SMEC

MCV 4600/5500

LM GUIDE TYPE
VERTICAL MACHINING CENTER

MCV 4600/5500

MCV 4600
MCV 5500

SMEC

High productivity

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.

High performance, high precision machining

The machine design ensures stable machining while the direct-drive spindle minimizes vibrations and thermal growth, ensuring high precision machining

LM GUIDE TYPE VERTICAL MACHINING CENTER

MCV 4600/5500

Ease of use design with low center of gravity design

- minimized gap between the front cover and table edge for easy load/unload of materials
- high rigidity single-piece bed with low center of gravity design
- LM guides with minimal overhang
- high rigidity and high precision with high rigidity saddle and single-piece column design
- maximized space efficiency with the compact design

Category		MCV 4600	MCV 5500
Travel (X/Y/Z)	mm(inch)	900/460/520(35.44/18.12/20.48)	1,050/550/520(41.34/21.66/20.48)
Table size	mm(inch)	1,050×460(41.34×18.12)	1,200×540(47.25×21.26)
Table loading capacity	kgf(lb)	600(1,322.78)	800(1,763.70)
Table surface	mm(inch)	18H8(0.71H8) T-slot×p125(4.93)×3ea	18H8(0.71H8) T-slot×p125(4.93)×4ea
Max. spindle speed	rpm	12,000	12,000
Tool-to-tool time	sec	1.3(60Hz), 1.6(50Hz)	1.3(60Hz), 1.6(50Hz)
Rapid traverse (X/Y/Z)	m/min(ipm)	36/36/30(1,417.33/1,417.33/1,181.11)	36/36/30(1,417.33/1,417.33/1,181.11)
Tool storage capacity	EA	30	30

Easy Accessibility

The low center of gravity design and minimized gap between the front cover and table edge allows easy load/unload of materials with minimal operator effort and easier machine maintenance

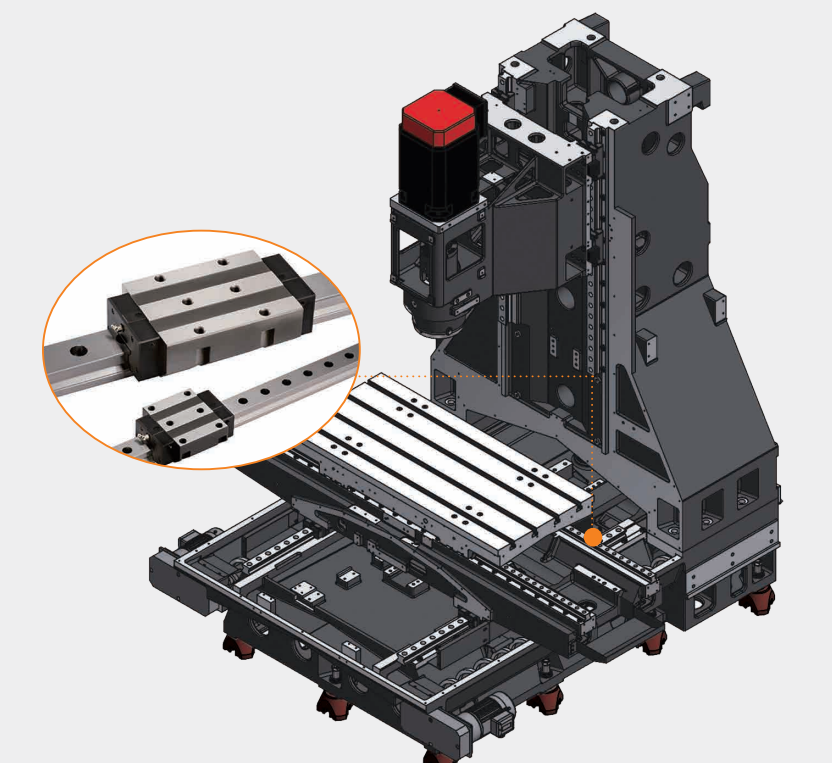
Operator Convenience

The high performance NC option (S4 package), standard operator-centric OP Panel (15" screen) and eco-friendly coolant system maximizes operator convenience

MCV 4600/5500

VERTICAL MACHINING CENTER

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.

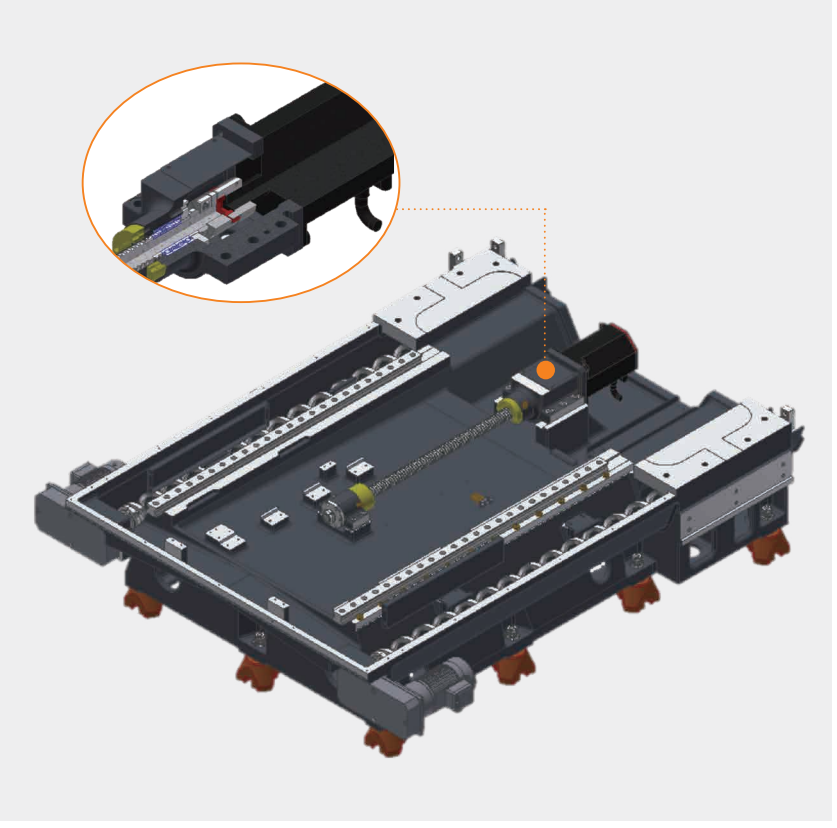
- Enhanced speed, rigidity and durability
- Compared to ball type LM guides, it significantly improves wear resistance, thus improving travel precision and durability

Rapid Traverse (X/Y/Z-axis)

36/36/30m/min

(1,417.33/1,417.33/1,181.11 ipm)

