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MACHINE SPECIFICATIONS

MODEL – FA294FT

Northwood NW 5-Axis FA294FT Iron Horse CNC Machining Center



Shown: Northwood FA294FT with 24” Z-Axis Ram and (2) Cast Iron-Worktables

CONSTRUCTION

FEA (Finite Element Analysis) Design engineering process utilized in entire machine design insuring maximum reliability.

The machine construction consists of a tubular steel weldment skirted with steel plating, cast iron tooling plate, and cast-iron drive components for maximum rigidity allowing for superior machining performance.

All machine components are heat-treated (normalized) or vibratory stress relieved.

The heavy steel fabricated moving gantry is reinforced by vertical and horizontal 4” diameter stiffeners. The bridge spans the machining centers 9ft (2,743.2mm) cast-iron worktable.

The Northwood Machining Centers with their extremely heavy-duty construction throughout insures machine stability, accuracy and superior longevity.





Z Axis Ram 24" (609.6mm) Travel



BASE CONSTRUCTION



Shown – Y and V Uprights – Single Piece Lower – and Single Piece Upper



Shown – Y and V Upright Design – Single 45mm Rail with Roller Bearings on Y and V.

ROOF BELLOW

An integral Roof Bellow System that travels with the ram. This system creates an overhead barrier to help keep chips inside of the machining center. The key feature is the self-supporting span capability of the cover, with minimal deflection.



Includes lighting under the bridge.



HEAD CONFIGURATION – 67HP

Heavy Duty Series HSD 4 & 5 Axis Head with Outboard Encoders

One (1) 67HP-50KW, Liquid Cooled, 4-Pole Spindle with HSK 100A Chuck, programmable RPM up to 12,000. Liquid cooled spindle. One (1) High Performance - Fanuc Synchronous Spindle Drive. Direct Drive B and C axes feature outboard rotary encoders.

One (1) Through the Spindle Air Blast for through the tool cooling (Programmable on/off).



67HP (50KW) Spindle with HSK-A100



Chiller



HEAD SPECIFICATIONS



HST810		
	C-axis	A-axis
Rotation (°)	±270	±110
Overtravel (°)	±275	±115
Mechanical stop	NO	NO
Encoder	Yes (see TABLE 6)	
Accuracy (arcsec)	8	8
Repeatability (arcsec)	6	6
Max Speed (7s)	180	180
Continuous torque (N m)	888	391
Stall Torque (N m)	539	311
Max Torque (N m)	1250	707
Holding brake	Yes	Yes
Brake typology	Normally Open	Normally Open
Braking torque (N m)	4000 (40bar)	2000 (40bar)
Max continuous power dissipation (W)	5550	2990
Handbook		
ES510		
Tool holder	HSK A100	
Motor	See TABLE 7	
Encoder	Yes (see TABLE 6)	
Max continuous power dissipation (W)	8000	

TOOL CHANGER

Two (2) HSK 100A “Fourteen (14) Station” Automatic Tool Changer Carousel “Dynamic” mounts under the gantry column with a safety device for automatic fault detection. The maximum tool diameter of 8” (203mm) per pocket with adjacent pockets empty and 4” (101mm) with all pockets full. Total carousel weight capacity of 120 lbs (954kg). Maximum pocket weight is 11lbs. **Twenty-Eight (28) total tool pockets.**



WORKTABLE

Two (2) Baycast - 108"
(2,743.2 mm) x 48"
(1,219.2 mm) cast iron
T-Slotted worktable.



ALUMINUM AND CARBON FIBER MACHINING PHOTOS



FLOOD COOLANT

Machine features Interlocking Sliding Doors on the front of the machine as well as a rear wall with integrated chip conveyor and flood coolant delivery system.

System includes Chip Conveyor in the rear of the machine with integral flume system to deliver chips to the conveyor. High pressure, high volume pumps are included to meet the machines system flood coolant demand as shown below.

Flood System Coolant Demand:

- 1 – **Through Spindle Coolant** 3 GPM @ 80 PSI.
- 1 – **External Coolant** with a capacity of 8 GPM @ 80 PSI.
- 1 – **Wash Wand Coolant** with a capacity of 5 GPM @ 40 PSI.

