SMEC

SL 4000L Series

HORIZONTAL TURNING CENTER

SMEC CO.,LTD.

SMEC Co., Ltd.

157-10, Goldenroot-ro, Juchon-myeon, Gimhae-si,
Gyeongsangnam-do, Korea
Tel +82 55 340 4800 / Fax +82 55 340 4740
www.smecmachinetools.com

SMEC CO.,LTD.

YouTube

Ⓔ SMEC 2023.06-NO.1

SL 4000L Series

SL 4000L
SL 4000LM

SMEC

SL 4000L Series

SL 4000L/LM

Heavy duty and precision machining in a compact footprint with ease of use features

- 45 degree TORQUE TUBE RIB bed to support heavy duty machining
- High precision machining possible during heavy duty cutting
- Significantly reduced non-cutting time for high efficiency machining
- Servo turret for improved high speed performance
- Low center of gravity design minimizing vibration and thermal growth for high precision turning

Category		SL 4000AL | BL	SL 4000ALM | BLM
Swing over bed	mm(inch)	770 (30.32)	770 (30.32)
Max turning length	mm(inch)	3,128 | 3,087 (123.15 | 121.54)	3,084 | 3,042 (121.42 | 119.77)
Chuck size	inch	12" | 15"	12" | 15"
Spindle bore	mm(inch)	115 | 132 (4.53 | 5.20)	115 | 132 (4.53 | 5.20)
Spindle speed	rpm	2,500 | 2,000	2,500 | 2,000
Main Motor (cont./max)	kW(Hp)	18.5/26 (24.81/34.87)	18.5/26 (24.81/34.87)
Travels X	mm(inch)	340 (13.39)	340 (13.39)
Travels Z	mm(inch)	3,170 (124.81)	3,170 (124.81)
No of tool positions	EA	12	12 (BMT75)

Superb spindle structure

The radiator fin head assembly to minimize thermal growth and Bzi sensor increases rotation accuracy for high quality machining

Optimized feed system design

The pre-tensioned double anchored feed system and 6 contact surface x-axis slideway frame enables high precision and heavy duty cutting

High rigidity design

The 45-degree slanted bed with torque tube ribbed structure supresses vibration during heavy duty cutting for high precision machining

Operator centered convenience features

Operator convenience maximized with features such as M-CODE based programmable tailstock, Manual Guide i and operator centered panel

Superb spindle design

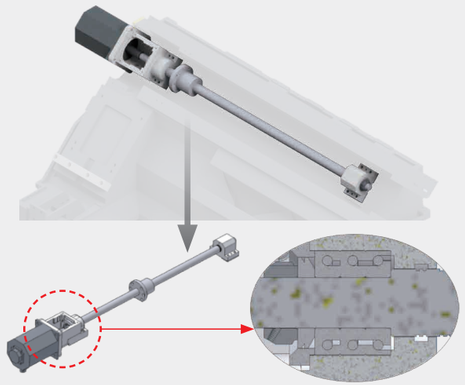
Radiator fin head assembly to minimize thermal growth

The radiator fin like ribbed structure of the head assembly minimizes thermal growth for precision machining

Reduced service issues with new spindle orientation sensor design

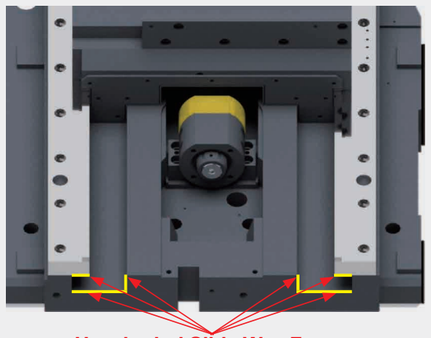
Spindle orientation sensor changed from position encoder to Bzi sensor, removing the need to adjust the timing belt and improving rotation accuracy and increasing productivity by removing a point of maintenance

Optimized feed system design



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
- Pre-tensioned double anchored (minimize thermal growth)
- High precision angular bearing+large diameter high precision ball screws



6 contact surface slideway frame (X-aixs)

The wide guideway surfaces and contact surface slideways are heat treated and precision ground to maintain high precision, heavy duty cutting capability over its lifetime

High rigidity design

High rigidity 45-degree slant bed to support heavy-duty cutting

The 45-degree slant bed with torque tube rib structure offers superb twisting and bending resistance during heavy duty cutting, enabling high precision machining.
Also, the slant bed allows for easier access to the workpiece and superb chip discharge

Easy chip removal

The 45-degree slant bed design allows for convenient chip removal and easy access for tool changes and inspections

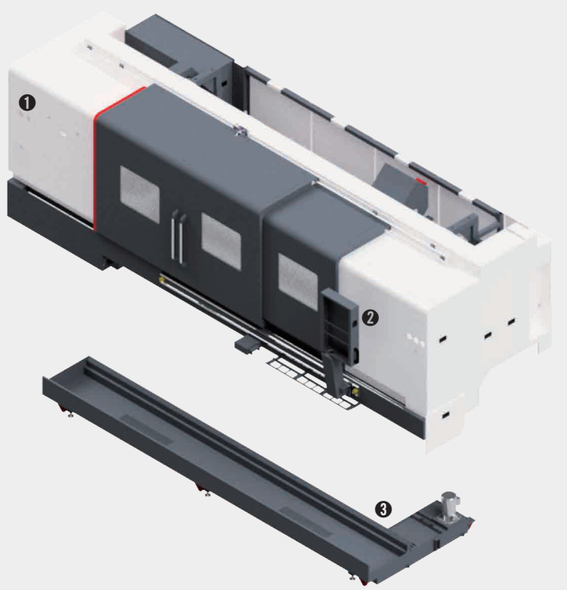
Programmable tailstock (standard)