High performance, high precision cutting capability



High quality precision with low center of gravity design

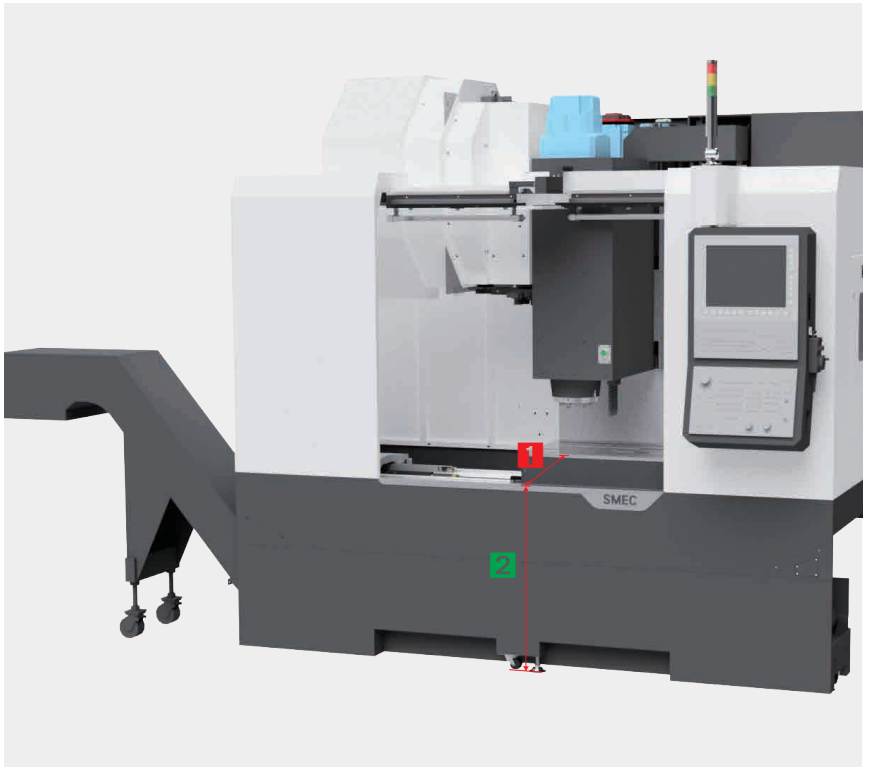
- High-rigidity single-piece bed designed with a low center of gravity box structure
- Overhang prevented through the adoption of the widest-in-class saddle for the roller type LM guideway
- High speed, high rigidity direct spindle

Servo Motor

Each axis ballscrew is directly connected with highly reliable digital servo motors enhancing traverse precision.

- Direct couplings used instead of intermediate mediums for power conversion
- Minimized backlash during axis feeds

Superior Accessibility



- With the door opened, a hoist can be brought in past the center point of the table, making it very easy to move heavy materials into the machine
- The distance between the cover and the table was minimized for easy loading/unloading of materials and to allow access to the entire table surface

1 Distance between front door and table

MCV 4600 : 250mm (9.85 inch)

MCV 5500 : 270mm (10.63 inch)

2 Distance from floor to table top

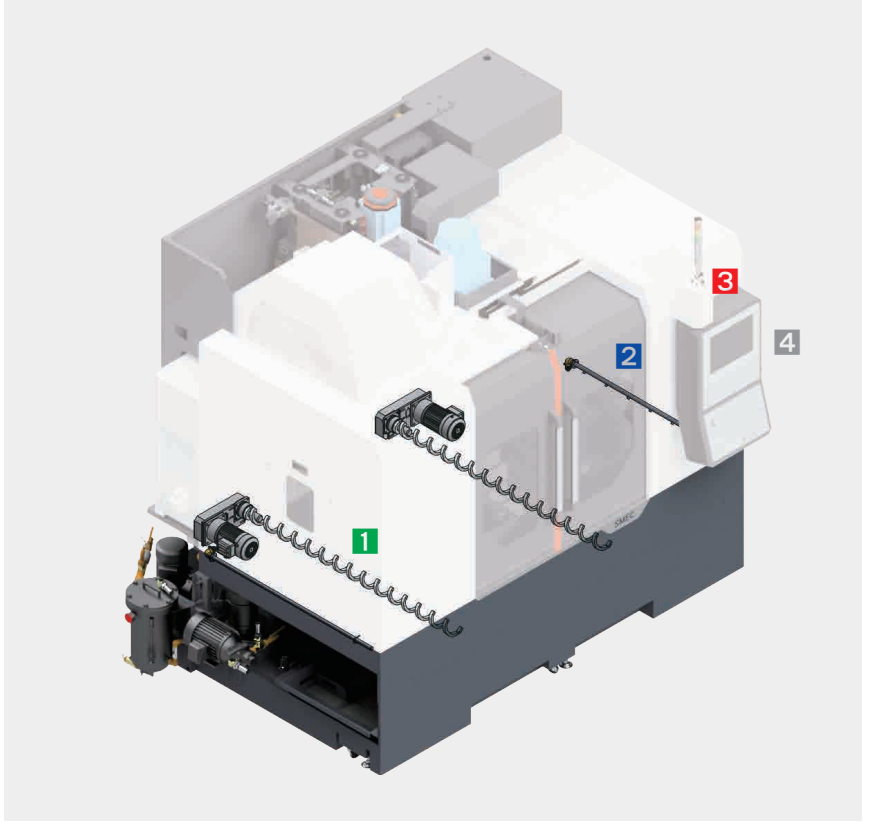
MCV 4600 : 885mm (34.85 inch)

MCV 5500 :

920mm (36.23 inch)
(REAR-TYPE COOLANT TANK)

1,000mm (39.38 inch)
(SIDE-TYPE COOLANT TANK)

Operator Convenience



1 Coil Conveyor

The 2 standard internal coil conveyors efficiently removes the chips that are created during machining

2 Bed Flushing

The standard bed flush system installed along the sides of the machine prevents chip build-up and ensure effective chip removal

3 Operator-centric OP Panel

The swivel-type OP Panel is easy to work with and the QWERTY keyboard and high visibility buttons and efficient arrangement improves operator convenience

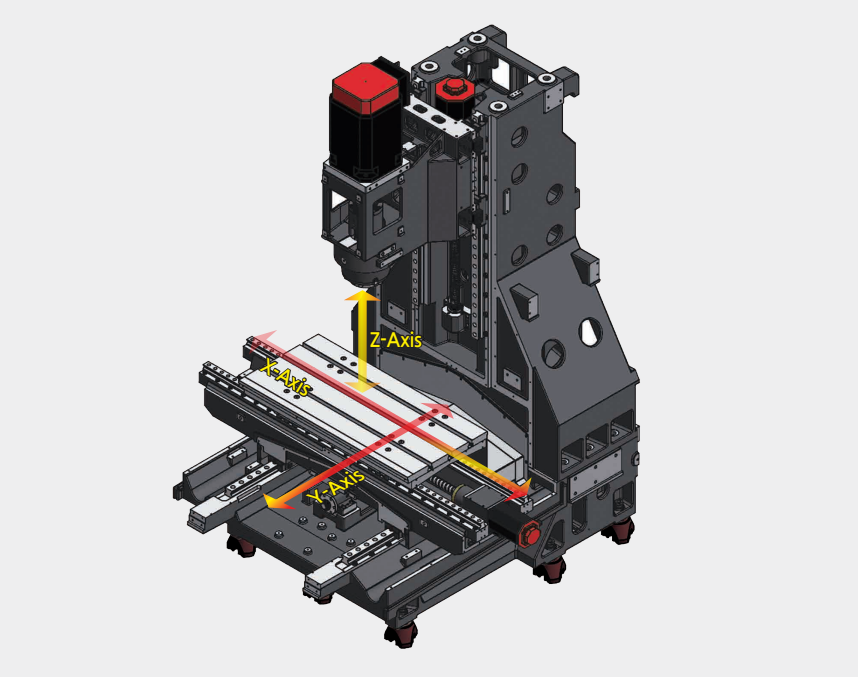
4 Machining Performance Enhancing High Performance NC Options Made Standard

