

TOSHIBA MACHINE

TDS series

VERTICAL BORING AND TURNING MILL

TDS series is used to manufac work pieces with exceptional

TDS series is a double column vertical borin technology for the heavy machining industry.



- Construction provides high rigidity and high accuracy.

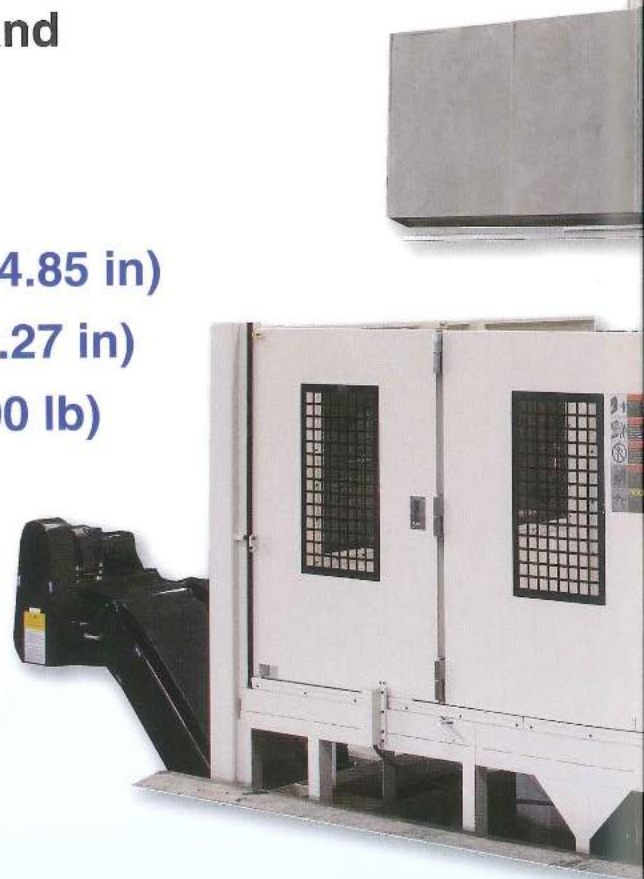
- Maximum work piece

Maximum swing 5 000 mm (16 ft-4.85 in)

Maximum height 2 750 mm (9 ft-0.27 in)

Maximum load 30 000 kg (66 000 lb)

- Integrated live milling spindle minimizes work piece handling and set-up.



ture large diameter and heavy accuracy and productivity.

g machine designed with proven



The above picture includes optional accessories.

Machine structure assures high rigidity and precise accuracy.



Rigid structure achieves high accuracy

Toshiba designed table creates efficient machining capability. Cast iron table is supported by large diameter thrust bearing for axial loads and a taper roller bearing for radial loads. Thus, heavy duty and high speed machining are exceedingly efficient.



Bed design creates high thermal rigidity

Cast iron bed has symmetrical arranged ribs to provide solid support for the table. Along with an oil cooling unit, the thermally symmetrical design generates minimal thermal distortion.



Solid rail head design

- 250mm×250mm (9.84in×9.84in) Square ram guide support ram on all four sides
- Solid high-grade cast iron rail head assures high rigidity.

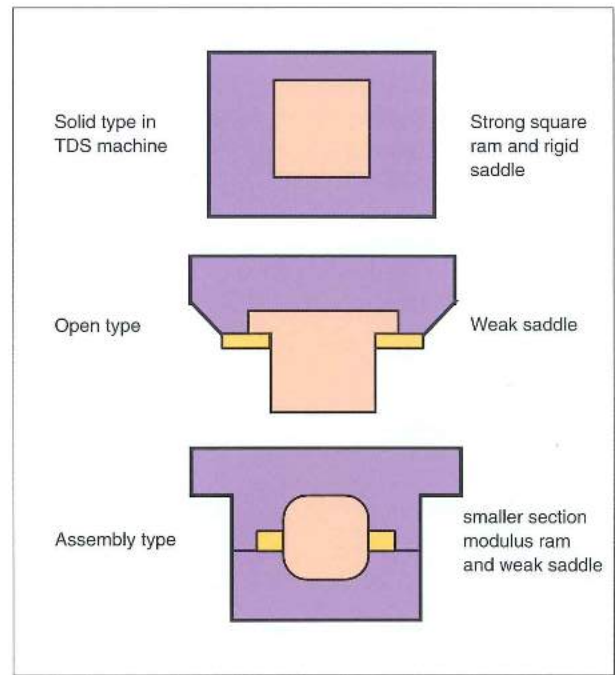
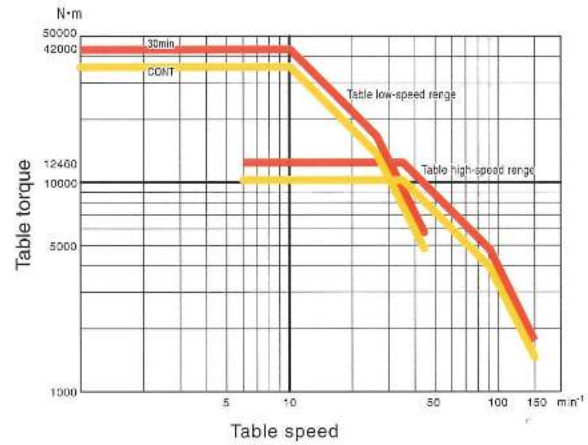
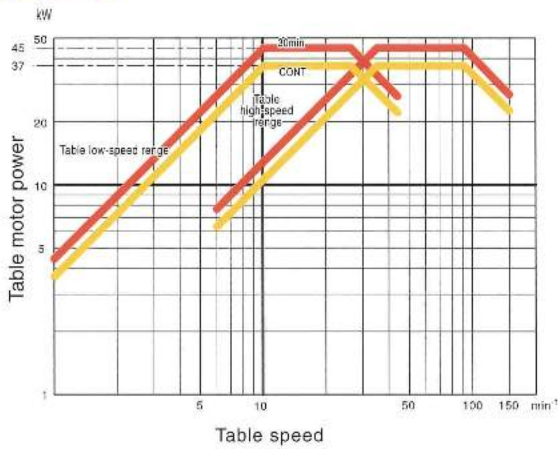
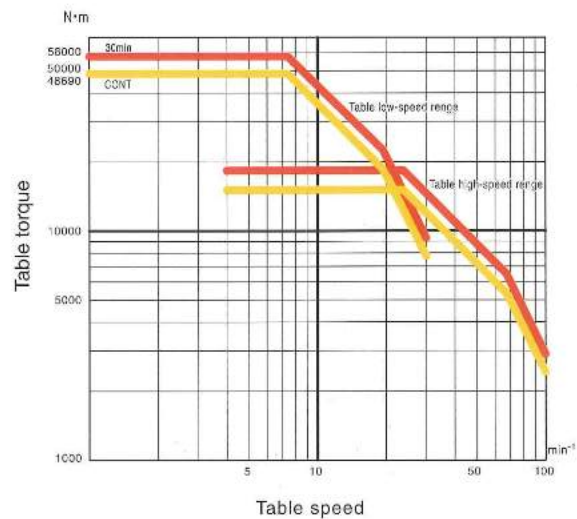
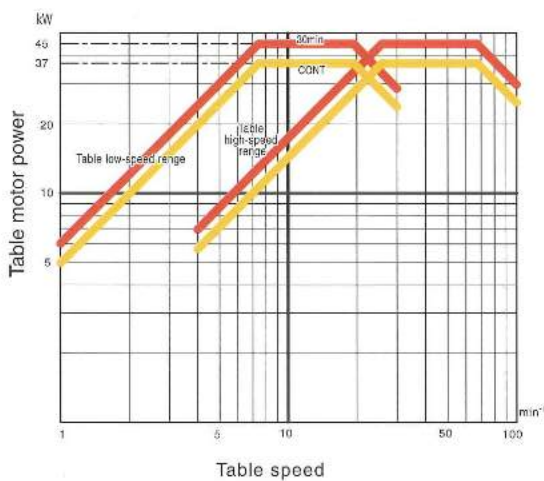