The programmable tailstock allows for the tailstock and the quill to be operated via M-CODE and maintains high precision during heavy-duty cutting

Tailstock Quill Stroke : 150mm (5.91 inch)

Tailstock Taper : MT5

Ease of use



❶ Easy hydraulic valve adjustment

The gauge and hydraulic valves are located at a height that make it easy for the operator to adjust

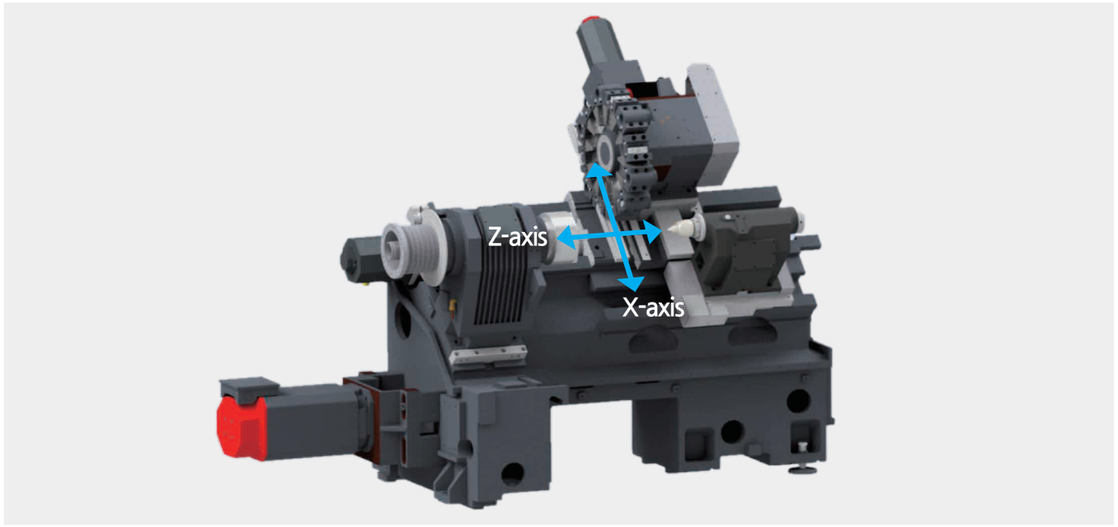
❷ User-centric 15" Large OP Panel

The QWERTY-type keyboard and high visibility buttons and effective button placement enhances ease of use

❸ Easy coolant tank maintenance

When cleaning the coolant tank, the coolant tank may be removed while leaving the chip conveyor attached to the machine, making it easier to clean and maintain

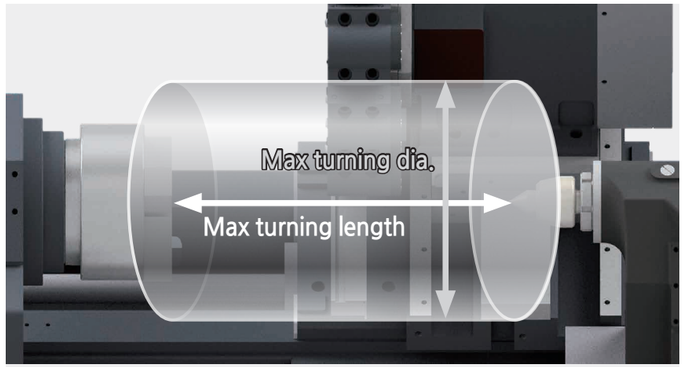
Machine Design



Model	Travel [mm(inch)]		Rapid Traverse [m/min(ipm)]	
	X-axis	Z-axis	X-axis	Z-axis
SL 4000L	340(13.39)	3,170(124.81)	16(629.93)	20(787.41)
SL 4000LM	340(13.39)	3,170(124.81)	16(629.93)	20(787.41)

All travel axes are comprised of high rigidity box guideways enabling heavy duty cutting and superb productivity

Work Range



Model	Unit	Max turning dia.	Max turning length
SL 4000AL/BL	mm(inch)	Ø650(25.60)	3,128/3,087(123.15/121.54)
SL 4000ALM/BLM	mm(inch)	Ø580(22.84)	3,084/3,042(121.42/119.77)

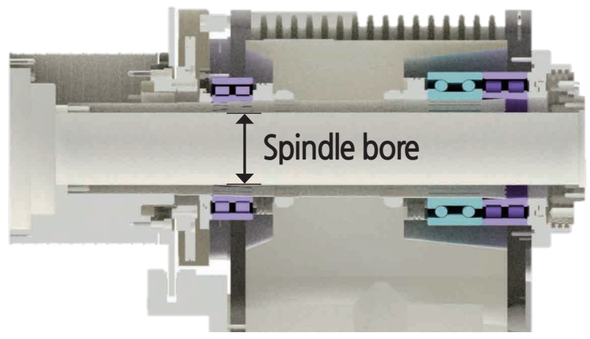
Providing a large work envelope, ensuring cost effective productivity

SL 4000AL
Max turning dia / length
Ø650/3,128mm
(25.60/123.15 inch)

SL 4000ALM
Max turning dia / length
Ø580/3,084mm
(22.84/121.42 inch)

Spindle

Model	Chuck size	Speed [rpm]	Power (Cont./Max) [kW(Hp)]	Torque (Cont./Max) [N·m(lbs.ft)]
SL 4000AL/ALM	12"	2,500	18.5/26(24.81/34.87)	1,651/2,320 (1,217.72/1,711.15)
SL 4000BL/BLM	15"	2,000	18.5/26(24.81/34.87)	1,651/2,320 (1,217.72/1,711.15)



Model	Spindle bore [mm(inch)]	Spindle nose (ASA)
SL 4000AL/ALM	Ø115(4.53)	A2-11
SL 4000BL/BLM	Ø132(5.20)	A2-11

The high power motor allows both high precision and high torque machining, improving operator productivity.

