SMEC

LCV 6700

BOX GUIDE TYPE
VERTICAL MACHINING CENTER

LCV 6700

LCV 6700(BT50)
LCV 6700(BT40)

SMEC

High precision, high rigidity design

The box guideways ideal for heavy duty machining provide superb machining stability

Diverse spindle lineup

Various spindles available to match the material to be machined

Box Guide Type Vertical Machining Center

LCV 6700

Best-in-class machining power and precision with its low center of gravity design

- Low center of gravity design prevents vibration, minimizes thermal growth, and provides high rigidity
- Superb feed performance through the application of box guideways on all axes
- Non-cutting time significantly reduced for high productivity
- Diverse spindle lineup offered with high speed, high precision DIRECT TYPE SPINDLE (8,000/12,000rpm), and GEAR TYPE SPINDLE (6,000rpm)
- Enhanced operator ease of use with the standard large-screen OP Panel

Category		LCV 6700(BT50)	LCV 6700(BT40)
Travel (X/Y/Z)	mm (inch)	1,350/670/650 (53.15/26.38/25.60)	1,350/670/650 (53.15/26.38/25.60)
Table size	mm(inch)	1,550×670(61.03×26.38)	1,550×670(61.03×26.38)
Table loading capacity	kgf(lb)	1,000(2,204.63)	1,000(2,204.63)
Max. spindle speed	rpm	Direct : 8,000 | Gear : 6,000	Direct : 12,000
Spindle motor (cont/max)	kW (Hp)	Direct : 11/18.5 | Gear : 15/18.5 (Direct : 14.76/24.81 | Gear : 20.12/24.81)	Direct : 11/22.2 (Direct : 14.76/29.78)
Tool-to-tool time	sec	2.45	1.3
Rapid traverse (X/Y/Z)	m/min (ipm)	30/30/24 (1,181.11/1,181.11/944.89)	30/30/24 (1,181.11/1,181.11/944.89)
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

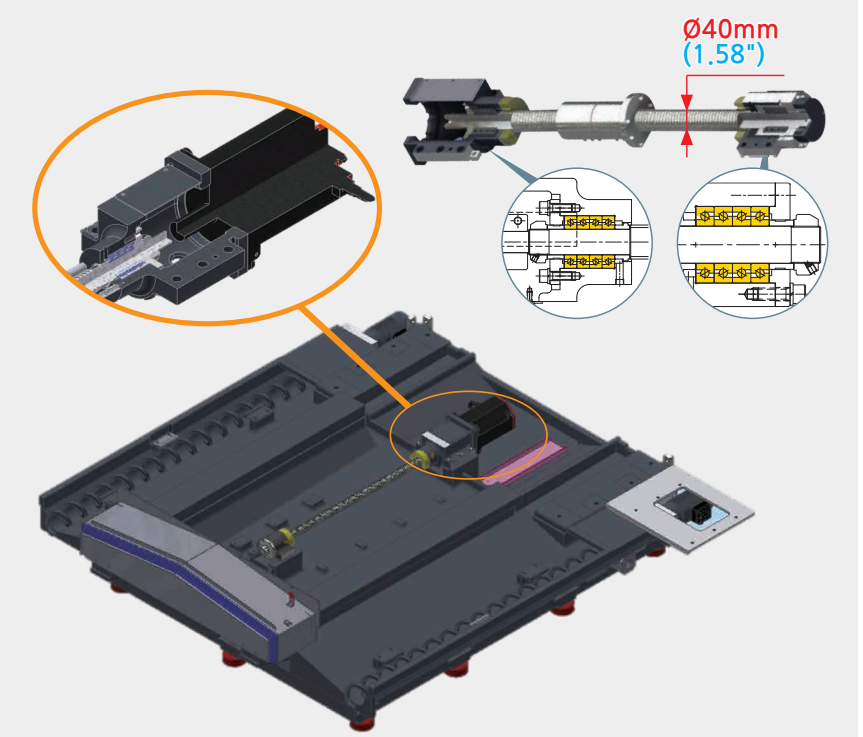
Operator Convenience

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

LCV 6700

VERTICAL MACHINING CENTER

High precision, high rigidity design



The box guideways ideal for heavy duty machining provide superb machining stability

Feed axes

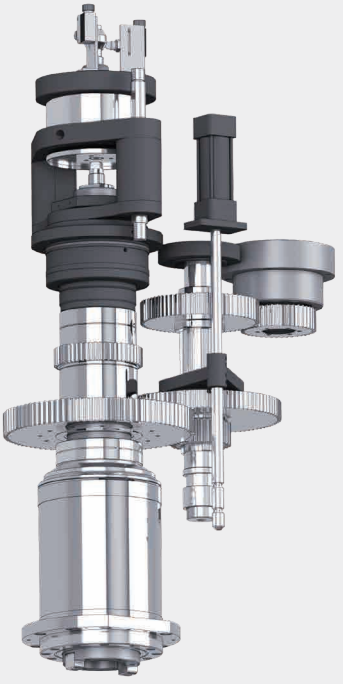
Direct coupling of servo motors and ballscrews minimizes backlash during axes feed.

Pre-tensioned double anchored travel axis

All travel axes employ pre-tensioned double anchored ball screws to minimize thermal growth and are supported on both ends using high precision P4 angular bearings for high precision operation

