



## CPV-1400B



## HIGH PERFORMANCE VERTICAL MACHINING CENTER

### MACHINE FEATURES

- Constructed with high quality meehanite cast iron and heat treated to relieve stress thereby assuring maximum rigidity and accuracy.
- Box ways on all 3 axes greatly upgrades stability and dampening capability.
- Automatic lubrication unit with intelligent pressure failure detection function provides reliable supply for saving cost and for environmental protection.
- Oil-coolant separation design which meets the environment protection requirements allows centralized collection for all way oil.

## STANDARD FEATURES:

- \* Fanuc Oi-MF Control
- \* AI APC Contour Control
- \* 6,000 RPM Spindle (ZF Gearbox)
- \* Powerful 25 hp (30 min) high torque spindle motor
- \* CAT50 Big Plus Spindle
- \* 1000 PSI CTS Prep Only
- \* Spindle Air Blow
- \* Rigid tapping
- \* Custom Macro B (User Definable)
- \* Twin Arm 24 Tool ATC
- \* Tool Change Time (Tool To Tool) 3.5 sec.
- \* Tool Change Time (Chip to Chip) 7.0 sec.
- \* Portable Manual pulse generator
- \* Program and data protection key switch
- \* Massive One-piece Meehanite cast iron bed
- \* Chip Auger
- \* 4<sup>th</sup> Axis Prep (no amplifier)
- \* Low friction turcite mating way surfaces
- \* Double Anchored, Pre-tensioned ballscrews
- \* 590 IPM Rapid Traverse Rate
- \* Full enclosure splash guard
- \* Flood coolant with large coolant tank
- \* Work light (2)
- \* Operator call lamp (red, yellow, green)
- \* Spindle load meter
- \* Assembly and operation tools
- \* Auto Power Off
- \* Heat exchanger for Electrical Cabinet
- \* Instruction manual, parts list, and electrical diagram
- \* Fanuc operator and maintenance manuals
- \* WARRANTY-MACHINE: ONE YEAR Parts only
- \* WARRANTY-CONTROL: TWO YEARS: Parts and Labor

## SPECIFICATIONS

### CAPACITY:

X axis travel	55.1" (1,400 MM)
Y axis travel	29.5" (750 MM)
Z axis travel	27.5" (700 MM)
Table loading area	70.8" X 31.4" (1,800 X800MM)
Allowable table load	3,968 lbs. (1,800 KG)
Table T Slots - width x slot spacing x # of slots	.8" x 5.1" x 5 (22 X 130 MM)

### SPINDLE:

Spindle nose to table top	5.9" – 33.5" (150-850 MM)
Column to spindle center	30.7" (780 MM)
Spindle taper	CAT 50 Big Plus
Spindle speed	6,000 RPM
A.C. spindle motor (30 min.)	25 HP
Spindle torque (30 min)	384 ft-lbs.
Spindle Driving Method	ZF Gearbox

**AUTOMATIC TOOL CHANGER:**

ATC Type	Twin Arm Type
Number of Tools	24
Max. Tool Weight	33 lbs. (15 KG)
Max. Tool Length	11.8" (300 MM)
Max. Tool Dia.	4.3" (110 MM)
Max tool Diameter (No Adjacent Tool)	7.8" (200 MM)
Tool Change Time TOOL – TOOL	3.5 sec
Tool Change Time CHIP – CHIP	7.0 sec
Tool Selection	Random Bi-Directional
Tool Shank	CAT 50

**MOTION:**

Rapid traverse rate, all axes	590 IPM (15 m/min)
Cutting feed rate	393 IPM (10 m/min)
Slide Type	Box Ways
Least command increment	.001mm,
Positioning accuracy	+/- .00020" (full stroke)
Repeatability	+/- .00008"

**GENERAL:**

Floor Space Required (W x D X H / INCHES)	153" X 127.8" X 118.5"
Machine Weight	25,353 lbs. (11,500 KG)
Standard Power Source Requirement - Fanuc	205-235 Volts / 3 Phase/60HZ
Power Capacity	83 AMPS (30 KVA)
Air Source Requirement	85 – 115 PSI (3/8 ID Supply Hose)

The CPV-1400B is designed for heavy cutting, long-term high accuracy, and superior surface finishes. Classic manufacturing methods and ultra rigid construction are combined with advanced technological features to provide exceptional value. **Please note that features and specifications are subject to change and should be verified at the time of order.**

**\*Geometric accuracies are guaranteed only if machine is installed on foundation meeting the minimum requirements of the machine and local building codes.**

## CONSTRUCTION



### **BED, COLUMN, AND SADDLE:**

The bed is a rigid one-piece casting with heavy ribbing to prevent deformation during heavy cutting. Fine grain Meehanite cast iron is used for its excellent dampening characteristics. Four Y-Axis boxways with extra wide outer boxways provide excellent support for the saddle, regardless of the load distribution on the table. The table is fully supported by the saddle in all positions. There is no table overhang. The rigid box type column casting is heavily ribbed to prevent twisting or distortion.

