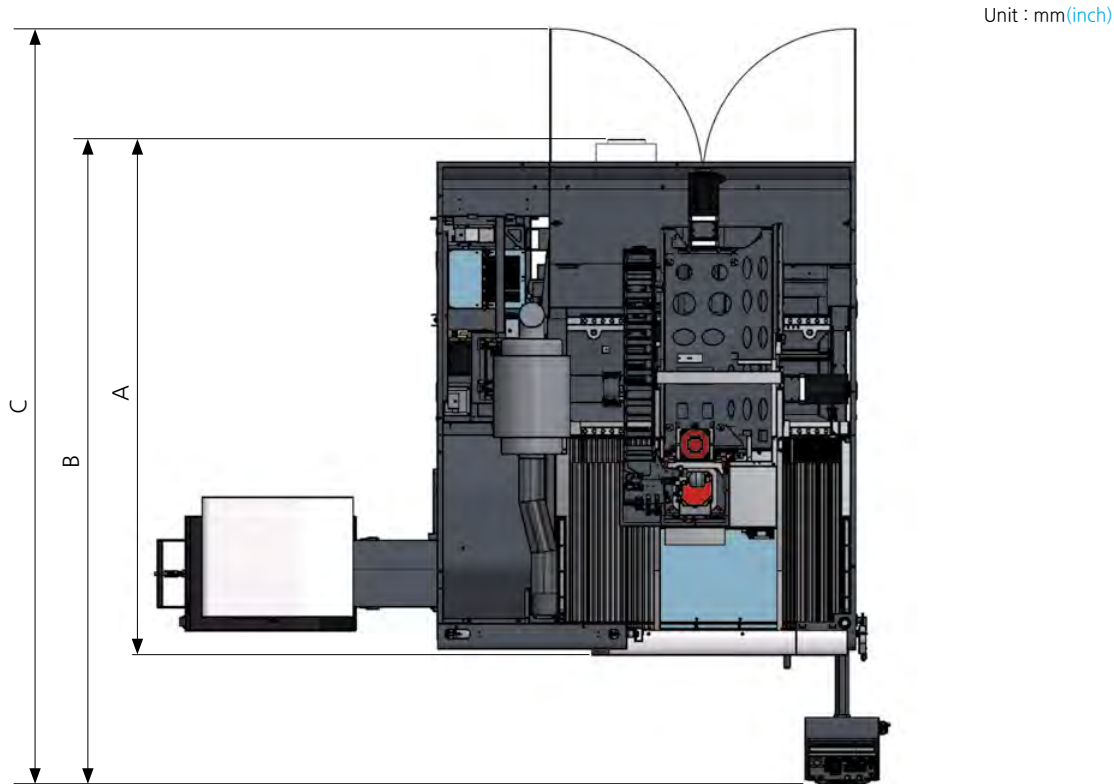


Right view

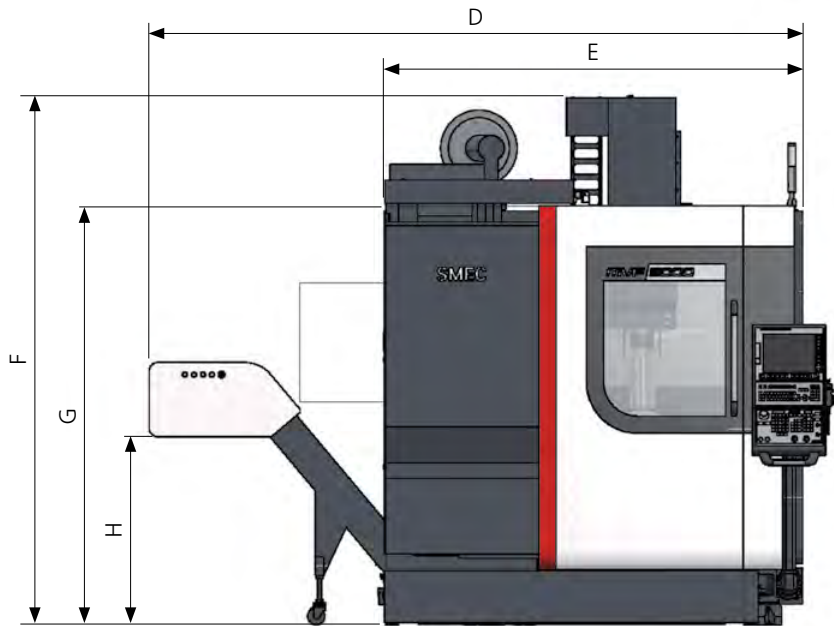


Machine Dimensions

Top view



Front view



Model	A (Length)	B	C	D	E (Width)	F (Height)	G	H
MVF 4000	2,933.75 (115.5)	3,623.75 (142.67)	4,176.94 (164.45)	3,270 (128.74)	2,285 (89.96)	3,028.5 (119.23)	2,404 (94.65)	826 (32.52)
MVF 5000	3,036.80 (119.56)	3,814.80 (150.19)	4,483 (176.5)	3,844.26 (151.35)	2,460 (96.85)	3,101 (122.09)	2,465 (97.05)	1,104.61 (43.52)

