CF/CX Series

[International NFX Series]

High Performance 5-axis Vertical Machining Center

YCM®

World Class CNC Machine Tool Manufacturer

A YCM Alliance Partner

Founded in 1954, the YCM company specializes in the manufacturing of High Speed Vertical Machining Centers and is recognized worldwide for technological advancements, manufacturing capabilities and superior product design. Since its founding, YCM machines are relied upon by quality conscious customers who have become accustomed to their uncompromising performance and renowned reliability. YCM products are unique and represent a differentiated approach to machine design.

YCM ALLIANCE

Make it Better, Together.

Quality, Precision, Speed, Reliability

The CF/CX Series high-performance 5-axis vertical machining centers deliver top-end quality and excellent value. Every machine tool is built and handcrafted for rigidity, thermal stability, and repeatability. The CF/CX Series produces consistent high-quality results from the first part to the last.

Rigid Design

During the design process, Finite Element Analysis (FEM) is used to ensure the best placement of mass and rib structures to provide constant stability under the intensive load of heavy-duty cutting. Direct drive servo motors deliver fast, accurate, and repeatable cutting. Each axial AC servo motor is equipped with absolute positioning encoders combined with a rigid body construction providing a combination of uncompromising precision and stiffness.

Spindle by YCM

The spindle is the critical union between the machine, cutting tool, and workpiece. YCM designs, manufactures and tests every spindle to perfection to ensure optimum performance and longevity. YCM IDD spindles have a proven history and are known as legendary for their reliability.

Designed for Versatility

The CF/CX Series is designed with versatility in mind. This platform is ideal for the demands of smaller complex parts performing 2D and 3D dimensional machining across a wide spectrum of industries including Aerospace, Automotive, Medical, Energy, and more.