SL 4000L Series
Max speed (A/B Type)
2,500/2,000rpm
Power (cont/max)
18.5/26kW
(24.81/34.87 Hp)
Torque (cont/max)
1,651/2,320N·m
(1,217.72/1,711.15 lbs.ft)

SL 4000L Series_Mill Motor
Max speed
4,000rpm
Power (cont/max)
5.5/7.5kW
(7.38/10.06 Hp)
Torque (cont/max)
35/47.7N·m
(25.82/35.19 lbs.ft)

The Double Row of high precision Cylindrical Roller Bearings and Angular Ball Bearings on the spindle front end and the Double Row of Cylindrical Roller Bearings in the spindle rear ensures high speed, high precision turning

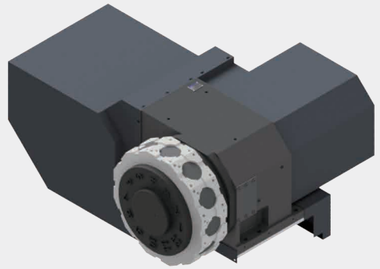
Turret

Servo turret

Turret indexing employs an internally developed method of Non Stop Random Index that uses a high powered Servo
Index Motor to allow 0.25 second single station turret indexing.
And the 3-piece Curvic Coupling significantly increases the clamping force and indexing accuracy

Turret indexing time : **0.25**sec

No. of tool positions : **12**ea (□32×32, Ø60)
(□1.26"×1.26", Ø2.37")



BMT Milling Turret

This 12 tool position (BMT75) turret with the largest in class curvic coupling and powerful hydraulic clamping force is capable of accepting a rotary tool in every tool position and allows a variety of machining operations with a single set-up
The best in class BMT75 tool holders ensure high rigidity, high precision machining and the non-stop turret indexing in either direction minimizes the turret index time down to 0.25 seconds per station.

Turret indexing time : **0.25**sec

No. of tool positions : **12**ea (□32×32, Ø60)
(□1.26"×1.26", Ø2.37")

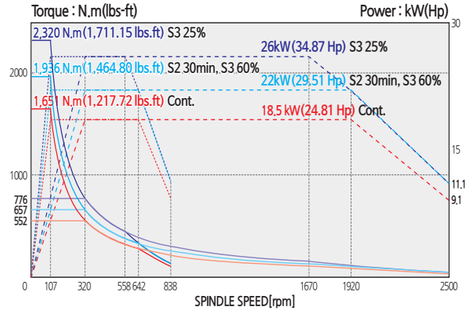
Power torque diagram

SL 4000L

Max speed (A/B Type) : **2,500/2,000**rpm

Power (cont/max) : **18.5/26**kW(24.81/34.87 Hp)

Torque (cont/max) : **1,651/2,320**N·m
(1,217.72/1,711.15 lbs.ft)

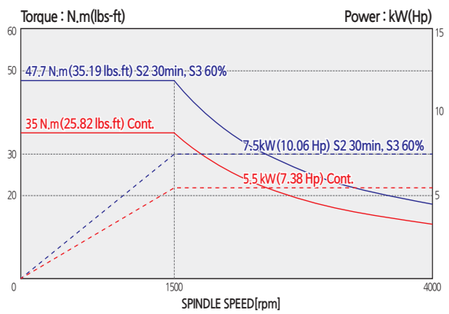


SL 4000LM Milling Motor Torque Diagram

Max speed : **4,000**rpm

Power (cont/15min) : **5.5/7.5**kW(7.38/10.06 Hp)

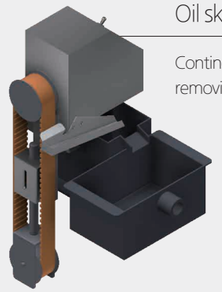
Torque (cont/15min) : **35/47.7**N·m
(25.82/35.19 lbs.ft)



Accessories [Optional]

Oil skimmer

Continously cleans the coolant by removing waste oils

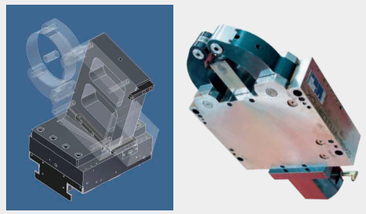


Air blow

Used to automatically remove chips from the chuck after machining and used for safe loading of the chuck in an automated line.

