SMEC

PCV 430/460

LM GUIDE TYPE
VERTICAL MACHINING CENTER

PCV Series

PCV 430
PCV 460

SMEC

- 1988 - Started as Samsung Heavy Industries Machine Tools Business
- 1989 - Horizontal and vertical machining center technology partnership with OKK Japan
- 1991 - Turning center and vertical machining center technology partnership with Mori Seiki
- 1996 - 5-sided processing center technology partnership with Toshiba
- 1999 - Spun out from Samsung Aerospace Industries and established SMEC Co., Ltd

Samsung
Machine Tools
Engineering
Company

High Efficiency

Enhanced high-speed machining significantly reducing non-cutting time

High Rigidity

Ensuring customer satisfaction and trust with high precision, high quality machining

PCV Series

PCV 430/460

Offering high speed, high precision machining in a compact design with the best in class performance to cost ratio.

- Easy to use and easy to maintain design
- highy rigid, single piece bed designed for low center of gravity
- widest in class Roller Type LM Guide saddle to prevent overhang
- high speed, high rigidity direct-coupled spindle

		PCV 430	PCV 460
Travel (X/Y/Z)	inch	27.56/16.93/20.08	27.56/18.12/20.08
Table size	inch	29.53 × 16.54	29.53 × 16.54
Table loading capacity	lb	1,234.59	1,234.59
Table surface	inch	0.71H8 × p4.93 × 3ea	0.71H8 × p4.93 × 3ea
Max. spindle speed	rpm	10,000	15,000
Tool-to-tool time	sec	1.3	1.3
Rapid traverse (X/Y/Z)	ipm	1,889.77/1,887.77/1,417.33	1,889.77/1,887.77/1,417.33
Tool storage capacity	EA	24	24

Economic

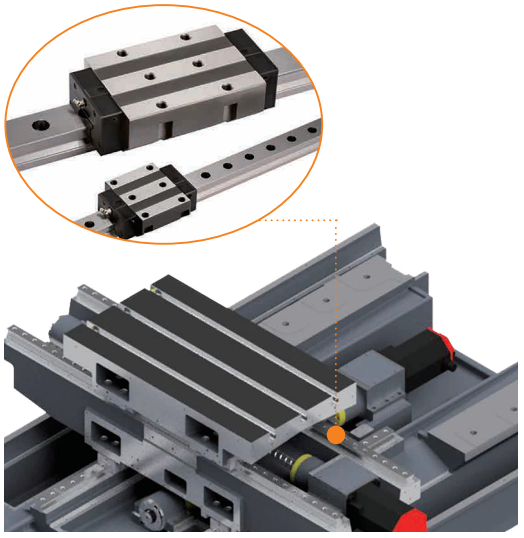
Best cost effective solution
with best performance to cost

Efficient Machining

Most compact in class design for
greatest machining efficiency

High Efficiency

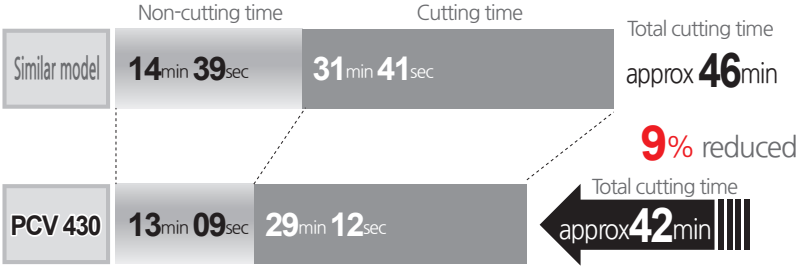
Rapid traverse(X/Y/Z axis)
1,889.77/1,887.77/1,417.33ipm



Roller type LM guide way

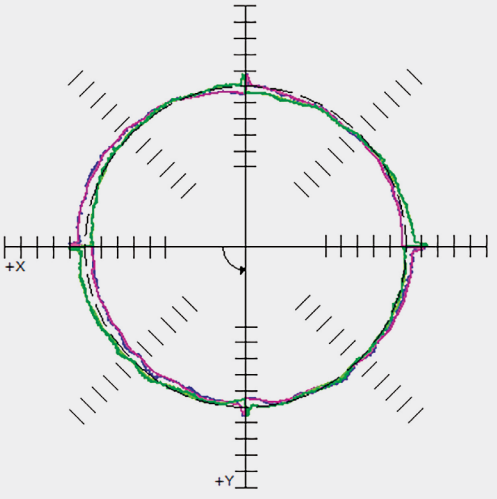
Highly responsive Roller Type LM Guideways offer superior rapid traverse speeds, reducing non-cutting time while minimizing noise during operation.

- high speed, high rigidity, enhanced durability
- compared to Ball Type LM Guides, it offers improved wear resistance, precision travel and product lifetime



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

Rigidity



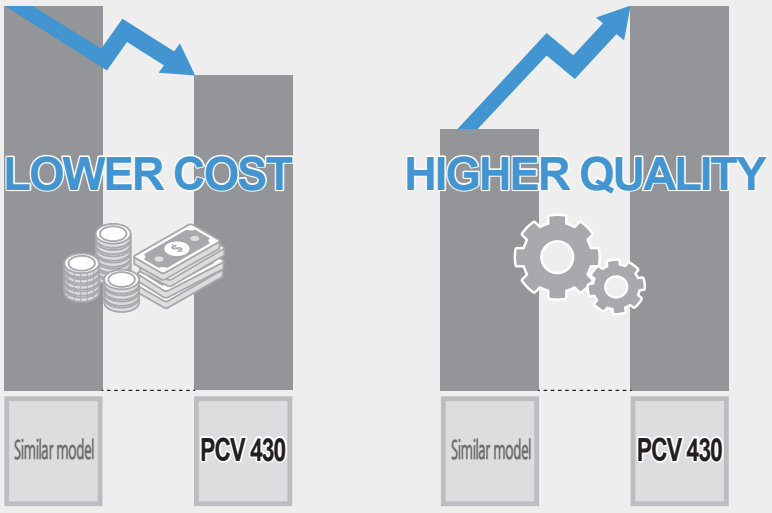
High precision design offers high precision cutting quality