Diverse spindle lineup

BT40/BT50 DIRECT



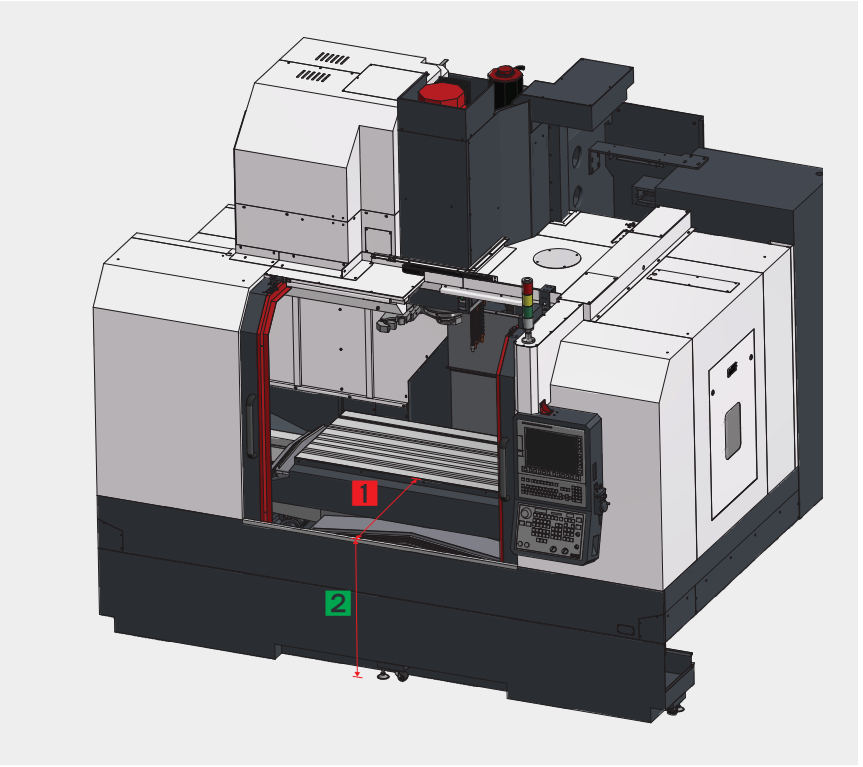
BT50 GEAR

Various spindles available to match the material to be machined

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.

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

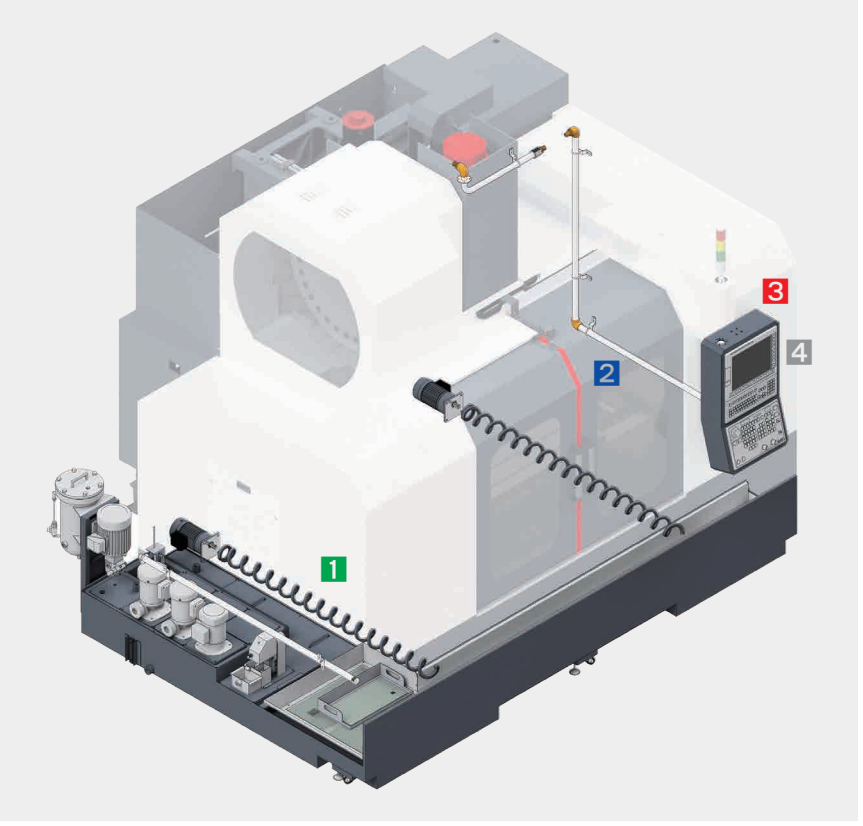
1 Distance between front door and table

280mm (11.03 inch)

2 Distance from floor to table top

960mm (37.80 inch)

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

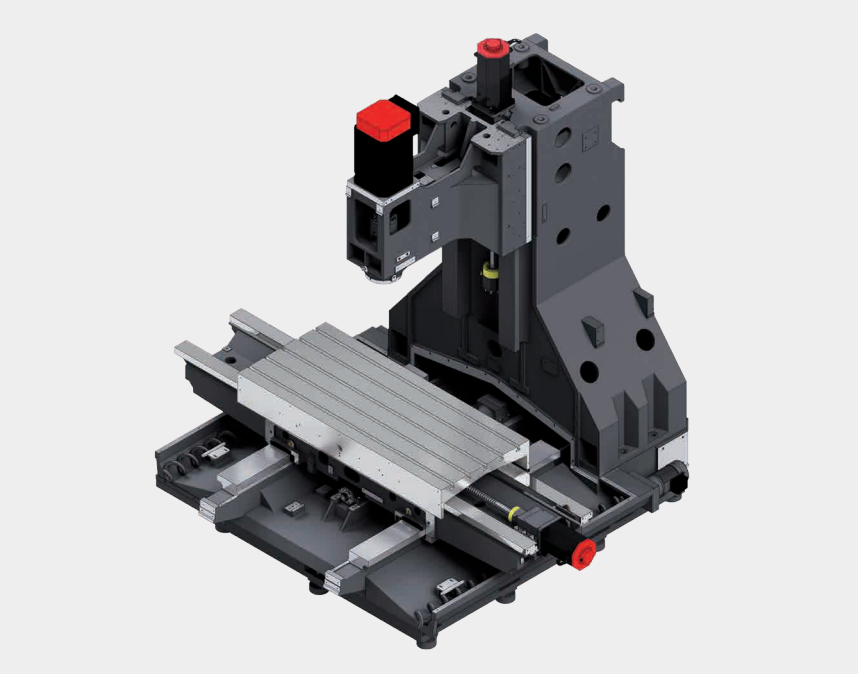
4 Machining Performance Enhancing High Performance NC Options Made Standard

