

TDS series

Vertical Boring and Turning Mill



TOSHIBA MACHINE

Best Partner of Leading Industries

ISO 9001



NUMAZU plant GOTEMBA plant

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

TDS series is used to manufacture large diameter and heavy work pieces with exceptional accuracy and productivity.

TDS series is a double column vertical boring machine designed with proven 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)**

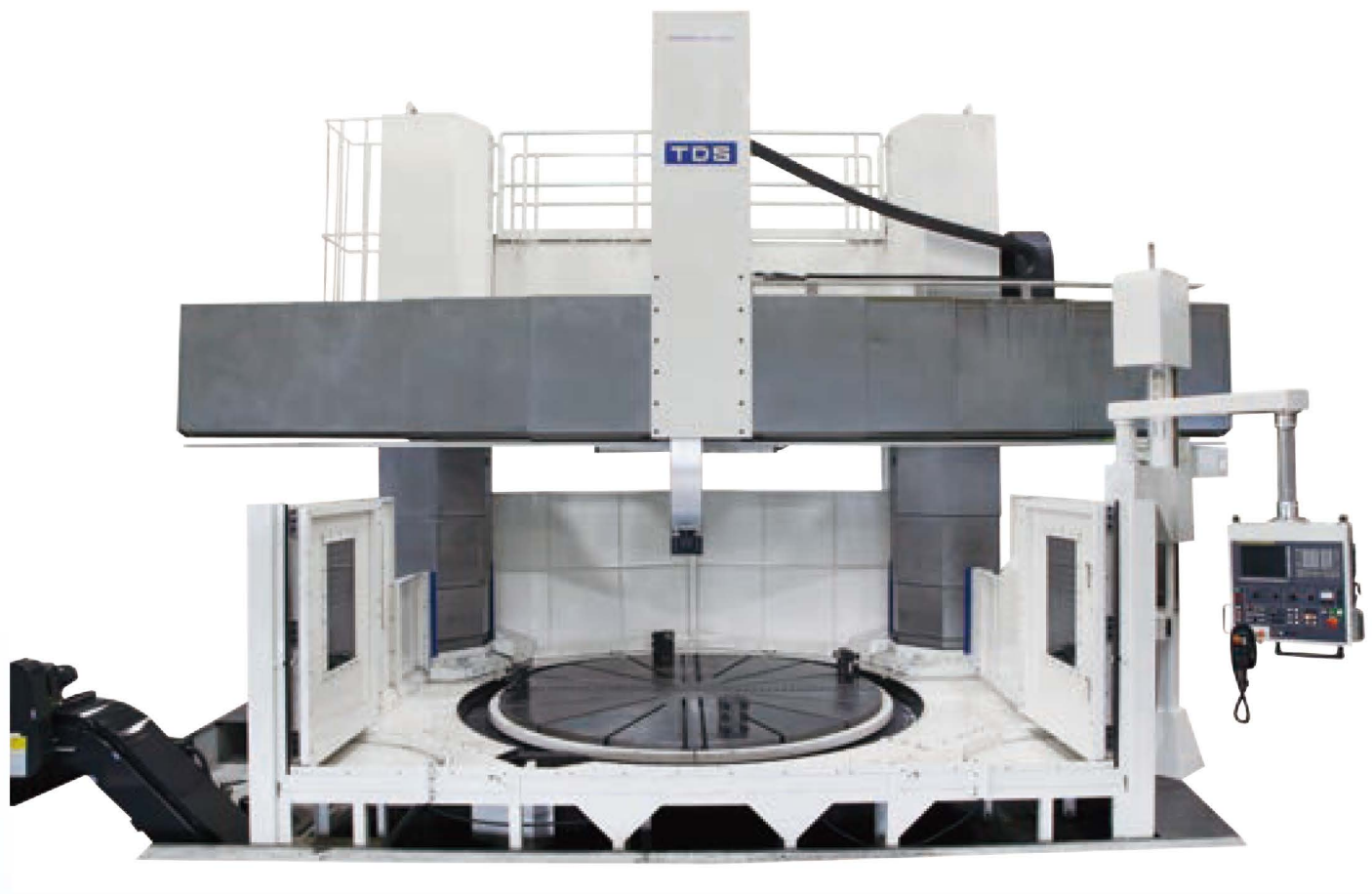
Maximum height **2 750 mm (9 ft-0.27 in)**

Maximum load **30 000 kg (66 000 lb)**

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

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.