CHIP CONVEYOR AND COOLANT DELIVERY

One (1) – Screw Auger, 5” diameter x 14’ Long, 8” wide overall length center less screw conveyor with a 2 HP @ 25 RPM drive. Trough is 3/16” thick x 5” wide with 1 ½” flared horizontal top each side. Overall width is 8” and overall height is 6”. Includes grating over auger conveyor opening.

***Northwood provides power and motor on/off control for conveyor and pumps (quantity and amperage to be determined by Conveyor and Pump supplier).*



CONTROL SYSTEM

Fanuc 310i-B5 “5 Axes Simultaneous” with Integrated PC-Features



Color LCD Touch Screen Monitor

Panel I Features

Intel Processor – Windows 7 Operating System
19.0” Color LCD – Touch Screen Control Panel
Panel I Memory 4 GB RAM
120 GB Solid State Hard Drive / DVD-ROM Disk Drive
Network Ready (Includes Card)

CNC Features

Operation

Automatic operation (Memory)
MDI Operation & DNC Operation
Schedule function / Program number search
Sequence number comparison and stop
Wrong operation prevention
Buffer register / Single block / Dry Run / JOG feed
Manual reference position return/shift
Full Function Manual handle feed (Remote MPG wheel)

Feed Function

Rapid traverse/Feed rate override
Cutting federate clamp
Automatic acceleration/declaration
Rapid traverse bell-shaped acceleration/deceleration
Linear acceleration/deceleration after cutting feed interpolation
Automatic corner deceleration (Look Ahead Expansion 1000 lines)
Feed rate control with acceleration in circular interpolation
3-Dimensional Manual Feed
AI advanced preview control
High-Speed Processing / AI Contour Control II

Program Input

Tape code / Optional block skip
External memory and sub program calling function
Absolute/incremental programming
Diameter/radius programming
Tilted Work plane selection / Automatic coordinate system setting
Workpiece coordinate system/preset (48 total pairs)
Direct input of workpiece origin offset value measured
Optional chamfering/corner R
Programmable parameter input
Subprogram call / Custom Macro B
Interrupting type custom macro
Circular interpolation by R programming



Remote Handheld

Full Keyboard/Mouse Ports (Two (2) PS/2)
One (1) Parallel Port
Fiber Optic Interface with CNC Controller (HSSB)
Two (2) USB Ports
Two (2) Serial/RS232 Ports
Basic Operation Package 2 (BOP 2)

Axis Control

Axis Control by PMC
Axis Synchronous/ Simultaneous 5 Controlled Axes
Position Switch

Interpolation Functions

Nano interpolation / Nano smoothing 2
Tool Center Point (TCP) Control
3-Dimensional Circular Interpolation
Positioning/Single direction positioning
Exact stop mode / Cutting mode / Dwell (G4)
Linear, Circular, Cylindrical and Helical interpolation
High-speed skip / Synchronous/Composite Control

Auxiliary/Spindle Speed Function

Auxiliary function / 2nd auxiliary function
Spindle analog output / Spindle Override

Tool function/Tool compensation

Tool offset memory C (99 pairs)
Tool radius/Tool length compensation
Tool length measurement & Cutter compensation
Inch/Metric compatibility
3-Dimensional Cutter Compensation

Accuracy compensation function

Smooth Backlash compensation
Store pitch error compensation

Editing Operation

Part Program Storage Size (2Mbyte)
1000 Total Registered Programs
Part program background and extended editing / Program protect

Setting and Display

Current position display
Alarm Message/Alarm History display
Operator Message/Operator History display
Run hour and parts count display
Actual cutting federate display
Maintenance information screen



Fanuc Servo and Amplifier



DRIVE SYSTEM

The machine X, U, and Y Axes drive systems consists of closed loop Fanuc AC servo motors powering precision ground ball screws with rotating compression nuts.

The machine Z Axis drive system consists of closed loop Fanuc AC servo motor powering a precision ground ball screw.

X, U, Y (40/20 pitch) and Z Axis precision ground ball screws are totally enclosed by bellows.

X, U, Y, and Z axis linear rails with roller bearing trucks.