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

LCV 6700

VERTICAL MACHINING CENTER

Machine Design

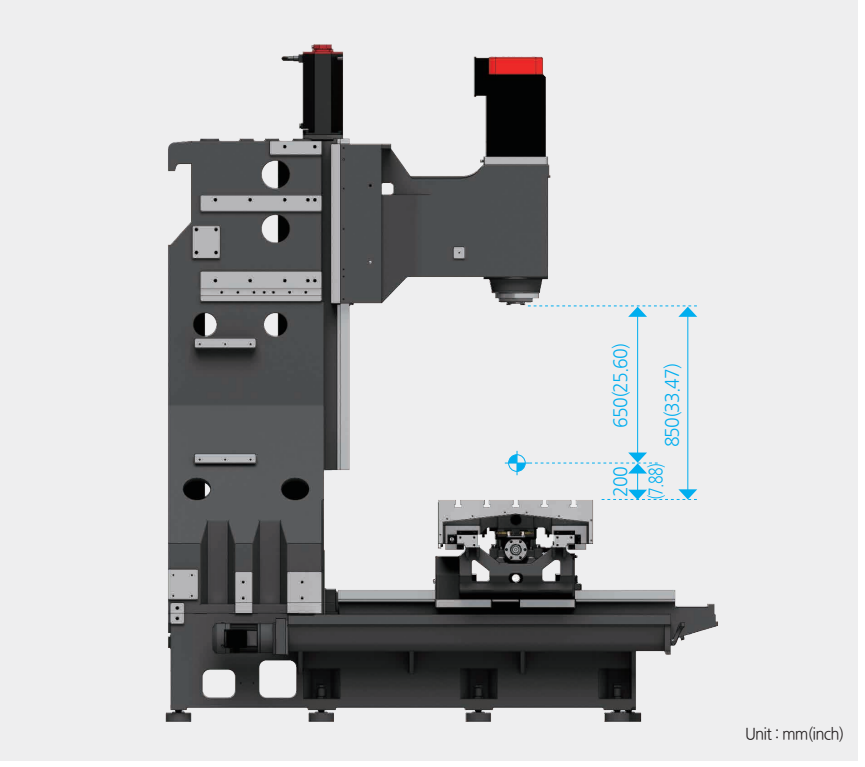


All feed axes use high rigidity box guideways to support heavy duty cutting, offering superb productivity with excellent rigidity

High rigidity bed design

The width of the guideways for the saddle on the box-like bed is twice the size of the saddle, providing stable support to prevent the saddle from sagging

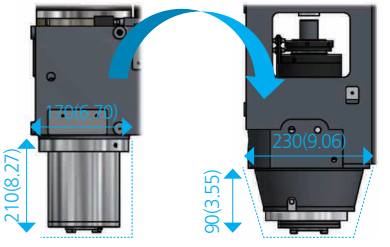
Model	Travel [mm(inch)]			Rapid Traverse [m/min(ipm)]		
	X-axis	Y-axis	Z-axis	X-axis	Y-axis	Z-axis
LCV 6700(BT50)	1,350(53.15)	670(26.38)	650(25.60)	30(1,181.11)	30(1,181.11)	24(944.89)
LCV 6700(BT40)	1,350(53.15)	670(26.38)	650(25.60)	30(1,181.11)	30(1,181.11)	24(944.89)



Unit : mm(inch)

Unit : mm(inch)

Quill-Type Head stock



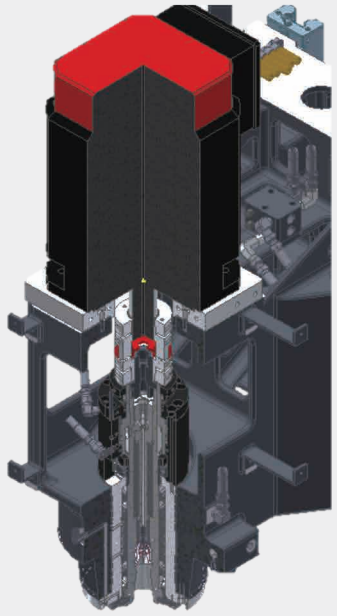
High speed direct drive head
- high precision and efficient cooling operation

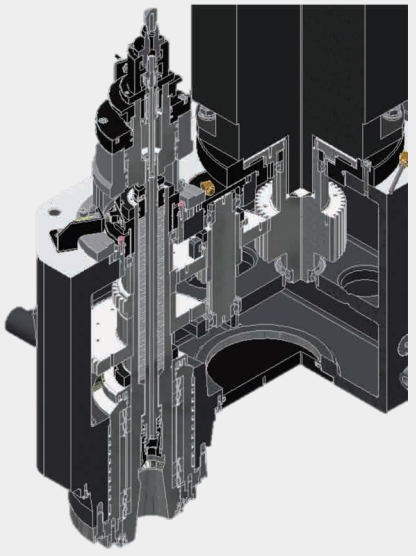
The standard quill-type head enables high speed, ultra precise machining while providing greater rigidity and minimizes thermal growth with forced heat dissipation

Spindle to table-top distance

200~850mm(7.88~33.47 inch)

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.

Direct Drive Type

LCV 6700 BT40

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)

LCV 6700 BT50

Max spindle speed : 8,000rpm

Power(Cont/Max) : 11/18.5kW
(14.76/24.81 Hp)

Torque(Cont/Max) : 143/286N·m
(105.48/210.95 lbs-ft)

Gear Head Type

LCV 6700 CAT50

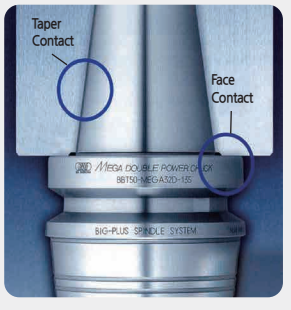
Max spindle speed : 6,000rpm

Power(Cont/Max) : 15/18.5kW
(20.12/24.81 Hp)

Torque(Cont/Max) : 497.5/767N·m
(366.94/565.72 lbs-ft)

High Efficiency Spindle Cooling System (12R 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



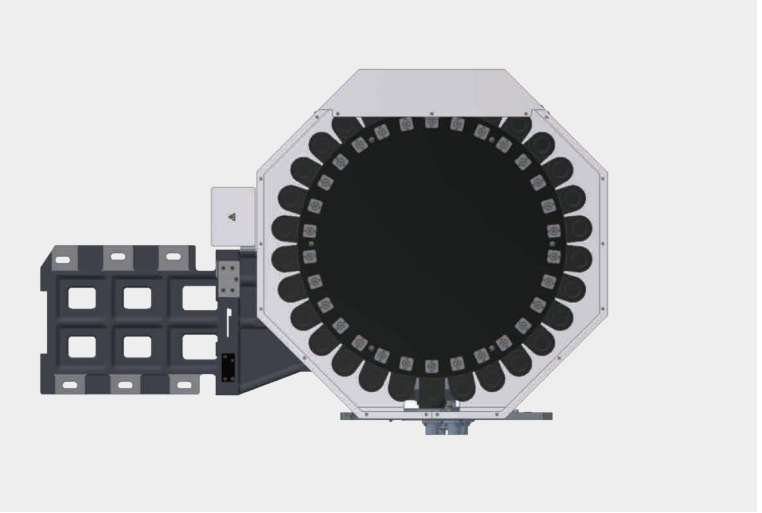
Big Plus Tool
(Simultaneous Dual Contact)