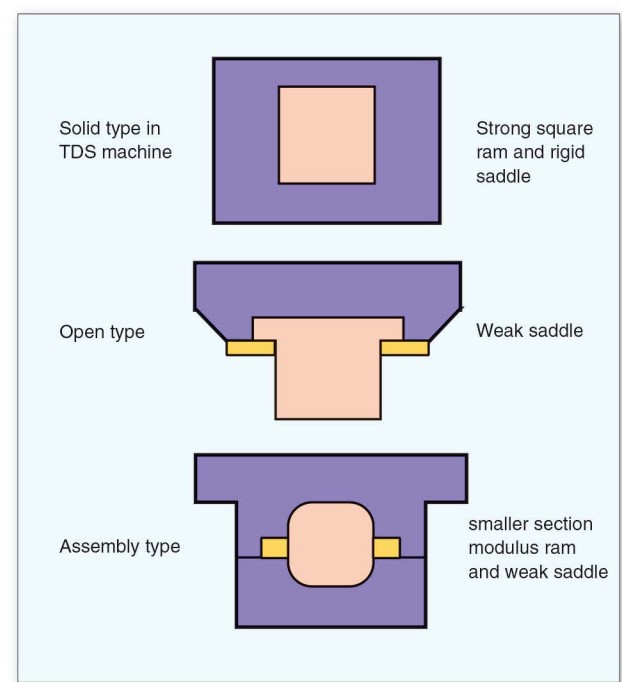
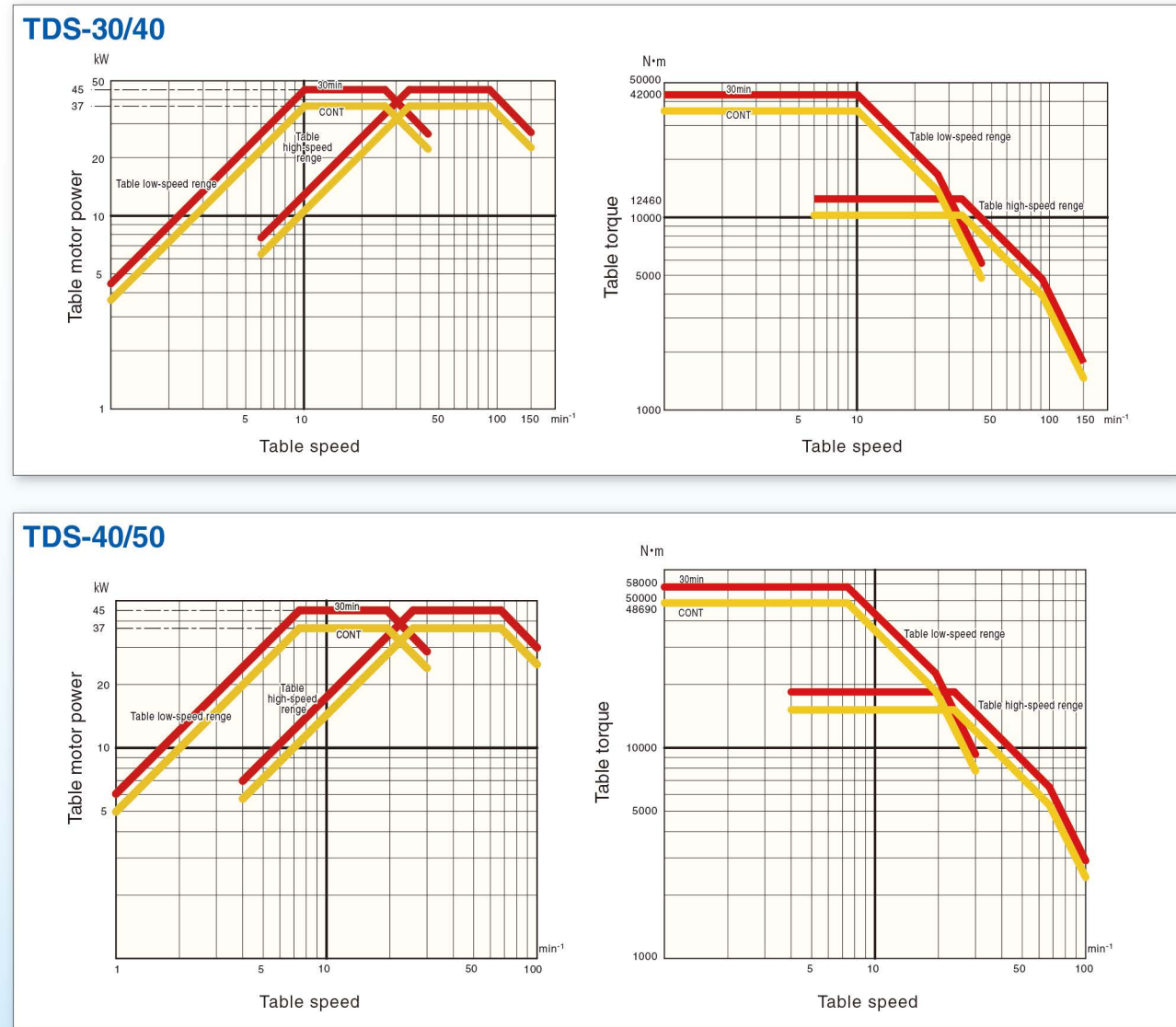