Standard / Optional

Category		MVF 4000	MVF 5000
Spindle			
RPM	12R	●	●
	15R	○	○
	18R built-in	X	○
ATC			
Tool type	BBT40	●	●
	CAT40	○	○
	HSK-A63	○	○
Pull Stud	15°	○	○
	45°	●	●
Lubrication			
Grease (feed system)		●	●
Cooling			
Spindle		●	●
ball screw(X/Y/Z)		●	●
Motor base(spindle/Z)		●	●
LM guide(X/Y/Z)		○	○
Table & Column			
Rotary Table	Ø400 (15.75")	●	●
	Ø500(19.69")	○	○
APC		X	X
T-slot table		●	●
Coolant Equipment			
FULL SPLASH GUARD		●	●
Through spindle coolant	20bar	○	○
	30bar	○	○
	70bar	○	○
Shower coolant		●	●
Coolant gun		○	○
Bed flushing		○	○
Air gun		○	○
Air blow		○	○
Tool measurement air blow (with tool measuring device)		○	○
Screw conveyor		X	X
Chip conveyor, HINGE	Left	☆	☆
	Right	X	X
	Rear	X	X
Chip conveyor, SCRAPER	Left	☆	☆
	Right	X	X
	Rear	X	X
Chip bucket	STD (380ℓ(100.39 gal))	○	○
	Rotating (200ℓ(52.83 gal))	○	○
Electrical Equipment			
3 step patrol lamp & buzzer		●	●
Elec. cabinet light		○	○
Remote MPG		○	○
3-axis MPG		●	●
Work counter		●	●
Total counter		●	●
Tool counter		●	●
Multi counter		●	●
Residual current breaker		○	○

● : Standard ☆ : Required Selection ○ : Optional X : N/A

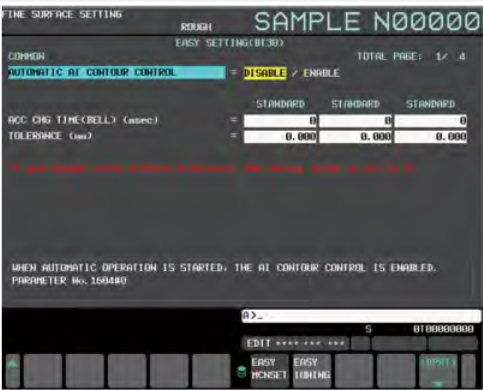
Category		MVF 4000	MVF 5000
Electrical equipment			
AVR (Auto Voltage Regulator)		○	○
Transformer 50kVA		○	○
Auto Power Off		○	○
Power outage backup module		○	○
Precision machining option			
AICC II (AI Contour Control II)		●	●
Jerk control		●	●
Smooth tolerance plus control		●	●
Machining quality selection function		●	●
Nano smoothing		●	●
Polar coordinate interpolation		○	○
High-speed processing		○	○
Look ahead block expansion		○	○
Repeating canned cycle		○	○
Repeating canned cycle 2		○	○
Drilling canned cycle		○	○
Convenience feature			
Manual guide i		●	●
Measurement			
Workpiece contact check device	TACO	○	○
	SMC	○	○
Auto tool measuring device		○	○
Tool breakage detection		○	○
Linear scale	X-axis	○	○
	Y-axis	○	○
	Z-axis	○	○
	B-axis	●	●
	C-axis	●	●
Thermal growth sensor		○	○
Coolant level detection		○	○
Environmental			
Air conditioner		●	●
Oil mist collector		○	○
Oil skimmer		○	○
Front spin window		○	○
Fixture & automation			
Auto door	STD	○	○
	High speed	X	X
Auto shutter		X	X
부조작반		○	○
Add. M-code (4 sets)		○	○
Robot interface		○	○
I/O expansion		○	○
Hydraulic equipment			
Hydraulic unit for fixtures		○	○
Safety device			
Door interlock		●	●
KCs		●	●

※ For detailed information, please contact your local SMEC dealer.