Make it Better, Together

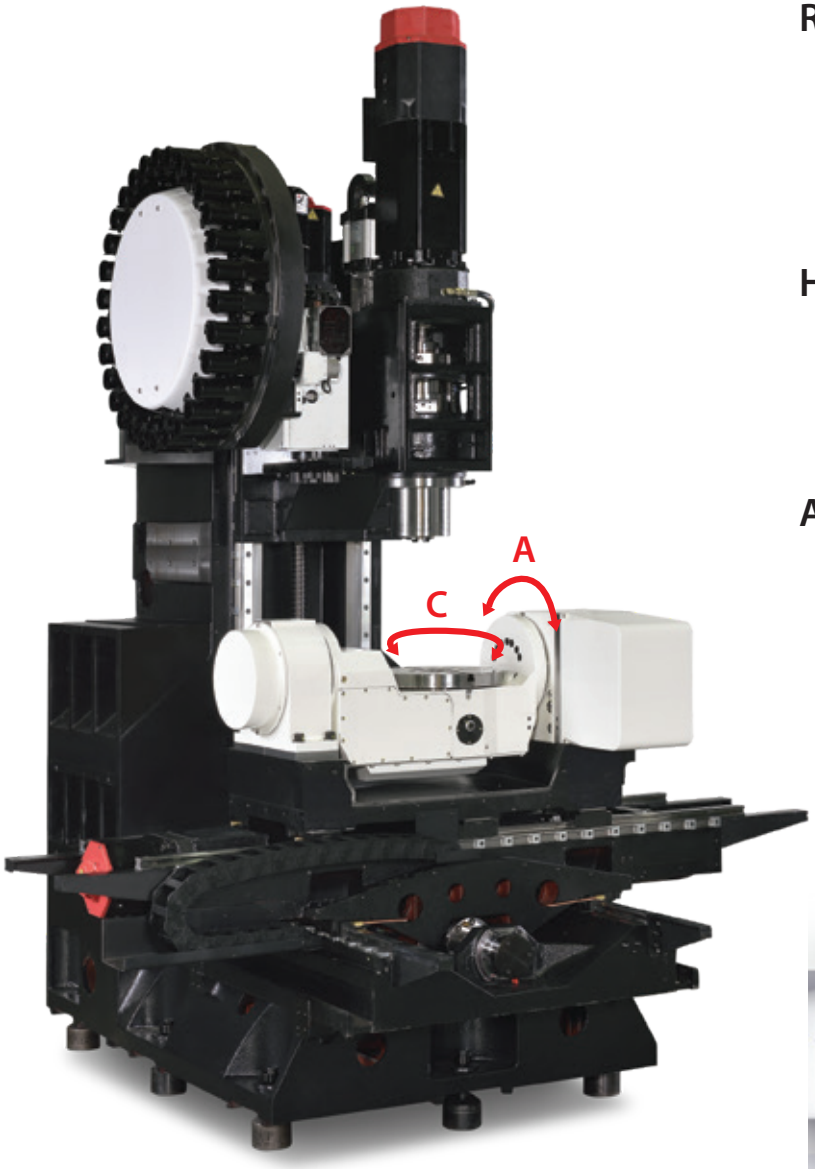
CF/CX

State of the Art Foundry

YCM Machine Tools are Built From the Ground Up

Unlike many machine tool manufacturers that purchase components and merely assemble them, YCM is a true machine tool builder. This commitment to quality begins at the YCM foundry where the heart of every machine – the base, is perfectly cast resulting in a rigid Meehanite® casting. All mating surfaces are then hand scraped by expert craftsmen. This establishes a quality base which is precise, rigid, and very stable. This build process is inherent with every YCM machine tool produced.

- Castings are poured at the YCM factory.
- Advanced Karl Fischer moisture and pH metering.
- Spectrum analysis to ensure consistent quality.
- Annealing and aging process to relieve casting stress.
- All mating surfaces are handcrafted.



MEEHANITE

FEM Finite Element Analysis

Rigid Structural Design

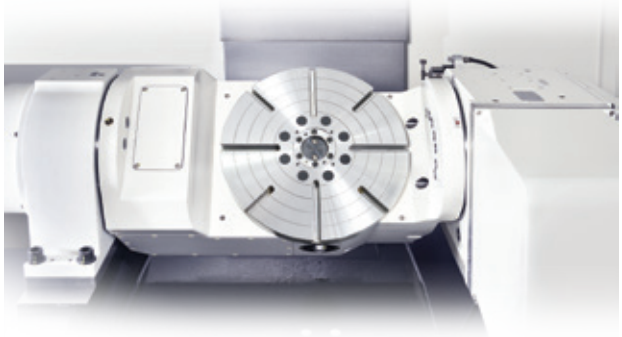
- Meehanite® components and mating surfaces are hand scraped providing optimum stiffness and vibration dampening.
- Extra wide column and base ensures greater support and stability during machining.

Highly Accurate Axial Movement

- Linear guideways enable fast and smooth axial movement.
- Pre-tensioned ball screws and direct drive motors achieve high torque and accurate positioning.

A/C-axis Rotary Table

- A-axis – 150˚ (+30˚/ -120˚)
- Table size – ø13.8" (ø350 mm)
- Max. workpiece dimension – ø15.8"x12.2" (ø400x310 mm)
- Max. workload – 440lbs (200kg)

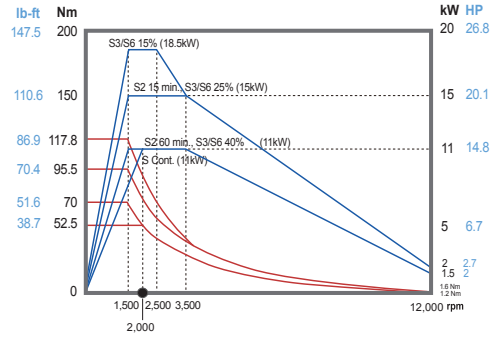


IDD PLUS Spindle

Designed and Built by YCM

- The YCM spindle is a proven design offering legendary reliability at all ranges of speed.
- Ceramic bearings and cooling system reduce the effect of spindle thermal growth and provides axial and radial rigidity.
- Low spindle vibration and less heat result in better finishes.
- Optimum machining efficiency, accuracy, and extended tool life can be achieved during heavier cutting and tapping applications.