The large 15" LCD display, data server and various NC options are made standard to significantly improve machining performance

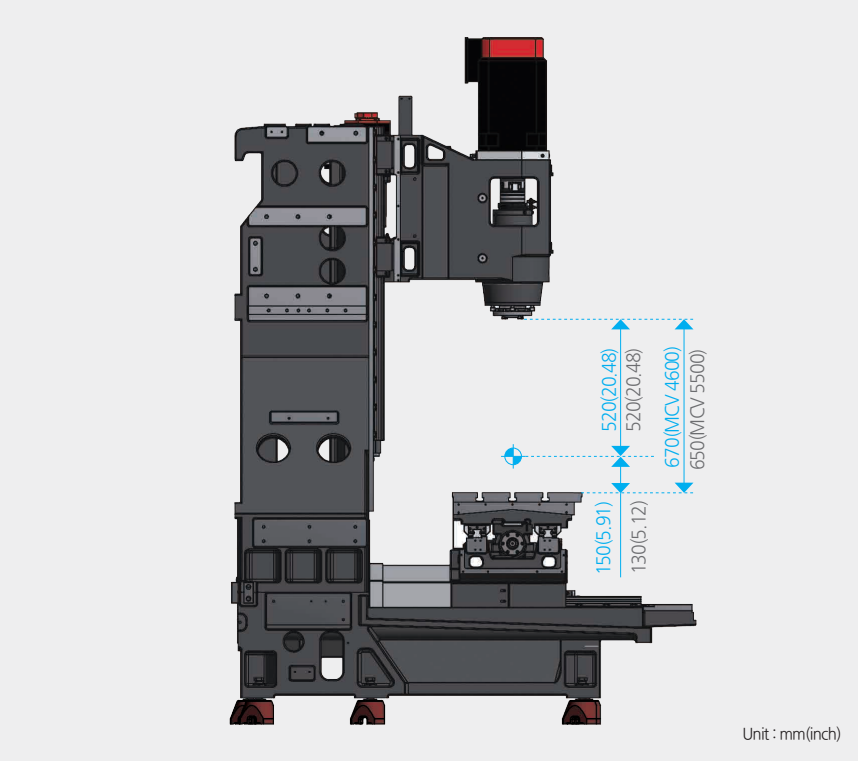
MCV 4600/5500

VERTICAL MACHINING CENTER

Machine Design



Model	Travel [mm (inch)]		
	X-axis	Y-axis	Z-axis
MCV 4600	900(35.44)	460(18.12)	520(20.48)
MCV 5500	1,050(41.34)	550(21.66)	520(20.48)



Unit : mm(inch)

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

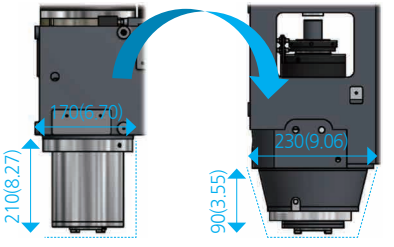
The longest-in-class 1,050mm X-axis stroke (MCV 5500) and the highly rigid saddle enables reliable machining of various materials and is suitable for long materials

Z-axis High Rigidity Arched Column

The arched column ensures high rigidity and high precision machining performance

Unit : mm(inch)

Quill-Type Head stock



High speed direct drive head
- high precision and efficient cooling operation

The standard quill-type head enables high speed, ultra precise machining while providing greater rigidity and minimizes thermal growth with forced heat dissipation

Spindle to table-top distance

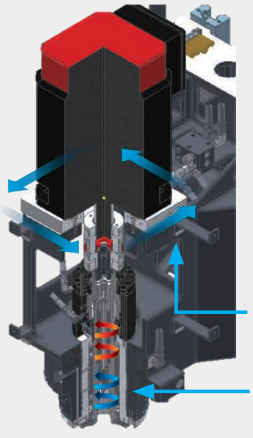
MCV 4600:**150~670**mm (5.91~26.38 inch)

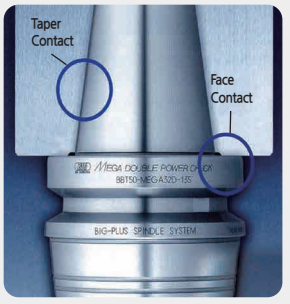
MCV 5500:**130~650**mm (5.12~25.60 inch)

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





Big Plus BBT40
(Simultaneous Dual Contact)

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.

Max spindle speed
12,000rpm

Power (Cont/Max)
11/22.2kW
(14.76/29.78 Hp)

Torque (Cont/Max)
70/141.4N·m
(51.63/104.30 lbs-ft)

JACKET Circulation Cooling

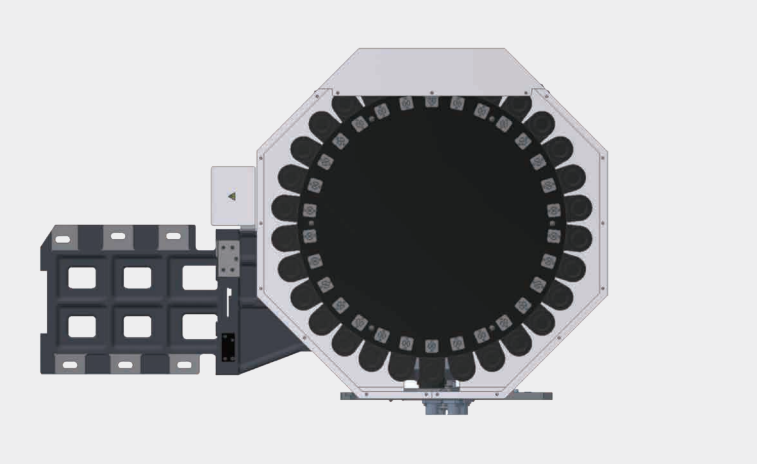
Semi-permanent grease lubrication applied to the bearings, while thermal growth is minimized using jacket circulation cooling around the bearing housing (a source of heat) via a Fan Cooler, ensuring stable performance and extending the lifetime of the spindle.