Table Torque-Power diagram

TDS-30/40

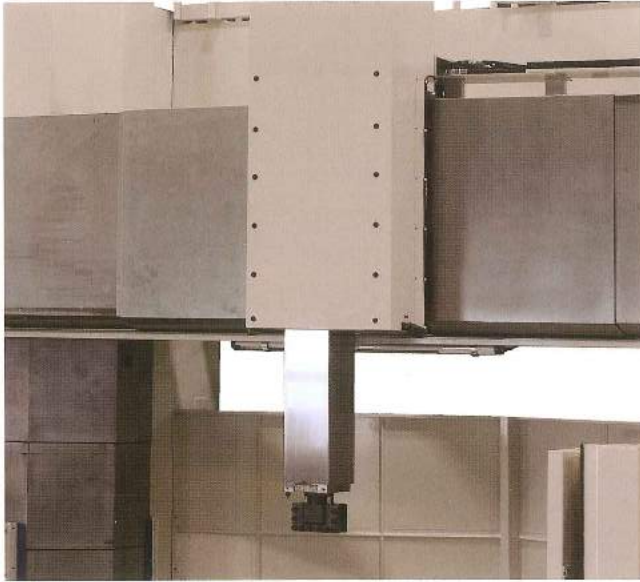


TDS-40/50

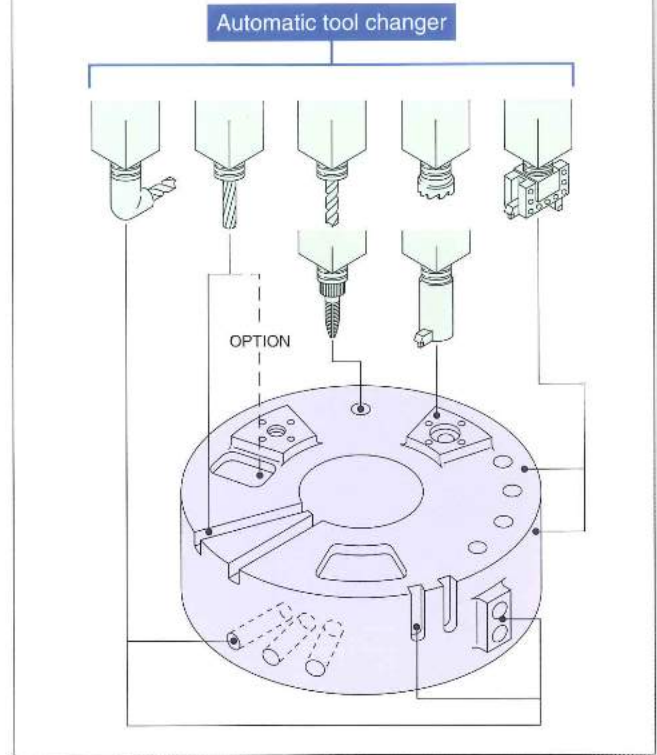


High performance cross rail

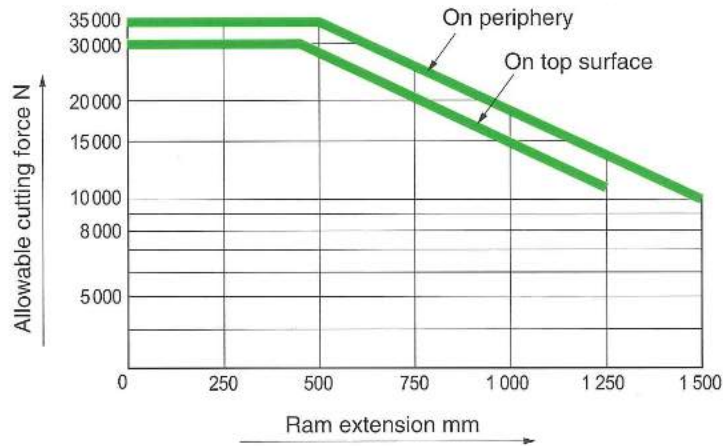
Large diameter ball screws position the railhead on the X axis along linear guide bearings. While the Z axis is guided by turcite b box slide ways to provide high positioning accuracy.