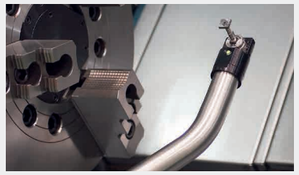
Steady rest

Provides additional stability when cutting long parts and the size of the steady rest may be selected



Tool presetter

Provides faster and more precise tool setup, checking for tool wear and compensation



Chip conveyor

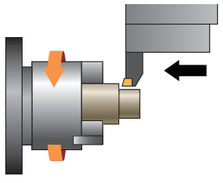
Used to discharge chips created during machining

Cutting Performance

Test conditions : SL 4500ALM, S45C

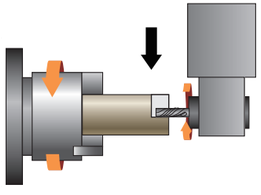
◆ O.D Cutting

Cutting dia.	mm(inch)	327(1.29)
Cutting depth	mm(inch)	9(0.36)
Cutting speed	m/min(ipm)	132(5,196.86)
Spindle speed	rpm	330
Feedrate	mm/rev(inch/rev)	0.4(0.016)
Chip removal rate	cc/min(oz/min)	1,296(43.83)



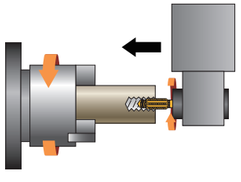
◆ Endmill

Endmill dia.	mm(inch)	25(0.99)
Cutting depth	mm(inch)	5(0.20)
Cutting speed	m/min(ipm)	220(8,661.42)
Spindle speed	rpm	2,800
Feedrate	mm/min(ipm)	1,008(39.69)
Chip removal rate	cc/min(oz/min)	126(4.27)



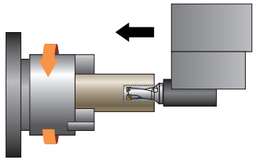
◆ Tap

Tap size	mm	M24
Cutting depth	mm(inch)	45(1.78)
Cutting speed	m/min(ipm)	20(787.41)
Spindle speed	rpm	265
Feedrate	mm/rev(inch/rev)	3(0.12)



◆ U-Drill Cutting

U-drill dia.	mm(inch)	Ø63(2.49)
Cutting speed	m/min(ipm)	200(7,874.02)
Spindle speed	rpm	1,011
Feedrate	mm/rev(inch/rev)	0.34(0.014)
Chip removal rate	cc/min(oz/min)	1,070(36.19)



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

SMEC FANUC i series

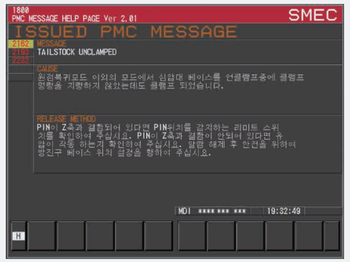
- 15'' LCD color display
- High quality designed OP Panel
- Conversational programming, Manual Guide i
- Part program size 2MB
- SMEC Custom S/W

SMEC Custom S/W displayed using MDI's S1 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.

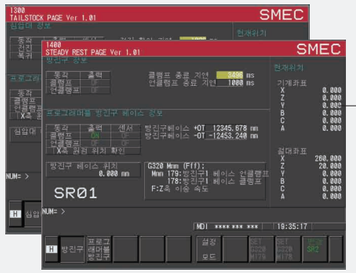
M/G-Code check function

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



PMC alarm check function

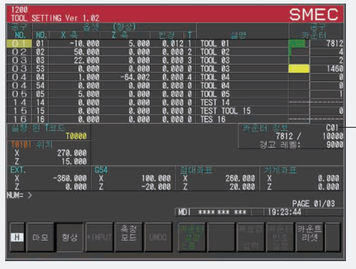
When a PMC alarm occurs, the cause and countermeasures are described in detail, making operation and maintenance more convenient



Easy tailstock setting

Easily configure a variety of functions such as travel limiting, origin setting and signal check

Counter for each T-Code

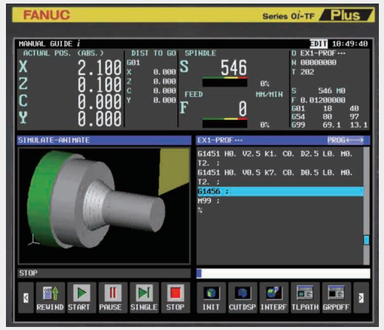


Display only the necessary tools and offsets and check the configured counter at the same time

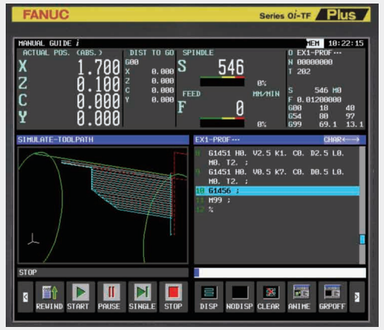
Tool information and setting management mode

Manual Guide i (STD)

SMEC's Manual Guide i system enables advanced part program creation and more efficient and faster machining with conversational programming



Check cutting result using cutting simulation



Check cutting path using cutting simulation

Easy program creation and editing

Program creation using advanced part program editing and extensive cutting cycles

Advanced cutting capabilities

Check cutting status such as cutting cycle name and tool icon during the cutting process

Check program using cutting simulations

Program pre-check using realistic cutting simulation

Measurement

Feedback of cutting results and tool offset values after cutting

Effective cutting setup

Tool and cutting condition offset data setup based on measurement cycle

IoT Solution (OPT)