Table Torque-Power diagram

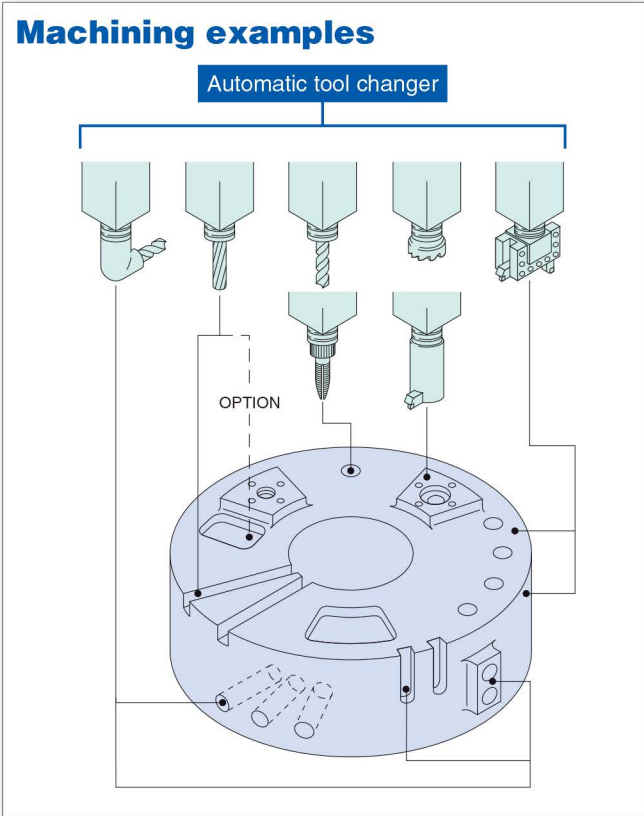


High performance cross rail

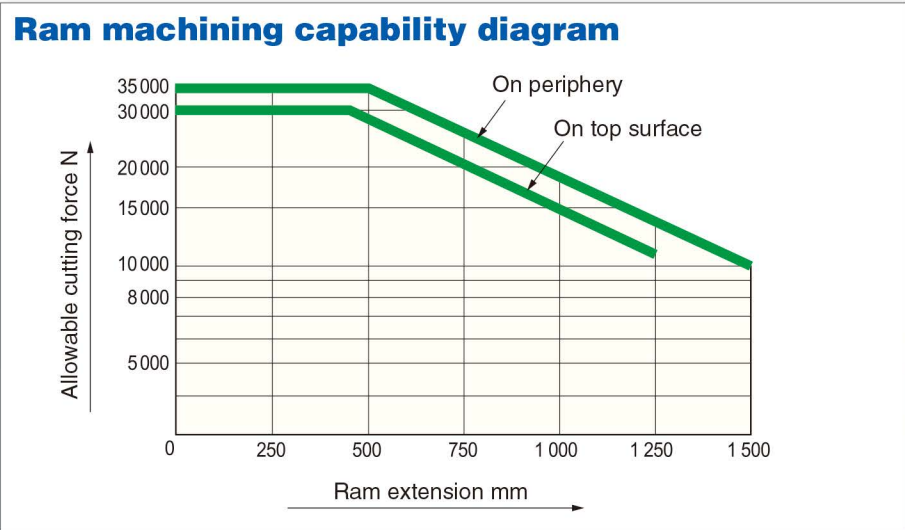
Large diameter ball screws position the railhead on the X axis along linear guide bearings. While the Z axis is guided by turcite b box slide ways to provide high positioning accuracy.