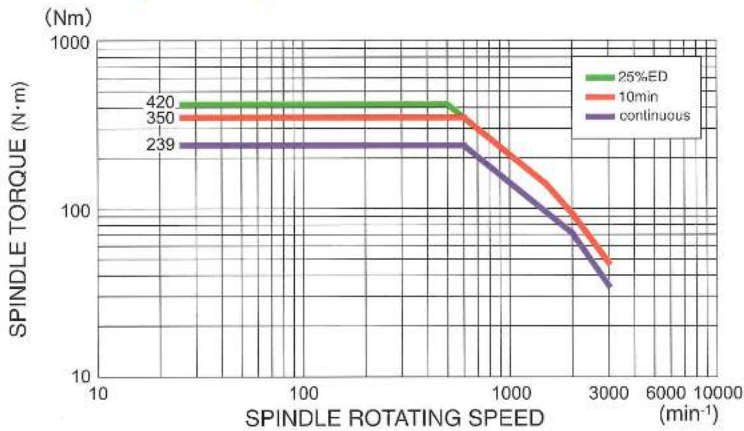
Machining examples



Ram machining capability diagram



Spindle torque diagram



Machine specifications

			TDS-30/40	TDS-30/40(S)	TDS-40/50	TDS-40/50(S)
Machine capacity	Table diameter	mm(in)	3 000 (118.11)		4 000 (157.48)	
	Maximum swing	mm(in)	4 000 (157.48)		5 000 (196.85)	
	Maximum height from table surface to ram bottom	mm(in)	2 700 (106.3)		2 950 (116.14)	
	Maximum machining height	mm(in)	2 500 (98.425)		2 750 (108.268)	
	Maximum machining diameter	mm(in)	4 000 (157.48)		5 000 (196.85)	
	Maximum cutting force of ram	N(lbf)	35 000 (7 868)	30 000 (6 744)	35 000 (7 868)	30 000 (6 744)
	Maximum mass on table	kg(lb)	30 000 (66 139)			
Travel	Horizontal travel of rail head (X-axis)	mm(in)	-2 050~2 150 (-80.709~84.646)		-2 550~2 650 (-100.394~104.33)	
	Vertical travel of ram (Z-axis)	mm(in)	1 500 (59.055)			
	Vertical travel of crossrail (Not NC-axis)	mm(in)	1 750 (68.9) 250 mm pitches, 8 positions (9.843 inch pitches, 8 positions)			
Table	Table speeds	min ⁻¹	1~150		1~100	
	Number of speed ranges		2 ranges			
	Maximum table torque	N·m(lbf·ft)	42 000 (30 979)		58 000 (42 780)	
Spindle	Spindle speeds	min ⁻¹	-	30~3 000	-	30~3 000
	Maximum spindle torque	N·m(lbf·ft)	-	420 (309.79)	-	420 (309.79)
Feedrate	X-axis rapid traverse rate (Horizontal travel of rail head)	m/min (ipm)	10 (394)			
	Z-axis rapid traverse rate (Vertical travel of ram)	m/min (ipm)	10 (394)			
	X-axis and Z-axis feedrate	mm/min (in/min)	1~2 000 (0.039~78.74)			
	Positioning speed of crossrail	mm/min (in/min)	300 (11.811)			
	Table rapid traverse rate	deg/min	-	360	-	360
	Table feedrate	deg/min	-	180	-	180
Ram	Type		Square ram type			
	Guideway		4-side closed type			
	Sectional dimensions	mm(in)	250×250 (9.843×9.843)			
Tool	Type of tool shank		7/24 taper No.55	7/24 taper No.50	7/24 taper No.55	7/24 taper No.50
	Type of retention knob		JIS 55P	JIS 50P	JIS 55P	JIS 50P
	Tool clamping force	kN(lbf)	60 (13 488)	40 (8 992)	60 (13 488)	40 (8 992)
Electric motors	For table rotation	kW(HP)	VAC 45/37(60/50) (30-min. rating/cont. rating)			
Machine size	Height	mm(ft)	7 000 (22.97)	7 500 (24.61)	7 000 (22.97)	7 500 (24.61)
	Floor area	mm(ft)	11 000×7 000 (36.09×22.97)		12 000×7 600 (39.37×24.93)	
	Mass of machine	kg(lb)	43 000 (94 799)	44 000 (97 003)	54 000 (119 050)	55 000 (121 254)
Accuracy	Positioning accuracy of linear axes	mm(in)	±0.010 per 1 000 (±0.0004 per 39.37)			
	Positioning repeatability of linear axes	mm(in)	±0.003 (±0.00012)			
	Positioning accuracy of rotary axis	sec	-	360° per ±10"	-	360° per ±10"
	Positioning repeatability of linear axes	sec	-	±5"	-	±5"

Standard Accessories

- (1) Installation parts
- (2) Servicing (or maintenance) tools
- (3) Stairways and handrail
- (4) Automatic lubrication unit for guideways
- (5) Crossrail step positioning unit
- (6) Telescopic crossrail guideway steel slide cover
- (7) Table lubricant oil cooling unit
- (8) Four (4) independent manual-operated jaws
(Maximum clamping force: 6 ton per each jaw)
- (9) Automatic main power OFF unit
- (10) Splash cover

Turning Basic Package

- (1) Automatic tool changer (ATC)

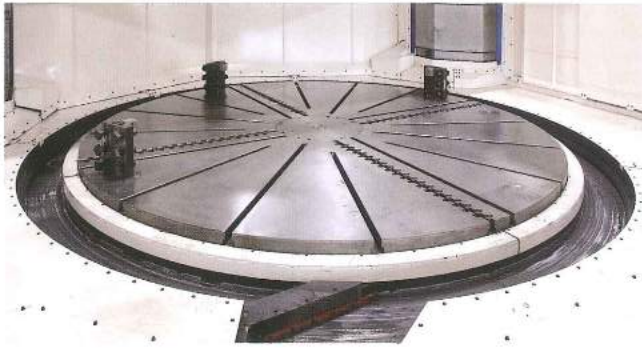
	TDS	TDS-(S)
Tool storage capacity	12 tools	24 tools 8 for turning 16 for rotation tool
Type of tool holder shank	7/24 taper No.55	7/24 taper No.50
Maximum tool dimensions W × T × L	500 × 150 × 500 mm (19.68 × 5.91 × 19.68)	400 × 150 × 500 mm (15.75 × 5.91 × 19.68)
Maximum tool mass	70kg (154.32 lbs)	50kg (110.23 lbs)
Total tool mass	500kg (1,102 lbs)	
Method of tool selection	Software tool pot address	

