



Shibaura Machine

View the Future with You

ISO 9001



GOTEMBA plant

SHIBAURA MACHINE CO., LTD.

TOKYO MAIN BRANCH
2-2, Uchisaiwaicho 2-Chome, Chiyoda-ku, Tokyo 100-8503, Japan
TEL:+81-3-3509-0271 FAX:+81-3-3509-0335

SHIBAURA MACHINE CO., AMERICA
Chicago Head Office
755 Greenleaf Avenue, Elk Grove Village, IL 60007, U.S.A.
TEL:847-709-7199 FAX:847-593-9741

Canada Branch
6 Shields Court, Suite 101, Markham, Ontario L3R 4S1, CANADA
TEL:905-479-9111 FAX:905-479-8339

SHIBAURA MACHINE UK LTD.
66 Burners Lane, Kiln Farm, Milton Keynes MK11 3HD
UNITED KINGDOM
TEL:+44-(0)1908-562327 FAX:+44-(0)1908-562348

SHIBAURA MACHINE SINGAPORE PTE. LTD.
Head Office
123 Pioneer Road, Singapore 639596, SINGAPORE
TEL:68611455 FAX:68612023

TOSHIBA MACHINE [THAILAND] CO., LTD.
127/28 Panjathanee Tower, 23rd Floor, Nonthree Road, Khwaeng Chong
Nonthree, Khet Yannawa, Bangkok 10120, THAILAND
TEL:02-681-0158 FAX:02-681-0162

TOSHIBA MACHINE [VIETNAM] CO., LTD.
2nd, VIT Tower, No.519, Kim Ma Street,
Ba Dinh District, Hanoi, VIETNAM
TEL:024-2220-8700,8701 FAX:024-2220-8702

TOSHIBA MACHINE (CHENNAI) PRIVATE LIMITED
No. 65 (P.O. Box No. 5), Chennai-Bangalore Highway, Chembarambakkam,
Poonamallee Taluk, Thiruvallur, Chennai-600123, Tamil Nadu, INDIA
TEL:044-2681-2000 FAX:044-2681-0303

SHIBAURA MACHINE TAIWAN CO., LTD.
No.62, Lane 188, Jui-Kuang Road, Nei-Hu District, Taipei, TAIWAN
TEL:02-2659-6558 FAX:02-2659-6381

SHANGHAI TOSHIBA MACHINE CO., LTD.
Head Office
4788, Jin Du Road, Xinzhuang Industry Zone, Shanghai, 201108
PEOPLE'S REPUBLIC OF CHINA
TEL:021-5442-0606 FAX:021-5866-2450

TSS-C series

Vertical Boring & Turning Mill



* We reserve the right to change any of specifications in this catalog without notice in order to effect improvements.

Shibaura-Machine's TSS-C series machines, which have a high reputation for performance and versatility are now available with additional features.

We have added table indexing capability and a live spindle to allow boring, drilling and tapping operations. This is the TSS-C(S) model.

■ **TSS-C(S) model was developed with the addition of a live spindle and table indexing to the CNC vertical boring and turning machine of single column type.**

TSS-C(S) model also performs machining operations as boring, drilling and tapping.

Positioning accuracy of rotary axis $\pm 15\text{sec.} / 360^\circ$
 Repeatability of rotary axis $\pm 10\text{sec.}$

With the optional C-axis HEIDENHAIN rotary scale

Positioning accuracy of rotary axis $\pm 4.5\text{sec.} / 360^\circ$ (Optimum data)
 Repeatability of rotary axis $\pm 2.0\text{sec.}$ (Optimum data)



■ **Table diameter/maximum swing assures stable machining even of large-diameter workpieces.**

The TSS-C series preserves the best features of single-column machines.

The stationary column and the moving table perform stable and accurate machining of large-diameter workpieces, larger the table diameter.

20/40 : **2 000/4 000 mm (78.7/157.5 in)**
 30/55 : **3 000/5 500 mm (118.1/216.5 in)**

■ **Two super-precision roller bearings of table maintain excellent stability.**

The table supported by two roller bearings stabilizes heavy-duty machining operations at high speed even at machining of large-diameter work.