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

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 :
BT40 : 1.3sec / BT50 : 2.45sec

Max. tool dia. [adjacent empty] :
BT40 : 80[125]mm (3.15[4.93]inch)
BT50 : 100[195]mm (3.94[7.68]inch)

Max. tool length : 300mm (11.82 inch)

Max. tool weight :
BT40 : 8 kg (17.64 lb)
BT50 : 15 kg (33.07 lb)

Table

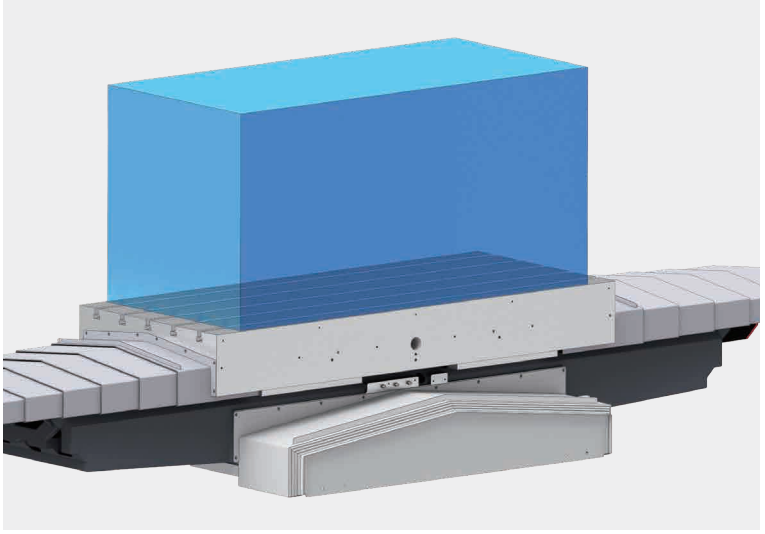


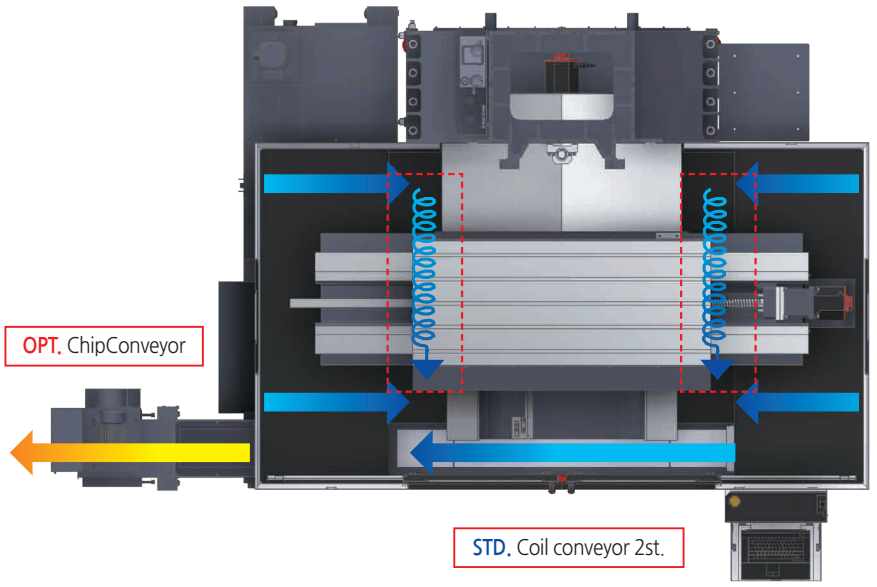
Table size and Table loading capacity were increased to support larger work area

Table size : 1,550×670mm
(61.03×26.38 inch)

Table surface :
18H8×p125×5ea
(0.71H8×p4.93×5ea)

Table loading capacity :
1000kgf (2,204.63 lbs)