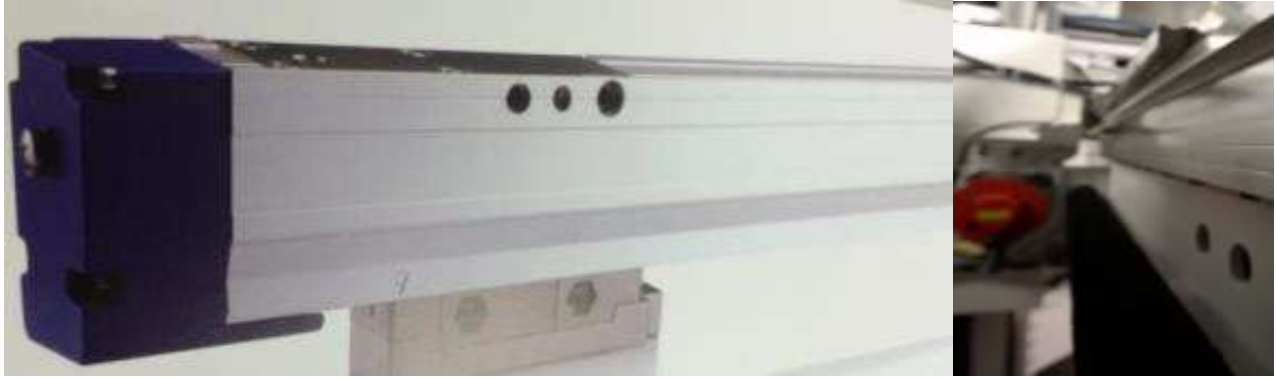


Integrated Drive System



LINEAR ENCODERS

X, U, Y, and Z Fully Enclosed Fagor Optical Linear Encoders with Integral Air Purge.



Z AXIS RAM COUNTERBALANCE

Force neutral pneumatic counterbalance system with high volume quick response valves.

The vertical Z axis uses a compression nut for maximum accuracy and speeds up to 500 IPM.



AXES SPECIFICATIONS

AXES TRAVEL

X Axis – (left to right)	180”
Y/V Axis – (front to back).....	142”
Z Axis – (up and down).....	24”
C Axis	+/- 270°
B Axis	+/-110°

AXES TRAVERSE/FEED RATES

X, and U Axes Rapid Traverse Rate.....	1,250 IPM (31 m/min)
Y Axis Rapid Traverse Rate	1,250 IPM (31 m/min)
Z Axis Rapid Traverse Rate	500 IPM (12 m/min)
X, and U Axes Maximum Machining Feed Rate	1,250 IPM (31 m/min)
Y Axis Maximum Machining Feed Rate.....	1,250 IPM (31 m/min)
Z Axis Maximum Machining Feed Rate	500 IPM (12 m/min)

MACHINE TOLERANCES

“Standard” Used: ASME B5.54 1992”

Linear Displacement Accuracy

- Returned X Axis 0.0015 Inches
- Returned Y/V Axis 0.0015 Inches
- Returned Z Axis 0.001 Inches
- Returned A Axis 8 arc sec
- Returned C Axis 8 arc sec

Bidirectional Repeatability Accuracy

- Returned X Axis 0.0008 Inches
- Returned Y/V Axis 0.0008 Inches
- Returned Z Axis 0.0008 Inches
- Returned A Axis 6 arc sec
- Returned C Axis 6 arc sec



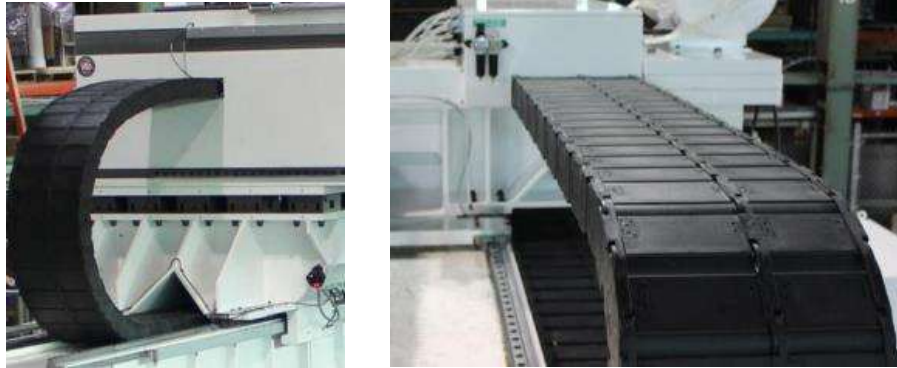
Traceability Statement

Calibration results apply to the equipment identified only. The equipment will be calibrated with certified standards traceable to the National Institute of Standards and Technology (NIST).