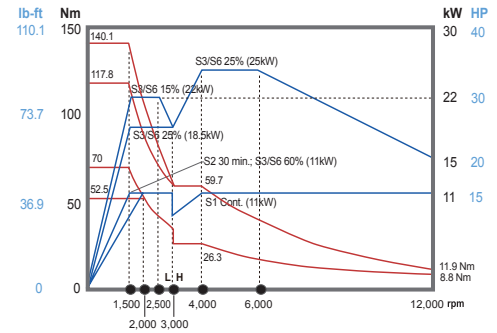
CF4E 12,000 rpm STANDARD



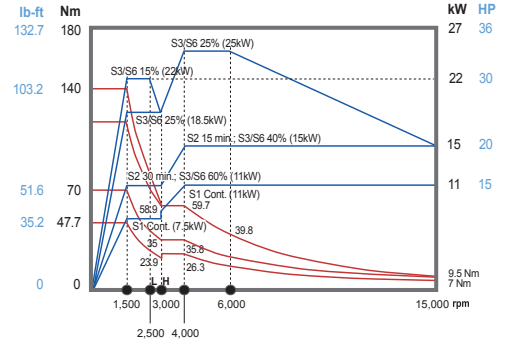
FANUC

POWER TORQUE

12,000 rpm STANDARD



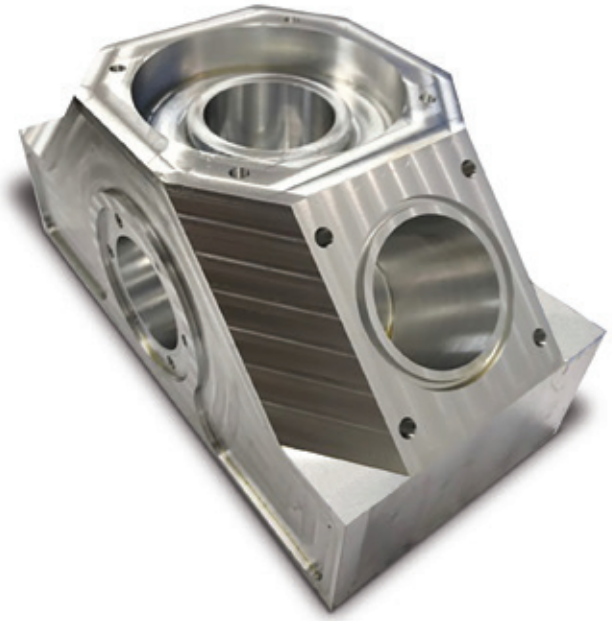
15,000 rpm OPTIONAL

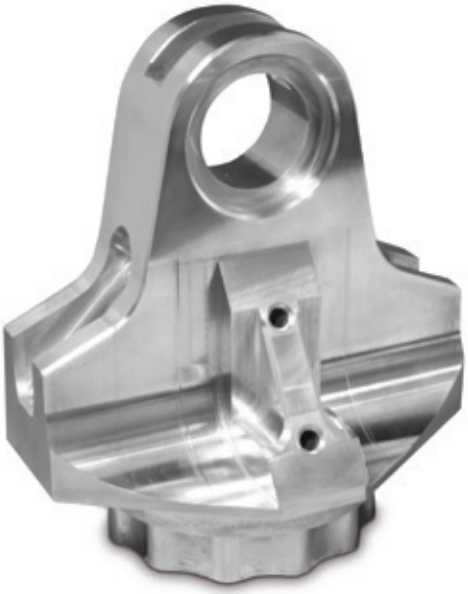


YCM ALLIANCE

Make it Better, Together.