- highy rigid, single piece bed design for low center of gravity
- widest in class Roller Type LM Guide saddle to prevent overhang
- high speed, high rigidity direct-coupled spindle

Roundness
3.32μm

Feedrate
39.38ipm

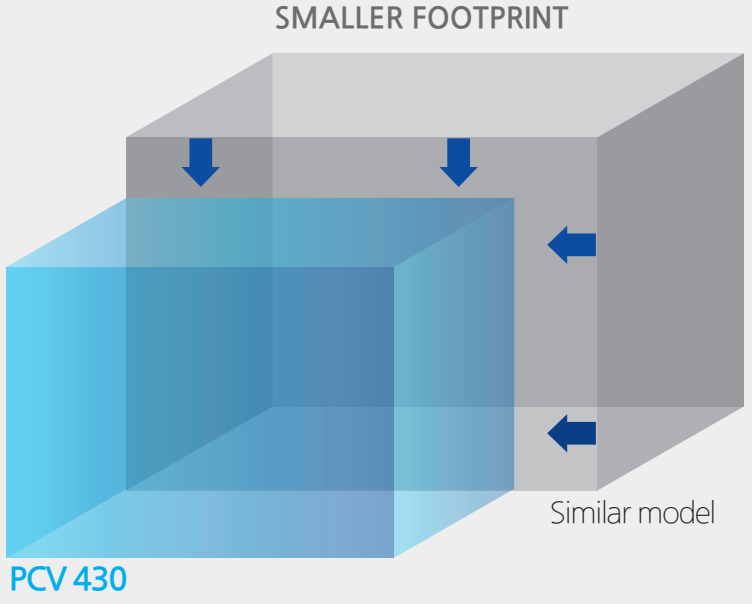
Economic



"12% more cost effective than similar model"

By optimizing performance compared to its cost, it offers the most cost effectiveness in its class with its enhanced cost efficiency.

Space Efficiency



"14% more space efficient than similar model"

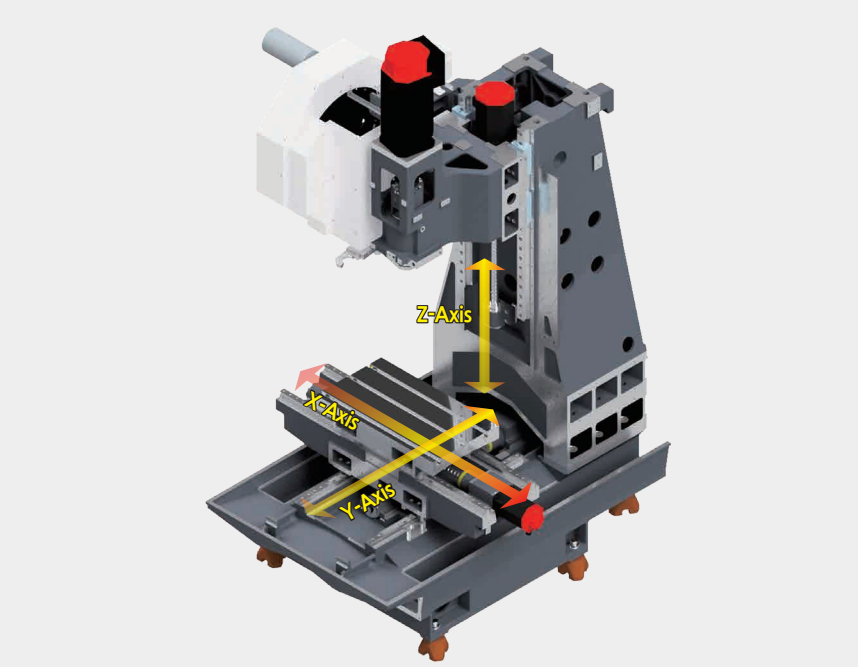
Compact design

- minimized installation footprint with compact design
- effective chip discharge design
- centralized OP panel for operator convenience
- more units can be installed in the same factory floorspace

PCV 430/460

VERTICAL MACHINING CENTER

Machine Design



Model	Travel (inch)		
	X-axis	Y-axis	Z-axis
PCV 430	27.56	16.93	20.08
PCV 460	27.56	18.12	20.08

Direct-coupled spindle for high speed, high precision
Through-spindle coolant (TSC) ready head assy design with TSC ready spindle and TSC coolant unit.