■ **Highly rigid column and arm**

The box-shaped column and the arm integrated with the rear angle support enhance rigidity dramatically.

■ **Stiff saddle of closed mono-block structure**

The 250 mm (9.84 in) square ram and the closed type single-block constructed saddle enclosing the ram assure high rigidity.

Maximum cutting force of ram

External machining

C : **35 000 N {3 570 kgf}(7 865 lbf)**
 C(S) : **30 000 N {3 060 kgf}(6 740 lbf)**

■ **Highly rigid roller type linear guides**

Roller type linear guides are employed for the rail head guideway (X-axis) to assure smooth high-speed feed and micro feed. The positioning accuracy has also increased.

Photo:TSS-30/55C with optional accessories.
 (Option no. 1 3 5 6 7 9 11 14 17 20)

TSS-C Single-Column type
 CNC Vertical Boring & Turning Mills
series



Powerful, accurate and easy-to-operate. The new TSS-C series presents a new standard of single-column type machines. HIGH PRODUCTIVITY

Table

The table is supported by a super-precision thrust cylindrical roller bearing and a tapered roller bearing, it maintains stable heavy-duty cutting operations at high speed even at machining of large-diameter workpieces.

The table is driven by the main motor and a large diameter helical gear under the table through a V belt and speed change gear train. Table speed change is performed by a two-range hydraulic shift and AC motor control.

Maximum load on table (TSS-C)

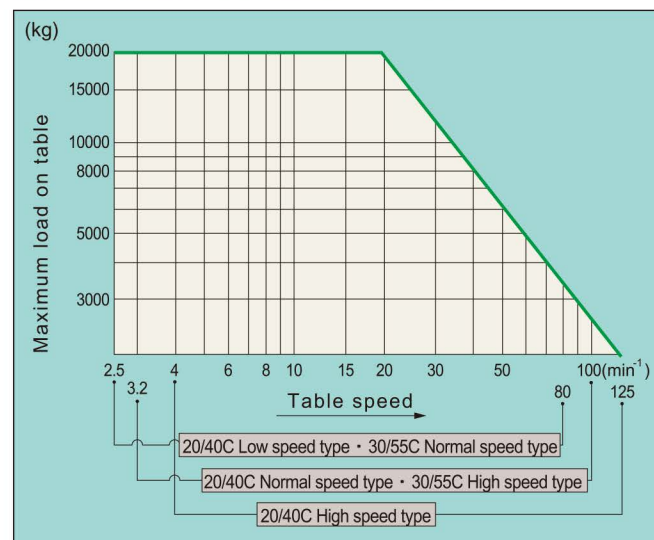
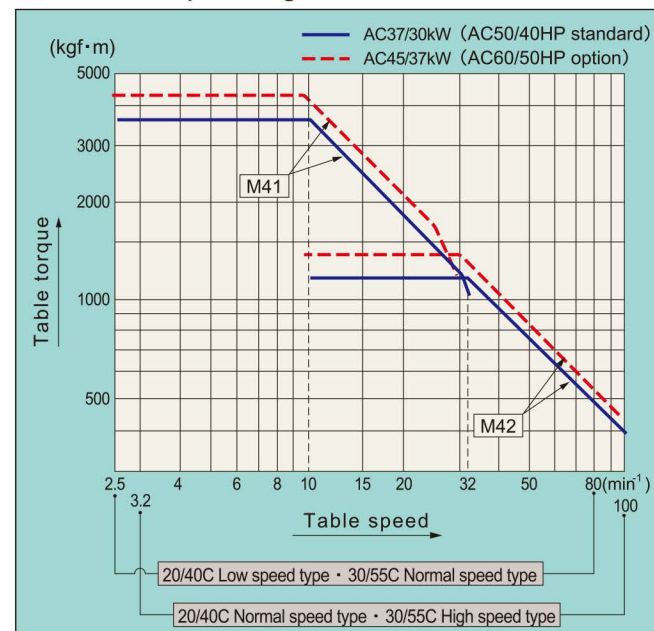
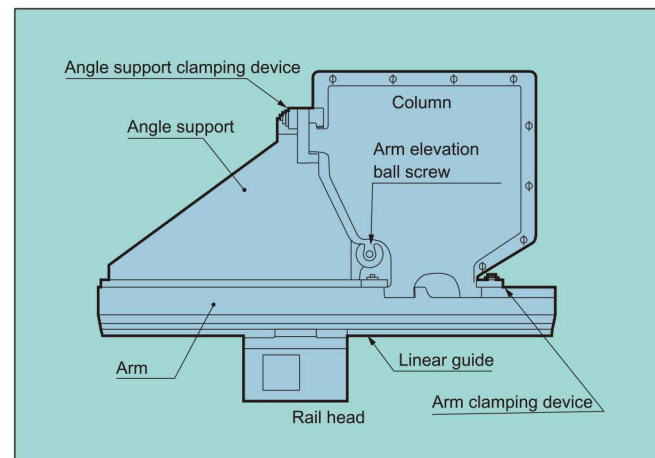