- (2) Work light
- (3) Operator call lamp (3-colored signal tower)
- (4) Auto power OFF function
- (5) Coolant unit
 - Integrated with the chip conveyor in Item 6 below
 - Coolant tank capacity: 800 L [211.4gallon]
 - Coolant delivery: 80 L/min [21.14gallon/min] (at pump delivery port)
 - Note: Use a fire-resistant water-soluble coolant.
- (6) Chip conveyor
 - Integrated with the coolant tank in Item 5 above
 - Hinged pan type

Optional Accessories

- (1) Jib crane for ATC
 - Maximum lifting mass: TDS:70 kg(154.32lb) TDS-(S):50 kg(110.23lb)
- (2) Rotary conveyor (arranged around the table)
- (3) Coolant-through-tool function (CTT) NOTE : The function is not allowed to be selected together with (10) listed bellow.
- (4) Automatic workpiece diameter and step measuring unit (including automatic tool compensation function)
- (5) Automatic tool nose measuring unit (including automatic tool compensation function)
- (6) X-axis linear scale feedback
- (7) Z-axis linear scale feedback
- (8) Independent manual-operated 8t clamping jaws (4 jaws)
 - NOTE : If this accessory is selected, Standard accessory number (8) don't include.
- (9) Various tool holders
- (10) Automatic tool changer (ATC) Mounted on the left side of the crossrail.
 - NOTE : The function is not allowed to be selected together with (3) listed bellow.
- (11) Through spindle type coolant delivery system (CTS)
- (12) Rotary scale for table indexing (Heidenhain)
 - NOTE : Items of 10,11,and 12 above are available only on a machine model TDS-(S).

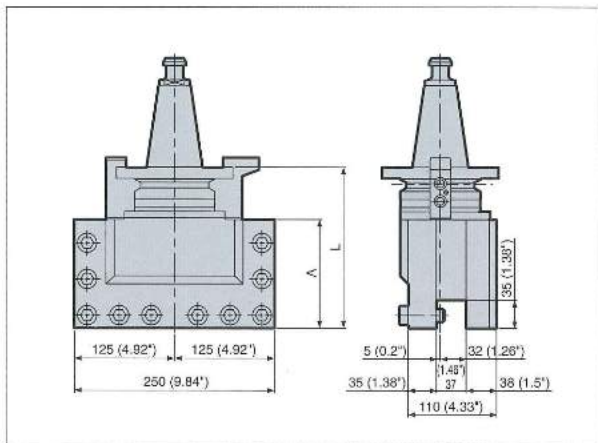
Rotary conveyor (Option)



Automatic tool nose measuring unit (Option)



Various tool holders (Option)

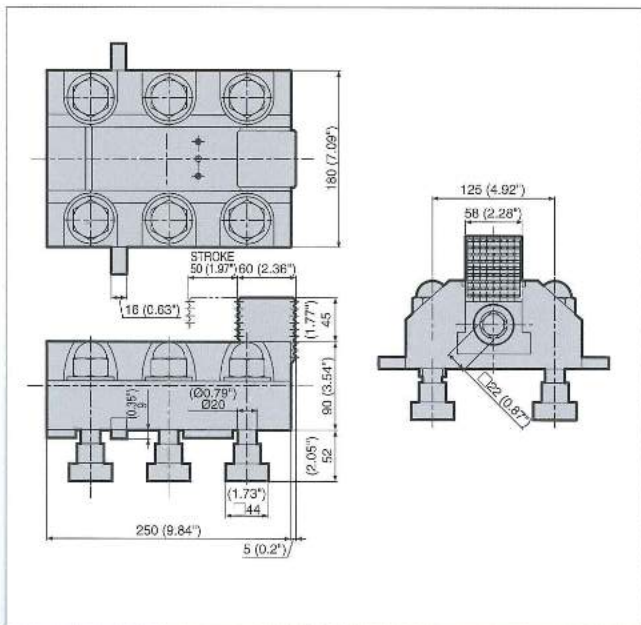


Unit : metric and inch in ()

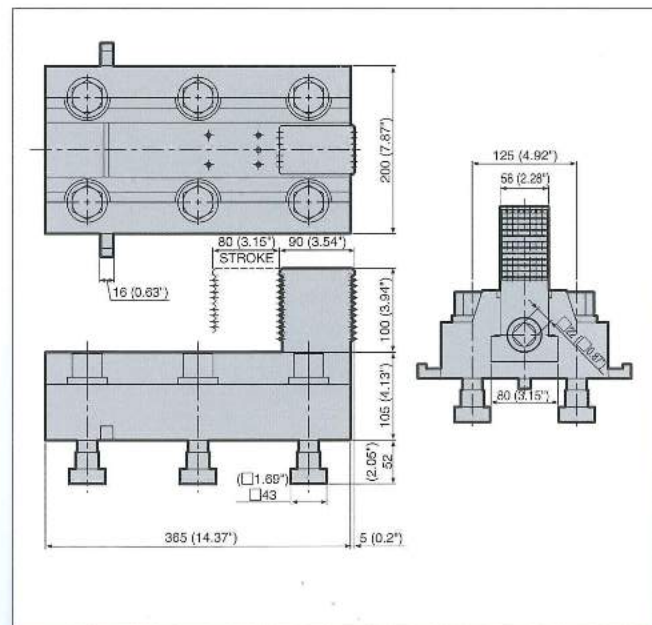
		A	L	Taper shank type
TDS	FM55-STW3232-160	100 (3.94)	160 (6.30)	7/24 taper No. 55T
	FM55-STW3232-200	140 (5.51)	200 (7.87)	
	FM55-STW3232-250	190 (7.48)	250 (9.84)	
TDS-(S)	FMX50D-STW-160-J	95 (3.74)	160 (6.30)	7/24 taper No. 50T
	FMX50D-STW-200-J	135 (6.30)	200 (7.87)	
	FMX50D-STW-250-J	185 (7.28)	250 (9.84)	

Please contact us for special request when you require.
We have plural other type of holders.

