AV-Tech Machine Tool, Inc.

September 1, 2006

TWINHORN VH-850 VERTICAL MACHINING CENTER

STANDARD FEATURES

- ► Fanuc Oi-MC & 640 Meters Memory
- ► AC Digital Servo & Spindle Drivers
- ► High Precision Contouring Function (AICC)
- ► PCMCIA Slot for Memory Expansion
- ► Helical Interpolation & Custom Macro B
- ► Hardened Ground Box Ways on X,Y & Z
- ► Meehanite Cast Iron Bed, Base & Headstock
- ► Heat Exchanger for Electrical Cabinet
- ► Automatic Power off (M30)
- ► Roll Out Coolant Tank & Chip Tray
- ► Fanuc Operating & Maintenance Manual
- ► 4th Axis Interface Cable only Ready
- ► One Year Machine Parts Warranty
- ► Fanuc 15 HP Spindle Motor
- ► Spindle CAT-40 with 8000 RPM
- ► Arm Type 24 Tool ATC
- ► RS232 Interface
- ► Pitch Error Compensation
- ► Auto Lubrication System
- ► Fully Enclosed Splash Guard
- ► Spindle Air Blast & Cutting Air Blast
- ► Spindle Air Curtain
- ► Tool Kit / Work Light
- ► Operating & Electrical Manuals
- ► Hand Held Coolant & Air Nozzle
- ► Two Year Control Warranty

MACHINE SPECIFICATIONS

Travel X Axis	33.46” (850mm)
Travel Y Axis	19.69” (500mm)
Travel Z Axis	20.47” (520mm)
Rapid Feed Rate X & Y Axis	630ipm
Rapid Feed Rate Z Axis	630ipm
Cutting Feed Rate	196.85ipm (5000mm/min)
Positioning X, Y & Z Axis	0.0001/12” (0.005mm / 300mm)
Repeatability X, Y & Z Axis	±0.0001” (±0.003mm)
Table Dimension	39.37” x 17.72” (1000mm x 450mm)
Maximum Loading	990 lb (450Kg)
Spindle Motor	FANUC AC Spindle Motor ßiI 8 / 8000
Spindle Horse Power	15 HP
Spindle Speed	8000 RPM
Spindle Taper	CAT-40
Servo Drive Motor X & Y Axis	Fanuc ß 12 / 3000is
Servo Drive Motor Z Axis	Fanuc ß 22 / 3000is
Distance from Spindle Nose to Table	4.72” – 25.59” (120 – 650mm)
Distance from Spindle to Column	21.26” (540mm)

Note: Prices and model specifications are subject to change without prior notice. All prices are in U.S. Dollars.

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ATC	Swing Arm Type Random, Shortest Path, Bi-Directional
Magazine Capacity	24 Tools
Tool Change Time	2.5 Second
Maximum Tool Weight	15.4 lb (7.0kg)
Maximum Tool Length	11.81" (300mm)
Maximum Tool Diameter	3.14" (80mm)
Floor Space L x W x H	99"x98"x106" (2508mmx2408mmx2700mm)
Power Requirement	220V, 3 Phase, 60Hz, 30kVA, 75Amp
Machine Weight	11,330 lb (5150 kg)