Eco-Friendly Chip Disposal

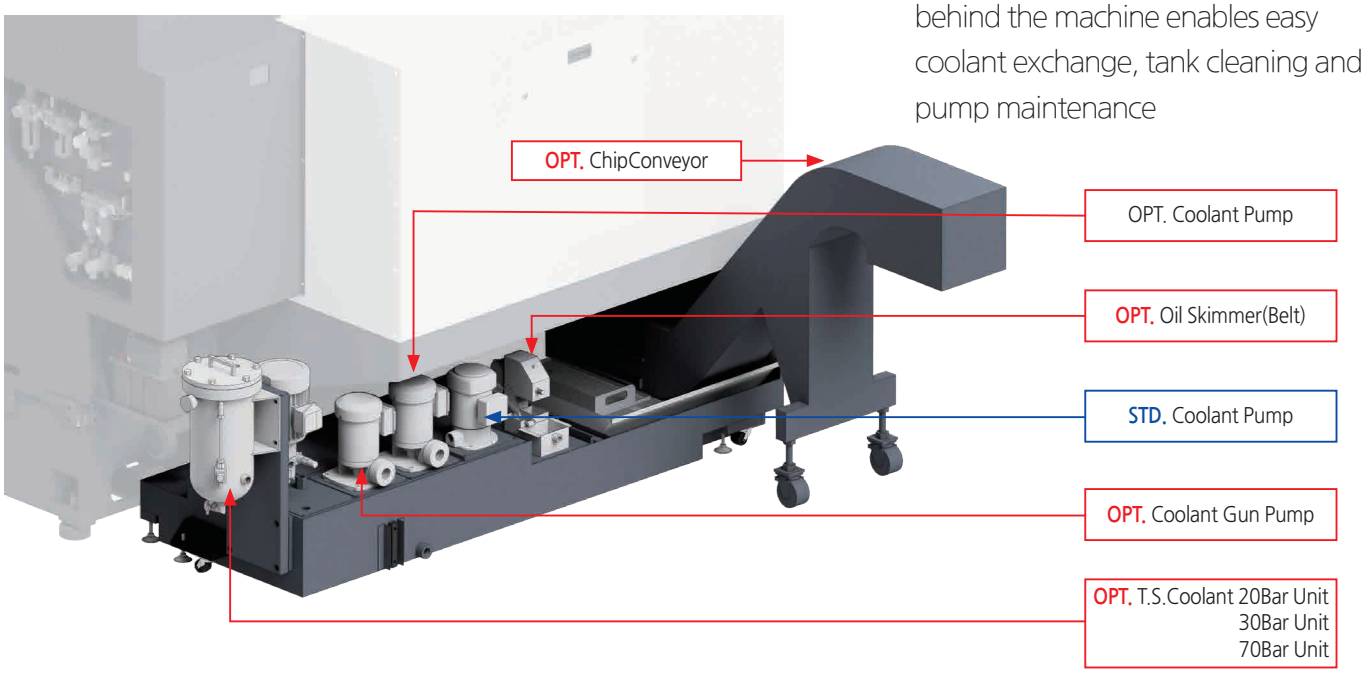


Complete chip discharge through the series of chip disposal processes by the coolant nozzle, bed flush, coil conveyor and chip conveyor

- Inclined surfaces such as SLIDE COVER and BASE COVER
- Inclined chute included in area where chips drop to discharge chips towards the coolant tank
- Coil conveyors are placed on the BED instead of the S/GUARD to reduce noise and damage to the S/GUARD

Automated Coolant Supply

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



Coolant tank capacity : 350ℓ (92.47 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.

Linear scale

Use of linear scales enhances precision as each feed axis is able to accurately traverse to the commanded location

Tool measurement probe

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

Measurement method : Touch probe
Repeatability : ± 1 ㎛

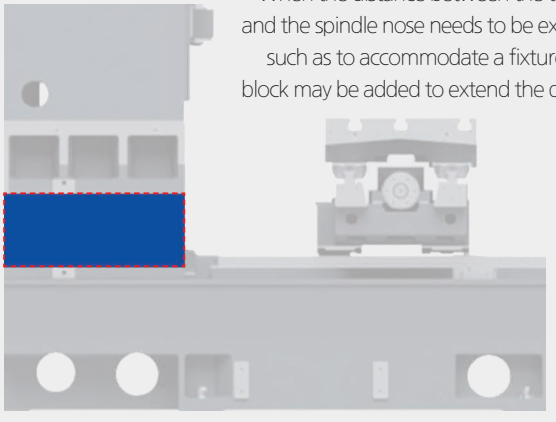
Measurement method : Non-contact
Repeatability : ± 0.1 ㎛
Min. tool detection : 0.03mm

Chip conveyor

Equipment meant to remove chips created during machining

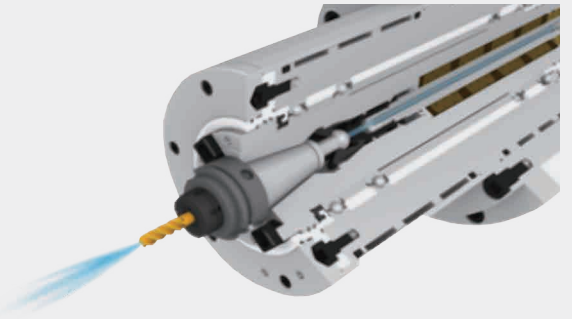
High column

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)

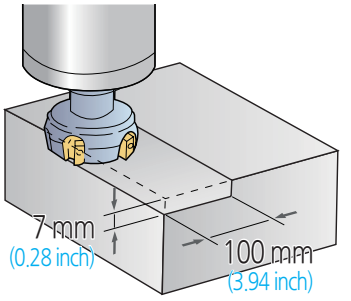
The TSC option may be added to improve machining effectiveness



Cutting performance

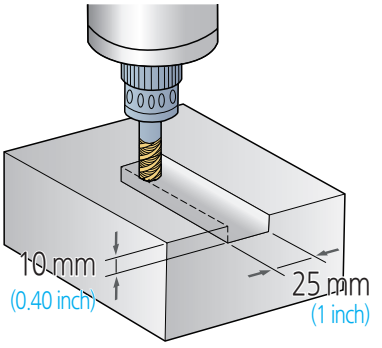
BT50 Face mill [Ø125mm (Ø4.93")] / Carbon steel (SM45C)

Chip removal rate [cm³/min (inch³/min)]	Spindle speed (r/min)	Feedrate [mm/min (ipm)]
762 (46.5)	968	871 (34.30)



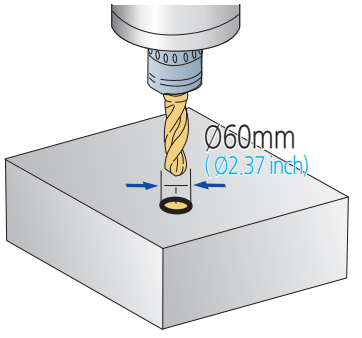
BT50 End mill [Ø25mm (Ø0.99")] / Carbon steel (SM45C)

Chip removal rate [cm³/min (inch³/min)]	Spindle speed (r/min)	Feedrate [mm/min (ipm)]
201 (12.27)	895	806 (31.74)



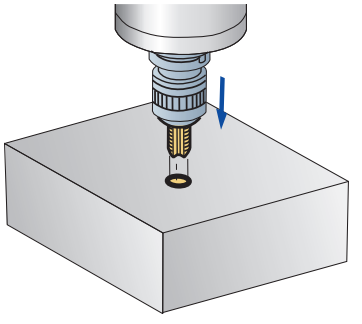
BT50 U-Drill [Ø60mm (Ø2.37")] / Carbon steel (SM45C)

Chip removal rate [cm³/min (inch³/min)]	Spindle speed (r/min)	Feedrate [mm/min (ipm)]
225 (13.74)	318	480 (18.90)



BT50 Tap / Carbon steel (SM45C)

Feedrate [mm/min (ipm)]	Spindle speed (r/min)	Tap size (mm)
350 (13.78)	100	M33×3.5