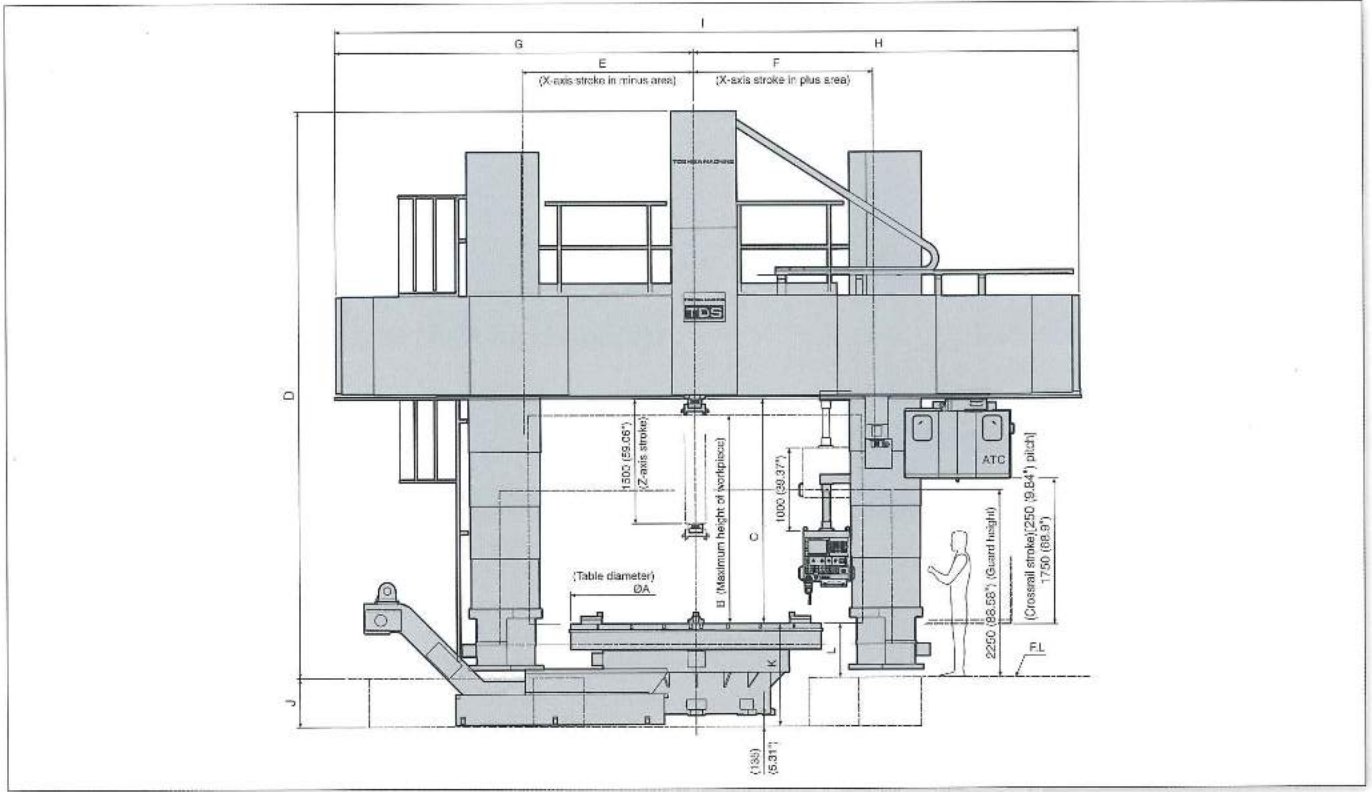
Standard clamping jaws (4 jaws)



High power clamping jaws (4 jaws) (Option) Clamping force is 8 tons.