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

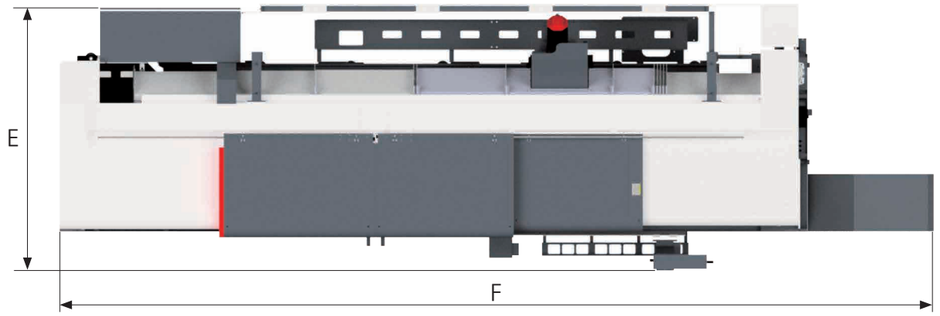
Problem diagnosis via remote control

- Provide remote diagnosis services to users via the IIoT solution

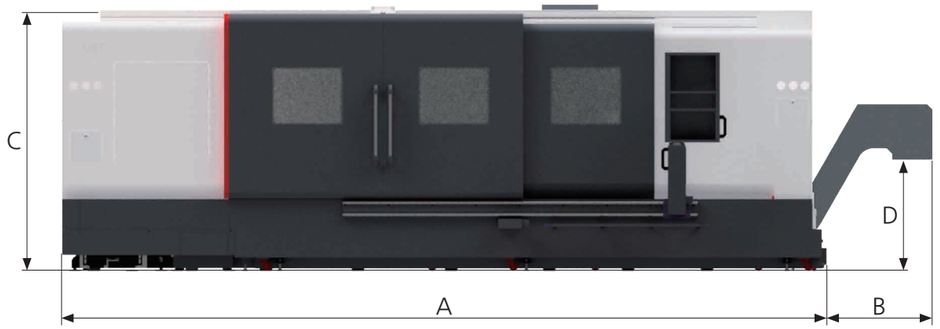
Machine Dimensions

Unit : mm(inch)

Top view



Front view

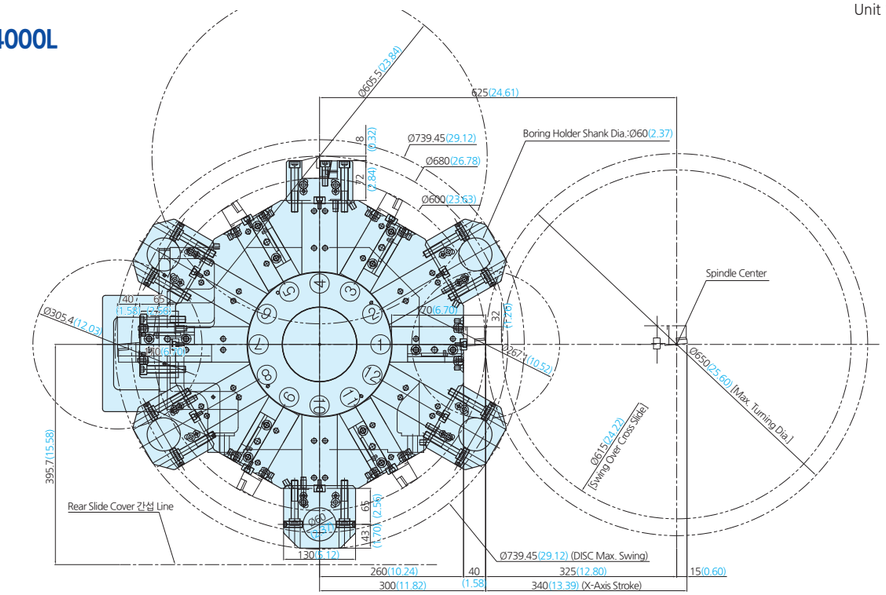


Model	A (Machine Length)	B	C (Machine Height)	D	E (Machine Width)	F
SL 4000L	6,360(250.04)	1,011(39.81)	2,212(87.09)	860(33.86)	2,267(89.26)	7,371(290.20)
SL 4000LM	6,360(250.04)	1,011(39.81)	2,212(87.09)	860(33.86)	2,267(89.26)	7,371(290.20)

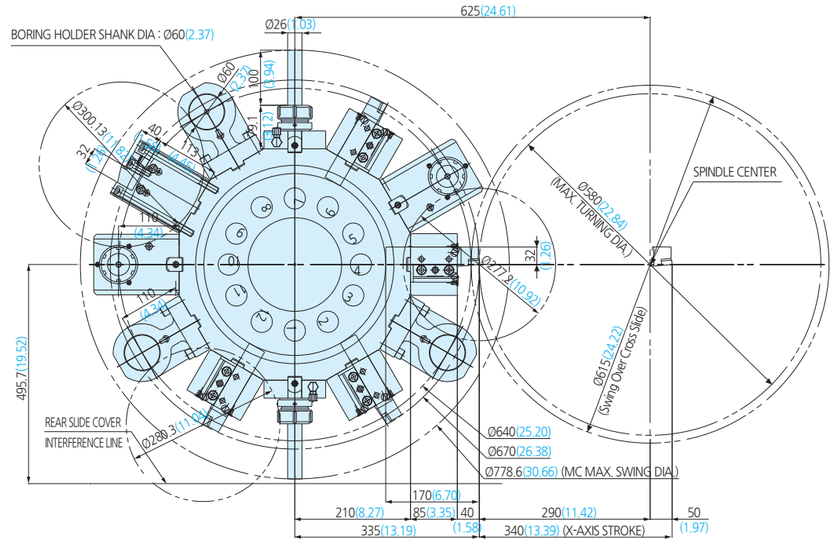
Turret Interference

Unit : mm(inch)