Table-torque diagram (TSS-C)

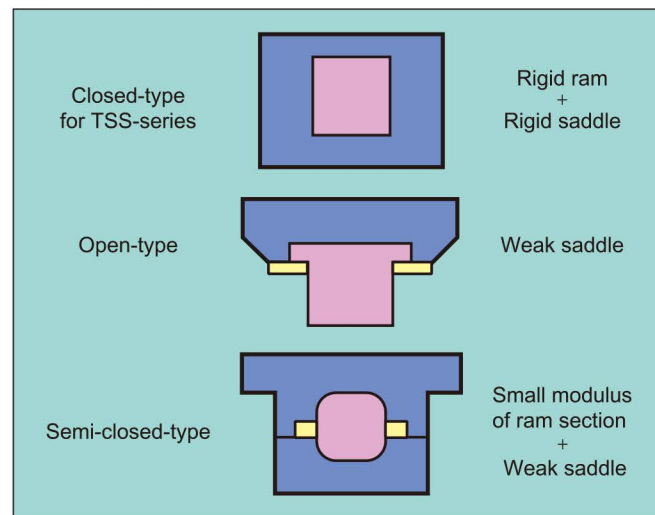


Column and arm

The thick-walled, well-ribbed and box-shaped column has a wide sectional area to assure high rigidity and supports the arm by three guideways. The arm, integrated with the rear angle support, transmits cutting reaction force exerted on the rail head to the column with high efficiency.



Closed type rail head

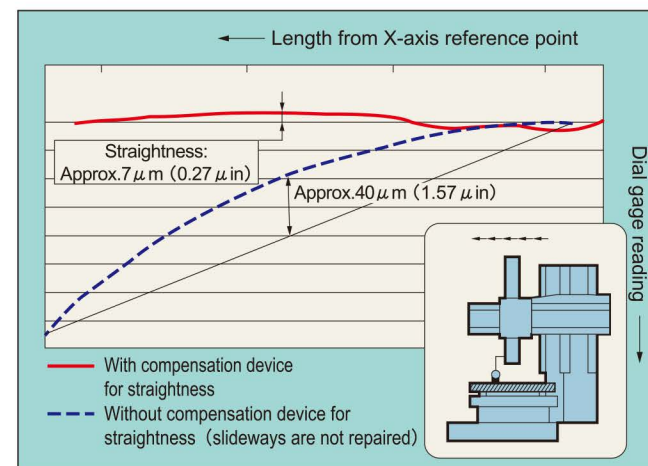


Compensation device for straightness of rail head (patent pending)

When incorporated in the machine, the compensation device for straightness of rail head travel (option) automatically compensates arm deflection according to the rail head movement. Thus, more accurate working accuracies can be assured.