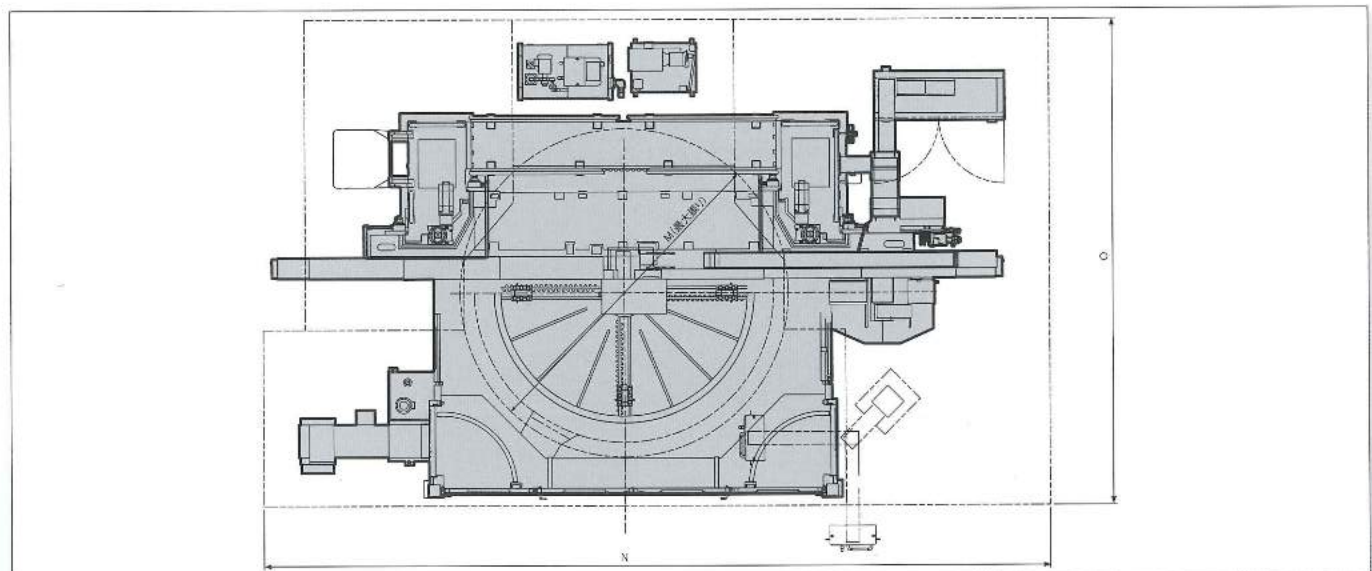


General View



	A	B	C	D	E	F	G	H	I	J	K	L
TDS-30/40	3 000 (118.1)	2 500 (98.4)	2 700 (106.3)	6 800 (267.7)	2 050 (80.7)	2 150 (84.6)	4 310 (169.7)	4 625 (182.1)	8 935 (351.8)	585 (23.0)	1 235 (48.6)	650 (25.6)
TDS-40/50	4 000 (157.5)	2 750 (108.3)	2 950 (116.1)	6 800 (267.7)	2 550 (100.7)	2 650 (104.3)	4 810 (189.4)	5 125 (201.8)	9 935 (391.1)	935 (36.8)	1 335 (52.6)	400 (15.8)
TDS-30/40(S)	3 000 (118.1)	2 500 (98.4)	2 700 (106.3)	7 400 (291.3)	2 050 (80.7)	2 150 (84.6)	4 310 (169.7)	4 625 (182.1)	8 935 (351.8)	585 (23.0)	1 235 (48.6)	650 (25.6)
TDS-40/50(S)	4 000 (157.5)	2 750 (108.3)	2 950 (116.1)	7 400 (291.3)	2 550 (100.7)	2 650 (104.3)	4 810 (189.4)	5 125 (201.8)	9 935 (391.1)	935 (36.8)	1 335 (52.6)	400 (15.8)

Unit : metric and inch in ()



	M	N	O
TDS-30/40	4 000 (157.5)	11 000 (433.1)	6 100 (240.2)
TDS-40/50	5 000 (196.9)	12 000 (472.4)	9 300 (366.1)
TDS-30/40(S)	4 000 (157.5)	11 000 (433.1)	6 100 (240.2)
TDS-40/50(S)	5 000 (196.9)	12 000 (472.4)	9 300 (366.1)

Unit : metric and inch in ()

CNC system specifications



Efficient operation panel

Manual operation

The operation panel includes all necessary controls for such manual operations as table start CW/CCW, railhead vertical/horizontal movement, mode selection, feedrate override, table speed override and MPG handwheel feed. As with conventional manual machines, efficient operation is possible through the panel while observing the tool tip.

Abundant NC functions for simplified and diverse machining operations

Such as constant surface speed control, multiple repetitive cycles for turning and custom macros are included in the pack specifications.

CNC System Specifications FANUC Series 31i-B

Standard and Pack Specifications

(Items marked * signify the pack options.)

Axis Control

Total controlled axes	
TDS	Two (2) axes
TDS-(S)	Three (3) axes
Simultaneously controllable axes	Two (2) axes

Axis name	
TDS	X, Z
TDS-(S)	X, Z, C

Extended axis name	
	(Max. three (3) characters.)
	Not used for the standard specifications.)
Minimum input increment	X- and Z-axes: 0.001 mm (0.0001 inch)
	(Diametral designation for X-axis)

*Inch/metric selection	
Interlock	
Machine lock	All axes
Emergency stop	
Overtravel	
Stored stroke check 1	
Mirror image	Effected on each axis.
Follow-up	At emergency stop
Servo OFF	
Chamfering ON/OFF	

Operation

Automatic operation (memory mode)	
MDI operation	
DNC operation	(Attached with reader puncher interface.)
DNC operation, using memory card	
	A compact flash card and special adapter are necessary.
Program number search	
Sequence number search	
*Program restart	
Error operation prevention function	
Buffer register	
Dry run	
Single block	
Manual feed (jog)	Feed in 21 steps 0 ~ 2,000 mm/min (0 ~ 78.74inch)

Manual reference point return	
Reference point return speed setting	
Reference point shift	
*Handwheel feed	One (1) pc.
*Scale factor for handwheel feed	x1 (0.001 mm/division) (0.0001 inch)
	x10 (0.010 mm/division) (0.001 inch)
	x100 (0.100 mm/division) (0.01 inch)

*Handwheel feed interruption

Interpolation Function

Positioning	
G00 (Linear interpolation type positioning is also possible.)	
Exact stop mode	G61
Cutting mode	G64
Exact stop	G09
Linear interpolation	

Circular interpolation	
Dwell	
	The stop time is specified by G04. (Max. 99999.999 sec.)
Thread-cutting	Equal-load thread-cutting
Multiple thread-cutting	
*Thread-cutting cycle retract	
Continuous thread-cutting	
Skip	
Reference point return	G28, G29
Reference point return check	G27
2nd reference point return	G30

Feed Function

Rapid traverse rate	(See Para. 2.1 above.)
Rapid traverse override	0 ~ 100 % in 10 % increments
Feed per minute	1 ~ 2,000 mm/min (0.039 ~ 78.74 inch/min)
Feed per revolution	0.01 ~ 500.00 mm/rev (2,000 mm/min or less, however.)

Constant control of tangential speed	
Feedrate clamp	
Automatic acceleration and deceleration	
	Rapid traverse: Linear type
	Cutting feed: Linear type or exponential function type
Bell type rapid traverse acceleration and deceleration	
Feedrate override	0 ~ 200 % in 10 % increments (2,000 mm/min or less, however.)