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

Tool-to-tool time : 1.3sec

Max. tool dia. [adjacent empty] :
80[125]mm (3.15[4.93]inch)

Max. tool length : 300mm (11.82 inch)

Max. tool weight : 8kg (17.64 lb)

Table

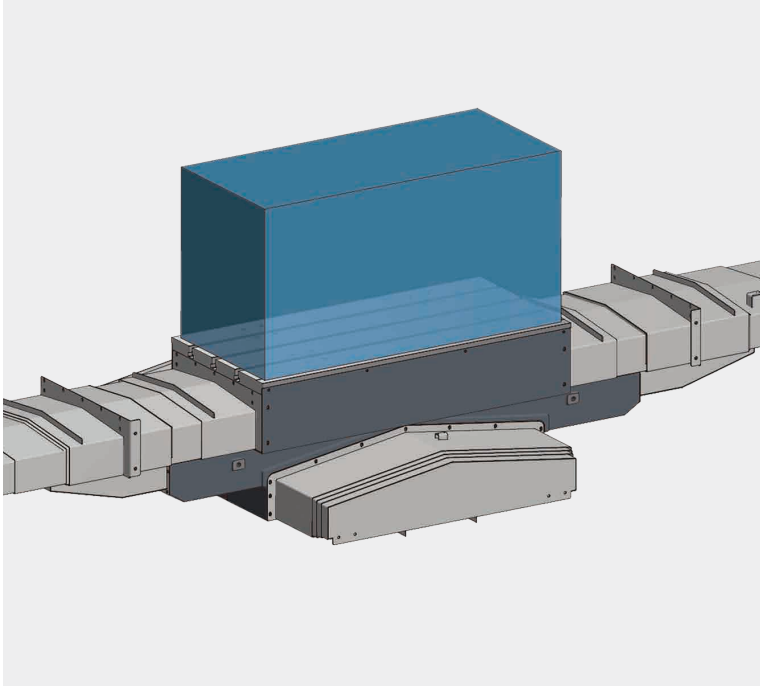


Table size and Table loading capacity were increased to support larger work area

Table size :

MCV 4600 : 1,050×460mm
(41.34×18.12 inch)

MCV 5500 : 1,200×540mm
(47.25×21.26 inch)

Table surface :

MCV 4600 : 18H8×p125×3ea
(0.71H8×p4.93×3ea)

MCV 5500 : 18H8×p125×4ea
(0.71H8×p4.93×4ea)

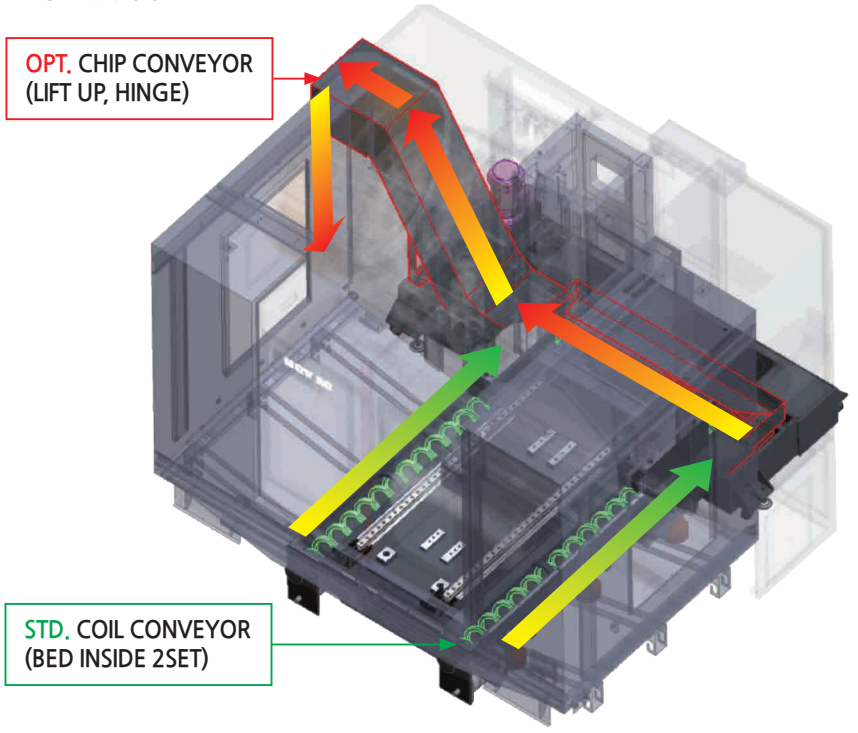
Table loading capacity :

MCV 4600 : 600kgf (1,322.78 lbs)

MCV 5500 : 800kgf (1,763.70 lbs)

Eco-Friendly Chip Disposal

MCV 5500



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

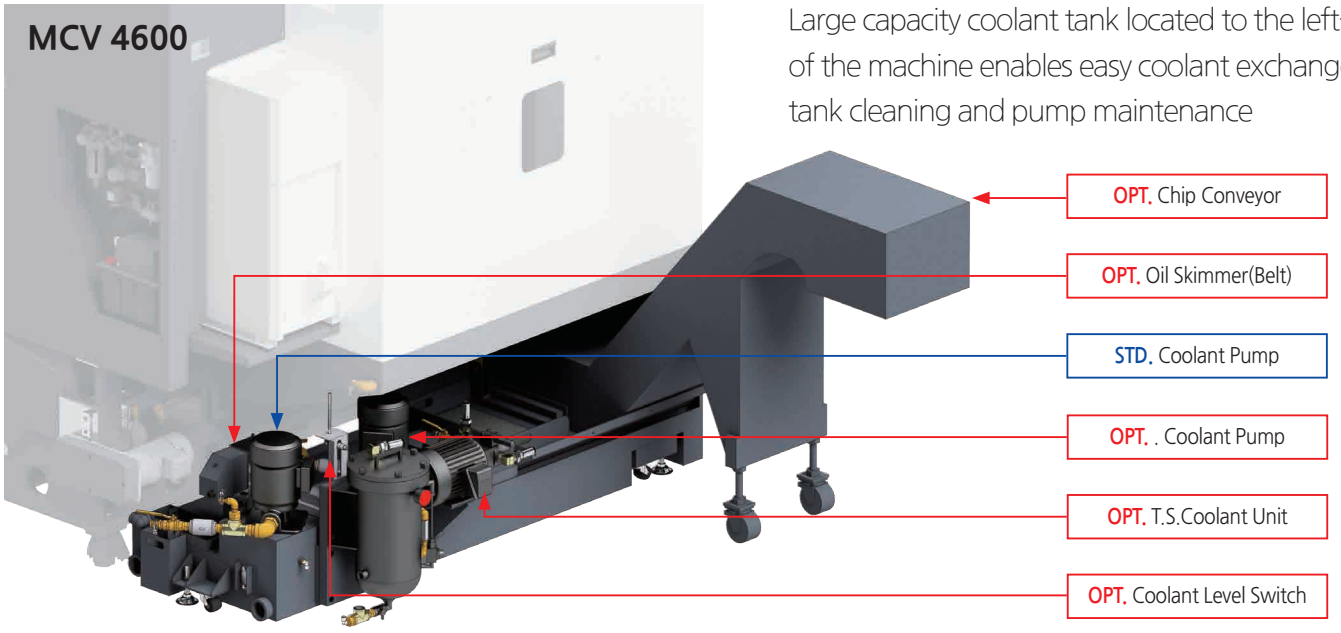
- the large, rectangular S/GUARD design and rear coolant tank ensures easy chip removal
- using bed flushing, complete chip disposal off the surface of the bed