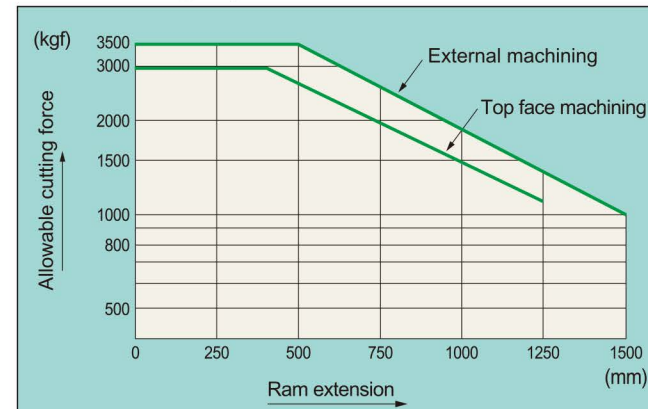
Straightness of rail head travel (X-axis)



Closed type rail head

The maximum cutting force of the ram is more than twice that of our conventional machines even when the ram is extended to its maximum stroke. The maximum output of live spindle is 18.5kW (25HP). The closed type single-block constructed rail head enclosing a 250mm (9.84in) square ram and other main machine components made of high-grade cast iron all assure high rigidity and quality machining.

Ram cutting capacities (TSS-C)



Example of machining data (TSS-C)

Workpiece material	AISI1049	AISI1049
Machining diameter	mm (in)	mm (in)
Cutting direction	Z-axis ↓ (External machining)	Z-axis ↓ (External machining)
Ram extension length	mm (in)	mm (in)
Cutting speed	m/min (fpm)	m/min (fpm)
Depth of cut	mm (in)	mm (in)
Feedrate	mm/rev (in/rev)	mm/rev (in/rev)
Cutting force of ram	kgf (lbf)	kgf (lbf)

1kgf ≒ 10N

Standard Accessories

1 Installation parts	1 set
2 Special service tools	1 set
3 Automatic slideway lubricating unit	1 set
4 Locally operated 4-jaw chuck (6 ton)	1 set
5 Automatic arm clamping devices	1 set
6 Arm slide cover	1 set
7 Table lubricant oil cooling unit	1 set
8 Power table traverse device	1 set
9 Automatic main power source OFF device	1 set
10 Chip guard (removable sections)	1 set
• Height of chip cover	from table top 750mm (29.5in)
• Inner diameter of chip cover	20/40 : ϕ 2 600mm (102.4in), 30/55 : ϕ 3 650mm (143.7in)