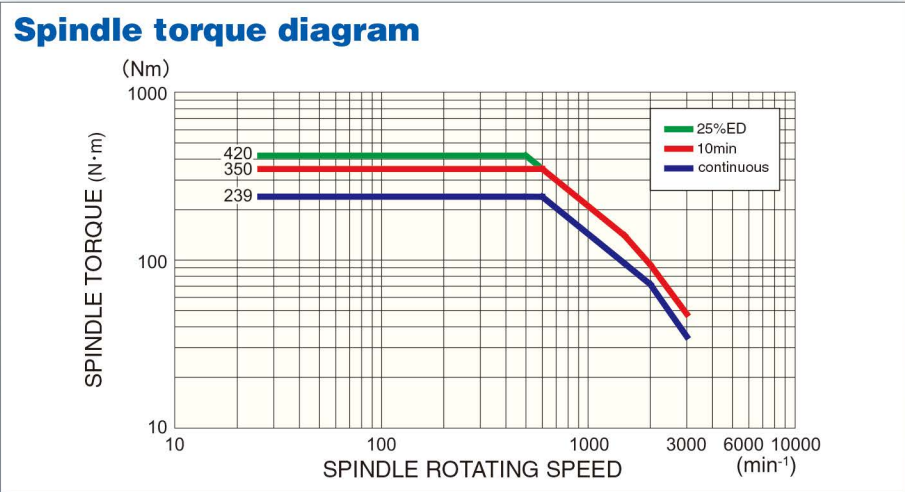
Machining examples



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).

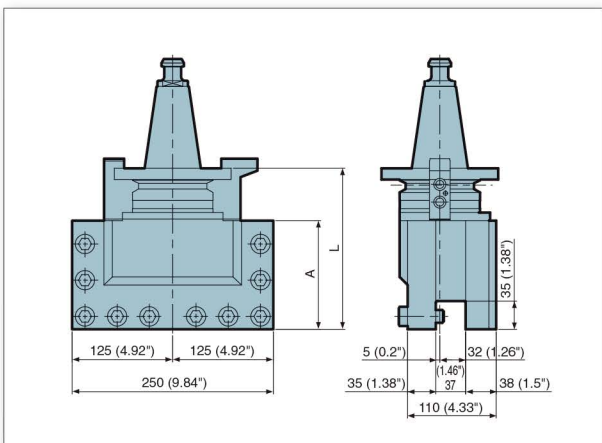
Rotary conveyor (Option)



Automatic tool nose measuring unit (Option)



Various tool holders (Option)

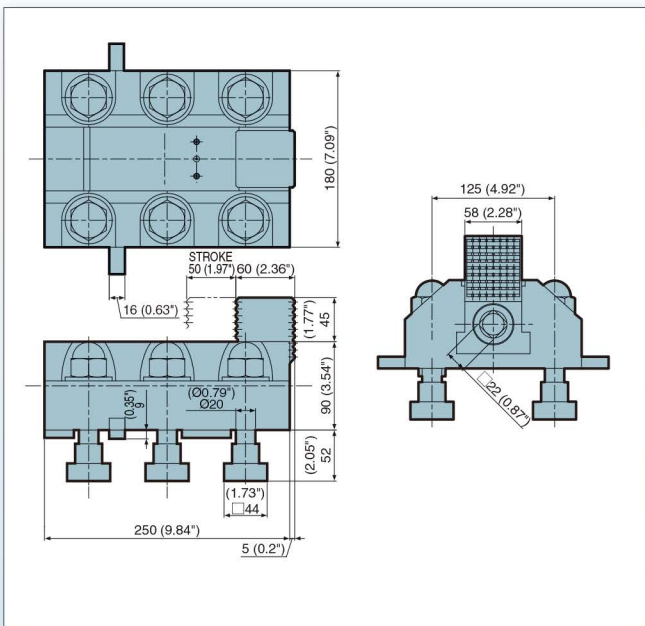


Unit : metric and inch in ()