### **SPINDLE, HEADSTOCK, AND COLUMN**

The high speed, 6,000 RPM, 50 taper spindle is a true cartridge type unit supported by precision class bearings that are permanently grease lubricated. The spindle is driven by a high torque 25 HP (30 min.) A.C. motor delivering an impressive 384 ft/lbs. (521 nm). Power is transferred through a heavy-duty two-speed planetary gear driven ZF gearbox , delivering outstanding heavy cutting performance. Promotes thermal stability and eliminates vibration. An encoder is attached to the spindle to allow rigid tapping.



**Balanced 6,000 RPM Spindle with spindle oil cooler 6000 BTU for High Speed Machining.**

**Hardened and Ground class C3 precision double-nut ballscrews (Ø40 mm) are pre-tensioned to minimize backlash, provide high precision movement, and reduce heat deformation on all axes.**

**Precision scraping on both bonded Turcite-B and cast iron surfaces helps to reduce wearing out, maintaining operation accuracy. Hardened and ground slideways give an extra 40% wear resistance.**

## GUIDEWAYS

Wide Box ways are used for unsurpassed long-term rigidity and accuracy. Each guideway is induction hardened and precision ground. Turcite is bonded to the mating way surfaces and then hand scraped to ensure perfect fit and tolerances. The Turcite resin with forced way lubrication provides a low friction surface and virtually eliminates guideway wear. All guideways are fully protected from chips and damage.

## OIL JACKET SPINDLE CHILLER (STANDARD)

Machine accuracy is maintained by using a refrigeration system that circulates cooled oil around the spindle reducing the thermal effects of any heat generated.

## AUTOMATIC TOOL CHANGER

The high quality 24-position tool changer uses a fast random bi-directional twin arm with 2.5 second tool-to-tool change time, and 6 seconds chip to chip.

## BALL SCREWS AND AXIS DRIVES

Each axis is driven by a high precision double-nut ballscrew. The ballscrews are centered between the guideways. The ballscrews are supported on both ends by angular contact thrust bearings. This double anchored pretension design provides outstanding positioning repeatability with virtually no thermal growth. All axes have large diameter 40 mm ball screws that are connected directly to oversize AC servo drive motors without gears or belts, to eliminate backlash. Each axis has a flexible coupling to protect the ball screw in the event of a sudden impact. These couplings can be quickly reset.

## PORTABLE MANUAL PULSE GENERATOR

The hand held "Manual Pulse Generator" lets each axis move in increments of 0.0001", 0.0010" or 0.0100" making fixture or part alignment quick and easy. The 10-foot cord gives full access to the machine.

## PROGRAM AND DATA PROTECTION KEY SWITCH

The keyed switch enables the protection mode for both the program and offset data. Removing the key limits access to only authorized personnel. In the unprotected position the key can not be removed and all data is available for edit.

## 290 PSI (20 BAR) THROUGH-SPINDLE-COOLANT SYSTEM (Option)

A dedicated **290-PSI** positive displacement pump delivers the coolant directly to the tool tip. The immediate benefit is more aggressive feeds and speeds can be maintained throughout the cutting process. There is also no need to stop and adjust coolant nozzles increasing the in-cut time and operator safety. Protecting the spindle and the vital rotary union from contamination is a canister filter with a replaceable **10-micron** element.

## 1,000 PSI THROUGH-SPINDLE-COOLANT (OPTION)

Severe applications, holes with high length to diameter ratios or tough materials require high-pressure coolant to evacuate chips and keep the cutting edge cool. The increased coolant and chip flow improves finishes and tool life, while allowing more aggressive feeds and speeds.

## FULLY ENCLOSED GUARDING

The fully enclosed guarding, including cut-out for filter mist, is made of heavy gauge sheet metal to contain both chips, coolant and coolant mist. The large dual sliding doors open to provide unrestricted overhead access for ease of lifting heavy fixtures or work pieces.

## CHIP DISPOSAL AND COOLANT SYSTEM

High volume coolant system washes chips down into the front of sheet metal enclosure for chip auger evacuation and provides flood coolant through adjustable head mounted nozzles along with four flushing nozzles mounted directly to spindle nose.