Override cancel	
Linear acceleration and deceleration after cutting feed interpolation	

Program Input

Tape code	Automatic recognition of EIA/ISO
Label skip	
Parity check	Parity H, parity V
Control in/out	
Optional block skip	One (1) pc.
*Addition of optional block skips	Nine (9) pcs. in total
Maximum programmable dimension	±99999.999 ±9999.999*
Program file name	32 characters
Sequence number	Eight (8)-digit integer following address N

Absolute/incremental programming	
	Joint use in the same block is possible.
Decimal point input, calculator type decimal point input	
Diametral/radial designation	
	(Diametral designation for X-axis)

Plane selection	G17, G18, G19
Coordinate system setting	
Automatic coordinate system setting	
*Work coordinate system	G52 ~ G59
*Work coordinate system preset	G50.3

Manual absolute ON/OFF	
	(Manual absolute ON is used for this machine.)
G code system	TDS: A, TDS-(S) : B

*Chamfering/Corner R	
Programmable data input	G10
Programmable parameter input	

Subprogram call	
	Looping of subprogram up to ten (10) levels is possible.
*Custom macro	

*Addition of custom macro common variables	#100 ~ #199, #500 ~ #999
Canned cycle for single turning	
*Canned cycle for multiple turning	Type I
Arc radius R designation	
*Automatic corner override	G62
*FANUC Series 15 tape format	
	(Can be used by parameter setting.)
Coordinate system shift	
Direct input of coordinate system shift	

Miscellaneous Function/Spindle Function

Miscellaneous function	Two (2)-digit integer following address M
Auxiliary function lock	
High-speed M, S, T, B interface	
Multiple command of Miscellaneous function	
Spindle function	Four (4)-digit integer following address S
*Spindle serial output	
*Constant surface speed control	
Spindle speed override	50 - 120 % in 5 % increments (Maximum speed or less in high-speed or low-speed mode, however.)
*Spindle orientation	

Tool Function/Tool Offset Function

Tool function	"2-2"-digit integer following address T
No. of tool offsets	32
Tool offset	
*Tool nose R compensation	
*Tool profile and tool wear compensation	
Tool offset value counter input	
Tool offset measured value direct input	

Accuracy Compensation Function

Backlash compensation	
Backlash compensation for each of rapid traverse and cutting feed	
Smooth backlash compensation	
*Stored type pitch error compensation	
*BI-directional pitch error compensation	

Editing Operation

Program storage capacity	64 kbyte
	(For the standard specifications, 2 kbyte is assigned for various functions.)
No. of registrable programs	63
	(For the standard specifications, nine (9) programs are used for various functions.)

Program editing	
Program protection	
Extended program editing	
*Background editing	
*Simultaneous editing of two (2) or more programs	
Memory card program editing and operation	No. of registered programs: 63
	To create a program in the memory card, a tool for personal computer is necessary.

Setting/Display

Status display	
Clock function	
Current position display	

Program comment display	Each program name shall consist of 31 characters.
Parameter setting and display	
Alarm display	
Alarm record display	
*Operator message record display	
Operation record display	
*Run hour and part quantity display	
Real speed display	
Real spindle speed and T-code display	
Operating monitor screen	Load meter display, etc.
Servo adjustment screen	
Spindle adjustment screen	
Servo waveform display	
Maintenance information screen	
*Each language display	English
Dynamic changeover of display language	
Data protect key	Four (4) kinds
Parameter setting support screen	
Screen clear	
Help function	
Self-diagnostic function	
Regular maintenance screen	
Hard and soft system structure screen	
Servo information screen	

*Graphic display	
Data Input/Output	
*Reader/puncher interface	Ch 1
*External data input	Including external message, external tool offset and external machine origin shift.
External key input	
External workpiece number search	
Memory card input and output	Program, offset data, parameter, pitch error compensation data, custom macro common variable, work coordinate system setting data, operation record data, tool management data

USB Memory Input/Output	
Screen hard copy	
Automatic data backup	

Communication Function

Built-in Etherne	
Others	
Status output signal	
Display unit integrated with control unit	with 10.4 inch color LCD
MDI unit	Separated MDI
Connectable servo motor	FANUC AC servo motor X-axis: Model aiF40/3000 Z-axis: Model aiF30/3000 (with brake)
Connectable servo amplifier	FANUC AC servo amplifier ai series SVM
Connectable position detector	Pulse encoder/optical scale (2-phase pulse interface)
Connectable spindle drive motor	FANUC AC spindle drive motor Table: Model ail40/6000

Connectable spindle amplifier	FANUC AC spindle amplifier ai series SPM
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Environmental conditions (at operation)	Ambient temperature (at operation): 0 - 58°C Relative humidity (at short term): 95 % or less, non-condensing
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NC Options Optional Specifications

Stored stroke check 2, 3	G22/G23
Pre-travel stroke limit check	
Chuck tailstock barrier	
Sequence number collation and stop	
Tool retraction and return	
Variable lead thread-cutting	G34
Arc thread-cutting	G35/G36
High-speed skip	(Essential when the automatic measuring function is selected.)
Addition of work coordinate systems	48 sets in total
Direct input of drawing dimensions	
Canned cycle II for multiple turning	Pocket profile
Manual guide i	
Manual guide i basic	
Manual guide i turning cycle	
Manual guide i animation	
Spindle positioning	
Extension of tool offsets	64 pcs. in total 99 pcs. in total 200 pcs. in total 400 pcs. in total

