Enshu

HORIZONTAL MACHINING CENTER

JE60S

A state-of-the-art, new generation machine, ensuring high quality and efficiency.

HORIZONTAL MACHINING CENTER

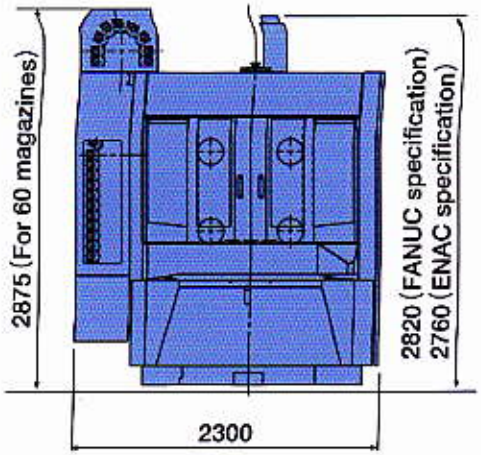
JE60S

A Machine based on a new concept where reliability, efficiency and productivity are merged together in high-order dimensions.

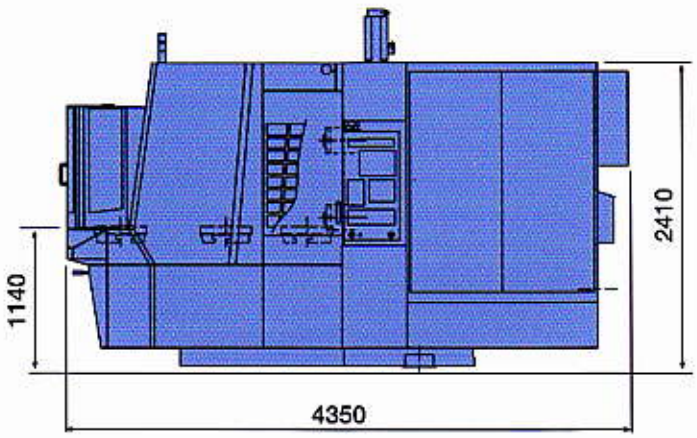
Ensures high efficiency and quality with further upgraded high speed and accuracy.