Z-axis column & headstock

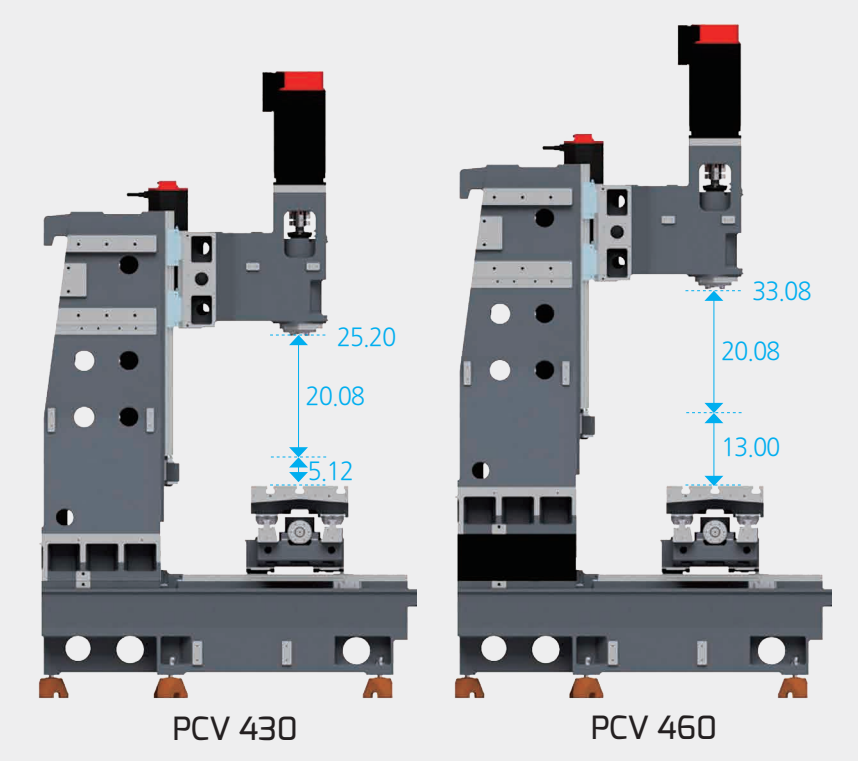
Highly rigid column and wide guideway span, ensures high spindle rigidity during heavy machining

X-axis saddle & table

Saddle with wide guideway span enables highly rigid machining over long periods of time

Bed & saddle

Highly rigid, single-piece bed designed for low-center of gravity with widest in class saddle span to prevent overhang



Spindle to table-top distance

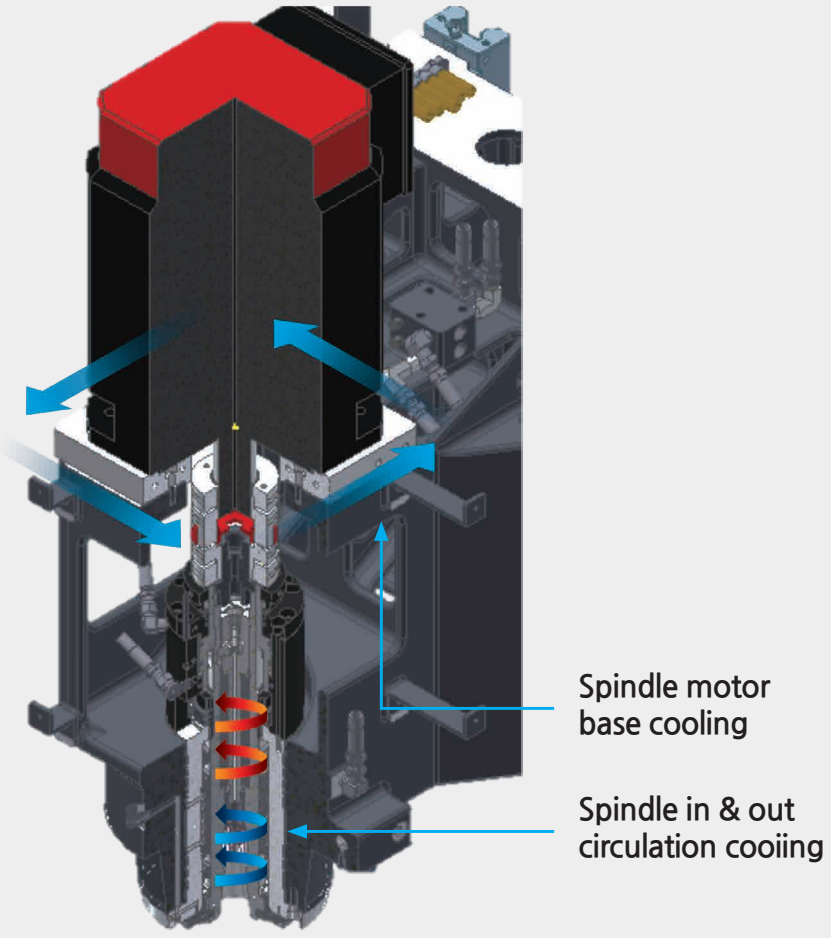
PCV 430

5.12~25.20 inch

PCV 460

13.0~33.08 inch

Spindle



JACKET Circulation Cooling

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

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.

10,000rpm Motor

Spindle Power(Cont/Max)

14.76/27.36HP

Spindle Torque(Cont/Max)

38.73/95.89lbs.ft

※PCV 430 standard specifications

15,000rpm Motor

Spindle Power(Cont/Max)

14.76/20.12HP

Spindle Torque(Cont/Max)

42.27/87.77lbs.ft

※PCV 430 standard specifications

ATC / Magazine

ATC Magazine

Designed with a standard 24 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 : 24 EA