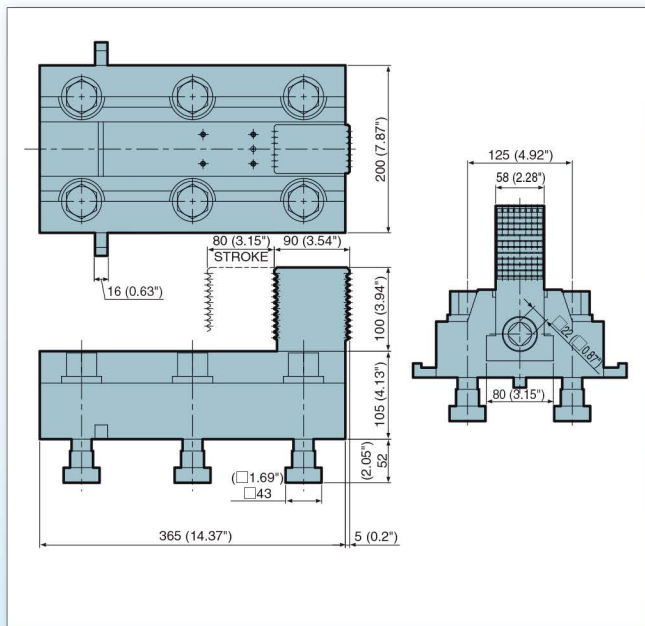
		A	L	Taper shank type
TDS	FM55-STW3232-160	100 (3.94)	160 (6.30)	7/24 taper No. 55T
	FM55-STW3232-200	140 (5.51)	200 (7.87)	
	FM55-STW3232-250	190 (7.48)	250 (9.84)	
TDS-(S)	FMX50D-STW-160-J	95 (3.74)	160 (6.30)	7/24 taper No. 50T
	FMX50D-STW-200-J	135 (6.30)	200 (7.87)	
	FMX50D-STW-250-J	185 (7.28)	250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

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

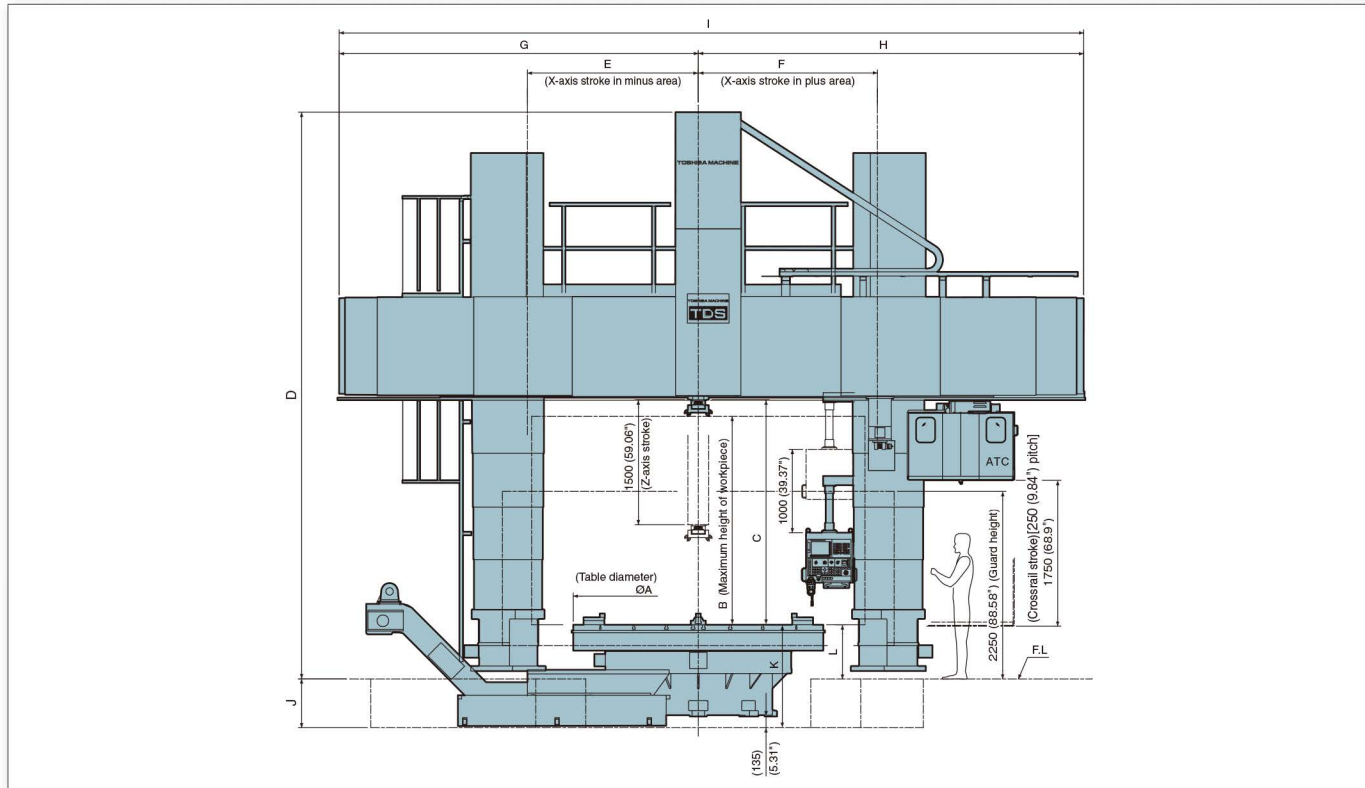
Standard clamping jaws (4 jaws)