Machining Solution (STD)

S4(SMEC SMOOTH SURFACE SYSTEM) Package

High performance NC options to improve machining performance provided as standard



Without S4 Package



With S4 Package

15 inch LCD monitor standard	
AICC II (AI Contour Control II)	Efficient accel/deceleration (200 block look ahead)
Jerk control	Speed control during acceleration changes
Smooth tolerance plus control	Stable curved shape forming
Machining conditions selection function	Adjust accuracy level according to machining conditions
Machining quality selection function	Visual machining check and setup guide
Manual Guide i	Visual machining check and setup guide
Data server	Transfer large program files
Part program storage	2MB (5,120M)
Number of registered programs	1,000ea

IoT Solution (OPT)



NC-Gate Basic Platform



IoT-Gate Expansion Platform

NC-Gate / IoT-Gate

The NC-Gate / IoT-Gate that was developed in-house with our ICT technology is a universal gateway that not only interworks with our machine tools, but machine tools from other manufacturers, robots, automation equipment, and analog / digital sensors as a network device capable of bi-directional communication.

Supported drivers : Fanuc / Mitsubishi / Siemens NC, Modbus TCP, DeviceNet, Profibus, Ethernet, AI/DI/DO

KPI (Key Performance Indexes)



Provides key performance indicators and displays target achievement

Indicators : achievement rate, productivity, process defect rate, equipment and factory usage, quality defect rate, lead time, and average cycle time

OEE (Overall Equipment Effectiveness)



Provides figures and graphs of overall equipment effectiveness

Availability, performance, quality, etc.

Realtime Monitoring



Provides operation status and alarm information in case of problems in the production line

Provides information about the operation status, speed, production alarms, etc. of each machine

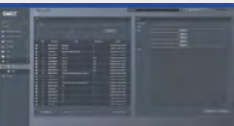
Remote Control/Management



Remote control and operation

Emergency stop switch, program editing, etc.

Remote A/S



Problem diagnosis via remote control

Provide remote diagnosis services to users via the IoT solution

SMEC User Interface



Fanuc Oi MF Plus

- 15" LCD color display
- Part program size 2MB
- High quality designed OP Panel
- SMEC Custom S/W
- Portable M.P.G

SMEC Custom S/W displayed using MDI's button or OP Panel's button



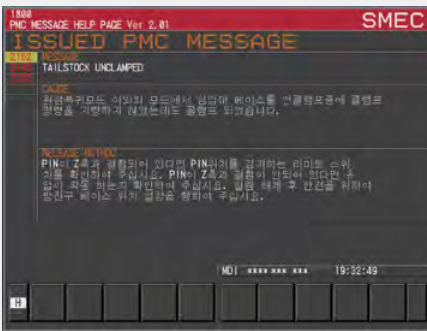
CUSTOM : Provide operator convenience and improve productivity using the support function for tool management and additional device setting.

SMEC HMI



M/G-Code check function

Allows the operator to directly read the M/G-Code on the machine for easy application programming

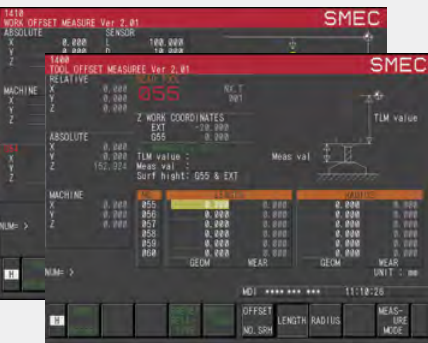


PMC alarm check function

When a PMC alarm occurs, the cause and countermeasures are described in detail, making operation and maintenance more convenient