Tool-to-tool time : 1.3 secs

Max. tool dia.(adjacent empty) : 3.15(4.93) inch

Max. tool length : 11.82 inch

Max. tool weight : 17.64 lbs

Table

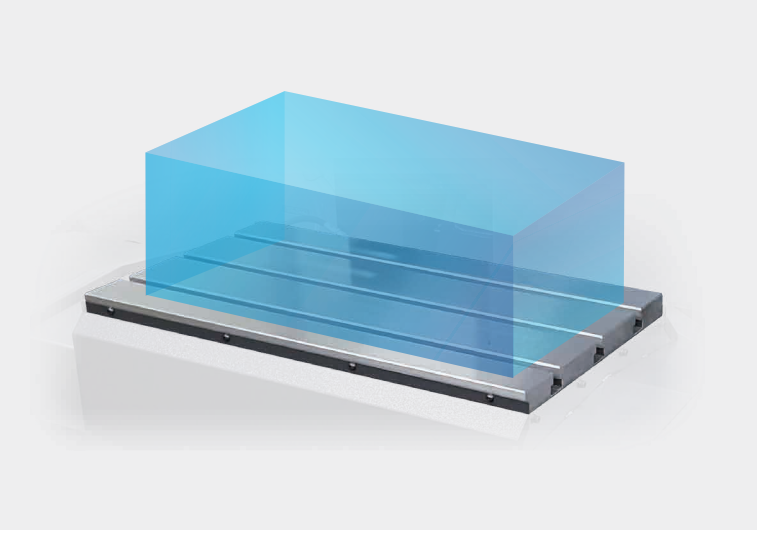


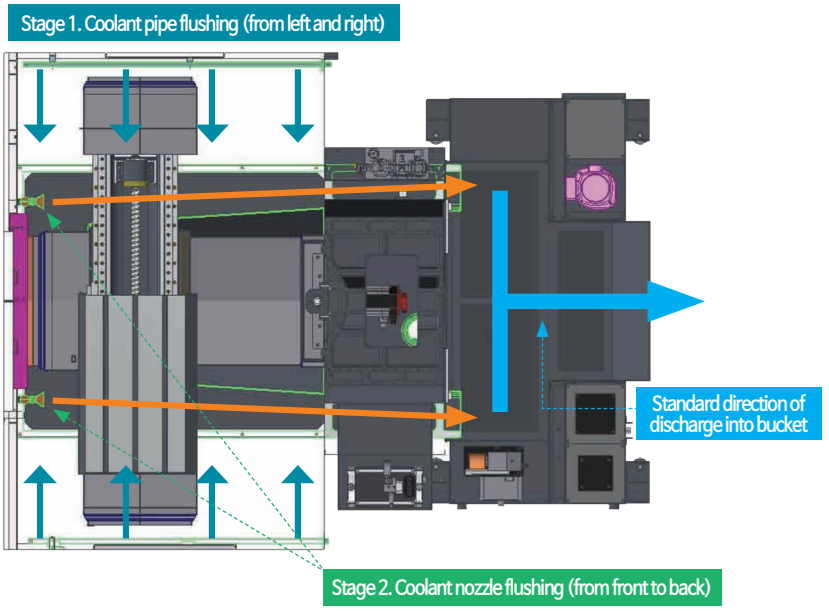
Table size and Table loading capacity were increased to support larger work area

Table size : 29.53×16.54 inch

Table surface : 0.71H8×p4.93×3 ea

Table loading capacity : 1,234.59 lbs

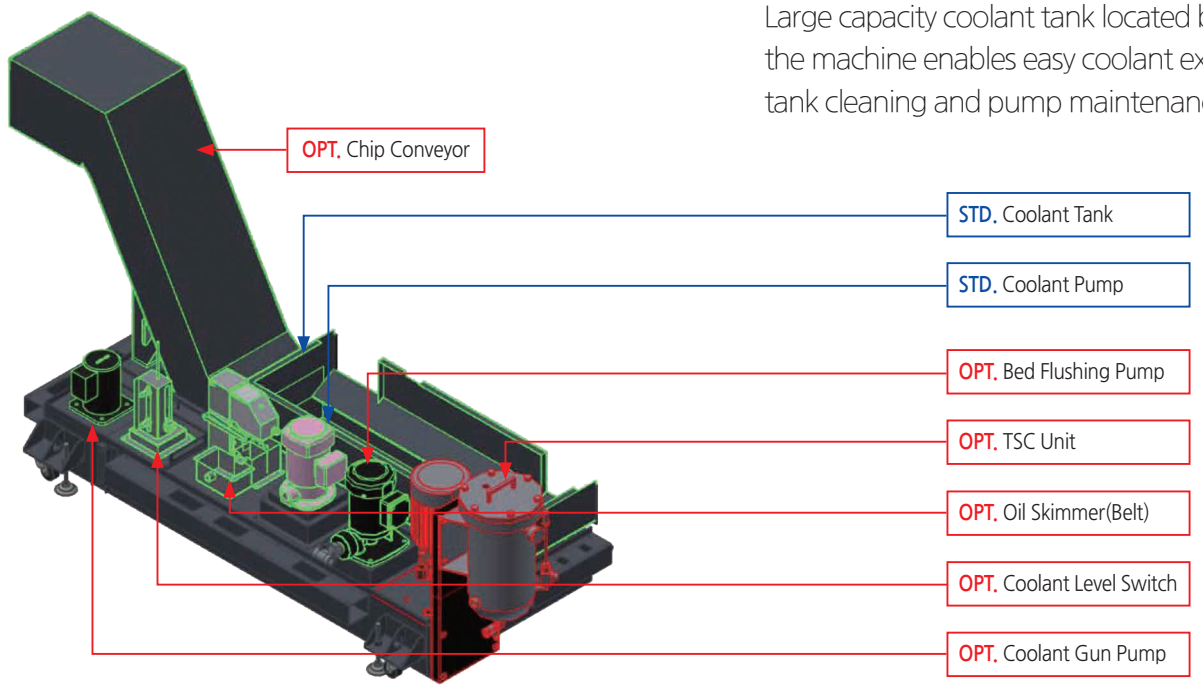
3-Stage Chip Disposal



Complete chip discharge through the series of chip disposal processes by the coolant pipe, coolant nozzle 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 (optional, PCV 460 not available)
- the left-side lift-up chip conveyor easily removes chips away from the tank for operator convenience (optional, PCV 460 not available)

Automated Coolant Supply



Large capacity coolant tank located behind the machine enables easy coolant exchange, tank cleaning and pump maintenance

Coolant tank capacity : 63.41 gallons(PCV 430)
76.61 gallons(PCV 460)

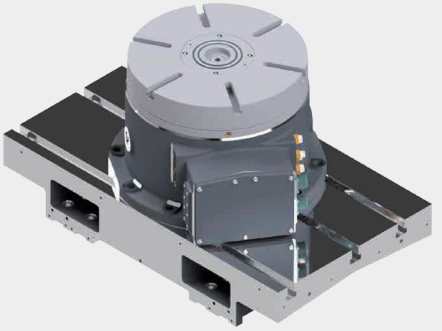
Options

Spindle Oil Cooler

For long-term high speed continuous operation, an oil cooler may be installed. This system circulates cooled oil around the spindle bearings preventing spindle thermal growth and enabling high precision machining.