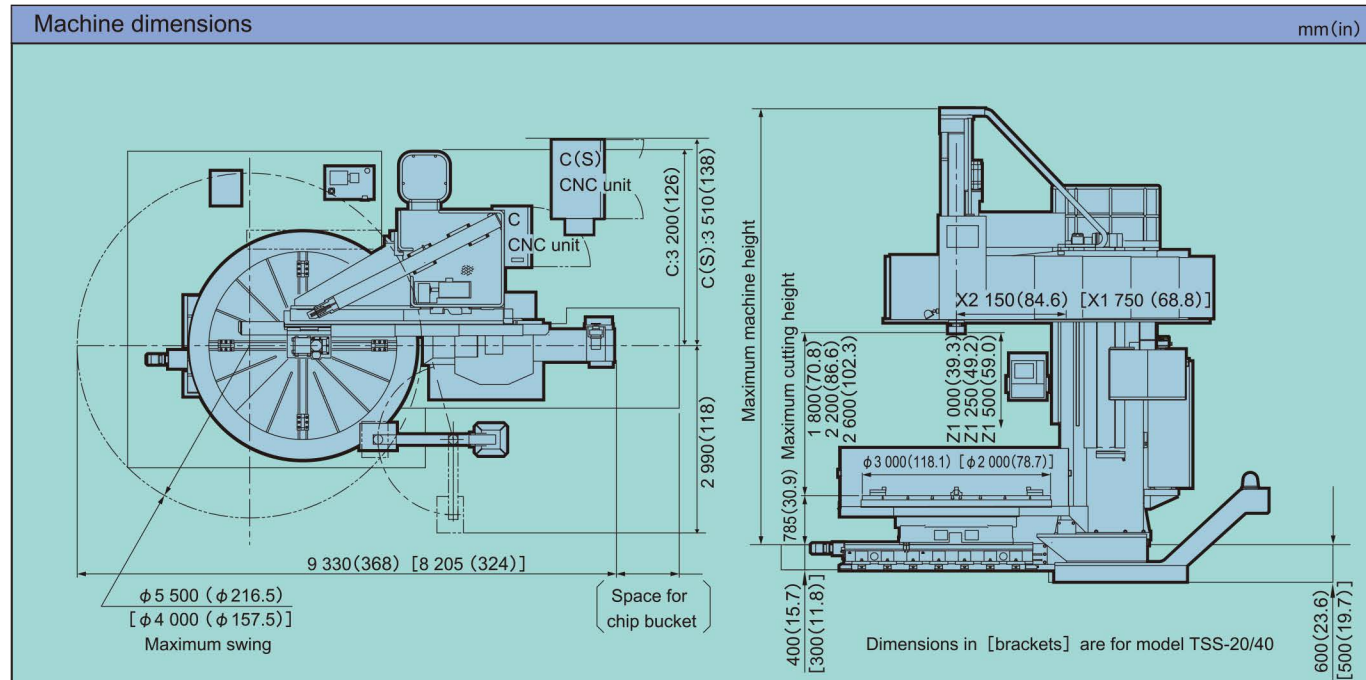
Optional Accessories

- Coolant unit (only water-soluble coolant can be used)
Flow rate of coolant pump 80 ℓ / min (21 gal / min)
Coolant tank capacity 400 ℓ (105 gal)
- Coolant through tool device (manifold required)
※When selecting coolant through tool please issue designated holder-OH type
- Automatic tool changer (ATC)

	TSS-C	TSS-C(S)
Tool storage capacity	12 tools	24 tools •for turning 8 tools •for milling 16 tools
Type of tool shank	JIS 55T	JIS 50T
Type of pull-stud	JIS 55P	JIS 50P
Maximum tool size	W500(19.7) × T150(5.9) × L500(19.7)mm (in)	W400(15.7) × T150(5.9) × L500(19.7)mm (in)
Maximum tool weight	70kg (154 lbs)	50kg (110 lbs)
Total tool weight	500kg (1 102 lbs)	
Tool selection	Soft tool pot address method	

- ATC jib crane
This is the jib crane for lifting a tool-holder.
- Compensation device for straightness of rail head
This is the device that compensates deflection of the arm automatically along with travel of rail head.
Accuracy Straightness of rail head (X-axis)
0.01mm(0.00039in) / 1 000mm(39.3in)
- Hand rails and ladder on column
This is installed on the column for maintenance.
These items are necessary if the "compensation device for straightness of rail head" is selected.
- Chip conveyor It is arranged on the right side of the table.
- Rotary conveyor It is arranged to the outside circumference of the table.
- Work light (Spot light type)
It is arranged on the left side of the rail head. Halogen lamp 50W
- Work light (Fluorescent lamp type)
It is arranged in front of the rail head. 36W × 1pc.
- Operator call lamp (Green, Yellow and Red)
- Extension supports for table (spider)
8 beams
Maximum diameter 20/40 ϕ 4 000mm (157.4in)
30/55 ϕ 5 500mm (216.5in)
- Locally operated 4-jaw chuck (8ton) 4pcs.
- Operating platform for arm and sub-pendant control box for operating platform
- Custom paint Machine exterior
- Automatic radius and step difference measuring device (with automatic tool compensation function)
- Automatic tool tip measuring device (with automatic tool compensation function)
- Splash guard with slide door
- Various tool holders
- HEIDENHAIN rotary scale for table indexing C(S) only

※Items 5 6 are necessary when C(S) machine model is selected.