TEST conditions : 6,000rpm [BT50] / GEAR-TYPE

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

Spindle Power & Torque Diagram

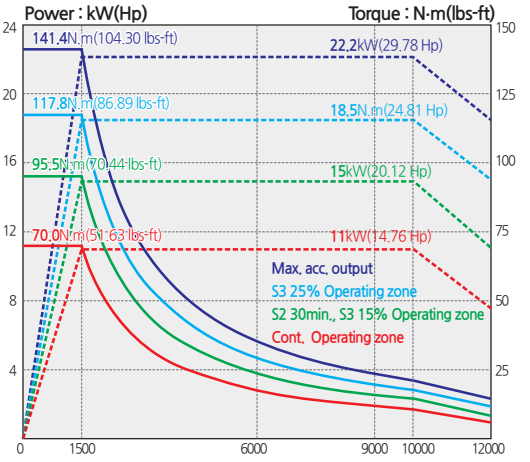
Direct Drive Type

LCV 6700 BT40

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)

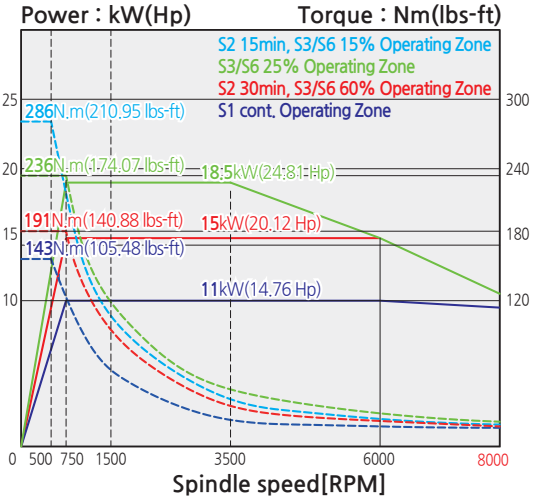


LCV 6700 BT50

Max Spindle Speed
8,000rpm

Power (Cont/Max)
11/18.5kW
(14.76/24.81 Hp)

Torque (Cont/Max)
143/286N·m
(105.48/210.95 lbs-ft)



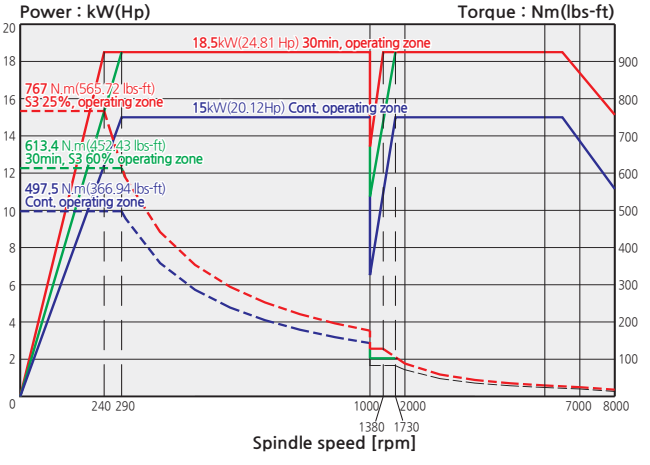
Direct Drive Type

LCV 6700 BT50

Max Spindle Speed
6,000rpm

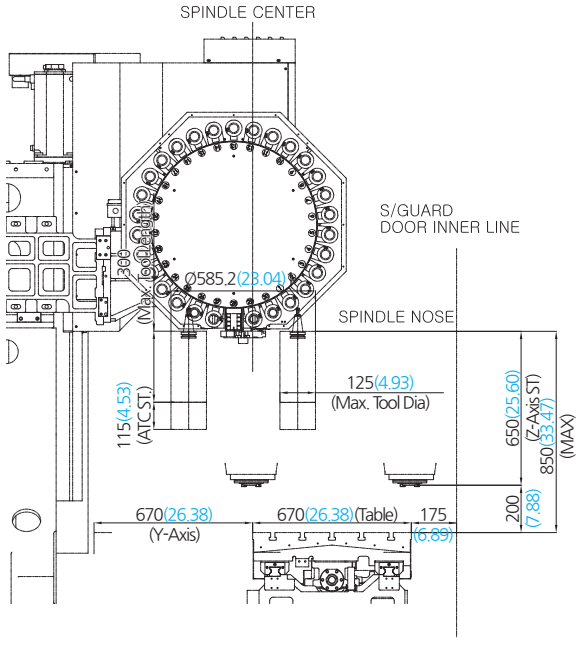
Power (Cont/Max)
15/18.5kW
(20.12/ 24.81 Hp)

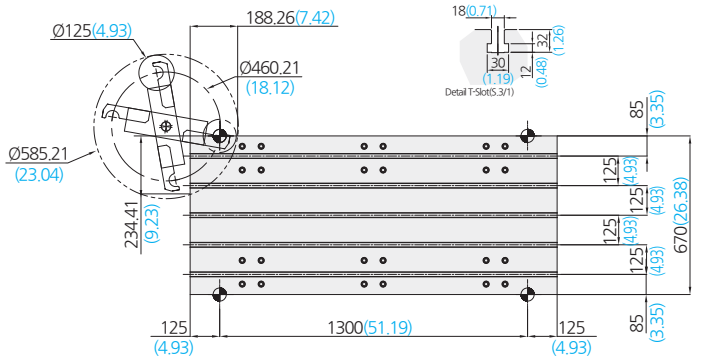
Torque (Cont/Max)
497.5/767N·m
(366.94/565.72 lbs-ft)



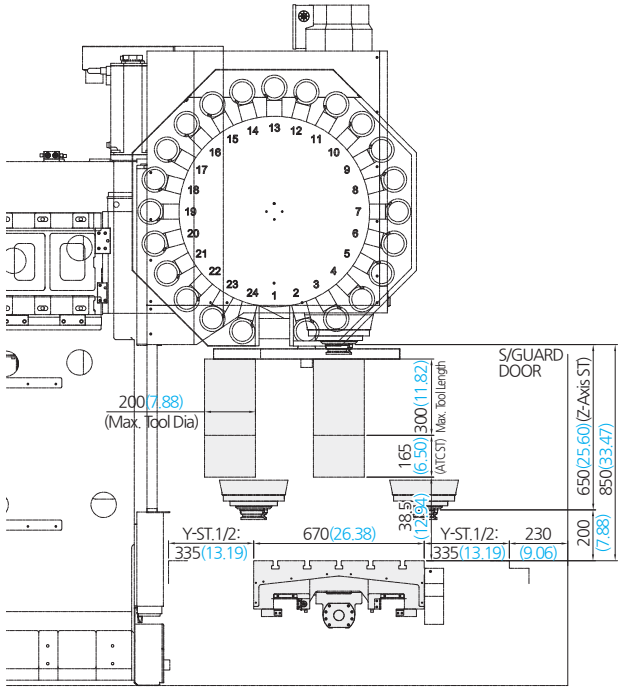
Unit : mm(inch)