SL 4000L



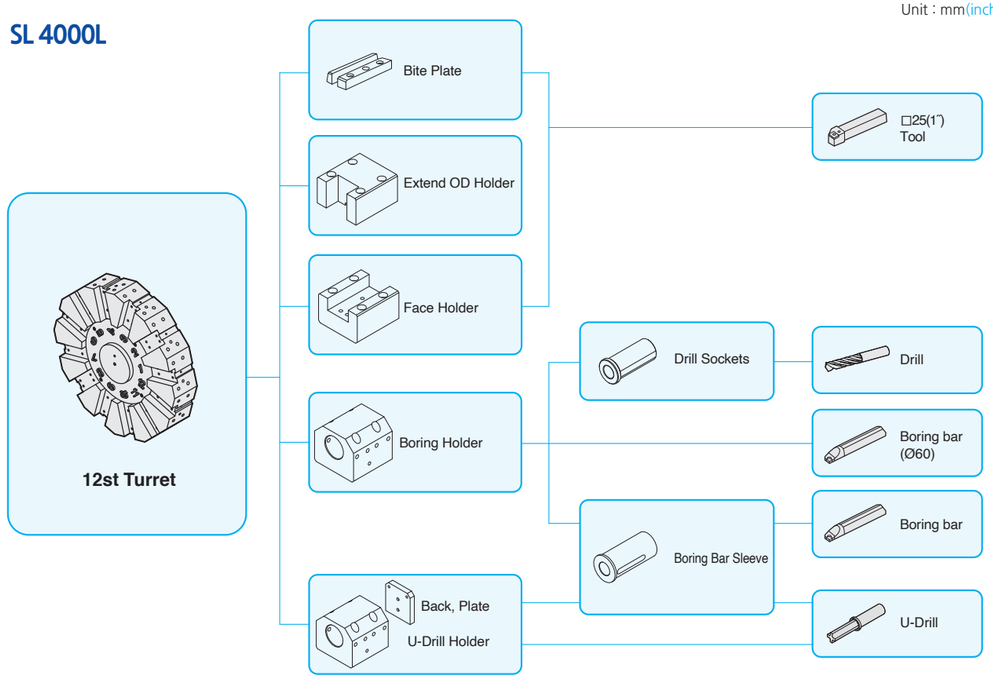
SL 4000LM



Tooling System

Unit : mm(inch)

SL 4000L



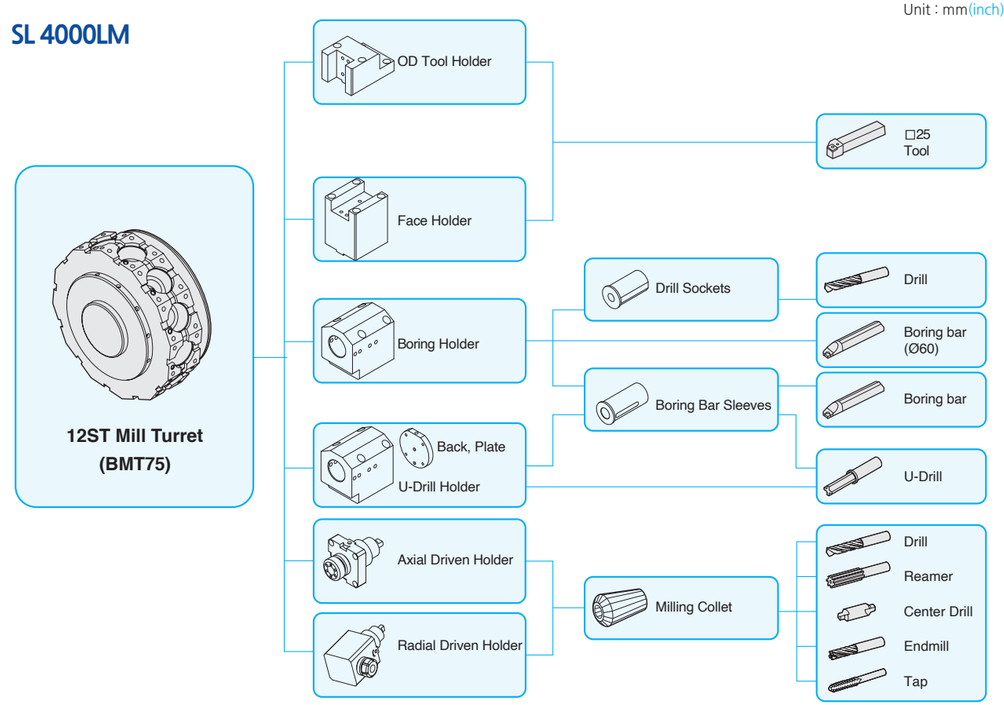
Standard Tooling

Item / Description			SL 4000L
Turning Holder	OD HOLDER	-	1
	Facing Holder	-	1
Boring Holder	BORING HOLDER	-	3
	U-Drill Holder	-	2
Driven Holder	AXIAL DRIVEN HOLDER	-	-
	RADIAL DRIVEN HOLDER	-	-
Socket	Boring	Ø12 (Ø1/2")	1
		Ø16 (Ø5/8")	1
		Ø20 (Ø3/4")	1
		Ø25 (Ø1")	1
		Ø32 (Ø1 1/4")	1
		Ø40 (Ø1 1/2")	1
		Ø50 (Ø2")	1
	Drill	MT 2	1
		MT 3	1
		MT 4	1
		MT 5	1

Tooling System

Unit : mm(inch)