Machine Specifications			20/40	30/55					
Capacity	Table diameter	mm(in)	2 000 (78.7)	3 000 (118.1)					
	Maximum swing	mm(in)	4 000 (157.5)	5 500 (216.5)					
	Maximum swing that can process a center	mm(in)	3 200 (125.9)	4 000 (157.4)					
	Maximum cutting height (Distance from table top to tool-holder under face)	Standard	mm(in)	1 800 (70.8)					
		High type 1	mm(in)	2 200 (86.6)					
		High type 2	mm(in)	2 600 (102.3)					
	Section dimension of square ram	mm(in)	250 × 250 (9.84 × 9.84)						
	Maximum size of bite on square tool-holder	mm(in)	32 × 32 (1.2 × 1.2)						
	C Maximum cutting force	N {kgf} [lbf]	35 000 {3 570} [7 870]						
	C(S) Maximum cutting force	N {kgf} [lbf]	30 000 {3 060} [6 740]						
	Maximum load on table	kg (lb)	20 000 (44 090)						
	Table speed	Normal	min ⁻¹	2~100	2~80				
		High speed	min ⁻¹	2~125	2~100				
	Table drive motor (30min/cont.)	kW (HP)	AC 45 / 37 (60 / 50)						
	Maximum table torque	C	N·m {kgf·m} [ft·lbf]	42 765 {4 360} [31 500]					
C(S)		N·m {kgf·m} [ft·lbf]	45 785 {4 668} [33 700]						
C(S) Spindle speed	Spindle speed	min ⁻¹	1~1 500						
	Maximum spindle torque	N·m {kgf·m} [ft·lbf]	350 {35.6} [258]						
	Spindle drive motor (30min/cont.)	kW (HP)	AC 18.5 / 15 (25 / 20)						
	Machining performance	Drilling	mm	ϕ 58					
Tapping		mm	M36 × P4						
Travel	Horizontal travel of rail head (X-axis)	mm(in)	1 750 (68.9)	2 150 (84.6)					
	Vertical travel of ram (Z-axis)	Standard	mm	1 000 (39.3)					
		Long type 1	mm	1 250 (49.2)					
		Long type 2	mm	1 500 (59.0)					
	Vertical travel of arm	Standard	mm	1 200 (47.2)					
Long type 1		mm	1 600 (62.9)						
Long type 2	mm	2 000 (78.7)							
Feedrate	Feedrate (X- and Z-axis)	mm/min (ipm)	1~2 000 (0.1~78.7)						
	Rapid traverse of rail head (X-axis)	mm/min (ipm)	10 000 (393)						
	Rapid traverse of ram (Z-axis)	mm/min (ipm)	8 000 (314)						
	C(S) Rapid traverse of rotary axis (C-axis)	deg/min	360						
Tool	C	Type of tool shank	7/24 taper No.55T						
		Type of pull stud	JIS 55P						
	C(S)	Type of tool shank	7/24 taper No.50T						
		Type of pull stud	JIS 50P						
Machine size	C	Floor space	mm(in)	8 205 × 6 190 (324 × 244)	9 330 × 6 190 (368 × 244)				
			C(S)	mm(in)	8 205 × 6 500 (324 × 256)	9 330 × 6 500 (368 × 256)			
	C	Machine weight	kg (lb)	30 000 (66 140)	35 000 (77 170)				
			C(S)	kg (lb)	31 000 (68 350)	36 000 (79 370)			
	Machine height	C	Ram stroke	mm(in)	1 000 (39.3)	1 250 (49.2)	1 500 (59.0)		
				Machine height	mm(in)	Standard	5 660 (223)	5 910 (233)	6 160 (243)
						High type 1	6 060 (239)	6 310 (249)	6 560 (259)
		High type 2	6 460 (255)			6 710 (265)	6 960 (274)		
		C(S)	Machine height	mm(in)	Standard	6 145 (242)	6 395 (252)	6 645 (262)	
					High type 1	6 545 (258)	6 795 (268)	7 045 (278)	
High type 2	6 945 (274)				7 195 (284)	7 445 (294)			

※The requirement space of machine may differ by equipped options.
Please confirm the details on our specifications.