MACHINE PRICES

VH-850 Fanuc Oi-MC Control / 8000RPM / 24 Tool Arm Type ATC	**$66,900**

OPTIONAL ACCESSORIES

Mitsubishi 64SM Control	N/C
Mitsubishi 65SM Control	$5,000
Fanuc 21i-MC Control	$10,000
Fanuc 18i-MC Control	$15,000
Spindle Speed 10,000RPM	$3,500
Spindle Speed 12000RPM	$5,500
Spindle Motor 20 Hp	$3,600
Data Server 256MB (DNC)	$2,300
Spiral Type Chip Conveyor & Cart	$1,950
Chain Type Chip Conveyor & Cart	$3,250
Spindle Oil Refrigeration Unit	$1,700
Coolant Through Spindle (Included Filter System)	$10,800
Coolant Through Tool	$1,250
Chip Flushing System	$780
Coolant Ring	$470
Water Curtain Device	$590
Oil Skimmer	$590
ZF Gearbox	$8,450
4th Axis Interface with Servo Drive & Power/Signal Cable	$4,300
4th Axis Complete with Manual Tailstock + Install (Tanshing VRNC-210)	$14,800
4th Axis Complete with Manual Tailstock + Install (Golden Sun CNC-251R)	$15,000
Transformer 25KVA	$1,200

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Twinhorn VH-850 Machine Specifications

1. HEADSTOCK

A. Belt Drive ---------- Variable Speed
B. Belt Type ---------- 920-8YU-40W for 6000 to 8000Rpm
C. Belt Type ---------- 810-5GT-35W for 12000Rpm
D. Spindle Bearings Grade ---------- P4
Angular Contact 6000 & 8000Rpm (Front) ---------- 7013C DBD P4
Angular Contact 12000Rpm (Front) ---------- 65BNC10-DB
Contact Angle ---------- 15 º
O.D ---------- 3.937” (100mm)
I.D ---------- 2.559” (65mm)
Width ---------- 0.709” (18mm)
Angular Contact 6000 & 8000Rpm (Rear) ---------- 6011
Angular Contact 12000Rpm (Rear) ---------- 55BNC10-DB
O.D ---------- 3.543” (90mm)
I.D ---------- 2.165” (55mm)
Width ---------- 0.709” (18mm)
E. Spindle Shaft Hardness ---------- HRC 60 - 62
F. Retention System ---------- Bevel Springs 88 pc
G. Holding Force ---------- 1,892 lb (860kg)
H. Counter Balance ---------- Mechanical
I. Spindle Orientation ---------- Sensor
J. Spindle Taper ---------- CT or BT40
K. Spindle Motor ---------- FANUC AC Spindle Motor ßiI 8 / 8000 / 15 Hp

2. TABLE

A. Dimensions
Length ---------- 39.37” (1000mm)
Width ---------- 17.72” (450mm)
B. Max. Table Load ---------- 990 lb (450kg)
C. Slide Ways ---------- Harden & Ground Box Ways

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3. AUTOMATIC TOOL CHANGER (ATC)

A. Type ---------- Arm Type Random, Shortest Path, Bi-Directional
B. Max. Tool Weight ---------- 15.4 lb (7kg)
C. Max. Tool Length ---------- 11.81" (300mm)
D. Tool Change Time (Tool to Tool) ---------- 2.5 Seconds
E. Magazine Capacity ---------- 24 Tools
Max. Tool Dia. (Adjacent Pot Tooled) ---------- 3.14" (80mm)
Max. Tool Dia. (Adjacent Pot Empty) ---------- 4.92" (125mm)

4. X AXIS

A. Ballscrew Diameter ---------- 1.57" (40mm)
Lead ---------- 0.393" (10mm)
Accuracy ---------- C3
B. Drive Motor ---------- Fanuc B12/3000i Motor
C. Thrust **(Continuous)** ---------- 1518 lb (690kg)
D. Rapid Rate (Linear Way) ---------- 944ipm (24000mm/min)
E. Rapid Rate (Box Way) ---------- 630ipm (16000mm/min)
F. Harden Ground Box Way (L x W x H) ---------- 62.99" x 2.48" x 1.38" (1600 x 63 x 35mm)
G. Travel ---------- 33.46" (850mm)
H. Positioning ---------- 0.0001"/12"
I. Repeatability ---------- ± 0.0001"