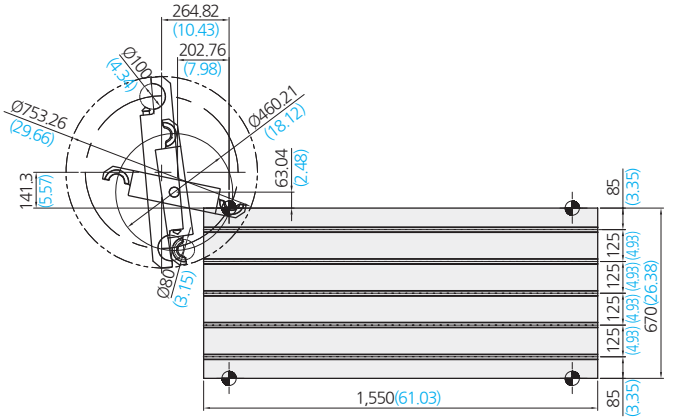
LCV 6700(BT40/30MG)





LCV 6700(BT50/30MG)

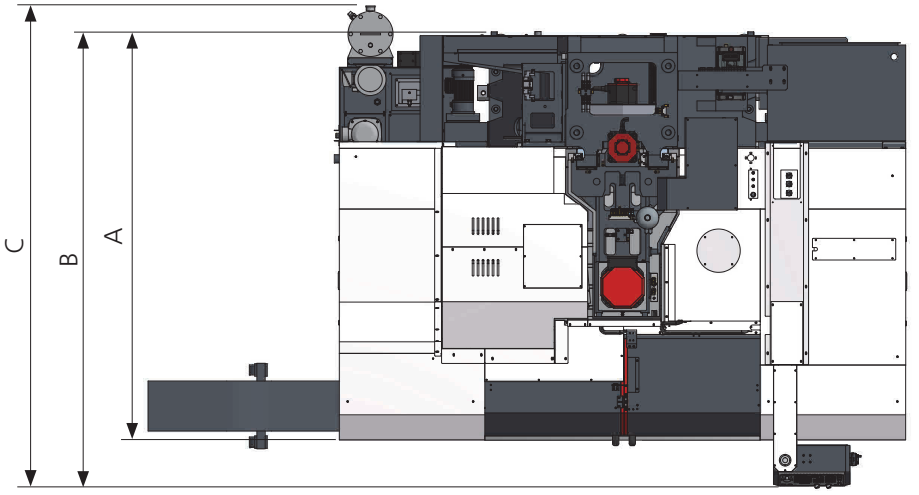




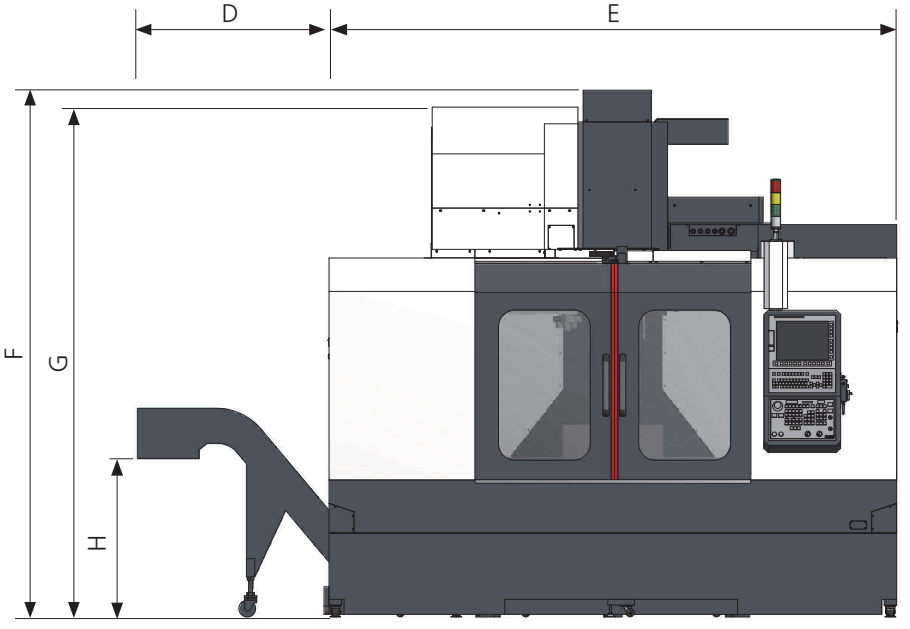
Machine Dimensions

Unit : mm(inch)

Top view



Front view



Model	A (Length)	B	C	D	E (Width)	F (Height)	G	H
BT 50 (CAT50)	2,450 (96.46)	2,727 (107.38)	3,882 (152.84)	1,148 (45.20)	3,400 (133.86)	3,156 (124.26)	3,054 (120.24)	950 (37.41)
BT 40 (CAT40)	2,450 (96.46)	2,727 (107.38)	3,882 (152.84)	1,148 (45.20)	3,400 (133.86)	3,055 (120.28)	2,950 (116.15)	950 (37.41)

Standard / Optional

● : Standard ○ : Optional X : N/A

Category		LCV 6700
Spindle		
RPM	6R	○
	8R	●
	12R	○
Spindle chiller		○
ATC		
Tool type	BBT40	○
	BBT50	●
	CAT40	○
	HSK-A63	X
Pull Stud	45°	●
Table & Column		
T-slot table		●
High column	200mm	○
	300mm	○
	400mm	○
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
Chip conveyor, SCRAPER	Left	○
	Right	○
	Rear	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		○