CNC system for enhanced productivity

CNC SYSTEM

CNC FANUC Series31iA

An updated high-performance CNC FANUC Series 31iA is used as the NC system. In addition to the existing operating functions, the FANUC 31iA is complete with such display functions as help function, alarm/operation status display and servo/spindle waveform display (10.4" color LCD spec). Operability has also improved.

Manual operation

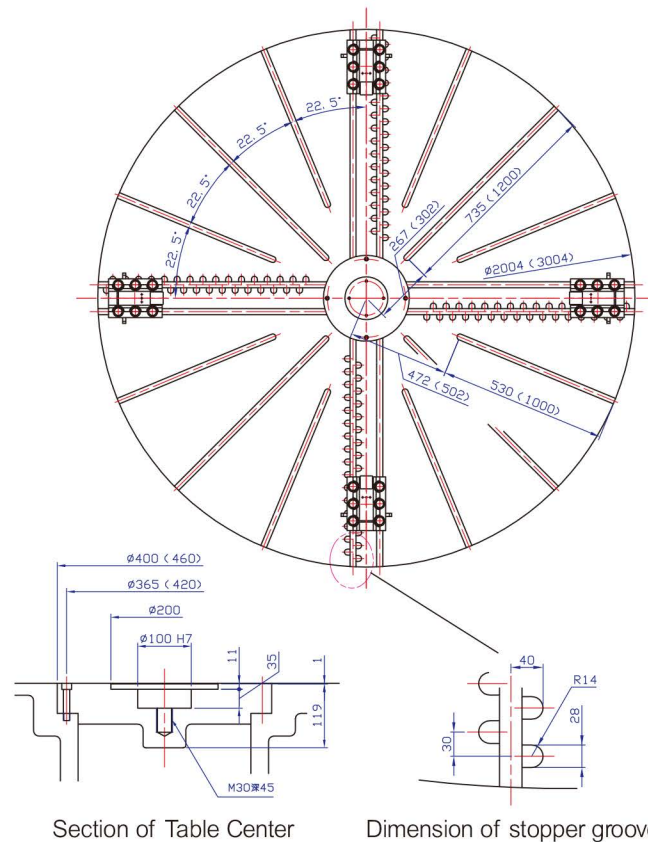
In addition to the CNC operation, the TSS-C machines can easily be operated manually, as required, through the pendant box which contains the necessary pushbuttons and other control switches such as table forward/reverse, X-and Z-axis feed selector switches, table speed override switch, feedrate switch, feedrate override switch, operation mode selector switch and manual pulse generator (MPG). Just as in the conventional machines, efficient manual operations are possible, while observing the tool edge.



Photo : 15" Color LDT(Option)

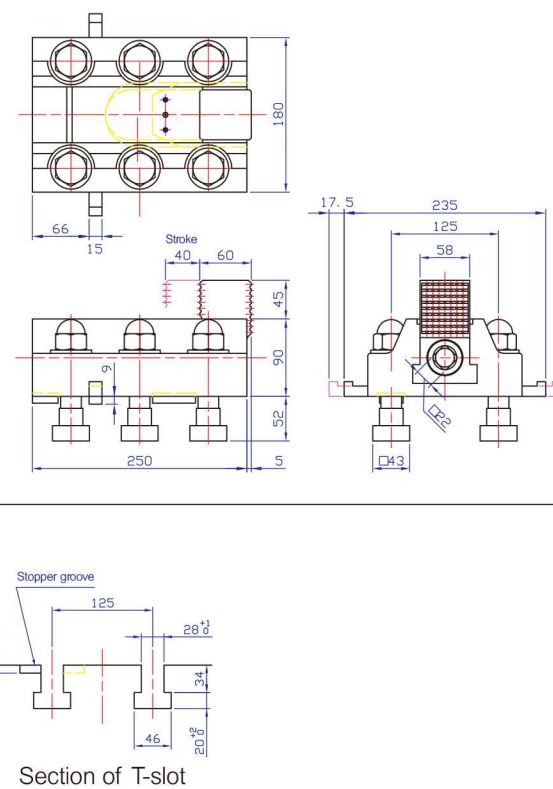
TABLE OUTER VIEW

Dimension indicate for 20/40 (30/55)