5. Y AXIS

A. Ballscrew Diameter ---------- 1.57" (40mm)
Lead ---------- 0.393" (10mm)
Accuracy ---------- C3
B. Drive Motor ---------- Fanuc B12/3000i Motor
C. Thrust **(Continuous)** ---------- 1518 lb (690kg)
D. Rapid Rate (Linear Way) ---------- 944ipm (24000mm/min)
E. Rapid Rate (Box Way) ---------- 630ipm (16000mm/min)
F. Harden Ground Box Way (L x W x H) ---------- 44.06" x 3.94" x 1.57" (1119 x 100 x 40mm)
G. Travel ---------- 19.69" (500mm)
H. Positioning ---------- 0.0001"/12"
I. Repeatability ---------- ± 0.0001"

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6. Z AXIS

A. Ballscrew Diameter ---------- 1.57” (40mm)
Lead ---------- 0.393” (10mm)
Accuracy ---------- C3
B. Drive Motor ---------- Fanuc B12/3000i Motor
C. Thrust **(Continuous)** ---------- 1518 lb (690kg)
D. Rapid Rate ---------- 944ipm (24000mm/min)
E. Rapid Rate ---------- 630ipm (16000mm/min)
F. Harden Ground Box Way (L x W x H) ---------- 43.85” x 2.95” x 1.57” (1114 x 75 x 40mm)
G. Travel ---------- 20.47” (520mm)
H. Positioning ---------- 0.0001”/12”
I. Repeatability ---------- ± 0.0001”

7. COOLANT SYSTEM

A. Coolant Motor Type ---------- CH2-30 / 780W-60HZ
B. Pump Capacity ---------- 33.3 L / min-0.3bar
C. Coolant Tank Volume ---------- 200L
D. Coolant Flush System (Option) ---------- CH2-30*2

8. FLOOR SPACE REQUIREMENTS

A. Length ---------- 98.74” (2580mm)
B. Width ---------- 94.80” (2480mm)
C. Height ---------- 106.30” (2700mm)

9. PACKING SIZE

A. Standard Machine ---------- 109.76” x 97.63” x 96.46” (2788 x 2480 x 2450mm)

10. WEIGHT

A. Net ---------- 11,330 lb (5150kg)

11. POWER REQUIREMENTS

220 Volt ---------- 208/220 VAC, 3 Phase / 75 Amps
440 Volt ---------- 220-440 3 Phase Transformer / 30 kVA

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Fanuc 0i-MC (Package B) Standard Features

* Work piece coordinate system (G52 – G59)
* Direct input of work piece origin offset valve measured
* Manual absolute on and off
* Optional chamfering / corner R
* Programmable data input (G10)
* Sub program call (4 folds)
* Custom macro B
* Pattern data input
* Interruption type custom macro
* Canned cycle for drilling
* Circular interpolation by R programming
* Automatic corner deceleration
* Feedrate clamp based on arc radius
* Coordinate system rotation
* Programmable mirror image
* Tape format for FS10/11
* Conversational programming with graphic function (Graphic module is required)
* <Auxiliary/Spindle speed function>
* Auxiliary function (M8-digit)
* 2nd auxiliary function (B8-digit)
* Auxiliary function lock
* High speed M/S/T interface
* Multiple command of auxiliary function
* Spindle serial output
* Spindle analog output
* Spindle override
* Analog voltage control by PMC
* 1st spindle orientation
* 1st spindle output switching function
* 2nd spindle orientation
* 2nd spindle output switching function
* Spindle synchronous control
* Rigid tapping
* <Tool function/Tool compensation>
* Tool function (T8-digit)
* Tool offset pairs +-6-digit 400
* Tool offset memory C
* Tool length compensation (G43/G44)
* Tool offset (G45~G48)
* Cutter compensation C (G41/G42)
* Tool life management
* Extended tool life management
* Tool length measurement
* Automatic tool length measurement (G37)
* <Editing operation>
* Part program storage length 320 m
* Number of registerable programs 400
* Part program editing
* Program protect
* Background editing
* Extended part program editing
* Playback
* <Setting and display>
* Status display
* Clock function
* Current position display
* Program display
* Parameter setting and display
* Self-diagnosis function
* Alarm display
* Alarm history display
* Operator message history display
* Operation history display
* Help function
* Run hour and parts count display
*Actual cutting speed display
* Display of spindle speed and T-code
* Directory display of floppy cassette
* Servo setting screen
* Spindle setting screen
* Servo waveform display (Graphic module is required)
* Display of hardware and software configuration
* Software operator's panel
* Software operator's panel general purpose switch
* Data protection key
* Multi-language display English, Japanese, German/French, Italian, Chinese, Spanish, Korean