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.



Tool Measurement Probe

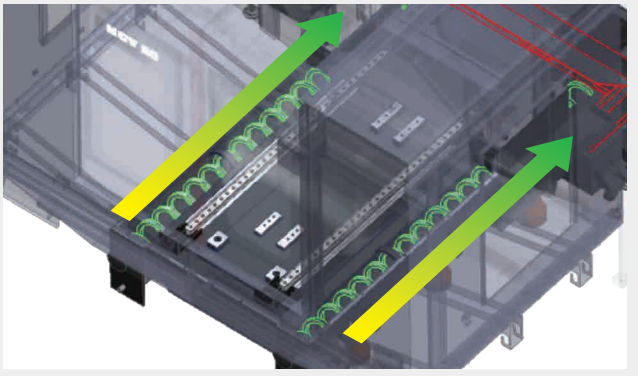
Various automated tool diameter, length and lifetime measuring devices may be installed.

Measurement method : Touch probe
Repeatability : ± 1 ㎛

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

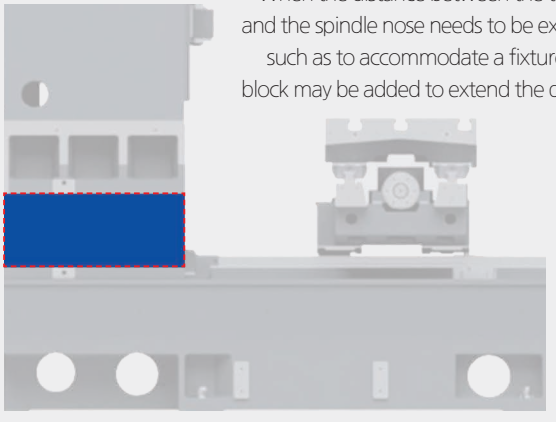
Internal Coil Conveyor

Coil conveyors may be added to enhance chip and coolant discharge



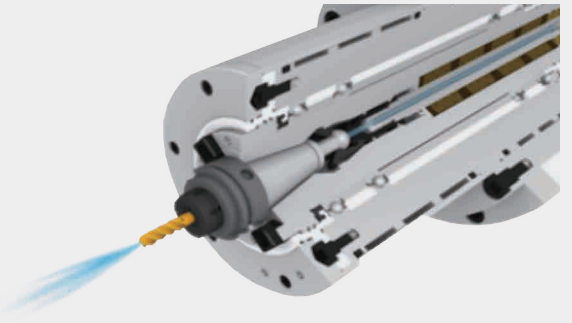
High Column

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)

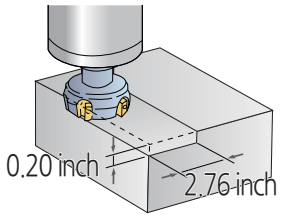
The TSC option may be added to improve machining effectiveness



Cutting Performance

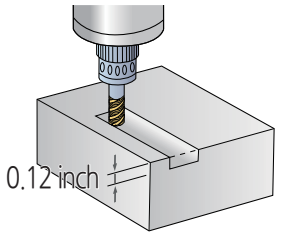
Face mill (ø3.15inch) / Carbon steel (SM45C)

Chip removal rate (inch³ /min)	Spindle speed (r/min)	Feedrate (ipm)
13.78	1,500	39.38



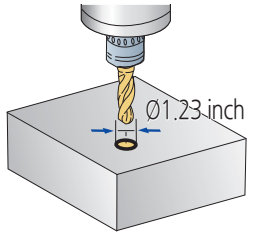
End mill (ø0.79inch) / Carbon steel (SM45C)

Chip removal rate (inch³ /min)	Spindle speed (r/min)	Feedrate (ipm)
3.63	2,546	60.16



U-Drill (ø1.22inch) / Carbon steel (SM45C)

Cutting rate (inch³ /min)	Spindle speed (r/min)	Feedrate (ipm)
8.43	1,233	11.19



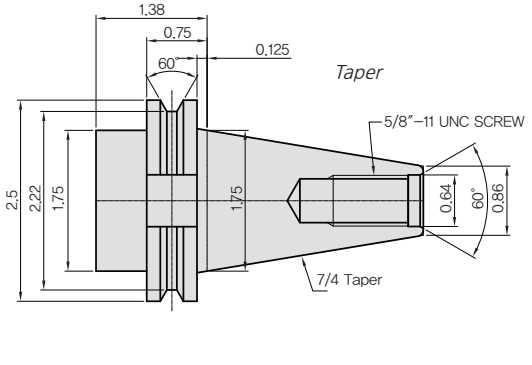
TEST conditions : 10,000rpm [BT40 14.76/20.12(15min) / 24.81/27.36(Max)HP]

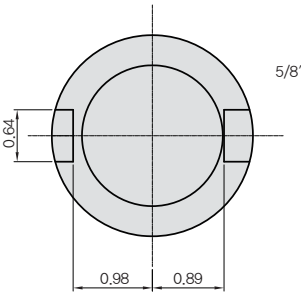
※ The above data is based on internal testing.
Values may change depending on cutting conditions.