ATC Magazine status check, setting and maintenance function



Work coordinates, tool setting support function



Counter for each T-Code

MVF Series

VERTICAL MACHINING CENTER

Machine Specifications

[] : Option

Category			MVF 4000	MVF 5000
Travel	X-axis travel	mm(inch)	650<370+280>(25.59<14.57+11.02>)	650<400+250>(25.59<15.75+9.84>)
	Y-axis travel	mm(inch)	450(17.72)	520(20.47)
	Z-axis travel	mm(inch)	475(18.7)	475(18.7)
	B-axis travel	deg	-30 ~ +110	-110 ~ +45
	C-axis travel	deg	360	360
	Spindle to table surface	mm(inch)	150 ~ 625(5.91~24.61)	150 ~ 625(5.91~24.61)
Table	Table size	mm(inch)	Ø400[Ø500](15.75[19.69])	Ø650[Ø500](25.59[19.69])
	Table loading capacity	kgf(lb)	250(551.16)	300(661.39)
	Table surface	mm(inch)	14H7(0.55H7) T-slot × p80(3.15) × 5ea	18H8(0.71H8) T-slot × p100(3.94) × 5ea
Spindle	Spindle speed	rpm	12,000[15,000]	12,000[15,000/18,000]
	Power (Cont/Max)	kW(HP)	11/18.5(14.75/24.81)	11/18.5(14.75/24.81)
	Torque (Cont/Max)	N.m(lbs.ft)	70/117.8(51.63/86.88)	70/117.8(51.63/86.88)
Feedrate	X-axis rapid traverse rate	m/min(ipm)	40(1,574.80)	40(1,574.80)
	Y-axis rapid traverse rate	m/min(ipm)	40(1,574.80)	40(1,574.80)
	Z-axis rapid traverse rate	m/min(ipm)	40(1,574.80)	40(1,574.80)
	B-axis rapid traverse rate	rpm	25	25
	C-axis rapid traverse rate	rpm	30	35
	Cutting feed(X/Y/Z)	mm/min(ipm)	1-10,000(0.04-393.70)	1-10,000(0.04-393.70)
ATC	Tool shank	-	BBT40[CAT40]	BBT40[CAT40]
	Pull stud	-	MAS P40T-1	MAS P40T-1
	Tool storage capacity	ea	30[40/60]	30[40/60]
	Max tool diameter <adjacent empty>	mm(inch)	Ø80<Ø150>(3.15<5.91>)	Ø80<Ø150>(3.15<5.91>)
	Max tool length / weight	mm/kgf(inch/lb)	300/8(11.81/17.64)	300/8(11.81/17.64)
	Tool-to-tool time	sec	1.3(60Hz), 1.6(50Hz)	1.3(60Hz), 1.6(50Hz)
	Tool changing method	-	Double Arm Swing	Double Arm Swing
	Tool select type	-	Memory random	Memory random
Machine	Size <with SIDE chip conveyor> L×W×H	mm(inch)	2,285<3,270> × 2,934 × 3,030 (89.96<128.74> × 115.51 × 119.29)	2,460<3,845> × 3,037 × 3,101 (96.85<151.38> × 119.57 × 122.09)
	Size <with REAR chip conveyor> L×W×H	mm(inch)	-	-
	Weight	kg(lb)	7,500(16,534.67)	8,500(18,739.29)
Coolant tank capacity			380(100.39)	354(93.52)
Electric power supply			41/220	41/220
Controller			FANUC 0i-MF Plus [FANUC 31i-B5 Plus], SIEMENS SINUMERIKONE	

※ Design and specifications are subject to change without notice.

NC Specification / FANUC

● : STD ○ : Optional X : N/A



Category		0i-MF Plus
Controlled axis	Controlled axes	X, Y, Z, C, B
	Max simultaneously controlled axes	4 [5 : F31i-B5 Plus]
	Least input increment	0.001mm / 0.0001"
	Built-in stroke limit	Soft overtravel 1, 2, 3
	Machine lock	●
Operation function	Manual handle feed	X1, X10, X100
	Dry run	●
	Single block	●
	Feed per minute	G94
	Feed per revolution	G95
	DNC operation	Ethernet, CF card
Interpolation function	Retraction for rigid tapping	●
	Linear interpolation	G01
	Circular interpolation	G02, G03
	Dwell	G04
	Cylindrical interpolation	G70.1
	Skip	G31
	Fine surface machining	●
	Smooth tolerance control	●
	Nano smoothing	X
	Polar coordinate interpolation	X
	Reference position (zero) return	G28
Feed function	Reference position (zero) return check	G27
	2nd, 3rd, 4th reference point return	G30
	Rapid traverse override	F0, 25%, 50%, 100%
	Feedrate override	0~200%
	Jog override	0 ~ 5,000 mm/min
	AI look ahead	20 block
	AI contour control II	200 block
	Look ahead block expansion (F0i) (400 Block)	○
	High-speed processing	X
Spindle function	Look ahead block expansion (F31i)	X
	Jerk Control	●
	Spindle orientation	●
	Rigid tapping	M29
Tool function	Spindle override	0 ~ 150%
	Tool number command	T2-Digt Tool number
	Tool nose radius compensation	G40 ~ G42
	Tool offset pairs	400 pairs
	Tool geometry / wear offset	●
	Tool length offset	●
	Tool life management	●
	Tool path graphic display	●