Individually operated chuck jaws

4pcs.
Maximum clump force 6ton



NC Options

TSS-C		
1. NC Pack Specifications (Marked with ☆ for only C(S) type)		
1-1	☆Controllable axis	3 axis
1-2	☆Cs contouring control	
1-3	☆Least input increment	Increment system C
1-4	Inch/metric conversion	
1-5	Program restart	
1-6	Manual handle feed	1 unit
1-7	Manual handle feed rate	x1:0.001mm (0.0001in) or 0.0001deg/pulse x10:0.010mm (0.0010in) or 0.0010deg/pulse x100:0.100mm (0.0100in) or 0.0100deg/pulse
1-8	Manual handle interruption	
1-9	☆Polar coordinate interpolation	
1-10	Thread cutting retract	
1-11	Optional block skip	Total 9pcs.
1-12	Work coordinate system	G52-G59
1-13	Work coordinate system preset	G50.3(G92.1)
1-14	☆G code system	B
1-15	Chamfering / corner R	
1-16	Custom macro	
1-17	Addition of custom macro common variables	#100-#199, #500-#999
1-18	Multiple repetitive cycles for turning	type I
1-19	☆Canned cycles for drilling	
1-20	Automatic corner override	G62
1-21	Tape format for FS15	
1-22	Spindle serial output	
1-23	Constant surface speed control	
1-24	Spindle orientation	
1-25	☆Spindle output switching function	(Used for milling spindle)
1-26	☆Rigid tap	
1-27	Tool nose radius compensation	
1-28	Tool offset	
1-29	Stored pitch error compensation	
1-30	Back ground editing	
1-31	Multi part program editing	English or Japanese
1-32	Operator message history display	
1-33	Run hour and parts count display	
1-34	Multi language display	English or Japanese
1-35	Graphic function	
1-36	Reader / puncher interface	Ch.1
1-37	External data input	including External tool offset, External reference position shift and External message
2. NC Special Specification (select user options) Marked with ∇ Available for C(S) type only.		
2-1	Simultaneous controllable axis	3axis
2-2	Stored stroke check 2,3	
2-3	Stored limit check before move	
2-4	Chuck and tale stock barrier	
2-5	Sequence number comparison and stop	
2-6	Tool retract and recover	
2-7	∇Cylindrical interpolation	
2-8	∇Helical interpolation	
2-9	∇Hypothetical interpolation	
2-10	Variable lead thread cutting	
2-11	Circular thread cutting	
2-12	High speed skip function	Is necessary for automatic measuring options.
2-13	Addition of work coordinate system	48 pairs

2-14	Direct drawing dimension programming	
2-15	Multiple repetitive cycles for turning	type II
2-16	Manual guide i	
	Manual guide i basic	
	∇Manual guide i milling cycle	
	Manual guide i turning cycle	
	Manual guide i animation	
2-17	Spindle positioning	
2-18	Tool offset pair	Total 64 pairs Total 99 pairs
2-19	2nd geometry tool offset	
2-20	Tool life management	
2-21	Part program storage size	128Kbyte (approx. 1 050ft) 256Kbyte (approx. 2 100ft) 512Kbyte (approx. 4 200ft)
2-22	Number of registerable programs	Expansion 1
2-23	Playback	
2-24	Machining time stamp	
2-25	Memory card program entry count extension	Max 1000
2-26	Fast data server	The optional board included
2-27	Data server buffer mode	
2-28	Fast Ethernet	The optional board included
2-29	Programmable mirror image	G50.1/G51.1
2-30	∇Rotary axis control Rotary axis control Display C-axis:0 to 360deg.	
2-31	Program number O8-digit	
2-32	15inch color LCD	

Note 1: Total expansion number depends on the part program storage size as follows.

Part program storage size	Number of registerable programs	Part program storage size	Number of registerable programs
64 Kbyte	120	256 Kbyte	500
128 Kbyte	250	512 Kbyte	1 000