Tool Shank

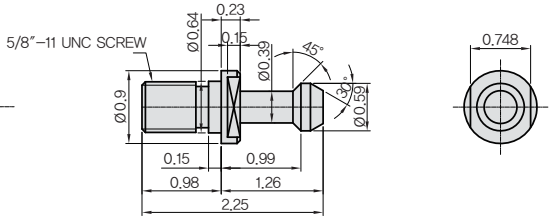
Unit : inch

CAT40





PULL STUD

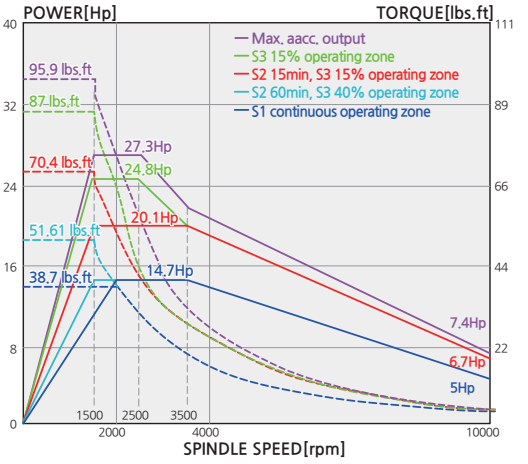


Spindle Power & Torque Diagram

10,000rpm Motor

Spindle Power(Cont/Max)
14.76/27.36HP

Spindle Torque(Cont/Max)
38.73/95.89lbs.ft



15,000rpm Motor

Spindle Power(Cont/Max)
14.76/20.12HP

Spindle Torque(Cont/Max)
42.27/87.77lbs.ft

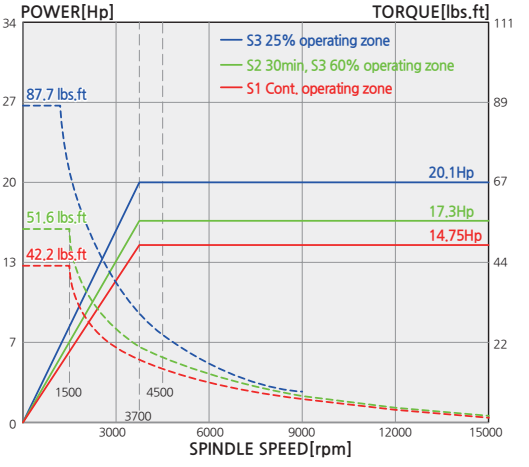
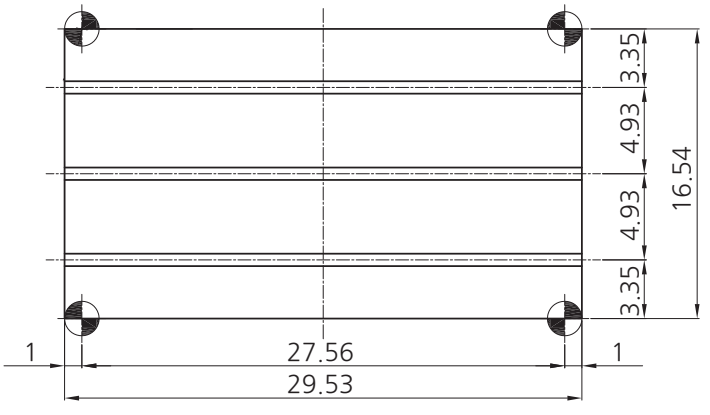
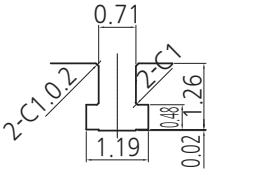


Table & T-Slot

Unit : inch



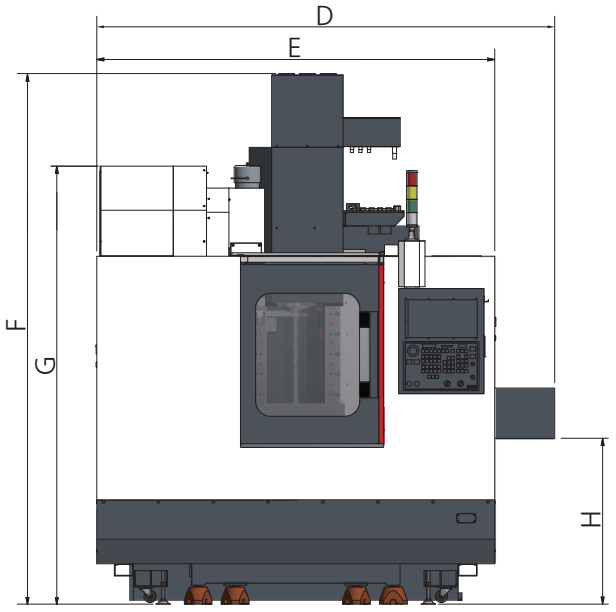


Detail T-Slot (S,3/1)