❏ NC Specification / FANUC



● : STD ○ : Optional X : N/A

Category		0i-MF Plus
Program input	Absolute / incremental command	G90/G91
	Repeating canned cycle	X
	Repeating canned cycle 2	X
	Canned cycles	X
	Drilling canned cycle	G73/74/76, G80~89
	Decimal point input	●
	Inch / metric conversion	G20 / G21
	Program restart	●
	Sub program call	●
	Max programmable value	±99999.999mm/±9999.9999"
	M function	3 digit
	Custom macro	●
	Addition of custom macro common variables	#100~#199, #500~#999 (#98000~#98499)
	Programmable data input	G10
	Tape code	ISO / EIA
	Optional block skip	●
	Workpiece coordinate system	G52 ~ G59
	Addition of workpiece coordinate system	48(300) pairs
Interface function	Embedded ethernet	●
	Fast ethernet	100 Mbps
Setting and display	Alarm and operator history display	●
	Run hour and parts count display	●
	Loadmeter display	●
	Self diagnosis function	●
	Extended part program editing	●
	Machining condition selecting function	●
	Machining quality level adjustment	●
	Display screen	15" LCD
	Multi-language display	25 language
Data input/output	Fast data server	●
	RS232C interface	●
	Memory card input / output	●
	USB memory input / output	●
Editing operation	Part program storage size	2MB
	Number of registered programs	1,000 EA
	Manual guide i	●
	Manual guide Oi	X

❏ NC Specification / FANUC

● : STD ○ : Optional X : N/A

Category		31i-B5 Plus	Category		31i-B5 Plus
Controlled axis	Controlled axes	X, Y, Z, C(4), B(5)	Program input	Absolute / incremental command	G90/G91
	Max simultaneously controlled axes	5		Repeating canned cycle	○
	Least input increment	0.001mm / 0.0001"		Repeating canned cycle 2	○
	Built-in stroke limit	Soft overtravel 1, 2, 3		Canned cycles	○
	Machine lock	●		Drilling canned cycle	G73/74/76, G80~89
Operation function	Manual handle feed	X1, X10, X100		Decimal point input	●
	Dry run	●		Inch / metric conversion	G20 / G21
	Single block	●		Program restart	●
	Feed per minute	G94		Sub program call	●
	Feed per revolution	G95		Max programmable value	±99999.999mm/±9999.9999"
	DNC operation	Ethernet, CF card		M function	3 digit
	Retraction for rigid tapping	●		Custom macro	●
Interpolation function	Linear interpolation	G01		Addition of custom macro common variables	#100~#199, #500~#999, #98000~#98499
	Circular interpolation	G02, G03		Programmable data input	G10
	Dwell	G04		Tape code	ISO / EIA
	Cylindrical interpolation	G70.1		Optional block skip	●
	Skip	G31		Workpiece coordinate system	G52 ~ G59
	Fine surface machining	●		Addition of workpiece coordinate system	48(300) pairs
	Smooth tolerance control	●	Interface function	Embedded ethernet	●
	Nano smoothing	●		Fast ethernet	100 Mbps
	Polar coordinate interpolation	○	Setting and display	Alarm and operator history display	●
	Reference position (zero) return	G28		Run hour and parts count display	●
	Reference position (zero) return check	G27		Loadmeter display	●
	2nd, 3rd, 4th reference point return	G30		Self diagnosis function	●
Feed function	Rapid traverse override	F0, 25%, 50%, 100%		Extended part program editing	●
	Feedrate override	0~200%		Machining condition selecting function	●
	Jog override	0 ~ 5,000 mm/min		Machining quality level adjustment	●
	AI look ahead	20 block		Display screen	15" LCD
	AI contour control II	400 block		Multi-language display	25 language
	Jerk control	●	Data input/output	Fast data server	●
	High-speed processing	●		RS232C interface	●
	Look ahead block expansion	●		Memory card input / output	●
	5-axis Package	●		USB memory input / output	●
Spindle function	Spindle orientation	●	Editing operation	Part program storage size	4MB (8MB)
	Rigid tapping	M29		Number of registered programs	1,000 EA (4,000 EA)
	Spindle override	0 ~ 150%		Manual guide i	●
Tool function	Tool number command	T2-Digt Tool number		Manual guide Oi	X
	Tool nose radius compensation	G40 ~ G42			
	Tool offset pairs	400 pairs			
	Tool geometry / wear offset	●			
	Tool length offset	●			
	Tool life management	●			
	Tool path graphic display	●			