MCV 4600 :
Side-type coolant tank

MCV 5500 :
Side-type and rear-type coolant tank available

Automated Coolant Supply

MCV 4600



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

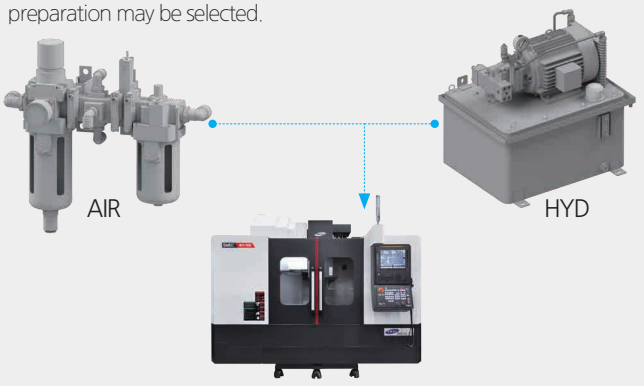
Coolant tank capacity :

MCV 4600 : 325ℓ (85.86 gal)
MCV 5500 : 365ℓ (96.43 gal)

Options

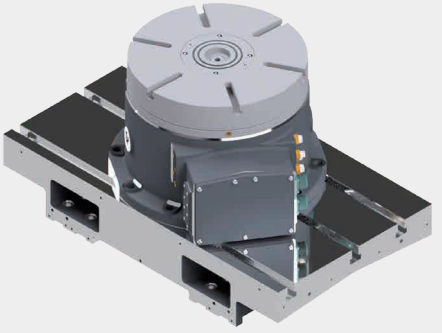
Rotary table and air/hyd fixture preparation

Components necessary for the installation of rotary table and fixtures may be added during assembly wherein hydraulic or pneumatic preparation may be selected.



NC rotary table

When using an NC rotary table, multi-axis machining of diverse shapes is possible.



Tool measurement probe

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

Measurement method : Touch probe
Repeatability : ± 1 ㎛

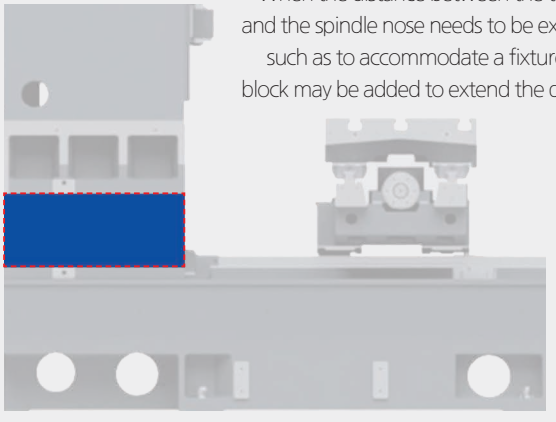
Measurement method : Non-contact
Repeatability : ± 0.1 ㎛
Min. tool detection : 0.03mm

Chip conveyor

Equipment meant to remove chips created during machining

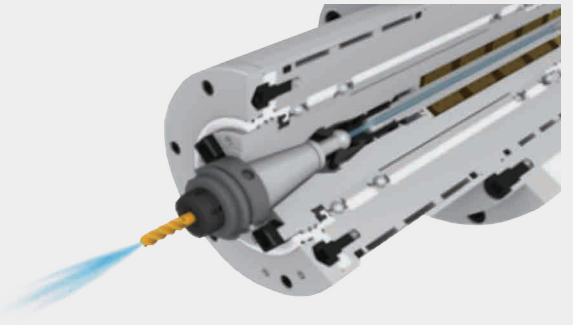
High column

When the distance between the table top and the spindle nose needs to be extended, such as to accommodate a fixture, a riser block may be added to extend the distance.



Through spindle cooling (TSC)

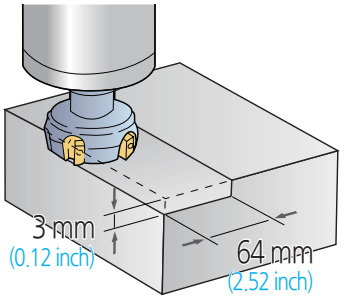
The TSC option may be added to improve machining effectiveness



Cutting performance

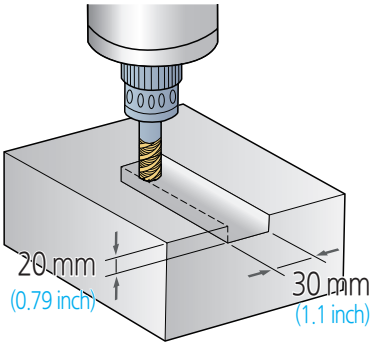
Face mill [Ø80mm (Ø3.15")] / Carbon steel (SM45C)

Chip removal rate [cm³/min(inch³/min)]	Spindle speed (r/min)	Feedrate [mm/min(ipm)]
432(26.37)	1,500	2,700(106.30)



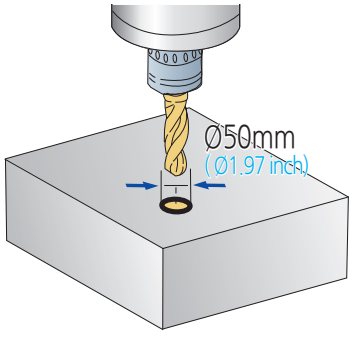
End mill [Ø30mm (Ø1.18")] / Carbon steel (SM45C)

Chip removal rate [cm³/min(inch³/min)]	ㅅSpindle speed (r/min)	Feedrate [mm/min(ipm)]
64.2(3.92)	223	107(4.22)



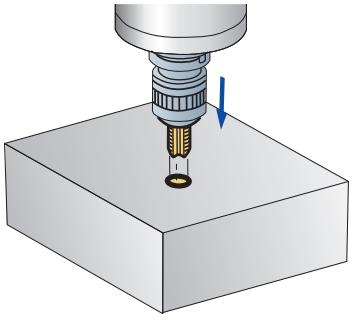
U-Drill [Ø50mm (Ø1.97")] / Carbon steel (SM45C)

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 [cm³/min(inch³/min)]	Spindle speed (r/min)	Tap size (mm)
547(33.38)	318	M27