SL 4000LM



Standard Tooling

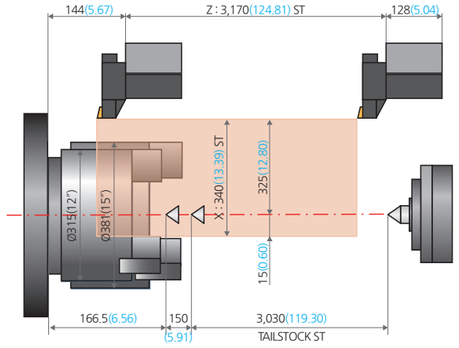
Item / Description			SL 4000LM
Turning Holder	OD HOLDER	-	4
	Facing Holder	-	1
Boring Holder	BORING HOLDER	-	2
	U-Drill Holder	-	1
Driven Holder	AXIAL DRIVEN HOLDER	-	2
	RADIAL DRIVEN HOLDER	-	2
Socket	Boring	Ø12 (Ø1/2")	1
		Ø16 (Ø5/8")	1
		Ø20 (Ø3/4")	1
		Ø25 (Ø1")	1
		Ø32 (Ø1 1/4")	1
		Ø40 (Ø1 1/2")	1
		Ø50 (Ø2")	1
	Drill	MT 2	1
		MT 3	1
		MT 4	1
		MT 5	1

Work Range

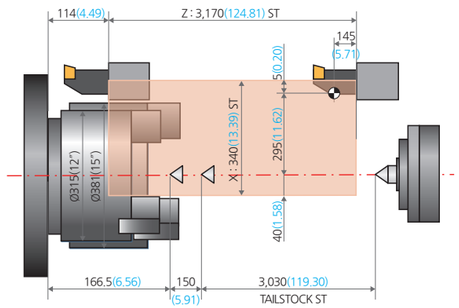
Unit : mm(inch)

SL 4000L

O.D Tool

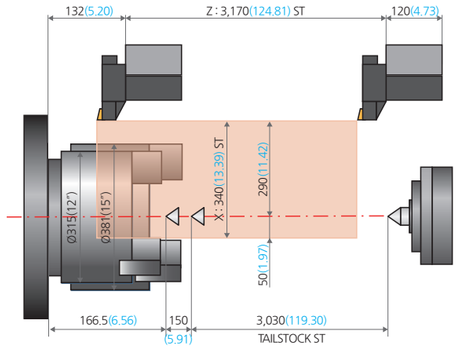


I.D Tool

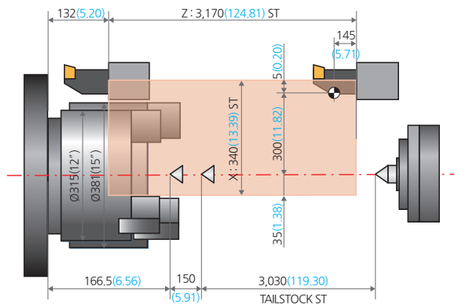


SL 4000LM

O.D Tool



I.D Tool



Standard / Optional

● : Standard ○ : Optional △ : Discuss X : N/A

Category			SL 4000L Series	SL 4000M series
Spindle	3 jaw open-center chuck		●	●
	Soft jaw (3set)		●	●
	Hard jaw (1set)		○	○
	Chuck clamp footswitch		●	●
	Dual pressure chucking		○	○
	C-axis control (0.001°)		X	●
	Chuck clamp confirmation		●	●
	Chuck dual footswitch		○	○
Turret	Tool holder		●	●
	Rotary holder type	BMT	X	●
	Rotary holder (axial)		X	●
	Rotary holder (radial)		X	●
	Boring bar sleeve (same as U-drill holder sleeve)		●	●
	Drill socket		●	●
	U-drill holder		●	●
Tailstock	Programmable tailstock		●	●
	Quill forward/reverse confirmation		○	○
	Tailstock footswitch		○	○
Coolant & Air Blow	Coolant above chuck		○	○
	Coolant gun		○	○
	Air blower (above chuck)		○	○
	Rotary tool holder TSC		○	○
	Air gun		○	○
	Coolant pump	4.5Bar	●	●
		7Bar	○	○
		10Bar	○	○
		14.5Bar	○	○
		20Bar	○	○
	Coolant chiller		○	○

Category			SL 4000L Series	SL 4000M series
Chip Disposal	Chip conveyor (Hinge / Scaper)	Side	○	○
		Rear	X	X
	Special chip conveyor (drum filter)		△	△
	Chip bucket	Fixed 380L	○	○
		Rotate 275L	○	○
Electrical	3 step patrol lamp and buzzer		●	●
	Lamp for electrical cabinet		X	X
	Remote MPG		X	X
	Work counter	Digital	△	△
	Total counter	Digital	△	△
	Tool counter	Digital	△	△
	Multi counter	6EA	△	△
		9EA	△	△
	Grounded circuit breaker		△	△
	AVR(Auto Voltage Regulator)		X	X
	Transformer		○	○
	Auto Power Off		○	○
Measurement	Tool Presetter	Manual	○	○
	Tool Presetter	Auto	○	○
	Linear scale	X-axis	○	○
		Z-axis	○	○
	Coolant level gauge (requires chip conveyor)		○	○
Environmental	Air conditioner for electrical cabinet		○	○
	Dehumidifier		△	△
	Oil mist collector		○	○
	Oil skimmer		○	○
Automation	Auto door		○	○
	Sub controller		△	△
	Barfeeder interface		△	△
	Additional M-codes (4 pairs)		△	△
	Automation interface		△	△
	I/O expansion (including both IN and OUT)	16 contacts	△	△
		32 contacts	△	△