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* Erase display
* Reader/puncher interface (2 ch)
* External tool offset
* External machine zero point shift
* External key input
* External work piece number search
* Power Mate CNC manager
* <Others>
* CNC screen display
* <Controlled axis>
* Simultaneous controllable axes; 4
* Axis name (X, Y, Z, U, V, W, A, B, C)
* Least input increment (0.001 mm, 0.001 deg, 0.001 inch)
* Incremental system 1/10
* Fine Acc & Dec control
* Inch/metric conversion
* Machine lock
* Overtravel
* Stroke limit external setting
* Mirror image
* Servo-off/mechanical handle
* Backlash compensation for each rapid traverse and cutting feed
* Stored pitch error compensation
* Unexpected disturbance torque detection function
* <Operation>
* DNC operation
* Schedule function
* Sequence number search
* Program restart
* Retraction for rigid tapping
* Dry run
* JOG feed
* Reference position return without DOG
* Reference position shift
* Manual handle feed rate
* Incremental feed
* <Interpolation functions>
* Linear interpolation type positioning
* Exact stop mode (G61)
* Linear interpolation (G01)
* <Data input/output>
* External I/O device control
* External message
* External data input
* External program input
* External program number search
* Memory card interface for maintenance
* Status output signal
* Built-in Ethernet
* Number of controlled axes; 4
* Axis control by PMC
* Simple synchronous control
* Flexible feed gear
* HRV control
* Interlock
* Emergency stop
* Stored stroke check 1
* Stored stroke check 2
* Follow-up
* Backlash compensation
* Position switch
* Control axis detach
* Automatic operation (memory)
* MDI operation
* Program number search
* Sequence number comparison and stop
* Manual intervention and return
* Buffer register
* Single block
* Manual reference position return
* Reference position setting with mechanical stopper
* Manual handle feed
* Manual handle interruption
* Jog and handle simultaneous mode
* Positioning (G00)
* Single direction positioning
* Exact stop (G09)
* Circular interpolation (G02/G03)

* Dwell (G04)
* Cylindrical interpolation
* Helical interpolation
* Threading/synchronous cutting
* Skip (G31)
* High-speed skip
* Reference position return (G28)
* Reference position return check (G27)
* 2nd reference position return
* 3rd/4th reference position return
* Normal direction control
* Index table indexing
* <Feed function>
* Rapid traverse rate; 240m/min (1 m)
* Rapid traverse override
* Feed per minute
* Feed per revolution
* Tangential speed control
* Cutting federate clamp
* Automatic acceleration/deceleration
* Rapid traverse bell shaped acceleration/deceleration
* Linear acceleration/deceleration after cutting feed interpolation
* Bell-shaped acc/dec after cutting feed interpolation
* Feedrate override
* One digit F-code feed
* Jog override
* Override cancel
* External deceleration
* Advanced preview control
* <Program input>
* Tape cede EIA; RS244/ISO840
* Label skip
* Parity check
* Control in/out
* Optional block skip
* Max. programmable dimension +- 8-digit
* Program number
* Sequence number
* Absolute/incremental command
* Decimal point programming/pocket calculator type decimal point programming
* Input unit 10 time multiply
* Plane selection (G17, G18. G19)
* Rotary axis designation
* Rotary axis roll-over
* Polar coordinate command
* Coordinate system setting (G92)
* Automatic coordinate system setting