TEST conditions : MCV 5500 - 12,000rpm [BT40]

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

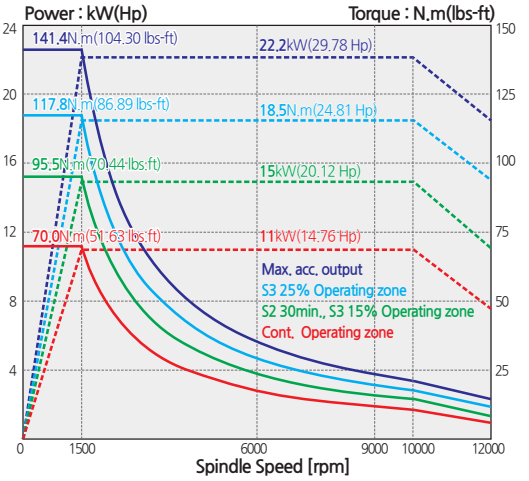
Spindle Power & Torque Diagram

MCV 4600/5500

Max Spindle Speed
12,000rpm

Power (Cont/Max)
11/22.2kW
(14.76/29.78 Hp)

Torque (Cont/Max)
70/141.4N·m
(51.63/104.30 lbs-ft)

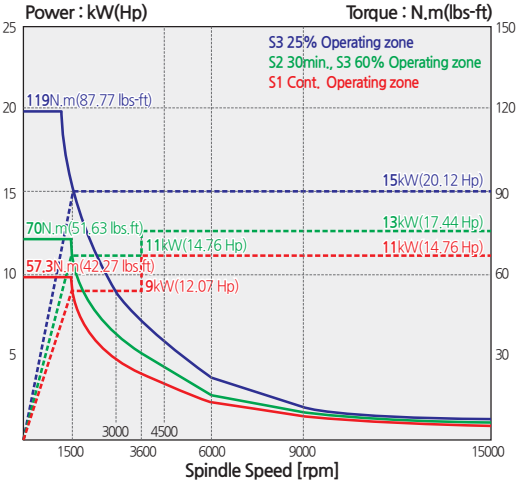


MCV 4600 (Optional)

Max Spindle Speed
15,000rpm

Power (Cont/Max)
11/15kW
(14.76/20.12 Hp)

Torque (Cont/Max)
57.3/119N·m
(42.27/87.77 lbs-ft)



MCV 5500 (Optional)

Max Spindle Speed
8,000rpm

Power (Cont/Max)
9/18kW
(14.76/20.12 Hp)

Torque (Cont/Max)
141.6/229.2N·m
(84.53/169.05 lbs-ft)

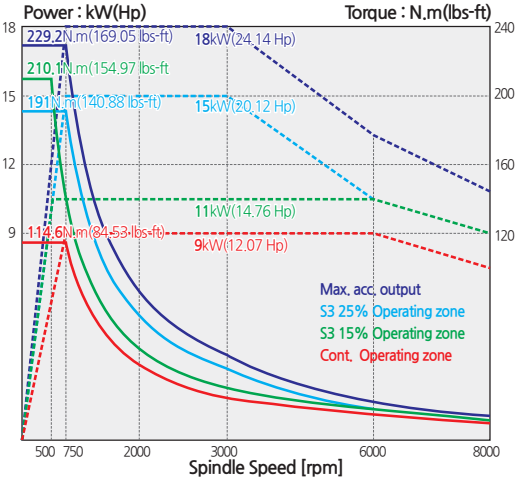


Table & T-Slot

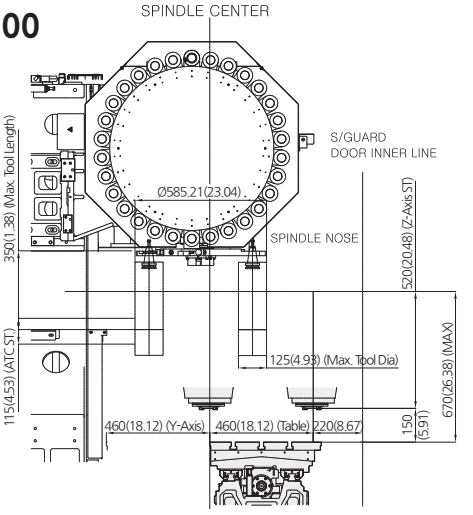
Unit : mm(inch)

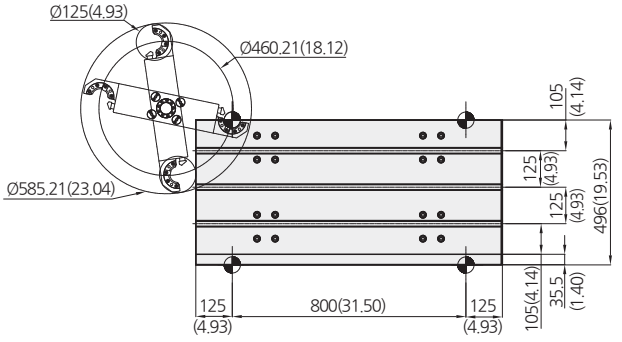
MCV 4600/5500

ATC Interference

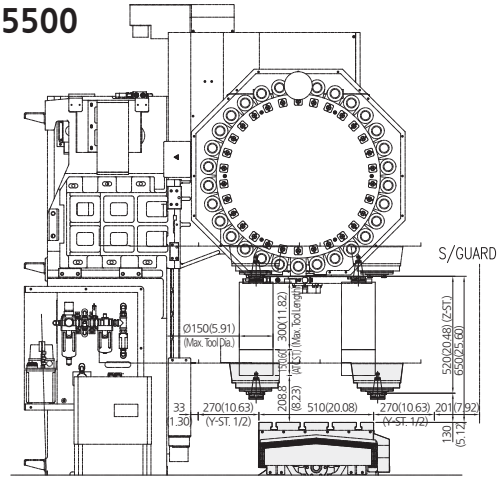
Unit : mm(inch)