All tolerances are based on inspection at an ambient temperature of 68° “required.” Compliance to quoted positioning accuracies and positioning repeatability tolerances will be provided for inspection to ASME B5.54 1992 - Standard.



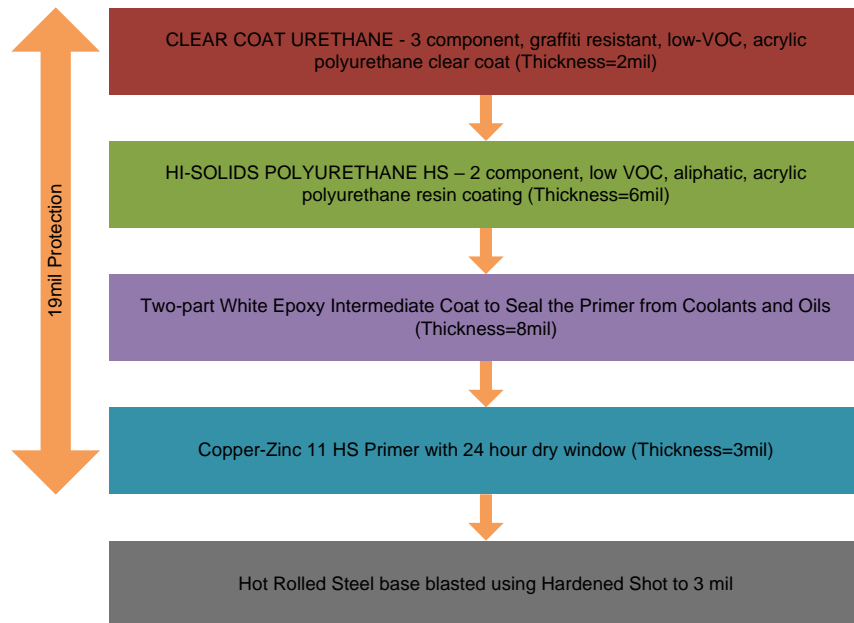
ENCLOSED CABLE TRACKS



X, U, Y, and Z Enclosed cable tracks.

PAINT SPECIFICATION

Anti-Corrosion Primer with Sherwin Williams “Polane” Strobe White Finish Coat.



AIR REQUIREMENT

110 - 145 PSI (7.5 to 10 bar) @ 40cfm “clean and dry”

The pressurized machine air supply must conform to following criteria, and according to ISO 8573-1, Pressurized Air for General Applications, Section 1: Contaminants and Quality Levels.

Solid Particle (contaminants): Class 4 - Max Size = 15 um and Max Concentration = 6 PPM

Water Content (moisture): Class 4 - Water Vapor = +3 °C Max Pressure Dew Point

Oil Carryover (oil content): Class 3 - Max Concentration = 0.83 PPM



AUTOMATIC OIL LUBRICATION

Automatic Oil Lubrication System for X, U, Y and Z axes. The CNC calculates linear distance traveled and automatically triggers the pump which has been designed to pump lubrication to all axes.

The Automatic Oil Lubrication System is designed to ensure that the bearings get the proper amount of oil to extend machinery life, reduce operating costs and increase productivity.

Catch troughs are also incorporated in order to prevent oil contamination of the part being machined and the coolant.



WEIGHT

Approximate Total Weight.....38,000 lbs
Approximate Weight of Traveling Gantry/Ram Assembly.....15,000 lbs

MACHINE ELECTRICAL



Industrial Air Conditioner
"Electrical Cabinet"



Fanuc Electrical Components
(Most reliable control system in the world
"average mean" between failures of 10 years)

Machine Voltage: 440/480 volt 3-Phase (200 AMPS)

Plant wiring required: 440/480 volt 3-Phase brought to the main panel.