Machine Dimensions

• Dimensions for Installation



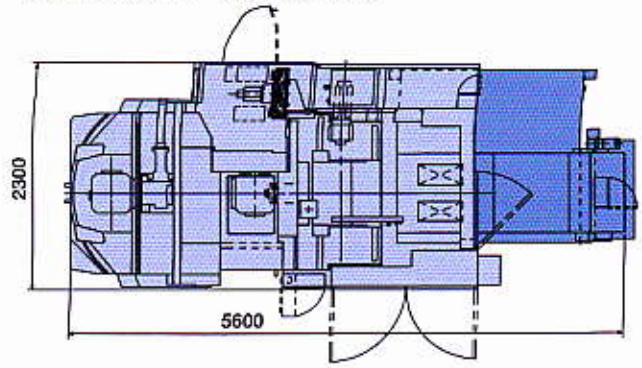
Front view



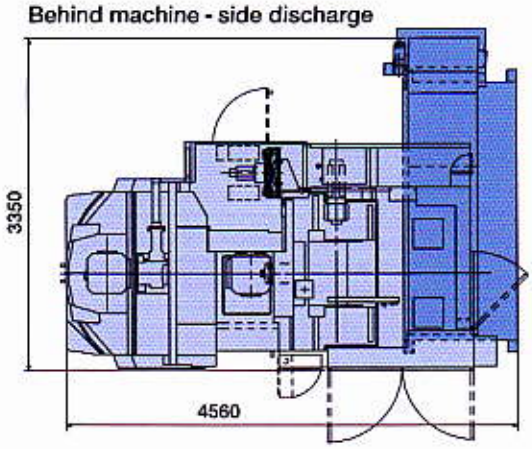
Side view

• Coolant tank layout

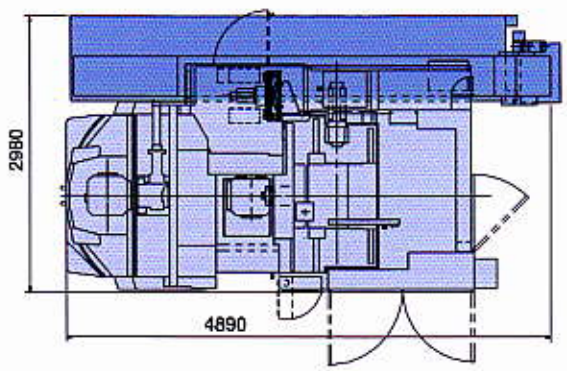
Behind machine - back discharge



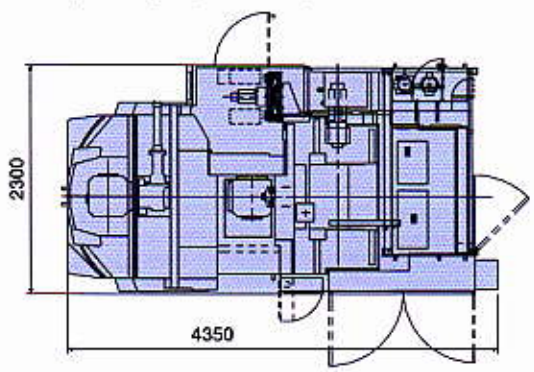
Behind machine - side discharge



Side of machine - back discharge



No chip conveyor(300L Tank)



Floor space

Machine Specifications

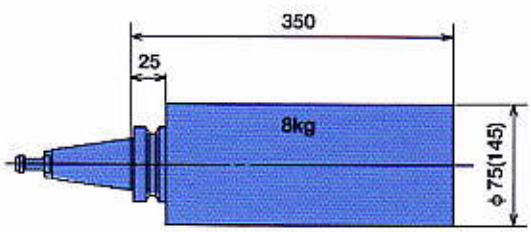
●MACHINE SPECIFICATION

Item		FANUC	ENAC
Travel	X axis travel (longitudinal stroke,column)	600mm(23.6in)	
	Y axis stroke (Vertical stroke,head)	600mm(23.6in)	
	Z axis stroke (Traverse stroke,Table)	630mm(24.8in)	
	Distance from table top to spindle center	70~670mm(2.8~26.4in)	
	Distance from table center to spindle nose	130~760mm(5.1~29.9in)	
Table(OP) RC400 Tudakoma	Table work area size	□400mm (15.7in)	
	Maximum allowance work weight	500kg(1,100lbs)	
	Shape of table top surface	24-M16 tap	
	Minimum index angle of table	1deg	
	Table index time	1.2sec./90deg	
	Height from floor to table top	1,140mm(44.9in)	
Spindle	Spindle speeds	40~13,000min^{-1}	
	Number of spindle speed ranges	Non step	
	Spindle taper hole	7/24 Taper NO.40	
	Inner diameter of Spindle bearing	φ85mm (φ3.35in)	
Feedrate	Rapid feedrate	50,000mm/min (1968.5in/min)	
	Cutting feedrate	1~15,000mm/min (0.04~590.5in/min)	
	Jog feedrate	1~4,000mm/min (0.04~157.5in/min)	
Automatic tool changer	Tool shank type	MAS BT40	
	Pull stud type	MAS P40T-Ⅱ	
	Magazine tool capacity	40 tools	
	Maximum tool diameter	φ75mm(φ145mm) (φ2.95in(φ5.7in))	
	Maximum tool length	350mm (13.8in)	
	Maximum tool weight	8kg(17.6lbs)	
	Tool selection method	Absolute address	
	Too change time(T to T)	1.0sec.	
	Too change time(C to C)	2.8sec.	
Automatic pallet changer	Number of pallets	2 pallets	
	Pallet exchange method	Rotary type	
	Pallet exchange time	6sec.	
Motor	Spindle motor (30min./Cont.)	22kW/18.5kW (30/10.2HP)	
	Axis feed motor (X)	5.2kW (6.9HP)	2.9kW (3.9HP)
	Axis feed motor (Y)	5.2kW (6.9HP)	4.4kW (5.9HP)
	Axis feed motor (Z)	5.2kW (6.9HP)	2.9kW (3.9HP)
	Index table motor	1.0kW (1.3HP)	0.85kW (1.1HP)
	Hydraulic pump motor	2.8kW (3.7HP)	
	Lubrication pump motor (ball screw,LM guide)	90W (0.12HP)	
	Lubrication pump motor (Spindle)	90W (0.12HP)	
	Cutting fluid pump motor (Spindle)	0.43/0.685kW(0.57/0.91HP)	
	Cutting fluid pump motor (Bed flash)	0.4kW (0.53HP)	
	Spindle cooling pump motor	1.0kW (1.3HP)	
	Magazine drive motor	0.9kW (1.2HP)	0.85kW(1.1HP)
	ATC arm drive motor	0.4kW (0.53HP)	
Power sources	Power supply	AC200V/AC220V +10%,−15% 50/60Hz ±2% 59kVA	
	Compressed air	0.3~0.8MPa (56.8~113.5psi) 600L/min (159gal/min)	
Tank capacity	Hydraulic unit	10L/min(2.6gal/min)	
	Lubrication oil tank (Ball screw,LM guide)	2L (0.5gal)	
	Lubrication oil tank (Spindle)	2L (0.5gal)	
	Cutting fluid tank (Option)	300L/400L/700L (79.3/105.7/185gal)	
	Spindle cooling oil tank	32L (8.5gal)	
Machine dimensions	Machine height	2,820mm (111in)	
	Floor space	2,300mmx4,350mm (90.6inx171.3in)	
	Machine weight(Incl. NC device)	9,600kg (21,120lbs)	