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

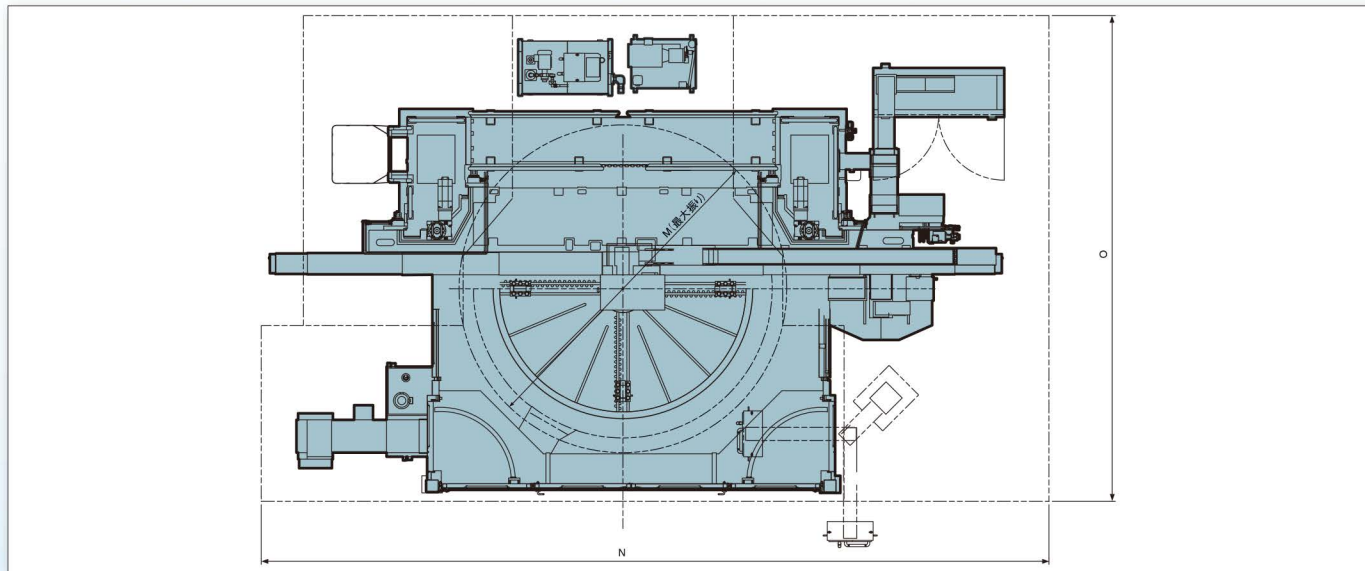


General View



	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)