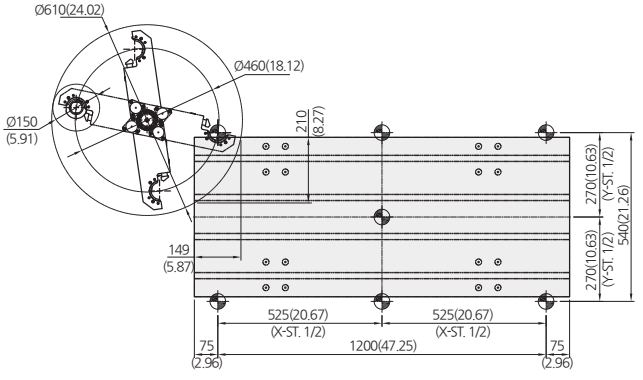
MCV 4600





MCV 5500

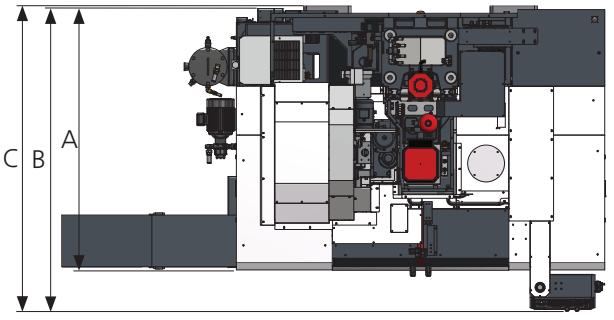




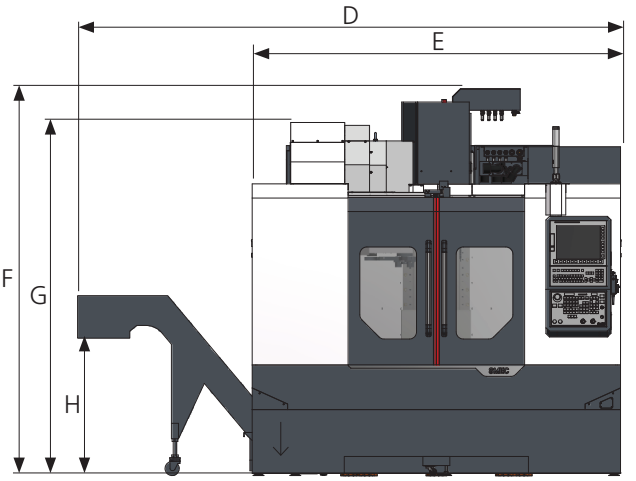
Machine Dimensions

Unit : mm(inch)

Top view

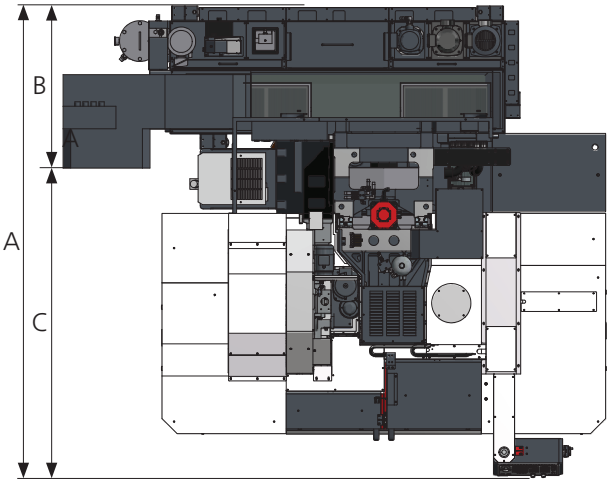


Front view

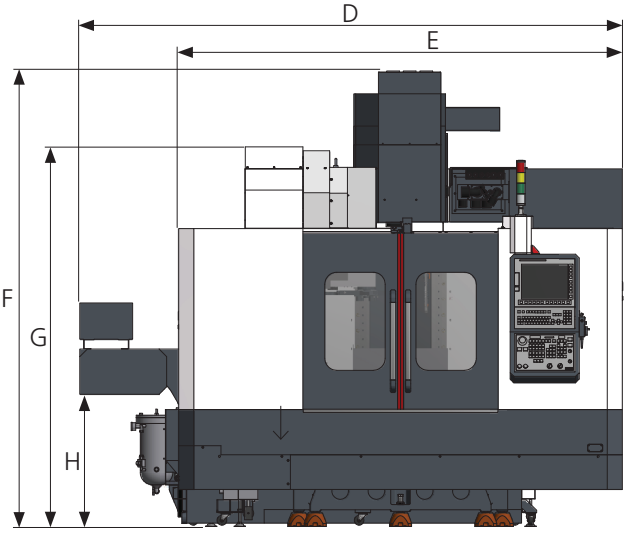


Model	A (Length)	B	C	D (Width)	E	F (Height)	G	H
MCV 4600	1,978 (77.88)	2,368 (93.23)	2,249 (88.55)	3,832 (150.87)	2,600 (102.37)	2,731 (107.52)	2,493 (98.15)	970 (38.19)

Top view



Front view



Model	A (Length)	B	C	D (Width)	E	F (Height)	G	H
MCV 5500	3,126 (123.08)	1,075 (42.33)	2,052 (80.79)	3,596 (141.58)	2,940 (115.75)	3,019 (118.86)	2,516 (99.06)	876 (34.49)

Standard / Optional

● : Standard ○ : Optional X : N/A

Category		MCV 4600	MCV 5500
Spindle			
RPM	12R	●	●
	15R	○	○
Spindle chiller		●	●
ATC			
Tool type	BBT40	●	●
	CAT40	○	○
	HSK-A63	X	X
Pull Stud	45°	●	●
Table & Column			
T-slot table		●	●
High column	200mm	○	○
	300mm	○	○
	400mm	X	X
Coolant Equipment			
FULL SPLASH GUARD		●	●
Shower coolant		○	○
Coolant gun		○	○
Bed flushing		○	○
Air gun		○	○
Air blow		○	○
Tool measurement air blow (with tool measuring device)		○	○
Internal screw conveyor		●	●
Chip conveyor, HINGE	Left	○	○
	Right	○	○
	Rear	X	X
Chip conveyor, SCRAPER	Left	○	○
	Right	○	○
	Rear	X	X
Chip bucket	STD (380ℓ)	○	○
	Rotating (200ℓ)	○	○
Electrical Equipment			
3 step patrol lamp & buzzer		●	●
Elec. cabinet light		○	○
Remote MPG		○	○
3-axis MPG		●	●
Work counter	GUI	●	●
Total counter	GUI	●	●
Tool counter	GUI	●	●
Multi counter	GUI	●	●
Residual current breaker		○	○
AVR (Auto Voltage Regulator)		○	○

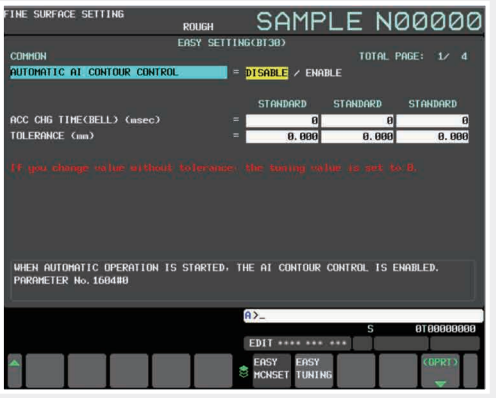
Category		MCV 4600	MCV 5500
Electrical equipment			
Transformer	50kVA	○	○
Auto Power Off		○	○
Power outage backup module		○	○
Z-axis drop prevention		●	●
Precision machining option			
AICC Ⅱ (AI Contour Control Ⅱ)		●	●
Jerk control		●	●
Smooth tolerance plus control		●	●
Machining condition selection function		●	●
Machining quality selection function		●	●
Data server		●	●
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	○	○
Coolant level detection		○	○
Environmental			
Air conditioner		○	○
Oil mist collector		○	○
Oil skimmer		○	○
Fixture & automation			
Auto door	STD	○	○
	High speed	X	X
Auto shutter		X	X
Operation sub-console		○	○
NC rotary table		○	○
NC rotary table interface		○	○
Rotary table control	+1 axis	○	○
	+2 axis	○	○
Add. M-code (4 sets)		○	○
Robot interface		○	○
I/O expansion		○	○
Hydraulic equipment			
Hydraulic unit for fixtures		○	○
Safety device			
Door interlock		●	●
KCs		●	●

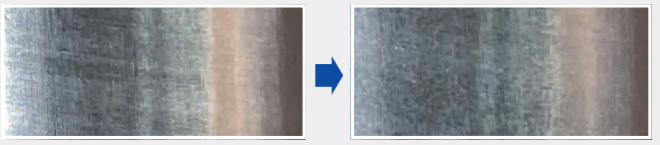
※ For detailed information, please contact your local SMEC dealer.