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

Machine Specifications

[ ] : Option

DESCRIPTION			SL 4000L		SL 4000LM	
			A type	B type	A type	B type
Chuck	Chuck size	inch	12"[15"]	15"[18"]	12"[15"]	15"[18"]
Capacity	Swing over bed	mm(inch)	770(30.32)	770(30.32)	770(30.32)	770(30.32)
	Swing over cross-slide	mm(inch)	615(24.22)	615(24.22)	615(24.22)	615(24.22)
	Max turning diameter	mm(inch)	650(25.60)	650(25.60)	580(22.84)	580(22.84)
	Max turning length	mm(inch)	3,128(123.15)	3,087(121.54)	3,084(121.42)	3,042(119.77)
Spindle	Spindle speed	rpm	2,500	2,000	2,500	2,000
	Spindle nose	ASA	A2-11	A2-11	A2-11	A2-11
	Draw tube ID	mm(inch)	103(4.06)	117.5(4.63)	103(4.06)	117.5(4.63)
	Spindle bore	mm(inch)	115(4.53)	132(5.20)	115(4.53)	132(5.20)
	Main spindle motor (cont/max)	kW(Hp)	18.5/26(24.81/34.87)	18.5/26(24.81/34.87)	18.5/26(24.81/34.87)	18.5/26(24.81/34.87)
Travels	X-axis stroke	mm(inch)	340(13.39)	340(13.39)	340(13.39)	340(13.39)
	Z-axis stroke	mm(inch)	3,170(124.81)	3,170(124.81)	3,170(124.81)	3,170(124.81)
	X-axis rapid traverse	m/min(ipm)	16(629.93)	16(629.93)	16(629.93)	16(629.93)
	Z-axis rapid traverse	m/min(ipm)	20(787.41)	20(787.41)	20(787.41)	20(787.41)
Turret	No of tool positions	ea	12	12	12(BMT 75)	12(BMT 75)
	OD tool size	mm(inch)	32(1.26)	32(1.26)	32(1.26)	32(1.26)
	Boring bar diameter	mm(inch)	60(2.37)	60(2.37)	60(2.37)	60(2.37)
	Indexing time	sec	0.25	0.25	0.25	0.25
	Rotary tool speed	rpm	-	-	4,000	4,000
	Rotary tool motor (cont/max)	kW(Hp)	-	-	5.5/7.5(7.38/10.06)	5.5/7.5(7.38/10.06)
Tailstock	Quill diameter	mm(inch)	160(6.30)	160(6.30)	160(6.30)	160(6.30)
	Quill stroke	mm(inch)	150(5.91)	150(5.91)	150(5.91)	150(5.91)
	Quill taper	MT	MT5 (Built-in)	MT5 (Built-in)	MT5 (Built-in)	MT5 (Built-in)
Machine	Size (with SIDE chip conveyor) LxWxH	mm(inch)	6,360(7,371)×2,267×2,212 (250.04(290.02)×89.26×87.09)		6,360(7,371)×2,267×2,212 (250.04(290.02)×89.26×87.09)	
	Size (with REAR chip conveyor) LxWxH	mm(inch)	-		-	
	Weight	kg(lb)	11,500(25,353.17)	11,500(25,353.17)	11,600(25,573.63)	11,600(25,573.63)
	Coolant tank capacity	Liter(gal)	313(82.69)	313(82.69)	313(82.69)	313(82.69)
Electric power supply		kVA/V	50/220	50/220	50/220	50/220
Controller			FANUC 0i-TF+			

※ Design and specifications are subject to change without notice.

NC Specification / FANUC

● : STD ○ : Optional X : N/A

Functions		0*i*-TF+
Controlled axis	Controlled axes	X, Z, Y, C
	Max simultaneously controlled axes	4
	Least input increment	0.001mm / 0.0001"
	Built-in stroke limit	Soft overtravel 1, 2, 3, 4
	Machine lock	●
Operation functions	Manual handle feed	X1, X10, X100
	Dry run	●
	Single block	●
	Feed per minute	G94
	Feed per revolution	G95
	DNC operation	Ethernet, CF card
	Thread cutting pause	○
Interpolation functions	Linear interpolation	G01
	Circular interpolation	G02, G03
	Dwell	G04
	Cylindrical interpolation	G70.1
	Skip	G31
	Nano smoothing	X
	Polar coordinate interpolation	●
	Reference position (zero) return	G28
	Reference position (zero) return check	G27
	2nd, 3rd, 4th reference point return	G30
	Variable lead thread cutting	●
	Thread repair	●
Feed function	Rapid traverse override	F0, 25%, 50%, 100%
	Feedrate override	0~200%
	Jog override	●
	AI look ahead	X
	AI contour control II	○ (200 block)
Spindle function	Spindle orientation	●
	Rigid tapping	M29
	Spindle override	S0 ~ 150%
	Arbitrary speed threading	○
Tool functions	Tool number command	T4-Digt Tool number
	Tool nose radius compensation	G40 ~ G42
	Tool offset pairs	128-pairs
	Tool geometry / wear offset	●
	Tool length compensation	●
	Tool life management	●
	Tool path graphic display	●

Functions		0*i*-TF+
Program input	Absolute / incremental command	G90/G91
	Repeating canned cycle	●
	Repeating canned cycle 2	●
	Canned cycles	●
	Drilling canned cycle	●
	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
	Direct drawing dimension programming	●
	Programmable data input	G10
	Tape code	ISO / EIA
	Optional block skip	●
	Workpiece coordinate system	G52 ~ G59
	Addition of workpiece coordinate system	X
Interface function	Embedded ethernet	●
	Fast ethernet	X
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 selection function	○
	Machining quality level adjustment	X
	Display screen	15" color LCD
	Multi-language display	25 language
Data input/ output	Fast data server	X
	RS232C interface	●
	Memory card input / output	●
	USB memory input / output	●
Editing operation	Part program storage size	512Kbyte(2Mbyte)
	Number of registered programs	400(1,000) EA
	Manual guide 0i	○
	Manual guide i	●