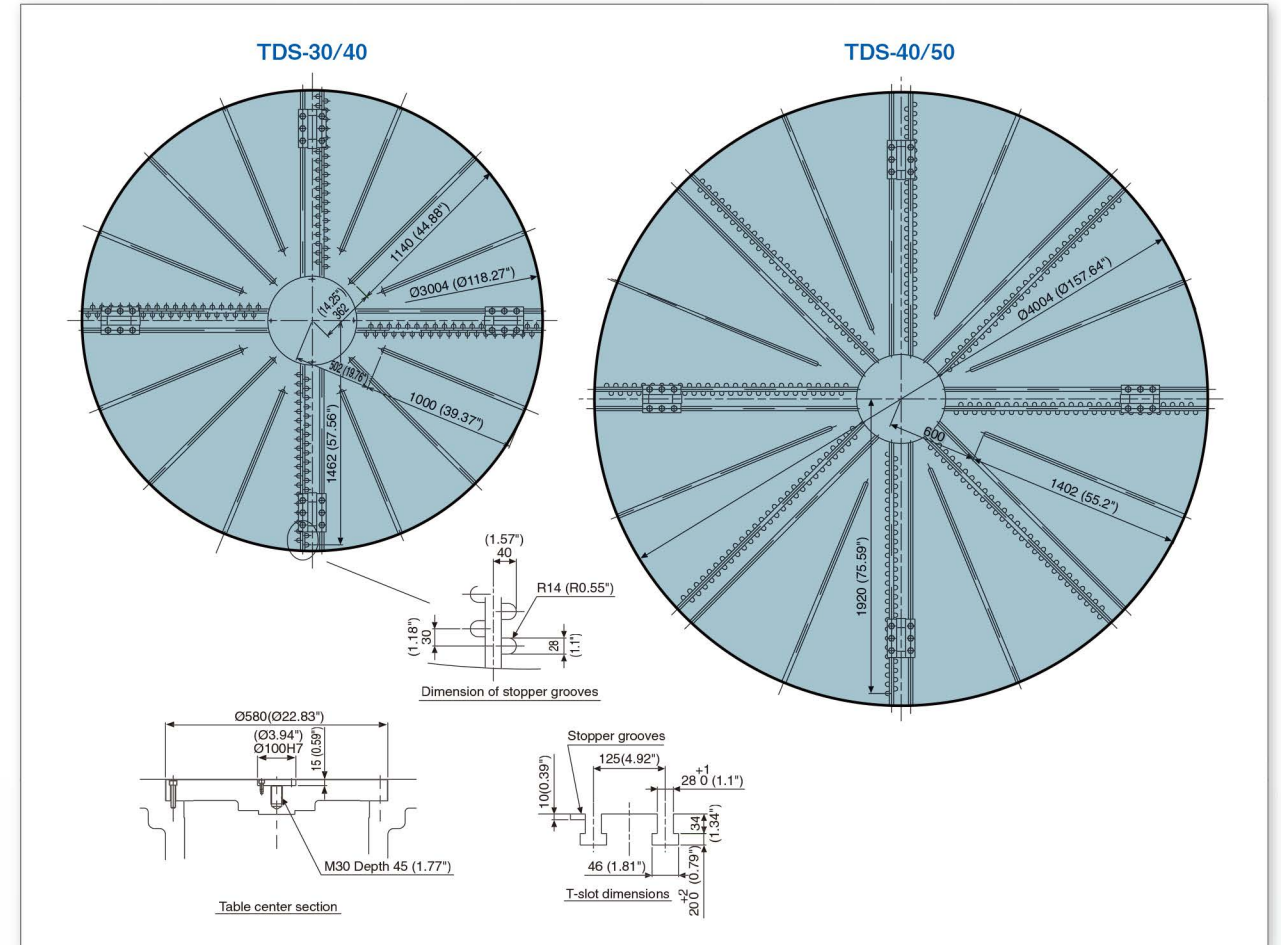
Unit : metric and inch in ()