• ATC max. tool dimensions

max. tool diameter φ 75(adjacent tools present), φ 145(no adjacent tools)

max. tool weight 8kg(incliding shank)



●STANDARD ACCESSORIES

Item
Maintenance tool kit
Leveling bolts and blocks
Work light
Spindle oil cooler
Total enclosed splashguard(Manual door)
Rotary type 2 APC
Manual pulse generator
Signal tower(Alarm lamp)
Signal tower(Work-off lamp)
Automatic power off
Spindle load meter(on display)

●OPTIONAL ACCESSORIES

Item
Cutting fluid tank (300L,400L)
Lift up chip conveyor (700L)
Ceiling shower coolant
Shower gun
Center through coolant(1.8/5.0/7.0Mpa)
Oil hole cutting fluid device
External spindle air brow
Automatic centering device
Scale feed back (X, Y, Zaxis) Futaba
Auto tool length measure tool breakage
Tool breakage detector (inside working area)
Tool breakage detector (inside magazine)
Auto door for APC
Circuit breaker for electrical leakage
Spindle run hour meter
Parts counter
Work-off buzzer

●Special optional accessories

Item
Spindle speed 13,000rpm (Hybrid cooling system)
Spindle speed 20,000rpm (Hybrid cooling system)
Spindle speed 8,000rpm
HSK-A63 Spindle
NC index table (0.001deg) B axis
500x500mm pallet
60 tools magazine
118 tools magazine
8 pallets magazine
Less 2APC

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Control Device Specifications