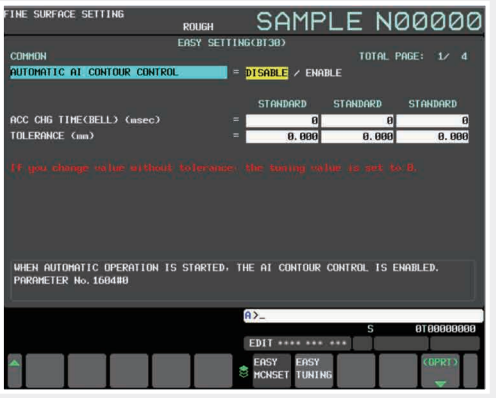
Category		LCV 6700
Electrical equipment		
AVR (Auto Voltage Regulator)		○
Transformer	50kVA	○
Auto Power Off		○
Power outage backup module		○
Z-axis drop prevention		●
Precision machining option		
AICC Ⅱ (AI Contour Control Ⅱ)		●
Jerk control		●
Smooth tolerance plus control		●
Machining condition selection 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
Auto shutter		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		●

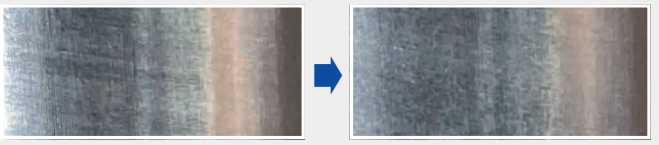
※ For detailed information, please contact your local SMEC dealer.

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

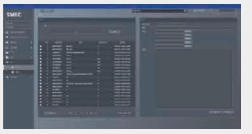
- Provides information about the operation status, speed, production alarms, etc. of each machine

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

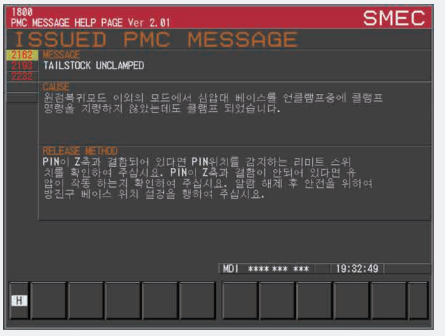
SMEC Custom S/W displayed using MDI's button or OP Panel's CUSTOM button

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

SMEC HMI

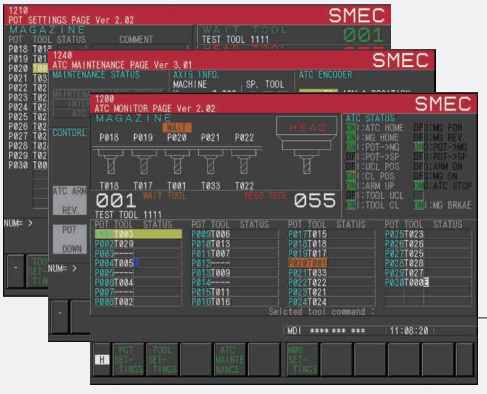
M/G-Code check function

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

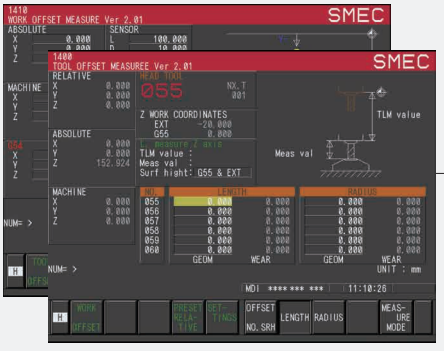


PMC alarm check function

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

LCV 6700

VERTICAL MACHINING CENTER

Machine Specifications

Category			LCV 6700(BT50)	LCV 6700(BT40)
Travel	X-axis travel	mm(inch)	1,350(53.15)	1,350(53.15)
	Y-axis travel	mm(inch)	670(26.38)	670(26.38)
	Z-axis travel	mm(inch)	650(25.60)	650(25.60)
	Spindle to table surface	mm(inch)	200 ~ 850(7.88 ~ 33.47)	200 ~ 850(7.88 ~ 33.47)
Table	Table size	mm(inch)	1,550 × 670(61.03 × 26.38)	1,550 × 670(61.03 × 26.38)
	Table loading capacity	kgf(lb)	1,000(2,204.63)	1,000(2,204.63)
	Table surface	mm(inch)	18H8(0.71H8) T-slot × p125(4.93) × 5ea	18H8(0.71H8) T-slot × p125(4.93) × 5ea
Spindle	Spindle speed	rpm	Direct 8,000 | Gear 6,000	Direct 12,000
	Power (Cont/Max)	kW (HP)	Direct 11/18.5 | Gear 15/18.5 (Direct 14.76/24.81 | Gear 20.12/24.8)	Direct 11/22.2 (Direct 14.76/29.78)
	Torque (Cont/Max)	N.m (lbs.ft)	Direct 143/286 | Gear 497.5/767 (Direct 105.48/210.95 | Gear 366.94/565.72)	Direct 70/141.4 (Direct 51.63/104.30)
Feedrate	X-axis rapid traverse rate	m/min(ipm)	30(1,181.11)	30(1,181.11)
	Y-axis rapid traverse rate	m/min(ipm)	30(1,181.11)	30(1,181.11)
	Z-axis rapid traverse rate	m/min(ipm)	24(944.89)	24(944.89)
ATC	Tool shank	-	BT50(CAT50)	BT40(CAT40)
	Pull stud	-	MAS P50T-1	MAS P40T-1
	Tool storage capacity	ea	30	30
	Max tool diameter [adjacent empty]	mm(inch)	100(3.94)[195(7.68)]	80(3.15)[125(4.93)]
	Max tool length / weight	mm/kgf(inch/lb)	300/15(11.82/33.07)	300/8(11.82/17.64)
	Tool-to-tool time	sec	2.45	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	mm(inch)	3,400[4,553] × 2,430 × 3,160 (133.86[179.26] × 95.76 × 124.41)	3,400[4,553] × 2,430 × 3,055 (133.86[179.26] × 95.76 × 120.28)
	Size [with REAR chip conveyor] L×W×H	mm(inch)	-	-
	Weight	kg(lb)	11,000(24,250.85)	11,000(24,250.85)
Coolant tank capacity		Liter(gal)	350(92.47)	350(92.47)
Electric power supply		kVA/V	32/220	32/220
Controller			FANUC 0i-MF Plus	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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