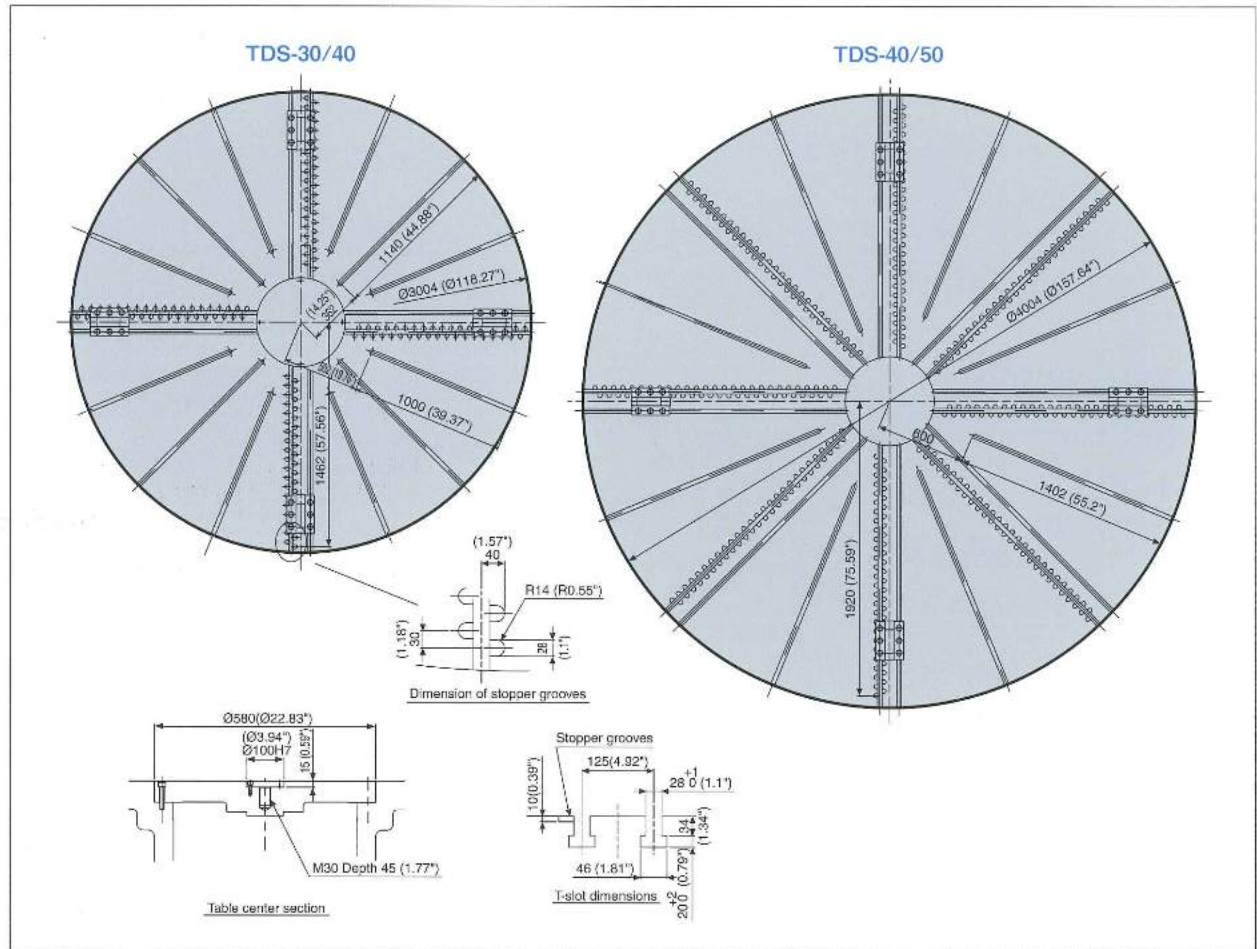
2nd profile tool offset	
Tool management function	64 sets
Program storage capacity	128 kbyte (1,050 ft equivalent) 256 kbyte (2,100 ft equivalent) 512 kbyte (4,200 ft equivalent) 1024 kbyte (8,400 ft equivalent)
No. of registrable programs (*1)	Extension 1
Playback	
Machining time stamp	
Extension of number of registrable memory card programs	1,000 max.

Fast data server (including option board)	
Data server buffer mode	
Fast Ethernet (including option board)	
Programmable mirror image	G50.1/G51.1
Program number consisting of eight (8)-digit integer following address O	
15 inch LCD	
Interruptive custom macro	

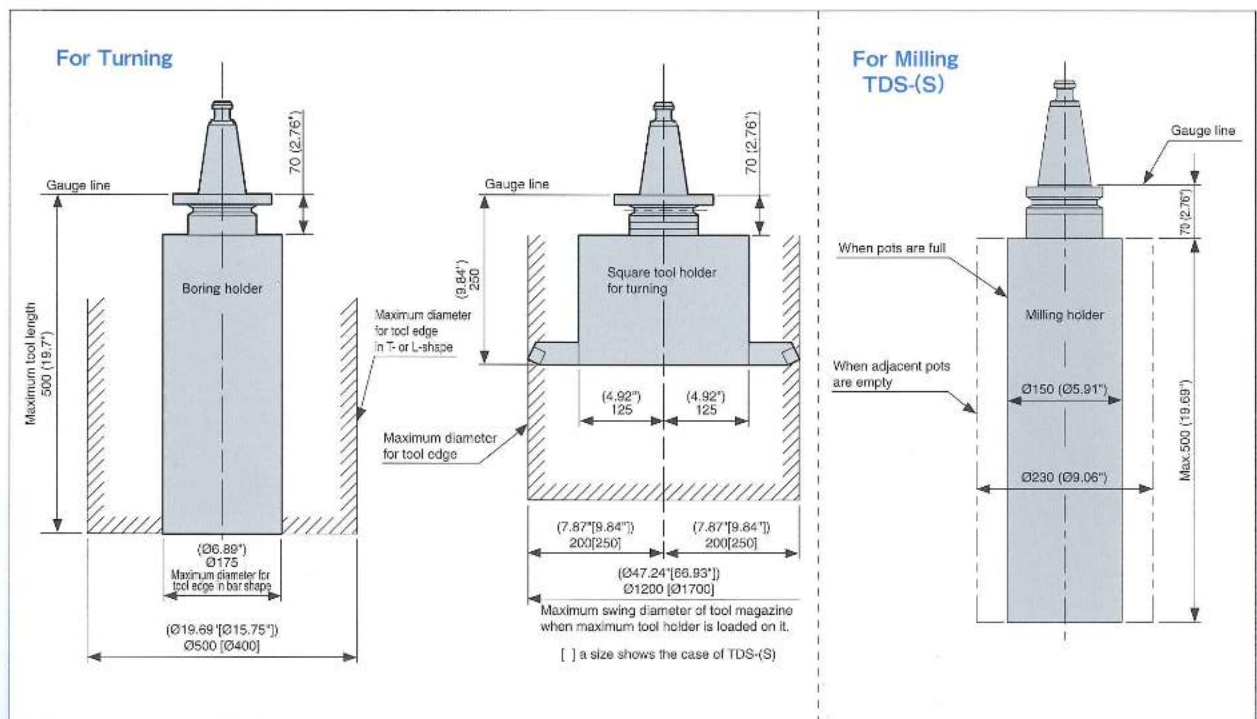
*1: The following combinations are available according to the program storage capacity selected.

Program storage capacity	No. of registrable programs
64 kbyte (standard)	120
128 kbyte	250
256 kbyte	500
512 kbyte	1 000

Table top



Tool dimensions for ATC



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ISO 9001



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