Make Better Parts





Advantages 5-Axis Machining

- Ability to machine all surfaces apart from the bottom clamping area.
- Save time by machining parts in a single set-up and eliminating multiple part set-ups.
- Machine complex shapes by accessing angles and arcs previously requiring multiple set-ups.
- Tool remains tangent to the cutting surface removing more material and reducing cycle time.
- Reduce tool length, increase rigidity, reduce vibration, optimize machining efficiency, better surface finish, longer tool life.
- Save manufacturing costs by reducing fixture error and number of fixtures.

Differences between 3-axis and 5-axis machining

3-axis machine

Change fixture → Process 1 → Change fixture → Process 2 → Change fixture → Process 3 → Change fixture → Process 4

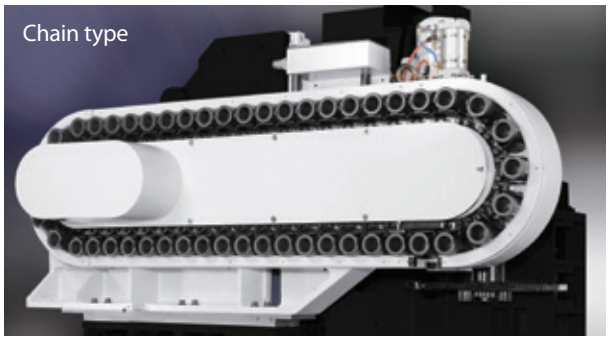
CX4 5-axis machine

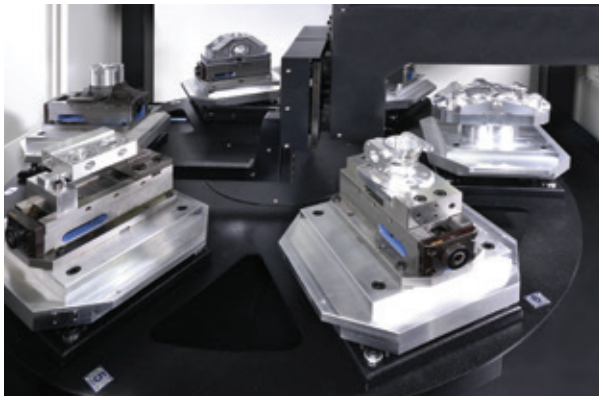
Change fixture → Process 1 → Process 2 → Process 3 → Change fixture → Process 4

- Improve Quality and Accuracy
- Shorten Process Time
- Reduce Overall Manufacturing Costs

Automatic Tool Change System

- Column mounted design minimizes vibration during tool change.
- 40 station tool magazine (standard).
- 60 / 90 / 120 station tool magazine (optional).





Automation Advantages

Multi-Pallet System

- Best for low volume production.
- Enable effective scheduling and pallet management.
- Flexible man-power deployment.
- Most profitable solution by reducing the cost per part.

CX4 (5-AXIS)

FANUC 31i-MB5

Communication Interface	Excellent Vision Quality	User-Friendly Deisgn
■ RJ45 Ethernet ■ USB ■ Compact Flash Card	15" LCD Display	Integrated Keyboard (QWERTY)

Fine Surface Setting Technology	■ AICC II+, high precision and high accuracy AI contour control. ■ Smooth tolerance control+. ■ Machining quality level adjustment function.
Fast Cycle Time Technology	■ Maximum 600 blocks of look-ahead for pre-calculating the machining program. ■ Block processing time .5 ms for achieving high-speed machining requirement. ■ Smart rigid tapping function combined with spindle capability for high-speed machining.
Program Dynamic Simulation	■ Manual Guide i features dynamic simulation of machining programs with full-screen display.
Upgraded Setting and Programming Application	■ 400 pairs of tool offset, 256 pairs of tool life management, 48 pairs of workpiece coordinate system, 1,000 registerable programs. ■ High-speed smooth TCP G43.4/G43.5. ■ 3-dimensional tool compensation. ■ 3-D rotation error compensation.