## **Control Specifications - Fanuc OiM-F Control**

8.4" color LCD screen  
Color graphics  
Simultaneous Controlled Axis  
Least input Increment on X, Y, and Z is .001 mm  
Least command increment on X, Y, and Z is .001mm  
Inch/Metric Conversion (G20/G21)  
Interlock on All Axes  
Machine Lock on All Axes  
Emergency Stop  
Stored Stroke Check 1, 2, 3,  
Mirror Image  
Backlash Compensation  
Unexpected disturbance torque detection  
Stored pitch compensation  
Automatic Operation (Memory)  
MDI Operation  
Search Function (Sequence, Program)  
Program restart  
Dry Run  
Single Block  
Buffer Register  
Manual Handle Interrupt  
Manual Jog Feed (Rapid, Jog, Handle)  
Manual Handle Feed Rate (x1, x10, x100)  
Feed Command (F Code Feedrate Direct Command)  
Feedrate Override 0-200% (10% Unit)  
Jog feed 0-5,000 mm/min (197 IPM)  
Rapid traverse override (F0, F25%, F50%, F100%)  
Override Cancel  
Rapid Traverse Bell-Shaped Acceleration/Deceleration  
Block Skip  
Exact Stop Mode / Exact Stop (G61/G09)  
Dwell (G04)  
Helical Interpolation  
Threading/Synchronous Feed  
Manual Reference Point Return  
1<sup>st</sup> Reference Point Return G28  
Reference Point Return Check G27  
2<sup>nd</sup> Reference Point Return G30  
3<sup>rd</sup> and 4<sup>th</sup> Reference Point Return  
Program stop, optional stop, end of program M00, M01, M02, M30  
Tape Code EIA RS-244/ISO 840 (Automatic Recognition)  
Optional Block Skip (9 ea)  
Maximum Programmable Dimensions +/- 9999.9999" (+/- 8 digits)  
Absolute and Incremental Command G90/G91  
Plane Selection G17. G18. G19  
Work Coordinate System Setting (G52 – G59)  
Work Coordinate Preset  
Additional Work Coordinate System 48 pairs  
Manual Absolute "On" fixed  
Programmable Data Input G10  
Sub Program Call 4 Levels of Nesting Custom Macro #100 to #199  
Addition to Custom Macro Common Variables #500 to #999  
Circular Interpolation by radius R

## **Control Specifications - Fanuc OiM-F Control (CONT'D.)**

Canned Cycle (G73,G74, G76, G80 ~ G89)  
Optional Chamfering / Corner R  
Skip Function (G31)  
Automatic Coordinate System Setting  
Coordinate System Rotation  
Programmable Mirror Image  
Single direction positioning (G60)  
External Data Input (Tool Offset, message, machine zero point shift)  
Cylindrical interpolation  
AICC 1Artificial Intelligence Contour Control (G5.1 Q1)  
Polar Coordinate Command  
Miscellaneous Function (M3 digits)  
Miscellaneous Function Lock  
Spindle Speed Command (S5 Digits, binary output)  
Spindle Speed Override (50% ~ 120%) 10% Unit  
Rigid Tapping  
Cutter Compensation C (G40-G42)  
Tool Length Measurement  
Tool Length Compensation (G43, G44, G49)  
Tool Offset Amount (+/- 6 Digits)  
Tool Offset Pairs (400 Pairs)  
Tool Life Management  
Reader/Puncher Interface RS232C  
Memory Card input/output  
Embedded Ethernet (100 Mbps)  
Part Program Storage Length: 320M  
Registered Programs 400 ea  
Memory Lock  
Back Ground Editing  
Extended Part Program Editing (Copy, Move, Change of NC Program)  
Self Diagnosis Function  
History Display of Alarm and Operator Message  
Help Function  
Run Hour / Parts Count Display  
Actual Cutting Feedrate Display  
Spindle / Servo Setting Screen  
Multi-language display (Selection of 5 Optional Language)  
Erase CRT Screen Display (Screen Saver)  
Bi-Direction Pitch Error Compensation  
Tool Management Function  
Protection of Data at 8-Levels  
Tool Monitoring Function (HWTM – Built-on Fanuc Type)  
Fanuc Manual Guide i conversational programming  
Alpha i AC digital servo system with 1,000,000 pulse encoders  
Full MDI keyboard  
PCMCIA data card slot on left side of LCD for program input / output – up to 2GB storage  
Advanced Preview Control (Look ahead of multi-blocks – 20 blocks look ahead)  
Automatic Acceleration / deceleration with Bell Shaped rapid acc / dec  
3 axes simultaneous control std. (4 axis opt.)  
Scaling  
Custom Macro B  
High speed skip signal