

2. Technology Specifications
2-1 Machine Specifications

ITEM		Unit : mm(inch)				
GENERAL		PROTURN-60			PROTURN-60B	
Machine dimensions (Without optional chip conveyor)	Length	3975 (156)	4510 (177)	5260 (207)	6260 (246)	7460 (294)
	Width	2310 (91)				
	Height	2050 (81)				
Height form floor to spindle center line		1085 (42.7)				
Machine weight, Approx. kg(lb)		6120 (13490)	6620 (14594)	7120 (15697)	8120 (17900)	9120 (20110)

CAPACITY

Swing over bed		710 (28)				
Swing over carriage		480 (19)				
Distance between centers		1000(39)	1500(59)	2000(79)	3000(118)	4000(158)
Maximum machining diameter		300 (12)				
Maximum machining length		1100(43)	1600(63)	2100(83)	3100(122)	4100(161)
Maximum loading capacity between centers by without rest		3000kg (6,600 lbs)				
Distance between main spindle nose and turret face	Maximum	1226 (48.3)	1726 (68)	2226 (89.7)	3266 (129)	4266 (168)
	Minimum	126 (5)				
Width of bed		500 (19.7)				
Length of bed		2850 (112)	3350 (132)	3850 (152)	4850 (191)	5850 (230)

MAIN SPINDLE AND HEADSTOCK

Main motor, continuous/30 minute rating	A.C 18.5/22 kW (25/30HP)	AC 22/26 kW (30/35HP)
Spindle speeds	2.8~2000 rpm	3~1000 rpm
Spindle speed designation	R P M direct designation	

ITEM	PROTURN-60	PROTURN-60B
MAIN SPINDLE AND HEADSTOCK		
Spindle nose type	A1-11 "	A2-11 "
Front spindle bearing I.D	φ150 (5.9)	φ220 (8.7)
Inside diameter of tapered hole in spindle	1/10 metric taper No. 120	
Hole through spindle	φ105 (4.13)	φ176 (6.9)
Max. torque of main spindle	193 kg.m	230 kg.m
Max. loading capacity by chuck only	750 kg (1650 lbs)	

SADDLE AND CARRIAGE						
Feed motor (servo motor)	X-axis	A.C 0.9 kW (1.2HP)				
	Z-axis	A.C 2.8 kW (3.7HP)				
Max. cutting force		630 kgf				
Thrust load	X-axis	800 kgf				
	Z-axis	1500 kgf				
Max. travel	X-axis	380 (15)				
	Z-axis	1100 (43)	1600 (63)	2100 (83)	3100(122)	4100(161)
Rapid-traverse rate	X-axis	6000 mm/min (236 ipm)				
	Z-axis	9000 mm/min (354 ipm)				
Ball screw size (diameter × pitch)	X-axis	32×5 (1.3×0.2)				
	Z-axis	50×10 (2×0.4)				
Cross-slide width		260 (10.2)				

TURRET TOOL POST	
Turret head type	Standard : H-4+V-8 Option : V-8, H-4+H-4, V-8+V-8
Number of tool positions	Standard : 4+8 Option : 4, 4+4, 8+8
Size(distance across flats)	H-4 : 200×200 (7.9×7.9)

ITEM			PROTURN-60	PROTURN-60B
TURRET TOOL POST				
Maximum cutting tool size (Square)			25×25 (1×1)	
Indexing time for one revolution	H-4 turret		2 sec	
	V-8 turret		4 sec	
Tool post clamping force	Clamping force	H-4	1800 kgf	
		V-8	2600 kgf	
	Unclamping force	H-4	1300 kgf	
		V-8	2000 kgf	
Max. tool swing diameter		H-4	600 (24)	
		V-8	600 (24)	

TAIL STOCK

Taper in tailstock spindle	MT NO. 6
Tailstock quill stroke	200 (7.9)
Tailstock quill diameter	112 (4.4)
Tailstock body rapid feed	1.7 m/min (70 ipm)
Tailstock body movement method	Manual (Hook type)
Tailstock quill movement method	Manual (hyd. cylinder)
Tailstock quill type	Dead center type

HYDRAULIC POWER UNIT

Hydraulic pump motor	2.2 kW - 4 poles
Hydraulic oil tank capacity	40 lit (10.56 US gal)
Normal line pressure setting	35 kg/cm ² (498 psi)
Pump displacement at 1800 rpm	40 lit/min (10.56 US gal/min)

ITEM		PROTURN 60		PROTURN 60B	
COOLANT SUPPLY UNIT					
Coolant pump motor		1.15 kW - 4 poles			
Coolant tank capacity (w/up gal)		50 (19)	55 (21)	60 (23)	65 (25)
Pump displacement at outlet of pump plain water at 50/60Hz standard		55/75 liters/min (1.5/2.0 US gal/min)			
LUBRICATION UNIT					

Lubricant pump motor	for head stock	0.25 kW - 4 poles
	for carriage	0.25 kW - 4 poles
Lubricant tank capacity	for head stock	14 US US gal
	for carriage	8 US US US gal
Pump displacement at 50/60 Hz	for head stock	0.75 US gal/min (0.2 US gal/min)
	for carriage	0.25 US gal/min (0.07 US gal/min)
Max. output pressure	for head stock	5 kg/cm ² (71 psi)
	for carriage	0-5 kg/cm ² (0-71.4 psi)

CHIP CONVEYOR

Drive motor	0.2 kW - 4 poles
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ENVIRONMENTAL CONDITIONS

Power supply	AC 200V/230V ±10%
Total power handling capability	15 kW
Operating ambient temperatures	10°C to 40°C (50°F to 104°F)
Relative humidity	Less than 75%

2-2 CNC Controller Specifications

2-2.1 Fanuc System

Items	Specification	FANUC series		
		21i-TB series	18i-TB series	15i-TB series
		Controlled axis		
Total controlled axis	2axes	○	○	○
Simultaneous controlled axes	2axes	○	○	○
Axis name	X, Z	○	○	○
Least input increment	X/Z: 0.001mm(0.0001inch)	○	○	○
Inch/Metric conversion	G20, G21	○	○	○
Axis interlock		○	○	○
Machine lock		○	○	○
Emergency stop		○	○	○
Over travel signal		○	○	○
Backlash compensation		○	○	○
Switchover between measuring system		☆	☆	☆
Chamfering ON/OFF		○	○	○
Inclination compensation		—	—	☆
Straightness compensation		—	☆	☆

Operation

MDI operation		○	○	○
Program number search		○	○	○
Sequence number search		○	○	○
Program restart		☆	☆	☆
Buffer register		○	○	○
Dry run		○	○	○
Single block		○	○	○
Manual continuous	JOG	○	○	○