CF4 (4+1)

YCM® MXP-200FB+

FANUC 0iMF+ Platform

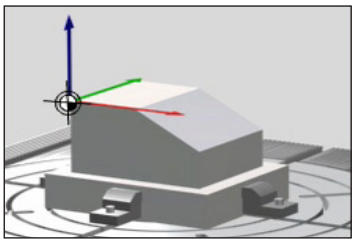
Communication Interface	Excellent Vision Quality	User-Friendly Deisgn
■ RJ45 Ethernet ■ USB ■ Compact Flash Card	10.4" LCD Display	Integrated Keyboard (QWERTY)

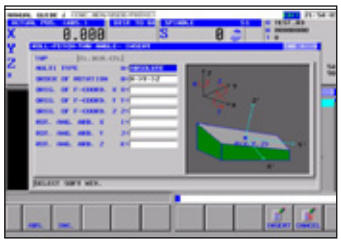
Fine Surface Finish Technology	■ AICC II+, high precision and high accuracy AI contour control. ■ Smooth tolerance control+. ■ Machining quality level adjustment function.
Fast Cycle Time Technology	■ Maximum 400 blocks of look-ahead for pre-calculating the machining program. ■ Block processing time 1ms for achieving high-speed machining requirement. ■ Smart rigid tapping function combined with spindle capability for high-speed machining.* *Note: Applicable to vertical machining centers with IDD spindle and built-in motorized spindle.
Program Dynamic Simulation	■ Manual Guide i features dynamic simulation of machining programs with full-screen display.
Upgraded Setting and Programming Application	■ 2MB program storage size. ■ Built-in memory card for easy program editing. ■ Directory filing structure with organized file management. ■ 400 pairs of tool offset, 1,000 registrable programs, 48 pairs of workpiece coordinate system, 256 pairs of tool life management.

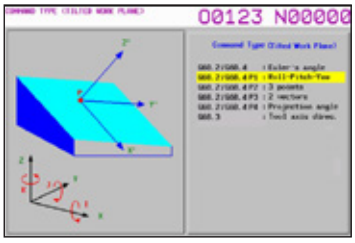
Standard Control Function

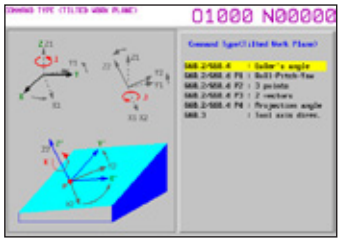
Tilted Working Plane Command (MXP-200FB+ / FANUC 31i-MB5)

- Program command enables to define X-Y-Z coordinates.
- Efficient program editing, easy machining definition.



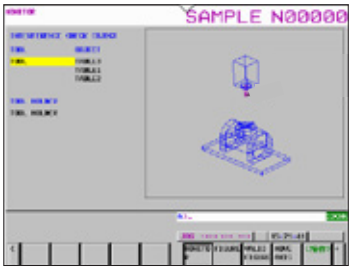


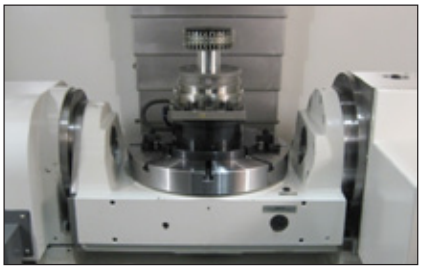




3D Interference Check (FANUC 31i-MB5)

- 3D interference check function helps to reduce the collision while 5th axis application.