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	
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

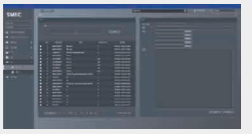
- Provides information about the operation status, speed, production alarms, etc. of each machine

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 IIoT solution

SMEC User Interface

Fanuc 0i MF Plus

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

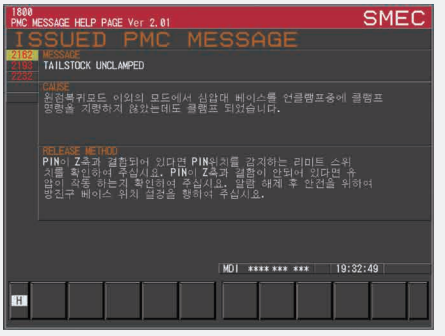
SMEC Custom S/W displayed using MDI's button or OP Panel's CUSTOM button

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

SMEC HMI

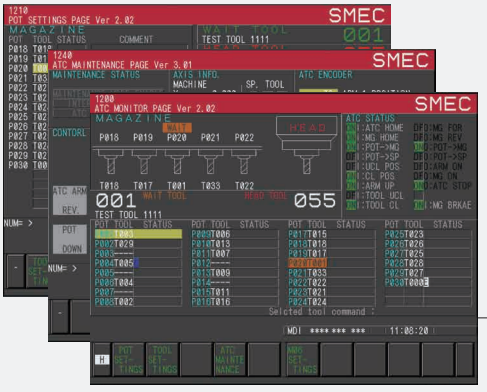
M/G-Code check function

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

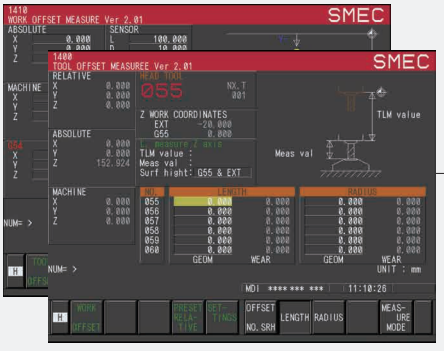


PMC alarm check function

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

MCV 4600/5500

VERTICAL MACHINING CENTER

Machine Specifications

Category			MCV 4600	MCV 5500
Travel	X-axis travel	mm(inch)	900(35.44)	1,050(41.34)
	Y-axis travel	mm(inch)	460(18.12)	550(21.66)
	Z-axis travel	mm(inch)	520(20.48)	520(20.48)
	Spindle to table surface	mm(inch)	150~670(5.91~26.38)	130~650(5.12~25.60)
Table	Table size	mm(inch)	1,050 × 460(41.34 × 18.12)	1,200 × 540(47.25 × 21.26)
	Table loading capacity	kgf(lb)	600(1,322.78)	800(1,763.70)
	Table surface	mm(inch)	18H8(0.71H8) T-slot × p125(4.93) × 3ea	18H8(0.71H8) T-slot × p125(4.93) × 4ea
Spindle	Spindle speed	rpm	12,000	12,000
	Power (Cont/Max)	kW(HP)	11 / 22.2(14.76/29.78)	11 / 22.2(14.76/29.78)
	Torque (Cont/Max)	N.m(lbs.ft)	70.1 / 141.4(51.63/104.30)	70.1 / 141.4(51.63/104.30)
Feedrate	X-axis rapid traverse rate	m/min(ipm)	36(1,417.33)	36(1,417.33)
	Y-axis rapid traverse rate	m/min(ipm)	36(1,417.33)	36(1,417.33)
	Z-axis rapid traverse rate	m/min(ipm)	30(1,181.11)	30(1,181.11)
	Cutting feed(X/Y/Z)	mm/min(ipm)	1-15,000(0.04-570.56)	1-15,000(0.04-570.56)
ATC	Tool shank	-	BBT40(CAT40)	BBT40(CAT40)
	Pull stud	-	MAS P40T-1	MAS P40T-1
	Tool storage capacity	ea	30	30
	Max tool diameter [adjacent empty]	mm(inch)	80(3.15)[125(4.93)]	80(3.15)[125(4.93)]
	Max tool length / weight	mm/kgf(inch/lb)	300/8(11.82/17.64)	300/8(11.82/17.64)
	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)	2,600[3,832] × 2,249 × 2,731 (102.37[150.87] × 88.55 × 107.52)	2,940[3,956] × 2,052 × 3,019 (115.75[155.75] × 80.79 × 118.86)
	Size [with REAR chip conveyor] L×W×H	mm(inch)	-	2,940 × 2,052[3,126] × 3,019 (115.75 × 80.79[123.08] × 118.86)
	Weight	kg(lb)	5,000(11,023.12)	6,700(14,770.98)
Coolant tank capacity		Liter(gal)	325(85.86)	365(96.43)
Electric power supply		kVA/V	30/220	32/220
Controller			FANUC 0i-MF Plus	

※ Design and specifications are subject to change without notice.

NC Specification / FANUC

● : STD ○ : Optional X : N/A

Category		0*i*-MF Plus
Controlled axis	Controlled axes	X, Y, Z
	Max simultaneously controlled axes	4
	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
	Retraction for rigid tapping	●
Interpolation function	Linear interpolation	G01
	Circular interpolation	G02, G03
	Dwell	G04
	Cylindrical interpolation	G70.1
	Skip	G31
	Fine surface machining	●
	Smooth tolerance control	●
	Nano smoothing	●
	Polar coordinate interpolation	X
	Reference position (zero) return	G28
	Reference position (zero) return check	G27
	2nd, 3rd, 4th reference point return	G30
Feed function	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
	Look ahead block expansion (F31i)	X
	Jerk Control	●
Spindle function	Spindle orientation	●
	Rigid tapping	M29
	Spindle override	50 ~ 150%
Tool function	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	●

Category		0*i*-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	1,000EA
	Manual guide i	●
	Manual guide 0i	○

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