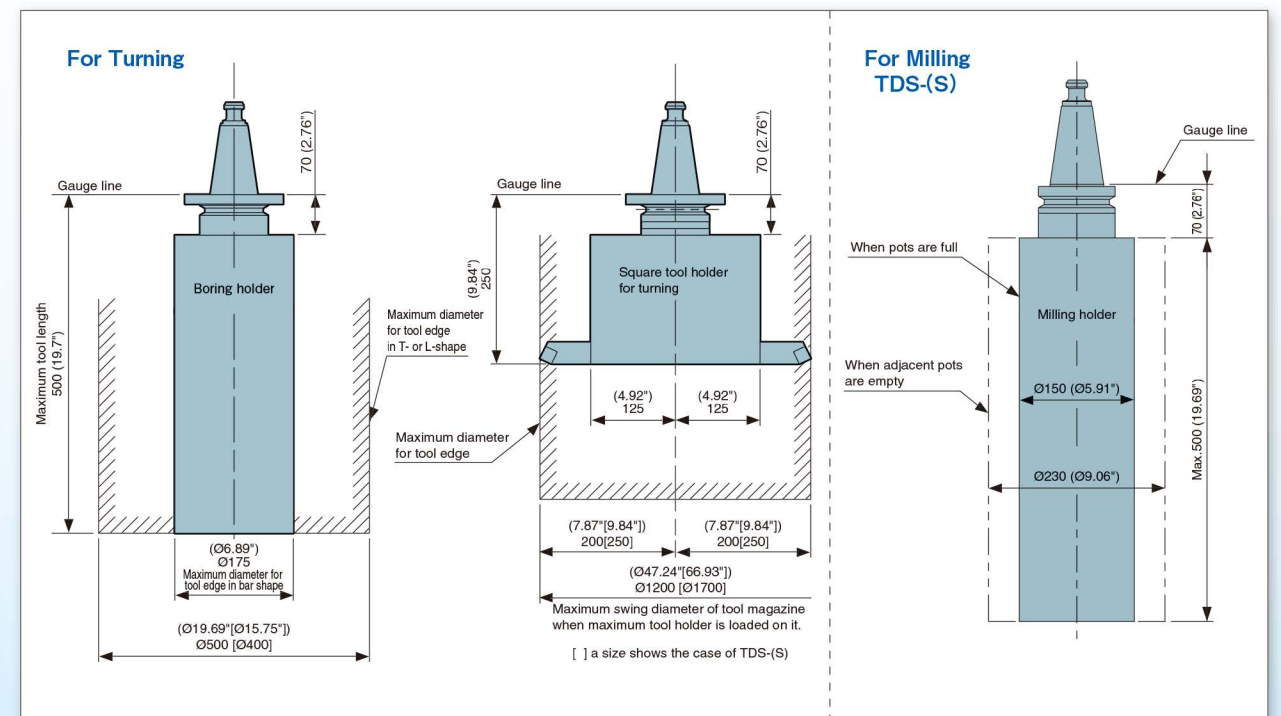
	M	N	O
TDS-30/40	4 000 (157.5)	11 000 (433.1)	6 100 (240.2)
TDS-40/50	5 000 (196.9)	12 000 (472.4)	9 300 (366.1)
TDS-30/40(S)	4 000 (157.5)	11 000 (433.1)	6 100 (240.2)
TDS-40/50(S)	5 000 (196.9)	12 000 (472.4)	9 300 (366.1)

Unit : metric and inch in ()

Table top



Tool dimensions for ATC



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	×1 (0.001 mm/division) (0.0001 inch)
----------------------------------	---

	×10 (0.010 mm/division) (0.001 inch)
--	---

	×100 (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-lead 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 ±9999.9999°
--------------------------------	---------------------------

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

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 ai40/6000

Connectable spindle amplifier	
	FANUC AC spindle amplifier ai series SPM

Environmental conditions (at operation)	
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	Ambient temperature (at operation): 0 ~ 58°C
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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
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Pre-travel stroke limit check	
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Chuck tailstock barrier	
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Sequence number collation and stop	
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Tool retraction and return	
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Variable lead thread-cutting	G34
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Arc thread-cutting	G35/G36
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High-speed skip	
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	(Essential when the automatic measuring function is selected.)
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Addition of work coordinate systems	48 sets in total
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Direct input of drawing dimensions	
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Canned cycle II for multiple turning	Pocket profile
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Manual guide i	
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Manual guide i basic	
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Manual guide i turning cycle	
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Manual guide i animation	
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Spindle positioning	
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Extension of tool offsets	64 pcs. in total 99 pcs. in total 200 pcs. in total 400 pcs. in total
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2nd profile tool offset	
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Tool management function	64 sets
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Program storage capacity	128 kbyte (1,050 ft equivalent)
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	256 kbyte (2,100 ft equivalent)
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	512 kbyte (4,200 ft equivalent)
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	1024 kbyte (8,400 ft equivalent)
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