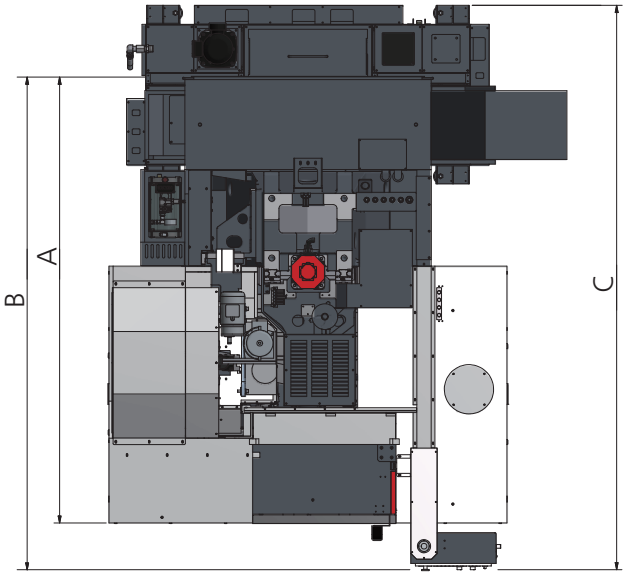
Machine Dimensions

PCV 430

Unit : inch

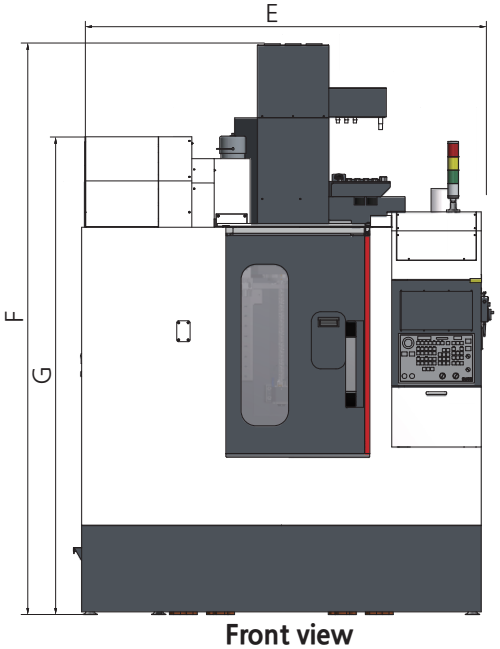


Front view

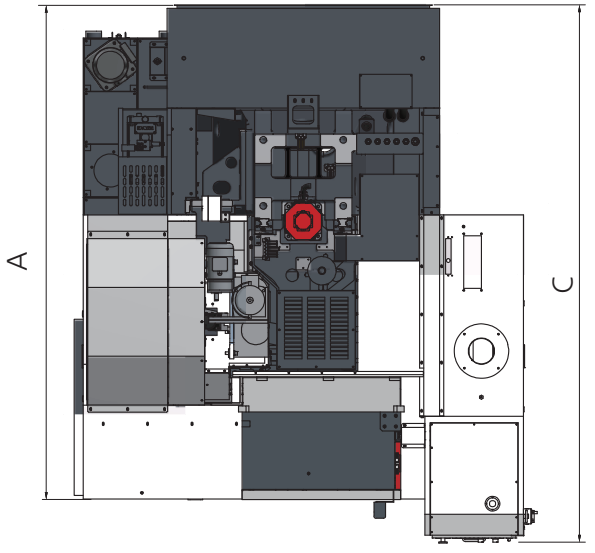


Top view

PCV 460



Front view



Top view

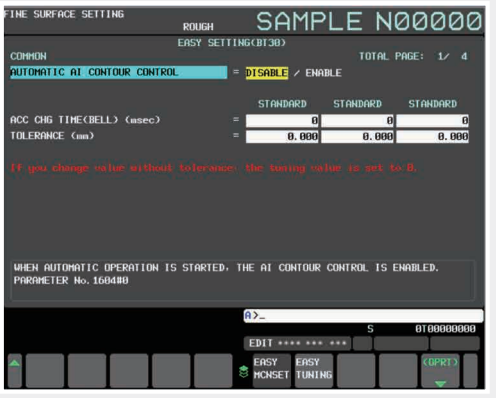
※ Chip conveyor not available for PCV 460

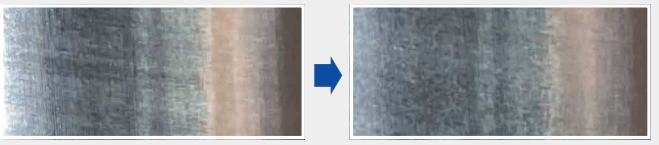
Model	A [Length]	B [Length(incl OP Panel)]	C [Length (max)]	D [Width (incl C/C)]	E [Width]	F [Height (max)]	G [Height (for boxing)]	H [Height of C/C discharge port]
PCV 430	92.84	102.54	117.31	107.41	82.68	110.30	91.71	34.49
PCV 460	92.84	-	100.93	X	82.68	118.17	99.58	X

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

10.4 inch LCD monitor standard	Screen size increased from 8.4 inch to 10.4 inch
AICC II (AI Contour Control II)	Efficient accel/decelaration (200 block look ahead)
Jerk control	Speed control during acceleration changes
Smooth tolerance plus control	Stable curved shape forming
Machining quality selection function	Adjust accuracy level according to machining conditions
Part rogram 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

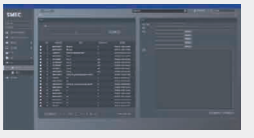
- Provides information about the operation status, speed, production alarms, etc. of each machine

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

Fanuc 0i MF Plus

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

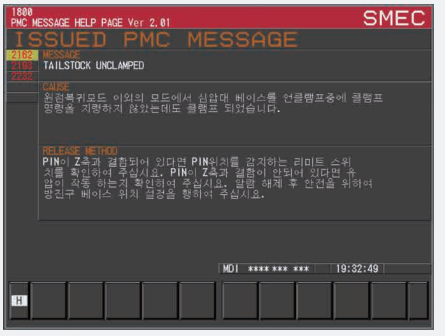
SMEC Custom S/W displayed using MDI's button or OP Panel's CUSTOM button