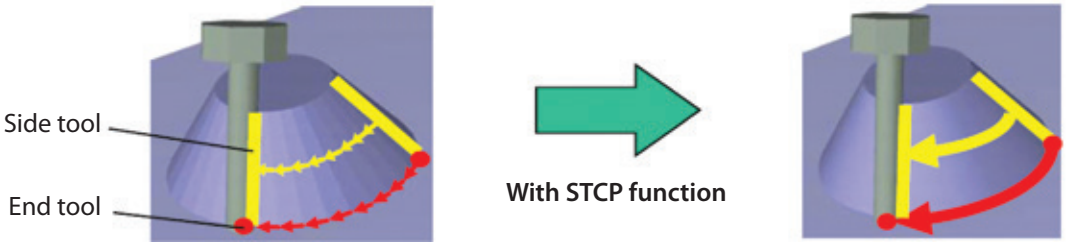




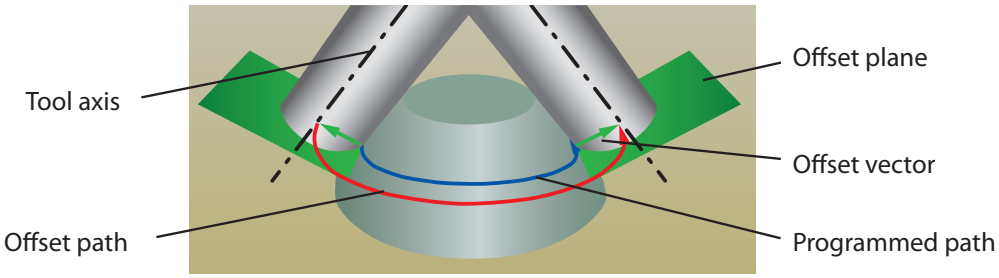
Exclusive Control Function

STCP (Smooth Tool Center Point) (FANUC 31i-MB5) High speed smooth tool center point control

- Simultaneous 5-axis machining with end-tool/side-tool.
- Smooth motion with tool end by compensating tool direction (Angle of rotary axis).
- Smooth machining with tool side by smoothing tool control.



3D Cutter Compensation (opt.)



SPINDLE	CF4/CX4
Speed	12,000 rpm / 15,000 rpm (optional)
Power	30 hp (22 kW) / 30 hp (22 kW) (optional)
Taper	Dual Contact CAT-40 / BBT-40
TRAVEL	
Axis (X / Y / Z)	25.6" (6500 mm) / 20.5" (520 mm) / 18.9" (480 mm)
Distance between spindle nose & table top	2.7" – 21.65" (70 – 550 mm)
TABLE	
Table Size	ø13.77" (ø350 mm)
No. T-slots x Size x Pitch	4 x 0.47" x 90° (4 x 12 mm x 90°)
Max. Load on Table	440 lb (200 kg)
FEEDRATE	
Rapid Feedrate X / Y / Z	1,417 / 1,417 / 1,417 ipm (36 / 36 / 36 m/mm)
Cutting Feedrate	0.04 – 787 ipm (1-20 m/min)
ACCURACY	
Positioning w/Linear Scales (X / Y / Z)	0.00027" / 0.00027" / 0.00027" (0.007 mm / 0.007 mm / 0.007 mm)
Repeatability w/Linear Scales (X / Y / Z)	0.00019" / 0.00019" / 0.00019" (0.005 mm / 0.005 mm / 0.005 mm)
A- and C-Axis Positioning Accuracy w/Rotary Scales	+/- 5 arc sec
A- and C-Axis Repeatability Accuracy w/Rotary Scales	+/- 2 arc sec
ATC	
Tool Magazine Capacity	40T (60 / 90 / 120T)
Max. Tool Weight	13.2 lb (6 kg)
Max. Tool Dimensions	ø3 x 11.02" (ø76 x 280 mm) w/o adjacent tools ø4.9" x 11.02" (ø125 x 280 mm)
GENERAL	
Pneumatic Supplier	80 psi (5.5 bar)
Power Consumption	220V, 123 amps
Machine Weight	13,670 lb (6,200 kg)
Controller	CF4: MXP-200FB+ CX4: FANUC 31i-MB5

Note: The manufacturer reserves the right to modify the design, specifications, mechanisms, etc. to improve the performance of the machine without notice. All specifications shown above are for reference.

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