○ : Standard OP : Option

Item		FANUC	ENAC	FANUC	ENAC
Controlled axes	Controlled axes	○	○	4 axes (X, Y, Z, B)	X, Y, Z, B axis & Spindle
	Simultaneous controllable axes	○	○	3 axes (for linear interpolation & positioning) 2 axes(for circular interpolation)	4 axes
	Additional axis	op	op	1 axis(Servo amolifire required)	
Input command	Least input increment	○	○	0.001mm	
	Least travel unit	○	○	0.001mm	
	Max. command value	○	○	±8digits 99999.999mm	
	Absolute/Incremental command	○	○	G 90/G 91	
	Decimal point input	○	○		
	Tape code	○	○	EIA/ISO code	
	Inch/Metric conversion	op	○	G20/G21	
	Least input increment 1/10	op	op	0.0001mm,0.00001inch,0.0001deg.	
Interpolation	Positioning	○	○	G00,G06	G00
	Liner interpolation	○	○	G01	
	Circular interpolation	○	○	G02,G03 (Multiple Quadrants circular interpolation)	G02,G03
	Exact Stop	○	○	G09	
	Exact Stop Mode	○	○	G61	G61/G64
	Tapping mode	○	—	G63	
	Cutting mode	○	—	G64	
	Helical interpolation	op	○	G02,G03	
	Cylindrical interpolation	op	op		
	Polar coordinate interpolation	op	op		
	Involute interpolation	op	—		
	NURBS interpolation	op	op		
	Spline interpolation	—	op		
Feedrate	Feedrate	○	○	5 digits mm/min Direct command	
	Dwell	○	○	G04 (max. 99999.999 sec)	
	Manual puls generator(handle feed)	○	○	1 set 0.001/0.01/0.1 (mm/div)	
	Automatic acceleration/deceleration	○	○	Rapid feed : Bell-Shape Cutting feed : Exponential	Linear acceleration/deceleration
	Rapid feed override	○	○	F0,25,50,100% (Rotary switch)	
	Cutting feed override	○	○	0~200% (Rotary switch)	
	Manual continuous feed(mm/min)	○	○		
	Feed Per Minute	○	○	G94	
	AI contouring control	○	op		GDC-1/GDC-2
	F1 digit feed	op	op		
	Automatic Corner override	op	—		
	High-speed and high-precision contour machining	op	op	180 block buffer, (60m/min for 1mm block length)	PENTIUM 500MHz(80m/min for 1mm block length)
Program memory & Editing	Program memory capacity	○	○	80m	1.0GB
	Program memory editing	○	○		
	Additional program memory capacity	op	—	160/320/640/1280m	
	Data server	op	—	ATA card 160MB	
	Number of programs	○	○	63	Unlimited
	No. of additional registerable programs	op	—	125/200/400/1000	
	Program No. search	○	○	O with 4 digits	File type
	Sequence No. search	○	○	N with 5 digits	
	Back ground editing	○	○	program editing during automatic cycle executing	
	Expand tape editing	○	○	Copy, Move, Alternative, Erase	
Operation & Display	Operation panel : Display section	○	○	9.5" LCD monochrome	10.4"LCD Color
	Operation panel : Operation section	○	○	Flat keyboard with soft key	
	Display functions	○	○	Program, current position, command values, compensatory values,user massage paramater,etc	
	MDI function	○	○		
	Language	○	○	Japanese / English	
	Multi-language display	op	op	German/French/ Italian/Spanish/Chinese/Korean	German/French/ Italian/Spanish
	Data protect key	○	○	1 pce.	
	Clock function	○	○		
	Help function	○	○		
	Alarm history display	○	○		
	Ladder symbol display	○	○		
	Actual speed display	○	○		
	Diagnostic function	○	○		
	Servo adjustment screen	○	○		
	Display erasing	○	○		
	Machining Time Stamp	op	op		
Data input/output	I/O Interface	○	○	RS232C(1 port)	RS232C 51200bps
	Memory card input/output	○	○	PC card	
	External data input	○	○		
	External work number search	op	○	Rotary switch : 15, Digital switch : 99	
	Program file	op	op	EPB-5(Enshu program bank)	
	Ethernet	op	○		
	Profibus DP	—	○		
	FL NET	op	—		
	Device net	op	—		
STM function	Spindle function(S function)	○	○	S with 5 digits, Direct command	
	Tool function(T function)	○	○	T with 4 digits, Direct command	T with 4 digits, direct command / tool name command
	Miscellaneous function (M function)	○	○	M with 2 digits(3 digits in some cases)	
	High-speed MSTB instruction	—	○		
	Multiple M-Function Commands	op	op	Up to 3 in the same block	Up to 5 in the same block
	Second miscellaneous function(B)	op	op		
	Spindle indexing at optional position	op	○		
Tool offset	Tool length compensation	○	○	G 43, G 44, G49	
	Tool offset memory	○	○	±6 digits, 99 sets	600sets
	Additional tool offset memory	op	op	200/400/499/999	1500sets
	Cutter compensation C	○	○	G 40, G 41, G 42	G41, G42
	Tool offset	○	○	G 45, G 46, G 47, G 48	
	Tool length measurement	○	○	Manual	
	3-dimensional tool compensation	op	op		