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

SMEC HMI

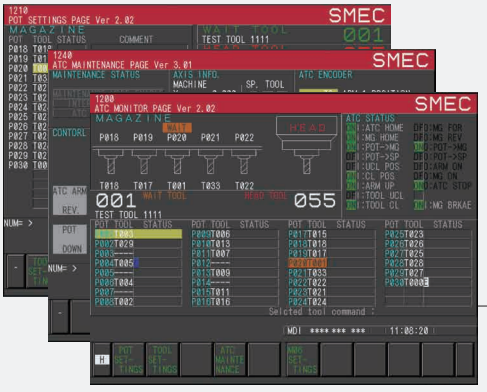
M/G-Code check function

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

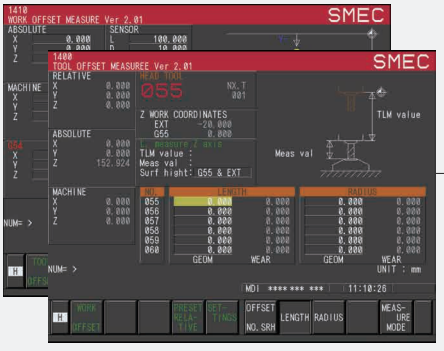


PMC alarm check function

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

PCV 430/460

VERTICAL MACHINING CENTER

Standard / Optional

● : Standard ○ : Optional X : N/A

Category		PCV 430	PCV 460
Spindle			
RPM	10R	●	○
	15R	○	●
Spindle chiller		○	●
ATC			
Tool type	BBT40	○	○
	HSK-A63	X	X
	CAT40	●	●
Pull Stud	45°	●	●
Table & Column			
APC		X	X
T-slot table		●	●
NC rotary table		○	○
High column	200mm	○	●
	300mm	○	X
	400mm	○	X
Coolant Equipment			
Top cover		X	X
Shower coolant		○	○
Coolant gun		○	○
Bed flushing		○	○
Air gun		○	○
Air blow		○	○
Tool measurement air blow (with tool measuring device)		○	○
Screw conveyor		○	○
Chip conveyor, HINGE (rear-type)	Left	○	X
	Right	○	X
	rear	X	X
Chip conveyor, SCRAPER (rear-type)	Left	○	X
	Right	○	X
Chip bucket	STD (380ℓ)	○	X
	Rotating (200ℓ)	○	X
Electrical Equipment			
3 step patrol lamp & buzzer		●	●
Elec. cabinet light		○	○
Remote MPG		○	○
3-axis MPG		●	●
Work counter	Digital	○	○
Total counter	Digital	○	○
Tool counter	Digital	○	○
Multi counter	Digital	○	○
Residual current breaker		○	○

Category		PCV 430	PCV 460
Electrical equipment			
AVR (Auto Voltage Regulator)		○	○
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 quality selection function		●	●
Convenience			
Manual guide i		○	○
Measurement			
Workpiece contact check device	TACO	○	○
	SMC	○	○
Auto tool measuring device		○	○
Tool breakage detection		○	○
Linear scale	X-axis	○	X
	Y-axis	○	X
	Z-axis	○	X
Coolant level detection		○	○
Environmental			
Air conditioner		○	○
Oil mist collector		○	○
Oil skimmer		○	○
Fixture & automation			
Auto door	STD	○	X
	High speed	X	X
Auto shutter		X	X
Operation sub-console		○	○
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 dervice			
Door interlock		●	●
KCs		●	●

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

Machine Specifications

[ ] : Optional

Category			PCV 430	PCV 460
Travel	X-axis travel	inch	27.56	27.56
	Y-axis travel	inch	16.93	18.12
	Z-axis travel	inch	20.08	20.08
	Spindle to table surface	inch	5.12~25.20	13.00~33.08
Table	Table size	inch	29.53 × 16.54	29.53 × 16.54
	Table loading capacity	lb	1,234.59	1,234.59
	Table surface	inch	0.71H8 × p4.93 × 3ea	0.71H8 × p4.93 × 3ea
Spindle	Spindle speed	rpm	10,000 [15,000]	15,000
	Power (Cont/Max)	HP	14.76/27.36	14.76/20.12
	Torque (Cont/Max)	lbs.ft	38.73/95.89	42.27/87.77
Feedrate	X-axis rapid traverse rate	ipm	1,889.77	1,889.77
	Y-axis rapid traverse rate	ipm	1,889.77	1,889.77
	Z-axis rapid traverse rate	ipm	1,417.33	1,417.33
	Cutting feed (X/Y/Z)	ipm	0.0394~590.56	0.0394~590.56
ATC	Tool shank	-	CAT40 (BT40)	CAT40 (BT40)
	Pull stud	-	MAS P40T-1	MAS P40T-1
	Tool storage capacity	ea	24	24
	Max tool diameter (adjacent empty)	inch	3.15(4.93)	3.15(4.93)
	Max tool length / weight	inch/lb	11.82(17.64)	11.82(17.64)
	Tool-to-tool time	sec	1.3	1.3
	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	inch	129.45 × 82.68(107.41) × 110.30	100.93 × 82.68 × 118.17
	Size (with REAR chip conveyor) L×W×H	inch	-	-
	Weight	lb	9,920.81	10,361.73
	Coolant tank capacity	gal	63.41	76.61
Electric power supply		kVA/V	32/220	32/220
Controller			FANUC 0i-MF Plus	

※ Design and specifications are subject to change without notice.

NC Specification / FANUC

● : STD ○ : Optional ( ) : Option 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	X
	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)	OPT(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	●

NC Specification / FANUC

● : STD ○ : Optional ( ) : Option X : N/A

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	10.4" color 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 0i	○
	Manual guide i	○

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