○ : Standard OP : Option

Item		FANUC	ENAC	FANUC	ENAC
Coodinate system	Manual reference point return	○	○		
	Automatic reference point return	○	○	G28	
	Reference point return check	○	○	G27	
	Return from Reference point	○	○	G29	
	2nd reference point return	○	○	G30 (To be used ATC position)	
	3nd,4th reference point return	op	○	G30 P3/P4	
	Automatic coordinate system setting	○	○		
	Coordinate system setting	○	○	G92	
	Work coordinate system setting	○	○	G54~G59 (6 sets)	
	Local coordinate system setting	○	○	G52	
	Machine coordinate system setting	○	○	G53	
	Additional pairs of work coordinate systems	op	op	Additional 48/300sets	G54-G59 with P-commond 100sets
	Flowting refernce point return	op	—	G30.1	
Operation support function	Cycle start / Feed hold	○	○		
	Single block	○	○		
	Optional stop	○	○	M01	
	Optional block skip	○	—	1set	
	Additional optional block skip	op	○	8sets	
	Dry run	○	○		
	Auxiliary functionlock	○	○		
	Machine lock	○	○		Functional programming test
	Program stop / Program end	○	○	M00, M01/M02, M30	
	Sequence Number Search	○	○		
	Emergency return	op	○		
	Program restart	op	op		
	Manual handle interrupt	op	op		
	Spindle override	op	○	50~120%	
	Sequence number comparison stop	op	—		
	Play back	op	op		
	External manual absolute on/off	op	op		
Programming support function	Canned cycle	○	○	G73, G74, G76, G80~G89	G73, G74, G76, G80~G89, G77, G78, G79
	Rigid tap/Solid tap	○	○	M29	G84, G74
	Sub program	○	○	M98, M99 : 4 levels of nesting	M98, M99 : 4 levels of nesting
	Programmable data input	○	○	G10	
	Circular arc radius R designation	○	○	G02, G03R...	G02, G03R...
	Scaling	op	op	G50, G51 scaling-up/scaling-down	
	Custom macro	op	○		
	Additional Custom Macro Common Variables	op	○	#100~#199, #500—#999	Common variables:Max1000sets
	Optional-Angle Chamfering/Corner Rounding	op	op		G01 R**
	Coordinate rotation	op	op	G68, G69	G68
	Automatic corner override	op	—	G62	
	Polar Coordinate Command	op	op		
	Programmable Mirror Image	op	op		
Mechanical accuracy compensation	Backlash offset	○	○	Feed/Rapid feed	
	Stored pitch error offset	○	○		
	Automatic form error compensation	—	○		
	Unidirectional positioning	op	op	G60	
	Optical sensor interface(X,Y,Z)	op	op		
Mecanical support function	Axes interlock	○	○		
	Internal PMC	○	○	S86 32,000step	In accordance with IEC1131-3 LAD/STL/FBD language 0.3 ms/1000 step 64 kbyte
	Index function	○	○		
Automatic operation support function	Skip function	○	op		
	Multi-Step Skip function	op	op		
	Tool life management	op	○	300sets	
	512 pairs of tool life management	op	—		
	Scheduling Function	—	○		
	DNC Function	○	○	DNC with RS232C interface	DNC with Ethernet
	High speed skip function	op	op		
Safety and Maintenance function	Emergency stop	○	○		
	Self diagnosis function	○	○		
	Follow-up	○	○		
	Servo-off	○	○		
	Stroke limit check before travel	op	○	1st forbidden area	
	Stored stroke limmit	○	○		
	Stored stroke check 2	op	○		
	Stored stroke check 3	op	○		
	Alarm history display	○	○		
	Key Operartion history	○	○		
	Serve monitor function	—	○		
	Power failure backup	—	○		UPS (for NC)
	Protection zone	—	op		10 areas (interference check)
	Equipment life warning counter	—	op		
	Guidance for alarm condition	—	○		
	Periodical check-up	—	op		
	Cycle time measurement	—	op		
Cabinet and installation condition	Cabinet structure	○	○	Airtight,dust proof construction	
	Power Supply	○	○	AC200V/AC220V+10%~-15% 50/60Hz±2%	
	Ambient temp.	○	○	0℃ to +40℃	5~45℃
	Relative humidity	○	○	10~75%RH(condensation not acceptable)	20~80%RH(condensation not acceptable)
	Vibration	○	○	0.5G max.	
Servo system	Servo motor	○	○	α i series	SGMK series
	Servo unit	○	○	α i series	SGDK series
	Servo system	○	○	Semi-closed loop (ABS)	
	Absolute position detection	○	○		
	Serial encoder	○	○		20/17/16 bit
	Conversational automatic programming function	—	○		Centering/Manual tool length & diameter measurment/ Datum surface/Drill/Linear & circular/Pocket/ Optional shape/Program display function

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